This follows confirmed as
Secret Restricted Data
Oklahoma Branch ORF.
13-59
### Map, Drawings, Photographs, and Descriptions

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### Photos - Metal Fabrication and Testing Area

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**A63 - 95 PHOTOS - SEPARATION AREAS**

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**A96 - 151 PHOTOS - RICHLAND VILLAGE**

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<td>Photo - Sacajawea Grade School</td>
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<td>Photo - Protestant Church</td>
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<tr>
<td>No.</td>
<td>Description</td>
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<td>115</td>
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<td>Photo - Prefabricated Type B House</td>
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<td>151</td>
<td>Photo - Richland Village Park</td>
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FLOW SHEET

BLDG. NO. 314 - ROD EXTRUSION

LIST OF OPERATIONS

<table>
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<tr>
<th>OPER. NO.</th>
<th>NAME</th>
<th>EQUIPMENT</th>
<th>E.P. NO.</th>
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<td>TRANSFER</td>
<td>TRUCK</td>
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<tr>
<td>2</td>
<td>PRE-HEAT</td>
<td>FURNACE</td>
<td>314-102</td>
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<tr>
<td>3</td>
<td>EXTRUDE</td>
<td>HYDRAULIC PRESS</td>
<td>314-101</td>
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<tr>
<td>4</td>
<td>STRAIGHTEN &amp; QUENCH</td>
<td>TABLE &amp; TANK</td>
<td>314-107</td>
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<tr>
<td>5</td>
<td>WEIGH</td>
<td>SCALES</td>
<td>314-107</td>
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<tr>
<td>6</td>
<td>CROP</td>
<td>SAW</td>
<td>314-106, 6,10</td>
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<tr>
<td>7</td>
<td>ANNEAL &amp; OUTGAS</td>
<td>FURNACE</td>
<td>314-103</td>
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<tr>
<td>8</td>
<td>STRAIGHTEN</td>
<td>STRAIGHTENING ROLLS</td>
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<td>9</td>
<td>TRANSFER</td>
<td>TRUCK</td>
<td>314</td>
</tr>
</tbody>
</table>
FLOW SHEET
BLDG. 313 - SLUG MACHINING

TOOL AND CONTROL ROOM

TURRET LATHE
E.P. 101

INSPECTION

LIST OF OPERATION

1. TRANSFER
2. MACHINE
3. TRANSFÉR
4. INSPECTION & TRANSFER

WELDING AREA

CANNING AREA
FLOW SHEET
ASSEMBLY OPERATION

EXPENDABLE SLEEVES

CAN

BOTTOM PLUG

PUT BOTTOM PLUG IN CAN

PUT CAN IN EXP. SLEEVES

PLACE IN CANNING FURNACE

MELT AL. SI.

PLACE 20 CC AL. SI. IN CAN

PUT SLUG IN CAN

MACHINE TOP CAP

PLACE TOP CAP ON SLUG

QUENCH

MACHINE OUT ENDS OF SLUG

MACH. INSULATOR & WELD CAP

INSERT INSULATOR & WELD CAP

WELD ENDS

INSPECTION

SLUG

PICKLE

BRONZE DIP

TIN DIP

CENTRIFUGE

AL-SI. DIP
WATER FLOW CIRCUITS AT DISCHARGE-PILE FACE
SCHEMATIC DIAGRAM OF THE HELIUM SYSTEM
ARRANGEMENT OF DRYING UNIT
HELIOUM CIRCULATION THROUGH PILE

BIOLLOGICAL SHIELD

THERMAL SHIELD

HELIUM PASSAGE

PARTITION

OUTLET

TUBES

GRAPHITE

GAS OUTLET

GAS INLET

CHAMBERS FOR HELIUM PASSAGE

COOLING TUBE

WEEN HOLE

GRAPHITE
FLOW CIRCUIT – WATER PLANT
B-AREA

RAW EMERGENCY RESERVOIRS

FILTER PLANT

DEAERATORS

WATER STORAGE

PUMPS

HIGH TANK

VALVE PIT

RETENTION BASIN

EMERGENCY BY-PASS
100 AREA STEAM LINES

LEGEND
181 - RIVER PUMP HOUSE
182 - RESERVOIR & PUMP HOUSE
183 - FILTER PLANT & PUMPS
184 - POWER HOUSE
185 - REAERATING PLANT
187 - ELEVATED TANKS
189 - REFRIGERATOR HOUSE
190 - MAIN PUMP HOUSE

103 -
105 - PILE BUILDING
115 - NITROGEN CIRCULATION & PUR.
151 - PRIMARY SUB-STATION

1704 - SUPERVISOR'S OFFICE & LAB.
1707 - CHARGE HOUSE
1713 - STORE ROOM
1715 - OIL & PAINT STORAGE
1716 - AUTOMOTIVE REPAIR SHOP
1717 - COMBINED SHOPS
1719 - FIRST AID
1722 - AREA SHOP
1734 - CYLINDER STORAGE
FLOW CIRCUIT - DEMINERALIZING PLANT
PROCESS WATER

15,000 G.P.M
FROM FILTER PLANT CLEARWELLS

ZEOKARB

ZEOKARB

15,000 G.P.M
FROM FILTER PLANT CLEARWELLS

ZEOKARB

ZEOKARB

H₂SO₄ ACID

DEACIDITE

DEACIDITE

REGENERATION NEW - RECLAIM SODA ASH

CLEARWELL STORAGE

CLEARWELL STORAGE

TO DEAERATORS
FLOW CIRCUIT — DEAERATION PLANT
PROCESS WATER

FROM REFRIGERATION PLANT

PUMPS 15,000 G.P.M.

SULFURIC ACID

VAC TOWER

EXHAUST GASES

O₂, CO₂

STEAM

O₂, CO₂

EXHAUST GASES

SULFURIC ACID

FROM REFRIGERATION PLANT

PUMPS 15,000 G.P.M.

SULFURIC ACID

VAC TOWER

EXHAUST GASES

O₂, CO₂

FROM REFRIGERATION PLANT

PROCESS WATER STORAGE
FLOW CIRCUIT - REFRIGERATION PLANT
PROCESS WATER

FROM DEAERATORS 7500 G.P.M. - 70°F

CONDENSER

FREON COMPRESSOR

WATER

FREON REFRIG
CIRCUIT

COOLER

7500 G.P.M. - 54°F

PUMPS

NORMAL STORAGE

CHILLED STORAGE

CHILLED STORAGE

FROM DEAERATORS 7500 G.P.M. 70°F.

CONDENSER WATER

FROM RIVER HOUSE 70°F TO DISPOSAL

40,000 TO 50,000 G.P.M.

PUMPS

NORMAL STORAGE
FLOW CIRCUIT- VALVE PIT
PROCESS WATER

NORMAL WATER FROM STORAGE TANKS

EMERGENCY TANKS

TWO STAGE PUMPS

HOT WATER HEATER

CHEMICAL ADDITION

CHILLED WATER FROM STORAGE

TWO STAGE PUMPS

FROM PILE

CHILLED WATER FROM STORAGE

TWO STAGE PUMPS

CHEMICAL ADDITION

CHEMICAL ADDITION

30,000 TO 38,000 G.P.M. TO PILE
BISMUTH PHOSPHATE SEPARATION PROCESS
SAMPLE CAN AND CASE ASSEMBLY

Filter Media

Sample Can

Filter Gap

Adapter Plug

Adapter
METAL FABRICATION AND TESTING (300) AREA
APPENDIX A 20

AERIAL VIEW OF TOTAL FABRICATION AND TESTING (300) AREA
APENDIX A 21

PRESS BUILDING (314)

This building contains an hydraulic press where billets are extruded into rods, and equipment for out-gassing, cropping, and final straightening of the uranium rods.
This building contains facilities for machining uranium rods into short cylinders (slugs); canning the slugs; and testing the canned slugs preparatory to use in the transmutation process.
OFFICE, LIBRARY, AND LABORATORY (300 AREA)

This building includes laboratories for instrument development and analytical control and the development necessary in connection with the plant processes.
APPENDIX A 24

TEST PILE BUILDING (305)

This building houses a test pile for determining the neutron absorption or emission properties of all materials such as graphite and uranium used in the manufacturing piles.
This semi-works is located in the 3CC Area for investigating problems arising in the separation and isolation of plutonium from uranium and fission by-product elements.
INSTRUMENT SHOP (3717 BUILDING)

This building contains facilities for maintenance, modification, and calibration of the many types of electronic and other instruments required in the manufacturing processes and safety surveys.
APPENDIX A 27

STANDARD BUILDING (3745)

This building provides for the storage and the use of radium and radium-beryllium sources required for calibration of special instruments. A small special pile for calibrating the monitoring and control equipment is also located here.
APPENDIX A 28

HEATING PLANT (354 BUILDING)
AERIAL VIEW OF PILE (100 B) AREA
APPENDIX A 30

AERIAL VIEW OF FIRE (100 D) AREA
APPENDIX A 31

AERIAL VIEW OF PILE (100 F) AREA
APPENDIX A 32

PILE CHANGE FACE (105 PILE BUILDING)
APPENDIX A 33

FILE DISCHARGE PACE (LC 5 PILE BUILDING)
APPENDIX A 34

HELIUM PURIFICATION BUILDING (115 F)
APPENDIX A 35

GAS STORAGE TANKS (110 D)
PILE CONTROL RODS

The rods enter the Pile through a specially constructed hole in the Pile shield and equipped so that they can be remotely operated. The rear section, not shown, is primarily a mechanical linkage between the section of the rod that enters the Pile and the drive and water supply.
The rod is suspended above the pile with the lower end of the rod coinciding with the bottom face of the top thermal shield. The rod is suspended by two cables that are wound right and left handed around the barrel of the winch, which is supported 40 feet above the top of the pile.
APPENDIX A 38

SAFETY ROD WINCHES
APPENDIX A 39

PILE MAIN CONTROL PANEL

The nine Selaya indicators on the top-center of the panel indicate the position of 7 shim and 2 regulating rods. All the controls for moving the regulating rods are located on the right-hand sloping panel of the control desk. The controls on the lower right of the panel are for withdrawing or lowering safety rods individually or in groups.
APPENDIX A 40

PILE MISCELLANEOUS CONTROL PANEL

The two gauges at top-left indicate the Helium pressure. The other 20 at the top indicate shim rod exit water temperatures and pile exit water pressure. The recorders indicate percent of air and water in Helium and exit water temperature of rods. The panel at the extreme right is the temperature monitor. The center is a jack board containing a jack for temperature measurement of each individual tube. The other instruments are temperature recorders.
APPENDIX A 41

PILE INLET WATER PANEL

This panel contains instruments for measuring and recording water pressure and temperature on the inlet and exit side of the pile.
APPENDIX A 42

PILE PRESSURE CONTROL PANEL

This panel, divided into three sections, indicates the inlet water pressure on each tube. The gauges have, instead of the usual dial face and pointer, a rotating drum set behind the panel with only a small portion of the drum visible through a slot. The right section indicates the pressure of the top face of the Pile, and the middle section and left section indicate the middle face and bottom face of the Pile, respectively.
APPENDIX A 43

FAR VIEW OF CONTROL BOARD (105 FILE BUILDING)
APPENDIX A 54

RIVER PUMP HOUSE (131 D)
APPENDIX A 49

RIVER PUMPS (LIT D)
APPENDIX A 46

RESERVOIR AND PUMP BODE (1000 D)
RESERVOIR PUMP GALLERY
APPENDIX A 48

AERIAL VIEW OF FILTER PLANT (185 D)
APPENDIX A 50

FILTRATION DEBS
APPENDIX A 51

CHEMICAL PUMP HOUSE (103 D)
APPEXILIX A 52

AERIAL VIEW OF DEMINERALIZATION PLANT (136 D)
APPENDIX A 53

DEAERATING BUILDING (185 E)

The Deaerating Building is the large two-story structure with ten deaeration units mounted vertically on steel structures on the left side of the building. The Refrigeration Building is the one-story structure adjacent on the left, and the main pump house is the one-story structure adjacent to the Deaerating Building on the right.
APPENDIX A 34

DEADBATCH CONTROL CALLERY
APPENDIX A 50

DEAERATOR ACID PUMPS
APPENDIX A 56

FINAL WATER CONDITIONING EQUIPMENT
APPENDIX A 57

REFRIGERATION EQUIPMENT (100 F BUILDING)
APPENDIX A 53

PILE AREA PROCESS WATER TANK
APPENDIX A 29

FIRE AREA PROCESS WATER PUMPS
APPENDIX A 60

RETENTION BASIN

The Retention Basin consists essentially of two different reservoirs each about 405 feet long and separated by an overflow flume extending from the intake chamber to the discharge flume. This basin holds up the discharged cooling water from the Pile for a period sufficient to permit decay of the radioactivity which the water has acquired in its passage through the Pile.
APPENDIX A 61

PRIMARY SUBSTATION (131 D)
APPENDIX A 62

POWER HOUSE (100 ACRE)
APPENDIX A 63

AREAL VIEW OF SEPARATION (200 M) AREA
APPENDIX A 64

LAG STORAGE (212 BUILDING)
APPENDIX A 65

AERIAL VIEW OF SEPARATION (200 E) AREA
APPENDIX A 66

AERIAL VIEW OF SEPARATION (200 T) AREA
AERIAL VIEW OF SEPARATION (221-T BUILDING)
BULK REDUCTION BUILDING (224 T)

This is a concentration building where the crude product from the separation plant is bulk reduced and further decontaminated.
PROCESS WASTE STORAGE (241 T BUILDING)

The radioactive by-products of the separation process are stored here in shielded tanks buried in order to eliminate radiation hazards. The most active wastes (metal solution and first by-product precipitate) eventually heat up to boiling and air-cooled reflux condensers, shown on the right, are provided to eliminate tanks boiling dry. The low active waste from 224 Building and the "decayed" wastes from the storage tanks are stored in a retention pond, shown on the left.
STACK AND VENTILATION BUILDING (291)

This building provides the facilities for handling the main ventilation requirements for Building No. 221 and for disposing of gaseous radioactive products into the atmosphere.
APPENDIX A 71

VERTICAL ACID STORAGE TANKS (211)
APPENDIX A 72

HORIZONTAL ACID STORAGE TANKS (211)
APPENDIX A 73

CHEMICAL PREPARATION AND SERVICE BUILDING (271 T)

Provides facilities for preparation of process chemicals and serves as an administrative headquarters for the operation of the process.
APPENDIX A 74

SAMPLE PREPARATION LABORATORY (222-T BUILDING)

This building houses the control laboratories for the process.
APPENDIX A 73

ISOLATION BUILDING (231 W)

Contains equipment for the final isolation of the product. Only one 231 Building is provided to handle the output from all the 200 Area separation plants.
APPENDIX A 76

AREA SHOP (272 E BUILDING)

This building houses a Machine Shop, Electrical Shop, Pipe Shop and Carpenter Shop for maintenance of the operating equipment in Building 321.
APPENDIX A 77

POWER PLANT (200 E AREA)
APPENDIX A 78

RESERVOIR AND PUMP HOUSE (283 W)
APENDIX A 79

FILTER PLANT (293 W)
APPENDIX A 30

HEAT TREATING SURFACE BUILDING (273 E)

A Heat Treating Furnace with necessary facilities for the purpose of heat treating and pickling piping and equipment is housed in this building adjacent to Building 272 E.
APPENDIX A 81

METEOROLOGICAL TOWER
APPENDIX A 82

OPERATING GALLERY (CELL BUILDING)

The operating gallery is the control center for cell equipment. At each section is a gauge board from which control and instrument lines run to the cells, via the pipe gallery. Weigh tanks are provided with inlet connections from appropriate chemical headers in the pipe gallery and outlets to the cell vessel connections.
APPENDIX A-43

PIPE GALLERY (221 BUILDING)

All cell piping except process transfer lines is brought up to the pipe gallery, terminating in connections on the wall. From here, connections are made to the weigh tanks and control boards in the operating gallery. Chemical headers, electrical and steam distribution lines are located in this gallery.
Electrical Gallery (221 Building)

The electrical gallery or basement gallery contains principally electrical lines. The steam main also enters the building through this gallery.
APPENDIX A 85

CELL COVERS (221 BUILDING)

The cell covers are in removable sections and is the only means of access to the cell. The cover sections have stepped interlocking edges so that there are no straight cracks through which radiation can pass. The light streaks running the length of the building are produced by an overhead crane used in servicing the cells.
SEPARATION PLANT DISSOLVER (221 BUILDING)

This is a vertical tank equipped to receive charges of active slugs and conduct operations at the boiling point. There are three dissolvers in 221 Building. The operations of coating removal, metal dissolving and reduction are carried out consecutively in this dissolver.
APPENDIX A 87

PRECIPITATOR AND SOLUTION TANK (221 BUILDING)

The precipitator, the upper tank in the photo, is a 9-foot by 9-foot tank. It is equipped with an agitator, a jacket and an overflow line which drains to the cell floor. The solution tank is a small edition of the precipitator equipped with agitator and necessary connections.
CENTRIFUGE AND CATCH TANK (221 BUILDING)

The centrifuge, shown in upper section of the photo, is a 40-inch solid bowl machine with an opening near the bottom of the casing through which the bowl effluent flows into the catch tank. The catch tank is identical to the precipitator in design, but has no agitator. The agitator opening is blanked off with a manhole cover.
APPENDIX A 69

OPERATION GALLERY (224 BUILDING)
APPENDIX A 90

STANDARD CELLS IN 224 BUILDING
APPENDIX A 94

SHELF TANK AND FILLING ENCLOSURE
FOR CONC. PRODUCT SOL. (224 BUILDING)
APPENDIX A 92

TYPICAL UNIT IN ISOLATION BUILDING
APPENDIX A 93

TYPICAL LABORATORY (231 W BUILDING)
APPENDIX A 94

VENTILATION SYSTEM IN 231 BUILDING
MAGAZINE STORAGE (213 BUILDING)

This building contains two parallel vaults in the easternmost portion of the 200 North Area for the storage of the product.
APPENDIX A 96

AERIAL VIEW OF RICHLAND VILLAGE (1100 AREA) LOOKING NORTH
AERIAL VIEW OF ADMINISTRATION AREA
APPENDIX A 98

SUBSTATION
APPENDIX A 99

SUBSTATION
APPENDIX A 101

RESOLUTIONS AND RESOLVES
APPENDIX A 105

SEWAGE DISPOSAL PLANT
APPENDIX A 109

MARCUS WHITMAN GRADE SCHOOL
APPENDIX A 110

SACAJAWEA GRADE SCHOOL
APENDIX A 112

PROTESTANT CHURCH
APPENDIX A 113

CATHOLIC CHURCH
APPENDIX A 114

RED CROSS BUILDING
APPENDIX A 116

DORMITORY
APPENDIX A 117

TRANSIENT QUARTERS
APPENDIX A 185

CONVENTIONAL TYP. A HOUSE
APPENDIX A 119

CONVENTIONAL TYPE B HOUSE
APPENDIX A 120

CONVENTIONAL TYPE D HOUSE
APPENDIX A 121

CONVENTIONAL TYPE E HOUSE
APPENDIX A 122

CONVENTIONAL TYPE F HOOK
APPENDIX A 123

CONVENTIONAL TYPE H HOUSE
CONVENTIONAL TYPE G HOUSE
APPENDIX A 126

TYPICAL PREFABRICATED-HOME STREET
APPENDIX A 127

PREFABRICATED TYPE A HOUSE
APPENDIX A 128

PRE-FABRICATED TYPE B HOUSE
APPENDIX A 130

AERIAL VIEW OF COMMERCIAL FACILITIES
APPENDIX A 132

WESTERN UNION BUILDING
APPENDIX A 133

POST OFFICE
APPENDIX A 135

OPTICAL SHOP
APPENDIX A 136

MEN'S APPAREL SHOP
APPENDIX A 137

MILK DEPOT
APPENDIX A 138

BUS DEPOT
APPENDIX A 141

SERVICE STATION
APPENDIX A 142

DEPARTMENT STORE
APPENDIX A  143

CAFEKRIA
APPENDIX A 144

HARDWARE STORE
APPENDIX A 145

BANK
APPENDIX A 146

ELECTRICAL SHOP
APPENDIX A 147

RECREATION BUILDING
APPENDIX A 149

TYPICAL BASEBALL FIELD
APPENDIX A 150

HIGH SCHOOL FOOTBALL FIELD
APPENDIX A 151

RICHLAND VILLAGE PARK