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

SUBJECT: MONTHLY STATUS AND PROGRESS REPORT

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

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MONTHLY STATUS AND PROGRESS REPORT

JANUARY 1959

PART I

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HANFORD OPERATIONS OFFICE

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DOCUMENT No. 71254 *LLP*

MONTHLY STATUS AND PROGRESS REPORT

HANFORD OPERATIONS OFFICE

JANUARY 1958

PART I

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HIGHLIGHT STATEMENT - JANUARY 1959

OPERATIONS

CANNED FUEL ELEMENT PRODUCTION TOTALLED 508 TONS, INCLUDING 30 TONS OF SOLID AND 405 TONS OF 1&E NORMAL-URANIUM, AND 9 TONS OF SOLID AND 64 TONS OF 1&E 94-METAL. THE 508-TON TOTAL IS 107% OF FORECAST. YIELDS WERE 87% FOR SOLID NORMAL, 83% FOR 1&E NORMAL, 78% FOR SOLID 94-METAL, AND 86% FOR 1&E 94-METAL PIECES. THE CANNING LINE TIME-OPERATED EFFICIENCY WAS 93.8%.

IN-PILE PRODUCTION DURING JANUARY WAS 98.5% OF FORECAST WITH AN AVERAGE TIME-OPERATED EFFICIENCY OF 76.4%. FUEL ELEMENT FAILURES DURING THE MONTH INCLUDED ONE SOLID AND THREE 1&E NORMAL-URANIUM FUEL ELEMENT PIECES AND TWO 1&E DEPLETED-METAL PIECES.

REMOVAL OF THE ACRS POWER LEVEL LIMITS DURING THE MONTH PERMITTED THE ATTAINMENT OF NEW POWER LEVEL RECORDS AT C, H, AND KE REACTORS AND THE ESTABLISHMENT OF A PROGRAM FOR THE GRADUAL INCREASE IN POWER LEVELS AT ALL REACTORS.

TOTAL SEPARATIONS PLANT PRODUCTION WAS 94.7% OF FORECAST, WITH 79.2% OF THE TOTAL PRODUCED BY PUREX AND 20.8% BY REDOX.

UO₃ PRODUCTION TOTALLED 399 TONS, 98.3% OF FORECAST.

PLANT ACQUISITION AND CONSTRUCTION

NEW PRODUCTION REACTOR - DESIGN AND DEVELOPMENT ARE CONTINUING. GENERAL ELECTRIC HAS 34 AND BURNS & ROE 39 DESIGNERS WORKING ON THE PROJECT. (SEE PART I, PAGE 16.)

CONFINEMENT OF RADIOACTIVE PARTICULAR MATTER - DESIGN IS 22% COMPLETE. (SEE PART I, PAGE 16.)

PRTR - DESIGN IS COMPLETE AND CONSTRUCTION IS 14% COMPLETE VERSUS 12% SCHEDULED. (SEE PART I, PAGE 17.)

PLUTONIUM FABRICATION PILOT PLANT - DESIGN IS 86% COMPLETE AND CONSTRUCTION IS 34% COMPLETE VERSUS 37% SCHEDULED. (SEE PART I, PAGE 17.)

CITY HALL - DESIGN IS COMPLETE AND CONSTRUCTION IS 83% COMPLETE VERSUS 93% SCHEDULED. (SEE PART II, PAGE 4.)

COMMUNITY

DISPOSAL - 4,326 OF 4,806 HOUSES HAVE BEEN SOLD AND AN ADDITIONAL 86 GOOD FAITH DEPOSITS HAVE BEEN MADE. 96 VACANT LOTS HAVE BEEN SOLD. (SEE PART II, PAGE 3.)

INCORPORATION - THE CITY COUNCIL HAS HIRED A CITY MANAGER WHO WILL REPORT FOR DUTY MARCH 1. (PART II, PAGE 4.)

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PLANT OPERATIONS

METAL PREPARATION

CANNING - THE NET PRODUCTION OF CANNED FUEL ELEMENTS WAS:

NORMAL URANIUM, SOLID	30 TONS
NORMAL URANIUM, I&E	405
94 METAL, SOLID	9
94 METAL, I&E	64
TOTAL	508 TONS

THE 508-TON TOTAL PRODUCTION OF CANNED FUEL ELEMENTS WAS 107% OF FORECAST^{1/}. NORMAL-URANIUM I&E PRODUCTION INCLUDED SEVEN TONS OF WATER MIXING PIECES.

YIELDS WERE 87% FOR NORMAL SOLID, 83% FOR NORMAL I&E, 78% FOR 94-METAL SOLID, AND 86% FOR 94-METAL I&E PIECES.

THE CANNING LINE TIME-OPERATED EFFICIENCY WAS 93.8%. THE MANUFACTURING PLANT WORKED ON A TWO-SHIFT BASIS WITH FOUR CANNING LINES ON EACH SHIFT.

AT MONTH END, THERE WERE ON HAND A 1.7-MONTH SUPPLY OF CANNED FUEL ELEMENTS, A 1.8-MONTH SUPPLY OF BARE URANIUM CORES, AND A 3.5-MONTHS SUPPLY OF CAPS AND CANS.

IN ADDITION TO THE URANIUM CANNING, 13,780 ACCEPTABLE LEAD CADMIUM PIECES WERE CANNED DURING THE MONTH.

SCRAP SHIPMENTS - TWO SHIPMENTS TOTALING APPROXIMATELY SEVENTY TONS OF NORMAL URANIUM AND 1.8 TONS OF 94-METAL WERE SENT TO FERNALD.

ENRICHED SHIPMENTS - THE FIRST MOTOR FREIGHT SHIPMENT OF 94 METAL FROM FERNALD WAS RECEIVED AT HANFORD IN JANUARY. IN-TRANSIT TIME WAS ABOUT THE SAME AS FOR RAILWAY EXPRESS. UNLOADING TIME AT HANFORD FOR THE MOTOR FREIGHT LOAD WAS ABOUT ONE-HALF MAN-DAY AS COMPARED TO THREE MAN-DAYS REQUIRED TO UNLOAD THE SAME AMOUNT OF MATERIAL FROM AN EXPRESS CAR. SHIPPING COSTS VIA MOTOR FREIGHT WERE APPROXIMATELY ONE-THIRD THOSE OF RAILWAY EXPRESS.

REACTOR OPERATION

DURING JANUARY, REACTOR PRODUCTION RATES AS PERCENTAGES OF INDEX^{2/} 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)	100.0	102.3	100.0	100.0	100.0	104.2	101.9	100.0	101.1
AVERAGE LEVEL WHILE OPERATING (INCLUDES ALL PRODUCTION)	93.4	86.7	97.5	94.4	94.6	95.0	93.1	89.9	92.6
TIME-OPERATED EFFICIENCY	53.3	69.2	86.5	78.9	76.0	70.6	90.6	85.7	76.4

IN-PILE PRODUCTION DURING JANUARY WAS 98.5% OF FORECAST^{3/}. AVERAGE TIME-OPERATED EFFICIENCY WAS 76.4% AS COMPARED WITH THE 82% FORECAST. VARIATION FROM FORECAST WAS CAUSED BY LOW EFFICIENCY AT THE SIX OLD REACTORS RESULTING FROM WATER LEAKS AND TUBE REPLACEMENT.

WITHDRAWAL OF THE ACRS POWER LEVEL LIMITATIONS DURING THE MONTH PERMITTED ACHIEVEMENT OF SEVERAL NEW MAXIMUM POWER LEVELS. INDIVIDUAL REACTOR POWER LEVEL RECORDS WERE ESTABLISHED AT C, H, AND KE REACTORS. ALL REACTORS WERE LIMITED DURING THE EARLY PART OF THE MONTH BY THE ACRS POWER LEVEL LIMITS AND DURING THE LATTER PART OF THE MONTH BY THE PROGRAM FOR GRADUAL POWER INCREASES.

- 1/ TS DOCUMENT CLVI-527
2/ TS DOCUMENT LXII-2211.
3/ TS DOCUMENT CLVI-527.

PLANT OPERATIONS (CONT'D.)

REACTOR OPERATION (CONT'D.)

AT MONTH'S END, B, D, DR, F, AND KW REACTORS WERE HELD AT THE PREVIOUS ACRS LEVELS WHILE C, H, AND KE REACTORS WERE PILOTING OPERATION AT HIGHER POWER LEVELS. THE SCHEDULE FOR INCREASING POWER LEVELS PERMITS AN INCREASE OF 25 KW PER WEEK IN MAXIMUM TUBE POWER UNTIL SPECIFIC OPERATIONAL LIMITS ARE REACHED. REACTORS OTHER THAN C, H, AND KE LAG ONE WEEK IN THEIR POWER RISES.

DURING JANUARY, THERE WERE ONE SOLID AND THREE I&E NORMAL-URANIUM FUEL ELEMENT FAILURES AND TWO I&E DEPLETED-METAL FUEL ELEMENT FAILURES. THIS BRINGS THE CUMULATIVE NUMBER OF NORMAL-URANIUM RUPTURE INCIDENTS TO 1,071, INVOLVING 1,090 PIECES (INCLUDING 18 I&E FAILURES), AND THE CUMULATIVE NUMBER OF DEPLETED-METAL RUPTURE INCIDENTS TO 13, INVOLVING 13 PIECES. THE NUMBER OF 94-METAL INCIDENTS REMAINS AT 60^{1/2}, INVOLVING 62 PIECES.

FOLLOWING IS A SUMMARY OF JANUARY REACTOR OUTAGES:

B REACTOR:

<u>DATE DOWN</u>	<u>DATE UP</u>	<u>OUTAGE HOURS</u>	<u>REMARKS</u>
1-1	1-2	38.6	SCRAMMED WHEN A SWITCH IN THE ELECTRICAL EQUIPMENT ROOM WAS INADVERTENTLY OPENED. COMPLETED CHARGE-DISCHARGE AND LEAK TESTING.
1-2	1-2	0.8	PANELLIT TRIP.
1-2	1-2	0.4	PANELLIT TRIP.
1-11	1-20	220.2	COMPLETED SCHEDULED CHARGE-DISCHARGE, TUBE REPLACEMENT, AND LEAK TESTING.
1-28	STILL DOWN		COMPLETED CHARGE-DISCHARGE AND TUBE REPLACEMENT. LEAK TESTING IS IN PROGRESS.

C REACTOR:

<u>DATE DOWN</u>	<u>DATE UP</u>	<u>OUTAGE HOURS</u>	<u>REMARKS</u>
1-4	1-8	99.7	COMPLETED SCHEDULED CHARGE-DISCHARGE AND MAINTENANCE. ONE TUBE OF STUCK I&E DEPLETED-METAL WAS DISCHARGED.
1-8	1-8	0.4	PANELLIT TRIP.
1-9	1-9	5.5	POISON DISCHARGE.
1-12	1-13	32.9	REMOVAL OF AN I&E DEPLETED-METAL FUEL ELEMENT FAILURE FROM TUBE 4081. COMPLETED MISCELLANEOUS MAINTENANCE AND CHARGE-DISCHARGE.
1-14	1-16	44.2	REMOVAL OF AN I&E DEPLETED-METAL FUEL ELEMENT FAILURE FROM TUBE 4076. DISCHARGED 83% OF THE REMAINING I&E DEPLETED-METAL.
1-16	1-16	5.2	POISON DISCHARGE.
1-21	1-21	0.3	PANELLIT TRIP CAUSED BY A FAULTY CIRCUIT ON THE OPERATIONAL CHARGE-DISCHARGE SYSTEM.
1-26	1-28	39.1	COMPLETED LEAK TESTING.
1-28	1-28	1.7	INSUFFICIENT CONTROL ROD TO ACHIEVE TURNAROUND.

D REACTOR:

<u>DATE DOWN</u>	<u>DATE UP</u>	<u>OUTAGE HOURS</u>	<u>REMARKS</u>
1-1	1-5	100.4	LEAK TESTING. COMPLETED CHARGE-DISCHARGE AND TUBE REPLACEMENT.
1-7	1-7	0.2	PANELLIT TRIP CAUSED BY IMPROPER JUMPERING PROCEDURE.

DR REACTOR:

<u>DATE DOWN</u>	<u>DATE UP</u>	<u>OUTAGE HOURS</u>	<u>REMARKS</u>
1-18	1-18	0.6	PANELLIT TRIP CAUSED BY A BROKEN BALL VALVE LINE.
1-23	1-29	157.0	COMPLETED LEAK TESTING, CHARGE-DISCHARGE, AND TUBE REPLACEMENT.

^{1/} INCORRECTLY REPORTED AS 58 IN DECEMBER.

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PLANT OPERATIONS (CONT'D.)

REACTOR OPERATIONS (CONT'D.)

F REACTOR:

<u>DATE DOWN</u>	<u>DATE UP</u>	<u>OUTAGE HOURS</u>
1-16	1-21	126.3
1-26	1-28	52.3
1-28	1-28	0.2

REMARKS

REMOVAL OF A SOLID NORMAL-URANIUM FUEL ELEMENT FAILURE FROM TUBE 1770. PERFORMED LEAK TESTING. COMPLETED REPLACEMENT OF TUBES AND PANELLIT GAUGES AND INSTALLATION OF ZONE TEMPERATURE THERMOCOUPLES. COMPLETED LEAK TESTING. PANELLIT TRIP.

H REACTOR:

<u>DATE DOWN</u>	<u>DATE UP</u>	<u>OUTAGE HOURS</u>
1-4	1-12	180.8
1-12	1-12	6.5
1-13	1-13	0.2
1-13	1-13	0.3
1-14	1-14	0.3
1-23	1-23	0.2
1-24	1-25	30.2

REMARKS

PANELLIT TRIP. COMPLETED CHARGE-DISCHARGE, TUBE REPLACEMENT, AND INSTALLATION OF REAR-FACE PIGTAILS. PANELLIT TRIP CAUSED BY A LEAKING REAR-FACE CAP. PANELLIT TRIP CAUSED BY AN OSCILLATING GAUGE. PANELLIT TRIP. PANELLIT TRIP. PANELLIT TRIP. PANELLIT TRIP CAUSED BY A FAULTY MERCURY SWITCH. COMPLETED CHARGE-DISCHARGE AND MISCELLANEOUS MAINTENANCE.

KE REACTOR:

<u>DATE DOWN</u>	<u>DATE UP</u>	<u>OUTAGE HOURS</u>
1-6	1-8	32.0
1-14	1-15	36.3
1-16	1-16	1.2

REMARKS

INVESTIGATION OF RUPTURE INDICATIONS IN KER LOOP #4 WHICH LATER PROVED TO BE FALSE. COMPLETED CHARGE-DISCHARGE. SCRAMMED BY A FAULTY RELAY ON KER LOOP #3. COMPLETED CHARGE-DISCHARGE AND MISCELLANEOUS MAINTENANCE. PANELLIT TRIP CAUSED BY A FAULTY GAUGE.

KW REACTOR:

<u>DATE DOWN</u>	<u>DATE UP</u>	<u>OUTAGE HOURS</u>
1-4	1-6	39.9
1-6	1-6	6.5
1-19	1-20	29.5
1-28	1-29	30.2

REMARKS

PANELLIT TRIP WHILE ADJUSTING GAUGES FOR FIVE-PUMP OPERATION. ADJUSTMENT WAS BEING ATTEMPTED DURING OPERATION JUST PRIOR TO REMOVING FROM SERVICE ONE HIGH-LIFT PUMP WHICH WAS OVERHEATING. COMPLETED CHARGE-DISCHARGE. POISON DISCHARGE. REMOVAL OF AN I&E NORMAL-URANIUM FUEL ELEMENT FAILURE FROM TUBE 0949. COMPLETED CHARGE-DISCHARGE. REMOVAL OF AN I&E NORMAL-URANIUM FUEL ELEMENT FAILURE FROM TUBE 2089. ALSO DISCHARGED AN I&E NORMAL-URANIUM FUEL ELEMENT FAILURE FROM TUBE 1071 DURING CHARGE-DISCHARGE.

PLANT OPERATIONS (CONT'D.)

REACTOR OPERATION (CONT'D.)

FUEL ELEMENT FAILURES - FOLLOWING IS A TABULATION OF JANUARY FUEL ELEMENT FAILURES:

TABULATION OF RUPTURED URANIUM SLUGS							
TUBE NO.	DATE RUPTURED	TUBE POWER ^{1/}	CONCENTRATION (MWD/T)	ASSIGNED LOSS (MWD) (DAYS)		TYPE METAL	TYPE FAILURE
(NORMAL)							
1770-F	1-16-59	972	722	427	0.31	SOLID.	UNKNOWN.
0949-KW	1-19-59	995	809	939	0.33	I&E.	INSIDE OTHER.
2089-KW	1-28-59	1050	566	695	0.24	I&E.	INSIDE OTHER.
1071-KW	1-28-59	1268	686	695	0.24	I&E.	UNKNOWN.
(DEPLETED)							
4081-C	1-12-59	667	688	587	0.39	I&E.	INSIDE OTHER.
4076-C	1-14-59	658	729	2066	1.36	I&E.	INSIDE OTHER.

EQUIPMENT EXPERIENCE - A TOTAL OF 297 PROCESS TUBES WERE INSTALLED: 70 AT B, 3 AT C, 19 AT D, 140 AT DR, 39 AT F, 25 AT H, AND ONE AT KE. CONTRARY TO THE STATEMENT IN THE DECEMBER REPORT, B, D, AND H REACTORS WILL REQUIRE NO MAJOR RETUBING EFFORTS WITHIN THE NEXT FIVE YEARS. SEVEN TUBE LEAKS AND THIRTEEN VAN STONE LEAKS WERE CORRECTED DURING THE MONTH.

MALFUNCTION OF EQUIPMENT DUE TO OVERHEATING OF THE BRUSHES ON THE NO. 5 HIGH-LIFT MOTOR AT 190-KW NECESSITATED REMOVING THE UNIT FROM SERVICE ON JANUARY 4. EFFORTS TO ADJUST PANELLIT GAUGES TO COMPENSATE FOR THE RESULTANT REDUCTION IN FLOW AND PRESSURE WERE UNSUCCESSFUL, AND THE REACTOR SCRAMMED. AN OUTAGE OF APPROXIMATELY FORTY HOURS RESULTED FROM THIS INCIDENT. HOWEVER, ABOUT EIGHTY-TWO PER CENT OF THE DOWN TIME WAS UTILIZED FOR CHARGE-DISCHARGE AND MAINTENANCE.

POISON SPLINES - THREE SPLINE STARTUPS WERE SUCCESSFULLY CARRIED OUT AT KW REACTOR DURING THE MONTH. NINE TO TWELVE SPLINES WERE USED ON EACH OF TWO MINIMUM DOWN TIME STARTUPS AND ONE EXTENDED OUTAGE STARTUP. TOTAL GAINS FOR THE THREE STARTUPS WERE EQUIVALENT TO MORE THAN ONE-HALF DAY'S PRODUCTION. TWO SPLINES ARE CURRENTLY BEING USED FOR EQUILIBRIUM FLATTENING AND PRECLUDE THE NECESSITY FOR AT LEAST ONE MINT COLUMN.

OF THE 44 SPLINES USED FOR TEMPORARY POISON AND SUPPLEMENTAL CONTROL DURING THE STARTUP OF D REACTOR ON JANUARY 5, FIVE HAD TO BE LEFT IN THE PILE. FOUR OF THE FIVE WERE STUCK, AND ONE BROKE OFF IN THE TUBE AFTER APPROXIMATELY TWELVE FEET HAD BEEN REMOVED. OPERATION WAS CONTINUED WITH THESE SPLINES IN THE PILE. DIFFICULTIES WERE ALSO EXPERIENCED LATER IN THE MONTH IN THE CHARGING OF SPINES FOR EQUILIBRIUM FLATTENING. THESE PROBLEMS CAN BE OVERCOME BY MECHANICAL AND PROCEDURAL IMPROVEMENTS AND ADDITIONAL OPERATOR TRAINING.

OPERATIONAL CHARGE-DISCHARGE (OCD) - PROGRESS HAS BEEN MADE ON AN ADVANCED DESIGN REAR-FACE BALL VALVE WITH INTEGRAL ACTUATOR FOR USE IN THE CHARGE-DISCHARGE-WHILE-OPERATING PROGRAM. SIGNIFICANT IMPROVEMENTS IN THE NEW DESIGN ARE LOW COST, UNITIZED CONSTRUCTION UTILIZING A MACHINED ONE-PIECE ALUMINUM CASTING, AND REDUCED COST OF INSTALLATION. THE NEW VALVE IS DESIGNED TO BE PLACED ON AN EXISTING REAR-FACE NOZZLE AFTER THE CAP IS REMOVED.

PU-240 PROGRAM - AFTER THE THIRTEENTH RUPTURE OCCURRED, ALL THE DEPLETED MATERIAL ORIGINALLY CHARGED INTO C REACTOR UNDER THE HIGH PU-240 PROGRAM WAS DISCHARGED. EIGHT TUBES OF IMPROVED FUEL ELEMENTS WHICH WERE CHARGED IN NOVEMBER 1958 WILL REMAIN IN THE REACTOR FOR FUEL EVALUATION PURPOSES. A PRELIMINARY CALCULATION OF PRODUCTION FROM THIS PROGRAM GIVES NINE KILOGRAMS OF PLUTONIUM AVERAGING 14% IN THE 240 ISOTOPE. THE DISCHARGED COLUMNS ARE BEING HELD SEPARATELY PENDING A DECISION ON SEPARATION PLANS.

^{1/} AT TIME OF RUPTURE.

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PLANT OPERATIONS (CONT'D.)

SEPARATIONS

TOTAL SEPARATIONS PLANT PLUTONIUM PRODUCTION WAS 94.7% OF FORECAST^{1/}, WITH 79.2% OF THE TOTAL PRODUCED BY PUREX AND 20.8% BY REDOX.

PUREX - THE MOST SUCCESSFUL NEPTUNIUM RECOVERY EFFORT TO DATE WAS PERFORMED FROM JANUARY 1 TO JANUARY 9. APPROXIMATELY 760 GRAMS OF NEPTUNIUM WERE RECOVERED FROM THE BACKCYCLED WASTE STREAM. PLUTONIUM PROCESSING WAS RESUMED ON JANUARY 13, FOLLOWING JUMPER REPLACEMENT AND VALVE REPAIRS, AND CONTINUED THROUGHOUT THE REMAINDER OF THE MONTH.

THE PLUTONIUM PRODUCT WAS WITHIN SPECIFICATIONS THROUGHOUT THE MONTH WITH THE EXCEPTION OF ONE BATCH OF PRODUCT GENERATED IMMEDIATELY FOLLOWING STARTUP. THE URANIUM PRODUCT CONTAINED HIGH GAMMA ACTIVITY FOLLOWING STARTUP DUE TO PROCESS INTERFERENCE FROM ORGANIC DEGRADATION PRODUCTS IN THE FEED TANK TO THE FINAL URANIUM CYCLE. FLUSHING OF THE SYSTEM RESTORED THE ORGANIC QUALITY, AND ACCEPTABLE MATERIAL WAS PRODUCED DURING THE REMAINDER OF THE MONTH.

REWORK INCLUDED APPROXIMATELY TEN TONS OF OUT-OF-SPECIFICATION MATERIAL GENERATED UPON STARTUP AND ABOUT FORTY TONS OF SUMP WASTE FROM THE UO₃ PLANT. THE SILICA-GEL FACILITY PROCESSED 105 TONS OF URANIUM DURING THE MONTH.

WASTE LOSSES FOR THE MONTH WERE 0.29% OF THE TOTAL PLUTONIUM THROUGHPUT AND 0.12% OF THE TOTAL URANIUM THROUGHPUT.

IODINE EMISSION AVERAGED 0.6 CURIES PER DAY. MAXIMUM EMISSION RATES OF 2.9 CURIES PER DAY OCCURRED DURING THE LAST THREE DAYS OF THE MONTH, AS A RESULT OF PROCESSING 80-DAY COOLED MATERIAL. MERCURIC NITRATE ADDITIONS TO THE D-CELL STORAGE TANKS CONTROLLED FURTHER EMISSION.

FABRICATION AND INSTALLATION OF A NEW HS EXTRACTION COLUMN JUMPER WAS ACCOMPLISHED DURING THE BUILDING SHUTDOWN. UPON STARTUP, FLOW RESTRICTIONS THROUGH THE NEW JUMPER WERE OBSERVED; INVESTIGATION REVEALED THAT A VALVE WAS PLUGGED WITH POLYETHYLENE PARTICLES. A CONICAL FILTER SCREEN WAS INSTALLED, AND NO FURTHER DIFFICULTIES WERE EXPERIENCED. THE HA EXTRACTION COLUMN SHOWS NO EXTENSIVE LOSS IN SEPARATION EFFICIENCY DUE TO PARTIAL FAILURE OF THE POLYETHYLENE PLATES.

NEPTUNIUM RECOVERY - SPECIAL PROCESSING TO RECOVER THE NEPTUNIUM ACCUMULATED IN THE BACKCYCLED WASTE STREAM BEGAN ON JANUARY 1. THE DICHROMATE OXIDIZING FLOWSHEET USED IN NOVEMBER WAS AGAIN EMPLOYED. RECYCLE OF THE NEPTUNIUM IN THE 2A AND 2B COLUMNS FOR DECONTAMINATION TOOK ONLY 16 HOURS, AS COMPARED WITH 57 HOURS IN NOVEMBER. APPROXIMATELY 760 GRAMS OF NEPTUNIUM WERE LOADED OUT AS A CONCENTRATED CRUDE NITRATE ON JANUARY 9 AND TRANSFERRED IN PR CANS TO THE 222-S BUILDING (REDOX LABORATORY) FOR FINAL PURIFICATION.

UNTIL FINAL DISPOSITION OF THE NEPTUNIUM IS RESOLVED, THE INVENTORY IS BEING HELD IN THE CRUDE NITRATE FORM TO AVOID HAVING TO PERFORM LATER REPROCESSING REQUIRED BECAUSE OF RECONTAMINATION BY PROTACTINIUM-233 ACTIVITY.

REDOX - THE PROCESSING OF 94-METAL CONTINUED DURING JANUARY. TOTAL URANIUM PRODUCTION WAS 73 TONS, 122% OF FORECAST. AT MONTH'S END, APPROXIMATELY 138 TONS OF ENRICHED UNH WERE AVAILABLE FOR CALCINATION.

THE DISSOLVERS WERE SCHEDULED FOR CONTINUOUS OPERATION THROUGHOUT THE MONTH WITH THE EXTRACTION COLUMNS OPERATING ONLY THREE TO FOUR DAYS OF THE WEEK, DEPENDING UPON COLUMN FEED AVAILABILITY. THE SMALL CHARGES TO THE DISSOLVERS AND THE LONG DISSOLVER TIME CYCLES REQUIRED FOR HEEL REMOVAL (IN ORDER TO ASSURE CRITICALITY CONTROL) HAVE MADE PERIODIC COLUMN SHUTDOWNS NECESSARY IN ORDER TO BUILD UP THE INVENTORY OF FEED. ONLY TWO OF THE THREE DISSOLVERS WERE AVAILABLE FOR OPERATION DURING THE MONTH. A REPLACEMENT IS NOT YET AVAILABLE FOR THE C-2 DISSOLVER WHICH WAS TAKEN OUT OF SERVICE LAST MONTH BECAUSE OF A LEAKING COIL.

EXTRACTION COLUMN OPERATION WAS RESUMED ON JANUARY 6, FOLLOWING AN OUTAGE FOR COLUMN FEED BUILDUP, AND CONTINUED UNTIL JANUARY 8. EQUIPMENT FLUSHING, DECONTAMINATION OF THE CRANE, AND MAINTENANCE WERE COMPLETED DURING THIS OUTAGE. THE EXTRACTION SECTION RESUMED OPERATION ON JANUARY 19 AND, WITH THE LARGE COLUMN FEED ACCUMULATION OF THE PRECEDING WEEK, AN EXTENDED OPERATING PERIOD WAS POSSIBLE. THE EXTRACTION SECTION WAS SHUT DOWN ON JANUARY 28 FOR THE REMAINDER OF THE MONTH.

PLANT OPERATIONS (CONT'D.)

SEPARATIONS (CONT'D.)

REDOX (CONT'D.)

THE GAMMA ACTIVITY OF BOTH PRODUCTS REMAINED WELL WITHIN SHIPPING SPECIFICATIONS THROUGHOUT THE MONTH EXCEPT FOR TWO BATCHES OF URANIUM, WHICH REQUIRED PROCESSING THROUGH THE SILICA-GEL FACILITY. SLIGHTLY HIGHER THAN NORMAL IRON CONTENT OF THE PLUTONIUM PRODUCT RESULTED FROM CONTAMINATION IN THE L-3 CONCENTRATOR. THE PRODUCT WAS SHIPPED; HOWEVER, PART OF THE MATERIAL WILL REQUIRE BLENDING WITH OTHER PLUTONIUM FOR IRON DILUTION.

WASTE LOSSES WERE 0.24% OF THE TOTAL URANIUM THROUGHPUT AND 0.51% OF THE TOTAL PLUTONIUM THROUGHPUT.

IODINE EMISSION AVERAGED 0.004 CURIES PER DAY. THE MAXIMUM DAILY EMISSION RECORDED DURING THE MONTH WAS 0.02 CURIES.

ON JANUARY 8, DURING BURIAL OF REDOX JUMPERS, A SPREAD OF CONTAMINATION OCCURRED COVERING AN AREA FROM THE BURIAL GROUND TO THE "T" PLANT. THE BURIAL BOX COLLAPSED WHILE BEING COVERED WITH DIRT AND RELEASED RuO_2 PARTICLES TO THE ATMOSPHERE. SIX CASES OF PERSONNEL CONTAMINATION WERE FOUND. NASAL IRRIGATION AND STANDARD DECONTAMINATION PROCEDURES WERE SUCCESSFULLY USED. DECONTAMINATION OF VEHICLES IN THE "T" PLANT AREA AND OF A CRANE AND RAILROAD ENGINE AT THE BURIAL GROUND HAS BEEN COMPLETED.

ON JANUARY 29, DURING JUMPER CHANGES IN H CELL, THE ONE-TON AUXILIARY UNIT ON THE SIXTY-TON CRANE FELL TO THE CANYON DECK. THE FALL WAS CAUSED BY A FAILURE AT THE POINT WHERE THE I-BEAM ON WHICH THE UNIT OPERATES IS U-BOLTED TO THE CRANE. NO CELL DAMAGE OCCURRED, AND NORMAL OPERATIONS WERE NOT AFFECTED. REPAIR OF THE UNIT IS IN PROGRESS.

UO_3 - PLANT PERFORMANCE WAS GOOD WITH UO_3 PRODUCTION TOTALLING 399 TONS, 98.3% OF FORECAST. SHIPPING SCHEDULES WERE MET. THE PLANT WAS DOWN THREE DAYS FOR LACK OF FEED AND THREE DAYS FOR MAINTENANCE, WHICH INCLUDED EQUIPMENT MODIFICATION TO PERMIT SEGREGATED PROCESSING OF ENRICHED UNH. ONLY TWO CALCINER SHUTDOWNS WERE NECESSARY FOR EQUIPMENT REPAIR - ONE TO REPLACE THE SHEAR PIN ON THE AGITATOR BLADES AND THE OTHER TO REPLACE ONE THERMOWELL.

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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

PRODUCTION FY-59

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PLANT OPERATIONS (CONT'D.)

RESEARCH AND DEVELOPMENT

NPR GRAPHITE DEVELOPMENT - THE SECOND PHASE OF TESTING CANDIDATE NPR GRAPHITES HAS BEGUN WITH THE ARRIVAL OF SAMPLES FROM NATIONAL CARBON COMPANY AND SPEER CARBON COMPANY. EARLIER SAMPLES RECEIVED WERE SMALL SAMPLES THAT COULD BE PREPARED ON SHORT NOTICE AND PERMIT TESTING OF RELATIVE RADIATION STABILITY OF GRAPHITES FROM NEW COKE SOURCES AT THE EARLIEST POSSIBLE DATE. SAMPLES TYPICAL OF THE SIZE AND PROCESS TO BE USED FOR NPR GRAPHITE ARE ARRIVING. INCLUDED ARE 4" x 4" x 50" EXTRUSIONS FROM THE NATIONAL CARBON COMPANY OF AGOT PROCESSED SOCONY VACUUM COKE AND CONTINENTAL COKE, WHICH ARE SIMILAR IN NATURE TO THE OLD KENDALL COKE. THE KENDALL COKE HAS CONTRACTED LEAST OF THE COKES TESTED AT HIGH TEMPERATURE BUT IS NO LONGER AVAILABLE. SAMPLES FROM SPEER CARBON COMPANY ARE ALSO 4" x 4" x 50" EXTRUSIONS, AND VARIATIONS IN PURIFICATION TECHNIQUES AS WELL AS COKE VARIATIONS HAVE BEEN INCLUDED.

BECAUSE OF EXISTING CONFLICTS IN THE USE OF THE L-42 POSITION IN THE MTR FOR HIGH TEMPERATURE IRRADIATION OF GRAPHITE, WHICH WOULD SERIOUSLY HAMPER THE SELECTION OF NPR GRAPHITE, AN ALTERNATE IRRADIATION FACILITY HAS BEEN DESIGNED. THIS DEVICE CONSISTS OF A SAMPLE BEARING SHIM ROD IN THE L-48 POSITION AND WILL DUPLICATE IRRADIATION CONDITIONS OBTAINED IN THE L-42 POSITION. THE MODIFIED SHIM ROD HAS BEEN DESIGNED TO OPERATE WITH ESSENTIALLY THE SAME CHARACTERISTICS AS A REGULAR ROD SO AS TO MINIMIZE CHANGES IN THE REACTOR OPERATING CONDITIONS.

CLUSTER FUEL ELEMENTS - THREE SEVEN-ROD CLUSTER FUEL ELEMENTS OPERATED SATISFACTORILY DURING THE PAST MONTH IN THE ETR 3" x 3" LOOP FACILITY. SPECIFIC POWER IS AVERAGING 70 KW/FT WITH COOLANT OUTLET TEMPERATURE OF 280°C. GOAL EXPOSURE FOR THIS IRRADIATION IS 1500 MWD/T OF WHICH 500 MWD/T HAS ALREADY BEEN ATTAINED.

EIGHT SEVEN-ROD CLUSTER FUEL ELEMENTS MADE FROM NATURAL URANIUM COEXTRUDED IN 30 MILS OF ZIRCALOY-2 WERE CHARGED INTO THE KER #3 LOOP FACILITY.

TO COMPARE THE BEHAVIOR OF DIFFERENT CLAD THICKNESSES DURING IRRADIATION, FOUR SEVEN-ROD CLUSTER FUEL ELEMENTS WITH 20 MIL CLADDING AND THREE ELEMENTS WITH 30 MIL CLADDING WERE CHARGED INTO THE KER #1 LOOP FACILITY.

IRRADIATION OF A SEVEN-ROD CLUSTER NPR PROTOTYPE FUEL ELEMENT WAS COMPLETED IN JANUARY WITH AN EXPOSURE OF 1200 MWD/T. THE COOLANT BULK OUTLET TEMPERATURE DURING THE TEST WAS 270°C, AND THE OUTPUT WAS 12 WATTS PER GRAM. THE RODS OF EACH CLUSTER WERE COEXTRUDED ZIRCALOY-2 CLAD URANIUM. UNDERWATER EXAMINATION REVEALED NO CHANGES IN DIMENSIONS.

THE KER #4 LOOP TUBULAR ELEMENT TESTS CONTINUE TO OPERATE AT 14 WATTS PER GRAM. BULK COOLANT TEMPERATURE IS 230°C. THIS NPR CANDIDATE ELEMENT IS 36 INCHES LONG CLAD WITH 0.030-INCH THICK ZIRCALOY-2.

HYDRIDING OF ZIRCALOY-2 - IN ORDER TO LEARN MORE ABOUT THE FORMATION OF ZIRCONIUM HYDRIDE, TEN ATTEMPTS WERE MADE TO HYDRIDE ZIRCALOY-2. THE SAMPLES EITHER HYDRIDED COMPLETELY AND LOST THEIR MECHANICAL INTEGRITY OR ELSE REMAINED DUCTILE WITH LITTLE OR NO HYDROGEN PICK-UP. IT WAS NECESSARY TO REDUCE THE OXYGEN CONCENTRATION TO VERY LOW VALUES BEFORE ANY HYDRIDING COULD BE INDUCED, BUT HYDRIDING OCCURRED VERY RAPIDLY IN DRY, OXYGEN-FREE HYDROGEN AT 10 PSI BETWEEN 350°C AND 450°C. THE EDGES OF THE SAMPLES WERE ATTACKED FIRST BEFORE THE FLAT SURFACES OF THE METAL. THE RESULTS CONFIRM THE HYPOTHESIS THAT ZIRCALOY-2 DEPENDS ON ITS OXIDE FILM FOR PROTECTION AGAINST HYDROGEN. IN THE ABSENCE OF AN OXIDE FILM OR IF THE OXIDE FILM HAS DEFECTS, ZR-2 WILL HYDRIDE RAPIDLY WITH COMPLETE DESTRUCTION OF THE METAL. A DEFECT IN THE OXIDE FILM CANNOT FORM IN THE PRESENCE OF OXYGEN OR WATER BECAUSE THE DEFECT WILL BE HEALED, AND ZR-2 WILL NOT HYDRIDE IN THE PRESENCE OF WATER OR OXYGEN AT TEMPERATURES UNDER 500°C.

PLUTONIUM RECYCLE PROGRAM - A HIGH PRESSURE, HIGH TEMPERATURE AUTOCLAVE HAS BEEN INSTALLED IN A HOOD FOR CORROSION TESTING OF BARE AND CLAD DEFECTED PLUTONIUM ALLOYS. PU-AL ALLOYS CONTAINING 12 W/O SILICON HAVE BEEN SHOWN FAR SUPERIOR TO PLAIN PU-AL ALLOY FROM A CORROSION STANDPOINT.

FABRICATION OF SWAGED UO₂ CLUSTER FUEL ELEMENTS FOR PRTR WAS INITIATED THIS MONTH. SINTERED UO₂ BISCUITS WERE CRUSHED, THE POWDER SCREENED, DECONTAMINATED FROM IRON BY MAGNETIC SEPARATION, VACUUM OUTGASSED AT 700°C, LOADED INTO ZIRCALOY TUBES, AND THE ASSEMBLIES SWAGED. THE SWAGING RESULTED IN ATTAINMENT OF 86% ± 1% OF THEORETICAL DENSITY. THE SWAGED RODS WERE CUT TO LENGTH, COUNTERBORED, AND CLOSED BY WELDED END CAPS.

PLANT OPERATIONS (CONT'D.)

RESEARCH AND DEVELOPMENT (CONT'D.)

PRTR DESIGN - CALCULATIONS BASED ON PRESENT PRTR DESIGN INDICATE THAT THE PRIMARY LOOP PUMP FLYWHEELS ARE ADEQUATE TO PREVENT STEAM FORMATION AFTER POWER FAILURE. THE PRTR SHIM CONTROL ASSEMBLY WILL BE REDESIGNED, TO ELIMINATE POSSIBLE LOSS OF A CONTROL ROD FROM THE REACTOR BY BREAKAGE OF THE PRESENT HEAD CHAIN SUPPORT.

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DOCUMENT NO. 71254 *del*

PLANT ACQUISITION AND CONSTRUCTION

PROJECT AND DESIGN STUDIES

NEW PRODUCTION REACTOR:

PACIFIC NORTHWEST UTILITIES CONFERENCE COMMITTEE - A TECHNICAL GROUP FROM THIS COMMITTEE ASSEMBLED AT HANFORD ON JANUARY 19 TO STUDY THE FEASIBILITY OF UTILITY PARTICIPATION IN THE INSTALLATION OF POWER GENERATION FACILITIES FOR NPR. THIS GROUP WORKED ON THE STUDY UNTIL JANUARY 28 AND THEN REPORTED ITS FINDINGS TO THE COMMITTEE, WHICH FORWARDED ITS REPORT TO THE WASHINGTON OFFICE EARLY IN FEBRUARY.

FUEL ELEMENT DEVELOPMENT - DATA FROM TESTS TO DATE INDICATE THAT THE SEVEN-ROD CLUSTER ELEMENT WILL NOT REQUIRE WATER MIXING DEVICES. ORIGINALLY, IT HAD BEEN PLANNED TO PLACE A SPIRAL WOUND WIRE AROUND EACH ROD. HOWEVER, TESTS IN A KER LOOP SHOWED A RELATIVELY UNIFORM TEMPERATURE THROUGHOUT THE CROSS SECTION OF THE FUEL ELEMENT.

GRAPHITE - PROCUREMENT PLANNING ON GRAPHITE FOR NPR IS MOVING IN THE DIRECTION OF SOLICITING BIDS DURING THE FIRST QUARTER OF FY 1960. FIRM DECISIONS ON COKE CONTENT OF GRAPHITE WOULD NOT BE AVAILABLE BY THESE DATES, BUT THE EXPECTATION IS TO SECURE QUOTATIONS ON GRAPHITE FOR ALL VARIETIES OF COKES UNDER CONSIDERATION. PRESENT INFORMATION INDICATES THAT THERE IS LITTLE VARIANCE IN COST OF THE VARIOUS BASE COKES USED IN THE GRAPHITE MANUFACTURING. CURRENTLY, A DENSITY OF 1.7 AND A GRAPHITIZING TEMPERATURE OF 2800°C ARE TO BE INCLUDED IN THE SPECIFICATIONS. TOTAL QUANTITY OF GRAPHITE TO BE REQUIRED IS PRESENTLY ESTIMATED AT 3,300 TONS OF MODERATOR AND 100 TONS OF REFLECTOR. AN ORDER OF 25,000 POUNDS OF ELECTRODE GRADE GRAPHITE HAS BEEN PLACED WITH GREAT LAKES CARBON COMPANY. THIS MATERIAL, WHICH WILL BE USED IN A RUPTURE TEST TO DETERMINE ADEQUACY OF THE VENTING SYSTEM, WILL BE COMPLETELY FABRICATED TO PILE SHAPES BY GREAT LAKES CARBON COMPANY AND IS EXPECTED TO BE SHIPPED BY MARCH.

ZIRCONIUM TUBES - PROPOSALS HAVE BEEN RECEIVED FROM BRIDGEPORT BRASS COMPANY, CHASE BRASS AND COPPER, HARVEY ALUMINUM CO., ALLEGHENY LUDLUM STEEL CO., AND MALLORY-SHARON FOR FABRICATION OF NPR-TUBES UNDER PILOT ORDERS. THESE ORDERS WOULD BE TWO OR THREE IN NUMBER FOR A TOTAL AMOUNT OF APPROXIMATELY TWO HUNDRED TUBES. PROPOSALS ARE CURRENTLY BEING EVALUATED.

MECHANICAL DEVELOPMENT - DEVELOPMENT CONTINUES ON SEVERAL TYPES OF PROCESS PIPING FITTINGS AND SEALS. IN DEVELOPMENT OF A TUBE-TO-NOZZLE JOINT, THE TEST SECTION CONTAINING TWO SCREWED CONNECTIONS, WITH A BANANA SEAL ON ONE END AND A BELL SEAL ON THE OTHER, HAS REACHED 3,200 THERMAL CYCLES FROM 225 TO 580°F WITHOUT FAILURE. A ROLLED JOINT DEVELOPED FOR THE NPD-2 REACTOR IS BEING SENT FROM CANADA FOR TESTING. THE OREGON METALLURGICAL LABORATORY IS DEVELOPING A SPLIT RING JOINT, AND TESTING IS BEING CONTINUED ON FLARED AND WELDED JOINTS. THERMAL CYCLING OF A TEST SECTION EMPLOYING FLARED ZIRCONIUM TUBE JOINTS WAS INITIATED WHEREIN THE DUMMY MATING NOZZLES CONTAIN MACHINED SERRATIONS TO LOCALIZE FORCES. ADDITIONAL FLARED TUBE TEST SECTIONS HAVE BEEN ORDERED FROM THE LEONARD PRECISION PRODUCTS COMPANY EMPLOYING NEW MATERIALS IN THE FITTINGS SO THAT FORCES APPLIED THROUGH INITIAL ASSEMBLY CAN BE MAINTAINED THROUGH THERMAL CYCLING. ALL METAL SEALS HOLD CONSIDERABLE PROMISE AS NOZZLE-TO-CONNECTOR AND NOZZLE CLOSURE SEALS. THE MARMAN CONOSEAL HAS COMPLETED 3,220 CYCLES AS A NOZZLE-TO-CONNECTOR SEAL BUT HAS NOT YET BEEN SUCCESSFULLY ADAPTED TO SERVICE AS A NOZZLE CAP SEAL. FLEXITALLIC, BANANA AND BELL SEALS COULD ALSO BE USED IN THESE APPLICATIONS. THE TESTING PROGRAM FOR THE PROTOTYPE CONCEPT EVALUATION LOOP HAS BEEN MODIFIED TO INCLUDE SEVERAL TESTS EVALUATING THE IMPLICATIONS OF GRAPHITE STACK DISTORTION. THE PROCESS TUBE STRESS, TUBE INSERTION FORCE, AND CONTROL ROD INSERTION FORCE WILL BE DETERMINED FOR THE WORST CONDITIONS OF STACK DISTORTION ANTICIPATED AFTER 5, 10, 15, 20, AND 25 YEARS OF SERVICE.

INSTRUMENT DEVELOPMENT - IN PLACE OF THE PANELLIT SYSTEM COMMON TO THE EXISTING REACTORS, NPR WILL UTILIZE PRESSURE TRANSDUCERS ON THE PROCESS TUBE INLET VENTURIS. THE TRANSDUCER SIGNALS WILL BE LED TO FLOW RECORDERS IN THE CONTROL ROOM. SOLID STATE TRANSDUCERS ARE UNDER DEVELOPMENT BY VENDORS. AS BACKUP TO THIS SYSTEM, IN-LINE FLOWMETERS ARE BEING INVESTIGATED. THE NPR PROCESS INTRODUCES THE NEW COMPLEXITY THAT THE CONVERSION FROM VOLUME FLOW TO MASS FLOW IS DEPENDENT UPON TEMPERATURE OF PROCESS WATER, REQUIRING COMPENSATION OF THE FLOW METERING SYSTEM FOR TEMPERATURE CHANGES.

THE HIGH PROCESS TEMPERATURE AND RECIRCULATING FEATURE OF NPR REQUIRE A SUBSTANTIALLY REDUCED DELAY TIME IN FUEL RUPTURE DETECTION. SEVERAL APPROACHES ARE CURRENTLY BEING EVALUATED AND WILL BE TESTED IN A KER OR ETR LOOP UNDER NPR CONDITIONS. THE RELATIVE ADVANTAGES

PLANT ACQUISITION AND CONSTRUCTION (CONT'D.)

PROJECT AND DESIGN STUDIES (CONT'D.)

NEW PRODUCTION REACTOR (CONT'D.)

INSTRUMENT DEVELOPMENT (CONT'D.)

OF VARIOUS SYSTEMS WILL DEPEND IN PART UPON THE BACKGROUND SPECTRUM IN THE RECIRCULATING COOLANT, WHICH HAS NOT BEEN CLEARLY DEFINED. LABORATORY TESTS OF THE SYSTEM EMPLOYING GM TUBES HAVE REVEALED AN EXCESSIVE TUBE FAILURE RATE. TESTS IN EXISTING PRODUCTION REACTORS OF THE NOBLE GAS FISSION PRODUCT DETECTION SYSTEM EMPLOYED IN PRTR HAVE BEEN UNPROMISING. CONSIDERABLE ATTENTION WILL BE GIVEN TO THE SILVER HALIDE ABSORPTION SYSTEM WITH GAMMA SENSITIVE CHAMBERS WHICH HAS BEEN REPORTED FAVORABLY BY THE BATTELLE MEMORIAL INSTITUTE. OTHER POSSIBILITIES, IF THEIR RESPONSE TIME CAN BE IMPROVED, INCLUDE THE DELAYED NEUTRON MONITOR NOW USED AT KER AND A COORDINATE GAMMA DETECTION SYSTEM SIMILAR TO THAT EMPLOYED IN CG-651, CONTINUOUS CHARGE-DISCHARGE FACILITY 100-C REACTOR SLUG DEVELOPMENT FACILITY AND DEMONSTRATION UNIT.

HEAT DISSIPATION DESIGN - THIRTEEN OF TWENTY-SIX SCOPE DRAWINGS HAVE BEEN SUBMITTED FOR APPROVAL. EFFORTS ARE BEING MADE TO DETERMINE THE MOST ECONOMICAL PIPING. THE PRIMARY LOOP PIPING WILL BE ABOUT $1\frac{1}{2}$ -INCH THICK. THE CURRENT STUDY IS CONSIDERING (1) CARBON STEEL PIPE CLAD WITH $1/8$ INCH 304 STAINLESS STEEL, (2) CENTRIFUGALLY CAST STAINLESS STEEL PIPE, AND (3) A MULTILAYER CARBON STEEL PIPE WITH AN INNER LAYER OF 304 STAINLESS STEEL. THERE APPEARS TO BE NO GREAT COST DIFFERENTIAL BETWEEN THE TYPES.

DESIGN MANPOWER:

BURNS & ROE - - - - - 39
GENERAL ELECTRIC CO. - - - - 34

CONFINEMENT OF RADIOACTIVE PARTICULATE MATTER IN 105 BUILDING EXHAUST AIR - DURING THE MONTH, DESIGN REACHED 22% WITH AN INCREASE OF 9%. COMPLETE DESIGN CRITERIA FOR THE REAR-FACE FOG SPRAY SYSTEM HAVE BEEN SUBMITTED TO THE COMMISSION FOR APPROVAL. SCOPE DESIGN FOR THE WATER SOURCE WAS REVISED TO OBTAIN WATER FROM THE FUEL ELEMENT STORAGE BASIN FILL LINE RATHER THAN FROM THE MAIN VALVE PIT AT THE FRONT OF THE PILE. THIS REVISION WILL RESULT IN A SHORTER PIPE RUN AND LESS NEED FOR SWP CONDITIONS.

RECIRCULATING GAS LOOP - IT IS NOW PLANNED TO START UP THE LOOP USING HELIUM INSTEAD OF NITROGEN. WORK IS CONTINUING ON THE THREE REMAINING GAS LUBRICATED COMPRESSORS. LEAK TESTING HAS BEEN COMPLETED ON THE LOOP, AND IN-PILE REMOTE HANDLING AND REMOVAL FACILITIES HAVE BEEN SATISFACTORILY TESTED.

WATER PLANT EXPANSION, 100-KE AND KW - DESIGN FOR THE PRIMARY PUMP WELL MODEL TESTING BY OREGON STATE COLLEGE HAS BEEN APPROVED. PREPARATION IS UNDER WAY FOR A PRODUCTION TEST OF THE PROTOTYPE PUMP UNIT. IT IS PLANNED TO CONDUCT THE TEST AT SHUTDOWN OF 100-KE.

REDUCTION OF PERSONNEL EXPOSURE RMA LINE, 234-5 BUILDING - AS IN THE CASE OF THE RMC BUTTON LINE, AN ALTERNATE SUPPLIER HAS BEEN FOUND FOR THE SHIELDING GLASS REQUIRED IN THE SHIELDING BARRIER.

ADDITIONAL PLUTONIUM FABRICATION FACILITIES RMA LINE, 234-5 BUILDING - A DIRECTIVE WAS ISSUED AUTHORIZING CONSTRUCTION. DESIGN IS 4% COMPLETE.

EQUIPMENT DECONTAMINATION, BUILDING 2706-W - PRELIMINARY PLANS AND SPECIFICATIONS HAVE BEEN RECEIVED FOR COMMENT. SUBMISSION OF THE BID PACKAGE IS SCHEDULED FOR THE SECOND WEEK OF FEBRUARY.

REPROCESSING OF POWER FUELS - A PROPOSAL WAS RECEIVED FOR THE FACILITIES NECESSARY FOR CHEMICAL PROCESSING OF POWER FUELS. THE CURRENT PROPOSAL COVERS ONLY RECEIVING AND STORAGE FACILITIES, PLUS DESIGN OF THE TOTAL PROJECT.

PROJECT PALM - DESIGN ONLY HAS BEEN AUTHORIZED. TO DATE, SOME DIFFICULTY HAS BEEN ENCOUNTERED IN ESTABLISHING A FIRM FLOW SHEET. DETAILED DESIGN HAS STARTED ON THE LOAD-OUT PORTION.

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HANFORD
DOCUMENT NO. 71254 *DeP*PLANT ACQUISITION AND CONSTRUCTION (CONT'D.)PROJECT AND DESIGN STUDIES (CONT'D.)

HANFORD EQUIPMENT IN THE ETR - THE PROJECT IS 97% COMPLETE. THE 6" X 9" HOLE IN-PILE TUBE FACILITY HAS BEEN PRESSURE TESTED AND SHIPPED FROM THE VENDOR'S PLANT. THE PROJECT PROPOSAL IS BEING AMENDED TO PROVIDE ADDITIONAL SCOPE TO COVER SOME NPR TESTING AND TO EXTEND THE COMPLETION TIME. A REACTOR HAZARDS REPORT HAS BEEN SUBMITTED COVERING INSERTION OF THE 6" X 9" HOLE IN-PILE TUBE.

300 AREA SANITARY WATER SYSTEM MODIFICATION - STRUCTURAL FAILURE OCCURRED TO THE NEWLY CONSTRUCTED 225,000-GALLON CONCRETE WATER TANK ON JANUARY 11. THE EXACT CAUSE OF THE FAILURE WAS NOT DETERMINED; BUT, BEFORE THE TANK WAS DRAINED, ONE QUADRANT OF THE WALL FOUNDATION WAS UNDERMINED UNTIL IT UNDERWENT A MAXIMUM OF ONE-HALF INCH SETTLEMENT AND ONE QUADRANT OF THE TANK BOTTOM SETTLED AND CRACKED. THE CONTRACTOR HAS SUBMITTED A PROPOSAL FOR ACCOMPLISHING REPAIRS. THIS PROPOSAL IS UNDER REVIEW.

PLANT CONSTRUCTION

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

MAJOR PROJECTS							
PROJECT	PROJECT PROPOSAL NO.	ACTUAL STARTING DATE	CONSTRUCTION		DESIGN		PRESENT WORKING ESTIMATE (THOUSANDS)
			SCHED. COMPL. DATE	COMPLETION		\$ ACTUAL COMPL.	
				\$ SCHED.	\$ ACTUAL		
CITY HALL*	AEC-157	3-24-58	5- 1-59	93	83	100	\$ 635
PRTR	AEC-167	3- 6-58	8-30-60	12	14	100	15,000
PUREX WASTE FACILITY	CA-719	8-27-58	11-30-59	68	65	100	1,448
RMC BUTTON LINE 234-5	CG-734	2-18-58	1-31-60	43	35	100	1,480
RMC FAB. LINE 234-5	CG-745	2-18-58	7- 1-59	80	79	100	1,050
PLUTONIUM FABRICATION PILOT PLANT	CA-747	3- 6-58	11- 1-60	37	34	86	4,000
HIGH LEVEL RADIO- CHEMISTRY FAC.	CA-749	8-14-58	6-30-59	28	24	100	960

PLUTONIUM RECYCLE TEST REACTOR:

PHASE I - (CONTAINMENT VESSEL, STORAGE BASIN, ION EXCHANGE VAULT AND EXCAVATION FOR SERVICE BUILDING) - AMERICAN PIPE & CONSTRUCTION COMPANY RESUMED SHELL ERECTION ON JANUARY 28, 1959. THE SHELL IS COMPLETE TO +5 -0" ELEVATION. ERECTION OF THE SHELL IS ON A TWO-SHIFT BASIS, WITH THE THIRD SHIFT TO BE USED FOR X-RAYING THE WELDS. THE STORAGE BASIN IS ESSENTIALLY COMPLETE AND THE INSTALLATION OF THE VENTILATION SUPPLY UNIT IS IN PROGRESS.

PHASE II - (SERVICE BUILDING AND INSTALLATION OF PROCESS AND OUTSIDE EQUIPMENT) - STRUCTURAL WORK WAS COMPLETED. THE INSTALLATION OF ROOFING AND SIDE PANELS IS IN PROGRESS. THE STEAM AND WATER SERVICE LINES TO THE BUILDING WERE COMPLETED.

PHASE II-A - (RIVER STRUCTURE AND CONDENSER FACILITY) - THE 36" CORRUGATED SEWER LINE TO THE RIVER WAS INSTALLED, BUT NOT TESTED. EXCAVATION IS 40% COMPLETE ON THE RIVER PUMP HOUSE.

PHASE II-B - (ELECTRICAL UTILITIES) - WORK WAS STARTED ON THIS CONTRACT DURING THE LAST WEEK IN JANUARY.

PHASE III - (REACTOR COMPLEX, CONTROLS AND ASSOCIATED EQUIPMENT) - THE CONTRACTOR HAS ASSUMED RESPONSIBILITY FOR THE WAREHOUSING OF EQUIPMENT FOR PRTR AND PFPP.

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* CITY HALL IS INCLUDED IN DISPOSAL PROGRAM.

PLANT ACQUISITION AND CONSTRUCTION (CONT'D.)

PLANT CONSTRUCTION (CONT'D.)

PLUTONIUM FABRICATION PILOT PLANT:

PHASE II - STRUCTURAL STEEL AND CONCRETE ARE ESSENTIALLY COMPLETE. BLOCK WORK IS 98% COMPLETE. THE PLASTERING OF INTERIOR WALLS IS IN PROGRESS.

PHASE III - THE BID PACKAGE WAS SENT OUT EARLY IN JANUARY FOR THE PHASE III (EQUIPMENT INSTALLATION) PORTION OF THE WORK. BIDS ARE TO BE OPENED FEBRUARY 11.

RMC BUTTON LINE - 234-5 BUILDING - HOOD 9-8 WAS MOVED TO ITS NEW LOCATION.

AN ALTERNATE SUPPLIER FOR THE SHIELDING GLASS, TO BE USED IN THE SHIELDING WALL, HAS BEEN FOUND AND ORDERS PLACED FOR DELIVERY IN FROM TEN TO FOURTEEN WEEKS. THE SUPPLIER, LIBBY OWENS FORD, WILL REPLACE THE SUPPLIER, PITTSBURGH PLATE GLASS CO., WHICH IS ON STRIKE.

RMC FABRICATION LINE - 234-5 BUILDING - THE EQUIPMENT IN HOOD 24-C WAS TURNED OVER TO THE OPERATING DEPARTMENT AND THE TRAINING OF OPERATORS WAS BEGUN JANUARY 13, 1959. A.T.P.'S ON THIS HOOD WILL BEGIN EARLY IN FEBRUARY.

ADDITIONAL FACILITIES FOR PUREX TANK FARM VAPOR WASTES - ALL UNDERGROUND CARBON STEEL PIPING WAS COMPLETED ON JANUARY 23, 1959.

HIGH LEVEL RADIOCHEMISTRY FACILITY (ADDITION TO 325 BUILDING) - ALL STRUCTURAL CONCRETE WORK IS COMPLETE. THE ONLY REMAINING CONCRETE IS THE EXTERIOR STAIRS AND LOADING DOCK.

STRUCTURAL STEEL ERECTION IS COMPLETE, ALSO THE INSTALLATION OF ROBERTSON SIDING ON THE EXTERIOR WALLS.

INSTALLATION OF THE STAINLESS STEEL CRIB WASTE LINE HAS BEEN COMPLETED. STAINLESS STEEL CELL LINERS ARE BEING FABRICATED OFF-SITE AT FLOHR COMPANY IN SEATTLE AND SHIPMENT OF THE LINER FOR CELL "C" IS EXPECTED EARLY IN FEBRUARY. HEAVY SHIELDING DOORS ARE BEING FABRICATED IN CALIFORNIA.

ADDITIONAL STEAM GENERATING FACILITY - 300 AREA - CORRUGATED ASBESTOS SIDING FOR THE SIDE WALLS IS 95% COMPLETE. ROOFING IS BEING INSTALLED ON COAL BUNKER AND OFFICE SECTIONS.

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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 January, 1959.
The "Secret" portion, Part I, is forwarded as a separate
report.

Enclosure:
Monthly Status and Progress Report, Part II

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MONTHLY STATUS AND PROGRESS REPORT

JANUARY 1959

PART II

U. S. ATOMIC ENERGY COMMISSION
HANFORD OPERATIONS OFFICE

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MONTHLY STATUS AND PROGRESS REPORT

HANFORD OPERATIONS OFFICE

JANUARY 1959

PART II

C O N T E N T S

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<u>PERSONNEL (ON-SITE)</u>	5

COMMUNITY OPERATIONS

JANUARY 1 JANUARY 31

GOVERNMENT HOUSING:

TOTAL HOUSES AVAILABLE FOR OCCUPANCY	784	700 *
1. OCCUPIED	610	524
2. UNOCCUPIED	174	176
TOTAL APARTMENTS AVAILABLE FOR OCCUPANCY	134	134
1. OCCUPIED	134	134
2. UNOCCUPIED	0	0

THE COMMERCIAL OPERATOR FOR LEASING OF THE DORMITORIES HAS ONLY THREE NOW IN OPERATION.

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	46	52	381	89	568
VACANT	234	168	19	11	432

SPOKANE HOUSING, INC., IS IN THE PROCESS OF REMODELING SOME TWO-BEDROOM HOUSES WITH ATTACHED GARAGES INTO THREE-BEDROOM HOUSES OR TWO-BEDROOM HOUSES WITH A FAMILY ROOM.

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

<u>TYPE</u>	<u>NUMBER OFFERED</u>	<u>NUMBER SOLD TO 1-31-59</u>	<u>ADDITIONAL GOOD FAITH DEPOSITS</u>
SINGLE	3,788	3,528	29
DUPLEX	1,018	798	57
TOTAL	4,806	4,326	86

A TOTAL OF 96 VACANT LOTS HAVE BEEN SOLD.

THE CORRECTED LIST OF SUCCESSFUL APPLICANTS ON RESIDENT'S PRIORITY FOR 230 SINGLE HOUSES WAS POSTED ON JANUARY 2, 1959. THE APPEAL PERIOD EXPIRED ON JANUARY 12, 1959; ONE APPEAL WAS RECEIVED.

HHFA ANNOUNCED THE OFFER OF 164 DUPLEX HOUSES TO SHUT-OUT JUNIOR TENANTS ON JANUARY 21; ALSO TWO VACANT LOTS LOCATED ALONG THE ABANDONED IRRIGATION CANAL WERE OFFERED TO PROJECT EMPLOYED PEOPLE ON JANUARY 26.

A LIST OF SUCCESSFUL APPLICANTS FOR 26 COMMERCIAL PROPERTIES WAS POSTED ON JANUARY 5, 1959.

TWENTY-SIX (26) COMMERCIAL PRIORITY APPLICANTS WERE CERTIFIED; ONE CERTIFICATION, FOR CAMPBELL'S STORE ON SYMONS, WAS WITHHELD PENDING APPEAL BY THE OPERATOR OF THE BAKERY.

THREE GOOD FAITH DEPOSITS WERE MADE ON PURCHASE OF COMMERCIAL PROPERTIES, ONE EACH BY STANLEY RANDOLPH, TRI-CITY PAINTERS, INC., AND THE SEATTLE FIRST NATIONAL BANK.

THE COMMERCIAL APPRAISER SUBMITTED HIS FINAL REPORTS ON 73 COMMERCIAL PROPERTIES ON WHICH HE HAD CONVERTED THE FAIR MARKET RENT TO THE PATTERN NOW USED IN EACH RESPECTIVE LEASE.

THE FINAL SIX GOVERNMENT-OWNED CHURCH LOTS WERE OFFERED FOR SALE BY HHFA ON JANUARY 30, 1959.

PAGE # 3

* A TOTAL OF 3,528 SINGLE HOUSES AND 798 DUPLEXES (5,124 UNITS) HAVE BEEN SOLD.

DECLASSIFIED

DECLASSIFIED

COMMUNITY OPERATIONS (CONT'D.)

MUNICIPAL:

THERE ARE NOW 805 ELECTRIC HEAT INSTALLATIONS IN RICHLAND, IN ADDITION TO THE 1,200 PREFABS. THIS MEANS 41.5% OF THE RESIDENTIAL BUILDINGS ARE HEATED WITH ELECTRICITY; 59 COMMERCIAL FACILITIES ARE ALSO ELECTRICALLY HEATED. PURCHASERS HAVE CONVERTED 26 DUPLEXES TO SINGLE UNITS. BUILDING PERMITS TOTALING \$2,786,130 WERE ISSUED IN 1958.

INCORPORATION:

CITY MANAGER - THE CITY COUNCIL HAS HIRED A CITY MANAGER. HE IS M. W. FULLER, PRESENTLY MANAGER OF SIDNEY, NEBRASKA. HE WILL REPORT FOR DUTY MARCH 1.

REAL ESTATE - REPRESENTATIVES OF THE BUREAU OF RECLAMATION AND HOO MET REGARDING POSSIBLE RELEASE OF SMALL ACREAGES ALONG THE CONTROL ZONE BOUNDARY TO COMPLETE CERTAIN FARM UNITS. THE BUREAU WAS REQUESTED TO INVESTIGATE WHETHER LANDS CAN BE REVESTED IN FORMER OWNERS AFTER REPAYMENT HAS BEEN COMPLETED AND CASE DISMISSED FROM FEDERAL COURT.

OTHER CONSTRUCTION

1100 AREA CONSTRUCTION:

CITY HALL - RICHLAND - PLASTERING HAS BEEN COMPLETED. THE CONVECTOR HEATING SYSTEM IS IN OPERATION.

MISCELLANEOUS:

CONTRACTS - THERE WERE THREE BID OPENINGS AND AWARDS MADE DURING THE MONTH OF JANUARY, WHICH WERE AS FOLLOWS:

<u>PROJECT NO.</u>	<u>CONTRACT NO.</u>	<u>NUMBER OF BIDS</u>	<u>GOVERNMENT ESTIMATE</u>	<u>LOW BID</u>	<u>LOW BIDDER</u>	<u>AWARDED</u>
AEC-157	1432	5	\$37,000	\$35,473	ELVRUM CONSTRUCTION CO.	1-9-59
CG-674 781	1430	9	75,000	68,324	R. J. BRITTON	1-9-59
CAR-818	1434	6	16,000	14,649	ROYAL COMPANY	2-2-59

PROCUREMENT:

AWARDS RECOMMENDED DURING THE MONTH OF JANUARY BY GENERAL ELECTRIC COMPANY WERE APPROVED FOR 13 TRANSACTIONS IN THE AMOUNT OF \$636,164. AMONG THE LARGER AWARDS WERE THE FOLLOWING:

NORTHWEST COPPER WORKS, PORTLAND, OREGON - \$79,779 - VAPOR DEGREASING FACILITY
PROJECT AEC-747

BARTON INSTRUMENT CORP., MONTEREY, CALIFORNIA - \$89,213.70 - 320 PRESSURE INDICATING INSTRUMENT
& SPARE PARTS
PROJECT CG-817

270 PURCHASE ORDERS IN THE TOTAL AMOUNT OF \$756,660.24 WERE PLACED DURING THE MONTH.

PERSONNEL (ON-SITE)

	<u>JANUARY 1</u>	<u>JANUARY 31</u>
ATOMIC ENERGY COMMISSION	278	275
GENERAL ELECTRIC COMPANY	7,970	7,970
TOTAL CONSTRUCTION PERSONNEL	<u>755</u>	<u>736</u>
TOTAL PROJECT PERSONNEL	9,003	8,981
PROJECT RELATED PERSONNEL:		
NON-COMMERCIAL	75*	75*
COMMERCIAL	1,500*	1,500*
SCHOOLS	453	454
ORGANIZATIONS	<u>14</u>	<u>14</u>
TOTAL PROJECT RELATED PERSONNEL	<u>2,042</u>	<u>2,043</u>
TOTAL PROJECT AND RELATED PERSONNEL	<u>11,045</u>	<u>11,024</u>

KEY PERSONNEL CHANGES - NONE.

* ESTIMATED.

END

**DATE
FILMED
9 / 22 / 92**