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TO: Director, Division of Production
USAEC, Washington 25, D. C.

FROM: J. E. Travis, Manager, Hanford Operations
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SUBJECT: MONTHLY STATUS AND PROGRESS REPORT

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Enclosed herewith is Part I ([REDACTED] portion) of subject report for the month of February, 1959. The [REDACTED] portion, Part II, is forwarded as a separate report.

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MONTHLY STATUS AND PROGRESS REPORT

FEBRUARY 1959

PART I

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U. S. ATOMIC ENERGY COMMISSION
HANFORD OPERATIONS OFFICE

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MONTHLY STATUS AND PROGRESS REPORT

HANFORD OPERATIONS OFFICE

FEBRUARY 1959

PART I

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HIGHLIGHT STATEMENT - FEBRUARY 1959

OPERATIONS

CANNED FUEL ELEMENT PRODUCTION TOTALLED 457 TONS, INCLUDING 82 TONS OF SOLID AND 314 TONS OF I&E NORMAL-URANIUM, AND 61 TONS OF I&E 94-METAL. THE 457-TON TOTAL IS 101.1% OF FORECAST. YIELDS WERE 86% FOR SOLID NORMAL, 85% FOR I&E NORMAL, AND 82% FOR I&E 94-METAL PIECES. THE CANNING LINE TIME-OPERATED EFFICIENCY WAS 95.6%.

A RECORD IN-PILE PRODUCTION OF 124.9% OF FORECAST WAS ACHIEVED, EXCEEDING THE PREVIOUS MAXIMUM ESTABLISHED IN DECEMBER 1958 BY 5.1%. NEW MAXIMUM POWER LEVELS WERE ESTABLISHED AT ALL REACTORS. TIME-OPERATED EFFICIENCY WAS 90.4%, EXCEEDING THE PREVIOUS EIGHT-REACTOR MAXIMUM BY 3.2%. FUEL ELEMENT FAILURES DURING THE MONTH INCLUDED THREE I&E NORMAL-URANIUM AND TWO I&E 94-METAL PIECES. THIS REPRESENTS THE BEST RUPTURE EXPERIENCE SINCE JUNE 1957.

TOTAL SEPARATIONS PLANT PRODUCTION WAS 102.6% OF FORECAST, WITH 83.1% OF THE TOTAL PRODUCED BY PUREX AND 16.9% BY REDOX.

PRODUCTION OF NORMAL UO_2 TOTALLED 399 TONS, 99.9% OF FORECAST. A TOTAL OF 47.9 TONS OF ENRICHED UO_3 WAS PROCESSED, 95.8% OF FORECAST.

PLANT ACQUISITION AND CONSTRUCTION

NEW PRODUCTION REACTOR - WORK CONTINUED ON DESIGN AND DEVELOPMENT. (SEE PART I, PAGE 15.)

REACTOR CONFINEMENT - DESIGN IS 34% COMPLETE, WITH CRITERIA FOR REAR-FACE FOG SPRAYS APPROVED. (SEE PART I, PAGE 16.)

PRTR - DESIGN IS COMPLETE, AND CONSTRUCTION IS 17% COMPLETE VERSUS 14% SCHEDULED. (SEE PART I, PAGE 17.)

PLUTONIUM FABRICATION PILOT PLANT - DESIGN IS 87% COMPLETE AND CONSTRUCTION IS 39% COMPLETE VERSUS 42% SCHEDULED. (SEE PART I, PAGE 17.)

CITY HALL - DESIGN IS COMPLETE AND CONSTRUCTION IS 90% COMPLETE VERSUS 90% SCHEDULED. (SEE PART I, PAGE 17.)

COMMUNITY

DISPOSAL - 4,397 OF 4,806 HOUSES HAVE BEEN SOLD AND AN ADDITIONAL 129 GOOD FAITH DEPOSITS HAVE BEEN MADE. (SEE PART II, PAGE 3.)

MUNICIPAL - THE RICHLAND CITY MANAGER REPORTED FOR WORK ON MARCH 2. (SEE PART II, PAGE 3.)

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PLANT OPERATIONS

METAL PREPARATION

Canning - The net production of canned fuel elements was:

Normal Uranium, Solid	82 Tons
Normal Uranium, I&E	314
94 Metal, Solid	-0-
94 Metal, I&E	<u>61</u>
Total	457 Tons

The 457-Ton total production of canned fuel elements was 101.1% of forecast¹. Normal-uranium I&E production included four tons of water mixing pieces.

Yields were 86% for normal solids, 85% for normal I&E, and 82% for 94-metal I&E pieces.

The canning line time-operated efficiency was 95.6%. High efficiency resulted from improved scheduling by maintenance and processing operations. The manufacturing plant worked on a two-shift basis with four canning lines per shift.

At month end, there were on hand a 1.8-month supply of canned fuel elements and a 1.6-month supply of bare uranium cores.

Autoclave Failures - There were two autoclave failures during the month. Both were "K" size normal I&E fuel elements, and both failures involved water entry through minute pinholes in the weld bead and along braze layer defects to the uranium core. In one case, water entry was through the base end weld and along a nonwet can base. In the other case, the pinhole in the cap end weld was associated with a large braze layer void. These were the first autoclave failures since December 2, 1958, when the cap etch process was adopted to assure Al-Si wetting of the I&E cap wafer.

Scrap Shipment - One shipment consisting of 21 tons of normal-uranium metal, one ton of C-6 oxide, and 0.6 ton of 94 metal was sent to Fernald.

Dingot Fuel Elements - The 65 tons of dingot material received in January having the large and nonuniform grain size has been found to have cracks believed to have occurred during the gamma extrusion to seven-inch diameter bars. Studies are under way to determine the quantity which may be utilized on a production test basis. In the meantime, no further use of this metal is contemplated.

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PLANT OPERATIONS (CONTINUED)

METAL PREPARATION (CONTINUED)

Dingot Fuel Elements (Continued)

As soon as an infallible test has been developed to eliminate the defective cores or as soon as the defects have been eliminated by improved fabrication techniques, dingot metal will be accepted in gradually increasing quantities.

REACTOR OPERATION

During February, reactor production rates as percentages of index¹ were:

	<u>B</u>	<u>C</u>	<u>D</u>	<u>DR</u>	<u>F</u>	<u>H</u>	<u>KE</u>	<u>KW</u>	<u>Total</u>
Maximum Power Level During Month (includes all production)	104.9	105.2	106.9	108.7	108.0	110.4	105.6	103.5	106.1
Average Level While Operating (includes all production)	101.3	97.4	99.7	104.3	104.0	103.8	101.6	96.8	100.6
Time-Operated Efficiency	87.7	75.5	92.0	99.9	100.0	83.5	92.4	92.4	90.4

A record in-pile production of 124.9% of forecast² was achieved during February, exceeding the previous maximum of December, 1958, by 5.1%. This achievement resulted from higher power levels permitted by withdrawal of the ACRS limits and from significantly improved time-operated efficiency. Time-operated efficiency was 90.4%, 3.2% above the previous eight-reactor maximum and 10.4% above the February forecast.

New maximum power levels were achieved at all reactors. At the end of the month, all reactors were limited by maximum tube powers based on fuel element rupture control.

Five fuel element failures occurred during the month, representing the best rupture experience since June, 1957. Three normal-uranium I&E fuel element failures were removed from KE reactor, and two 94-metal I&E fuel element failures were removed from H reactor. This brings the cumulative number of normal uranium rupture incidents to 1,074, involving 1,093 pieces (including 21 I&E failures), and the cumulative number of 94-metal rupture incidents to 62, involving 64 pieces. The number of depleted-metal rupture incidents remains at 13, involving 13 pieces.

- 1 TS Document LXII-2211.
- 2 TS Document CLVI-605.

PLANT OPERATIONS (CONTINUED)

REACTOR OPERATION (CONTINUED)

Following is a summary of February reactor outages:

B Reactor

Date Down	Date Up	Outage Hours	Remarks
1-28	2-1	105.6	Concluded leak testing, charge-discharge, and tube replacement.
2-26	Extended into March.		Manually tripped because of a broken front-face ball valve. The elevator was accidentally moved with the poison charging machine connected to the valve. The poison and aluminum pieces flushed onto the elevator were removed and charge-discharge and miscellaneous maintenance are in progress.

C Reactor

Date Down	Date Up	Outage Hours	Remarks
2-2	2-6	103.4	Charge-discharge and maintenance.
2-6	2-7	4.7	Poison discharge.
2-20	2-23	56.8	Leak testing

D Reactor

Date Down	Date Up	Outage Hours	Remarks
2-1	2-4	53.3	Panellit trip during spline insertion. Completed charge-discharge during a period of insufficient reactivity.
2-5	2-5	0.3	Beckman trip during range calibration.
2-5	2-5	0.2	Beckman trip during investigation of circuitry.

DR Reactor

Date Down	Date Up	Outage Hours	Remarks
2-2	2-2	0.2	Panellit trip caused by a faulty jumper.

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PLANT OPERATIONS (CONTINUED)

REACTOR OPERATION (CONTINUED)

H Reactor

<u>Date Down</u>	<u>Date Up</u>	<u>Outage Hours</u>	<u>Remarks</u>
2-16	2-19	77.9	Removal of a stuck I&E 94-metal fuel element failure from tube 0482. Completed charge-discharge, replacement of four VSR's, and tube replacement.
2-24	2-26	31.7	Removal of an I&E 94-metal fuel element failure from tube 4280. Completed charge-discharge and miscellaneous maintenance.
2-26	2-26	1.1	No. 1 safety circuit trip caused by a faulty VSR limit switch.

KE Reactor

<u>Date Down</u>	<u>Date Up</u>	<u>Outage Hours</u>	<u>Remarks</u>
2-4	2-6	45.8	Removal of an I&E normal-uranium fuel element failure from tube 4379. KER loop No. 3 was discharged. Completed charge-discharge.
2-6	2-6	0.5	Panellit trip on KER loop No. 4.
2-6	2-6	4.2	Poison discharge.
2-6	2-6	0.3	Panellit trip due to high pressure on test hole 3865.
2-28	Extended into March.		Panellit trip caused by a stuck I&E normal-uranium fuel element failure in tube 2470. Also removed an I&E normal-uranium fuel element failure from tube 5148. Charge-discharge is in progress.

KW Reactor

<u>Date Down</u>	<u>Date Up</u>	<u>Outage Hours</u>	<u>Remarks</u>
2-24	2-25	32.8	Charge-discharge.
2-25	2-25	1.2	Temperature monitor trip caused by a faulty resistance temperature detector on tube 3348.
2-25	2-26	1.1	Panellit trip.
2-26	2-26	3.7	Poison discharge.

Fuel Element Failures - Following is a tabulation of February fuel element failures:

PLANT OPERATIONS (CONTINUED)

REACTOR OPERATIONS (CONTINUED)

Fuel Element Failures (Continued)

Tabulation of Fuel Element Failures							
Tube No.	Date Ruptured	Tube Power ^{1/}	Concentration (MWD/T)	Assigned (MWD)	Loss (Days)	Type Metal	Type Failure
(Normal)							
4379-KE	2-4-59	1234	653	811	0.25	I&E	Inside other.
2470-KE	2-28-59	1343	735	1040	0.32	I&E	(Still in tube section.)
5148-KE	2-28-59	709	813	1057	0.33	I&E	Inside other.
(94 Metal)							
0482-H	2-16-59	983	893	685	0.45	I&E	Side hot spot.
4280-H	2-24-59	858	801	357	0.23	I&E	Inside other.

Equipment Experience - Thirty-five process tubes were installed - 28 at H and 7 at C.

One tube leak at H and one Van Stone leak at C were corrected during the month.

Broken Front-Face Ball Valve at B Reactor - The front-face ball valve nozzle on tube 3675 was broken February 26, when the front elevator was inadvertently moved with the charging machine still connected. The tube charge of aluminum and poison pieces was flushed on to the front elevator. Personnel had left the elevator just shortly before the incident. There was no additional damage to reactor components nor any over-exposure of personnel. The reactor outage time assigned to the incident was 20.2 hours.

Poison Splines - Use of poison splines for startup and flattening control continued generally successfully at D and KW reactors. D reactor experienced a scram, following an early February outage when a spline obstructed the center hole of the upstream I&E fuel element. A spline cap attachment as used at KW is being fabricated for D and should preclude this problem in the future. Approximately 20 splines were in use for flattening control at D reactor at month's end. Equipment is being assembled to extend spline usage to KE reactor.

^{1/} At time of rupture.

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PLANT OPERATIONS (CONTINUED)

REACTOR OPERATIONS (CONTINUED)

Operational Charge-Discharge - During the month at C reactor, 51 uranium columns were discharged and recharged with the operational charge-discharge equipment with no interruption in reactor operation. Within a one-week period, 13, 11, 11, and 14 tubes were discharged and recharged on different days. Charge-discharge rates of 6 to 8 tubes per hour with one machine appear possible.

The 16-tube prototype rupture detection apparatus, which utilizes halogen filled GM tubes, is being installed in the charge-discharge pattern. This system, located in a sample room, continuously monitors the gross gamma activity of a sample drawn from the effluent of each tube, avoiding the delay in rupture identification due to discontinuous monitoring in the present system.

PLANT OPERATIONS (CONT'D.)

SEPARATIONS

TOTAL SEPARATIONS PLANT PLUTONIUM PRODUCTION WAS 102.6% OF FORECAST^{1/}, WITH 83.1% OF THE TOTAL PRODUCED BY PUREX AND 16.9% BY REDOX.

PUREX - THE PLANT OPERATED AT A RATE OF 22.5 TONS PER DAY UNTIL FEBRUARY 13 WHEN PLUTONIUM SEPARATION WAS DISCONTINUED TO PERMIT NEPTUNIUM RECOVERY. BOTH THE URANIUM AND PLUTONIUM PRODUCTS MET SPECIFICATIONS WITHOUT SPECIAL PROCESSING, AND THE SILICA-GEL FACILITY WAS IDLE DURING THE MONTH. OUT-OF-SPECIFICATION URANIUM PRODUCT FROM JANUARY WAS REWORKED ALONG WITH SUMP WASTE FROM THE UO₃ PLANT.

IODINE EMISSION INCREASED TO 2.8 CURIES PER DAY DURING THE FIRST WEEK OF THE MONTH BECAUSE OF THE DISSOLUTION OF SHORT-COOLED MATERIAL. MERCURIC NITRATE ADDITIONS WERE USED TO REDUCE IODINE EMISSION, AND THE ACTIVITY HAD RETURNED TO NORMAL BY MID-MONTH. WASTE LOSSES WERE NORMAL DURING THE MONTH.

NEPTUNIUM RECOVERY - JUMPER CHANGES WERE COMPLETED AND NEPTUNIUM RECOVERY BEGAN IN THE PUREX PLANT ON FEBRUARY 17 USING A NEW FLOWSHEET, WHICH UTILIZED ONLY THE COLUMNS OF THE FINAL PLUTONIUM CYCLE. BECAUSE OF FLOWSHEET CONTROL DIFFICULTIES, ONLY ABOUT 20% OF THE NEPTUNIUM PRESENT WAS RECOVERED, ALTHOUGH THE OPERATION CONTINUED THROUGH FEBRUARY 27. THE UNRECOVERED NEPTUNIUM REMAINS IN THE BACKCYCLED WASTE STREAM FOR RECOVERY DURING THE NEXT RUN. THE PRESENT RUN WAS CONSIDERED TO HAVE BEEN VERY SUCCESSFUL IN THAT THE EXPERIENCE GAINED WILL RESULT IN FURTHER IMPROVEMENTS. THE GREATEST ADVANTAGE OF THE NEW FLOWSHEET WILL BE A PROCESSING CYCLE OF ABOUT FOUR DAYS INSTEAD OF THE SEVEN DAYS PREVIOUSLY REQUIRED.

PRELIMINARY TESTS WERE CONDUCTED IN REDOX TO DETERMINE THE FEASIBILITY OF RECOVERING NEPTUNIUM FROM REDOX PROCESS STREAMS. NO CONCLUSIVE DATA ARE YET AVAILABLE.

REDOX - PROCESSING OF 94-METAL CONTINUED DURING FEBRUARY. PROCESSING CAPABILITIES WERE RESTRICTED BY THE UNAVAILABILITY OF A REPLACEMENT FOR THE C-2 DISSOLVER.

OPERATIONS WERE RESUMED ON FEBRUARY 10, FOLLOWING A SIX-DAY OUTAGE FOR CRANE REPAIRS AND REPLACEMENT OF THE H-2 CENTRIFUGE. DISSOLVING OPERATIONS WERE CONDUCTED ON A SEVEN-DAY WEEK BASIS FOR THE REMAINDER OF THE MONTH, WHILE THE EXTRACTION COLUMNS OPERATED PERIODICALLY AS FEED WAS AVAILABLE.

AN ACID PRECYCLE FLOWSHEET WAS TESTED DURING THE MONTH TO EVALUATE EFFECTS ON NEPTUNIUM DISTRIBUTION AND GAMMA ACTIVITY. THE GAMMA ACTIVITY IN BOTH PRODUCT STREAMS WAS SIGNIFICANTLY INCREASED AS A RESULT OF THE TEST.

BOTH PRODUCTS WERE WITHIN SHIPPING SPECIFICATIONS THROUGHOUT THE MONTH WITH THE EXCEPTION OF TWO BATCHES OF PLUTONIUM, WHICH REQUIRED REPROCESSING.

HIGHER THAN NORMAL WASTE LOSSES OCCURRED DURING THE MONTH AS A RESULT OF SHORT OPERATING PERIODS, THE NEPTUNIUM TEST, AND EQUIPMENT FLUSHES. AVERAGE LOSSES WERE 0.36% OF THE TOTAL URANIUM THROUGHPUT AND 0.55% OF THE TOTAL PLUTONIUM THROUGHPUT. FIVE BATCHES OF WASTE MATERIAL WERE REPROCESSED.

TOTAL IODINE EMISSION FOR THE MONTH WAS 0.09 CURIES.

UO₃ - PLANT PRODUCTION OF NORMAL UO₃ TOTALLED 399.4 TONS, 99.9% OF FORECAST. A TOTAL OF 47.9 TONS OF ENRICHED UO₃ WAS PROCESSED, 95.8% OF FORECAST. ALL SHIPPING SCHEDULES WERE MET.

PROCESSING OF ENRICHED UNH WAS BEGUN ON FEBRUARY 12, FOLLOWING A THREE-DAY OUTAGE FOR FINAL EQUIPMENT MODIFICATIONS TO THE POWDER HANDLING SYSTEM AND CONVERSION OF THE TD-4 TOWER TO A SCRUBBER FOR THE CONCENTRATOR CONDENSATE STREAMS. A TWO-DAY OUTAGE WAS NECESSARY LATER IN THE MONTH FOR REPLACEMENT OF THE ENRICHED UNH FEED PUMP AND FOR MOTOR BRUSH INSPECTION.

A TOTAL OF 218 TONS OF NITRIC ACID WAS RECOVERED DURING THE MONTH.

^{1/} TS DOCUMENT CLVI-605.

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REACTOR OPERATION FY-59

SUM OF MAXIMUM POWER LEVELS (UPPER LINE)

SUM OF AVERAGE POWER LEVELS WHILE OPERATING (LOWER LINE)

AVERAGE TIME OPERATED EFFICIENCY

* LXII-2211

PRODUCTION FY-59

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PLANT OPERATIONS (CONT'D.)

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RESEARCH AND DEVELOPMENT

GRAPHITE TESTING - DEVELOPMENT, TESTING, AND CONSTRUCTION OF COMPONENTS FOR THE INSTRUMENTED MTR L-48 SHIM ROD ARE PROGRESSING RAPIDLY ON A PRIORITY BASIS. FABRICATION OF A PROTOTYPE TEST HEAD CONTAINING THE MAGNET CONNECTING MECHANISM HAS BEEN COMPLETED AND WILL BE TESTED DURING THE NEXT MTR SHUTDOWN. LABORATORY CONSTRUCTION OF THE EXPERIMENTAL SECTION IS PROGRESSING. A TECHNIQUE FOR EVACUATION, LEAK TESTING, AND SEALING IS UNDER DEVELOPMENT. THE TEST THIMBLE FOR THE FIRST HIGH TEMPERATURE GRAPHITE EXPERIMENT FOR THE ETR HAS BEEN COMPLETED. PLANS CALL FOR CHARGING THIS THIMBLE THE FIRST WEEK IN MARCH.

LENGTH CONTRACTION OF GRAPHITE SAMPLES SUBJECTED TO NEUTRON BOMBARDMENT AT TEMPERATURES GREATER THAN 350°C HAS BEEN ATTRIBUTED TO A CLOSER PACKING OF THE CRYSTALLITES WITHIN THE COKE PARTICLES OR OF THE COKE PARTICLES RELATIVE TO ONE ANOTHER BY RADIATION-INDUCED STRESS RELIEF. THESE CHANGES IN STRUCTURE WOULD NOT BE EXPECTED TO UNDERGO THERMAL ANNEALING AS DOES THE RADIATION DAMAGE IN WHICH ATOMS ARE DISPLACED WITHIN THE CRYSTAL LATTICE STRUCTURE. TO TEST THIS POSSIBLE MECHANISM, GRAPHITE SAMPLES THAT HAVE CONTRACTED DURING HIGH TEMPERATURE IRRADIATION ARE BEING ANNEALED AT INTERVALS OF 500°C TO A FINAL TEMPERATURE OF 2600°C. PITCH COKE EXPERIMENTAL GRAPHITES FABRICATED BY BATTELLE MEMORIAL INSTITUTE AND IRRADIATED TO 742 MD/AT AT 450°C CONTRACTED IN LENGTH FROM 0.02% TO 0.05%. AFTER THE INITIAL ANNEALING AT 600°C FOR SIX HOURS, NO CHANGE OCCURRED. HIGHER TEMPERATURE ANNEALINGS ARE IN PROGRESS.

ZIRCALOY-2 TUBES FOR PRTR - A SHIPMENT OF 491 ZIRCALOY-2 TUBES AND 15,000 FEET OF ZIRCALOY-2 WIRE FOR FABRICATING THE AL-Pu ALLOY CLUSTERS FOR THE PRTR ARRIVED THIS MONTH. OF THE 491 TUBES, ABOUT 100 HAVE BEEN INSPECTED BY RADIOGRAPHIC TESTING OPERATION. SEVEN TUBES WERE REJECTED FOR INTERNAL DISCONTINUITIES AS DETERMINED BY DYE PENETRANT. ANOTHER SHIPMENT OF 360 TUBES IS IN TRANSIT. THE REMAINDER OF THE ZIRCALOY-2 TUBING ORDER HAS BEEN FABRICATED AND WILL BE SHIPPED PRESENTLY.

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PLANT ACQUISITION AND CONSTRUCTION

PROJECT AND DESIGN STUDIES

NEW PRODUCTION REACTOR:

FUEL ELEMENTS - ZIRCALOY-CLAD TUBULAR ELEMENTS RECEIVED FROM NUCLEAR METALS ARE WELL WITHIN TOLERANCES, AND TUBE CLADDING IS GOOD. THERE IS STILL A PROBLEM OF END CLOSURES TO BE RESOLVED. A METHOD OF SUPPORTING TUBES WITHIN TUBES IS ALSO BEING STUDIED.

ZIRCONIUM PROCESS TUBES - FIVE PROPOSALS HAVE BEEN RECEIVED FROM NPR PILOT TUBE ORDERS AND ARE BEING REVIEWED. FOUR OF THE FIVE BIDS PROPOSE FINAL DIMENSIONING BY TUBE REDUCING IN EACH CASE USING TUBE REDUCING CORPORATION AS A SUBCONTRACTOR. THE FIFTH PROPOSAL BY CHASE BRASS & COPPER COMPANY PROPOSES COLD DRAWING FOR FINAL DIMENSIONING.

GRAPHITE - PLANS CALL FOR THE VENDOR TO ROUGH MACHINE THE EXTERIOR OF BLOCKS AND TO BORE THE TUBE BLOCKS. THIS WILL REDUCE FREIGHT COSTS. FINISH MACHINING IS TO BE ACCOMPLISHED BY THE CPFF CONSTRUCTION CONTRACTOR.

FOUR SAMPLES OF REACTOR GRADE GRAPHITE IRRADIATED IN THE L-42 POSITION OF THE MTR AT 750°, 1050°, AND 975°F WERE DISCHARGED. DATA ON THESE SAMPLES WILL EXTEND KNOWLEDGE OF CONTRACTION RATE. THE NEXT TEST WILL BE ON OTHER TYPES OF REACTOR GRADE SAMPLES. SAMPLES FROM THE SAME BAR OF ONE GRADE ARE TO BE IRRADIATED IN THE ETR AND TEST HOLES OF HANFORD REACTORS TO ESTABLISH A CORRELATION THAT WILL PERMIT EVALUATION OF ETR IRRADIATIONS OF SAMPLES OF NEW NPR CANDIDATE GRAPHITES.

THERMAL SHIELD DEVELOPMENT - CAST IRON THERMAL SHIELDS USED ON PREVIOUS REACTORS ARE NOT CONSIDERED APPLICABLE TO THE NPR BECAUSE THE COOLING TUBES WERE IMBEDDED IN LEAD, WHICH MIGHT MELT OR CREEP AT THE HIGHER TEMPERATURES TO BE USED. ONE ALTERNATE BEING CONSIDERED IS A STAINLESS STEEL TUBE CAST INTO GREY IRON; OTHERS ARE FILLET WELDING OF A ROUND PIPE TO THE BLOCK AND THE USE OF EMBEDDING MATERIALS WITH A HIGHER MELTING POINT THAN LEAD.

PRIMARY LOOP INSTRUMENTATION SYSTEM - REACTOR PORTION - THE REACTOR PORTION OF THE PRIMARY LOOP INSTRUMENTATION WILL PERFORM SIX BASIC FUNCTIONS:

1. TUBE FLOW MONITORING: EACH TUBE WILL BE MONITORED. LOW AND HIGH CONDITIONS WILL INITIATE A REACTOR SCRAM SIGNAL.
2. TUBE OUTLET TEMPERATURE MONITORING: TEMPERATURE AT EACH TUBE WILL BE MEASURED. TEMPERATURES ON A ZONE BASIS WILL BE CONTINUOUSLY MONITORED, AND HIGH TEMPERATURES WILL ACTIVATE A SCRAM SIGNAL.
3. REACTOR BULK COOLANT TEMPERATURE MONITORING: INLET AND OUTLET RISER BULK TEMPERATURES WILL BE MONITORED, AND TRIP POINTS SET ON THE EXIT BULK TEMPERATURE MONITORS TO PREVENT BOILING.
4. REACTOR BULK FLOW MEASUREMENT: FLOW METERS WILL BE USED TO RECORD FLOW THROUGH EACH RISER SYSTEM.
5. REACTOR POWER LEVEL CALCULATOR: THE CALCULATOR WILL DETERMINE TOTAL THERMAL OUTPUT FROM THE FLOW DATA PROVIDED BY THE RISER FLOW METERS AND FROM THE TEMPERATURE DIFFERENCE ACROSS EACH OF THE RISER SYSTEMS.
6. PRIMARY COOLANT PRESSURE MONITORING: REACTOR TRIP SIGNALS WILL PROVIDE AUTOMATIC RELIEF OF PRESSURES IN A LOOP THAT EXCEEDS SPECIFIED LIMITS.

PRIMARY LOOP INSTRUMENTATION - HEAT CONVERSION SYSTEM - THIS SYSTEM WILL CONSIST OF THREE PARTS:

1. COOLANT TEMPERATURES ENTERING AND LEAVING EACH EVAPORATOR WILL BE MONITORED TO INDICATE MALFUNCTIONING OF THE HEAT REMOVAL SYSTEM AND TO AUTOMATICALLY CONTROL EXCESSIVE COOLANT TEMPERATURES IN THE REACTOR.

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PLANT ACQUISITION AND CONSTRUCTION (CONT'D.)

PROJECT AND DESIGN STUDIES (CONT'D.)

NEW PRODUCTION REACTOR (CONT'D.)

PRIMARY LOOP INSTRUMENTATION - HEAT CONVERSION SYSTEM (CONT'D.)

2. AUTOMATIC FLOW CONTROL WILL BE PROVIDED TO MAKE CONTINUOUS ADJUSTMENTS FOR PRESSURE AND TEMPERATURE CHANGES.
3. PRESSURE CONTROL WILL BE PROVIDED TO PREVENT BOILING IN ANY TUBE; PROVIDE A SURGE VOLUME FOR EXPANSION AND CONTRACTION OF THE PRIMARY COOLANT; TO KEEP PRESSURE SURGES IN THE SYSTEM TO A MINIMUM; AND GIVE A LIQUID LEVEL CONTROL SIGNAL FOR ADDING OR REMOVING COOLANT FROM THE SYSTEM.

EQUIPMENT DEVELOPMENT - INSTALLATION OF THE PROTOTYPE CONCEPT EVALUATION LOOP IN THE 189-D BUILDING IS 85% COMPLETE. COMPLETION IS SCHEDULED IN MARCH.

IN TUBE-TO-NOZZLE JOINT DEVELOPMENT, THE JOINT THAT WAS SUCCESSFULLY THERMAL CYCLED 3,221 TIMES WAS REMOVED AND EXAMINED. A SLIGHT LEAK HAD OCCURRED AT BOTH ENDS DURING THERMAL CYCLING, WITH A GREATER AMOUNT AT THE BANANA SEAL. A LARGE AMOUNT OF FOREIGN MATERIAL, APPARENTLY IRON OXIDE, WAS FOUND DEPOSITED IN EACH SEALING CAVITY. TWO TEST SECTIONS IN WHICH A ZIRCONIUM TUBE HAS BEEN ROLLED INTO A STAINLESS STEEL BLOCK, AS IN BOILER CONSTRUCTION, HAVE BEEN RECEIVED FROM THE CANADIAN GENERAL ELECTRIC COMPANY FOR TESTING.

REACTOR CONFINEMENT - DESIGN IS 34% COMPLETE WITH CRITERIA FOR THE REAR-FACE FOG SPRAYS APPROVED.

ADVANCE PROCUREMENT IS UNDER WAY FOR THE REAR-FACE SPRAY MATERIALS, WITH ALMOST ALL STAINLESS STEEL PIPING BEING OBTAINED FROM EXCESS AT AEC INSTALLATIONS.

THE PROGRAM FOR CONDUCTING FUEL MELTING AND BURNING TESTS AT ORNL IS PROGRESSING. UNIRRADIATED SAMPLES WERE GIVEN TRACE IRRADIATION AND TESTED TO PROVIDE PRELIMINARY DATA EARLY IN MARCH. IRRADIATED SAMPLES ARE TO BE TESTED IN APRIL SO THAT THE FINAL REPORT WILL BE AVAILABLE BY MAY 1. DURING THE TEST, IT IS PLANNED TO SUBSTITUTE IRRADIATED PILE GRAPHITE FOR THE FILTER MEDIA TO DETERMINE WHAT EFFECT THE REACTOR GRAPHITE STACK WILL HAVE TOWARDS RETAINING FISSION PRODUCTS DURING A MELT-DOWN.

CONCURRENT WITH DETAILED DESIGN, A STUDY IS PROGRESSING ON BUILDING CLOSURE. TESTS ARE TO BE RUN ON EXISTING CONCRETE BLOCK BUILDINGS TO DETERMINE LATERAL WALL LOADINGS PERMISSIBLE ON THE CONCRETE BLOCK PANELS ON REACTOR BUILDINGS.

RECIRCULATING GAS-COOLED TEST LOOP - WORK IS BEING RESUMED WITH THE SHIPMENT OF THE COMPRESSORS FROM THE VENDOR. THE SCOPE HAS BEEN CHANGED TO PERMIT STARTUP WITH HELIUM INSTEAD OF NITROGEN.

PUMP TEST FACILITY - DESIGN IS 80% COMPLETE, WITH THE BID PACKAGE TO BE SUBMITTED IN THE NEAR FUTURE. ORDERS ARE BEING PLACED FOR EQUIPMENT FOR THE TEST STAND.

ADDITIONAL PLUTONIUM FABRICATION FACILITIES, 234-5 BUILDING - DESIGN IS NOW 6% COMPLETE. TWO OF THREE SCOPE DOCUMENTS HAVE BEEN COMPLETED.

PROCESSING NONPRODUCTION POWER FUELS - THE PROPOSAL COVERING TOTAL DESIGN PLUS CONSTRUCTION OF RECEIVING AND STORAGE FACILITIES HAS BEEN SUBMITTED FOR WASHINGTON APPROVAL. THIRTY MONTHS CONSTRUCTION TIME IS CONTEMPLATED FOR THIS PORTION OF THE FACILITY.

ADDITIONAL STEAM GENERATING FACILITY - THE NEWLY INSTALLED BOILER HAS BEEN TURNED OVER TO OPERATING PERSONNEL AND IS PRODUCING STEAM.

306 BUILDING PILOT PLANT MODIFICATIONS - A PURCHASE ORDER HAS BEEN PLACED FOR THE 2750-TON EXTRUSION PRESS. PROJECT WORK HAS BEEN DELAYED DUE TO NECESSITY FOR REBIDDING PRESS.

HANFORD EQUIPMENT IN THE ETR - OVER-ALL PROGRESS ON CURRENT SCOPE IS 98% COMPLETE. INSERTION OF THE 6" X 9" HOLE IN-PILE FACILITY IS AWAITING WASHINGTON APPROVAL OF THE HAZARDS REPORT. A REVISION TO THE PROJECT PROPOSAL IS BEING PREPARED REQUESTING AN INCREASE IN SCOPE FOR LOOP MODIFICATIONS TO RUN TESTS ON NEW PRODUCTION REACTOR FUEL ELEMENTS.

PLANT ACQUISITION AND CONSTRUCTION (Cont'd.)

PLANT CONSTRUCTION

MAJOR CONSTRUCTION - THE STATUS OF MAJOR CONSTRUCTION IS INDICATED BELOW:

PROJECT	PROJECT PROPOSAL No.	MAJOR PROJECTS				DESIGN % ACTUAL COMPL.	PRESENT WORKING ESTIMATE (THOUSANDS)
		CONSTRUCTION					
		ACTUAL STARTING DATE	SCHED. COMPL. DATE	COMPLETION			
				% SCHED.	% ACTUAL		
CITY HALL*	AEC-157	3-24-58	5- 1-59	90	90	100	\$ 635
PRTR	AEC-167	3- 6-58	8-30-60	14	17	100	15,000
PUREX WASTE FACILITY	CA-719	8-27-58	11-30-59	84	78	100	1,448
RMC BUTTON LINE 234-5	CG-734	2-18-58	1-31-60	53	47	100	1,480
RMC FAB. LINE 234-5	CG-745	2-18-58	7- 1-59	87	85	100	1,050
PLUTONIUM FABRICATION PILOT PLANT	CA-747	3- 6-58	11- 1-60	42	39	87	4,000
HIGH LEVEL RADIO- CHEMISTRY FAC.	CA-749	8-14-58	6-30-59	37	35	100	960

PLUTONIUM RECYCLE TEST REACTOR:

PHASE I - (CONTAINMENT VESSEL, STORAGE BASIN, ION EXCHANGE VAULT AND EXCAVATION FOR SERVICE BUILDING) - SHELL STEEL WORK TO THE 35' ELEVATION IS COMPLETE EXCEPT FOR REPAIR WELDING, X-RAY AND SNIFFER TESTING.

INSTALLATION OF DOME PLATES, WHICH BEGIN AT +35' ELEVATION, WAS STARTED ON FEBRUARY 24, 1959. THE LARGE ACCESS AIR LOCK WAS PLACED IN ITS FINAL POSITION.

PHASE II - (SERVICE BUILDING & INSTALLATION OF PROCESS AND OUTSIDE EQUIPMENT). - INSTALLATION OF STEAM AND WATER LINES FROM THE 300 AREA IS COMPLETE.

PHASE II-A - (RIVER STRUCTURE AND CONDENSER FACILITY) - THE 36" CORRUGATED SEWER PIPE LINE HAS BEEN ACCEPTED.

ADDITIONAL FACILITIES FOR PUREX TANK FARM VAPOR WASTES - THE PLACING OF CONCRETE FOR THE CONDENSER BUILDING AND THE PUMP PIT HAS BEEN COMPLETED.

* CITY HALL IS INCLUDED IN THE DISPOSAL PROGRAM.

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MAR 12 1955

TO: Director, Division of Production
USAEC, Washington 25, D. C.

FROM: J. E. Travis, Manager, Hanford Operations
Office, USAEC, Richland, Washington

SUBJECT: MONTHLY STATUS AND PROGRESS REPORT

SYMBOL: B:HRE

Enclosed herewith is Part II ("Official Use Only" portion)
of subject report for the month of February, 1959.
The "Secret" portion, Part I, is forwarded as a separate
report.

Enclosure:
Monthly Status and Progress Report, Part II

DISTRIBUTION:

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MONTHLY STATUS AND PROGRESS REPORT

FEBRUARY 1959

PART II

U. S. ATOMIC ENERGY COMMISSION
HANFORD OPERATIONS OFFICE

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MONTHLY STATUS AND PROGRESS REPORT
HANFORD OPERATIONS OFFICE

FEBRUARY 1959

PART II

C O N T E N T S

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COMMUNITY OPERATIONS

FEBRUARY 1 FEBRUARY 28

GOVERNMENT HOUSING:

TOTAL HOUSES AVAILABLE FOR OCCUPANCY	700	598*
1. OCCUPIED	524	426
2. UNOCCUPIED	176	172
 TOTAL APARTMENTS AVAILABLE FOR OCCUPANCY	 134	 134
1. OCCUPIED	134	133
2. UNOCCUPIED	0	1

THREE DORMITORIES ARE NOW IN OPERATION BY A COMMERCIAL OPERATOR.

PRIVATE HOUSING UNITS (WHERRY ACT):

	<u>COLUMBIA HEIGHTS</u>		<u>SPOKANE HOUSING</u>		
	<u>HOUSES</u>	<u>APTS.</u>	<u>HOUSES</u>	<u>APTS.</u>	<u>TOTAL UNITS</u>
TOTAL UNITS	280	220	400	100	1,000
RENTED	45	51	378	90	564
VACANT	235	169	22	10	436

DISPOSAL - THE REPORT OF SALES AT THE END OF FEBRUARY IS AS FOLLOWS:

<u>TYPE</u>	<u>NUMBER OFFERED</u>	<u>NUMBER SOLD TO 2-28-59</u>	<u>ADDITIONAL GOOD FAITH DEPOSITS</u>
SINGLE	3,788	3,568	103
DUPLEX	<u>1,018</u>	<u>829</u>	<u>26</u>
TOTAL	4,806	4,397	129
<u>COMMERCIALS</u>	26	3	3

A TOTAL OF 96 VACANT LOTS HAVE BEEN SOLD.

CERTIFICATIONS ON ALL SINGLE UNIT HOUSES (226) TO BE SOLD UNDER RESIDENT'S PRIORITY OFFERING WERE APPROVED.

THE APPLICATION PERIOD FOR SHUT-OUT JUNIOR TENANTS EXPIRED ON FEBRUARY 20, 1959. OF THE 630 ELIGIBLES, ONLY 272 APPLICATIONS WERE RECEIVED FOR THE 164 AVAILABLE DUPLEX UNITS.

FEBRUARY 25, 1959 WAS THE LAST DAY FOR APPLICATION FOR PRIORITY FOR TWO RESIDENTIAL LOTS LOCATED ON THE ABANDONED IRRIGATION CANAL. ONLY TWO APPLICATIONS WERE RECEIVED.

JOE SMITH OF HHFA, WASHINGTON, ARRIVED ON THE PROJECT TO ARRANGE FOR SALE OF 1611 MORTGAGES IN NINE PACKAGES OF ABOUT ONE MILLION DOLLARS EACH. HE INFORMED THE CHAMBER OF COMMERCE THAT THEIR GOAL IS TO OFFER EVERY PROPERTY IN RICHLAND BY JUNE 30 OF THIS YEAR.

MUNICIPAL - CITY MANAGER MURREY FULLER REPORTED TO WORK ON MARCH 2, 1959.

COMMERCIAL - REPRESENTATIVES OF THE COMMISSION AND GENERAL ELECTRIC COMPANY MET WITH REPRESENTATIVES AND TRUSTEES OF THE AMERICAN LEGION BUILDING AND JACK HOUSTON, OF REC-HALL BOWLING ALLEYS, WHO WANTS TO BUY THE LEGION BUILDING. IT WAS AGREED THAT HOO WOULD REQUEST A RENTAL APPRAISAL ON THE LAND AND WOULD REQUEST AUTHORITY FROM THE DIVISION OF PRODUCTION TO NEGOTIATE A LEASE IF MR. HOUSTON BUYS THE BUILDING.

* A TOTAL OF 3,568 SINGLE HOUSES AND 829 DUPLEXES (5,226 UNITS) HAVE BEEN SOLD.

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COMMUNITY OPERATIONS (Cont'd.)

SCHOOLS - SCHOOL ENROLLMENT HAS REMAINED HIGH THIS YEAR. ON FEBRUARY 15, 1959, ENROLLMENT WAS APPROXIMATELY ~~5,800~~ 4,200 ELEMENTARY, 1,400 JUNIOR HIGH, AND 1,200 SENIOR HIGH. ATTENDANCE HAS BEEN UNUSUALLY HIGH THIS YEAR IN ALL GRADES.

REAL ESTATE --- REPRESENTATIVES OF THE COMMISSION MET WITH THE CHAMBER OF COMMERCE ROADS AND BRIDGES COMMITTEE TO DISCUSS A POSSIBLE STATE HIGHWAY RUNNING FROM HORN RAPIDS TO VERNITA, THROUGH THE PROJECT AREA. THE COMMITTEE PLANS A TRIP TO OLYMPIA TO DISCUSS THE MATTER WITH THE GOVERNOR.

OTHER CONSTRUCTION

MISCELLANEOUS:

CONTRACTS - THERE WERE THREE BID OPENINGS DURING THE MONTH OF FEBRUARY. THE RESULTS OF THESE OPENINGS ARE LISTED BELOW:

<u>PROJECT No.</u>	<u>CONTRACT No.</u>	<u>No. BIDS RECEIVED</u>	<u>GOVERNMENT ESTIMATE</u>	<u>HIGH BID</u>	<u>LOW BID</u>	<u>APPARENT LOW BIDDER</u>
CAC-747	1425	5	\$246,000	\$515,000	\$278,800	GEORGE A. GRANT
5462- 62202	1439	3	9,500	8,500	5,330	R. J. BRITTON
IRC-241	1435	5	13,300	18,373	13,515	F. H. LOHSE

PROCUREMENT - SIXTEEN AWARDS MADE BY GENERAL ELECTRIC COMPANY WERE APPROVED IN THE AMOUNT OF \$1,495,946 FOR THE MONTH OF FEBRUARY. THERE WERE 284 PURCHASE ORDERS, IN THE TOTAL AMOUNT OF \$158,691.57, PLACED BY THE ATOMIC ENERGY COMMISSION DURING FEBRUARY.

PERSONNEL (ON-SITE)

	<u>FEBRUARY 1</u>	<u>FEBRUARY 28</u>
ATOMIC ENERGY COMMISSION	275	276
GENERAL ELECTRIC COMPANY	7,970	7,959
TOTAL CONSTRUCTION PERSONNEL	<u>736</u>	<u>666</u>
TOTAL PROJECT PERSONNEL	8,981	8,901

KEY PERSONNEL CHANGES - FRANCIS H. BACON, DEPUTY DIRECTOR, ORGANIZATION & PERSONNEL DIVISION, RETIRED - EFFECTIVE FEBRUARY 28, 1959.

END

**DATE
FILMED
9/17/92**