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UC-80 – Reactor Technology
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THE HIGH FLUX ISOTOPE REACTOR

Selected Construction Drawings

Volume 2

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ORNL-3572

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THE HIGH FLUX ISOTOPE REACTOR

Selected Construction Drawings

Volume 2

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AUGUST 1964

OAK RIDGE NATIONAL LABORATORY
Oak Ridge, Tennessee
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INTRODUCTION

This volume is intended to supplement the descriptive material and schematic drawings contained in Volume 1. It contains an up-to-date list of HFIR construction drawings with reproductions of those 178 drawings which depict the more important components and systems. They are presented here in order to provide the reference material in a readily available form. For the most part these drawings have been reduced from the original F and D sizes, and it is realized that in some cases they may not be completely legible. It is suggested that their usefulness can be greatly enhanced through the use of a magnifying glass.

The Editors

EXPLANATION OF DRAWING NUMBERING SYSTEMS

Singmaster and Breyer Drawings

The Singmaster and Breyer drawings give fairly complete information on all but the ORNL-supplied material. They do not include all the detail which the manufacturers' drawings give, nor will they give detailed mounting or attachment schemes. The S and B job number for the HFIR is 1546, the second number refers to the area within the HFIR site, and the letter refers to the type of system. Thus for drawing No. 1546-01-M-5501:

1546 – HFIR
01 – Reactor Building
M-5501 – Mechanical drawing

For convenience the S and B job number (1546) is omitted from the listings.

01	Reactor Building
02	O and M Building
03	Cooling Tower and CT Equipment Building
04	Electrical Building
05	Yard Area and Miscellaneous
A-1000	Architectural
E-2000	Electrical, Power Distribution
E-2100 and 2200	Electrical, Control and Wiring Diagram
H and V-3000	Heating and Ventilating (H&V)
I-4000	Instrumentation
M-5000	Mechanical Layout
M-5500	Process Piping
P-5900	Plumbing
S-6000	Structural
U-7000	Utility, Roads – Site Plans
U-7100	Utility, Piping
U-7200	Utility, Line Nomenclature
U-7300	Utility, Storage Tanks
U-7400	Utility, Excavations

ORNL Reactor Controls Drawings

The ORNL reactor controls drawings include both the details of ORNL-fabricated instrumentation systems and the control diagrams (i.e., relay-contact networks). They do not include manufacturing details of instrumentation purchased outside ORNL. RC-11 refers to the HFIR project; Q numbers are given to instrumentation systems which may be in general usage. Some equipment items have been given both RC and Q numbers. Modifications for the HFIR would *not* be shown on Q prints; therefore the RC number is shown.

Q-2091-1 thru 6	Alpha or β-γ Lab Monitors
Q-2240-3 thru 22	Constant Air Monitors
Q-2288-1 thru 40	N-16 Monitor
Q-2310-1 thru 2	Constant Air Monitors
Q-2350-1 thru 13	Liquid Waste Monitoring
Q-2351-1 thru 52	Gaseous Waste Monitoring
Q-2352-1 thru 5	Sampling Sink Radiation Monitors
Q-2353-1 thru 6	Cooling Water – Linear-Log Radiation Monitor
RC11-1-1A thru C	Safety and Control – Block Diagram – Obsolete
RC11-1-2A thru P	Rod Control – Elementary Diagram
RC11-2	Cabinets B-C-D – Wiring Diagrams
RC11-3	Rod Drive Platform
RC11-4	Instrument Cabinet Construction
RC11-5	Process Panelboard E
RC11-6	Instrument Cabinet Construction
RC11-7	
RC11-8	Instrument Air and Pneumatic System
RC11-9-1 thru 4	Obsolete
RC11-9-5A thru D	Modular Reactor Instrumentation
RC11-9-6A thru F	Chamber Voltage – Monitor and Test Unit
RC11-9-7A thru F	Chamber High Voltage Supply and Flux Amplifier
RC11-9-8A thru F	Flux Reset Mechanism
RC11-9-9	
RC11-9-10A thru F	Operational Amplifier
RC11-9-11A thru F	Dual Signal Converter
RC11-9-12A thru F	Analogue Multiplier
RC11-9-13A thru F	Fast Trip Comparator
RC11-9-14	
RC11-9-15A thru F	Logical OR
RC11-9-16A thru F	Magnet Control Amplifier
RC11-9-17A thru F	HFIR Test Circuit
RC11-9-51 thru 54	Safety System
RC11-9-55A thru 61A	Drawer Interconnection & Wiring
RC11-10	Obsolete
RC11-11-1 thru 9	Miscellaneous
RC11-12-1 thru 5	Obsolete
RC11-12-5A thru E	Servo Demand Drive Unit
RC11-12-6A thru E	Servo Power Amplifier Driver Unit
RC11-12-7A thru E	Servo Power Amplifier Output Unit
RC11-12-51	Servo System
RC11-12-55A thru 58B	Drawer Interconnection & Wiring
RC11-13-1A thru H	Pulse Amplifier and Count Rate Meter
RC11-13-2A thru F	0.1 Hp Motor – Servo Amplifier
RC11-13-3	
RC11-13-4A thru T	$^3/_4$ inch Fission Chamber and Preamp
RC11-13-5A thru D	Obsolete
RC11-13-6A thru F	Linear Count Rate Meter
RC11-13-51 thru 54	Wide Range Counting Instrument
RC11-13-55A thru 60B	Drawer Interconnection & Wiring
RC11-14-1 thru 18	PCP II – Multisection Ion Chamber
RC11-15-1 thru 6	+15, +25 Volt Power Supply
RC11-16-1 thru 6	–15, –25 Volt Power Supply
RC11-17-1 thru 6	±10 Volt Power Supply
RC11-18	
RC11-19	
RC11-20	
RC11-21-1 thru 7	32 V DC to 115/6.3 V AC Inverter
RC11-22-1 and 2	Magnet
RC11-23-1 thru 3	Meter Module

Reactor Division Drawings

The Reactor Division drawings are of the ORNL-supplied equipment – mainly the reactor-vessel internals, including fuel, control rods, experiments, and various supporting structures.

COMPLETE DRAWING LIST

Singmaster and Breyer Drawings (as of April 6, 1964)

Throughout this section, the first column lists drawing numbers; the second column, revision numbers; and the third column, drawing titles.

01-A-1001	2	Reactor Bldg. – Plan of Sub-Pile Room and Primary Heat Exchanger Cells
01-A-1002	2	Reactor Bldg. – Ground Floor Plan
01-A-1003	4	Reactor Bldg. – First Floor Plan
01-A-1004	3	Reactor Bldg. – Second Floor Plan
01-A-1005	2	Reactor Bldg. – Third Floor Plan
01-A-1006	0	Reactor Bldg. – Roof Plan and Details
01-A-1007	2	Reactor Bldg. – Elevations
01-A-1008	2	Reactor Bldg. – Section A/1008
01-A-1009	1	Reactor Bldg. – Section B/1009
01-A-1010	1	Reactor Bldg. – Wall Sections
01-A-1011	1	Reactor Bldg. – Room Finish Schedule
01-A-1012	3	Reactor Bldg. – Door Schedule and Details
01-A-1013	1	Reactor Bldg. – Details of Stair No. 2 and at Observation Gallery and Control Room
01-A-1014	1	Reactor Bldg. – Miscellaneous Details
01-A-1015	2	Reactor Bldg. – Reflected Ceiling Plans and Details
01-A-1016	2	Reactor Bldg. – Details of Stair No. 1 and Elevator
01-A-1017	1	Reactor Bldg. – Details Stairs Nos. 3, 4, and 5 and Typical Stair Details
01-A-1018	3	Reactor Bldg. – Details Toilets and Locker Rooms
02-A-1101	0	Office and Maintenance Bldg. – Ground Floor and Roof Plans
02-A-1102	0	Office and Maintenance Bldg. – Elevations and Sections
02-A-1103	0	Office and Maintenance Bldg. – Wall Sections
02-A-1104	0	Office and Maintenance Bldg. – Room Finish Schedule
02-A-1105	0	Office and Maintenance Bldg. – Door Schedule and Details
02-A-1106	0	Office and Maintenance Bldg. – Reflected Ceiling Plan and Details
02-A-1107	1	Office and Maintenance Bldg. – Details – Locker and Toilet Rooms and Miscellaneous Interior Detail
04-A-1201	3	Electrical Bldg. – Plans, Sections and Elevations
04-A-1202	0	Electrical Bldg. – Wall Sections and Details
05-A-1301	0	Typical Architectural Details
05-A-1302	1	Fan Shed Plans Elevation and Details
05-A-1303	0	Cooling Tower Equipment Bldg. – Plans, Elevations and Details
05-E-2001	1	Electrical Key Plans
04-E-2002	4	One-Line Diagram – Normal Power – 13.8 KV and 2.4 KV Distribution
01-E-2003	4	One-Line Diagram – 480 V Normal Power Sub-Station No. 1 Reactor Bldg.
01-E-2004	4	One-Line Diagram – 480 V Normal Power Sub-Station No. 2 Reactor Bldg.
04-E-2005	4	One-Line Diagram – 480 V Normal Power Sub-Station No. 3 Electrical Bldg.
04-E-2006	5	One-Line Diagram – 480 V Normal Power Sub-Station No. 4 Electrical Bldg.
04-E-2007	4	One-Line Diagram – Normal Emergency System No. 1 and Fail Free System
04-E-2008	3	One-Line Diagram – Normal – Emergency System No. 2
01-E-2009	3	One-Line Diagram – Instrument Power
01-E-2010	2	One-Line and Elementary Diagrams Office and Maintenance Bldg.
01-E-2011	1	Reactor Bldg. – Lighting Layout Sub-Pile and Heat Exchange Rooms
01-E-2012	1	Reactor Bldg. – Lighting Layout Ground Floor
01-E-2013	2	Reactor Bldg. – Lighting Layout First Floor
01-E-2014	3	Reactor Bldg. – Lighting Layout Second Floor
01-E-2015	2	Reactor Bldg. – Lighting Layout Reactor Bay and Third Floor
01-E-2016	2	Reactor Bldg. – Lighting Layout Sections and Details
01-E-2017	1	Reactor Bldg. – Lighting Layout Sections and Details
01-E-2018	1	Fixture Schedule
01-E-2019	3	General Notes, Symbols and Receptacle Schedule
01-E-2020	2	Panel Schedule A to G
01-E-2021	4	Reactor Bldg. – Panel Schedules
01-E-2022	1	Panel Schedule
01-E-2023	6	Panel Schedules
01-E-2024	4	Reactor Bldg. and Miscellaneous Areas Panel Schedules
01-E-2026	3	One-Line Diagram – Instrument Power Panels P-1A, P-1B, P-31, P-32, and P-33
01-E-2030	2	Reactor Bldg. – Power and Control Conduit Layout Sub-Pile Room
01-E-2031	6	Reactor Bldg. – Power and Control Conduit Layout Ground Floor
01-E-2032	4	Reactor Bldg. – Power and Control Conduit Layout Ground Floor
01-E-2033	6	Reactor Bldg. – Power and Control Layout First Floor
01-E-2034	5	Reactor Bldg. – Power and Control Conduit Layout First Floor Plan
01-E-2035	3	Reactor Bldg. – Power and Control Conduit Layout Second Floor
01-E-2036	2	Reactor Bldg. – Power and Control Conduit Layout Second Floor
01-E-2037	2	Reactor Bldg. – Power and Control Conduit Layout Third Floor and Misc. Areas
01-E-2038	2	Reactor Bldg. – Power and Control Conduit Layout Details
01-E-2039	1	Reactor Bldg. – Power and Control Conduits Sections and Details
01-E-2040	2	Reactor Bldg. – Power Details
01-E-2041	5	Substation, Motor Control Center and Terminal Box Details
01-E-2042	5	Reactor Bldg. – Details for Terminal and Junction Boxes
01-E-2043	0	Reactor Bldg. – Power and Control Conduit Layout Beam Ports
01-E-2044	1	Reactor Bldg. – Power and Control Layout – Personnel Bridge
01-E-2046	2	Reactor Bldg. – Power and Control Sections and Details
01-E-2047	1	Reactor Bldg. – Underground Duct Bank (South)
01-E-2048	0	Reactor Bldg. – Underground Duct Bank (North)
01-E-2049	2	Reactor Bldg. – Power and Control Conduits – Sections and Details
01-E-2050	2	Reactor Bldg. – Underfloor Duct Sections
01-E-2051	3	Reactor Bldg. – Section and Details
01-E-2052	4	Reactor Bldg. – Power Sections and Details
01-E-2053	3	Reactor Bldg. – Power and Control Conduit Layout Details
01-E-2054	4	Reactor Bldg. – Power and Control Sections and Details
01-E-2055	2	Reactor Bldg. Tray Details – Auxiliary Control Room
01-E-2056	2	Control Room Equipment Arrangements and Details
01-E-2057	2	Reactor Bldg. – Power and Control Conduit Layout Monitoring Platform
05-E-2058	3	Grounding Area Plan
01-E-2059	2	Reactor Bldg. – Grounding Plan – Roof, Third and Second Floors
01-E-2060	4	Reactor Bldg. – Grounding Plan – Ground and First Floors
05-E-2061	2	Grounding – Details
05-E-2062	3	Yard Underground Distribution Area Plan
05-E-2063	4	Yard Underground Distribution Duct Bank, Sections and Details
05-E-2064	2	Manhole No. 4, Handholes Nos. 1, 2, 4, and 5 and Duct Bank – Sections and Details
01-E-2065	3	Manhole No. 3 – Sections and Details
05-E-2066	1	Yard Underground Distribution Manhole No. 1 – Sections and Details
04-E-2067	4	Electrical Bldg. – Equipment Layout
04-E-2068	4	Electrical Bldg. – Power and Control Layout – Underground
04-E-2069	3	Electrical Bldg. – Power and Control Layout – Overhead
04-E-2070	4	Electrical Bldg. – Lighting and Grounding Layout
04-E-2071	3	Switchgear and Substation Elevations and Details – Electrical Bldg.
05-E-2072	1	Manhole No. 2 and Handhole No. 3 – Sections and Details
03-E-2073	1	Cooling Tower and Control Layout
03-E-2074	3	Cooling Tower Power and Control Layout
03-E-2075	5	Cooling Tower Equipment Bldg. – Power-Lighting and Control Conduit Layout
05-E-2076	3	Outdoor Lighting Plan
05-E-2077	0	Yard Lighting – Sections and Details
01-E-2079	3	Reactor Bldg. – Fire Alarm, Intercom and Sound Powered Phone Systems – Ground Floor
01-E-2080	4	Reactor Bldg. – Fire Alarm, Intercom and Sound Powered Phone Systems – First Floor
01-E-2081	3	Reactor Bldg. – Fire Alarm, Intercom and Sound Powered Phone Systems – Second Floor
01-E-2082	2	Reactor Bldg. – Fire Alarm, Intercom and Sound Powered Phone Systems – Third Floor

05-E-2083	3	Fire Alarm, Intercom and Sound Powered Phone Systems – Miscellaneous Areas
01-E-2084	5	Fire Alarm Block Diagram
05-E-2085	3	Intercom and Sound Powered Phone Systems – Block Diagrams
01-E-2086	3	Reactor Bldg. – Telephone, Public Address and Bldg. Evacuation Alarm System – Ground Floor
01-E-2087	0	Reactor Bldg. – Telephone, Public Address and Bldg. Evacuation Alarm System – First Floor
01-E-2088	0	Reactor Bldg. – Telephone, Public Address and Bldg. Evacuation Alarm System – Second Floor
01-E-2089	0	Reactor Bldg. – Telephone, Public Address and Bldg. Evacuation Alarm System – Third Floor
05-E-2090	2	Telephone, Public Address and Bldg. Evacuation Alarm Systems – Sections and Details and Miscellaneous Area Layout
05-E-2091	4	Sewage Treatment Plant and Miscellaneous Areas Power and Lighting Layout
05-E-2092	3	Diversion Valve Station Layout
05-E-2093	2	Yard Underground Distribution Electrical Duct Bank Profiles
05-E-2094	1	Stack and Fan Shed Power and Control Layout
05-E-2095	2	Stack and Fan Shed Sections and Details
02-E-2096	2	Office and Maintenance Bldg. – Power and Control Layout
02-E-2097	0	Office and Maintenance Bldg. – Lighting Layout and Details
02-E-2098	2	Office and Maintenance Bldg. – Grounding, Telephone, Public Address, Fire Alarm, Etc.
05-E-2100		13.8 KV Overhead Line, Circuit Plan and Profile, from X-10 Substation to Station 13 + 80
05-E-2101		13.8 KV Overhead Line, Circuit Plan and Profile, from 13 + 80 to 36 + 15.20
05-E-2102		13.8 KV Overhead Line, Circuit Plan and Profile, from 15.20 to 57 + 97.08
05-E-2103		13.8 KV Overhead Line, Circuit Plan and Profile, from 57 + 97.08 to 77 + 50
05-E-2104		
05-E-2105		13.8 KV Overhead Line, Extension of Circuit 3, Station 0 + 0 to Station 12 + 54
05-E-2106		13.8 KV Overhead Line, Pole Details
05-E-2107		13.8 KV Overhead Line, Pole Details
05-E-2108		13.8 KV Overhead Line, Pole Details
05-E-2109		13.8 KV Overhead Line, Bill of Material
05-E-2110		13.8 KV Overhead Line, Switching Station
05-E-2111		
05-E-2112		
01-E-2113	5	Elementary Control Diagrams Symbols, Notes and Operating Descriptions
01-E-2114	4	Elementary Control Diagrams – Operating Descriptions
01-E-2115	3	Elementary Control Diagrams – Heating and Ventilating Equipment
01-E-2116	4	Elementary Control Diagrams – Heating and Ventilating Equipment
01-E-2117	5	Elementary Control Diagram – Process Water Equipment
05-E-2118	4	Elementary Control Diagrams – Process Water Equipment
01-E-2119	5	Elementary Control Diagram – Process Water Equipment
01-E-2120	6	Elementary Control Diagram – Process Water Equipment
05-E-2121	3	2400 V Feeder Breaker – Elementaries and Wiring Diagrams
05-E-2122	3	2400 V Main Breaker – Elementaries and Wiring Diagrams
01-E-2123	4	480 V Substations Wiring – Diagrams
01-E-2124	7	Elementary Control Diagrams – Miscellaneous Equipment
01-E-2125	5	Elementary Control Diagram – Process Water Equipment
05-E-2126	3	2400 V Starter Wiring Diagrams
01-E-2127	5	2400 V Starter Wiring Diagram
05-E-2128	5	Elementary Control Diagram – Miscellaneous Equipment
01-E-2129	4	Elementary Control Diagrams Annunciators IE Through 4E
01-E-2130	3	Elementary Control Diagrams – Annunciators B, C, D, F, G, H, and I
01-E-2140	6	Electrical Bill of Material
01-E-2141	6	Electrical Bill of Material
01-E-2142	4	Electrical Bill of Material
01-E-2143	1	Bill of Material
05-E-2145	0	Gaseous Waste Monitoring Layout and Wiring Exhaust Stack
01-E-2150	4	Conduit and Cable Schedule
01-E-2151	2	Conduit and Cable Schedule
01-E-2152	3	Conduit and Cable Schedule
01-E-2153	2	Conduit and Cable Schedule
01-E-2154	3	Conduit and Cable Schedule
01-E-2155	4	Conduit Schedule
01-E-2156	3	Conduit Schedule
01-E-2157	6	Conduit Schedule
01-E-2158	4	Conduit Schedule
01-E-2159	5	Conduit Schedule
01-E-2160	5	Conduit Schedule
01-E-2161	4	Cable Schedule
01-E-2162	3	Cable Schedule
01-E-2163	3	Cable Schedule
01-E-2164	3	Cable Schedule
01-E-2165	6	Cable Schedule
01-E-2166	2	Cable Schedule
01-E-2167	4	Cable Schedule
01-E-2168	3	Cable Schedule
05-E-2169	0	Cable Schedule and Conduit Schedule – Stack Monitoring System
01-E-2170	1	Cell 110 Interconnection Wiring Diagram
01-E-2171	0	Wiring Diagrams Personnel Bridge and Air Con. Freeze Protection Alarm
01-E-2172	4	Interconnection Wiring Diagram – M.C.C. – "C", M.C.C. – "D" and 480 V SWGR No. 2
01-E-2173	4	Cell 111 – Interconnection Wiring Diagram
01-E-2174	3	Cell 112 – Interconnection Wiring Diagram
01-E-2175	4	Cell 113 – Interconnection Wiring Diagrams
01-E-2176	3	Interconnection Wiring Diagram – M.C.C. "F", "J", "L", and Misc. Areas
03-E-2177	3	Cooling Tower Interconnection Wiring Diagram M.C.C. "K" and "N"
05-E-2178	2	Interconnection Wiring Diagram Motor Control Centers "G" and "H"
04-E-2179	4	Interconnection Wiring Diagram 13.8 KV SWGR, 2400 V SWGR, 480 V SWGR 3 and 4, 480 V SWGR 1 and 2 (N.E.) and Diesel Generator
01-E-2180	3	Interconnection Wiring Diagram Nuclear Panels "A", "B", "C", and "D"
01-E-2181	5	Interconnection Wiring Diagram M.C.C. "B" and "E"
01-E-2182	3	Interconnection Wiring Diagram 480 V SWGR No. 1 and M.C.C. "A"
01-E-2183	2	Interconnection Wiring Diagram Process Panel "E", Sheet No. 1
01-E-2184	1	Interconnection Wiring Diagram Process Panel "E" Sheet No. 2
01-E-2185	2	Interconnection Wiring Diagram Panels "F-G, H, and I"
01-E-2186	1	Interconnection Wiring Diagram Console – Center Panel
01-E-2187	2	Interconnection Wiring Diagram Console – Left and Right Panels
01-E-2188	1	Interconnection Wiring Diagram Nuclear Relay Cabinet
01-E-2189	1	Interconnection Wiring Diagram Nuclear Instrument Cabinet and Process Relay Cabinet
01-E-2190	2	Interconnection Wiring Diagram Pull Box No. 52 – Thermocouples
01-E-2191	1	Interconnection Wiring Diagrams – Auxiliary Control Room Monitoring Cabinets and Miscellaneous Equipment
01-E-2192	2	Schematic Block Diagram Heat Power Calculators and Miscellaneous Instrumentation
01-E-2193	1	Interconnection Wiring Diagram Terminal Boxes 14A and B, 15A and B, and 16A and B (Safety System)
01-E-2194	2	Interconnection Wiring Diagram Terminal Boxes 10 and 11 Nuclear
01-E-2195	2	Interconnection Wiring Diagram Terminal Box No. 1 – Process Non-Sensitive Signal
01-E-2196	2	Interconnection Wiring Diagram Terminal Box No. 9 – Process Non-Sensitive Signal
01-E-2197	1	Interconnection Wiring Diagram Terminal Box 8 (Process) and Terminal Boxes 5A and 5B (Liquid Waste Monitor)
01-E-2198	3	Interconnection Wiring Diagram Terminal Boxes Nos. 6A and 6B (H&V) and Terminal Box No. 7 (Elect. System)
01-E-2199	2	Interconnection Wiring Diagram Terminal Box Nos. 1 and 2 – Sub-Pile Room
01-E-2200	3	Interconnection Wiring Diagrams Miscellaneous Terminal Boxes and Instrumentation
01-E-2201	4	Process Panel "E" Wiring Diagram – Sheet No. 1
01-E-2202	4	Process Panel "E" Wiring Diagram – Sheet No. 2
01-E-2203	2	Process Panel "E" Wiring Diagram – Sheet No. 3
01-E-2204	3	Process Panel "E" Wiring Diagram – Sheet No. 4
01-E-2207	3	Wiring Diagram – Console Right Panel
01-E-2208	2	Wiring Diagram Console Center Panel
01-E-2209	1A	Wiring Diagram – Console Left Panel
01-E-2212	3	Wiring Diagram Nuclear Instrument Cabinet
01-E-2213	4	Wiring Diagram Process Instrument Cabinet and Interconnections
03-E-2215	3	Wiring Diagram Cooling Tower Instrument Board

01-E-2219	1A	General Arrangement Panels "F", "G", "H", and "I"
01-E-2220	3	Electric Power System – Panel "I" – Equipment Arrangement and B/M
01-E-2221	3	Wiring Diagram – Panel "I"
01-E-2222	1A	Panels "F" – "G" – "H" and "I" – Construction Details
01-E-2224	1A	Health Physics Monitor Panel "H" Equipment Arrangement and B/M
01-E-2225	2	Health Physics Monitor Panel "H" Wiring Diagram
01-E-2228	1A	Waste Systems -- Panels F and G Equipment Arrangement and B/M
01-E-2229	5	Waste System – Panel "F-G" Wiring Diagram
01-E-2232	1A	Nuclear Relay Cabinet Equipment Arrangement and B/M
01-E-2233	2	Nuclear Relay Cabinet Wiring Diagram Sections "D" and "E"
01-E-2234	2	Nuclear Relay Cabinet Wiring Diagram Sections "A", "B", and "C"
01-E-2235	1A	Nuclear Relay Cabinet Construction Details
01-E-2236	1A	Critical Facility Relay Cabinet Sheet Metal and Construction Details
01-E-2238	2	Process Relay Cabinet Layout, Equipment Arrangement, Construction Details and B/M
01-E-2239	2	Process Relay Cabinet Wiring Diagram
01-E-2240	1A	Nuclear Panels A, B, C, and D – Sheet Metal Layout
01-E-2241	2	Nuclear Panels A, B, C, and D – Construction Details
01-H&V-3001	2	Reactor Bldg. – H&V Air Flow Diagrams
01-H&V-3003	2	Reactor Bldg. – H&V Steam and Water Flow Diagrams
01-H&V-3004	2	Reactor Bldg. – H&V Sub-Pile Room and Roof Plan
01-H&V-3005	3	Reactor Bldg. – H&V Ground Floor Plan
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01-H&V-3007	3	Reactor Bldg. – H&V Second Floor Plan
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Q-2240-4	1	Constant Air Monitors – Count Rate Meter Panel and Mounting Boards
Q-2240-5	1	Constant Air Monitors – Count Rate Meter Terminal Boards
Q-2240-6	0	Constant Air Monitors – Assembly Products Meter Modification
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Q-2240-10	2	Constant Air Monitors – Filter Tape Drive Control Chassis
Q-2240-11	1	Constant Air Monitors – Filter Tape Drive Control Panel
Q-2240-12		Constant Air Monitors – Filter Tape Drive Beta-Gamma Parts List
Q-2240-14	1	Constant Air Monitors – Pump Assembly Mounting Plate and Details
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Q-2288-9	2	N^{16} Monitor – Shield No. 3 – Assembly
Q-2288-10	0	N^{16} Monitor – Shield No. 3 Details – Sheet 1
Q-2288-11	1	N^{16} Monitor – Shield No. 3 Details – Sheet 2
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Q-2288-15	1	N^{16} Monitor – Instrumentation
Q-2288-16	1	N^{16} Monitor – Scintillation Det. and Details
Q-2288-17	0	N^{16} Monitor – Scintillation Detector, Connector Box and Shield Details
Q-2288-18	1	N^{16} Monitor – Scintillation Detector Preamp Circuit, Connector Box and Power Supply Details
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Q-2288-24	0	N^{16} Monitor – Details
Q-2288-25	0	N^{16} Monitor – Shield Box
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RC11-1-2M	0	Superseded by S & B Dwg. No. E-2130
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RC11-10-2	0	Superseded by S & B Dwg. No. E-2052
RC11-10-3	0	Superseded by S & B Dwg. No. M-5506
RC11-10-4	1	Proposed Mounting for Temperature Sensors with Testing Nozzles
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RC11-10-6	0	Monitoring Platform Equipment Arrangement and Conduit Layout
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RC11-10-10	0	S.B.H.E., O.H.O.G., and C.H.O.G. Systems, Sections and Details
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RC11-13-2E		0.1 HP Motor-Servo Amplifier – Assembly
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RC11-13-4M	0	$\frac{3}{4}$ inch Fission Chamber & Preamp. – DC Power Supply – Circuit Board
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RC11-13-5B		Now ORNL Dwg. No. RC11-13-51
RC11-13-5C		Now ORNL Dwg. No. RC11-13-51
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RC11-13-59A	D	Drawer No. 4 Wiring
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RC11-14-8	0	PCP II Multi-Section Ion Chamber – Chamber Assembly – Insulators Details
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RC11-14-10	0	PCP II Multi-Section Ion Chamber – Chamber Assembly – Misc. Details
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RC11-14-12	0	PCP II Multi-Section Ion Chamber – Sensitive Volume Sub-assembly – Can Details
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RC11-14-18	0	PCP II Multi-Section Ion Chamber – Cabling Assembly, Moisture Proofing Capsule, Subassemblies
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RC11-15-2	1	+15, +25 volt Power Supply – Details
RC11-15-3	0	+15, +25 volt Power Supply – Panel
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RC11-15-5		+15, +25 volt Power Supply – Assembly
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RC11-16-3	0	–15, –25 volt Power Supply – Panel
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RC11-16-5		–15, –25 volt Power Supply – Assembly
RC11-16-6	0	–15, –25 volt Power Supply – Parts List
RC11-17-1	0	±10 volt Power Supply – Circuit
RC11-17-2	0	±10 volt Power Supply – Details
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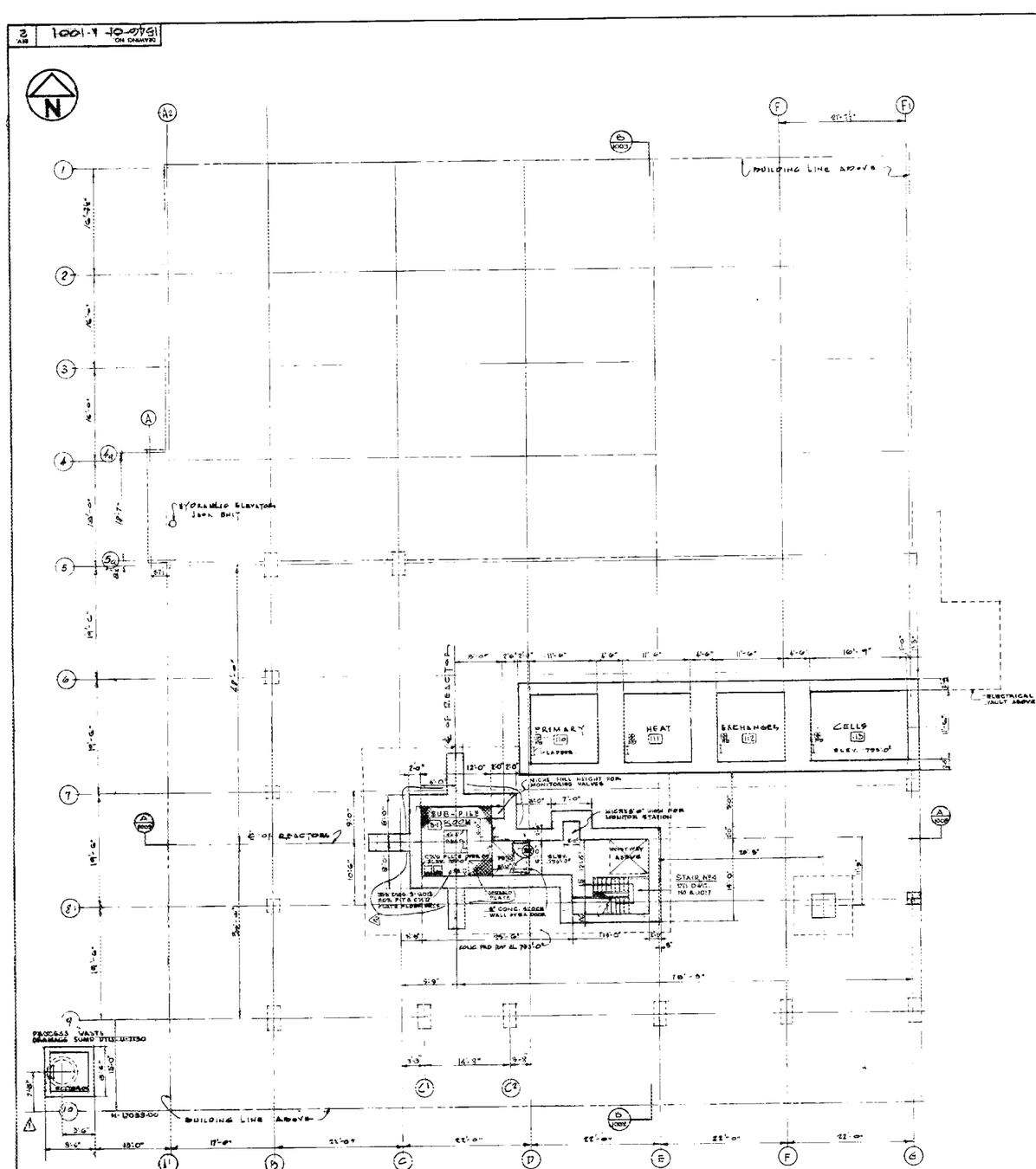


PLAN - SUB PILE ROOM & HEAT EXCHANGERS

SCALE 1/8" = 1'-0"

NOTES

1. SEE DWG. 1946-01-A-1002 FOR GENERAL NOTES, LEGEND & ABBREVIATIONS.
2. PLAN SECTIONS HEAT EXCHANGER AND SUB-PILE ROOM DWGS. S-6010, S-6015, FOUNDATIONS S-6001
3. FLOOR DRAIN LOCATIONS AND ELEVATIONS DWG. M-5320

DRAWING NO.	1946-01-A-1001
REV.	7

REFERENCE DRAWING		NO.
REACTOR BLDG.	ELEVATIONS	1946-01-A-1002
" "	SECTIONS	1946-01-A-1003
" "	DOOR SCHEDULE DET.	1946-01-A-1016
" "	ROOM FINISH SCHED.	1946-01-A-1011

SPECIFICATION NO.

SINGMASTER & BREYER
ARCHITECTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N. Y.

FOR

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER
BY [signature] DATE 3-9-61
UNION CARBIDE NUCLEAR COMPANY
BY C. E. WALTERS DATE 3/28/61
U. S. ATOMIC ENERGY COMMISSION
BY R. H. SOMERS DATE 3/29/61

HIGH FLUX ISOTOPE REACTOR

REACTOR BUILDING
PLAN OF SUB PILE ROOM AND PRIMARY HEAT EXCHANGER CELLS

DRAWN B.W.J. CHKD. J.F.C. DATE 12-5-60 DRAWING NO. 1946-01-A-1001 REV. 2
SCALE 1/8" = 1'-0"

S. & B. 346

DEPT.	CHK.
ARCH.	
ELECT.	
H & V.	
PIPT.	
MECH.	
STRUC.	
UTIL.	

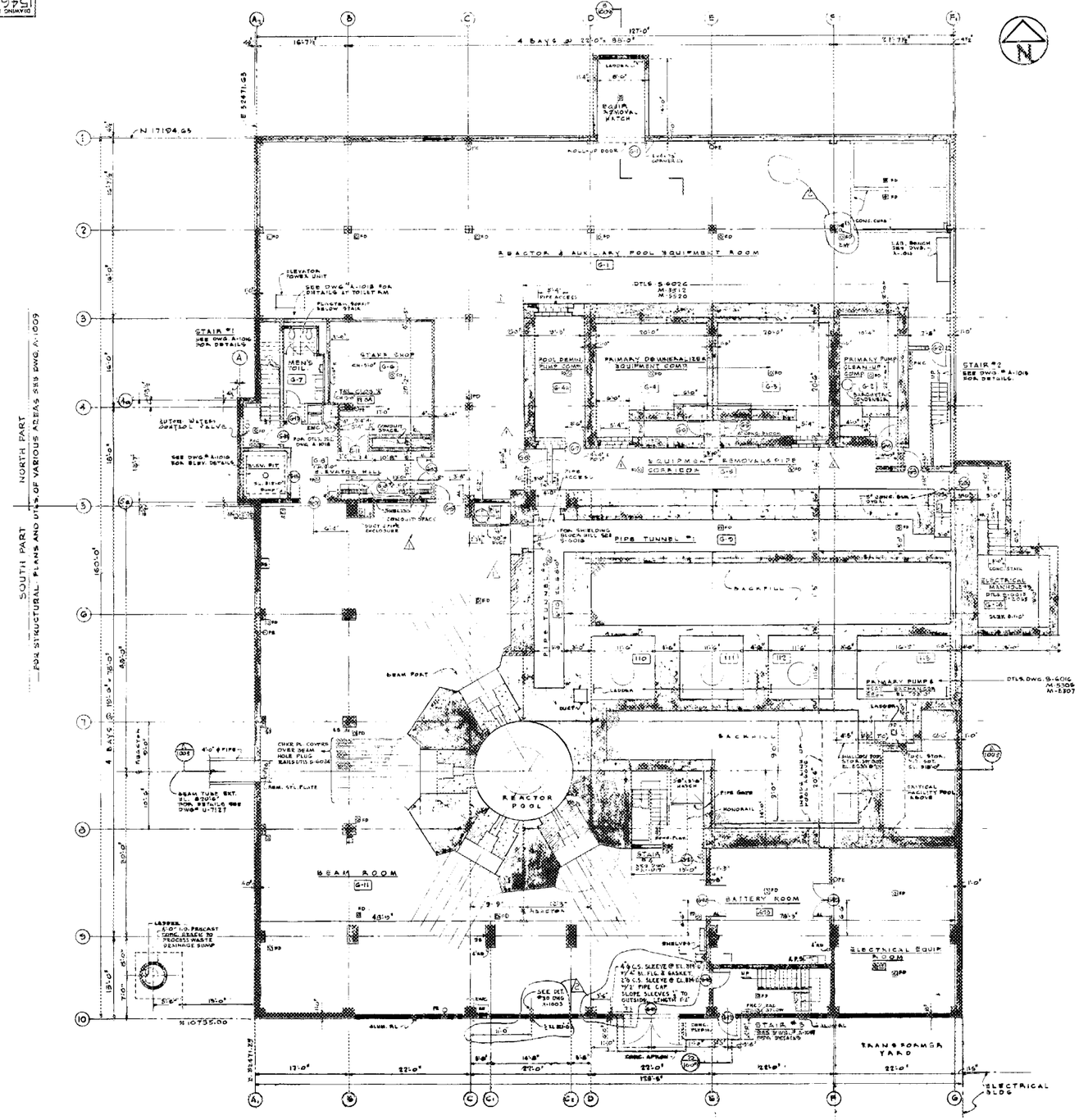
CERTIFIED FOR CONSTRUCTION

NO.	REVISIONS	BY	CHK.	APP. S&B	DATE	APP. ACNC	DATE	APP. AEC	DATE
1	REVISED DIMENSION AT PROCESS WASTE SUMP.	JFC	WHG		9-17-60	NPL		NPL	
0	CERTIFIED FOR CONSTRUCTION	WLH	JFC		7-8-60	7-8-60			
0	ISSUED FOR TITLE II APPROVAL	WLH	JFC		3-17-60	CEW 3-23-60	RBS	3-30-60	
0	ISSUED FOR TITLE I PRELIMINARY APPROVAL	PAP	JFC		1-5-60				
2	REDO FLOOR ABOVE IN SUB-PILE ROOM, REVISED FLOOR DRAIN.	JFC	JFC		11-16-60	NPL		NPL	

NO.	REVISIONS	BY	CHK.	APP. S&B	DATE	APP. ACNC	DATE	APP. AEC	DATE
0	REDRAWN AS WELL AS LETTER OF 10-10-60 TO INCLUDE AS BUILT COMMENTS	BW	JFC		12-9-60		12-9-60		
	REISSUED FOR TITLE I APPROVAL	PAP	WLH		10-10-60		10-10-60		
1	REVISED FOR TITLE I APPROVAL	WLH	JFC		8-15-60		8-15-60		
0	REVISED FOR ARRANGEMENT SCHEMATIC	WLH	JFC		7-15-60	BW	8-23-60		8-23-60

001

DRAWING NO 1546-01-A-1002 REV 2



GENERAL NOTES

1. ALL PARTITIONS TO BE 4" THK. CONCRETE BLOCK UNLESS OTHERWISE NOTED. SEE DETAILED AREAS DWGS. A-1013, A-1016, A-1017, A-1018.
2. FOR ROOM FINISH SCHEDULE SEE DWG. 1546-01A-1011
3. FOR WALL SECTIONS SEE 1546-01A-1010
4. FOR ELEVATIONS SEE DWG. 1546-01-A-1007
5. FOR BUILDING SECTIONS SEE DWGS 1546-01-A-1008 & 1546-01-A-1009
6. PARTITIONS TO EXTEND TO UNDERSIDE OF CONSTRUCTION UNLESS OTHERWISE NOTED.

LEGEND AND ABBREVIATIONS

- METAL
- CONVENTIONAL CONCRETE
- HIGH DENSITY CONCRETE
- CONCRETE BLOCK
- STRUCTURAL GLAZED FACING TILE (GGFT)
- BRICK
- NORMAL DENSITY SHIELDING BLOCKS
- INSULATION
- CONCRETE BLOCK-PLASTER FINISH
- CONSTANT AIR MONITOR (NIC)
- LAB. MONITOR (NIC) PROVIDE SHELF.
- FHC FIRE HOSE CABINET
- MO MASONRY OPENING
- APS ACID PROOF SINK
- SS SERVICE SINK
- EPB ELECTRIC PANEL BOARD
- AL ACTIVE LEAF (DOOR)
- FE FIRE EXTINGUISHER
- ES EMERGENCY SHOWER
- RD ROOF DRAIN
- RL ROOF LEADER
- FD FLOOR DRAIN
- EWC ELECTRIC WATER COOLER
- EWF EYE WASH FOUNTAIN
- PIPE SLEEVE IN FLOOR, FOR FUTURE USE
- PTD PAPER TOWEL DISPENSER
- 101 DOOR NUMBER
- 101 ROOM NUMBER
- 1/1004 SECTION NO. / DWG WHERE SECTION IS DRAWN — SECTION INDICATION
- NIC NOT IN CONTRACT
- CH CEILING HEIGHT

DRAWING NO. 1546-01-A-1002 REV. 2

REFERENCE DRAWING		NO.
REACTOR BLDG.	ELEVATIONS	1546-01-A-1007
"	WALL SECTIONS	1546-01-A-1010
"	SECTIONS	1546-01-A-1008 1009
"	ROOM FINISH SCH	1546-01-A-1011

SPECIFICATION REF.

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420 LEXINGTON AVE. NEW YORK 17, N.Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER
BY H. Kimmell DATE 8-9-61
UNION CARBIDE NUCLEAR COMPANY
BY G. E. WINTERS DATE 3-29-61
U. S. ATOMIC ENERGY COMMISSION
BY L. H. JACKSON DATE 5-4-61

NOTES

1. TOP OF FLOOR SLAB ELEV. 817'-0" UNLESS OTHERWISE NOTED
2. SEE STRUCT. DWG. 1546-01-S-6024 & 6025 FOR SLOPES IN FLOOR SLABS.
3. FOR DETAILS AT DOORS #G-16 & G-17 SEE DWG. 1546-01-A-1014
4. FOR LOUVERS IN CONCRETE WALLS SEE DWG. 1546-01-A-1007.
5. FLOOR DRAIN LOCATIONS AND ELEVATIONS DWG M5520

CERTIFIED FOR CONSTRUCTION

S. & B. 546
DEPT. CHK.
ARCH. JRC
ELECT. EW
H.&V. J.J.T.
INST.
MECH.
STRUC. R.J.S.
UTIL.
PROC.

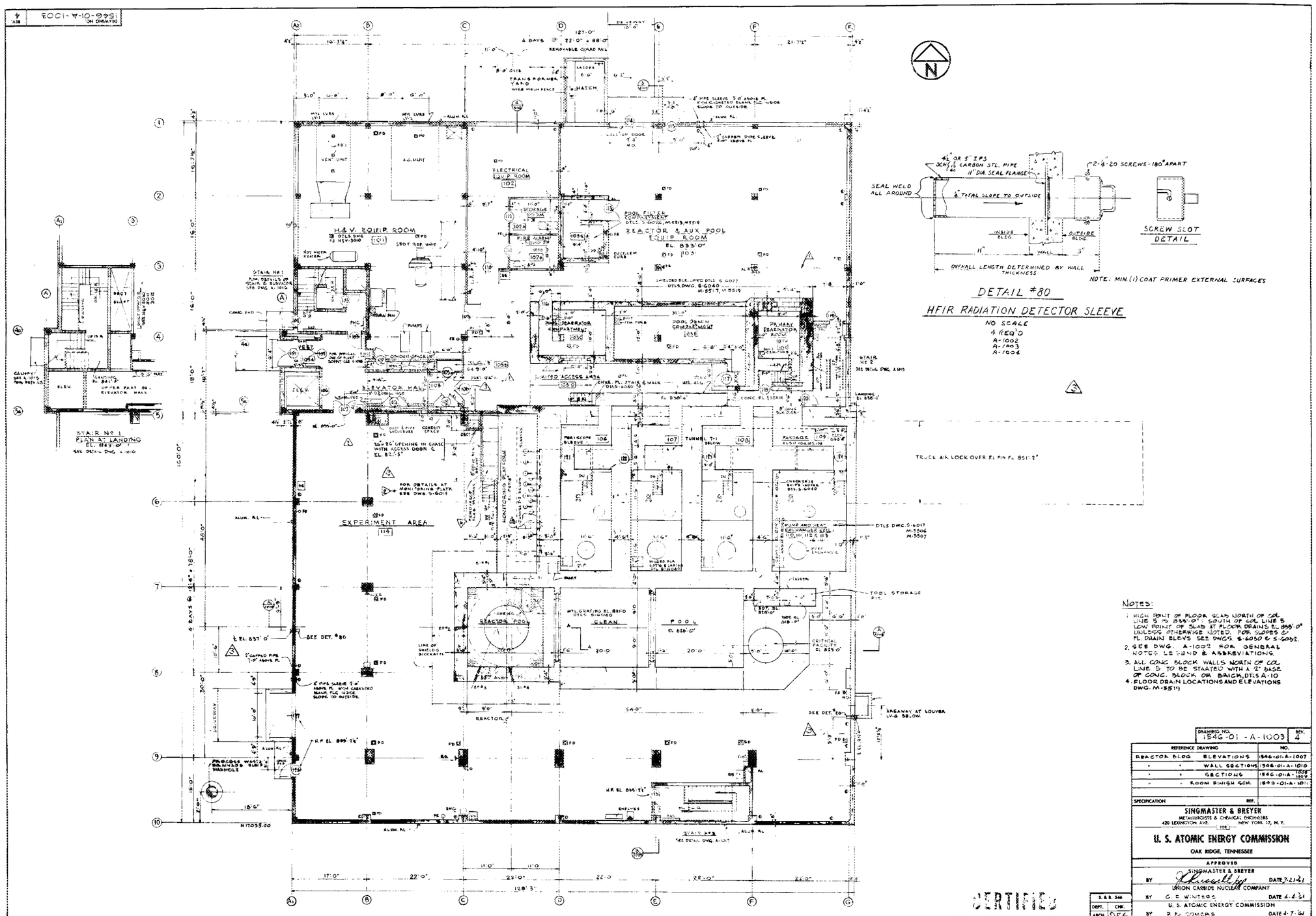
NO.	REVISIONS	BY	CHK.	APPR. L.&S.	DATE	APPR. U.C.N.C.	DATE	APPR. ARC.	DATE
2	ADDED LOUVERS AS PER FLOW SHEET REVISED BY J. HUGHETT E.&S. CHIP	WHG	JRC			N.R.		N.R.	
1	NOTE ADDED STATING NO WELD DONE GIVEN CONCRETE BLK. CONT. OPNGS.	WHG	JRC		9-7-61	N.R.		N.R.	
0	CERTIFIED FOR CONSTRUCTION	WLH	JRC		8-9-61				
0	ISSUED FOR TITLE I APPROVAL	JRC	JRC		3-29-61	CEW	3-29-61	EWJ	4-4-61
0	ISSUED FOR TITLE I PRELIMINARY PROPOSAL	JRC	WHG		1-6-61				

NO.	REVISIONS	BY	CHK.	APPR. L.&S.	DATE	APPR. U.C.N.C.	DATE	APPR. ARC.	DATE
0	PROCEED AS PER ACC LETTER OF 10-11-60 & AS PROVED BY NOTED COMMENTS REVISED FOR TITLE I APPROVAL	EW	JRC		10-11-60				
0	REVISED TO ACCOMMODATE ...	WHG	WHG		9-15-60	CEW	9-15-60	RJS	9-27-60
0	REVISED TO ACCOMMODATE ...	WHG	JRC		9-13-60	CEW	9-13-60	EWJ	9-13-60
0	REVISED TO ACCOMMODATE ...	WHG	JRC		7-20-60	CEW	7-20-60	EWJ	7-20-60

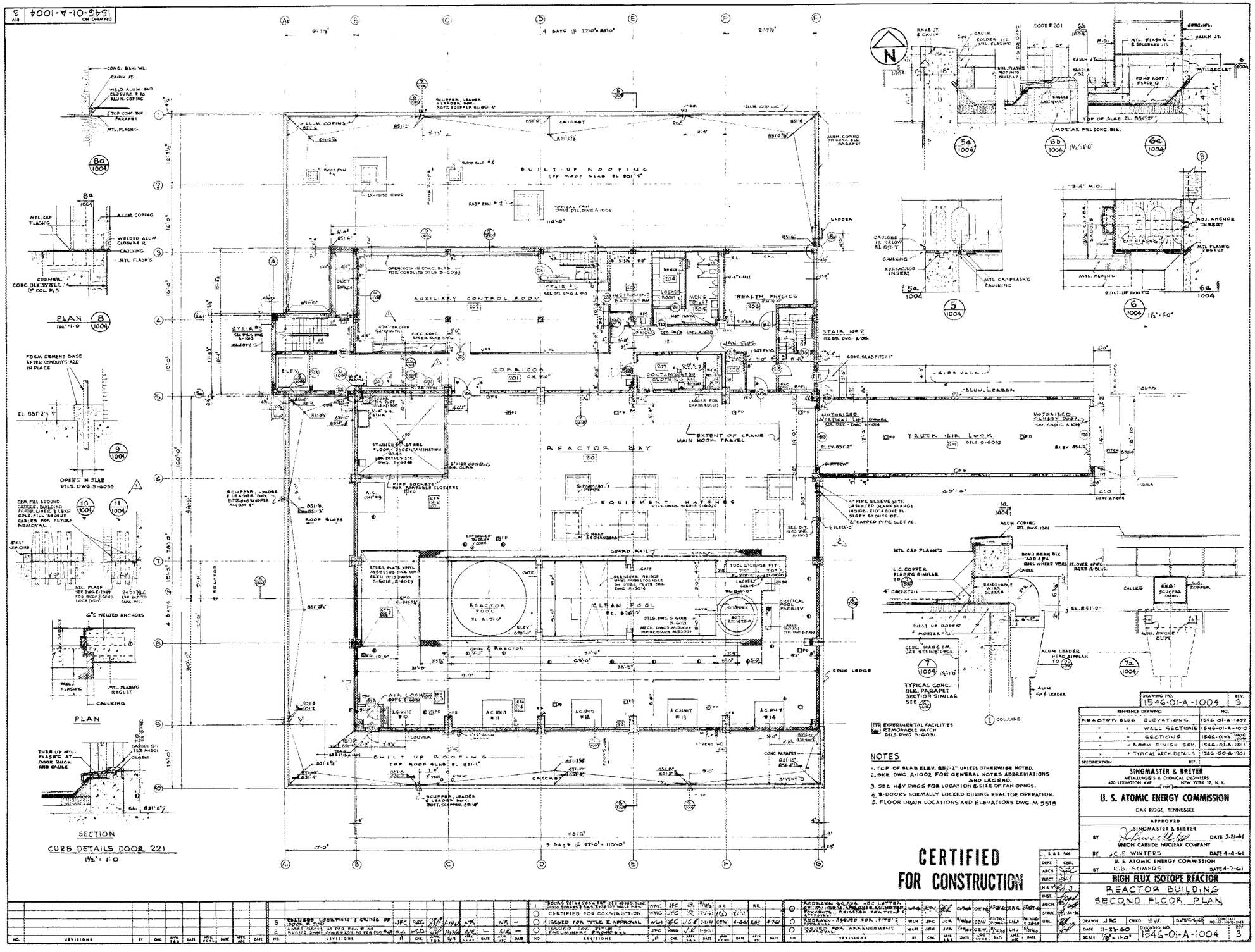
DRAWN JRC CHKD EW DATE 3-29-61 NO. 27-1-1-1-1-1-1-1 CONTROL NUMBER
DATE 11-17-60 DRAWING NO. 1546-01-A-1002 REV. 2
SCALE 1/8" = 1'-0"

HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
GROUND FLOOR PLAN

002


DRAWING NO. 1546-01-A-1003 REV. 4
H&V. EQUIP. ROOM
ELECTRICAL EQUIP. ROOM
REACTOR & AUX POOL EQUIP. ROOM
ELEVATOR HALL
EXPERIMENT AREA
REACTOR POOL
POOL
CLEAN
STAIR No. 1 PLAN AT LANDING
TRUCK AIR LOCK OVER EL FIN FL 851'-2"
DETAIL #80
HFIR RADIATION DETECTOR SLEEVE
NO SCALE
4 REQ'D
A-1002
A-1003
A-1004
SEAL WELD ALL AROUND
2-4-20 SCREWS-180° APART
SCREW SLOT DETAIL
OVERALL LENGTH DETERMINED BY WALL THICKNESS
NOTE: MIN. (1) COAT PRIMER EXTERNAL SURFACES
Notes:
1. HIGH POINT OF FLOOR SLAB NORTH OF COL. LINE 5 TO 854'-0" SOUTH OF COL. LINE 5. LOW POINT OF SLAB AT FLOOR DRAINS EL 853'-0" UNLESS OTHERWISE NOTED. FOR SLOPES & FL. DRAIN ELEVS SEE DWGS. S-6050 & S-6092.
2. SEE DWG. A-1002 FOR GENERAL NOTES, LEGEND & ABBREVIATIONS.
3. ALL CONC. BLOCK WALLS NORTH OF COL. LINE 5 TO BE STARTED WITH A 2" BASE OF CONC. BLOCK OR BRICK, DTLS A-10
4. FLOOR DRAIN LOCATIONS AND ELEVATIONS DWG. M-5519
DRAWING NO. 1546-01-A-1003 REV. 4
REFERENCE DRAWING NO.
REACTOR BLDG ELEVATIONS 1546-01-A-1007
" " WALL SECTIONS 1546-01-A-1010
" " SECTIONS 1546-01-A-1008 1009
" " ROOM FINISH SCH. 1546-01-A-1011
SPECIFICATION REF.
SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.
FOR
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
APPROVED
SINGMASTER & BREYER
BY DATE 7-21-61
UNION CARBIDE NUCLEAR COMPANY
BY G. E. WINTERS DATE 6-6-61
U. S. ATOMIC ENERGY COMMISSION
BY D. F. COMPAS DATE 4-7-61
HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
FIRST FLOOR PLAN
S. & B. 546
DEPT. CHK.
ARCH.
ELECT.
H & V.
INST.
MECH.
STRUC.
UTIL.
DRAWN GEETY CHKD E.W. DATE 12-16-60 CONTRACT NO. ET 1603 3609
DATE 11-17-60 DRAWING NO. 1546-01-A-1003 REV. 4
SCALE 1/8" = 1'-0"
CERTIFIED FOR CONSTRUCTION
NO. REVISIONS BY CHK. APP. ELEC. DATE APP. H&V. DATE APP. SEC. DATE
4 FOOT MONITOR PLATFORM & COMPUTER PENETRATION AS PER ORNL REQUEST JFC
3 ADDED ACCESS DOOR FOR DIRECT OPEN AIR FOR FLOOR DRAINS, ADDED DET. 8 & 9 & LEGEND ON PLAN OF FIG. FLOOR & REVISED WALL
2 DOOR CHANGED TO HINGE WITH VERBAL SANCTION OF ORNL SEE DWG. 1-6009 JFC
1 CONDUIT SHAFTS WAS 8" R.M. 100 WHS SH WELDING BLK. CONC. OPENINGS WNG JFC
0 CERTIFIED FOR CONSTRUCTION WLH JFC
0 ISSUED FOR TITLE II APPROVAL WLH JFC
0 ISSUED FOR TITLE I PRELIMINARY PROPOSAL WMG JFC
0 REDRAWN AS PER AEC - LETTER OF 11-15-61 PRINCIPLE ALTERATIONS CONSISTING INCLUDED FOR TITLE I APPROVAL JFC
0 REDRAWN FOR TITLE I APPROVAL WLH JFC
0 REVISED FOR ARRANGEMENT APPROVAL WLH JFC
NO. REVISIONS BY CHK. APP. ELEC. DATE APP. H&V. DATE APP. SEC. DATE

DRAWING NO. 1546-01-A-1004 REV. 3



NOTES

1. TOP OF SLAB ELEV. 851'-2" UNLESS OTHERWISE NOTED.
2. SEE DWG. A-1002 FOR GENERAL NOTES ABBREVIATIONS AND LEGEND.
3. SEE H&V DWGS FOR LOCATION & SIZE OF FAN OPNGS.
4. ⊠-DOORS NORMALLY LOCKED DURING REACTOR OPERATION.
5. FLOOR DRAIN LOCATIONS AND ELEVATIONS DWG M-5518

CERTIFIED FOR CONSTRUCTION

REFERENCE DRAWING	NO.
REACTOR BLDG. ELEVATIONS	1546-01-A-1007
" " WALL SECTIONS	1546-01-A-1010
" " SECTIONS	1546-01-A-1008 1009
" " ROOM FINISH SCH.	1546-01-A-1011
" " TYPICAL ARCH. DETAILS	1546-00-A-1901
SPECIFICATION	REF.

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
BY SINGMASTER & BREYER DATE 3-22-61
UNION CARBIDE NUCLEAR COMPANY
BY C.E. WINTERS DATE 4-4-61
U. S. ATOMIC ENERGY COMMISSION
BY R.B. SOMERS DATE 4-7-61

HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
SECOND FLOOR PLAN

DRAWN JPG CHKD E.W. DATE 10-6-60 SINGMASTER NO. 47-1901-11-2488
DATE 11-23-60 DRAWING NO. 1546-01-A-1004 REV. 3
SCALE 1/8" = 1'-0"

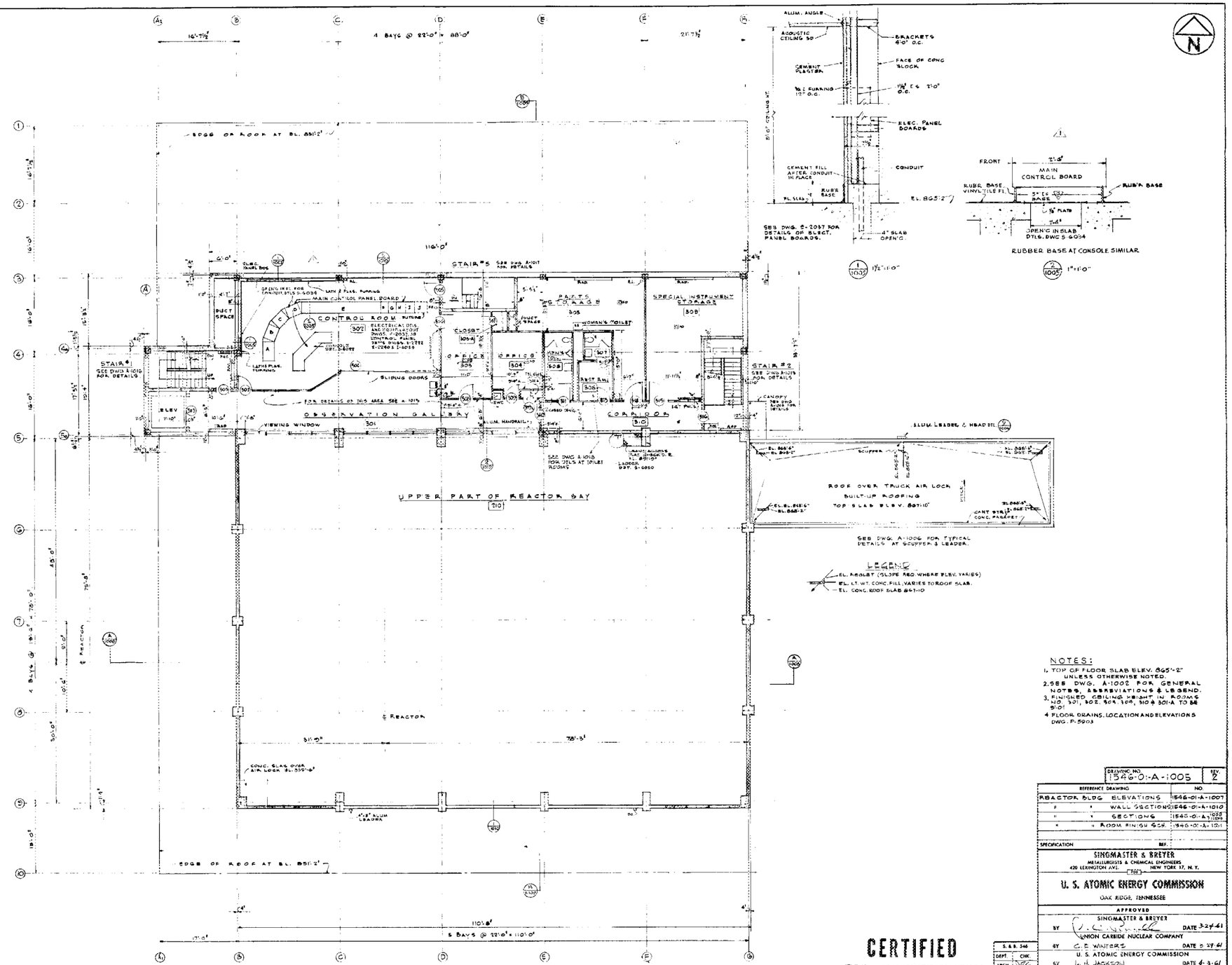
NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. ECNS.	DATE	APPR. ARC.	DATE
3	DOOR # 208	JFC						NR	—
2	ADDED INSERT AS PER FCN # 54							NR	—
1	ADDED DWGS. A-1008 & A-1009 AS PER FCN # 48							NR	—

NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. ECNS.	DATE	APPR. ARC.	DATE
1	ISSUED FOR TITLE II APPROVAL	WLH	JFC	JCR	2-14-61	CEW	4-5-61	RBS	4-7-61
0	CERTIFIED FOR CONSTRUCTION	WMG	JFC		7-7-61				
0	ISSUED FOR TITLE I PRELIMINARY ENGINEERING	JFC	WMG	JCR	1-9-61				

NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. ECNS.	DATE	APPR. ARC.	DATE
0	REDRAWN & ISSUED FOR TITLE II APPROVAL - REVISED PER FCN # 5	WLH	JFC	JCR	9/16/60	CEW	11-21-60	LHJ	12-28-60
0	ISSUED FOR ARRANGEMENT APPROVAL	WLH	JFC	JCR	7/11/60	CEW	8/10/60	LHJ	8/16/60

S.&B. 546	
DEPT.	CHK.
ARCH.	
ELECT.	
H & V	
INST.	
MECH.	
STRUC.	
UTIL.	

DRAWING NO. 1546-01-A-1005 REV. 2



NOTES:

1. TOP OF FLOOR SLAB ELEV. 865'-2" UNLESS OTHERWISE NOTED.
2. SEE DWG. A-1002 FOR GENERAL NOTES, ABBREVIATIONS & LEGEND.
3. FINISHED CEILING HEIGHT IN ROOMS NO. 301, 302, 304, 306, 310 & 301-A TO BE 8'-0"
4. FLOOR DRAINS. LOCATION AND ELEVATIONS DWG. P-5903

CERTIFIED FOR CONSTRUCTION

DRAWING NO.	1546-01-A-1005 REV. 2
REFERENCE DRAWING	NO.
REACTOR BLDG ELEVATIONS	1546-01-A-1007
" " WALL SECTIONS	1546-01-A-1010
" " SECTIONS	1546-01-A-1008
" " ROOM FINISH SCH.	1546-01-A-1011
SPECIFICATION	REF.

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N. Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER
BY C. C. Winters DATE 3-24-61
UNION CARBIDE NUCLEAR COMPANY
BY C. E. WINTERS DATE 3-29-61
U. S. ATOMIC ENERGY COMMISSION
BY L. H. JACKSON DATE 4-3-61

S. & B. 546

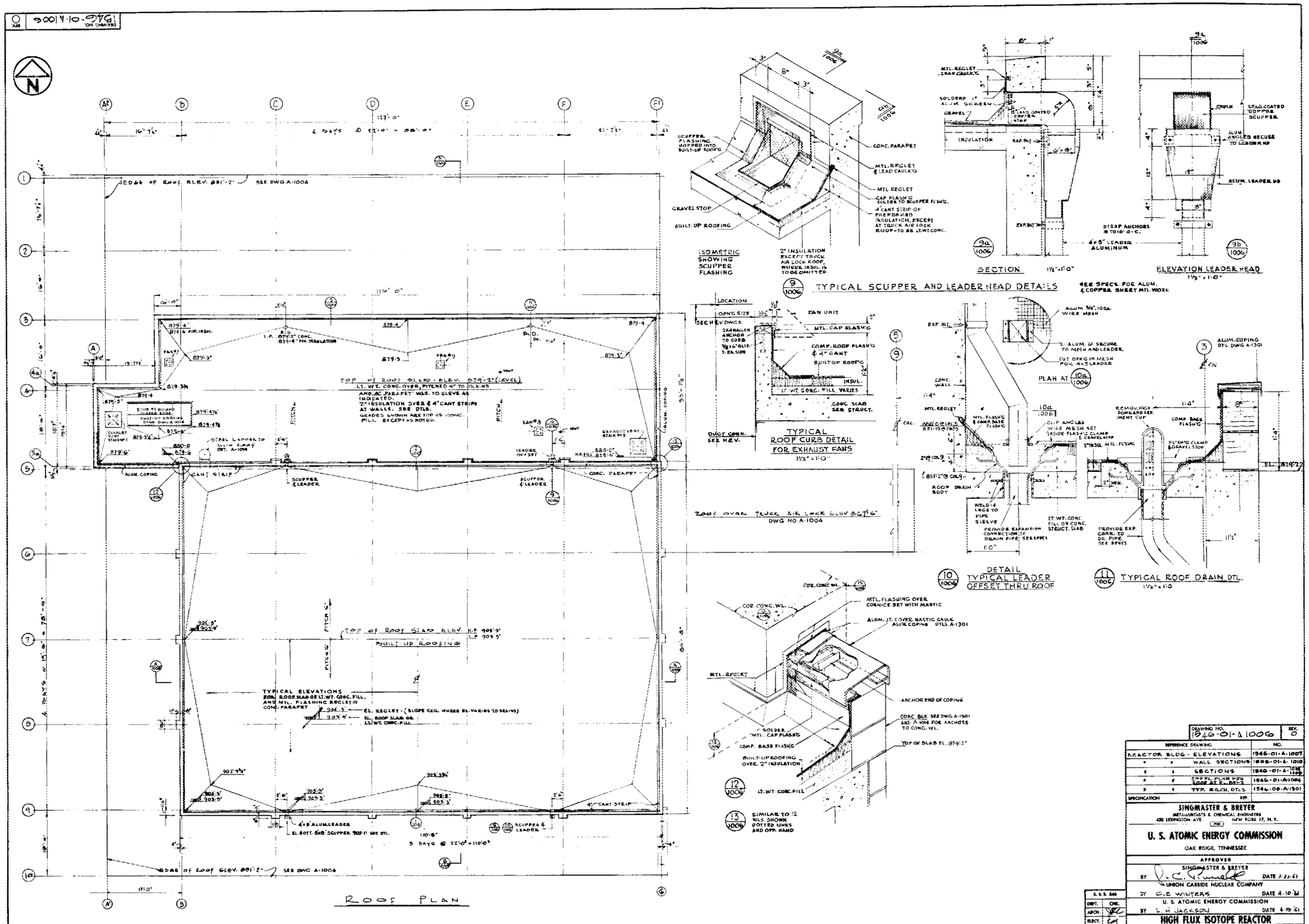
DEPT.	CHK.
ARCH.	
ELECT.	
H & V.	
INST.	
MECH.	
STRUC.	
UTIL.	

HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
THIRD FLOOR PLAN

DRAWN JFC	CHKD. EW	DATE	CO NO.	CONTRACT NO. AT-(40-1)-1546	
DATE 11-28-60	DRAWING NO. 1546-01-A-1005				REV. 2
SCALE 1/4" = 1'-0"					

NO.	REVISIONS	BY	CHK	APPR. S&B	DATE	APPR. FCNL	DATE	APPR. AEC	DATE
2	CORRECTED ANGLES IN DETAIL NO. 2-1005	JFC	NE	JFC	11-28-60	BL	—	BR	—
1	REPAIR ROOF, REFRAME BLDG. PARAPETS & ADD. PANELS & CONDUCTS LAYOUT, & DET.	JFC	JFC		11-8-60				
0	CERTIFIED FOR CONSTRUCTION	WLH	JFC		7-26-60		11-1-60		
0	ISSUED FOR TITLE II APPROVAL	WLH	JFC		3-24-60	CEW	3-24-60	LHJ	4-3-61
0	ISSUED FOR TITLE I PRELIMINARY PROPOSAL	WMR	JFC		1-19-60				

NO.	REVISIONS	BY	CHK	APPR. S&B	DATE	APPR. FCNL	DATE	APPR. AEC	DATE
0	ADD DRAWN. AS REQ. DUE LETTER DT. 10-12-60, MAS APPROVED AS NOTED	JFC	EW		10-17-60				
0	AS-BUILT FOR TITLE I APPROVAL							R.B.S.	10-19-60
0	AS-BUILT ISSUED FOR TITLE II APPROVAL	JFC	WLH	JCR	7-26-60	CEW	10-12-60 7-26-61	LHJ	10-19-60 7-26-61
0	ISSUED FOR ARRANGEMENT APPROVAL	JFC	FAV	JCR	7/29/60	CEW	8-22-61	LHJ	8-31-61



DRAWING NO.	1946-01-A1006
REV.	0

REFERENCE DRAWING	NO.
REACTOR BLDG - ELEVATIONS	1946-01-A-1007
" " WALL SECTIONS	1946-01-A-1010
" " SECTIONS	1946-01-A-1006
" " ROOF PL. PLAN NOW ROOF AT K-BAY-2	1946-01-A-1004
" " TYP. ARCH. DTLS.	1946-00-A-1301

SPECIFICATION

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

FOR

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER
BY L. C. Pumelle DATE 3-21-61
UNION CARBIDE NUCLEAR COMPANY
BY C.E. WALTERS DATE 4-10-61
U. S. ATOMIC ENERGY COMMISSION
BY L. H. JACKSON DATE 4-19-61

HIGH FLUX ISOTOPE REACTOR

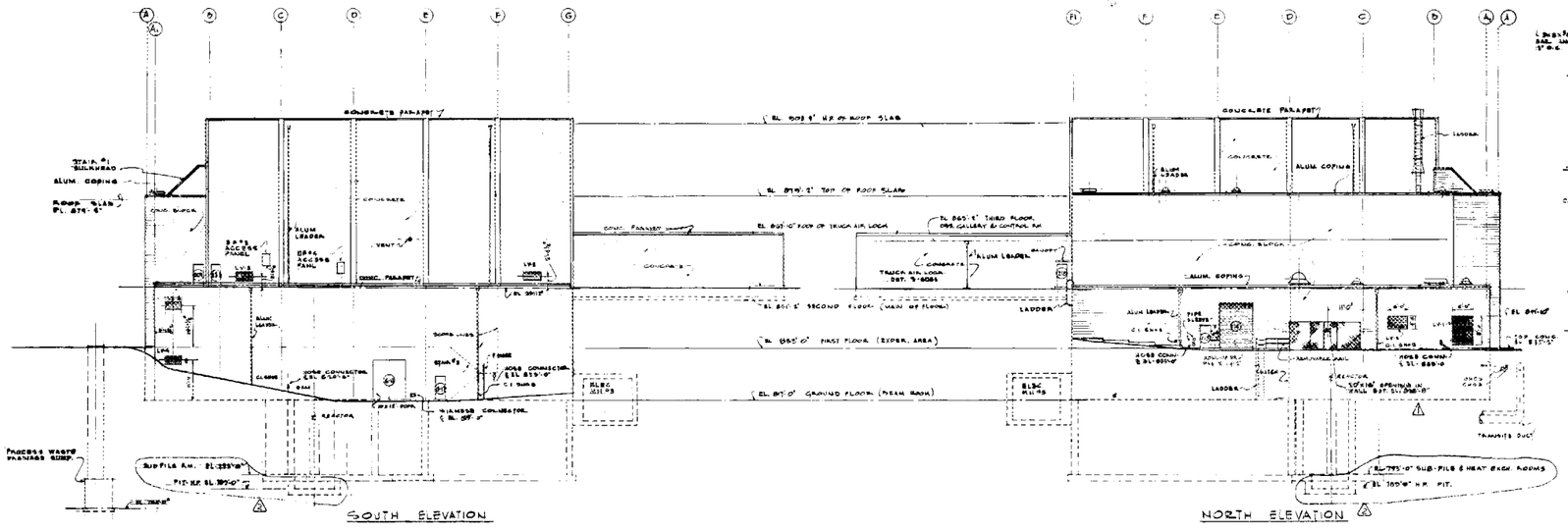
REACTOR BUILDING
ROOF PLAN AND DETAILS

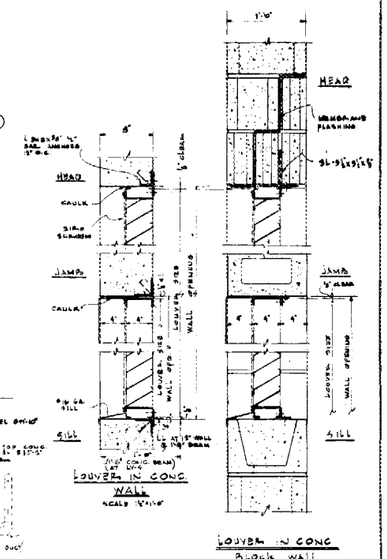
DRAWN E.W. | CHKD JFC | DATE 12-2-60 | CONTRACT NO. AT-(40-1)-2060 | REV.
DATE 12-1-60 | DRAWING NO. 1946-01-A1006 | 0
SCALE 1/8"=1'-0"

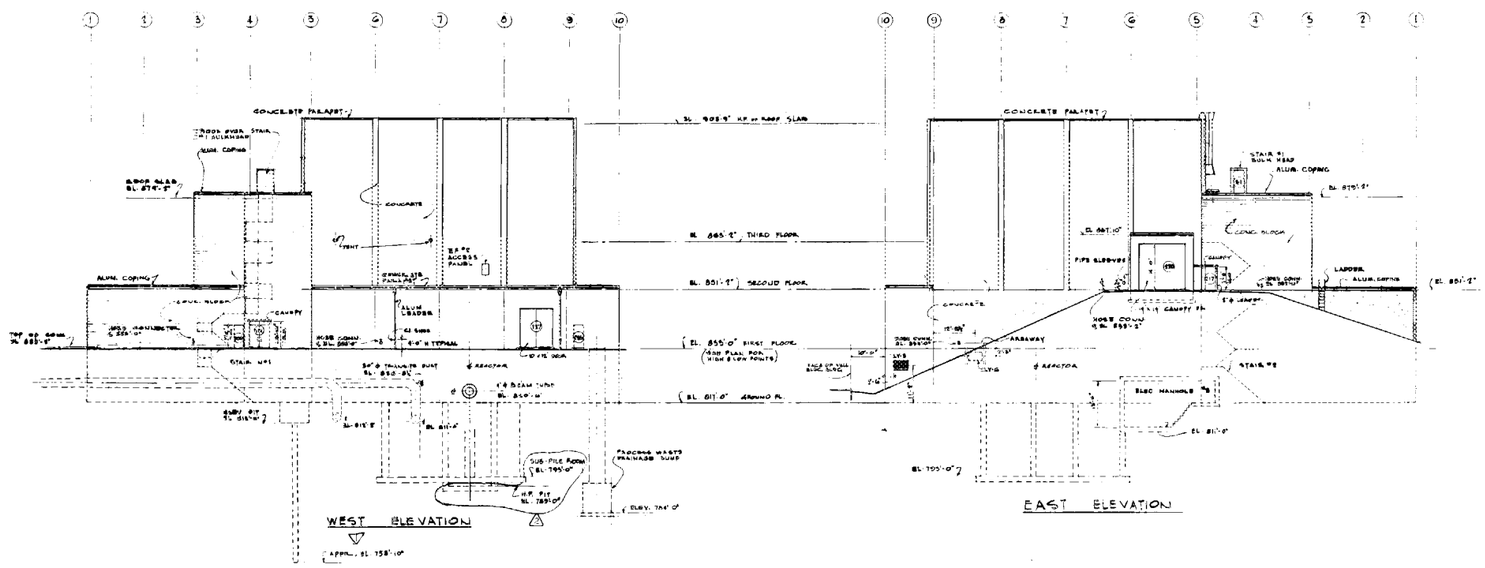
NO.	REVISIONS	BY	CHK.	APPR. E&S	DATE	APPR. MECH.	DATE	APPR. ELEC.	DATE
0	CERTIFIED FOR CONSTRUCTION	WLH	JFC	JFC	4-22-61	CSW	4-22-61	LMJ	4-25-61
1	ISSUED FOR TITLE II APPROVAL	WMS	JFC	JFC	3-31-61	CSW	4-12-61	LMJ	4-18-61
2	ISSUED FOR TITLE I APPROVAL	BAP	JFC	JFC	1-19-61	CSW	1-19-61	LMJ	1-19-61
3	ISSUED FOR TITLE I APPROVAL	BAP	JFC	JFC	1-9-61	CSW	1-9-61	LMJ	1-9-61
4	REVISED PER TITLE I APPROVAL, REVISED PER TITLE II APPROVAL	BW	JFC	JFC	11-15-60	CSW	11-21-60	LMJ	11-22-60
5	ISSUED FOR TITLE I APPROVAL	BAP	JFC	JFC	10-14-60	CSW	10-14-60	LMJ	10-14-60

U.C.C.		
DIST.	CHK.	
ARCH.		
ELECT.		
H.&V.		
INST.		
MECH.		
STRUC.		
UTIL.		

2 | 1546-01-1007
REV | DRAWING NO.







LOUVER SCHEDULE			
MK. NO.	NO. REQ.	WALL OPENING	LOUVER TYPE
LV-1	1	5'-0" x 2'-8"	FIXED LOUVER 12" C.B. WALL
LV-2		5'-0" x 4'-0"	" " " " "
LV-3	5	5'-0" x 2'-3"	" " " 8" CONC. WALL
LV-4	1	5'-0" x 2'-0"	" " " 12" CONC. WALL
LV-5	1	3'-6" x 2'-6"	" " " " "
LV-6	1	10'-0" x 2'-0"	" " " " "

NOTES

1. FOR DETAILS OF PARAPETS, SCUPPERS, LOADERS & OTHER ROOF ITEMS SEE DWG A-1004 & A-1006
2. FOR DETAILS OF LADDERS, EXT. DOORS & CANOPY AT DOORS #217 SEE DWG A-1014
3. FOR DETAILS AT STAIR No 1 BULKHEAD & DOOR #A-1 SEE DWG A-1010
4. FOR DETAILS AT DOOR # 101 CANOPY SEE DWG A-1015 FOR DOOR # 217 CANOPY DWG A-1014
5. FOR DETAILS OF FLUSH WALLS EL. 811'0" TO EL. 851'2" SEE DWG S-6005
6. FOR DETAILS OF CONC. WALLS ABOVE ELEV. 851'2" SEE DWG. S-6050.
7. FOR GRADES AT EXTERIOR WALLS DWG S. U-1009, 10, 11, 12

DRAWING NO. 1546 01 A-1007 REV. 2

REFERENCE DRAWING	NO.
REACTOR BUILDING PLANS	1546-01-A-1001 to 6
" " WALL SECTIONS	A-1008
" " SECTIONS	A-1005
" " "	A1009
SPECIFICATION	REF.

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

JOB
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER
BY R. C. Wilde DATE 3-31-61
UNION CARBIDE NUCLEAR COMPANY
BY C. E. Winters DATE 4-11-61
U. S. ATOMIC ENERGY COMMISSION
BY L. H. Jackson DATE 4-19-61

S. & B. 546
DEPT. | CHK.
ARCH. | JPC
ELECT.
H & V.
INST.
MECH.
STRUC.
UTIL.

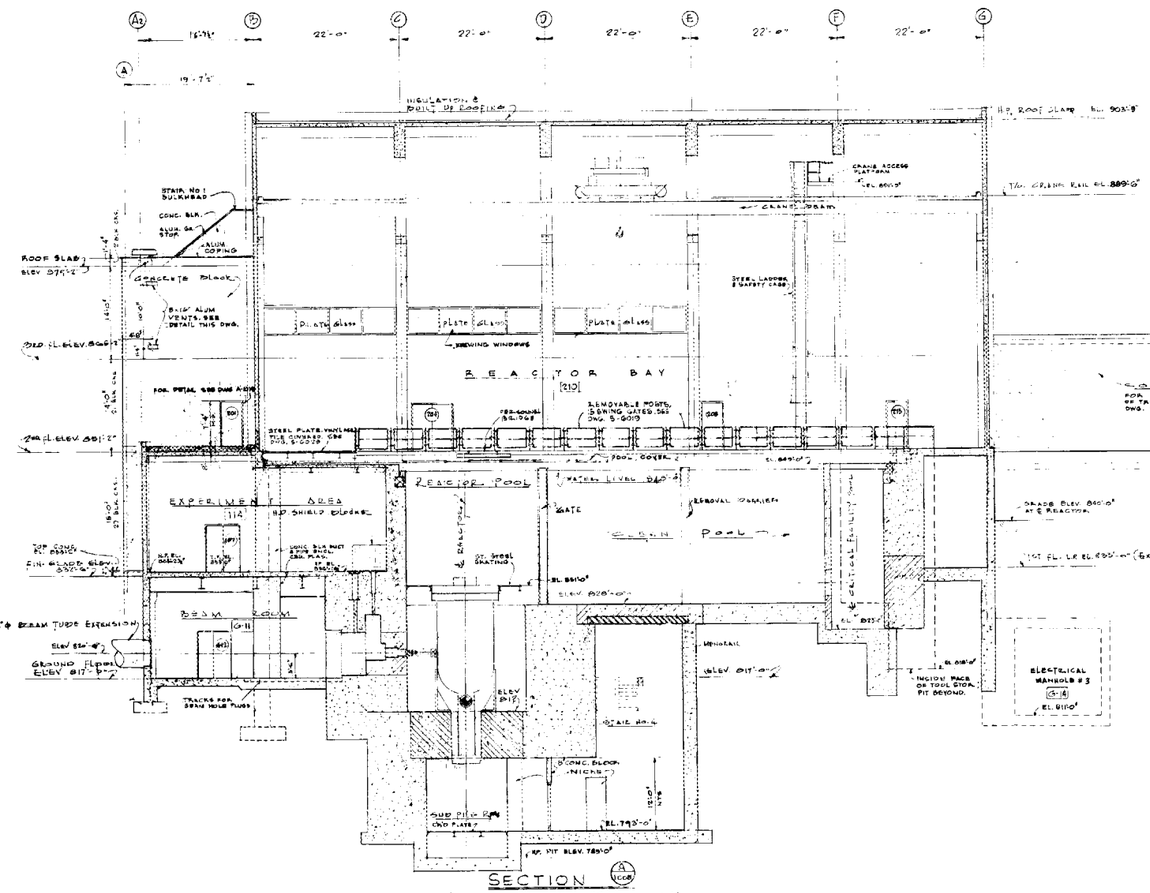
HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
ELEVATIONS

DRAWN M.L. | CHKD JPC | DATE 12-9-60 | CONTRACT NO. AT-(40-1)-1349
DATE 12-9-60 | DRAWING NO. 1546 01 A-1007 | REV. 2
SCALE 1/8" = 1'-0"

CERTIFIED FOR CONSTRUCTION

NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. UCC	DATE	APPR. AEC	DATE
2	REVISED PIT BELOW SUB-PILE ROOM	JPC	JPC					NA	
1	REVISED ELEV. AT OPENING NORTH ELEV. & AT ELEVATOR, MECH. UNITS	WMG	JPC					NA	
0	CERTIFIED FOR CONSTRUCTION	MC	JPC						
0	ISSUED FOR TITLE I APPROVAL	M.L.	JPC						
0	ISSUED FOR TITLE I PRELIMINARY PROPOSAL	RAP	JPC						
0	REDRAWN AS PER ABC LETTER DATED 10-6-60 & MEETING AT S&B 10-14 & 10-20 - TITLE CHGD. REISSUED FOR TITLE I APPROVAL	WLK							
0	ISSUED FOR TITLE I APPROVAL	WLK	JPC	JCR	11-21-60	CLW	11-30-60	HJ	11-30-60

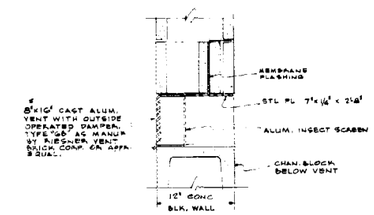
8001 Y-10-9761 ON DRAWING



SECTION A 1008

AT ϕ OF REACTOR - LOOKING NORTH

SCALE 1/8" = 1'-0"



DETAIL AT ALUM. WALL VENT.

SCALE - 1½" = 1'-0"

NOTES

① SEE DWG. A-1001 FOR GENERAL NOTES - ABBREVIATIONS AND LEGEND.

② SEE DWG. A-1009 FOR REFERENCE TO STRUCT. DWGS IN VARIOUS AREAS

CERTIFIED FOR CONSTRUCTION

NO.	REVISIONS	BY	CHK.	APPR. E&S	DATE	APPR. ARCH.	DATE	APPR. ARC.	DATE
2	REVISED FROM CONST & PT AT SUBPILE ROOM.	JRC	JRC	[illegible]	[illegible]	NR		NR	
1	REVISED RAILING AT POOL	NR	JRC	[illegible]	[illegible]	NR		NR	
0	CERTIFIED FOR CONSTRUCTION	MC	JRC	[illegible]	[illegible]	[illegible]	[illegible]		
0	ISSUED FOR TITLE II APPROVAL	MC	JRC	[illegible]	[illegible]	CSW	[illegible]	LHJ	[illegible]

NO.	REVISIONS	BY	CHK.	APPR. E&S	DATE	APPR. ARCH.	DATE	APPR. ARC.	DATE
0	ISSUED FOR "FILE" PRELIMINARY PROPOSAL	MAP	JRC	[illegible]	[illegible]				
	REDRAWN TO REF. LEG. LETTER JAN 10								
	10 INDICATED WORK BALANCED	TEAM	JED	[illegible]	[illegible]				
	REVISED FOR TITLE I APPROVAL								
0	ISSUED FOR TITLE I APPROVAL	MAP	[illegible]	[illegible]	[illegible]	CEW	[illegible]	[illegible]	[illegible]

NO.	REVISIONS	BY	CHK.	APPR. E&S	DATE	APPR. ARCH.	DATE	APPR. ARC.	DATE

E.S.D. 346	
DEPT.	CHK.
ARCH.	SFC
ELECT.	[illegible]
M & V.	[illegible]
INST.	[illegible]
MECH.	[illegible]
STRUC.	[illegible]
UTIL.	[illegible]

REFERENCE DRAWING

REFERENCE DRAWING	NO.
REACTOR BLDG. PLANS	1546-01-A-1001 TO 1006 INCL.

SPECIFICATION REF.

SINGMASTER & BREYER
METALLURGICAL & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N. Y.

FOR

U. S. ATOMIC ENERGY COMMISSION

OAK RIDGE, TENNESSEE

APPROVED

SINGMASTER & BREYER
BY [signature] DATE 3-21-61

UNION CARBIDE NUCLEAR COMPANY
BY C. E. WINTERS DATE 4-4-61

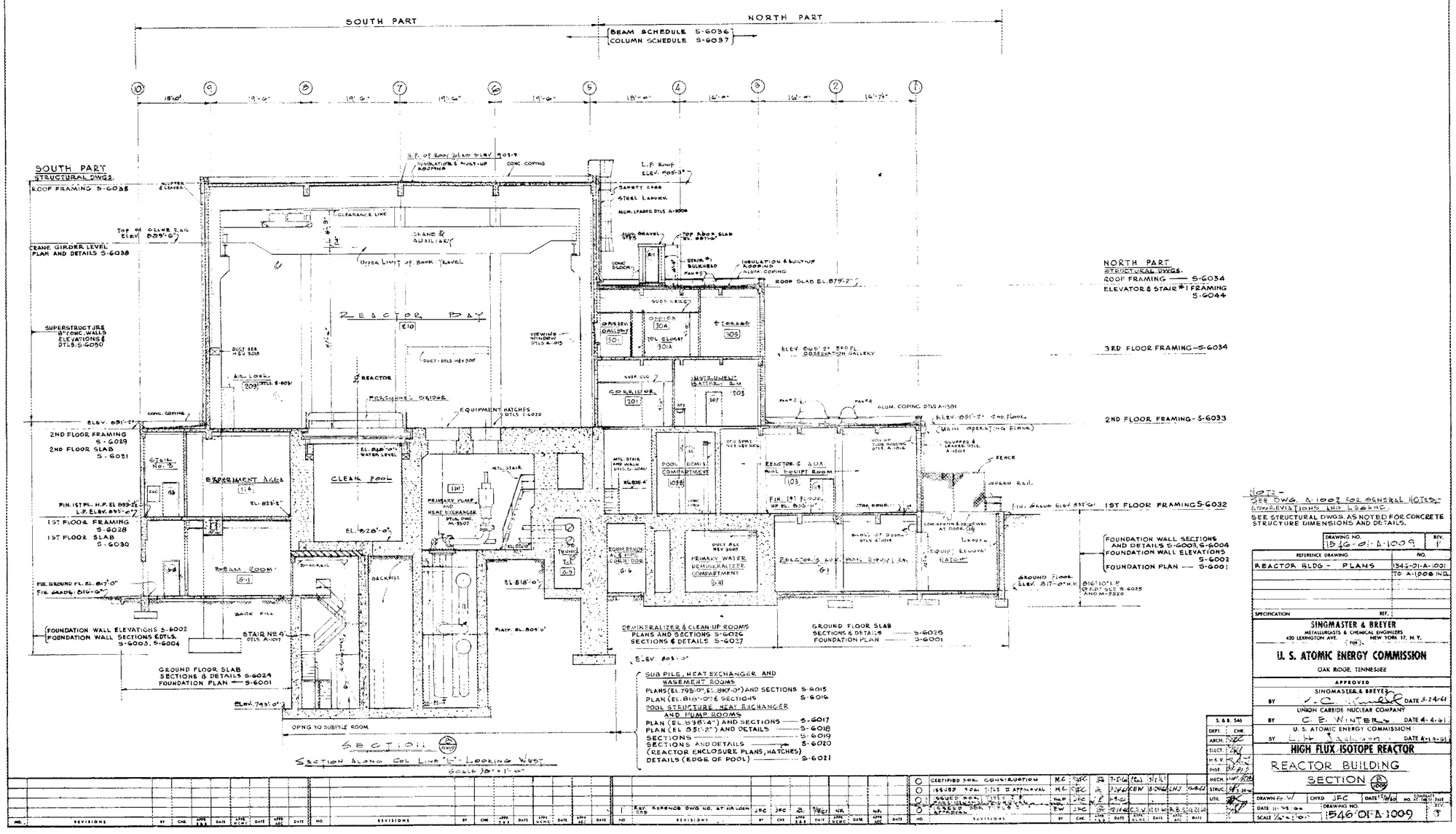
U. S. ATOMIC ENERGY COMMISSION
BY L. H. JACKSON DATE 4-19-61

HIGH FLUX ISOTOPE REACTOR

REACTOR BUILDING

SECTION A 1008

DRAWN S. W.	CHKD W.C.	DATE 2-8-61	NO. CONTROL DRAWING
DATE 11-22-60	DRAWING NO. 1546-01-A-1008		REV. 2
SCALE 1/8" = 1'-0"			



NOTE - SEE DWG. A-1002 FOR GENERAL NOTES, ABBREVIATIONS AND LEGEND.
SEE STRUCTURAL DWGS. AS NOTED FOR CONCRETE STRUCTURE DIMENSIONS AND DETAILS.

DRAWING NO.	REV.
1B 16-01-A-1009	1

REFERENCE DRAWING	NO.
REACTOR BLDG - PLANS	546-01-A-1001
	TO A-1008 INCL.

SPECIFICATION REF.

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

FOR

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER
BY J. C. [illegible] DATE 3-24-61
UNION CARBIDE NUCLEAR COMPANY
BY C. E. WINTER DATE 4-4-61
U. S. ATOMIC ENERGY COMMISSION
BY L. H. [illegible] DATE 4-12-61

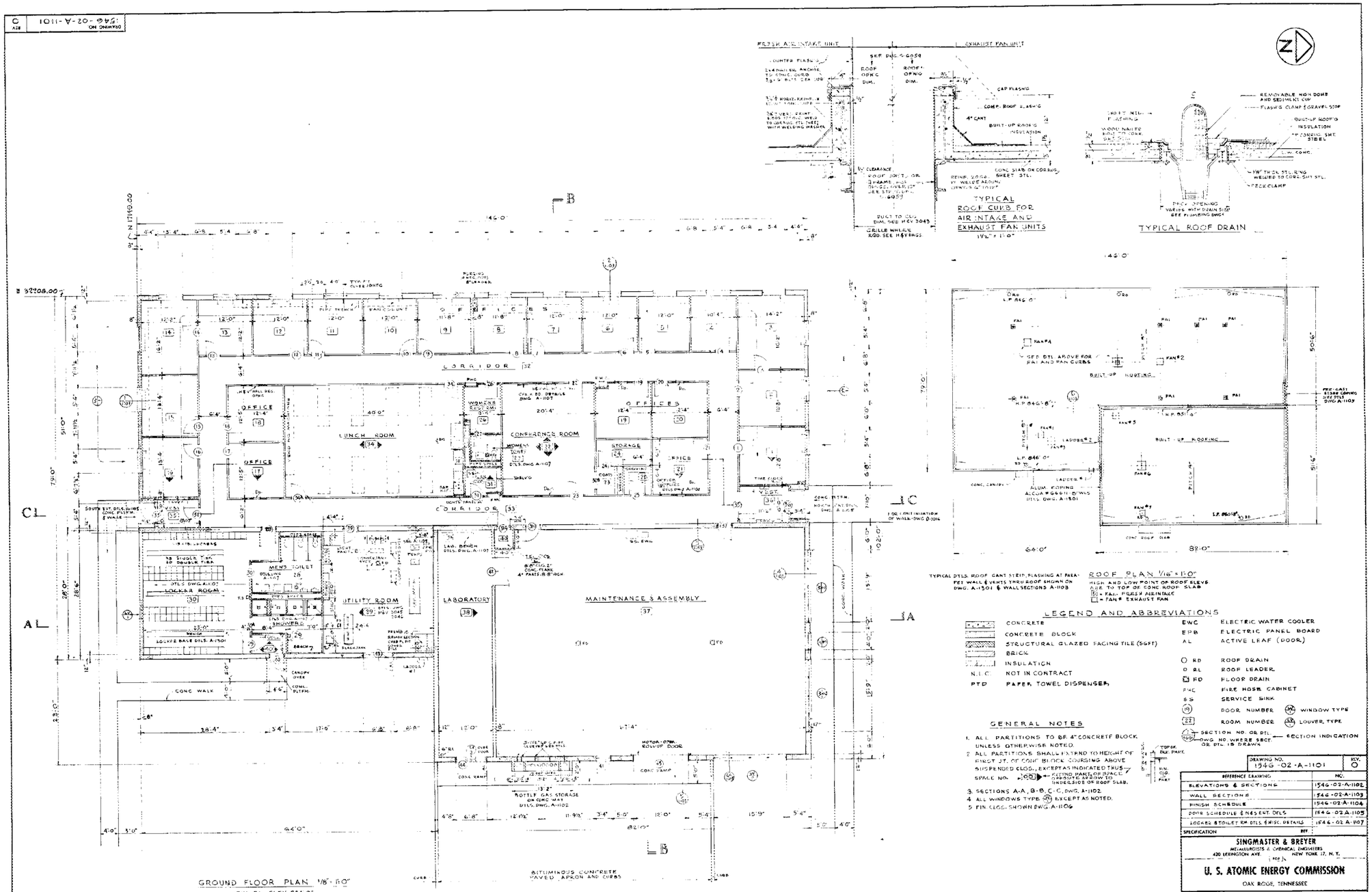
HIGH FLUX ISOTOPE REACTOR

REACTOR BUILDING
SECTION

DRAWN BY W	CHKD JFC
DATE 11-15-60	DRAWING NO. 546-01-A-1009
SCALE 1/8" = 1'-0"	REV. 1

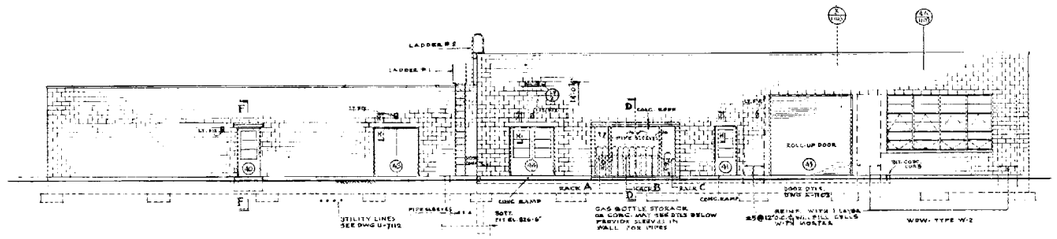
009

DRAWING NO. 1546-02-A-1101 REV. C

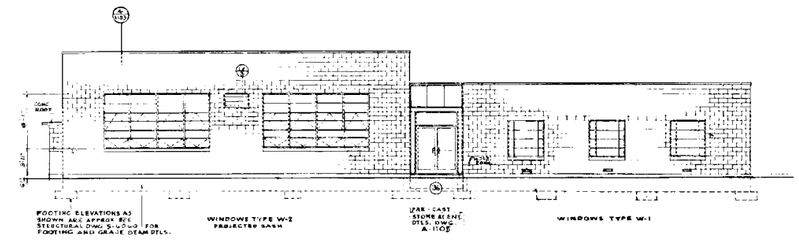


010

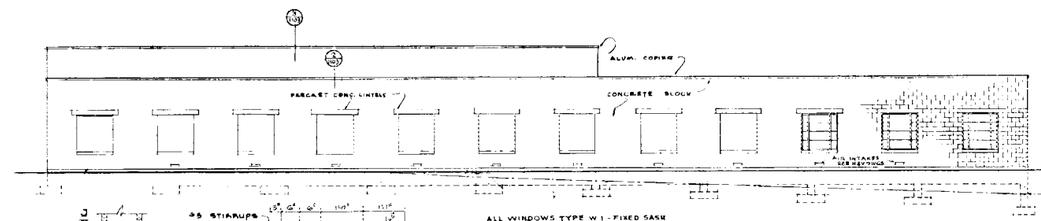
DRAWING NO. 1546-02-A-1102 O



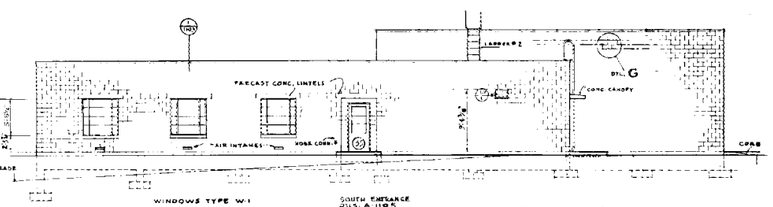
EAST ELEVATION



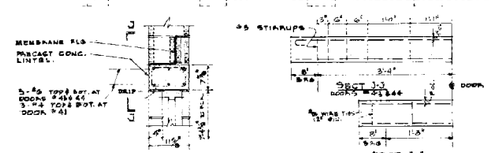
NORTH ELEVATION



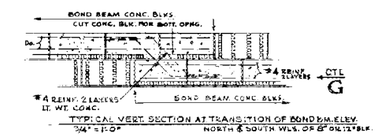
WEST ELEVATION



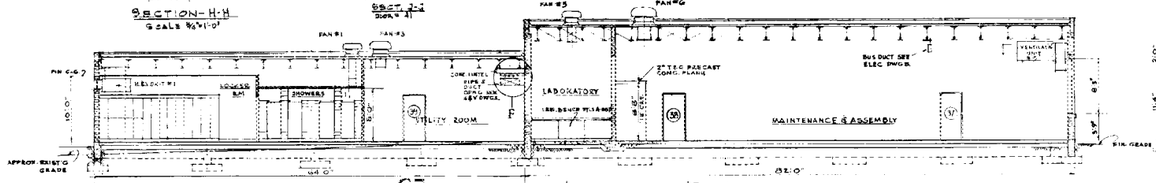
SOUTH ELEVATION



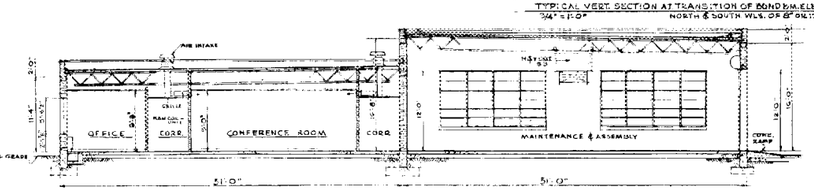
SECTION H-H



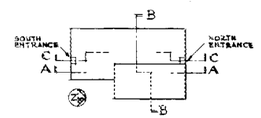
TYPICAL VERT. SECTION AT TRANSITION OF BOND BM. ELEV. NORTH & SOUTH WLS. OF 8" OR 12" BLK.



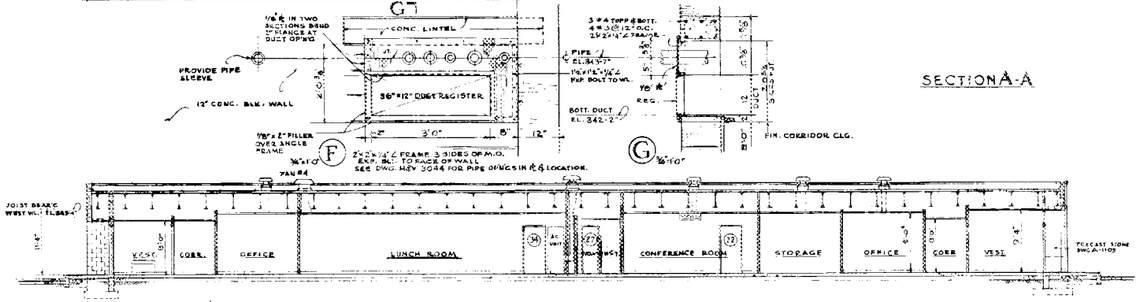
SECTION A-A



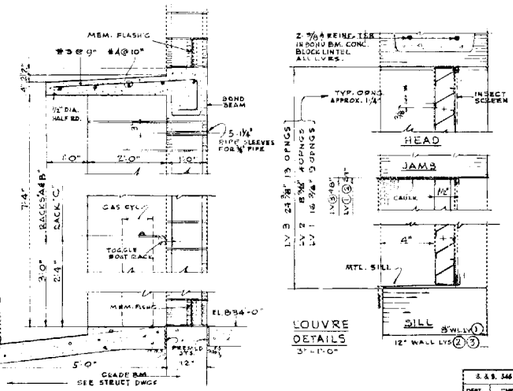
SECTION B-B



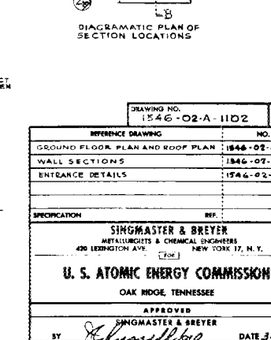
DIAGRAMATIC PLAN OF SECTION LOCATIONS



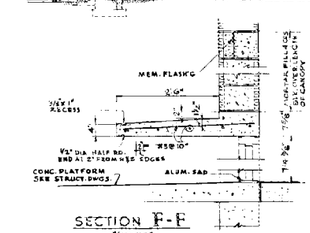
SECTION C-C



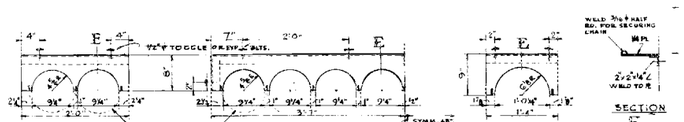
SECTION D-D



LOUVRE DETAILS



SECTION F-F



BOTTLE GAS STORAGE DETAILS

DRAWING NO.	REV.
1546-02-A-1102	O

REFERENCE DRAWING	NO.
GROUND FLOOR PLAN AND ROOF PLAN	1546-02-A-1101
WALL SECTIONS	1546-02-A-1105
ENTRANCE DETAILS	1546-02-A-1107
SPECIFICATION	REF.

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
BY SINGMASTER & BREYER DATE 3-9-61
UNION CARBIDE NUCLEAR COMPANY
BY C.E. WINTERS DATE 3-17-61
U. S. ATOMIC ENERGY COMMISSION
BY L.H. JACKSON DATE 3-21-61

HIGH FLUX ISOTOPE REACTOR
OFFICE AND MAINTENANCE BUILDING
ELEVATIONS AND SECTIONS

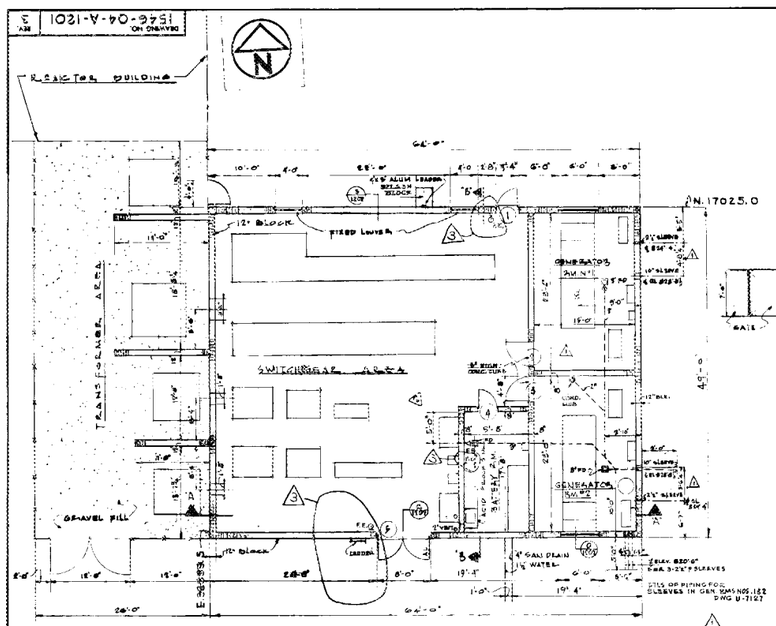
DRAWN GEETY	CHKD WLH	DATE 12-7-60	DRAWING NO. 1546-02-A-1102
SCALE 1/8"=1'-0"		CONTRACT NO. AT-(40-1)-2000	REV. O

NO.	REVISIONS	BY	CHK.	APPD. ENG.	DATE	APPD. ARCH.	DATE	APPD. MECH.	DATE
O	ISSUED FOR TITLE II APPROVAL	WMG	RSN			CEW	2-15-61	LHJ	3-21-61
O	ISSUED FOR TITLE I PRELIMINARY PROPOSAL	WMG	JFC						
O	REDRAWN AS PER CHANGES IN TITLE I-B, AS ISSUED FOR TITLE I APPROVAL	WMG	JFC			CEW	11-9-60	ABS	12-30-60
O	ISSUED FOR TITLE I APPROVAL	FAP	JFC			CEW	11-7-60	LHJ	12-1-60
C	CERTIFIED FOR CONSTRUCTION	WMG	JFC			CEW	2-7-61	LHJ	2-7-61

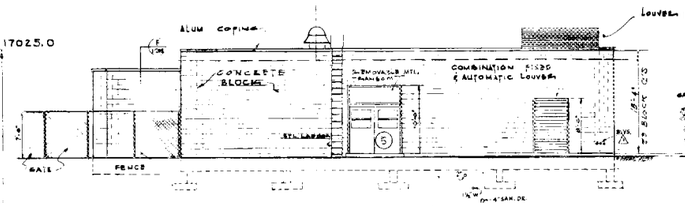
DEPT.	CHK.	
ARCH.		
ELECT.		
H&V.		
INST.		
MECH.		
STRUC.		
UTIL.		

011

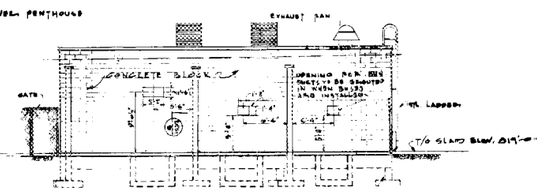
DRAWING NO. 1546-04-A-1201 REV. 3



FLOOR PLAN
SCALE 1/8" = 1'-0"

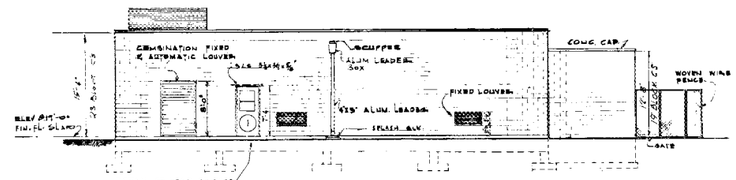


SOUTH ELEVATION



WEST ELEVATION

FOR BOTT. ELEV. OF FOOTING SEE DWG 1546-01-S-6065

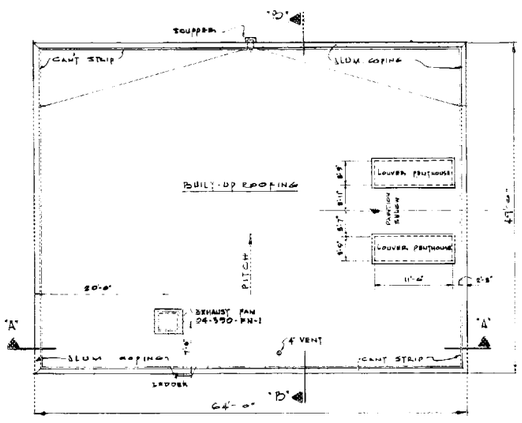


NORTH ELEVATION
SCALE 1/8" = 1'-0"

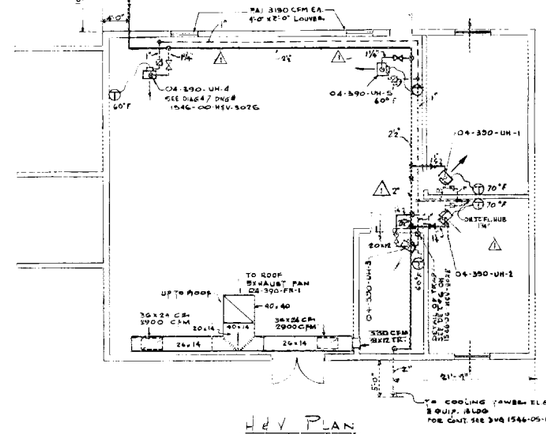
DOOR NO.	DOOR TYPE	DOOR OPG WIDTH	DOOR OPG HEIGHT	THICK	MAT	SWING	GLASS	FRAME TYPE	FRAME MAT	HARDWARE TYPE	HARDWARE SET NO.	REMARKS
1	B	5'-0"	7'-1½"	1¾"	W.M.	LHR	—	GLAZE BLNK.	19	P.S.	3-4	9	
2	A	3'-0"	8'-0"	1¾"	W.M.	LHR	—	13	P.S.	—	25		
3	A	3'-0"	8'-0"	1¾"	W.M.	RHR	—	13	P.S.	—	25		
4	A	3'-0"	7'-0"	1¾"	W.M.	W.M.	—	13	P.S.	—	2	
5	B	7'-0"	7'-0"	1¾"	W.M.	DBL. ACCESS		19	P.S.	5-6	12	5'-8½" LOUVER; REMOVABLE TRANSOM

DOORS SCHEDULE

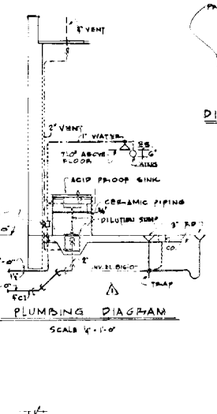
NOTE
FOR DOOR TYPES SEE DWG No 1946-01-A-1012 REACTOR BLDG
FOR FRAME & SADDLE TYPES SEE DWG No 1946-00-A-1801



ROOF PLAN
SCALE 1/8" = 1'-0"



HEV PLAN
SCALE 1/8" = 1'-0"



PLUMBING DIAGRAM
SCALE 1/8" = 1'-0"

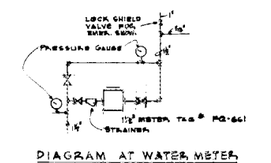
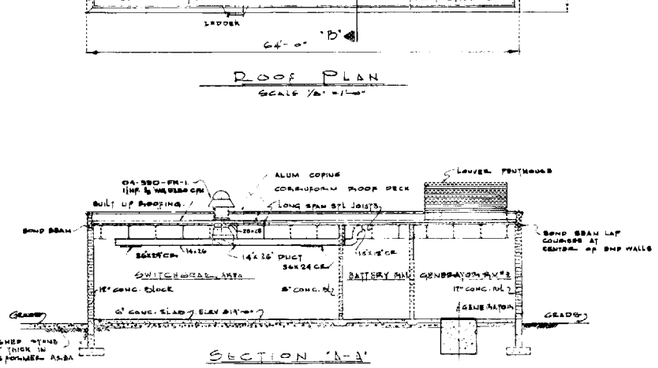
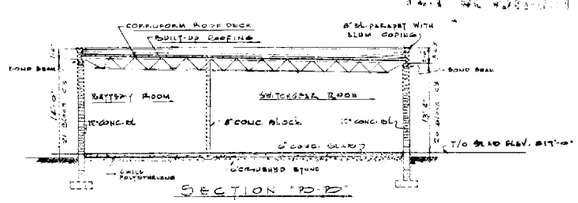


DIAGRAM AT WATER METER
NO SCALE

GENERAL NOTES
1. SEE DWG. A-1002 FOR LEGEND & ABBREVIATIONS.
2. FLOOR FINISH WILL BE STEEL TROWELED CONC. IN SWITCHGEAR AREA & DIESEL GEN. ROOM & VINYL COATING ON BATTERY RM FLOOR.
3. FOR FINISH PAINTING SEE SPEC. NO 27 FOR PROTECTIVE COATING SEE SPEC. NO 109.
4. SEE DWG A-1201 FOR LOUVER, AUTOMATIC LOUVERS WALL SECTIONS ROOF CURBS & LADDER DETAILS
5. SEE DWG A-1005 FOR DETAILS AT SCUPPERS & LEADER BOX.
6. FOR CONTINUATION OF PIPING OUTSIDE OF BLDG. SEE DWG. U-7114
7. FOR PLUMBING LEGEND SEE DWG P-8905



SECTION 'A-A'



SECTION 'D-D'

NOTE:
SIZE OF LOUVERS & LOUVER PENTHOUSES IN GENERATOR RMS SHALL BE VERIFIED WITH CERTIFIED GENERATOR VENDOR PRINTS BEFORE SUBMITTING SHOP DRAWINGS.

DRAWING NO.	REV.
1946-04-A-1201	3

REFERENCE DRAWING	NO.
WALL SECTIONS	1946-04-A-1908
UTILITY PLAN - YARD PIPING	1946-05-U-7128
FLOOR & ROOF FRAMING PLANS	1546-04-S-6002
FOUNDATIONS & EQUIPMENT SETTINGS	1546-06-S-6063
H&V SPEC. SECT. 100, H&V DUCT & PIPING DTLS.	1946-00 H&V NOTES & DETAILS
SPECIFICATION	REF.

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER
BY J.C. Russell DATE 3-31-61
UNION CARBIDE NUCLEAR COMPANY
BY W.L.M. ORGAN DATE 5-6-61
U. S. ATOMIC ENERGY COMMISSION
BY L.H. JACKSON DATE 5-9-61

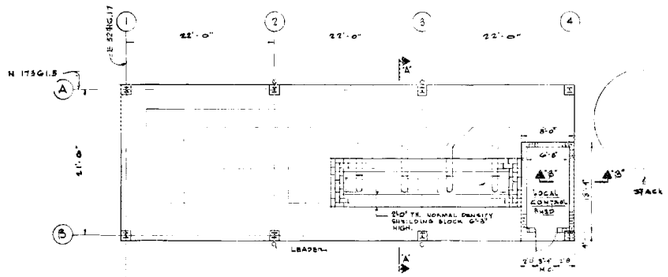
HIGH FLUX ISOTOPE REACTOR
ELECTRICAL BUILDING
PLANS, SECTIONS & ELEVATIONS

DRAWN BY: W	CHKD. JFC
DATE 12-14-60	DRAWING NO. 1946-04-A-1201
SCALE AS NOTED	REV. 3

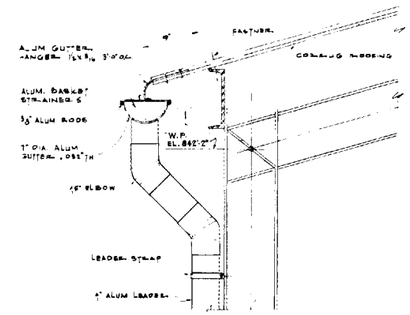
S.E.B. 546
DEPT. CHK.
ARCH.
ELECT.
H & V
INST.
MECH.
STRUC.
UTIL.

NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. U.C.N.C.	DATE	APPR. AEC	DATE
3	REVISED TYPE HOOD TABLE HANGERS & ADDED SUPPORT FOR SCUPPER & LEADER BOX	MLG	JWB		11/22/61	NR	—	NR	—
2	CHANGED FROM 'C' TO 'A' SUPPORTS & ADDED FLOOR SLAB EL. FOR DIESEL GENERATOR	JFC	NF	11/14/61	11/14/61	NF	—	NR	—
1	CH. COND. DRAIN CONN. TO FLUE BELL, VOL. SLOW & FUSE WITH TAG & ELEV. TAP 8"	WMG	JFC			NA		NR	
	ADDED SIZES TO STEAM & REF. PIPING	K.M.							

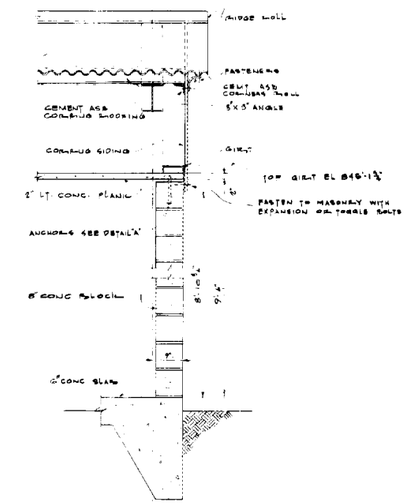
NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. U.C.N.C.	DATE	APPR. AEC	DATE
0	CERTIFIED FOR CONSTRUCTION	W.C.	JFC						
0	ISSUED FOR TITLE II APPROVAL	W.C.	JFC		9/14/61	W.L.M.	9-6-61	L.H.J.	9-9-61
0	ISSUED FOR TITLE I PRELIMINARY APPROVAL	M.S.	JFC						
0	ISSUED FOR TITLE I APPROVAL	B.W.	JFC		7-7-61				



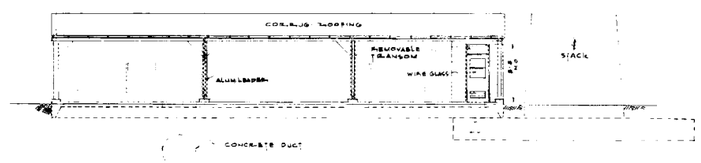
FLOOR PLAN
SCALE 1/4"=1'-0"



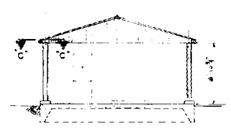
EAVE & GUTTER DETAIL
SCALE 1½"=1'-0"



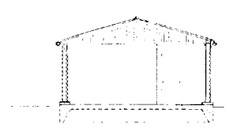
SECTION 'B-B'
SCALE 3/4"=1'-0"



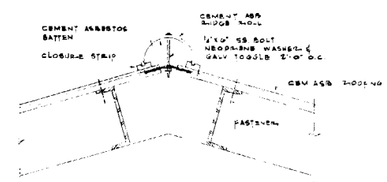
SOUTH ELEVATION
SCALE 3/8"=1'-0"



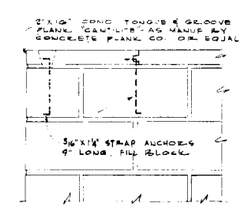
WEST ELEVATION
SCALE 3/8"=1'-0"



EAST ELEVATION
SCALE 3/8"=1'-0"



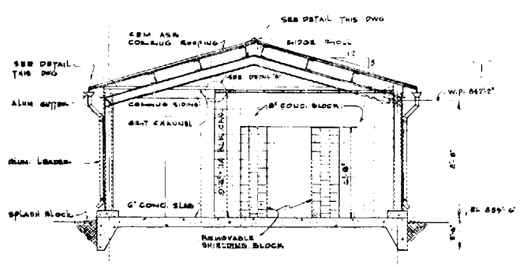
RIDGE ROLL DETAIL
SCALE 1½"=1'-0"



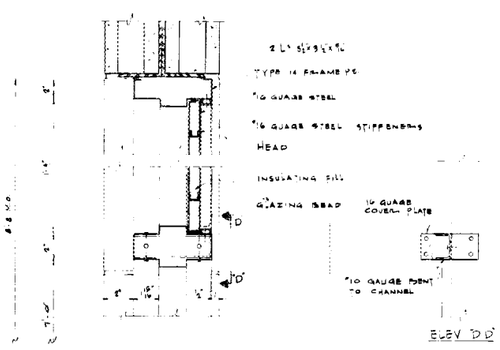
DETAIL 'A'
SCALE 1½"=1'-0"

NOTES

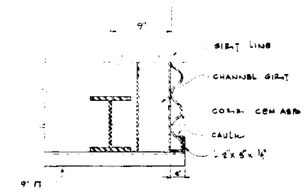
1. SEE DWG 1946-0-A-1003 FOR GENERAL NOTES, LEGEND & ABBREVIATIONS
2. DOORS TO BE HM 3'-0" x 7'-0" x 1¾" TH. TYPE 'D' AS SHOWN ON DWG 1946-01-A-1012. FRAME SHALL BE TYPE 14 AS SHOWN ON DWG 1946-00-A-1501. HARDWARE SHALL BE SET #3. DOOR TO HAVE 2'-0"x 1'-0" ADJUSTABLE LOUVER. FOR TYPICAL DETAIL SEE
3. SEE SPEC SECTION 12 FOR DESCRIPTION AND SPACING OF FASTENERS FOR CORRG. CEM ASB.
4. SEE SPEC. NO 27 FOR FINISH PAINTING SEE SPEC. NO 100 " PROTECTIVE COATINGS.



SECTION 'A-A'
SCALE 1/4"=1'-0"



REMOVABLE TRANSOM DETAIL
SCALE 3/4"=1'-0"



SECTION 'C-C'
SCALE 1½"=1'-0"

NO.	REVISIONS	BY	CHK.	APPR. ENG.	DATE	APPR. ARCH.	DATE	APPR. ARC.	DATE
1	ADDED LOUVER IN DOOR, INDICATED W.P. OR STEEL PALVES.	JBC	JBC		4/26/61	N.A.		N.A.	
0	CERTIFIED FOR CONSTRUCTION	MC	JBC		4/14/61				
0	155-20 FOR FINAL APPROVAL	MC	JBC		3-30-61	CEW	3/29/61		3/29/61

S. & S. 546		
DEPT.	CHK.	
ARCH.	JBC	
ELECT.		
H & V		
INST.		
MECH.		
STRUC.	JBC 3-23-61	
UTIL.		

REFERENCE DRAWING	NO.
STEEL FRAMING FAN SHED	1946-0-S-0076
FOUNDATION SLAB " "	1946-03-S-0078
FAN & SCREENING DETAILS	1946-03-MEY-5095

SPECIFICATION REV.

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
430 LEXINGTON AVE. NEW YORK 17, N. Y.

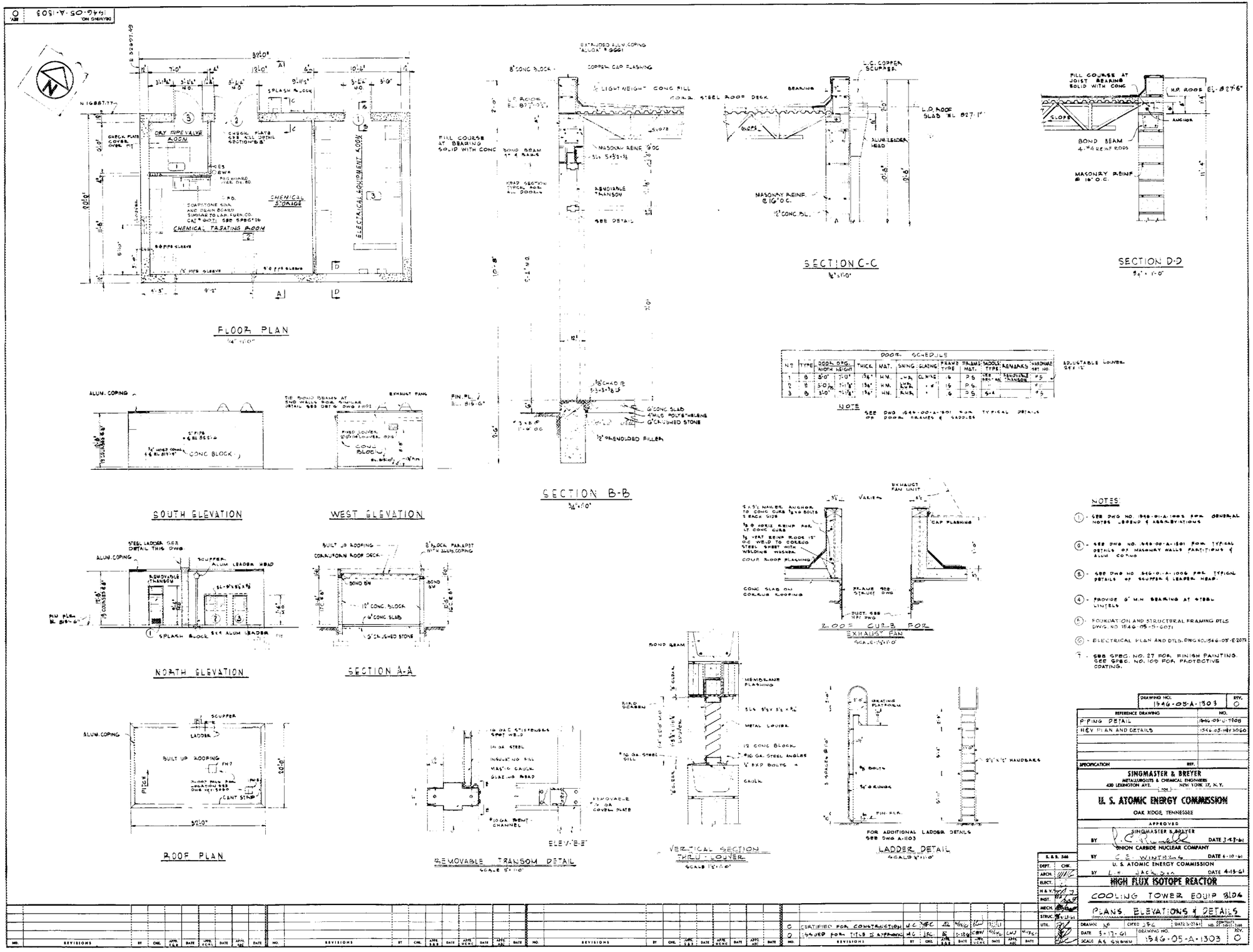
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

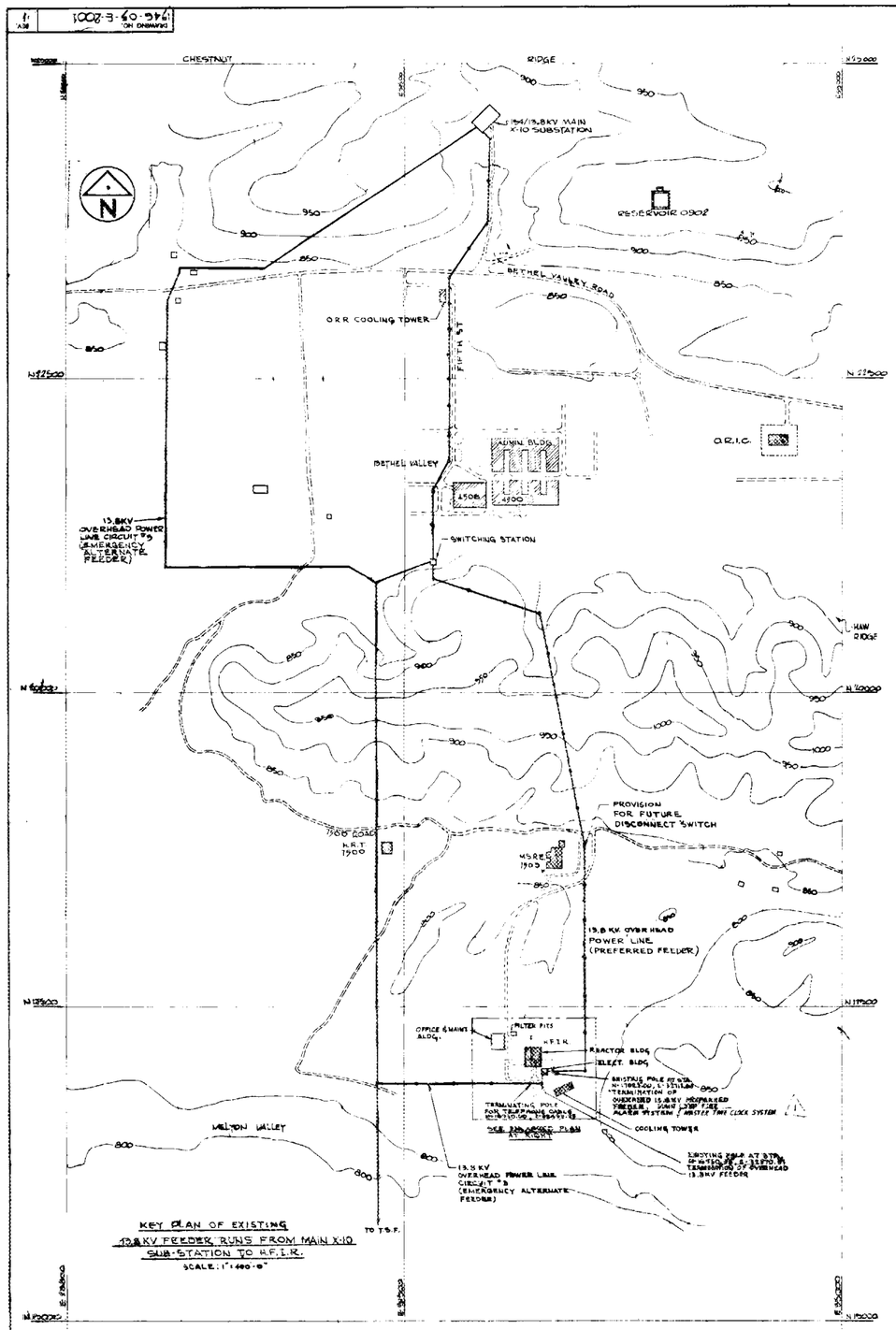
APPROVED
SINGMASTER & BREYER
BY [signature] DATE 3-17-61
UNION CARBIDE NUCLEAR COMPANY
BY C. E. WINTERS DATE 5-17-61
U. S. ATOMIC ENERGY COMMISSION
BY L. H. JACKSON DATE 5-22-61

HIGH FLUX ISOTOPE REACTOR
FAN SHED
PLANS ELEVATION & DETAILS

DRAWN M. C. CHKD J. F. C. DATE 5-10-61 NO. CONTRACT 27-INST-1004
DATE 3-8-61 DRAWING NO. 1946-03-A-1902 REV. 1
SCALE AS SHOWN

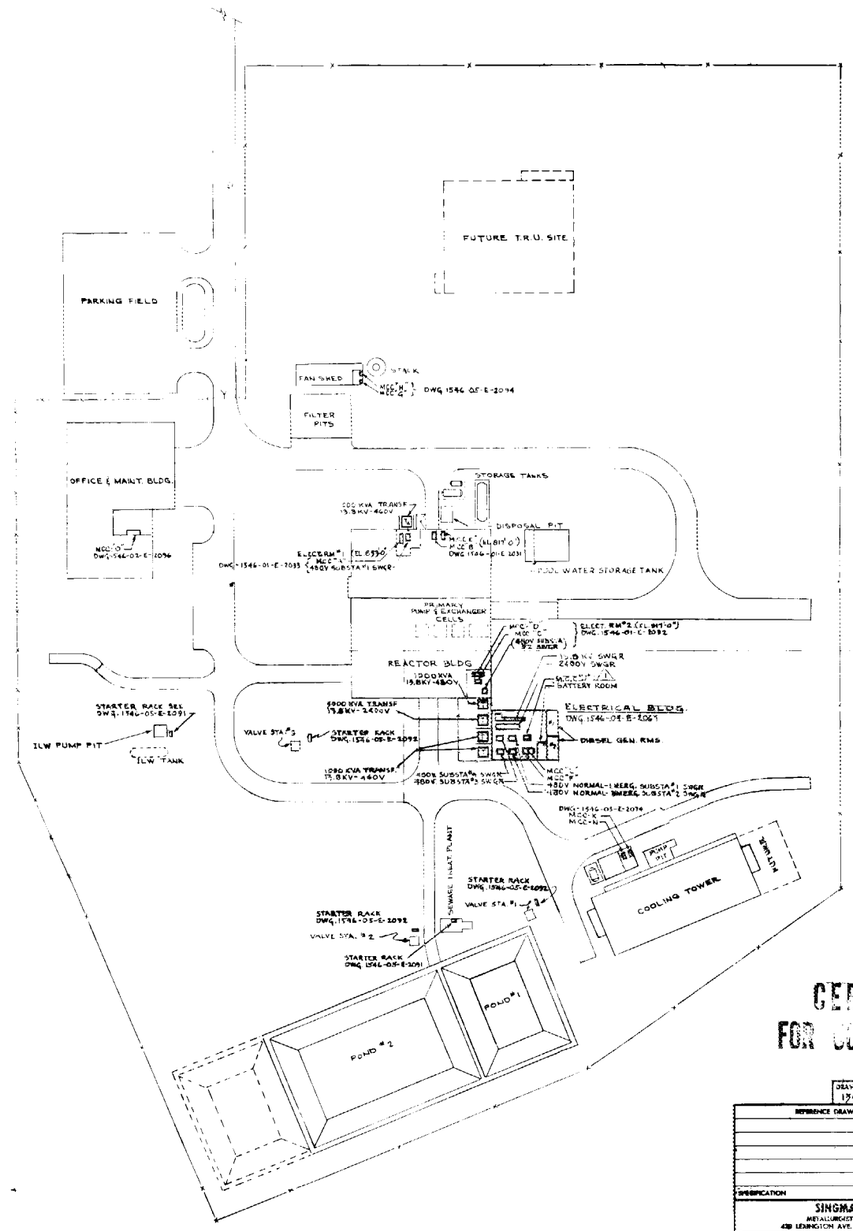
DRAWING NO. 1946-03-A-1902 REV. 1


FLOOR PLAN
1/4" = 1'-0"
DRY PIPE VALVE ROOM
CHEMICAL STORAGE
CHEMICAL TESTING ROOM
ELECTRICAL EQUIPMENT ROOM
SOUTH ELEVATION
WEST ELEVATION
NORTH ELEVATION
SECTION A-A
SECTION B-B
3/4" = 1'-0"
SECTION C-C
3/4" = 1'-0"
SECTION D-D
3/4" = 1'-0"
ROOF PLAN
REMOVABLE TRANSOM DETAIL
SCALE 3/4" = 1'-0"
VERTICAL SECTION THRU LOUVER
SCALE 1 1/2" = 1'-0"
LADDER DETAIL
SCALE 3/4" = 1'-0"
ROOF CURB FOR EXHAUST FAN
SCALE 1 1/2" = 1'-0"
DOOR SCHEDULE
NOTES:
1. SEE DWG NO. 1946-01-A-1005 FOR GENERAL NOTES, LEGEND & ABBREVIATIONS
2. SEE DWG NO. 1946-05-A-1501 FOR TYPICAL DETAILS OF MASONRY WALLS PARTITIONS & ALUM. COPING
3. SEE DWG NO. 1946-01-A-1006 FOR TYPICAL DETAILS OF SCUPPER & LADDER HEAD.
4. PROVIDE 6" MIN. BEARING AT STEEL LINTELS
5. FOUNDATION AND STRUCTURAL FRAMING DTLS DWG. NO. 1946-05-S-6071
6. ELECTRICAL PLAN AND DTLS. DWG NO. 1946-05-E-2072
7. SEE SPEC. NO. 27 FOR FINISH PAINTING. SEE SPEC. NO. 109 FOR PROTECTIVE COATING.
DRAWING NO. 1946-05-A-1503 REV. 0
REFERENCE DRAWING NO.
PIPING DETAIL 1946-05-U-7108
HEV PLAN AND DETAILS 1946-05-HEV 3060
SPECIFICATION REF.
SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.
FOR
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
APPROVED
SINGMASTER & BREYER
BY DATE 3-23-61
UNION CARBIDE NUCLEAR COMPANY
BY C. E. WINTERS DATE 6-10-61
U. S. ATOMIC ENERGY COMMISSION
BY E. H. JACKSON DATE 4-13-61
HIGH FLUX ISOTOPE REACTOR
COOLING TOWER EQUIP BLDG
PLANS ELEVATIONS & DETAILS
DRAWN CHKD DATE 5-17-61
SCALE AS SHOWN
DRAWING NO. 1946-05-A-1503 REV. 0
CERTIFIED FOR CONSTRUCTION
ISSUED FOR TITLE & APPROVAL
REVISIONS



KEY PLAN OF EXISTING 13.8 KV FEEDER RUNS FROM MAIN X-10 SUB-STATION TO H.F.I.R.

SCALE: 1" = 100'-0"



KEY PLAN OF ELECTRICAL EQUIPMENT ARRANGEMENT

SCALE: 1" = 50'-0"

NOTES:

1. FOR UNDERGROUND DUCT RUNS SEE DWG 1946-05-E-2068
2. DWG NO. REFERRED TO ABOVE SHOW THE MAIN POWER LAYOUTS FOR THE EQUIPMENT.

CERTIFIED FOR CONSTRUCTION

DRAWING NO. 1946-09-E-2001	REV. 1

REFERENCE DRAWING	NO.
SPECIFICATION	REF. SECTION 107

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER
BY J. Russell Jr. DATE 6-2-61
UNION CARBIDE NUCLEAR COMPANY
BY C. E. WINTERS DATE 6-12-61
U. S. ATOMIC ENERGY COMMISSION
BY R. B. ROGERS DATE 6-16-61

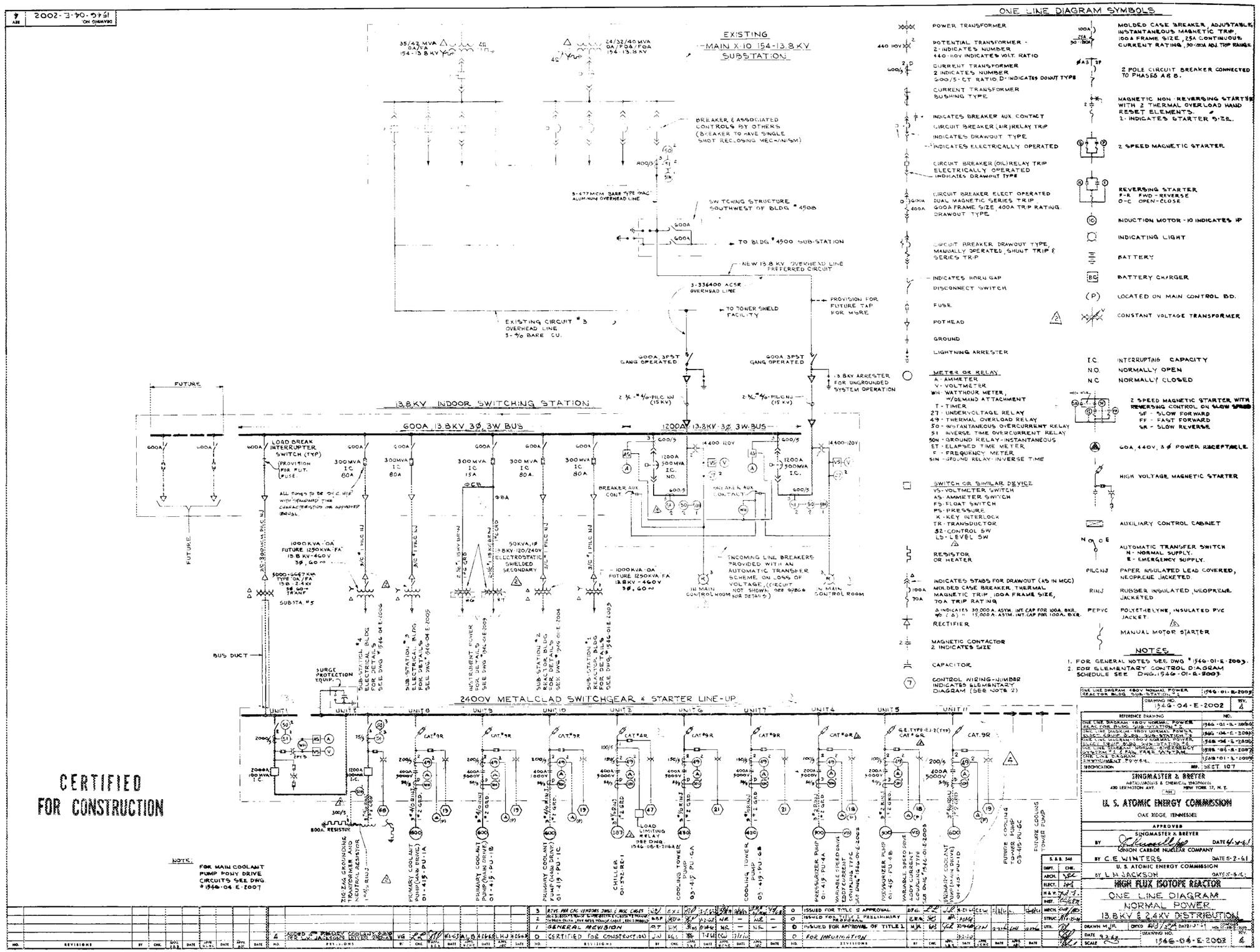
HIGH FLUX ISOTOPE REACTOR

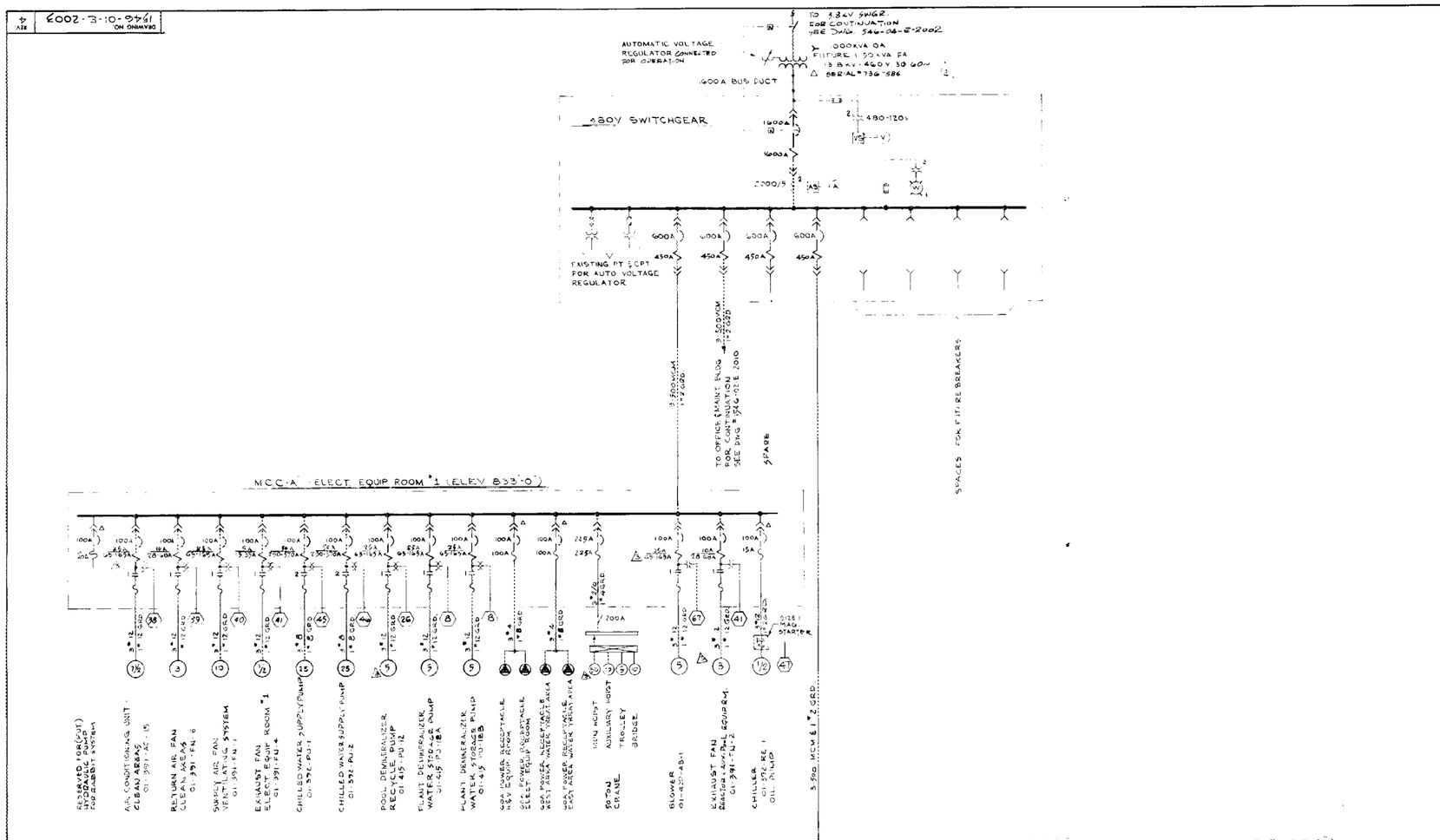
ELECTRICAL KEY PLAN

DRAWN	A/M/JR
CHKD	
DATE	
DATE	9-2-60
SCALE	AS NOTED
DRAWING NO.	1946-09-E-2001
REV.	1

NO.	REVISIONS	BY	CHK.	APPD. E.&S.	DATE	APPD. ECONS	DATE	APPD. ARC.	DATE
1	1961 REVS.	PG	LJS						
0	CERTIFIED FOR CONSTRUCTION	RJB							
0	ISSUED FOR TITLE II APPROVAL	JK							
0	ISSUED FOR TITLE I PRELIMINARY PROPOSAL								
0	ISSUED FOR APPROVAL OF TITLE I	JK							
0	FOR INFORMATION								

E.&S.									
DEPT.	CHK.								
ARCH.									
ELECT.									
H.&V.									
WST.									
MECH.									
STRUC.									
UTIL.									


DRAWING NO. 1546-04-E-2002
EXISTING
MAIN X-10 154-13.8 KV
SUBSTATION
35/42 MVA OA/FA 154-13.8 KV
24/32/40 MVA OA/FOA/FOA 154-13.8 KV
BREAKER & ASSOCIATED CONTROLS BY OTHERS (BREAKER TO HAVE SINGLE SHOT RECLOSING MECHANISM)
3-477MCM BARE TYPE "AAC" ALUMINUM OVERHEAD LINE
SWITCHING STRUCTURE SOUTHWEST OF BLDG. #4508
TO BLDG. #4500 SUB-STATION
NEW 13.8 KV OVERHEAD LINE PREFERRED CIRCUIT
3-336400 ACSR OVERHEAD LINE
TO TOWER SHIELD FACILITY
PROVISION FOR FUTURE TAP FOR MORE
EXISTING CIRCUIT #3 OVERHEAD LINE 3-4/0 BARE CU.
600A, 3PST GANG OPERATED
13.8KV ARRESTER FOR UNGROUNDED SYSTEM OPERATION
13.8KV INDOOR SWITCHING STATION
600A, 13.8KV, 3Ø, 3W BUS
1200A, 13.8KV, 3Ø, 3W BUS
LOAD BREAK INTERRUPTER SWITCH (TYP)
PROVISION FOR FUT. FUSE
ALL FUSES TO BE D.C. MIN WITH STANDARD TIME CHARACTERISTICS OR APPROVED EQUAL
1000KVA-OA FUTURE 1250KVA-FA 13.8KV-460V 3Ø, 60~
5000-6667KVA TYPE OA/FA 13.8-2.4KV 3Ø 60~ TRANS
SUBSTA. #5
50KVA, 13.8KV-120/240V ELECTROSTATIC SHIELDED SECONDARY
INCOMING LINE BREAKERS PROVIDED WITH AN AUTOMATIC TRANSFER SCHEME ON LOSS OF VOLTAGE. (CIRCUIT NOT SHOWN, SEE 9286 FOR DETAILS)
IN MAIN CONTROL ROOM
BUS DUCT
SURGE PROTECTION EQUIP.
2400V METALCLAD SWITCHGEAR & STARTER LINE-UP
UNIT 1
UNIT 2
UNIT 8
UNIT 9
UNIT 10
UNIT 3
UNIT 6
UNIT 7
UNIT 4
UNIT 5
UNIT 11
800A RESISTOR
ZIG ZAG GROUNDING TRANSFORMER AND NEUTRAL RESISTOR
PRIMARY COOLANT PUMP (MAIN DRIVE) 01-415-PU-1A
PRIMARY COOLANT PUMP (MAIN DRIVE) 01-415-PU-1B
PRIMARY COOLANT PUMP (MAIN DRIVE) 01-415-PU-1C
CHILLER 01-592-RE-1
COOLING TOWER PUMP 03-415-PU-6A
COOLING TOWER PUMP 03-415-PU-6B
PRESSURIZER PUMP 01-415-PU-4A
PRESSURIZER PUMP 01-415-PU-4B
PRIMARY COOLANT PUMP (MAIN DRIVE) 01-415-PU-1D
FUTURE COOLING TOWER PUMP 03-415-PU-6C
FUTURE COOLING TOWER PUMP
LOAD LIMITING RELAY SEE DWG. 1546-06-E-2106
NOTES:
FOR MAIN COOLANT PUMP PONY DRIVE CIRCUITS SEE DWG. #1546-04-E-2007
CERTIFIED FOR CONSTRUCTION
ONE LINE DIAGRAM SYMBOLS
POWER TRANSFORMER
POTENTIAL TRANSFORMER - 2-INDICATES NUMBER 440-120V INDICATES VOLT. RATIO
CURRENT TRANSFORMER 2 INDICATES NUMBER 600/5-CT RATIO, D-INDICATES DONUT TYPE
CURRENT TRANSFORMER BUSHING TYPE
INDICATES BREAKER AUX CONTACT
CIRCUIT BREAKER (AIR) RELAY TRIP
INDICATES DRAWOUT TYPE
INDICATES ELECTRICALLY OPERATED
CIRCUIT BREAKER (OIL) RELAY TRIP ELECTRICALLY OPERATED INDICATES DRAWOUT TYPE
CIRCUIT BREAKER ELECT OPERATED DUAL MAGNETIC SERIES TRIP 600A FRAME SIZE, 400A TRIP RATING. DRAWOUT TYPE
CIRCUIT BREAKER DRAWOUT TYPE, MANUALLY OPERATED, SHUNT TRIP & SERIES TRIP
INDICATES HORN GAP
DISCONNECT SWITCH
FUSE
POTHEAD
GROUND
LIGHTNING ARRESTER
METER OR RELAY
A - AMMETER
V - VOLTMETER
WH - WATTHOUR METER, W/DEMAND ATTACHMENT
T - TIMER
27 - UNDERVOLTAGE RELAY
49 - THERMAL OVERLOAD RELAY
50 - INSTANTANEOUS OVERCURRENT RELAY
51 - INVERSE TIME OVERCURRENT RELAY
50N - GROUND RELAY-INSTANTANEOUS
ET - ELAPSED TIME METER
F - FREQUENCY METER
51N - GROUND RELAY-INVERSE TIME
SWITCH OR SIMILAR DEVICE
VS - VOLTMETER SWITCH
AS - AMMETER SWITCH
FS - FLOAT SWITCH
PS - PRESSURE
K - KEY INTERLOCK
TR - TRANSDUCTOR
S2 - CONTROL SW
LS - LEVEL SW
RESISTOR OR HEATER
INDICATES STABS FOR DRAWOUT (AS IN MCC)
MOLDED CASE BREAKER THERMAL MAGNETIC TRIP, 100A FRAME SIZE, 70A TRIP RATING
Δ INDICATES 30,000 A. ASYM. INT. CAP FOR 100A. BKR. (Δ) " 15,000 A. ASYM. INT. CAP FOR 100A. BKR.
RECTIFIER
MAGNETIC CONTACTOR 2 INDICATES SIZE
CAPACITOR
CONTROL WIRING-NUMBER INDICATES ELEMENTARY DIAGRAM (SEE NOTE 2)
MOLDED CASE BREAKER, ADJUSTABLE INSTANTANEOUS MAGNETIC TRIP, 100A FRAME SIZE, 25A CONTINUOUS CURRENT RATING, 30-80A ADJ. TRIP RANGE
2 POLE CIRCUIT BREAKER CONNECTED TO PHASES A & B.
MAGNETIC NON-REVERSING STARTER WITH 2 THERMAL OVERLOAD HAND RESET ELEMENTS. 2-INDICATES STARTER SIZE.
2 SPEED MAGNETIC STARTER
REVERSING STARTER F-R FWD-REVERSE O-C OPEN-CLOSE
INDUCTION MOTOR - 10 INDICATES HP
INDICATING LIGHT
BATTERY
BATTERY CHARGER
(P) LOCATED ON MAIN CONTROL BD.
CONSTANT VOLTAGE TRANSFORMER
I.C. INTERRUPTING CAPACITY
N.O. NORMALLY OPEN
N.C. NORMALLY CLOSED
2 SPEED MAGNETIC STARTER WITH REVERSING CONTROL ON SLOW SPEED SF - SLOW FORWARD FF - FAST FORWARD SR - SLOW REVERSE
60A, 440V, 3Ø POWER RECEPTACLE
HIGH VOLTAGE MAGNETIC STARTER
AUXILIARY CONTROL CABINET
N C E AUTOMATIC TRANSFER SWITCH N - NORMAL SUPPLY. E - EMERGENCY SUPPLY.
PILC NJ PAPER INSULATED LEAD COVERED, NEOPRENE JACKETED.
RINJ RUBBER INSULATED NEOPRENE JACKETED.
PEPVC POLYETHELYNE, INSULATED PVC JACKET.
MANUAL MOTOR STARTER
NOTES
1. FOR GENERAL NOTES SEE DWG #1546-01-E-2003.
2. FOR ELEMENTARY CONTROL DIAGRAM SCHEDULE SEE DWG. 1546-01-E-2003
ONE LINE DIAGRAM 480V NORMAL POWER REACTOR BLDG. SUB-STATION #3 1546-01-E-2003
DRAWING NO. 1546-04-E-2002 REV. A
REFERENCE DRAWING NO.
ONE LINE DIAGRAM 480V NORMAL POWER REACTOR BLDG. SUB-STATION #2 1546-01-E-2003
ONE LINE DIAGRAM 480V NORMAL POWER REACTOR BLDG. SUB-STATION #1 1546-04-E-2003
ONE LINE DIAGRAM 480V NORMAL POWER REACTOR BLDG. SUB-STATION #4 1546-04-E-2003
ONE LINE DIAGRAM 480V NORMAL POWER REACTOR BLDG. SUB-STATION #5 1546-04-E-2003
ONE LINE DIAGRAM 13.8KV & 2.4KV DISTRIBUTION 1546-01-E-2005
ENVIRONMENT POWER 1546-01-E-2005
SPECIFICATION NO. SEST 107
SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE NEW YORK 17, N.Y.
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
APPROVED
SINGMASTER & BREYER
BY DATE 6-1-61
UNION CARBIDE NUCLEAR COMPANY
BY C.E. WINTERS DATE 5-2-61
U. S. ATOMIC ENERGY COMMISSION
BY L.H. JACKSON DATE 5-4-61
HIGH FLUX ISOTOPE REACTOR
ONE LINE DIAGRAM
NORMAL POWER
13.8KV & 2.4KV DISTRIBUTION
DRAWN M.J.R.
DATE 9-2-60
DRAWING NO. 1546-04-E-2002
SCALE
REVISIONS
0 ISSUED FOR TITLE II APPROVAL
0 ISSUED FOR TITLE I PRELIMINARY PROGRAM
0 ISSUED FOR APPROVAL OF TITLE I
0 FOR INFORMATION
3 REVS. PER CRC VENDORS DWGS. & MUC CHGS.
2 GENERAL REVISION
1 CERTIFIED FOR CONSTRUCTION
4 ADDED JOB PRELIMINARY COOLANT PUMP PER CWC JACKSON'S LETTER 2-20-61



1. ALL 13.8kV/2400V AND 13.8kV/480V TRANSFORMERS, 2400V SWGR, 480V SWGR WILL BE FURNISHED BY THE GOVERNMENT AND INSTALLED BY THE CONTRACTOR. A COMPLETE DESCRIPTION OF ALL EQUIP. FURNISHED BY THE GOVERNMENT IS SHOWN IN SPEC. 2 OF THE SPEC.

2. WIRING FOR 480V, & 120/240V A.C. CIRCUITS SHALL BE AS FOLLOWS UNLESS OTHERWISE NOTED. #12 THROUGH #2 - TYPE "THW" #1 THROUGH 750MCM - TYPE "RHW". ALL DC WIRING SHALL BE POLYETHYLENE INSULATION WITH PVC JACKET.

3 SPACES & SPARES ON MCC'S & PANELS NOT SHOWN

4 FOR COMPLETE DESCRIPTION OF LOAD CONNECTED TO LIGHTING & POWER PANELS SEE PANEL SCHEDULE B.

5 ALL CIRCUIT BREAKERS, STARTERS & SWITCHES ARE 3 POLE UNLESS OTHERWISE NOTED.

ELEMENTARY DIAGRAM SCHEDULE	
ELEM. NOS	DWG. NOS
#1-#9	1546-02-E-2010
#6-#12	1546-01-E-2117
#13-#15	1546-01-E-2124
#16	1546-05-E-2118
#17-#18	1546-01-E-2119
#19	1546-01-E-2120
#20	1546-05-E-2077
#21	1546-01-E-2120
#22-#24	1546-05-E-2118
#25-#26	1546-01-E-2117
#27	1546-01-E-2125
#28-#29	1546-01-E-2124
#30-#41	1546-01-E-2119
#42-#47	1546-01-E-2116
#48-#53	1546-01-E-2124
#54	1546-01-E-2125
#55	1546-01-E-2044
#56-#63	1546-01-E-2123
#64-#66	1546-01-E-2116
#67	1546-01-E-2117
#68	1546-05-E-2121
#69	1546-01-E-2124
#70	1546-01-E-2128

CERTIFIED FOR CONSTRUCTION

DRAWING NO.	1546-01-E-2003
REV.	4

REFERENCE DRAWING	NO.
ONE LINE DIAGRAM NORMAL POWER	1546-06-E-2002
13.8kV & 4.16kV DISTRIBUTION	
ONE LINE & ELEMENTARY DIAGRAMS OFFSITE MAINTENANCE BLDG.	1546-02-E-2018
SPECIFICATION	REF. SPEC 1001 107

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

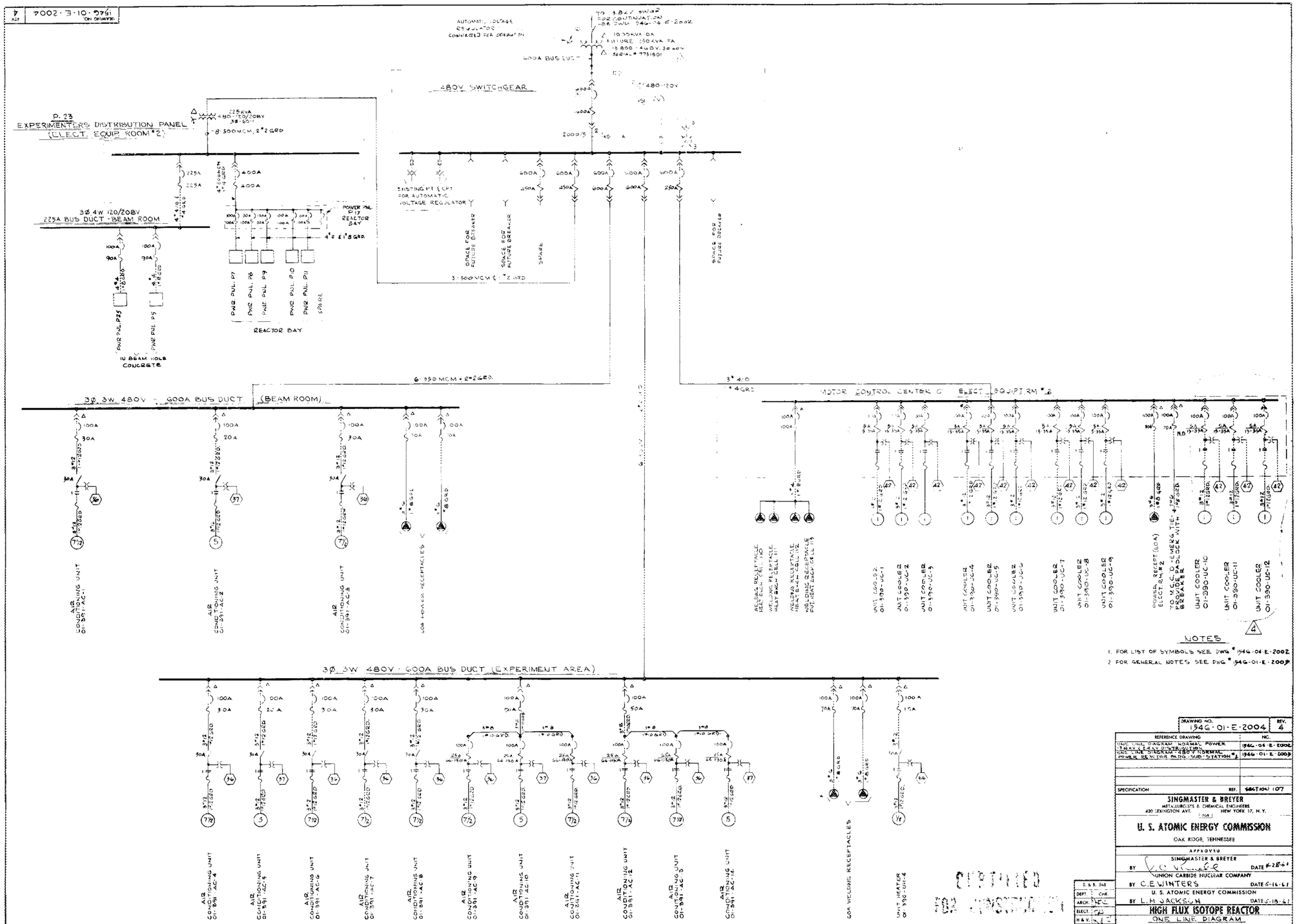
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

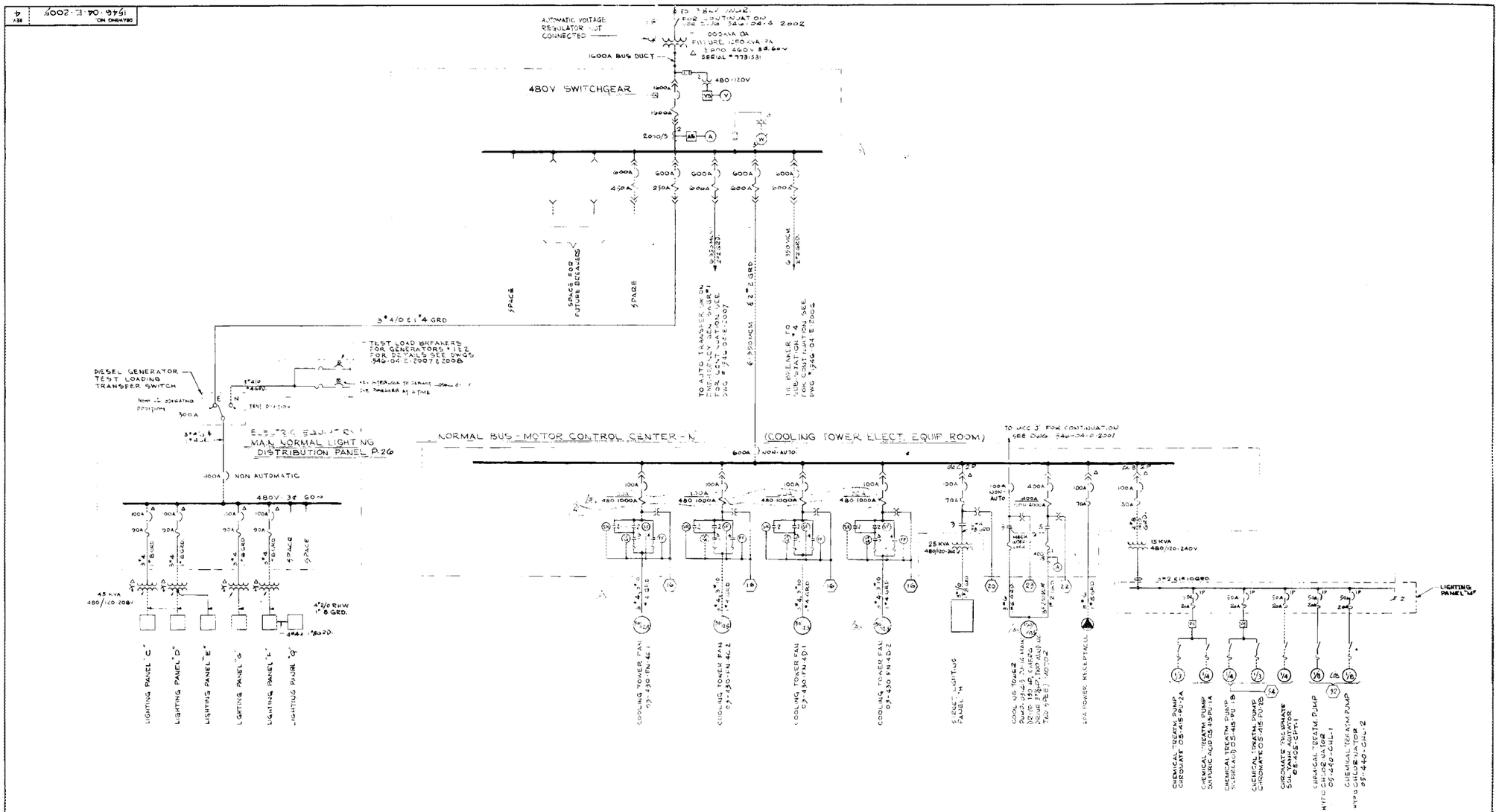
APPROVED
SINGMASTER & BREYER
BY K. C. H. DATE 4-28-61
UNION CARBIDE NUCLEAR COMPANY
BY C.E. WINTERS DATE 5-16-61
U. S. ATOMIC ENERGY COMMISSION
BY L. H. JACKSON DATE 5-18-61

HIGH FLUX ISOTOPE REACTOR
ONE LINE DIAGRAM
480V NORMAL POWER
SUB-STATION UR 2
REACTOR BLDG.

DRAWN M.R. DATE 3-3-61
DATE 3-3-61
SCALE
DRAWING NO. 1546-01-E-2003
REV. 4

NO.	REVISIONS	BY	CHK.	APPD.	DATE	APPD.	DATE	APPD.	DATE
4	REVISED PER CFC VENDOR'S DWG	L.L.							
3	NEW PER CFC VENDOR'S DWG & MISC. CHGES.								
2	REVISED REFERENCE IN INSTRUMENT TRANSFORMER PANEL & WATER TREATMENT DIST. & LIGHT DIST. SCHED.								
1	GENERAL REVISION								
0	CERTIFIED FOR CONSTRUCTION								
0	ISSUED FOR TITLE I PRELIMINARY PROPOSAL								
0	ISSUED FOR APPROVAL OF TITLE I								
13	FOR INTERPRETN								


480V SWITCHGEAR
600A BUS DUCT
P. 23
EXPERIMENTERS DISTRIBUTION PANEL
(ELECT. EQUIP. ROOM #2)
3Ø 4W 120/208V
225A BUS DUCT - BEAM ROOM
REACTOR BAY
3Ø 3W 480V - 600A BUS DUCT (BEAM ROOM)
MOTOR CONTROL CENTER C ELECT. EQUIPT. RM #2
3Ø 3W 480V - 600A BUS DUCT (EXPERIMENT AREA)
NOTES
1. FOR LIST OF SYMBOLS SEE DWG # 1946-04-E-2002
2. FOR GENERAL NOTES SEE DWG # 1946-01-E-2009
DRAWING NO. 1946-01-E-2004
REV. 4
SINGMASTER & BREYER
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
HIGH FLUX ISOTOPE REACTOR
ONE LINE DIAGRAM
480V NORMAL POWER
SUB-STATION #2
REACTOR BLDG.
1946-01-E-2004



NOTES:

1. FOR LIST OF SYMBOLS SEE DWG #1546-04-E-2002
2. FOR GENERAL NOTES SEE DWG #1546-01-E-2003

REFERENCE DRAWING	NO.
ONE LINE DIAGRAM-NORMAL POWER, 13.8KV & 4.16KV DISTRIBUTION	1546-04-E-2002
ONE LINE DIAGRAM-480V NORMAL POWER 1546-01-E-2003 SUB-STATION #1	1546-01-E-2003
ONE LINE DIAGRAM-480V NORMAL POWER 1546-04-E-2006 SUB-STATION #4	1546-04-E-2006
ONE LINE DIAGRAM-NORMAL EMERGENCY SYSTEM #1 & EMERGENCY SYSTEM	1546-04-E-2007
ONE LINE DIAGRAM-NORMAL EMERGENCY SYSTEM #2	1546-04-E-2008
SPECIFICATION REF.	SECTION J-107

DRAWING NO. 1546-04-E-2005 REV. 4

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER BY [signature] DATE 4-23-61
UNION CARBIDE NUCLEAR COMPANY BY C.E WINTERS DATE 5-16-61
U. S. ATOMIC ENERGY COMMISSION BY L.H. JACKSON DATE 5-18-61

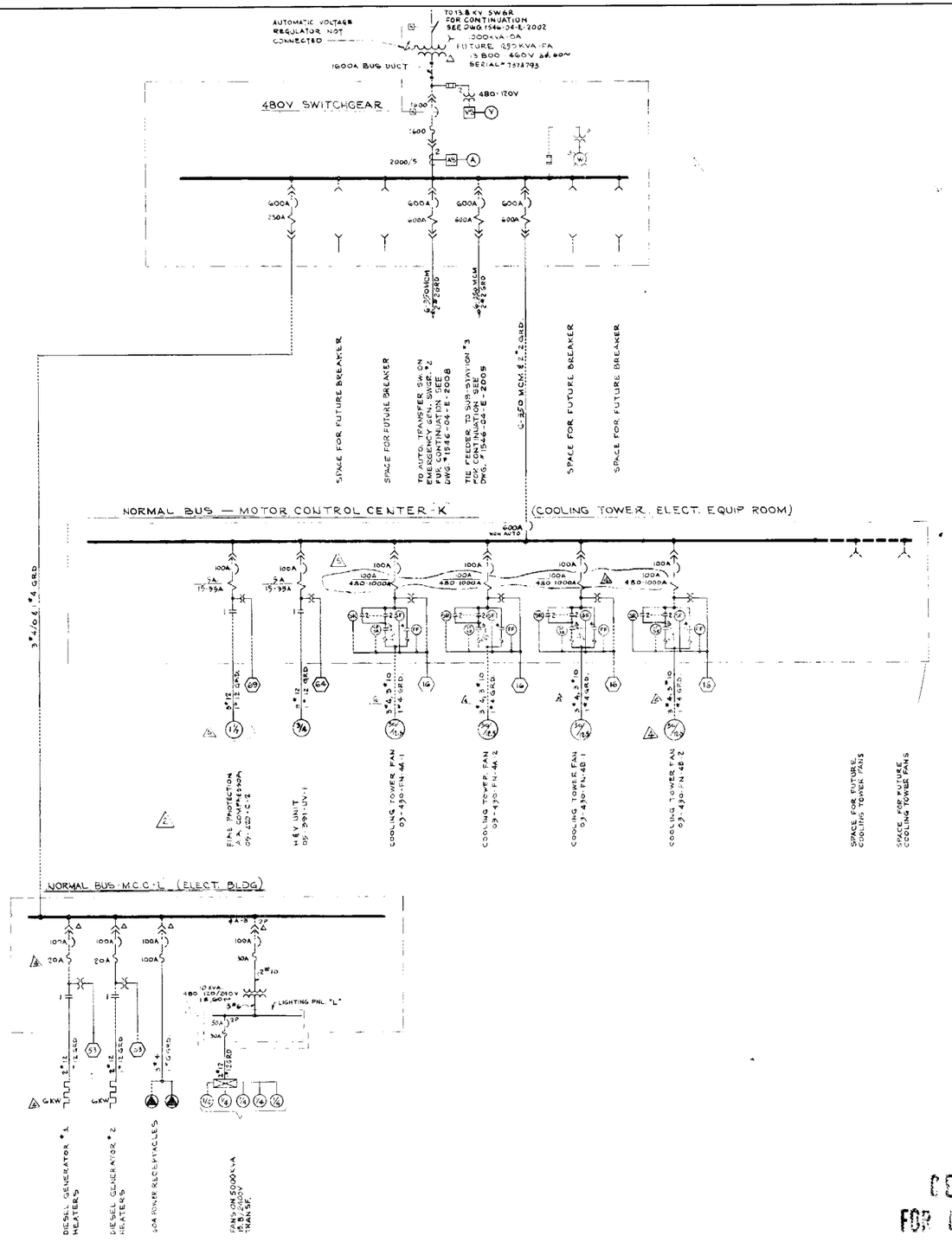
HIGH FLUX ISOTOPE REACTOR
ONE LINE DIAGRAM
480V - NORMAL POWER
SUB-STATION No 3
ELECTRICAL BLDG.

DRAWN M.J.R. CHKD DATE 2-5-61 DRAWING NO. 1546-04-E-2005 REV. 4
DATE 9-2-60 SCALE

S. & B. 546
DIFT. CHK. ARCH. ELECT. H & V. INST. MECH. STRUC. UTIL.

NO.	REVISIONS	BY	CHK.	APPR. E.E.S.	DATE	APPR. MCHC	DATE	APPR. ARC	DATE
4	REVISED PER CFC VENDOR'S DWG	LL							
3	REVISED PER CFC VENDOR'S DATA								
2									
1	GENERAL REVISION								
0	CERTIFIED FOR CONSTRUCTION	JU							
0	ISSUED FOR TITLE & APPROVAL								
0	ISSUED FOR APPROVAL OF TYPE I								
0	FOR INFORMATION								

DRAWING NO 1946-04-E-2006 REV 5



NOTES

1. FOR LIST OF SYMBOLS SEE DWG #1946-04-E-2002.
2. FOR GENERAL NOTES SEE DWG #1946-01-E-2003

CERTIFIED FOR CONSTRUCTION

DRAWING NO.	REV.
1946-04-E-2006	5

REFERENCE DRAWING	NO.
ONE LINE DIAGRAM - NORMAL POWER 13.8KV & 4.16KV DISTRIBUTION	1946-04-E-2002
ONE LINE DIAGRAM - 480V NORMAL POWER MAC FOR BLDG. SUB-STATION #3	1946-01-E-2003
ONE LINE DIAGRAM - 480V NORMAL POWER ELECT. BLDG. SUB-STATION #4	1946-04-E-2005
ONE LINE DIAGRAM - NORMAL EMERGENCY SYSTEM #1	1946-04-E-2008
SPECIFICATION REV.	SECTION 107

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.
FOR
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER
BY R. C. Runck DATE 4-28-61
UNION CARBIDE NUCLEAR COMPANY
BY C.E. WINTERS DATE 5/16/61
U. S. ATOMIC ENERGY COMMISSION
BY L.H. JACKSON DATE 5/18/61

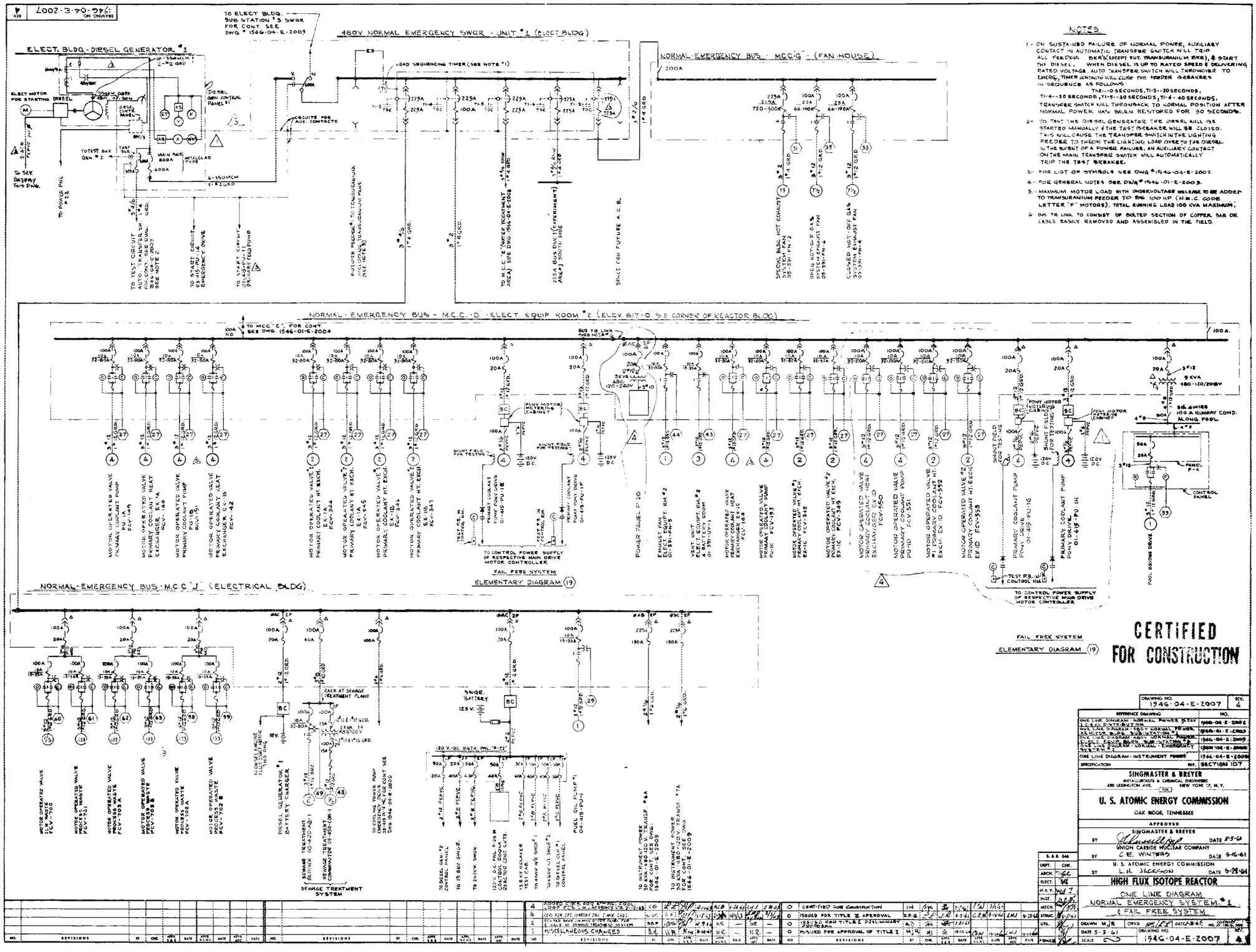
S. & B. 546
DEPT. CHK.
ARCH.
ELECT.
H & V.
INST.
MECH.
STRUC.
UTIL.

HIGH FLUX ISOTOPE REACTOR
ONE LINE DIAGRAM
480V NORMAL POWER
SUB-STATION NO 4
ELECTRICAL BLDG.

DRAWN W. JR CHKD. DATE/ 3-1-61
DATE 9-2-60 DRAWING NO. 1946-04-E-2006 REV. 5
SCALE

NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. UCNC	DATE	APPR. ARC	DATE
5	REVISIONS PER CFC VENDOR'S DWG.	L.L.							
4	REV. PER CFC VENDORS DWG. & MISC. CHGS	J.B.							
3	REWIRE KEY INTERLOCKS REF. FROM NUMBER UNITS 3 & 4 ETC. COOLING TOWER FANS CONTROL CIRCUITS	DBP				NR	—	NR	—
2	ADDED AIR COMPRESSOR 09-420-C-2	FCM				NR	—	NR	—
1	GENERAL REVISION	P.T.	HM			NR	—	NR	—
0	CERTIFIED FOR CONSTRUCTION	J.J.							

NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. UCNC	DATE	APPR. ARC	DATE
0	ISSUED FOR TITLE II APPROVAL	F.J.B.			4/1/60	C.E.W.	5/16/61	L.H.J.	5/18/61
0	ISSUED FOR TITLE I PRELIMINARY PROPOSAL	E.R.S.			1/3/61				
0	ISSUE FOR APPROVAL OF TITLE I	J.S.			12-7-60	C.E.W.	12-22-60	L.H.J.	12-22-60
0	FOR INFORMATION				9-2-60				



NOTES

1. ON SUSTAINED FAILURE OF NORMAL POWER, AUXILIARY CONTACT IN AUTOMATIC TRANSFER SWITCH WILL TRIP ALL FEEDER BKRS (EXCEPT FUT. TRANSURANIUM BKR), & START THE DIESEL. WHEN DIESEL IS UP TO RATED SPEED & DELIVERING RATED VOLTAGE AUTO TRANSFER SWITCH WILL THROW OVER TO EMERG. TIMER CONTACTS WILL CLOSE THE FEEDER BREAKERS IN SEQUENCE AS FOLLOWS:
   T1-2--10 SECONDS, T1-3--20 SECONDS, T1-4--20 SECONDS, T1-5--30 SECONDS, T1-6- 40 SECONDS.
   TRANSFER SWITCH WILL THROWBACK TO NORMAL POSITION AFTER NORMAL POWER HAS BEEN RESTORED FOR 30 SECONDS.
2. TO TEST THE DIESEL GENERATOR THE DIESEL WILL BE STARTED MANUALLY & THE TEST BREAKER WILL BE CLOSED. THIS WILL CAUSE THE TRANSFER SWITCH IN THE LIGHTING FEEDER TO THROW THE LIGHTING LOAD OVER TO THE DIESEL. IN THE EVENT OF A POWER FAILURE, AN AUXILIARY CONTACT ON THE MAIN TRANSFER SWITCH WILL AUTOMATICALLY TRIP THE TEST BREAKER.
3. FOR LIST OF SYMBOLS SEE DWG #1546-04-E-2003.
4. FOR GENERAL NOTES SEE DWG #1546-01-E-2003.
5. MAXIMUM MOTOR LOAD WITH UNDERVOLTAGE RELEASE TO BE ADDED TO TRANSURANIUM FEEDER TO BE 100 HP (N.E.C. CODE LETTER "F" MOTORS). TOTAL RUNNING LOAD 100 KVA MAXIMUM.
6. BUS TIE LINK TO CONSIST OF BOLTED SECTION OF COPPER BAR OR CABLE EASILY REMOVED AND ASSEMBLED IN THE FIELD.

DRAWING NO.	REV.
1946-04-E-2007	4

REFERENCE DRAWING	NO.
ONE LINE DIAGRAM - NORMAL POWER SYSTEM	1946-06-E-2003
ONE LINE DIAGRAM - NORMAL POWER SYSTEM	1946-06-E-2003
ONE LINE DIAGRAM - NORMAL POWER SYSTEM	1946-06-E-2003
ONE LINE DIAGRAM - NORMAL POWER SYSTEM	1946-06-E-2003
ELECT. EQUIP. ROOM - SUB-STATION #2	1946-06-E-2003
ONE LINE DIAGRAM - NORMAL EMERGENCY SYSTEM	1946-04-E-2006
ONE LINE DIAGRAM - INSTRUMENT POWER	1946-04-E-2006
SPECIFICATION	REF. SECTION 107

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER BY [signature] DATE 5-5-61
UNION CARBIDE NUCLEAR COMPANY BY C.E. WINTERS DATE 5-15-61
U. S. ATOMIC ENERGY COMMISSION BY L.H. JACKSON DATE 5-24-61

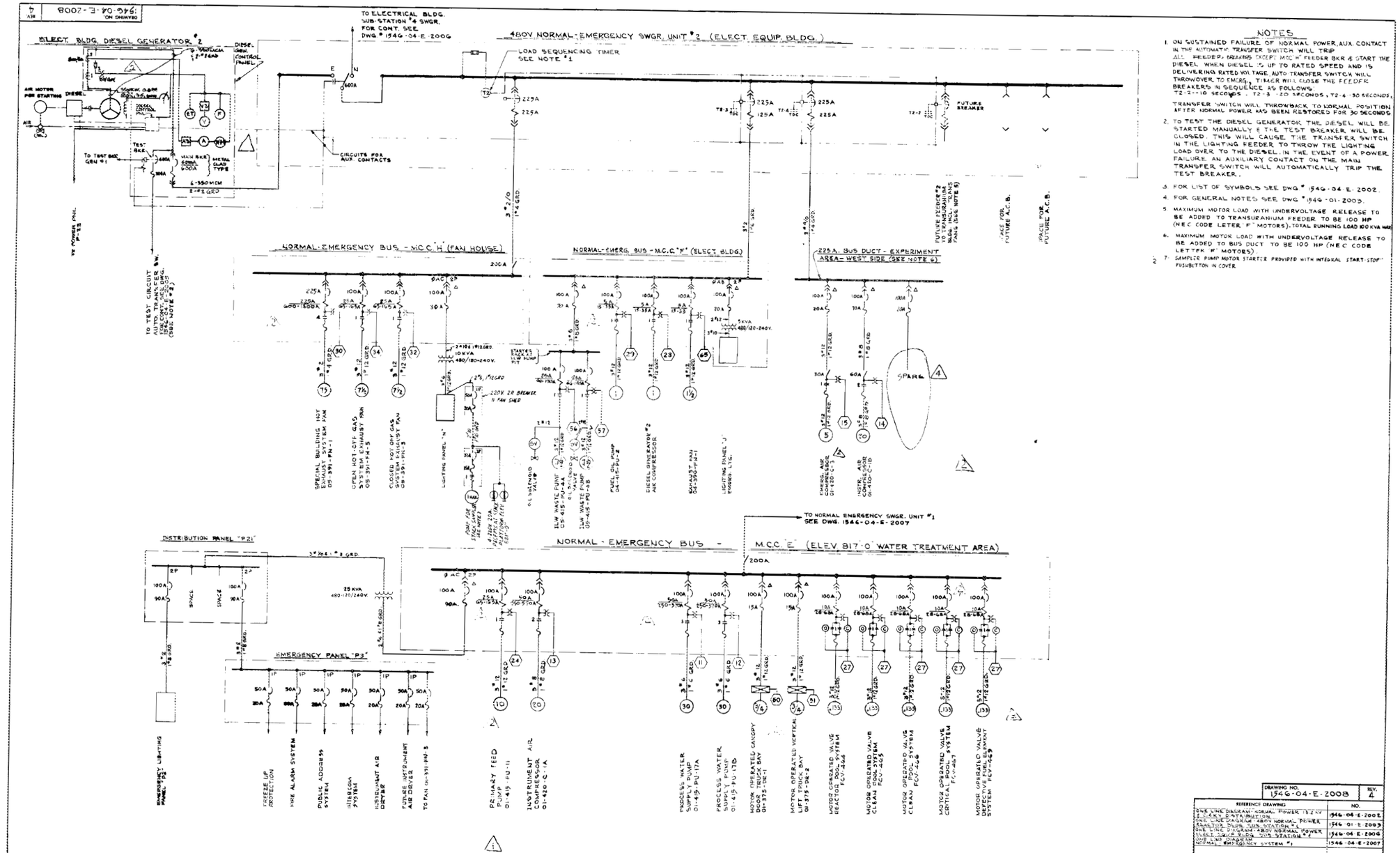
S. & B. 546
DEPT. CHK.
ARCH.
ELECT.
H.V.A.C.
INST.
MECH.
STRUC.
UTIL.

HIGH FLUX ISOTOPE REACTOR

ONE LINE DIAGRAM
NORMAL EMERGENCY SYSTEM #1
& FAIL FREE SYSTEM

DRAWN M.J.R. CHKD. [illegible] DATE 5-5-61 NO. OF SHEETS 1
DATE 5-5-61 DRAWING NO. 1946-04-E-2007 REV. 4
SCALE NONE

NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. FUNC.	DATE	APPR. AEC	DATE
4	ADDED CODES FOR ANNUNCIATOR LOOP PER C.H. JACKSON 4-27-61								
3	DEL. HFR CFC HANDRS ON 1 MVA CKTS. REVISED SEWAGE TREATMENT SYSTEM & SCALE AT SEWAGE TREATMENT SYSTEM								
2	MISCELLANEOUS CHANGES								
1									
0	CERTIFIED FOR CONSTRUCTION								
0	ISSUED FOR TITLE II APPROVAL								
0	ISSUED FOR TITLE I PRELIMINARY DESIGN REVIEW								
0	ISSUED FOR APPROVAL OF TITLE I								



NOTES

1. ON SUSTAINED FAILURE OF NORMAL POWER, AUX. CONTACT IN THE AUTOMATIC TRANSFER SWITCH WILL TRIP ALL FEEDER BREAKERS EXCEPT MCC "H" FEEDER BKR & START THE DIESEL. WHEN DIESEL IS UP TO RATED SPEED AND IS DELIVERING RATED VOLTAGE, AUTO TRANSFER SWITCH WILL THROWOVER TO EMERG. TIMER WILL CLOSE THE FEEDER BREAKERS IN SEQUENCE AS FOLLOWS. T2-2 - 10 SECONDS, T2-3 - 20 SECONDS, T2-4 - 30 SECONDS.

   TRANSFER SWITCH WILL THROWBACK TO NORMAL POSITION AFTER NORMAL POWER HAS BEEN RESTORED FOR 30 SECONDS.
2. TO TEST THE DIESEL GENERATOR, THE DIESEL WILL BE STARTED MANUALLY & THE TEST BREAKER WILL BE CLOSED. THIS WILL CAUSE THE TRANSFER SWITCH IN THE LIGHTING FEEDER TO THROW THE LIGHTING LOAD OVER TO THE DIESEL. IN THE EVENT OF A POWER FAILURE, AN AUXILIARY CONTACT ON THE MAIN TRANSFER SWITCH WILL AUTOMATICALLY TRIP THE TEST BREAKER.
3. FOR LIST OF SYMBOLS SEE DWG # 1546-04-E-2002.
4. FOR GENERAL NOTES SEE DWG # 1546-01-2003.
5. MAXIMUM MOTOR LOAD WITH UNDERVOLTAGE RELEASE TO BE ADDED TO TRANSURANIUM FEEDER TO BE 100 HP (N.E.C. CODE LETER "F" MOTORS). TOTAL RUNNING LOAD 100 KVA MAX.
6. MAXIMUM MOTOR LOAD WITH UNDERVOLTAGE RELEASE TO BE ADDED TO BUS DUCT TO BE 100 HP (N.E.C. CODE LETTER "F" MOTORS)
7. SAMPLER PUMP MOTOR STARTER PROVIDED WITH INTEGRAL "START-STOP" PUSHBUTTON IN COVER.

CERTIFIED FOR CONSTRUCTION

DRAWING NO.	REV.
1546-04-E-2008	4

REFERENCE DRAWING	NO.
ONE LINE DIAGRAM - NORMAL POWER 13.2 KV SECONDARY DISTRIBUTION	1546-04-E-2002
ONE LINE DIAGRAM 480V NORMAL POWER SWITCH BUS 'D' SUB STATION #4	1546-01-E-2003
WIRING DIAGRAM 480V NORMAL POWER SWITCH BUS 'D' SUB STATION #4	1546-04-E-2005
WIRING DIAGRAM NORMAL EMERGENCY SYSTEM #1	1546-04-E-2007

SPECIFICATION REF. SECTION 107

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.
FOR
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER
BY [signature] DATE 5-5-61
UNION CARBIDE NUCLEAR COMPANY
BY C. E. WINTERS DATE 5-26-61
U. S. ATOMIC ENERGY COMMISSION
BY L. H. JACKSON DATE 5-22-61

HIGH FLUX ISOTOPE REACTOR

ONE LINE DIAGRAM
NORMAL - EMERGENCY SYSTEM #2

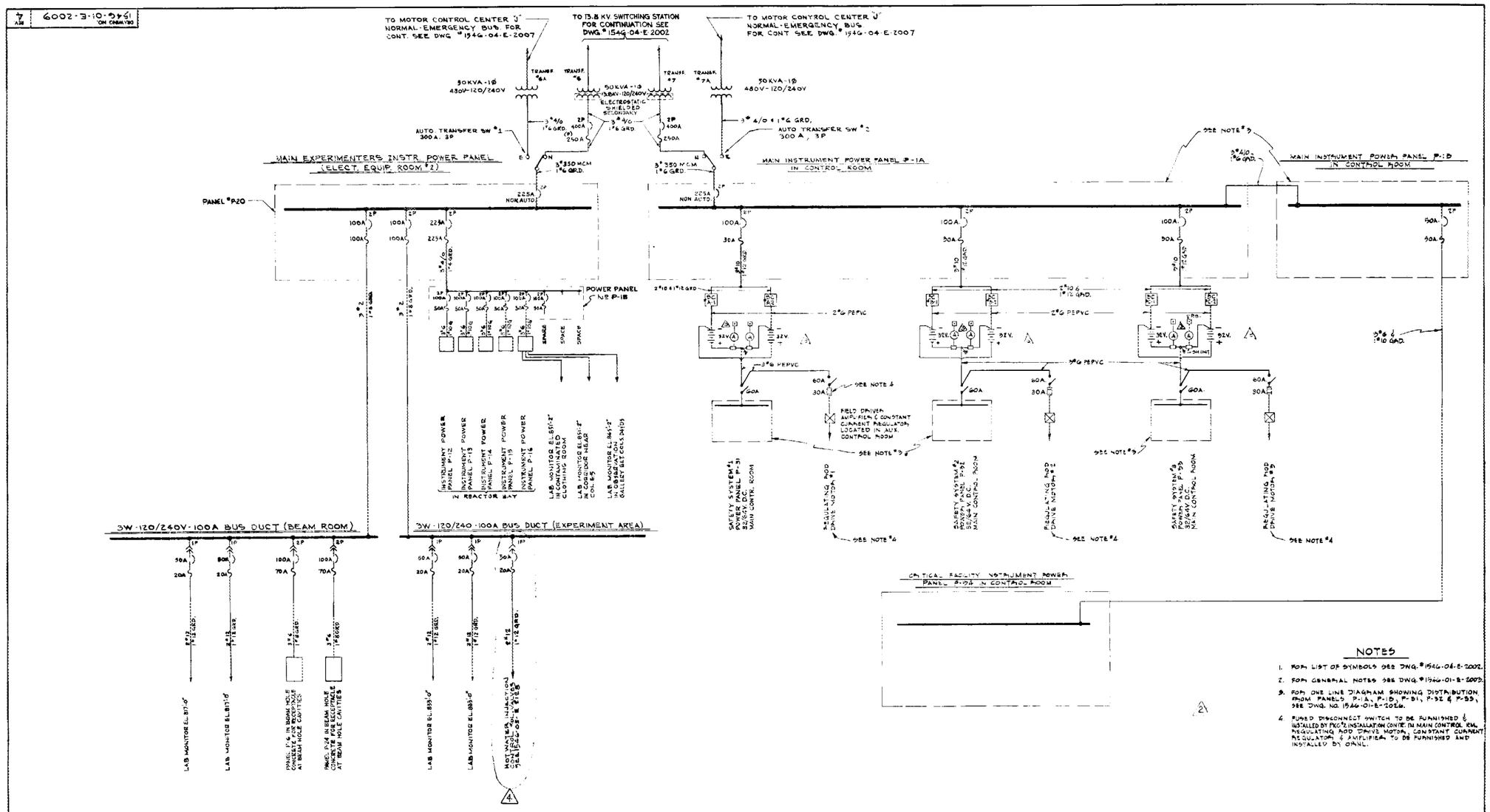
S.&B. 346	
DEPT. CHK.	
ARCH.	
ELECT.	
H & V	
INST.	
MECH.	
STRUC.	
UTIL.	
PROCESS	

DRAWN M.R. CHKD. DATE 7-6-61 CONTRACT NO. AT-(40)-1088
DATE 5-5-61 DRAWING NO. 1546-04-E-2008 REV. 4
SCALE

NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. UCNC	DATE	APPR. ARC	DATE
4	REV'D PER F.C.O. # 172	AW	[illegible]	[illegible]	5-26-61	N.R.	—	N.R.	—
3	REVISED PER CFC VENDORS DWG	L.L.	[illegible]	[illegible]	5-5-61	N.R.	—	N.R.	—
2	ADDED HOT WATER & STEAM SAMPLER PUMP & L.L. & R.C. VENDORS DWG	BBP	[illegible]	[illegible]	1-26-61	[illegible]	1-26-61	[illegible]	1-26-61
1	MISCELLANEOUS CHANGES	B.H.	[illegible]	[illegible]	8-24-60	N.R.	—	N.R.	—

NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. UCNC	DATE	APPR. ARC	DATE
0	CERTIFIED FOR CONSTRUCTION	J.D.	[illegible]	[illegible]	5-5-61	[illegible]	[illegible]		
0	ISSUED FOR TITLE II APPROVAL	D.P.G.	[illegible]	[illegible]	5-5-61	C.E.W.	5-26-61	C.E.W.	5-27-61
0	ISSUED FOR PRELIMINARY APPROVAL	A.J.	[illegible]	[illegible]	12-5-60				
0	ISSUED FOR APPROVAL OF TITLE I	M.R.	[illegible]	[illegible]	12-15-60	[illegible]	12-15-60	C.E.W.	12-15-60

022



NOTES

1. FOR LIST OF SYMBOLS SEE DWG. #1546-04-E-2002.
2. FOR GENERAL NOTES SEE DWG. #1546-01-E-2003.
3. FOR ONE LINE DIAGRAM SHOWING DISTRIBUTION FROM PANELS P-1A, P-1B, P-31, P-32 & P-33, SEE DWG. NO. 1546-01-E-2006.
4. FUSED DISCONNECT SWITCH TO BE FURNISHED & INSTALLED BY PCC #2 INSTALLATION CONTR. IN MAIN CONTROL RM. REGULATING MOD DRIVE MOTOR, CONSTANT CURRENT REGULATOR & AMPLIFIER TO BE FURNISHED AND INSTALLED BY ORNL.

CERTIFIED FOR CONSTRUCTION

DRAWING NO. 1546-01-E-2009 REV. 4

REFERENCE DRAWING	NO.
ONE LINE DIAGRAM-NORMAL POWER-13.8KV & 2.4KV DISTRIBUTION	1546-04-E-2002
ONE LINE DIAGRAM-480 V NORMAL POWER REACTOR BLDG. SUBSTATION #	1546-01-E-2003
ONE LINE DIAGRAM-NORMAL-EMERGENCY SYSTEM # 1	1546-04-E-2007
ONE LINE DIAGRAM-NORMAL-EMERGENCY SYSTEM # 2	1546-04-E-2008
SPECIFICATION	REF. SECTION 107

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N. Y.

FOR

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER BY [signature] DATE 5-8-61
UNION CARBIDE NUCLEAR COMPANY BY C.E. WINTERS DATE 5-16-61
U. S. ATOMIC ENERGY COMMISSION BY L.H. JACKSON DATE 5-27-61

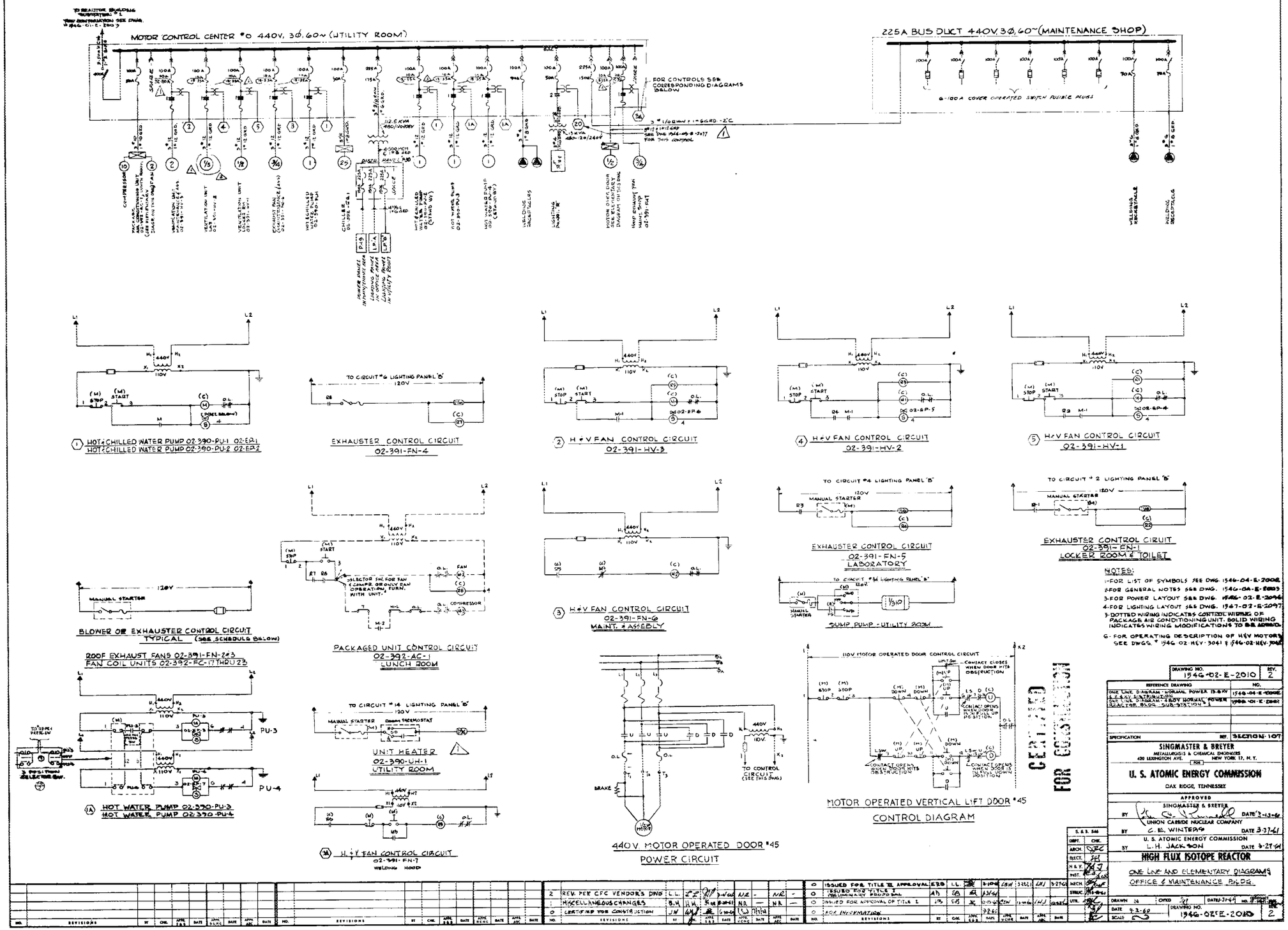
HIGH FLUX ISOTOPE REACTOR

ONE LINE DIAGRAM
INSTRUMENT POWER

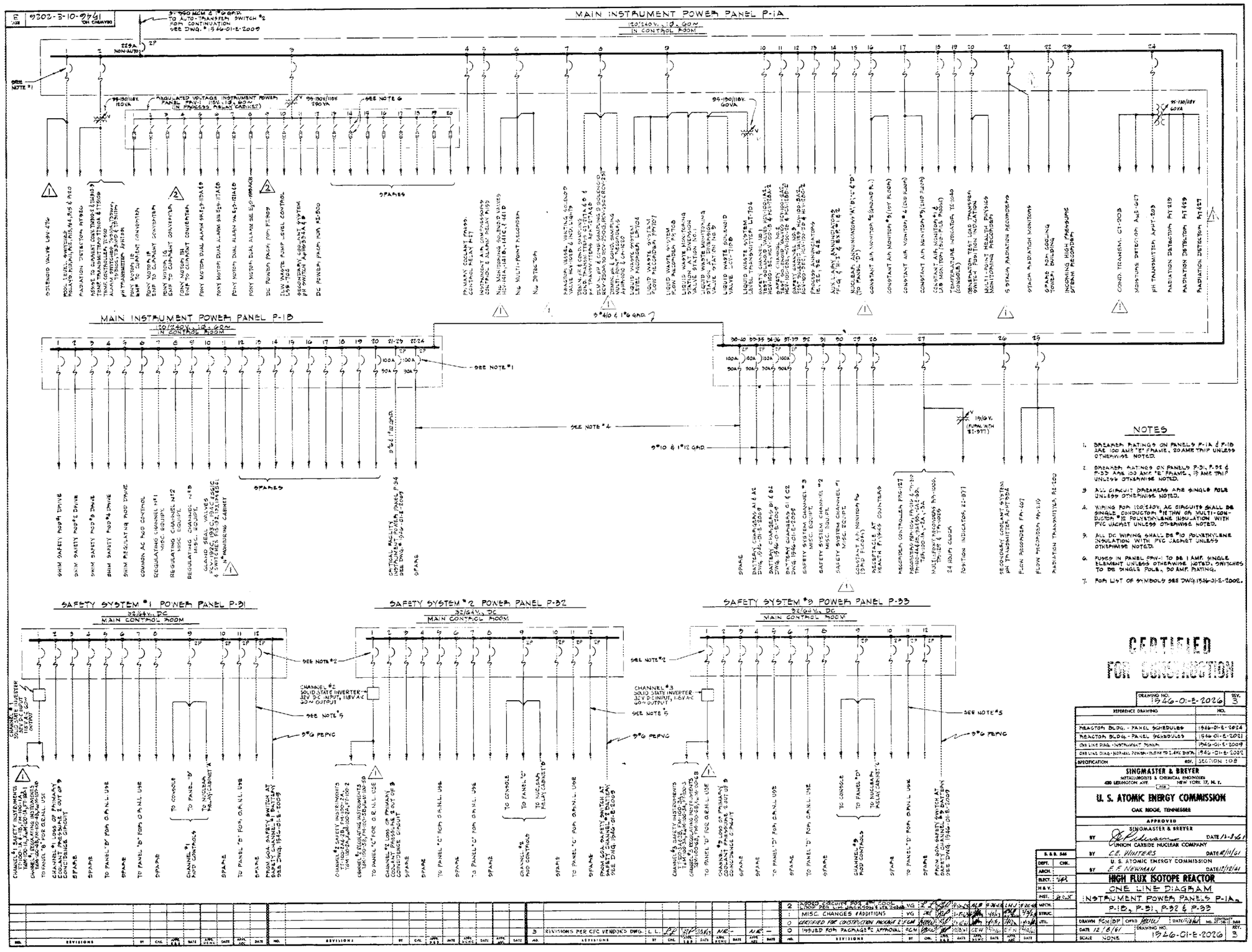
S. & B. 546
DEPT. CHK.
ARCH.
ELECT.
H. & V.
INST.
ARCH.
STRUC.
UTIL.
PROJECT

DRAWN M.J.R. CHKD. DATE 5-3-61 CONTRACT NO. AT-(40-1)-2002
DATE 5-5-61 DRAWING NO. 1546-01-E-2009 REV. 4
SCALE

NO.	REVISIONS	BY	CHK.	APPR. E&B	DATE	APPR. VENDOR	DATE	APPR. ARC	DATE
4	REV'D PER PCO #172	AN	[illegible]	[illegible]	5-2-61	[illegible]	[illegible]	[illegible]	[illegible]
3	ADD INSTR. BATT. MAINTENANCE, PER ORNL	DG	[illegible]	[illegible]	9-1-60	[illegible]	[illegible]	[illegible]	[illegible]
2	REVISED CERTIFIED FOR CONSTR. PKG #2	D.A.P.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	ISSUED FOR PACKAGE & APPROVAL ADDED REG. MOD. DRIVE MOTOR #3 TO "A", "B" & "C" DATA & APPR NOTES 3 & 4	CCM	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	MISCELLANEOUS CHANGES	D.H.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0	CERTIFIED FOR CONSTRUCTION	JW	[illegible]	[illegible]	7-26-61	[illegible]	7/26/61		
0	ISSUED FOR TITLE II APPROVAL	DPD	[illegible]	J.R.	5-24-61	CEW	5-24-61	LHJ	5-24-61
0	ISSUED FOR TITLE I PRELIMINARY PROPOSAL	AD	[illegible]	[illegible]	[illegible]				
0	ISSUED FOR APPROVAL OF TITLE I	M.J.R.	[illegible]	[illegible]	[illegible]	CEW	2-23-61	LHJ	2-23-61


MOTOR CONTROL CENTER #0 440V, 3Ø, 60~ (UTILITY ROOM)
225A BUS DUCT 440V, 3Ø, 60~ (MAINTENANCE SHOP)
6-100A COVER OPERATED SWITCH FUSIBLE PLUGS
FOR CONTROLS SEE CORRESPONDING DIAGRAMS BELOW
COMPRESSOR
CHILLER
WELDING RECEPTACLE
LIGHTING PANEL
L1
L2
440V
110V
(M) STOP
(M) START
(C)
O.L.
TO CIRCUIT #6 LIGHTING PANEL 'B'
120V
1 HOT & CHILLED WATER PUMP 02-390-PU-1 02-EP-1
HOT & CHILLED WATER PUMP 02-390-PU-2 02-EP-2
EXHAUSTER CONTROL CIRCUIT
02-391-FN-4
2 H & V FAN CONTROL CIRCUIT
02-391-HV-3
4 H & V FAN CONTROL CIRCUIT
02-391-HV-2
5 H & V FAN CONTROL CIRCUIT
02-391-HV-1
TO CIRCUIT #4 LIGHTING PANEL 'B'
MANUAL STARTER
EXHAUSTER CONTROL CIRCUIT
02-391-FN-5
LABORATORY
TO CIRCUIT #2 LIGHTING PANEL 'B'
EXHAUSTER CONTROL CIRCUIT
02-391-FN-1
LOCKER ROOM & TOILET
3 H & V FAN CONTROL CIRCUIT
02-391-FN-6
MAINT. & ASSEMBLY
BLOWER OR EXHAUSTER CONTROL CIRCUIT
TYPICAL (SEE SCHEDULE BELOW)
200F EXHAUST FANS 02-391-FN-2&3
FAN COIL UNITS 02-392-FC-17 THRU 23
PACKAGED UNIT CONTROL CIRCUIT
02-392-AC-1
LUNCH ROOM
TO CIRCUIT #14 LIGHTING PANEL 'B'
THERMOSTAT
UNIT HEATER
02-390-UH-1
UTILITY ROOM
PU-3
PU-4
HOT WATER PUMP 02-390-PU-3
HOT WATER PUMP 02-390-PU-4
H & V FAN CONTROL CIRCUIT
02-391-FN-7
WELDING HOOD
440V MOTOR OPERATED DOOR #45
POWER CIRCUIT
BRAKE
TO CONTROL CIRCUIT (SEE THIS DWG.)
110V MOTOR OPERATED DOOR CONTROL CIRCUIT
CONTACT CLOSES WHEN DOOR HITS OBSTRUCTION
CONTACT OPENS WHEN DOOR IS IN FULL UP POSITION
CONTACT CLOSES WHEN DOOR IS IN FULL DOWN POSITION
MOTOR OPERATED VERTICAL LIFT DOOR #45
CONTROL DIAGRAM
SUMP PUMP - UTILITY ROOM
NOTES:
1-FOR LIST OF SYMBOLS SEE DWG. 1546-04-E-2008
2-FOR GENERAL NOTES SEE DWG. 1546-04-E-2003
3-FOR POWER LAYOUT SEE DWG. 1546-02-E-2046
4-FOR LIGHTING LAYOUT SEE DWG. 1547-02-E-2097
5-DOTTED WIRING INDICATES CONTROL WIRING OF PACKAGE AIR CONDITIONING UNIT. SOLID WIRING INDICATES WIRING MODIFICATIONS TO BE MADE.
6-FOR OPERATING DESCRIPTION OF H&V MOTORS SEE DWGS. # 1546-02-HEV-3041 & 1546-02-HEV-3042
DRAWING NO. 1546-02-E-2010 REV. 2
REFERENCE DRAWING NO.
ONE LINE DIAGRAM - NORMAL POWER 13.8 KV & 4.8 KV DISTRIBUTION 1546-04-E-2008
ONE LINE DIAGRAM - 4.8 KV NORMAL POWER REACTOR BLDG. SUB-STATION #1 1546-01-E-2001
SPECIFICATION REF. SECTION-107
SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.
FOR
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
APPROVED
SINGMASTER & BREYER
BY DATE 2-13-61
UNION CARBIDE NUCLEAR COMPANY
BY C. E. WINTERS DATE 3-27-61
U. S. ATOMIC ENERGY COMMISSION
BY L. H. JACKSON DATE 3-27-61
HIGH FLUX ISOTOPE REACTOR
ONE LINE AND ELEMENTARY DIAGRAMS
OFFICE & MAINTENANCE BLDG.
DRAWN DATE 2-3-60
DRAWING NO. 1546-02-E-2010
SCALE
REV. 2
FOR CONSTRUCTION
REVISIONS
2 REV. PER CFC VENDOR'S DWG. C.L. 2-2-61
MISCELLANEOUS CHANGES B.H. H.H. 8-24-61 N.R. — N.R. —
0 CERTIFIED FOR CONSTRUCTION J.H. 6-16-60
0 ISSUED FOR TITLE II APPROVAL E.B.D. I.L. 3-10-61
0 ISSUED FOR TITLE I PRELIMINARY PROPOSAL A.D. 3-14-61
0 ISSUED FOR APPROVAL OF TITLE I J.B. 12-19-60
0 FOR INFORMATION 3-2-60
DEPT. CHK. ARCH. ELECT. H & V. INST. STRUC. MECH. UTIL.
S. & S. 546

024



NOTES

1. BREAKER RATINGS ON PANELS P-1A & P-1B ARE 100 AMP "E" FRAME, 20 AMP TRIP UNLESS OTHERWISE NOTED.
2. BREAKER RATINGS ON PANELS P-31, P-32 & P-33 ARE 100 AMP "E" FRAME, 15 AMP TRIP UNLESS OTHERWISE NOTED.
3. ALL CIRCUIT BREAKERS ARE SINGLE POLE UNLESS OTHERWISE NOTED.
4. WIRING FOR 120/240V. AC CIRCUITS SHALL BE SINGLE CONDUCTOR #12 THW OR MULTI-CONDUCTOR #12 POLYETHYLENE INSULATION WITH PVC JACKET UNLESS OTHERWISE NOTED.
5. ALL DC WIRING SHALL BE #10 POLYETHYLENE INSULATION WITH PVC JACKET UNLESS OTHERWISE NOTED.
6. FUSES IN PANEL CPV-1 TO BE 1 AMP. SINGLE ELEMENT UNLESS OTHERWISE NOTED. SWITCHES TO BE SINGLE POLE, 30 AMP. RATING.
7. FOR LIST OF SYMBOLS SEE DWG. 1946-01-E-2002.

CERTIFIED FOR CONSTRUCTION

REFERENCE DRAWINGS	NO.
REACTOR BLDG. - PANEL SCHEDULES	1946-01-E-2024
REACTOR BLDG. - PANEL SCHEDULES	1946-01-E-2021
ONE LINE DIAG. - INSTRUMENT POWER	1946-01-E-2009
ONE LINE DIAG. - NORMAL POWER - INDOOR TO 1.4 KV. DISTR.	1946-01-E-2002
SPECIFICATION	REV. SECTION 108

DRAWING NO. 1946-01-E-2026 REV. 3

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N. Y.
FOR
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER BY [signature] DATE 12-8-61
UNION CARBIDE NUCLEAR COMPANY BY C.E. HUNTERS DATE 12/11/61
U. S. ATOMIC ENERGY COMMISSION BY E.F. NEWMAN DATE 12/12/61

S. & B. 546

DEPT.	CHK.
ARCH.	
ELECT.	
H & V.	
INST.	
MECH.	
STRUC.	
UTIL.	

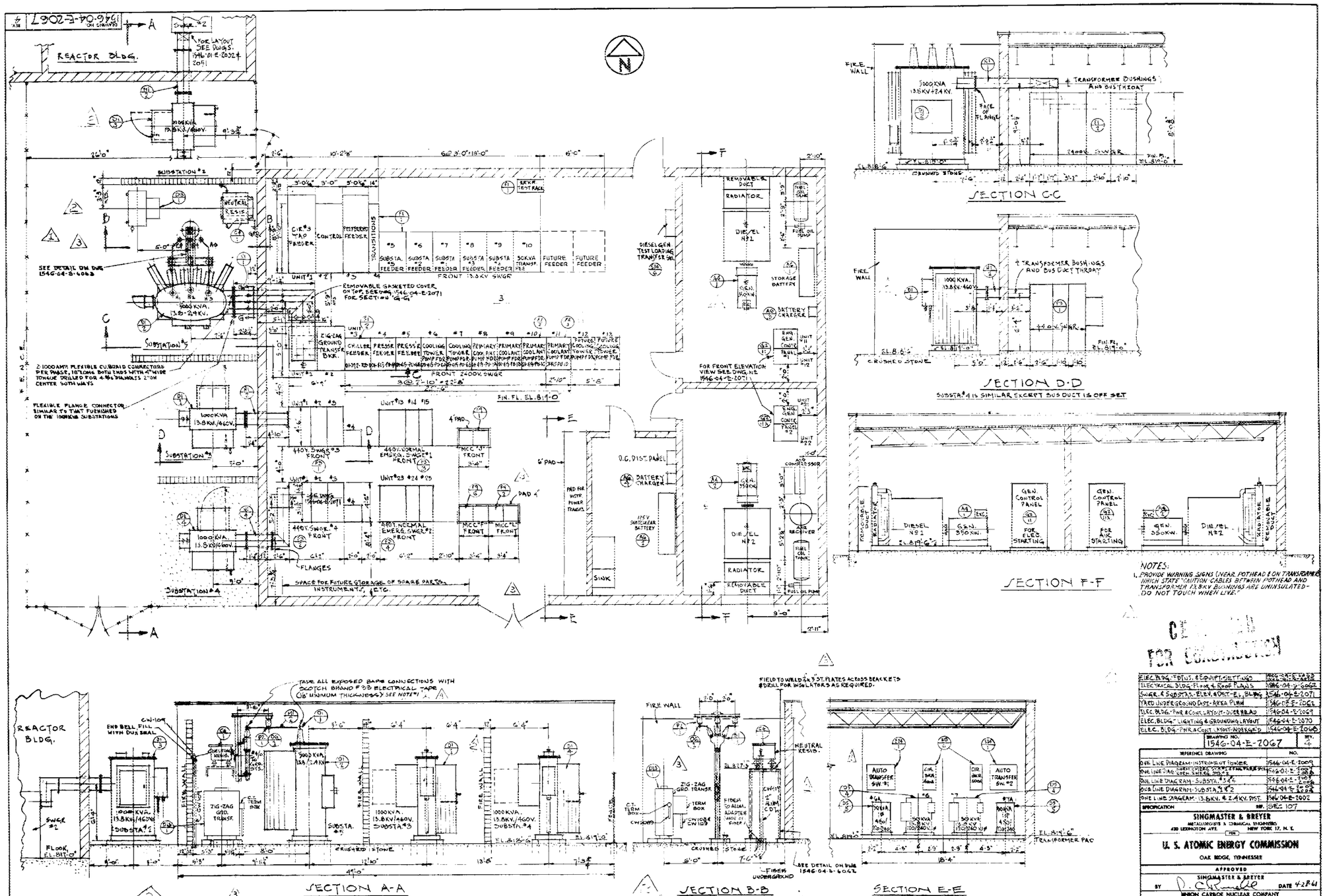
HIGH FLUX ISOTOPE REACTOR

ONE LINE DIAGRAM
INSTRUMENT POWER PANELS P-1A, P-1B, P-31, P-32 & P-33

DRAWN RCM/DP CHKD [illegible] DATE 12/8/61 NO. CONTRACT AT-(40-1)-540
DATE 12/8/61 DRAWING NO. 1946-01-E-2026 REV. 3
SCALE NONE

NO.	REVISIONS	BY	CHK.	APPR. ELEC.	DATE	APPR. MECH.	DATE	APPR. INST.	DATE	APPR. ARC.	DATE
2	ADDED CIRCUITS FOR FAN COOL. DOOR PER L.W. JACKSON & SEE DWG.	VG	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	MISC. CHANGES & ADDITIONS	VG	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0	CERTIFIED FOR CONSTRUCTION PACKAGE 2	RCM	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0	ISSUED FOR PACKAGE "C" APPROVAL	RCM	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	GEW	[illegible]	[illegible]	[illegible]

NO.	REVISIONS	BY	CHK.	APPR. ELEC.	DATE	APPR. MECH.	DATE	APPR. INST.	DATE	APPR. ARC.	DATE
3	REVISIONS PER CFC VENDOR'S DWG.	L.L.	[illegible]	[illegible]	[illegible]	N.R.-		N.R.-			



NOTES:

1. PROVIDE WARNING SIGNS (NEAR POTHEAD & ON TRANSFORMER) WHICH STATE "CAUTION-CABLES BETWEEN POTHEAD AND TRANSFORMER 13.8KV BUSHINGS ARE UNINSULATED-DO NOT TOUCH WHEN LIVE."

FOR CONSTRUCTION

ELEC. BLDG.-FDTUS. & EQUIPT. SETTING	1546-04-E-2068
ELECTRICAL BLDG. Floor & Roof Plans	1546-04-E-2066
SWGR. & SUBSTAS.-ELEV. & DIST.-E., BLDG.	1546-04-E-2071
YARD UNDERGROUND DIST.-AREA PLAN	1546-01-E-2062
ELEC. BLDG.-PWR. & CONT. LAYOUT-OVERHEAD	1546-04-E-2069
ELEC. BLDG.-LIGHTING & GROUNDING LAYOUT	1546-04-E-2070
ELEC. BLDG.-PWR. & CONT. LAYOUT-UNDERGRD.	1546-04-E-2060

DRAWING NO. 1546-04-E-2067 REV. 4

REFERENCE DRAWING	NO.
One Line Diagram-Instrument Power	1546-04-E-2009
One Line Diag.-Cont. Sheet 1 of 3	1546-01-E-2008
One Line Diagram-Substa. #3 & 4	1546-04-E-2005
One Line Diagram-Substa. #1 & 2	1546-04-E-2004
One Line Diagram-13.8KV. & 2.4KV. Dist.	1546-04-E-2002

SPECIFICATION NO. SPEC. 107

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N. Y.

FOR

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER BY R. C. Kramble DATE 4-28-61
UNION CARBIDE NUCLEAR COMPANY BY C.E. WINTERS DATE 5-15-61
U. S. ATOMIC ENERGY COMMISSION BY L.H. JACKSON DATE 5-17-61

HIGH FLUX ISOTOPE REACTOR

ELECTRICAL BLDG
EQUIPMENT LAYOUT

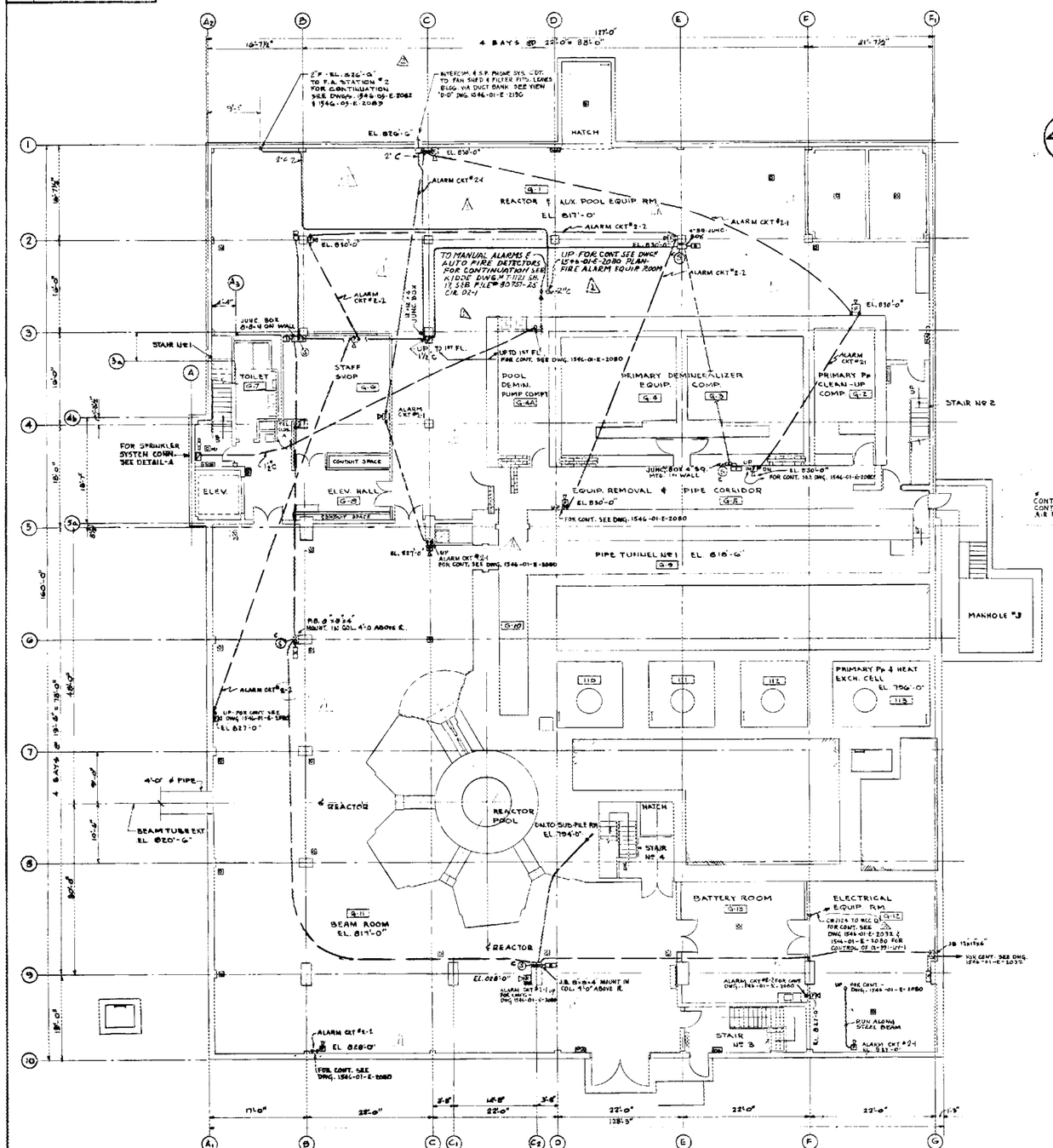
DRAWN B. KNAFFEL CHKD. RANK DATE 4/28/61 CONTRACT NO. AT-(40-1)-3501
DATE 4/28/61 DRAWING NO. 1546-04-E-2067 REV. 4
SCALE 1/4"=1'-0"

NO.	REVISIONS	BY	CHK.	APPD. ELEC.	DATE	APPD. MECH.	DATE	APPD. ARC.	DATE
4	1000 HP MASTER FOR PLUGGING COOLANT FLOW PUMP-BASED ON DWG. 1546-01-E-2051 REV. 2	JMC							
3	REVISED TO CONFORM TO CPC VENDOR PRINTS	VG							
2	CHANGES INCORPORATED A. TRANSFORMER MOUNTED BY SUBSTA. #4 B. SUBSTA. #4 IS SIMILAR TO SUBSTA. #3	JH							
1	REVISED SECTIONS A-A, B-B & E-E	JN							
0	CERTIFIED FOR CONSTRUCTION	LH							
0	ISSUED FOR TITLE II APPROVAL								

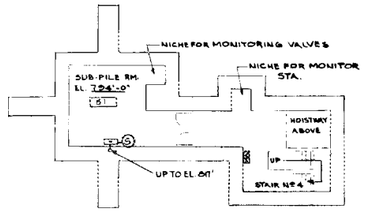
S. & B. 546		
DIFT.	CHK.	
ARCH.		
ELECT.		
H. & V.		
INST.		
MECH.		
STRUC.		
UTIL.		

DRAWING NO. 1546-01-E-2079 REV. 3

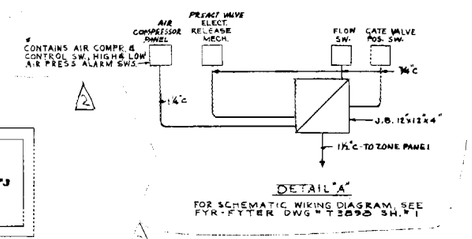
CERTIFIED FOR CONSTRUCTION



GROUND FLOOR

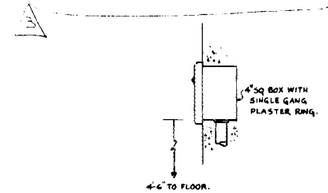


SUB-PILE ROOM



DETAIL "A"

FOR SCHEMATIC WIRING DIAGRAM, SEE FYR-FYTTER DWG # T5895 SH. # 1



DETAIL OF MANUAL ALARM STATION

SYMBOLS

- RECEPTACLE FOR SOUND POWERED TEL.
- MANUAL FIRE ALARM STATION.
- INTERCOM STAFF STATION
- FIRE ALARM HORN.
- MASTER INTERCOM STATION.
- AUTO. TEMP. DETECTOR MOUNTED WITH BOX FLUSH WITH CONCRETE CEILING.
- AUTO. TEMP. DETECTOR MOUNTED ON HUNG CEILING.
- AUTO. TEMP. DETECTOR MOUNTED WITH OUTLET BOX EXPOSED ON CONCRETE CEILING UNLESS OTHERWISE NOTED
- INTERCOM STAFF STATION WITH CRADLE PHONE.

NOTES.

1. FOR FIRE ALARM BLOCK DIA. SEE DWG. 1546-01-E-2084
2. MANUAL ALARM BOXES TO BE LOCATED 4'-6" ABOVE FINISHED FLOOR & MOUNTED FLUSH UNLESS OTHERWISE NOTED.
3. ALL FIRE ALARM SYSTEM CONDUIT TO BE ¾" UNLESS OTHERWISE NOTED.
4. ALL INTER-COM & SOUND POWER PHONE SYSTEM CONDUIT TO BE 1" UNLESS OTHERWISE NOTED.
5. INTER-COM SLAVE UNITS SHALL BE MOUNTED 3'-0" ABOVE FINISHED FLOOR, UNLESS OTHERWISE NOTED. SEE DWG. 1546-01-E-2085 FOR MOUNTING DETAILS.
6. SOUND POWER PHONE PLUG-INS TO BE LOCATED 3'-0" ABOVE FINISHED FLOOR UNLESS OTHERWISE NOTED. SEE DWG. 1546-01-E-2082 FOR MOUNTING DETAILS.
7. FIRE ALARM HORNS SHALL BE LOCATED AT ELEVATIONS AS NOTED. SEE DWG. 1546-01-E-2082 FOR MOUNTING DETAILS
8. ALL WIRE FOR THE FIRE ALARM, INTERCOM & SOUND POWERED SYSTEMS SHALL BE #12 TYPE "THW" UNLESS OTHERWISE NOTED
9. FOR LOCATION OF FIRE ALARM DETECTORS & CONDUIT WORK TO DETECTORS & MANUAL ALARM STATIONS SEE ALARM LATER SONIC CO. DWG # T-521 SK NOS. 17, 18, 18 & 21

AREAS TO BE COVERED BY HEAT ACTUATED DEVICES

LOCATION OR ROOM No.	② MOUNTED WITH BOX FLUSH WITH CONCRETE CEILING	◑ MOUNTED ON HUNG CEILING	① BOX SURFACE MOUNTED ON CONCRETE CEILING
G-1	✓		
G-2	✓		
G-3	✓		
G-4	✓		
G-4A	✓		
G-5	✓		
G-6		✓	
G-7	✓		
G-8		✓	
G-9	✓		
G-10	✓		
G-11	✓		
G-12	✓		
G-13	✓		
STAIRS #1			✓
STAIRS #2			✓
STAIRS #3			✓
MANHOLE #3	✓		
B-1	✓		

REFERENCE DRAWING	NO.
GEN. NOTES, SYMBOLS & RECEPT. SCHED.	1546-E-2015
REACTOR BLDG. F.A., INTERCOM & SPD. - HTFL.	1546-01-E-2080

SPECIFICATION REF. SECTION 107

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER BY DATE 5-12-61
UNION CARBIDE NUCLEAR COMPANY BY C.E. WINTERS DATE 6/5/61
U. S. ATOMIC ENERGY COMMISSION BY L.H. JACKSON DATE 6/7/61

HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
FIRE ALARM, INTERCOM AND SOUND POWERED PHONE SYSTEMS 6R. FLOOR

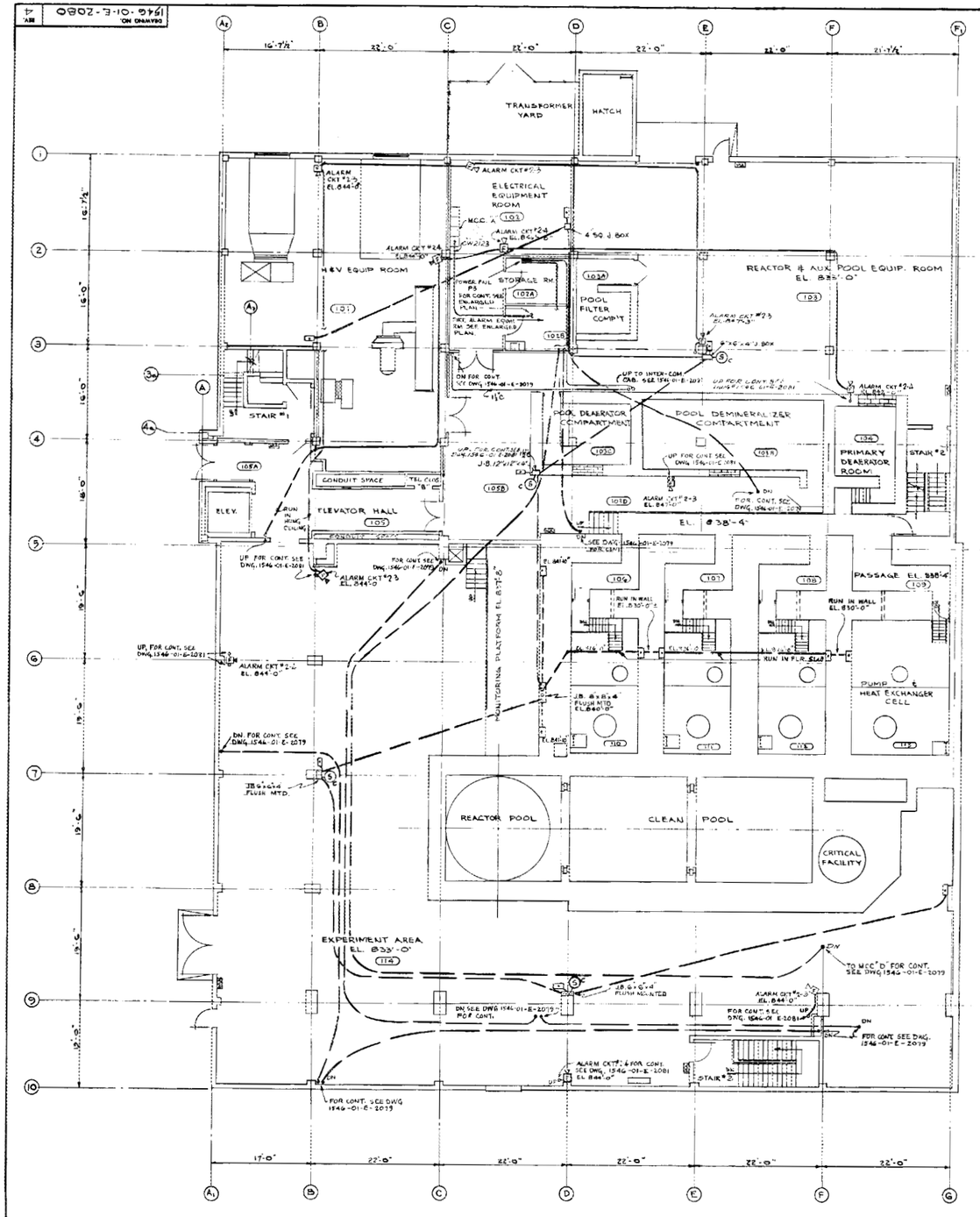
S & B. 546		
DEPT.	CHK.	
ARCH.	AEC	
ELECT.	CRD	
M & V.		
INST.		
ARCH.		
STRUC.		
UTIL.		
PROJECT		

DRAWN DS CHKD AFO DATE 5-12-61 DOWNCAST NO. 07 (8011) 3080
DATE 5-12-61 DRAWING NO. 1546-01-E-2079 REV. 3
SCALE 1/8" = 1'-0"

NO.	REVISIONS	BY	CHK.	APPR. ELEC.	DATE	APPR. MECH.	DATE	APPR. ARC.	DATE
1	MISC. REVISIONS CHANGED BOTH #2	JNJ	[illegible]	[illegible]	8-24-64	NB		NA	
0	CERTIFIED FOR CONSTRUCTION	MJR	PMT	[illegible]	7-5-61	[illegible]	10/16/61		
0	REISSUED FOR TITLE II APPROVAL	MJR	AFO	[illegible]	5-26-61	[illegible]	6/6/61	L.W.J.	6/7/61
0	ISSUED FOR TITLE II APPROVAL	JK	AFO	[illegible]	5-3-61				
3	REV. PER CFC VENDOR'S DWG.	L.L.	[illegible]	[illegible]	1-26-61	[illegible]	[illegible]	[illegible]	[illegible]
2	REVS. TO CONFORM TO UCC V'DRG. REVISIONS	LMK	[illegible]	[illegible]	11-22-60	[illegible]	[illegible]	[illegible]	7/14/61

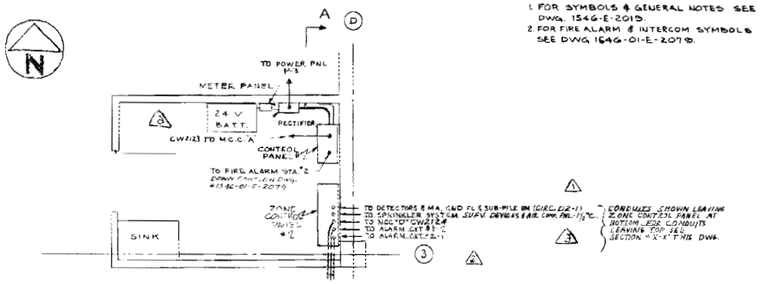
027

DRAWING NO. 1946-01-E-2080 REV. 4



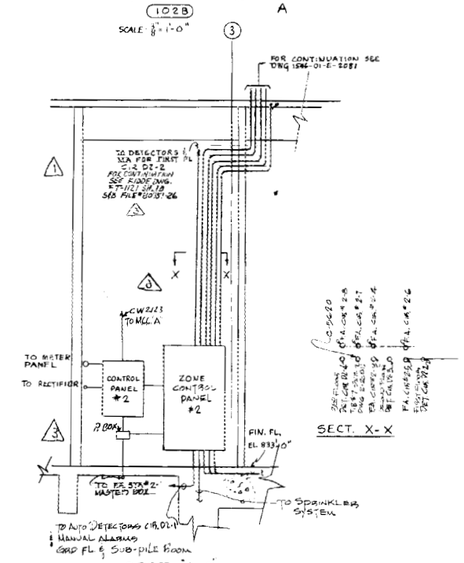
NOTES

1. FOR SYMBOLS & GENERAL NOTES SEE DWG. 1546-E-2013.
2. FOR FIRE ALARM & INTERCOM SYMBOLS SEE DWG. 1546-01-E-2070.



FLOOR PLAN
FIRE ALARM EQUIPT RM
(102B)

SCALE 3/8" = 1'-0"



SECT. X-X

SECT. 'A-A'

SCALE 3/8" = 1'-0"

AREAS TO BE COVERED BY HEAT ACTUATED DEVICES

LOCATION OR ROOM NO	(R) MOUNTED WITH BOX FLUSH WITH CONCRETE CEILING	(C) MOUNTED ON HUNG CEILING	(S) BOX SURFACE MOUNTED ON CONCRETE CEILING
101			✓
102			✓
102A			✓
102B			✓
103			✓
103A			✓
103B	✓		
103C	✓		
103D	✓		
104	✓		
105		✓	
105A		✓	
105B	✓		
109	✓		
107	✓		
108	✓		
109	✓		
110	✓		
111	✓		
112	✓		
113	✓		
114	✓		
STAIR #1			✓
STAIR #2			✓
STAIR #3			✓

CERTIFIED FOR CONSTRUCTION

REFERENCE DRAWING	NO.
REACTOR BLDG. FA & INTERCOM. GRD FL	1546-01-E-2079
REACTOR BLDG. FA & INTERCOM. 2ND FL	1946-01-E-2081
REACTOR BLDG. FA & INTERCOM. 3RD FL	1546-01-E-2082
FIRE ALARM SYS. - BLOCK DIAGRAM	1546-03-E-2084
SPECIFICATION REF.	SECT. 107

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER BY R. C. Rinaldi DATE 5-19-61
UNION CARBIDE NUCLEAR COMPANY BY C. E. WINTERS DATE 12/6/61
U. S. ATOMIC ENERGY COMMISSION BY L. H. JACKSON DATE 6/7/61

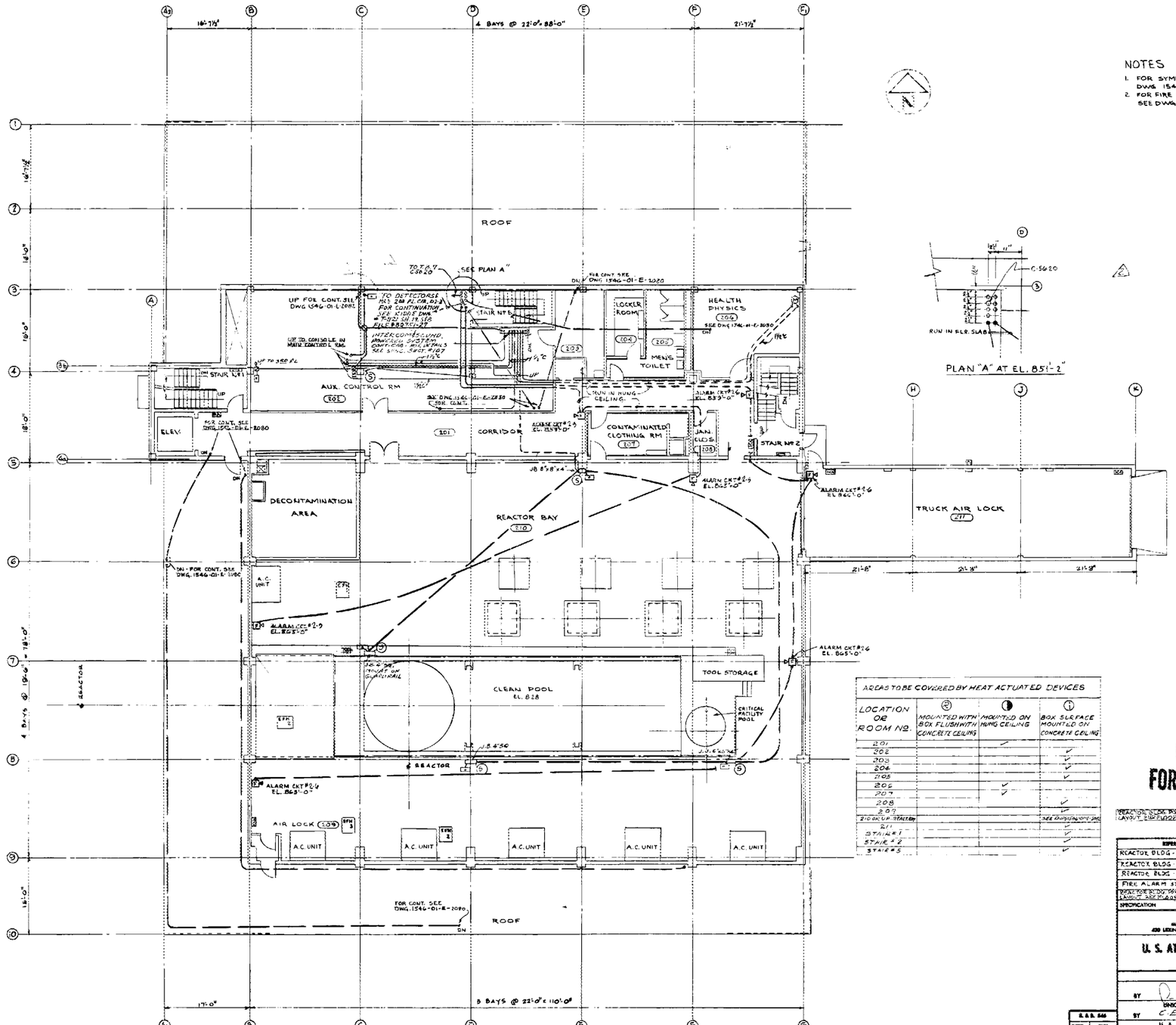
HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
FIRE ALARM INTERCOM. & SOUND POWERED PHONE SYSTEMS
FIRST FLOOR

DRAWN D.S. CHKD A.K.O. DATE 5/19/61 APPROVED
DATE 5-19-61 DRAWING NO. 1546-01-E-2080 REV. 4
SCALE 1/8" = 1'-0"

S & B. 546
DEPT. CHK.
ARCH.
ELECT.
H & V.
INST.
MECH.
STRUC.
UTIL.
PROC.

NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. U.C.N.C.	DATE	APPR. AEC	DATE
0	MISC. REMARKS	JN	DJH	JN	3/30/61	DJ	3/30/61		
1	REVISED FOR CONSTRUCTION	MJK	PHT	JN	5/19/61	DJ	5/19/61		
2	REVISED FOR TITLE I APPROVAL	MJK	PFD	JN	9/26/61	PHT	9/26/61	LHJ	11/7/61
3	ISSUED FOR TITLE I APPROVAL	DJK	PFD	JN	9/14/61				
4									

028



NOTES

1. FOR SYMBOLS & GENERAL NOTES SEE DWG. 1546-E-2019.
2. FOR FIRE ALARM & INTERCOM SYMBOLS SEE DWG. 1546-OHE-2078

AREAS TO BE COVERED BY HEAT ACTUATED DEVICES

LOCATION OR ROOM Nº	② MOUNTED WITH BOX FLUSH WITH CONCRETE CEILING	◐ MOUNTED ON HUNG CEILING	① BOX SURFACE MOUNTED ON CONCRETE CEILING
201		✓	
202			✓
203			✓
204			✓
205			✓
206		✓	
207		✓	
208			✓
209			✓
210 BELOW REACTOR			SEE DWG. 1546-01-E-2082
211			✓
STAIR #1			✓
STAIR #2			✓
STAIR #3			✓

CERTIFIED FOR CONSTRUCTION

REACTOR BLDG. POWERED CONTROL CONDUIT LAYOUT 2ND FLOOR (NORTH SECTION) — 1546-01-E-2035

DRAWING NO. 1546-01-E-2081 — REV. 3

REFERENCE DRAWING	NO.
REACTOR BLDG - F.A. & INTERCOM - GRD. FL.	1546-01-E-2075
REACTOR BLDG - F.A. & INTERCOM - 1ST FL.	1546-01-E-2080
REACTOR BLDG - F.A. & INTERCOM - 3RD FL.	1546-01-E-2082
FIRE ALARM SYS. - BLOCK DIAGRAM	1546-05-E-2006
REACTOR BLDG. POWERED CONTROL CONDUIT LAYOUT 2ND FLOOR (SOUTH SECTION)	1546-01-E-2036
SPECIFICATION	REV. SECTION 107

SINGMASTER & BREYER
ARCHITECTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

FOR

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED

BY SINGMASTER & BREYER DATE 5-19-61

BY UNION CARBIDE NUCLEAR COMPANY C.E. WINTERS DATE 6/6/61

BY U. S. ATOMIC ENERGY COMMISSION L.H. JACKSON DATE 6/7/61

HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
FIRE ALARM, INTERCOM, & SOUND POWERED PHONE SYSTEMS
SECOND FLOOR

DRAWN D.S.K. CHKD A.O. DATE 4/6/61 NO. REQUIRED

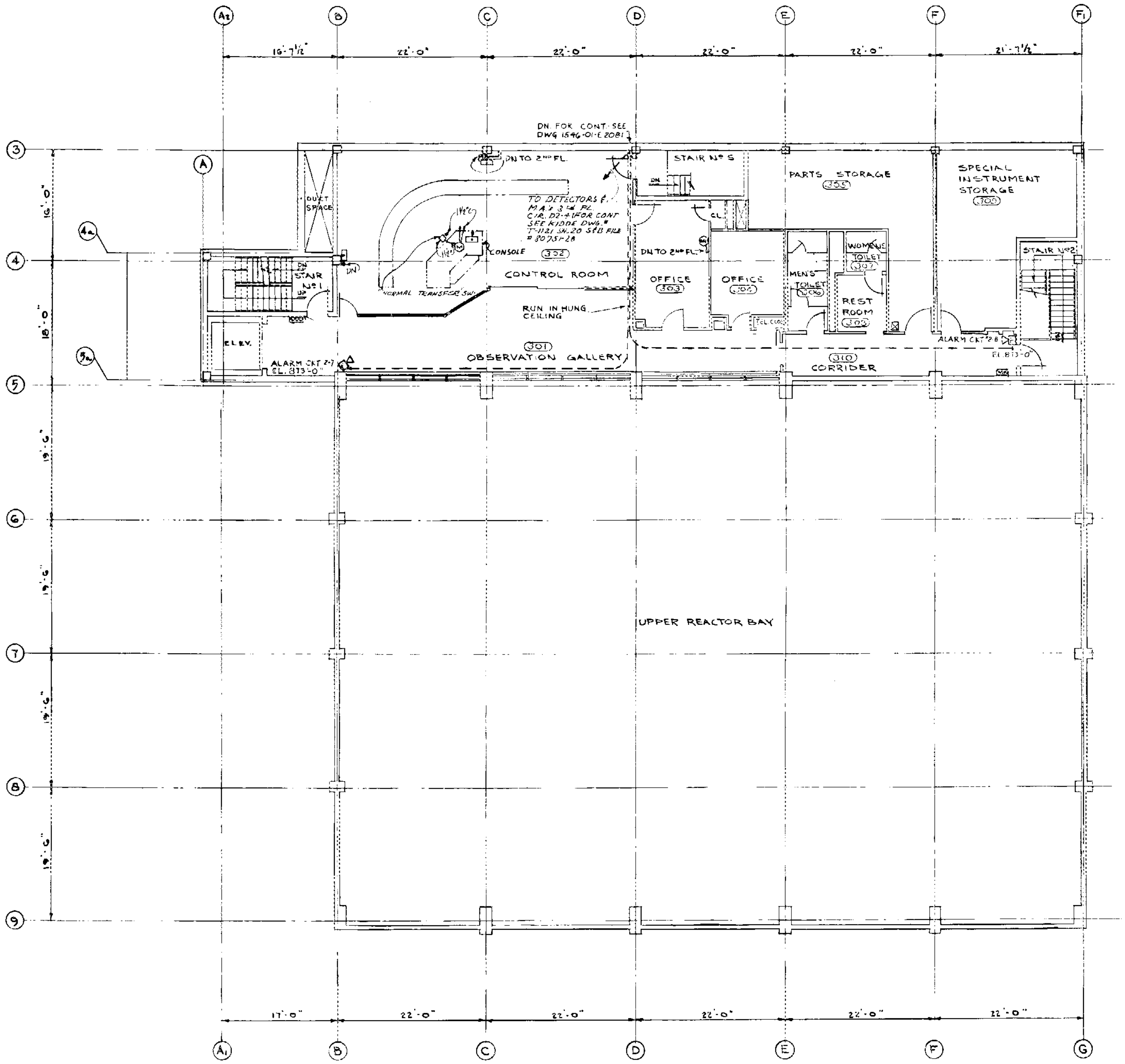
DATE 5/10/61 DRAWING NO. 1546-01-E-2081 REV. 3

SCALE 1/8" = 1'-0"

NO.	REVISIONS	BY	CHK.	APPD. E&S	DATE	APPD. S&B	DATE	APPD. UCC	DATE
3	KEYED TO NEW FIRE PROOF DATA	LMF							
2	ADDED CONDUIT NO. C-5620	JK					JK	—	JK
1	MISC. REVISIONS	JN	JSK	FJ	5-8-61	NR		NR	
0	CERTIFIED FOR CONSTRUCTION	MT	PRT		3-31-61		3-31-61		
C	REISSUED FOR TITLE II APPROVAL	ZBS	AKO		2-14-61		2-14-61		2-14-61
B	ISSUED FOR TITLE II APPROVAL	JK	A.O.		1-20-61				

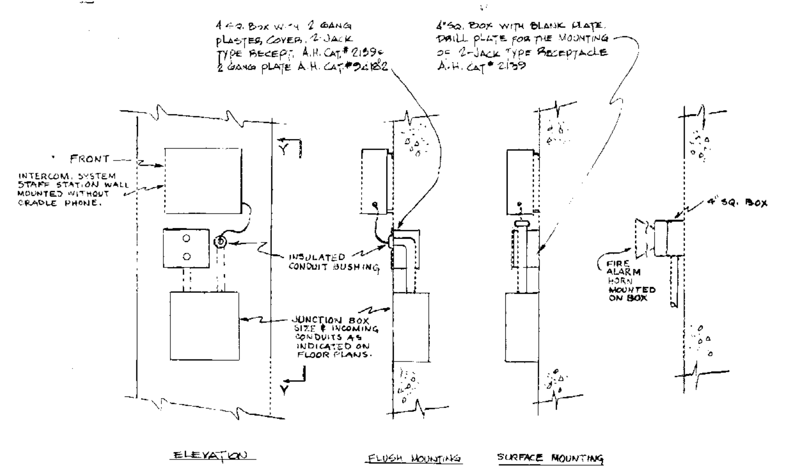
R & B 546
DIST. CHK.
ARCH.
M.ACT.
H & V.
ENGY.
MECH.
STRUC.
UTIL.
PROJ.

DRAWING NO. 1546-01-E-2082 REV. 2



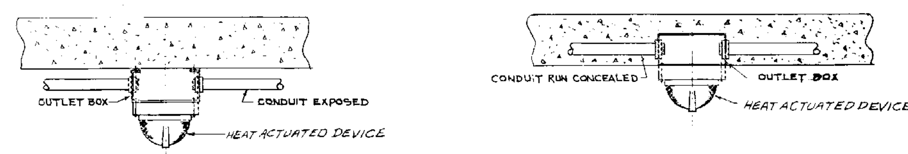
NOTES

1. FOR SYMBOLS & GENERAL NOTES SEE DWG 1546-01-E-2019.
2. FOR FIRE ALARM & INTERCOM SYMBOLS & NOTES SEE DWG 1546-01-E-2079.



DETAIL OF SOUND POWER RECEPTACLE & INTERCOM STAFF STATION MOUNTING

AUDIBLE ALARM MOUNTING DETAILS

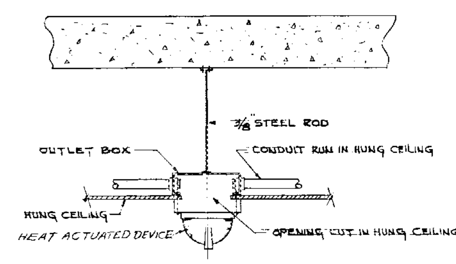


OUTLET BOX & CONDUIT EXPOSED

OUTLET BOX & CONDUIT CONCEALED

TYPICAL MOUNTING DETAILS OF HEAT ACTUATED DEVICE

NOT TO SCALE



HEAT ACTUATED DEVICE MOUNTED IN HUNG CEILING

NOT TO SCALE

AREAS TO BE COVERED BY HEAT ACTUATED DEVICES

LOCATION OR ROOM Nº.	Ⓡ MOUNTED WITH BOX FLUSH WITH CONCRETE CEILING	◐ MOUNTED ON HUNG CEILING	ⓘ BOX SURFACE MOUNTED ON CONCRETE CEILING
301		✓	
302		✓	
303		✓	
304		✓	
305			✓
306			✓
307			✓
308			✓
309			✓
310		✓	
UPPER REACTOR BAY 310			✓
STAIR #1			✓
STAIR #2			✓
STAIR #5			

CERTIFIED FOR CONSTRUCTION

DRAWING NO. 1546-01-E-2082 REV. 2

REFERENCE DRAWING	NO.
REACTOR BLDG. F.A. & INTERCOM GND FL.	1546-01-E-2079
REACTOR BLDG FA & INTERCOM 1ST FL	1546-01-E-2080
REACTOR BLDG FA & INTERCOM 2ND FL	1546-01-E-2081
FIRE ALARM BLOCK DIAGRAM	1546-01-E-2084
INTERCOM SYSTEM BLOCK DIAGRAM	1546-01-E-2085
SPECIFICATION REF.	SECTION 107

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.
FOR
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER BY [signature] DATE 5-26-61
UNION CARBIDE NUCLEAR COMPANY BY C.E. WINTERS DATE 6/5/61
U. S. ATOMIC ENERGY COMMISSION BY L.H. JACKSON DATE 6/7/61

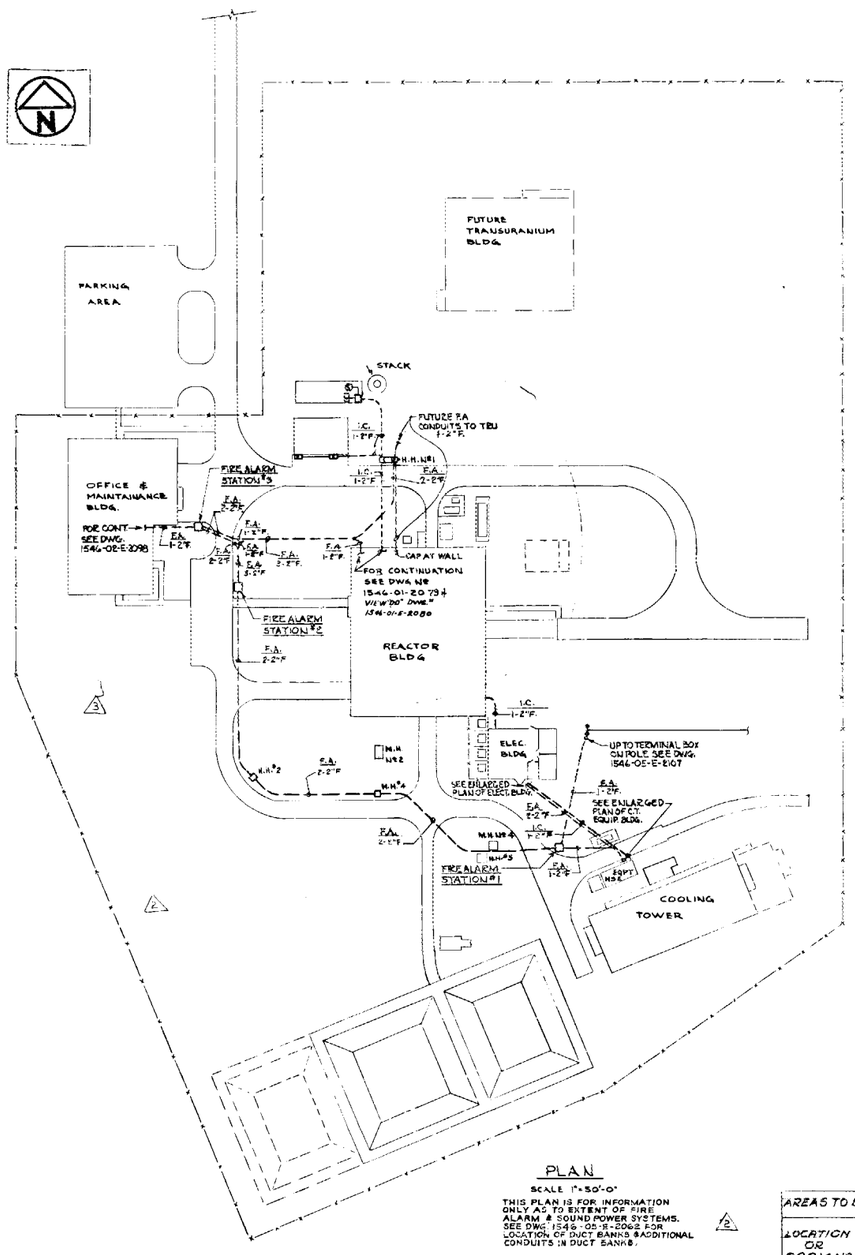
HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
FIRE ALARM, INTERCOM. & SOUND POWERED PHONE SYSTEMS
THIRD FLOOR

S & B. 546	
DEPT.	CHK.
ARCH.	
ELECT.	
H & V.	
INST.	
MECH.	
STRUC.	
UTIL.	
PROC.	

DRAWN D.S. CHKD AFO DATE 5/25/61 SCALE 1/8" = 1'-0" & AS NOTED CONTRACT NO. AT-(40-1)-1300
DRAWING NO. 1546-01-E-2082 REV. 2

NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. UCNC	DATE	APPR. AEC	DATE
2	[illegible] DATA	JAC			2-1-63				2/4/63
1	MISC. REVISIONS	JN			6-14-6?	NK	—		—
0	CERTIFIED FOR CONSTRUCTION	PT	PAT					—	—
0	ISSUED FOR TITLE II APPROVAL	JK	AFO		5-26-61	C.E.W.	6/5/61	L.H.J.	6/7/61

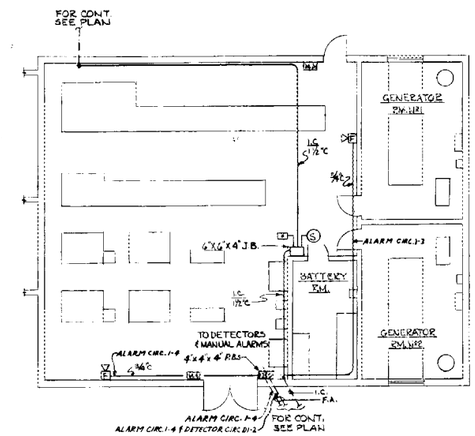
DRAWING NO. 1546-05-E-2083 REV. 3



PLAN

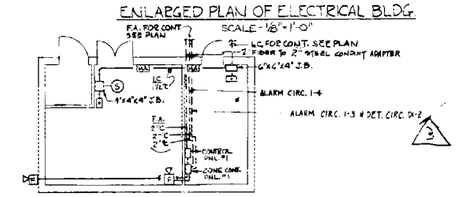
SCALE 1" = 50'-0"

THIS PLAN IS FOR INFORMATION ONLY AS TO EXTENT OF FIRE ALARM & SOUND POWER SYSTEMS. SEE DWG. 1546-05-E-2082 FOR LOCATION OF DUCT BANKS & ADDITIONAL CONDUITS IN DUCT BANKS.



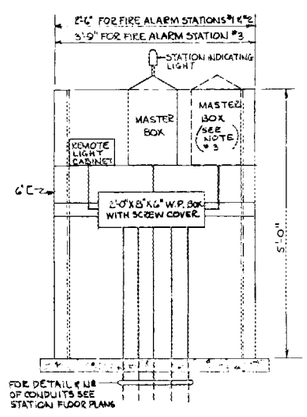
ENLARGED PLAN OF ELECTRICAL BLDG.

SCALE - 1/8" = 1'-0"



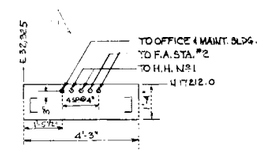
ENLARGED PLAN OF COOLING TOWER EQUIP. BLDG.

SCALE 1/8" = 1'-0"



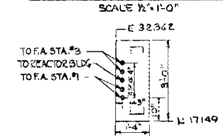
TYPICAL DETAIL OF F.A. STATIONS

SCALE 1" = 1'-0"



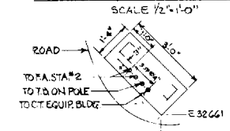
FLOOR PLAN F.A. STATION #3

SCALE 1/2" = 1'-0"



FLOOR PLAN F.A. STATION #2

SCALE 1/2" = 1'-0"



FLOOR PLAN F.A. STATION #1

SCALE 1/2" = 1'-0"

AREAS TO BE COVERED BY HEAT ACTUATED DEVICES			
LOCATION OR ROOM Nº	MOUNT WITH FACE FLUSH WITH CONCRETE CEILING	MOUNTED ON HUNG CEILING	BOX SURFACE MOUNTED ON CONCRETE CEILING
ELECT. BLDG.			✓

NOTES

1. FOR SYMBOLS & GENERAL NOTES SEE DWG. Nº 1546-E-2019.
2. FOR FIRE ALARM SYMBOLS / NOTES SEE DWG. Nº 1546-01-E-2070.
3. ADDITIONAL MASTER BOX APPEARS ON FIRE ALARM STATION #3 ONLY.
4. FOR CONDUIT WORK TO DETECTORS, MANUAL ALARM STATIONS AND SPRINKLER, SUPERVISORY DEVICES SEE KIDDE ULTRASONIC DWG.Nº 7-1121 SH. 21 (S.S.B. FILE # 80 XST-23).

CERTIFIED FOR CONSTRUCTION

DRAWING NO.	1546-05-E-2083
REV.	3
REFERENCE DRAWING	NO.
YARD UNDERGROUND DISTRIB. AREA PLAN	1546-00-E-2062
REACTOR BLDG. F.A. & INTERCOM GND. FL.	1546-01-E-2079
OFFICE & MAINTENANCE BLDG.	1546-02-E-2098
SPECIFICATION	NO. SECTION 107

SINGMASTER & BREYER
INSTRUMENTS & CHEMICAL ENGINEERS
488 LEXINGTON AVE. NEW YORK 17, N.Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER BY R. C. Hunsicker DATE 5-26-61
UNION CARBIDE NUCLEAR COMPANY BY C.E. WINTERS DATE 6/5/61
U. S. ATOMIC ENERGY COMMISSION BY L.H. JACKSON DATE 6/7/61

HIGH FLUX ISOTOPE REACTOR

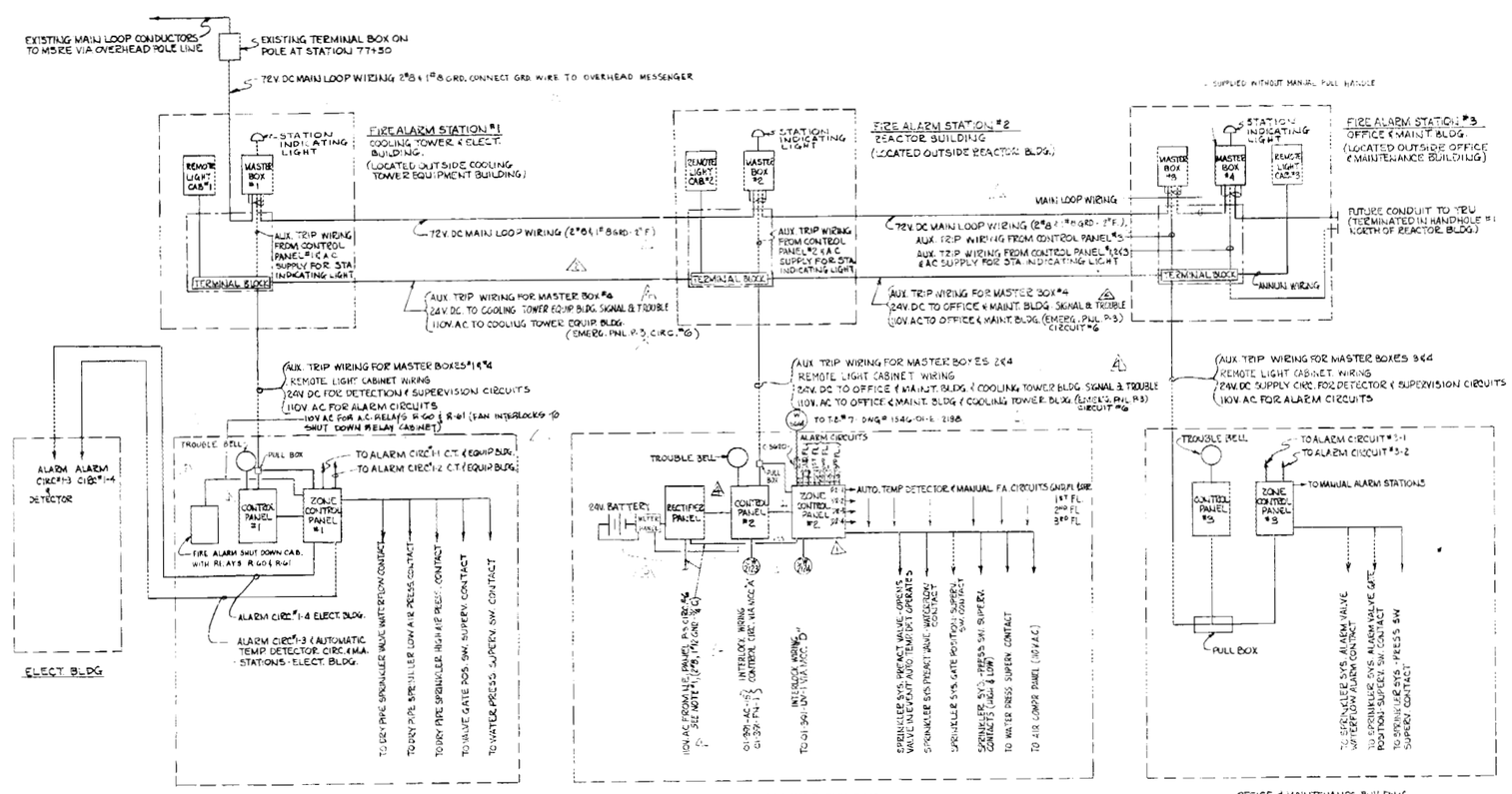
FIRE ALARM, INTERCOM & SOUND POWERED PHONE SYSTEMS
MISC. AREAS

DRAWN R.R.P.	CHKD. A.F.D.	DATE 5-26-61	CONTRACT NO. AT-1201-1
DATE 5-26-61	DRAWING NO. 1546-05-E-2083		REV. 3
SCALE AS NOTED			

S. & S. SYS.	
DEPT.	CHK.
ARCH.	
ELECT.	
H. & V.	
INST.	
MECH.	
STRUC.	
UTIL.	

NO.	REVISIONS	BY	CHK.	APP. S&B	DATE	APP. UCNC	DATE	APP. ARC	DATE
2	REVISED F.A. STA. #3 & H.H. Nº 1. ADDED NOTE ON PLAN.	P.M.			1-8-61	A.L.B.	—	A.L.B.	—
1	REVISED PLAN AND STA. #3 & F.A. STATION #1 & 2 MOUNTING. ADD. OF FIRE, SMOKE DETECTORS	J.N.	D.H.		12-28-60		—	N.P.	—
0	CERTIFIED FOR CONSTRUCTION	P.T.	P.A.T.		11-21-60				
0	ISSUED FOR TITLE II APPROVAL	R.E.P.	A.F.D.		5-26-61		6/5/61		6/7/61

DRAWING NO. 1546-01-E-2084 REV. 5



NOTES

1. 110V AC CIRCUIT #6 PANEL P-3 AND 24V.D.C. POWER SUPPLY CONDUCTORS FOR SIGNAL & TROUBLE, SHALL BE #8 AWG "THHN" WIRE THROUGHOUT. ¾" #8 CABLES PREFERRED FOR D.C. CIRCUITS.
2. FOR INTERCONNECTION WIRE DIAGRAM OF FIRE ALARM SYSTEM SEE KIDDIE ULTRASONIC & DETECTION DWG. # T-1121 SH. #2.
3. FOR SCHEMATIC WIRING DIAGRAM OF FIRE ALARM SYSTEM SEE KIDDIE ULTRASONIC & DETECTION DWG. # T-1121 SH. 1.

4

CERTIFIED FOR CONSTRUCTION

ZONE PANEL #1

ZONE No. 1	COVERS	ACTUATED BY	RESULTING OPERATION
1	COOLING TOWER & COOLING TOWER EQUIP. BLDG.	SPRINKLER VALVE WATER FLOW SW. OR MANUAL F.A. BOX IN CT EQUIP. BLDG.	AUDIBLE ALARM CIRCUITS 1-1 & 1-2 SOUND, MASTER BOX #1 TRIPPED, ZONE LIGHTS ON ZONE PANEL & REMOTE LIGHT CABINET EXTINGUISHED & SHUT DOWN RELAYS ACTUATED**
2	ELECTRICAL BLDG	MANUAL F.A. BOX OR AUTO. FIRE DETECTOR	AUDIBLE ALARM CIRCUITS 1-3 & 1-4 SOUND, MASTER BOX #1 TRIPPED, ZONE LIGHTS ON ZONE PANEL & REMOTE LIGHT CABINET EXTINGUISHED
3	* TROUBLE SIGNAL	SPRINKLER-LOW AIR PRESS. HIGH AIR PRESS. GATE POS. SW. & WATER PRESS. SW.	TROUBLE BELL SOUNDS, MASTER BOX #4 TRIPPED, ZONE LIGHTS ON ZONE PANEL & REMOTE LIGHT CABINET EXTINGUISHED
4	SPARE		

** - SHUTDOWN RELAY CABINET DETAILS SHOWN ON DWG. # 1546-05-E-2015, (ELEMENTARY CONTROL DIAGRAM DWG. # 1546-05-E-2118). SHUTDOWN RELAY CABINET NOT INCLUDED IN FIRE ALARM EQUIPMENT PACKAGE. COVERED BY SPEC. SECTION 107-17 OF THE SPECIFICATIONS. ZONE PANEL TO HAVE NORMALLY OPEN CONTACT TO OPERATE SHUTDOWN RELAYS.

ZONE PANEL #2

ZONE No. 2	COVERS	ACTUATED BY	RESULTING OPERATION
1	GROUND FLOOR & SUB PILE RM.	GROUND FLOOR & SUB PILE RM. MANUAL F.A. BOXES OR AUTO. FIRE DETECTORS	AUDIBLE ALARM CIRCUITS #2-1 & #2-2 SOUND MASTER BOX #2 TRIPPED, ZONE LIGHTS ON ZONE PANEL & REMOTE LIGHT CABINET EXTINGUISHED, & ALARM SOUNDED IN MAIN CONTROL ROOM PREACT. VALVE TRIPS & FANS FN-1 & AC-15 & LVH SHUT DOWN.
2	FIRST FLOOR REACTOR BLDG.	FIRST FLOOR MANUAL F.A. BOXES OR AUTO. FIRE DETECTORS,	AUDIBLE ALARM CIRCUITS #2-3 & 2-4 SOUND MASTER BOX #2 TRIPPED, ZONE LIGHTS ON ZONE PANEL & REMOTE LIGHT CABINET EXTINGUISHED & ALARM SOUNDED IN MAIN CONTROL ROOM PREACT. VALVE TRIPS & FANS FN-1 & AC-15 SHUT DOWN.
3	SECOND FLOOR REACTOR BLDG.	SECOND FLOOR MANUAL F.A. BOXES OR AUTO. FIRE DETECTORS	AUDIBLE ALARM CIRCUITS #2-5 & 2-6 SOUND MASTER BOX #2 TRIPPED ZONE LIGHTS ON ZONE PANEL & REMOTE LIGHT CABINET EXTINGUISHED & ALARM SOUNDED IN MAIN CONTROL ROOM PREACT. VALVE TRIPS & FANS FN-1 & AC-15 SHUT DOWN.
4	THIRD FLOOR REACTOR BLDG.	THIRD FLOOR MANUAL F.A. BOXES OR AUTO. FIRE DETECTORS,	AUDIBLE ALARM CIRCUITS #2-7 & 2-8 SOUND MASTER BOX #2 TRIPPED, ZONE LIGHTS ON ZONE PANEL & REMOTE LIGHT CABINET EXTINGUISHED & ALARM SOUNDED IN MAIN CONTROL ROOM PREACT. VALVE TRIPS & FANS FN-1 & AC-15 SHUT DOWN.
5	REACTOR BLDG.	WATERFLOW SWITCH	MASTER BOX #2 TRIPPED ZONE LIGHTS ON ZONE PANEL & REMOTE LIGHT CABINET EXTINGUISHED & ALARM SOUNDED IN MAIN CONTROL ROOM.
6	* TROUBLE SIGNAL	SPRINKLER WATER-FLOW SW. GATE POS. SW. & PRESS SW.	TROUBLE BELL SOUNDS, MASTER BOX #4 TRIPPED, ZONE LIGHTS ON ZONE PANEL & REMOTE LIGHT CABINET EXTINGUISHED

ZONE PANEL #3

ZONE No. 3	COVERS	ACTUATED BY	RESULTING OPERATION
1	MAINT. & OFFICE BLDG.	MANUAL F.A. BOXES OR SPRINKLER WATER FLOW SWITCH	AUDIBLE ALARM CIRCUITS 3-1 & 3-2 SOUND MASTER BOX #3 TRIPPED, ZONE LIGHTS ON ZONE PANEL & REMOTE LIGHT CABINET EXTINGUISHED
2	* TROUBLE SIGNAL	SPRINKLER WATER-GATE POS. SW. & PRESS SW.	TROUBLE BELL SOUNDS, MASTER BOX #4 TRIPPED, ZONE LIGHTS ON ZONE PANEL & REMOTE LIGHT CABINET EXTINGUISHED

* OPERATION FOR A BROKEN WIRE IN SUPERVISED CIRCUIT PERFORMS SIMILAR OPERATION TO THAT SHOWN, EXCEPT THAT ZONE LIGHTS ARE NOT EXTINGUISHED

REFERENCE DRAWING	NO.
MED UNDERGROUND PHTRG. AREA PLAN	1546-05-E-2062
REACTOR BLDG. F.A. INTERCOM. GND. FL.	1546-01-E-2079
F.A. & INTERCOM. MISC. AREAS.	1546-01-E-2083
SPECIFICATION	REF. SECT. 107

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N. Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER BY [signature] DATE 5-25-61
UNION CARBIDE NUCLEAR COMPANY BY C.E. WINTERS DATE 6/2/61
U. S. ATOMIC ENERGY COMMISSION BY L.H. JACKSON DATE 6/15/61

HIGH FLUX ISOTOPE REACTOR

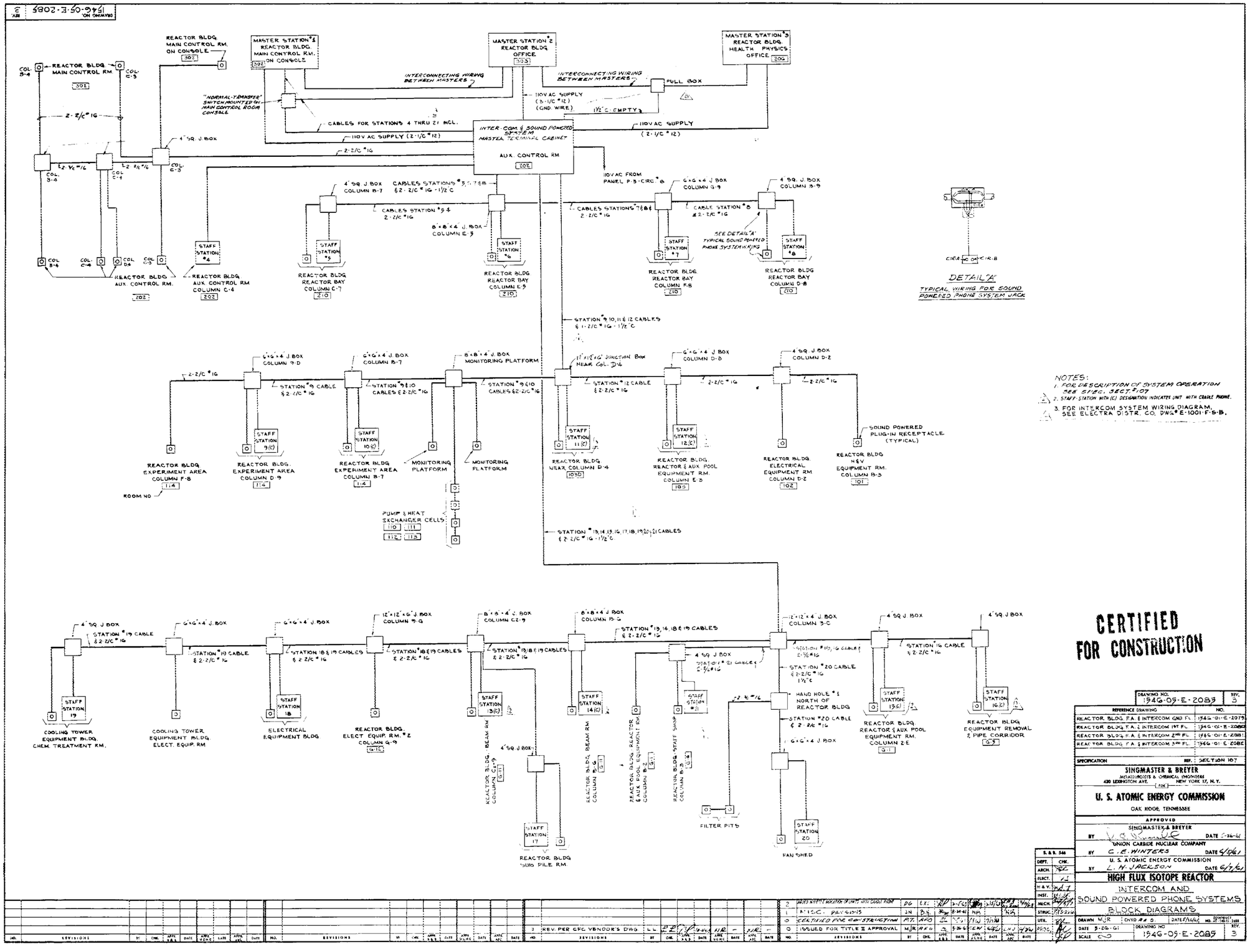
FIRE ALARM BLOCK DIAGRAM

S. & B. 546
DEPT. CHK. ARCH. ELECT. N.R.V. INST. MECH. STRUC. UTIL. PROC.

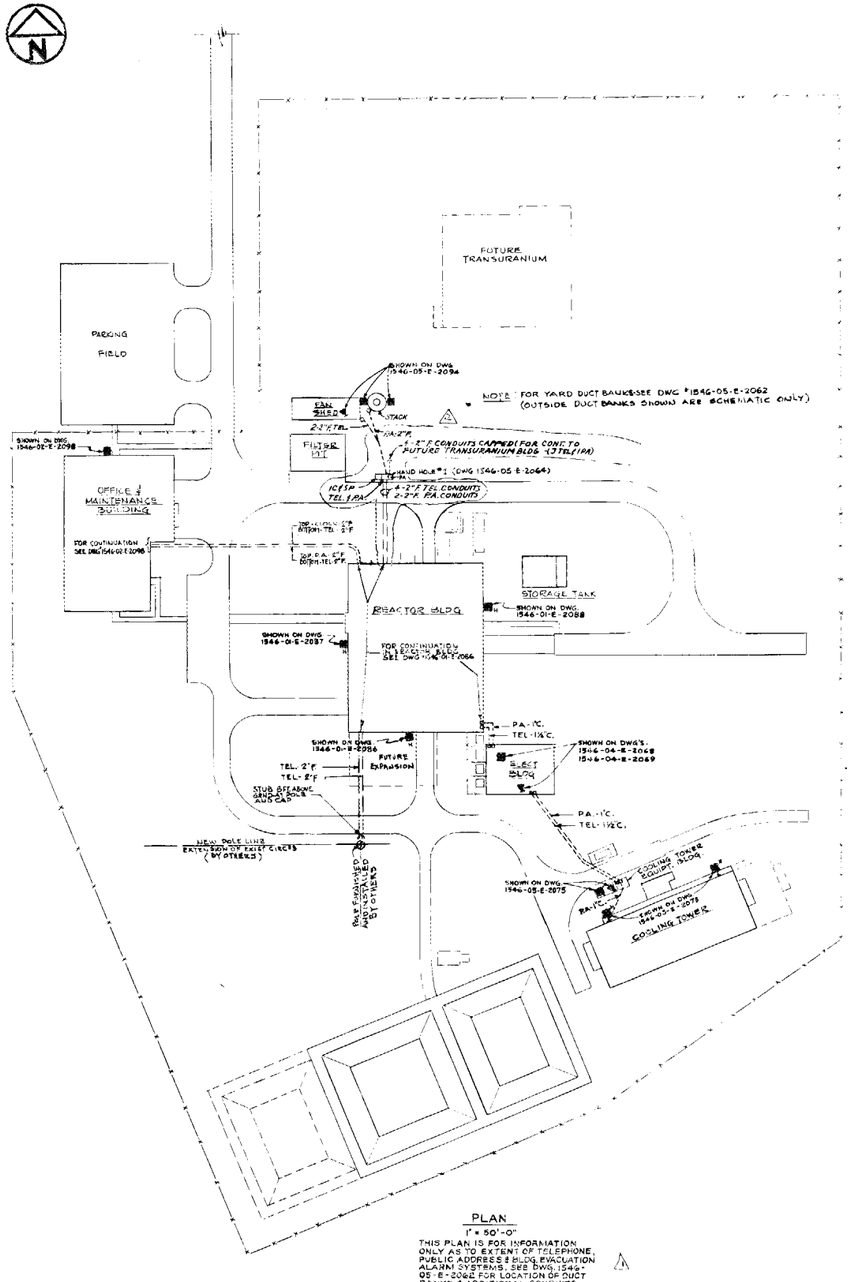
DRAWN R.R.P. CHKD A.F.D. DATE 6/6/61 NO. CONTRACT
DATE 3/25/61 DRAWING NO. 1546-01-E-2084 REV. 5
SCALE NONE

NO.	REVISIONS	BY	CHK.	APPR. ELE.	DATE	APPR. STRUC.	DATE	APPR. MEC.	DATE
5	REV. PER CFC VENDOR'S DWG.	LL	[illegible]	[illegible]	[illegible]	N.R.	—	N.R.	—
4	REVISED TO AGREE WITH VENDORS PRINTS & MISC. MINOR REVISIONS.	DG	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	MISC. REVISIONS	BRS	[illegible]	[illegible]	[illegible]	N.R.	—	N.R.	—
2	MISC. REVISIONS	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1	MISC. REVISIONS	JN	[illegible]	[illegible]	[illegible]	N.R.		N.R.	
0	CERTIFIED FOR CONSTRUCTION	RP	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0	ISSUED FOR TYPE II APPROVAL	RRP	AFD	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

032


DRAWING NO. 1946-09-E-2085 REV. 3
REACTOR BLDG. MAIN CONTROL RM. ON CONSOLE 302
MASTER STATION #1 REACTOR BLDG. MAIN CONTROL RM. ON CONSOLE 302
MASTER STATION #2 REACTOR BLDG. OFFICE 303
MASTER STATION #3 REACTOR BLDG. HEALTH PHYSICS OFFICE 209
REACTOR BLDG. MAIN CONTROL RM. 302
INTERCONNECTING WIRING BETWEEN MASTERS
PULL BOX
"NORMAL-TRANSFER" SWITCH MOUNTED ON MAIN CONTROL ROOM CONSOLE
110V AC SUPPLY (3-1/C #12) (GND. WIRE)
1½" C. EMPTY
CABLES FOR STATIONS 4 THRU 21 INCL.
110V AC SUPPLY (2-1/C #12)
INTER-COM & SOUND POWERED SYSTEM MASTER TERMINAL CABINET
AUX. CONTROL RM 202
110V AC SUPPLY (2-1/C #12)
2-2/C #16
4" SQ. J BOX
110V AC FROM PANEL P-3-CIRC #8
6"x6"x4" J BOX COLUMN G-9
4" SQ. J BOX COLUMN B-9
4" SQ. J BOX COLUMN B-7
CABLES STATIONS #3, 5, 7 & 8 & 2-2/C #16-1½" C
CABLES STATION #9 & 2-2/C #16
8"x8"x4" J. BOX COLUMN E-9
CABLES STATIONS #7 & 8 & 2-2/C #16
CABLE STATION #8 & 2-2/C #16
SEE DETAIL "A" TYPICAL SOUND POWERED PHONE SYSTEM WIRING
STAFF STATION #4
STAFF STATION #5
STAFF STATION #6
STAFF STATION #7
STAFF STATION #8
REACTOR BLDG. AUX. CONTROL RM. 202
REACTOR BLDG. AUX. CONTROL RM COLUMN C-4 202
REACTOR BLDG. REACTOR BAY COLUMN C-7 210
REACTOR BLDG. REACTOR BAY COLUMN E-9 210
REACTOR BLDG. REACTOR BAY COLUMN F-8 210
REACTOR BLDG. REACTOR BAY COLUMN D-8 210
DETAIL "A"
TYPICAL WIRING FOR SOUND POWERED PHONE SYSTEM JACK
STATION #9, 10, 11 & 12 CABLES & 1-2/C #16-1½" C
6"x6"x4" J BOX COLUMN 9-D
6"x6"x4" J BOX COLUMN B-7
8"x8"x4" J. BOX MONITORING PLATFORM
12"x12"x6" JUNCTION BOX NEAR COL. D-4
6"x6"x4" J BOX COLUMN D-8
4" SQ. J BOX COLUMN D-2
2-2/C #16
STATION #9 CABLE & 2-2/C #16
STATION #9 & 10 CABLES & 2-2/C #16
STATION #9 & 10 CABLES & 2-2/C #16
STATION #12 CABLE & 2-2/C #16
STAFF STATION 9(C)
STAFF STATION 10(C)
STAFF STATION 11(C)
STAFF STATION 12(C)
SOUND POWERED PLUG-IN RECEPTACLE (TYPICAL)
REACTOR BLDG. EXPERIMENT AREA COLUMN F-8 1:4
ROOM NO
REACTOR BLDG. EXPERIMENT AREA COLUMN D-9 1:4
REACTOR BLDG. EXPERIMENT AREA COLUMN B-7 1:4
MONITORING PLATFORM
MONITORING PLATFORM
REACTOR BLDG. NEAR COLUMN D-4 105D
REACTOR BLDG. REACTOR & AUX. POOL EQUIPMENT RM. COLUMN E-8 105
REACTOR BLDG. ELECTRICAL EQUIPMENT RM COLUMN D-2 102
REACTOR BLDG. H&V EQUIPMENT RM. COLUMN B-3 101
PUMP & HEAT EXCHANGER CELLS 110 111 112 113
STATION #13, 14, 15, 16, 17, 18, 19, 20 & 21 CABLES & 2-2/C #16-1½" C
4" SQ. J BOX
STATION #19 CABLE & 2-2/C #16
6"x6"x4" J. BOX
STATION #19 CABLE & 2-2/C #16
6"x6"x4" J. BOX
STATION #18 & 19 CABLES & 2-2/C #16
12"x12"x6" J. BOX COLUMN 9-G
STATION #18 & 19 CABLES & 2-2/C #16
8"x8"x4" J. BOX COLUMN C2-9
STATION #18 & 19 CABLES & 2-2/C #16
8"x8"x4" J BOX COLUMN B-G
STATION #13, 14, 18 & 19 CABLES & 2-2/C #16
4" SQ. J BOX
STATION #21 CABLES & 2-2/C #16
12"x12"x4" J. BOX COLUMN 3-C
STATION #15, 16 CABLES & 2-2/C #16
STATION #20 CABLE & 2-2/C #16 1½" C
4" SQ. J BOX
STATION #16 CABLE & 2-2/C #16
4" SQ. J BOX
STAFF STATION 19
STAFF STATION 18
STAFF STATION 13(C)
STAFF STATION 14(C)
STAFF STATION #21
STAFF STATION 15(C)
STAFF STATION 16(C)
COOLING TOWER EQUIPMENT BLDG. CHEM. TREATMENT RM.
COOLING TOWER EQUIPMENT BLDG. ELECT. EQUIP. RM
ELECTRICAL EQUIPMENT BLDG.
REACTOR BLDG. ELECT. EQUIP. RM. #2 COLUMN G-9 G-16
REACTOR BLDG. BEAM RM COLUMN C2-9 G-11
REACTOR BLDG. BEAM RM COLUMN B-G G-11
REACTOR BLDG. REACTOR & AUX. POOL EQUIPMENT RM COLUMN E-8 G-1
REACTOR BLDG. STAFF SHOP COLUMN B-3 G-3
FILTER PITS
HAND HOLE #1 NORTH OF REACTOR BLDG
STATION #20 CABLE & 2-2/C #16
6"x6"x4" J BOX
STAFF STATION 17
REACTOR BLDG. SUB PILE RM.
STAFF STATION 20
FAN SHED
REACTOR BLDG. REACTOR & AUX. POOL EQUIPMENT RM. COLUMN 2-E G-1
REACTOR BLDG. EQUIPMENT REMOVAL & PIPE CORRIDOR G-3
NOTES:
1. FOR DESCRIPTION OF SYSTEM OPERATION SEE SPEC. SECT. #107
2. STAFF-STATION WITH (C) DESIGNATION INDICATES UNIT WITH CRADLE PHONE.
3. FOR INTERCOM SYSTEM WIRING DIAGRAM, SEE ELECTRA DISTR. CO. DWG #E-1001-F-5-B.
CERTIFIED FOR CONSTRUCTION
DRAWING NO. 1946-09-E-2085 REV. 3
REFERENCE DRAWING NO.
REACTOR BLDG. F.A. & INTERCOM GND FL. 1946-01-E-2079
REACTOR BLDG. F.A. & INTERCOM 1ST FL. 1946-01-E-2080
REACTOR BLDG. F.A. & INTERCOM 2ND FL. 1946-01-E-2081
REACTOR BLDG. F.A. & INTERCOM 3RD FL. 1946-01-E-2082
SPECIFICATION REF. SECTION 107
SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
APPROVED
SINGMASTER & BREYER BY DATE 6-26-61
UNION CARBIDE NUCLEAR COMPANY BY C. E. WINTERS DATE 6/26/61
U. S. ATOMIC ENERGY COMMISSION BY L. H. JACKSON DATE 6/27/61
HIGH FLUX ISOTOPE REACTOR
INTERCOM AND SOUND POWERED PHONE SYSTEMS BLOCK DIAGRAMS
DRAWN MJR CHKD AA O. DATE 5/26/61 NO. SDW 1946-2085
DATE 3-20-61 DRAWING NO. 1946-09-E-2085 REV. 3
SCALE NONE
S. & B. 546
DEPT. CHK.
ARCH. REV. 1 REV. 2 REV. 3
ELECT. REV. 1 REV. 2 REV. 3
H & V. REV. 1 REV. 2 REV. 3
INST. REV. 1 REV. 2 REV. 3
MECH. REV. 1 REV. 2 REV. 3
STRUC. REV. 1 REV. 2 REV. 3
UTIL. REV. 1 REV. 2 REV. 3
PROC. REV. 1 REV. 2 REV. 3
2 ADDED ATTEST LOCATION DWG. AND CABLE FROM DG E.E. 5-26-61
1 MISC. - REV. 4-5-15 JN B.H. 8-14-61
0 CERTIFIED FOR CONSTRUCTION P.T. RFO 7-11-61
0 ISSUED FOR TITLE II APPROVAL MJR RFO 5-26-61
3 REV. PER CFC VENDOR'S DWG. LL 11-8-61
NO. REVISIONS BY CHK. APPR. S&B DATE APPR. ARCH. DATE APPR. ELEC. DATE APPR. MEC. DATE

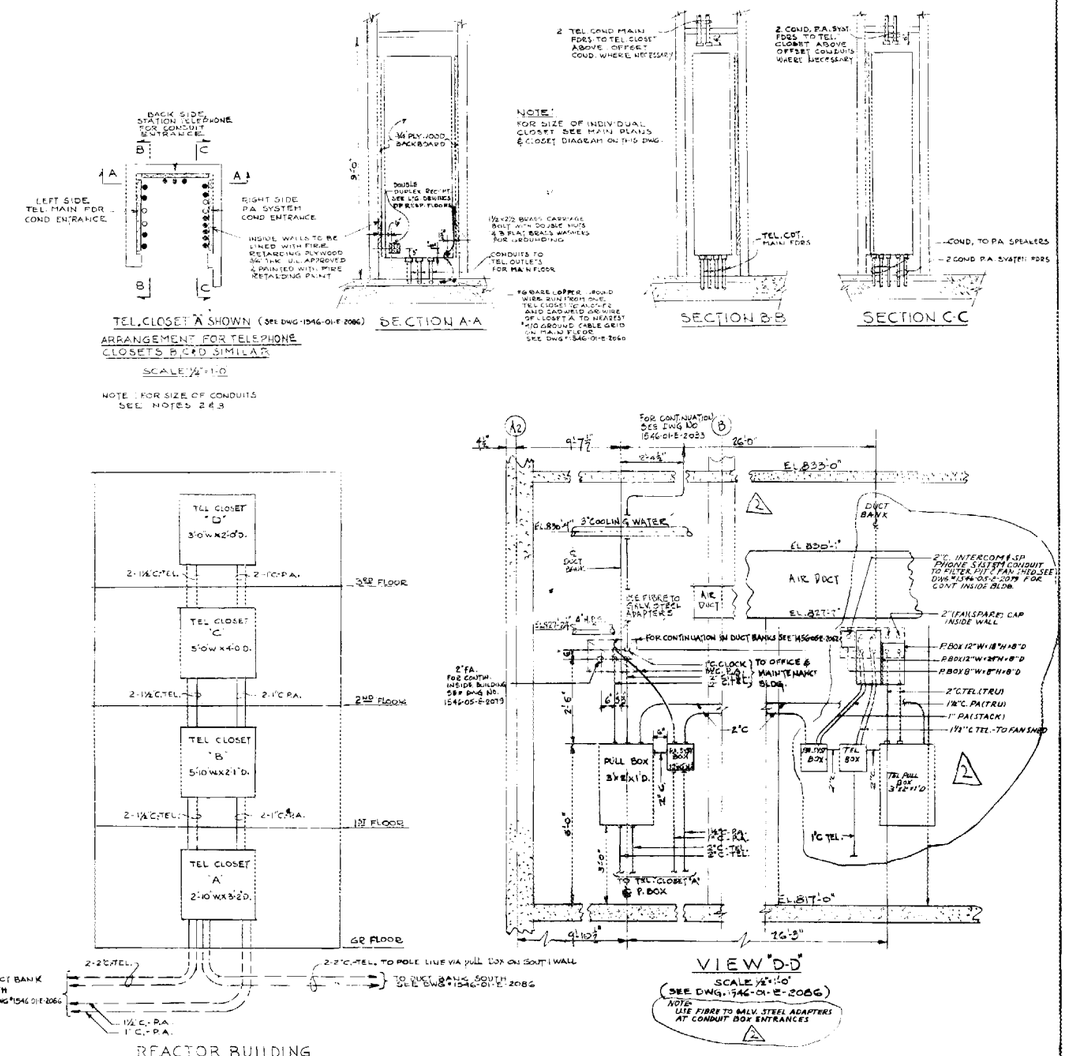
DRAWING NO. 1546-05-E-2090 REV. 2



PLAN

1" = 50'-0"

THIS PLAN IS FOR INFORMATION ONLY AS TO EXTENT OF TELEPHONE, PUBLIC ADDRESS & BLDG. EVACUATION ALARM SYSTEMS. SEE DWG. 1546-05-E-2062 FOR LOCATION OF DUCT BANKS & ADDITIONAL CONDUITS IN DUCT BANKS.



TEL. CLOSET "A" SHOWN (SEE DWG 1546-01-E-2086)

ARRANGEMENT FOR TELEPHONE CLOSETS B & D SIMILAR

SCALE: ½" = 1'-0"

NOTE: FOR SIZE OF CONDUITS SEE NOTES 2 & 3

REACTOR BUILDING

TELEPH. & P.A. CLOSET DIAGRAM

N.T.S.

CONDUITS BETWEEN FLOORS TO CLOSETS TO HAVE LONG SWEEPING BENDS, AND WITHOUT FITTINGS FOR PULLING CABLE.

VIEW "D-D"

SCALE: ½" = 1'-0"

(SEE DWG. 1546-01-E-2086)

NOTE: USE FIBRE TO GALV. STEEL ADAPTERS AT CONDUIT BOX ENTRANCES

NOTE

1. FOR TELEPHONE & P.A. SYSTEM NOTES & SYMBOLS - SEE DWG #1546-01-E-2086
2. FOR YARD DUCT BANK LAYOUT SEE DWG # 1546-05-E-2062
3. FOR DUCT BANK SECTIONS SEE DWG # 1546-05-E-2063

CERTIFIED FOR CONSTRUCTION

DRAWING NO.	REV.
1546-05-E-2090	2

REFERENCE DRAWING	NO.
TELEPH., P.A. & BLDG. EVACUATION ALARM SYSTEMS DIAGRAM	1546-01-E-2086
" " " 1ST FL.	1546-01-E-2087
" " " 2ND FL.	1546-01-E-2088
" " " 3RD FL.	1546-01-E-2089
YARD UNDERGROUND DISTRIB. AREA PLAN	1546-05-E-2062
SPECIFICATION	NO. SECTION 107

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N. Y.

FOR

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER BY DATE 5-17-61
UNION CARBIDE NUCLEAR COMPANY BY C. E. WINTERS DATE 5-19-61
U. S. ATOMIC ENERGY COMMISSION BY L. H. JACKSON DATE 5-26-61

S. & B. 546
DEPT. CHK.
ARCH.
ELECT.
H. & V.
INST.
MECH.
STRUC.
UTIL.

HIGH FLUX ISOTOPE REACTOR

TELEPHONE, PUBLIC ADDRESS & BLDG. EVACUATION ALARM SYSTEMS
SECTIONS & DETAILS & MISC. AREA LAYOUT

DRAWN E.R.S. | CHKD. J.L. | DATE 5-16-61 | DRAWING NO. 1546-05-E-2090 | REV. 2
DATE 5/15/61
SCALE AS SHOWN

NO.	REVISIONS	BY	CHK.	APPL. ELEC.	DATE	APPL. MECH.	DATE	APPL. ARC.	DATE
1	ADDED NOTE ON PLAN	P.M.	[illegible]	[illegible]	[illegible]	[illegible]		N.A.	
0	CERTIFIED FOR CONSTRUCTION	JW	JR	[illegible]	7-19-61	[illegible]	7-19-61		
0	ISSUED FOR TITLE II APPROVAL	FB	EL	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5-26-61
2	REVS. PER REC. #45	JMC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

DRAWING NO. 1546-01-E-2113 REV. 5

ELEMENTARY CONTROL DIAGRAM
SYMBOLS

- INDICATES EQUIPMENT AND WIRING FURNISHED AND INSTALLED BY CONTRACTOR OR EQUIPMENT FURNISHED BY GOVERNMENT AND INSTALLED BY CONTRACTOR. SEE SPECIFICATIONS FOR LIST OF EQUIPMENT FURNISHED BY GOVERNMENT.
- INDICATES EQUIPMENT AND WIRING FURNISHED AND INSTALLED BY OTHERS.
- AIR CIRCUIT BREAKER
- MANUAL STARTER
- PUSHBUTTON · MOMENTARY CONTACT · NORMALLY OPEN - START OR AS NOTED.
- PUSHBUTTON · MOMENTARY CONTACT · NORMALLY CLOSED - STOP OR AS NOTED.
- PUSHBUTTON · MAINTAINED CONTACT · STOP - RESET OR AS NOTED
- RUN - OFF · AUTOMATIC SELECTOR SWITCH.
- SINGLE POLE · SINGLE THROW SWITCH.
- SINGLE POLE · DOUBLE THROW SWITCH.
- NORMALLY OPEN CONTACT, R3-1 INDICATES CONTACT 1 OF RELAY R3. HR INDICATES HAND RESET
- NORMALLY CLOSED CONTACT
- OVERLOAD RELAY CONTACTS, HAND RESET UNLESS OTHERWISE NOTED
- OPERATING COIL:

M · MOTOR STARTER	SR · SLOW REVERSE
C · CONTACTOR	F · FORWARD
R5 · RELAY #5	R · REVERSE
TR · TIMING RELAY	O · OPEN
SF · SLOW FORWARD	C · CLOSE
FF · FAST FORWARD	MR · STARTER COIL AUX RELAY

METER:
A · AMMETER
V · VOLTMETER
WHM · WATT HOUR METER

RELAY:
51 · OVERCURRENT
50N · GROUND OVERCURRENT
51N · GROUND OVERCURRENT

SWITCH:
VS · VOLTMETER SWITCH
AS · AMMETER SWITCH
PE · PNEUMATIC ELECTRIC

- GROUND
- FUSE
- INDICATING LIGHT: R · RED, G · GREEN, B · BLUE, W · WHITE, A · AMBER
- STORAGE BATTERY
- SOLENOID VALVE
- RESISTOR
- INDUCTOR
- RECTIFIER

LOCATION INDICATING SYMBOLS

- (A) LOCATED IN AUXILIARY CONTROL ROOM
- (C) LOCATED IN MOTOR CONTROL CENTER, 2400V STARTER OR LOCAL STARTER
- (E) LOCATED LOCAL TO EQUIPMENT
- (L) LOCATED IN LOCAL PANEL
- (M) LOCATED AT OR NEAR MOTOR
- (P) LOCATED IN MAIN CONTROL ROOM

- 250/5 CURRENT TRANSFORMER · 250/5 INDICATES RATIO.
- CURRENT TRANSFORMER · DONUT GROUND SENSOR TYPE.
- TRANSFORMER
- MOTOR 120V 1Ø

CIRCUIT BREAKER SYMBOLS

(TC)	BREAKER TRIP COIL
(CC)	CLOSING COIL
(X)	AUXILIARY RELAY FOR CLOSING COIL
(Y)	ANTI-PUMPING RELAY
52	CIRCUIT BREAKER
a	CONTACT CLOSED WHEN BREAKER CLOSED
b	CONTACT CLOSED WHEN BREAKER OPEN
aa	CONTACT CLOSED WHEN BREAKER NEAR CLOSED POSITION
CS	CONTROL SWITCH
DS	DOOR SWITCH
SS-10 / 1	SELECTOR SWITCH #10, CONTACT #1
SS-10	IN POSITION 1, CONTACT #1 IS CLOSED & CONTACT #2 IS OPEN.
TR	TIMING RELAY CONTACT
TDO	TDO - TIME DELAY OPEN
TDC	TDC - TIME DELAY CLOSE
INST	INST - INSTANTANEOUS ACTING CONTACT
	HEATER
ZS-3 / 2	FOREIGN POWER ISOLATING SWITCH #3 CONTACT #2 LOCATED IN TERMINAL BOXES IN AUXILIARY CONTROL ROOM. SWITCHES PERMIT ISOLATING POWER SUPPLY CIRCUITS TO CONTROL BOARDS, WHERE POWER SUPPLY BREAKER IS NOT IN THE CONTROL ROOM. FOR COMPLETE DESCRIPTION OF SWITCH CONTACT OPERATION SEE DWG NO. 1546-01-E-2041.

ELEMENTARY CONTROL DIAGRAM
OPERATING DESCRIPTIONS

REACTOR MAIN PROCESS EQUIPMENT

This equipment group includes the pressurizer pumps 01-415-PU-4A and -4B; the primary coolant pumps 01-415-PU-1A, 1B, 1C (1D); and the cooling tower pumps 03-415-PU-6A and -6B. Two modes of operating and controlling this equipment are provided:

1. An "automatic sequence" whereby operation of a single master pushbutton will start the above equipment in proper sequence.
2. A "manual control system" which permits individual control of each pump.

The automatic sequence facilitates operation, and permits the reactor to be brought back on the line in minimum time after a power failure. The permissive switch from the reactor key switch circuit must be closed before the automatic sequence can be started.

MASTER TIMER CIRCUIT

(Dwg. #1546-01-E-2119)

The master timer is controlled from a pushbutton at the main console. Operation of the start button will start the timer. The contacts of the timer will close in sequence to start the various pumps. The timer will automatically reset at the end of the 1 minute time cycle or during a power failure. The timer has spare contacts for future interlocking.

The timer contact "on-off" settings are adjustable in the field. A stop pushbutton is provided to permit stopping the timing sequence at any time. A panel mounted (LIGHT WILL GO ON DURING THE TIMING CYCLE.)

PRESSURIZER PUMPS

01-415-PU-4A & 4B

(Dwg. #1546-01-E-2119)

The pressurizer pumps are driven by a variable speed unit consisting of a 2300 volt squirrel cage induction motor and an "eddy current type" coupling. A selector switch (SS2) is provided to permit choosing the pump which will be started in the "automatic sequence mode". Each motor is provided with spring return start-neutral-stop selector switch and a running light. In normal operation one pump will be running while the other is in standby position. In the standby position the pump will automatically start-up on a loss in primary coolant system pressure. The pump is placed in standby by operating the standby pushbutton. A blue indicating light on the panel will indicate when the pump is in standby position. The motor will be automatically stopped by the following:-

1. Overload (relay must be hand reset to permit restart)
2. Ground Fault (relay must be hand reset to permit restart)
3. Opening of the 2400 volt motor starter door
4. Operation of the protective device interlocks in the variable speed drive unit.
5. Loss of voltage (A pump in standby position must be reset in that position after a power failure).

The "eddy current coupling" variable speed drive units are automatically started and stopped whenever the corresponding drive motor is started and stopped. Each unit is provided with a potentiometer for speed control and a speed indicator, located on the process panel. The selector switches are located in the control room.

PRIMARY COOLANT PUMPS

01-415-PU-1A, -1B, 1C, 1D MAIN DRIVE MOTORS

01-415-PU-1E, -1F, 1G, -1H PONY DRIVE MOTORS

(Dwg. #1546-01-E-2120)

The primary coolant pumps are driven by a "main" a-c 2300 volt squirrel cage induction motor coupled to the pump shaft and a "pony" 120 volt d-c series motor coupled to the a-c motor shaft. The pony motor is supplied from a 120 volt storage battery in parallel with a battery charger. In normal operation both motors are energized and supply positive motor torque to the load. The function of the pony motor is to provide emergency cooling flow in the event of an a-c power failure.

A selector switch (SS-3) is provided to permit choosing the spare pump, which will not be included in the automatic start-up sequence.

A permissive interlock from the reactor control system is provided in the automatic mode "starting circuit" which will prevent pump start-up unless the reactor power demand is at its minimum value. The permissive interlock is sealed out after pump start-up. A main drive motor [illegible] provided on the process panel, and a stop button at the motor. The main drive motor will be automatically stopped by the following:-

1. Overload (relay must be hand reset to permit restart)
2. Ground fault (relay must be hand reset to permit restart)
3. Opening of the 2400 volt motor starter door
4. [illegible] main motor.
5. Loss of pressure in the primary loop. (Low pressure will also prevent starting the pumps).
6. Loss of voltage

The pony motor is energized at all times. It may be shut down by opening a safety switch located on the pump compartment.

An ammeter in the metering cabinet indicates the current supplied to, or taken from, the battery. Motor and pump bearing temperatures are recorded in the main control room.

The motor also has a shunt "test" field which permits full load current to be drawn by the pony motor, with the a-c motor in operation. The test pushbutton which energizes the shunt field is located on the process panel and must be manually held in the test position for the length of the test. The "test" power for the shunt field is taken from the associated starter control power transformer, and will be automatically removed on loss of a-c power or opening of the motor starter.

The following alarms are provided:-

1. Winding temperature higher than normal.
2. Winding temperature approaching the insulation damage point.
3. Mechanical seal failure or misoperation
4. High pump or motor bearing temperature (obtained from recorder)
5. Charge failure or DC. ground in battery charger.
6. Abnormally high current to the pony motor series field
7. Abnormally low current to the pony motor series field.
8. Excessive vibration on main motor.

MAIN COOLING TOWER PUMPS

03-415-PU-6A, -6B

Drawing #1546-01-E-2120

A selector switch (SS4) is provided to permit choosing the spare pump which will not be included in the automatic start-stop sequence. With the present installation of 2 pumps, the selector switch should be set to select the [illegible] spare unit. A spring return start-neutral-stop selector switch and running light are provided on the process panel, and a stop button at the motor. The motor will be automatically stopped by:-

1. Overload (relay must be hand reset to permit restart)
2. Ground fault (relay must be hand reset to permit restart)
3. Opening of the 2400 volt motor starter door
4. Loss of voltage

Provision is made in the start circuits for an interlock with the secondary cooling system throttling valve. The permissive interlock will be sealed out after pump start-up.

PRIMARY COOLANT CLEAN-UP PUMPS

01-415-PU-2A and -2B

Dwg. #1546-01-E-2119

An on-off selector switch and running light are provided on the process panel, and a stop button at the motor. The pump will be automatically stopped on low water level in the primary loop deaerator and will restart automatically when the level rises again. The pump motor is connected to the normal power system and will not be in operation during a power failure. The motor will automatically restart after a power failure.

COOLING TOWER STANDBY PUMP

03-415-PU-14

DWG. #1546-05-E-2118

The pump is driven by a 2 winding, 2 speed motor. Each of the windings serve a different function. The normal high speed winding is used for normal operation of the pump, to provide secondary cooling water when the reactor is shut down and the main pumps are out of service. The slow speed winding is used to provide the emergency cooling flow required to keep the reactor at 10% of power during an a-c power outage.

HIGH SPEED WINDING

03-415-PU-14

The high speed winding is supplied from the normal power system. A spring return start-neutral-stop selector switch and running light are provided on the process panel board. Electrical and mechanical interlocks are provided between the high and low speed winding starters so that only one can be energized at a time.

LOW SPEED WINDING

03-415-PU-14

The slow speed winding is supplied from the normal-emergency power system. A "run-off-automatic" switch is provided on the process panelboard to permit selecting the mode of operation. In the automatic position the pump will be automatically started after a loss of normal power, by an auxiliary contact on the automatic transfer switch in "Normal-Emergency Switchgear Unit #1". The pump will continue to run after normal power has been restored. The starter is interlocked with Solenoid Valve PCV-3528 so that the static head of the cooling tower will be by-passed whenever the slow speed winding is energized. A running light for the slow speed winding is also provided on the process panelboard. When the run-off-auto switch is on the "off" position, an alarm will be sounded in the control room.

NOTES

1. FOR COMPLETE OPERATING DESCRIPTION OF EQUIPMENT REFER TO APPROPRIATE OPERATING MANUAL. THE OPERATIONAL DESCRIPTIONS GIVEN HEREIN COVER THE HIGHLIGHTS OF THE CIRCUIT OPERATION ONLY.
2. ALL CONTACTS ARE SHOWN IN THE SHUTDOWN OR DEENERGIZED POSITION UNLESS OTHERWISE NOTED.
3. WHEREVER POSSIBLE, THE PUMP CONTROL PUSHBUTTONS AND SWITCHES LOCATED ON THE THE MAIN PROCESS PANELBOARDS WILL BE BACK LIGHTED MULTI-POSITION UNITS SPECIFICALLY DESIGNED FOR INCORPORATION IN GRAPHIC DIAGRAMS.

CERTIFIED FOR CONSTRUCTION

NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. UCNC	DATE	APPR. AEC	DATE
5	REVISED MASTER TIMER DISCR.	AW			1-26-64	N.R.	-	NR	-
4	ADDED 4th PRIMARY COOLANT PUMP PER L.H. JACKSON'S LETTER OF 2/12/63	JMC			4-24-63	AL B	4-26-63	L.H.J.	4-26-63
3	MISC REVS				2-5-63		5/63		7/5/63
2	REVISED-CERTIFIED FOR CONSTRUCTION PACKAGE 2	VO							7/13/61
2	ISSUED FOR PACKAGE 2 APPROVAL ADDED SYMBOL AND REV. OPER DISCRIPT'NS	FCM						EFN	12/12/61
1	CERTIFIED FOR CONSTRUCTION	MJR							
0	ISSUED FOR TITLE II APPROVAL	MJR			3-31-61	C.E.W.	4-14-61	L.H.J.	4-19-61

REFERENCE DRAWING	NO.
ELEM. CONTROL DIAG. PROCESS WATER EQPT	1546-01E-2117
ELEM. CONTROL DIAG. PROCESS WATER EQPT	1546-01E-2118
ELEM. CONTROL DIAG. PROCESS WATER EQPT	1546-01E-2119
ELEM. CONTROL DIAG. PROCESS WATER EQPT	1546-01E-2120

SPECIFICATION REF. SECT. 10

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.
FOR
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER — BY [signature] DATE 3-31-61
UNION CARBIDE NUCLEAR COMPANY — BY C. E. WINTERS DATE 4-14-61
U. S. ATOMIC ENERGY COMMISSION — BY L. H. JACKSON DATE 4-19-61

S. & B. 546 — DEPT. / CHK.: ARCH., ELECT., H & V, INST., MECH., STRUC., UTIL.

HIGH FLUX ISOTOPE REACTOR

ELEMENTARY CONTROL DIAGRAMS
SYMBOLS, NOTES &
OPERATING DESCRIPTIONS

DRAWN EXS/MJR CHKD [signature] DATE 3-31-61 CONTRACT NO. AT-(40-1)-2684
DATE 3-31-61 SCALE — DRAWING NO. 1546-01-E-2113 REV. 5

REV. 4 DRAWING NO. 1546-01-E-2114

COOLING TOWER FANS

Dwg # 1546-01-E-2118

A run-off automatic switch is provided on the process panelboard for selecting the mode of fan operation. In the run position the fan is controlled by a three unit pushbutton station located on the process panelboard. The pushbutton control provided for:-

1. Fast Speed (Forward Direction)
2. Slow Speed (Forward Direction)
3. Slow Speed (Reverse Direction)

Time delay relay TR provides automatic deceleration in going from fast to slow speed. Interlocking is provided between the various starter coils to permit only one to be energized at a time. Running lights for each of the 3 speeds are provided on the process panelboard, and a stop button at the motor.

In the automatic mode, the fans are controlled by Temperature Controller TC310 through dual alarm switches TS310A through TS310D. Each dual alarm switch operates two time delay relays, one for fast speed control, the other for slow speed control. Each relay controls the two fans in each cell as a unit. The time delay relay settings are adjustable and perform the following functions:-

1. By providing different time settings for the TCO 310A,B, C and D relays, the fan load is added to the motor control center in a stepped sequence. This will limit the voltage drop due to motor inrush currents to permissible limits, in the event of a restoration of voltage accompanied by maximum cooling requirements.
2. By adjustment of the time delay, the number of starts and stops or speed changes can be limited to prevent motor overheating, in the event that the control system calls for frequent cycling action.
3. The relays interpose suitable contact ratings between the dual alarm switch and the fan starter coils.

In the "automatic" mode, the fans will automatically restart after a power failure. In the "run" mode the fans will not restart after a power failure. The fans will be automatically shut down in the event of a fire in the cooling tower or operation of the vibration switch near the fan. Both shutdown devices must be manually reset before the fans can be started again.

PRIMARY FEED PUMP

01-415-PU-11 (2)

Drawing No. 1546-01-E-2118

The pump is provided with a run auto-off switch, locally mounted to permit selecting the mode of operation. In the automatic position, the pump will be automatically started by low flow in the ess line & on loss of normal power, by an auxiliary contact on the automatic transfer switch in "Normal-Emergency Switchgear Unit #1." The pump will continue to run after normal power has been restored. Running lights for the pump are provided at the run off auto switch & in a "Remote control-Off" selector switch mounted on the process panelboard. The "Remote control-Off" selector switch enables the pump to be shut down from the control room. When the "Remote-control-Off" selector switch and/or the run auto-off switch are in the off position an alarm will be sounded in the control room.

DEMINERALIZED WATER STORAGE PUMPS

01-415-PU-18A & 18B

(2) Dwg. #1546-01-E-2117

A spring return start-neutral stop selector switch and running light for each motor is provided on the process panel and a stop button at the motor. Either or both motors can be running at one time. The motors are connected to the normal power supply and must be restarted manually after a power outage.

POOL COOLANT PUMPS

01-415-PU-9A & 9B

Dwg. #1546-01-E-2117

An "On---Off-reset" selector switch and running light for each motor are provided on the process panel and a stop-reset button at the motor. High level in the reactor pool and critical pool; and low level in the pool surge tank; shut-down the motors and actuate an alarm on the annunicator in the control room. When a pump is shut down by the level switches, its selector switch must be turned to the off-reset position, before it can be restarted. Either or both motors may be running at one time. The motors are connected to the normal power system and the motors will automatically restart when power is restored after an outage.

POOL DEMINERALIZER PUMPS

01-415-PU-7A & 7B

Dwg. #1546-01-E-2117

An "On-Off-reset" selector switch and running light for each motor are provided on the process panel and a stop-reset button at each motor. High level in the clean pool shuts down the motor and actuates an alarm on the annunciator in the control room. When a pump is shutdown by the level switches, its selector switch must be turned to the off-reset position before it can be restarted. Low level in the pool deaerator stops the motors and a rise in level restarts the motors. Pool deaerator low level also actuates an alarm on the annunciator in the control room. Either or both motors may be running at one time. The motors are connected to the normal power system and the motors will automatically restart when power is restored after an outage.

PRIMARY DEMINERALIZER RECYCLE PUMP

POOL DEMINERALIZER RECYCLE PUMP

01-415-PU-6 and 12

Dwg. #1546-01-E-2117

Each motor is provided with a momentary start-stop pushbutton and running light near the motor. The motors are connected to the normal power system and must be restarted manually after a power outage.

PROCESS WATER PUMPS

01-415-PU-17A and 17B

Dwg. #1546-01-E-2117

Each motor is provided with a "start-stop-standby" selector switch, a white running light, and a momentary contact standby switch and blue standby monitoring light. In the standby position, the pump will be automatically started by a drop in process water pressure. A pump is placed in standby position by placing the selector switch in the "standby position" and operating the momentary contact "standby" switch. The blue monitoring light will indicate when the pump is in standby. In normal operation one pump should be in the "start position" and the other in "standby". The motors are connected to the normal-emergency power system. Only the motor in the "start position" will automatically restart on return of voltage after a power outage. Both motors may be operated at one time. A local stop-reset pushbutton is also provided for each motor.

(2)

HNO_3 and NaOH PUMPS

01-415-PU-15 & 16

Dwg. #1546-01-E-2117

Each motor is provided with a momentary start-stop pushbutton near the motor a momentary contact stop pushbutton, running light at plant demin panel & momentary stop button at the motor. The motors are connected to the normal power system and must be restarted manually after a power outage.

MOTOR OPERATED BLOCK VALVES

FCV-140, 142, 144, 149, 151, 153

FCV-344, 345, 346, 347, 348, 349

FCV-464, 465, 466, 467, 469

EQUALIZING SOLENOID VALVES

FCV-180, 181, 182

Dwg. #1546-01-E-2125

(2) All of the above electrically operated valves are controlled by selector switches located on the process panelboard in the main control room. Position indicating lights for the valves are also provided on the panelboard. The valve drives are connected to the normal-emergency system and will be operable during a normal power system failure.

HEATING & VENTILATING SYSTEMS - REACTOR BLDG.

REFER ALSO TO APPROPRIATE H&V CONTROL DIAGRAMS ON DRAWING NO'S 1546-01-H&V-3028 & 3029

SPECIAL BUILDING HOT EXHAUST SYSTEM FAN

05-391-FN-1 and 2

AIR CONDITIONING UNITS

01-391-AC-2, -5, -10, -14

Dwg. #1546-01-E-2115

Each exhaust fan is provided with a local selector switch marked "On-Off Standby". In normal operation one fan should be in the "On" position, the other fan in the standby position. Indicating lights on the gaseous waste system panel in the main control room will indicate when each fan is running. A "monitoring" light for each fan is also provided to warn the operator when the standby fan is not in the "standby" position or that its control circuit is de-energized.

(3) Six pressure electric switches in each of two ducts provide three stage control and alarm actuation (two for each stage for added reliability of operation). The intended operation is as follows: A slight loss of air flow in either duct will cause one or both switches in the control room (FS-905-B1 or FS-913-B1) to actuate an alarm in the control room. A larger loss in air flow in either duct will cause one or two pressure switches (FS-905-A1 or FS-913-A1 or FS-914-A1) to open and start the standby fan through relay R102; and simultaneously sound an alarm in the main control room. On a still larger loss in air flow, P.S. switches (FS-905-A2 & FS-913-A2 or FS-904-A2 & FS-914-A2) through relay R101 to shut down the air conditioning units with fresh air intakes (Units 01-391-AC-2, -5, -10 and -14). When normal air flow is restored units will restart automatically. The circuits are fail safe and a loss in control power or opening of a relay coil will simulate a loss in air flow.

Fan FN-1 is connected to Normal Emergency system #2 via MCC "H"; and FN-2 to NE system #1 via MCC "G". In the event of a power failure, the two feeders to the fan shed are sequenced so that on a return in voltage as a result of Diesel start-up, MCC "H" will be energized approximately 10 seconds before MCC "G". (This system permits the HFIR stack fans to receive top priority on Generator #2 and the TRU fans on Generator #1). The control circuits are arranged so that the following operation will be obtained in the event of a power failure:

Fan No.	Switch Position	Operation Obtained
FN-1 FN-2	On Standby	FN-1 only will run
FN-1 FN-2	Standby On	FN-1 and FN-2 will run

Each air conditioning unit is controlled by a local maintained on-off pushbutton. The motors are connected to the normal power system and will restart automatically after a power outage. Energizing the motor starter coil also actuates an EP relay which allows control air into the static pressure regulator controlling the air inlet damper. (damper normally closed) The bleed damper which protects against an excessive negative room pressure is pneumatically operated and does not require an electric control power supply.

Each air conditioning unit is provided with its own local alarm circuit for freeze protection. In the event of a temperature drop below set point, the local buzzer and light will be energized & for AC-2,5,10 & 14 only an EP switch is energized which pneu. opens stm valve. Operation of the local silence pushbutton will stop the buzzer, but the local light will remain on until the alarm contacts return to normal.

CLOSED HOT OFF GAS SYSTEM FANS

05-391-FN-3 & 4

(Dwg. #1546-01-E-2115)

Control system similar to that provided for fans FN-1 and FN-2 except that a single stage system of control and alarm is provided. PS switch PS-915-1 operates through relay R103 to start the standby fan, & PS-905-1 in the control room actuates the alarm in the control room. (3)

OPEN HOT OFF GAS SYSTEM FANS

05-391-FN-5 & 6

(Dwg. #1546-01-E-2115)

Control system similar to that provided for fans FN-1 and FN-2 except that a single stage control system of control and alarm is provided. PS switch PS-916-1 operates through relay R104 to start the standby fan, & PS-906-1 in the control room actuates the alarm in the control room. (3)

AIR CONDITIONING UNITS

01-391-AC-1, -3, -4, -6, -7, -8, -9, -11, -12, -13

Dwg. #1546-01-E-2115

Each motor is controlled by a local maintained on-off pushbutton. When the motor starter is energized an electric-pneumatic relay is actuated which permits control air to operate the associated pneumatic control system components. Each motor is connected to the normal power supply and will restart automatically after a power outage.

AIR CONDITIONING UNIT

01-391-AC-15

RETURN AIR FAN

01-391-FN-6

Dwg. # 1546-01-E-2115

The air conditioning and return air fan motors are controlled by a single local maintained on off reset pushbutton. The motors are interlocked so that both will start and stop together as a unit. The fans will be automatically shut down by a fire alarm operation or by the associated freeze protection circuit. (See SBHE exhaust fan write-up for description of freeze protection circuit). The motors are connected to the normal power supply and will restart automatically after a power outage. Energizing the AC-15 fan motor control circuit will also actuate an electro-pneumatic relay to permit control air to operate the various pneumatic control system components.

SUPPLY AIR FAN

01-391-FN-1

EXHAUST FANS

(3) 01-391-FN-2, 01-391-FN-3, 01-391-FN-4

Dwg. # 1546-01-E-2115

The supply air fan and exhaust fan motors are controlled by a single local maintained on off reset pushbutton. The motors are interlocked so that they will start and stop together as a unit. The fans will be automatically shut down by a fire alarm operation or by the associated freeze protection circuit (See SBHE exhaust fan write up for description of freeze protection circuit). The motors are connected to the normal power supply and will restart automatically after a power outage. Energizing the supply air fan motor control circuit will also actuate an electro-pneumatic relay to permit control air to operate the various pneumatic control system components.

VENTILATING UNIT

01-391-UV-1

EXHAUST FAN

01-391-FN-5

Dwg. #1546-01-E-2116

Ventilating Unit 01-391-UV-1 and exhaust fan 01-391-FN-5 are controlled by a single local maintained "start-stop" pushbutton. The motors are interlocked so that they will start and stop together as a unit. The ventilating unit and the exhaust fan will be automatically shut down by a fire alarm, drop in air flow or by the associated freeze protection circuit. The motors are connected to the normal emergency power system and will restart automatically after a power outage. Energizing the ventilating unit motor control circuit will also actuate an electro-pneumatic relay to permit control air to operate the various pneumatic control system components. Stoppage of either fan will sound an alarm in the central control room.

UNIT COOLERS

01-390-UC-1 to (12) (4)

Dwg. #1546-01-E-2116

Unit cooler motors 01-390-UC-1 to 3 are provided with a run off auto switch. A dual thermostat in the cell will start the unit cooler motors when the cell temperature reaches 80°F. and should the temperature reach 104°F. will actuate an alarm in the central control room. The motors are connected to the normal power supply and will restart automatically after a power outage, if required by the thermostat.

(4) Unit cooler motors 01-390-UC-4 to 6, 01-390-UC-7 to 9 and 01-390-UC-10 to 12, operate as described above. (4)

CHILLED WATER SUPPLY PUMPS

01-392-PU-1 and 2

Dwg. #1546-01-E-2116

Chilled water supply pump motors are controlled by a local selector switch marked "PU-1, OFF, PU-2".

Setting the selector switch to "PU-1" sets up the circuit for energizing this pump motor to operate on demand for chilled water. The motor is connected to the normal power supply system and will restart automatically after a power outage, if required by the chilled water thermostat. Energizing the pump motor control circuit will also actuate an electro-pneumatic relay to permit control air to operate the various pneumatic control system components.

Setting the selector switch to "PU-2" sets up this pump motor to operate as described above.

CHILLER

01-392-01-RE-1

Dwg. #1546-01-E-2116

The chiller motor is controlled by a single local momentary "start-stop" pushbutton with a green and red indicating light to indicate when motor is running or stopped. The chiller will be automatically shut down by the following safety devices:(red pilot lights on a local console indicate the cause of the shutdown)

1. Condenser high pressure
2. Bearing or motor winding high temperature
3. Refrigerant low temperature
4. Loss of chilled water flow, oil pump not running, or loss of condenser water flow.
5. Low oil pressure
6. Low chilled water temperature.

If chiller is stopped by a safety, other than low chilled water temperature, chiller start button must be pushed to restart motor. If chiller stops because of low chilled water temperature, it will automatically restart as soon as temperature cutout is satisfied. A timer is also provided which will limit the number of motor starts to approximately 3 per hour.

A fixed resistor is connected in the current transformer circuit to provide a signal voltage for overcurrent protection for the motor. The output signal voltage is applied to a separate electronic control circuit which prevents motor overcurrent by decreasing the compressor loading. Chiller must be manually restarted after power outage. (Circuit permits immediate manual restart after a power outage.) For complete description of operation see vendors drawings and descriptive bulletins.

NOTES

1. FOR NOTES SEE DWG # 1546-01-E-2113

CERTIFIED FOR CONSTRUCTION

NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. UCNC	DATE	APPR. AEC	DATE
4	ADDED UNIT COOLERS 10,11,12 PER LH JACKSON'S LETTER OF 2-12-63	JMC			4-16-63	ALB	4-26-63	LHJ	4-25-63
3	CHANGES TO DESIGNATIONS FOR PS SWITCHES & MINOR MISC. REVISIONS	U.B.							
2	REVISED & CERTIFIED FOR CONSTRUCTION PACKAGE 2	VO							
2	ISSUED FOR PACKAGE #2 APPROVAL. MODIFIED DWG. PU-18A & B, PU-17A & B, FN-1 & 2 & MOT. OPER. VALVES				1-4-61	CEW	12-11-61	EFN	12-12-61
1	CERTIFIED FOR CONSTRUCTION	MJR					7-20-61		
0	REISSUED FOR TITLE II APPROVAL	EO			4-20-61	CEW	5-16-61	LHJ	
0	ISSUED FOR TITLE II APPROVAL	MJR			3-31-61	CEW	4-14-61	LHJ	4-19-61

REFERENCE DRAWING	NO.
ELEM. CONT. DIAGS. NOTES, SYM. & OPER. DES.	1546-01E-2113
ELEM. CONT. DIAGRAMS PROCESS WATER EQPT	1546-01E-2117
ELEM. CONT. DIAGRAMS PROCESS WATER EQPT	1546-01E-2118
SPECIFICATION REF.	SECT. 107

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FOR
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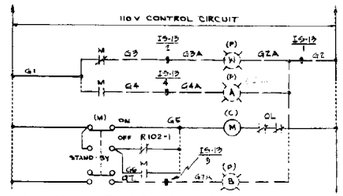
APPROVED
SINGMASTER & BREYER BY [signature] DATE 3-31-61
UNION CARBIDE NUCLEAR COMPANY BY C.E. WINTERS DATE 4-14-61
U. S. ATOMIC ENERGY COMMISSION BY L.H. JACKSON DATE 4-19-61

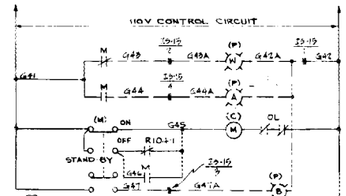
S. & B. 546 — DEPT. / CHK.: ARCH., ELECT., H & V., INST., MECH., STRUC., UTIL.

HIGH FLUX ISOTOPE REACTOR
ELEMENTARY CONTROL DIAGRAMS
OPERATING DESCRIPTIONS

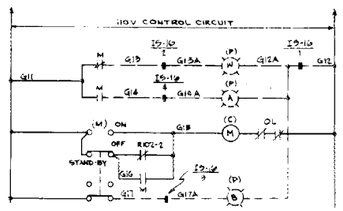
DRAWN MJR CH'KD [initials] DATE 3-31-61 CONTRACT NO. AT-(30-1)-2688
DATE 3-31-61 SCALE ~ DRAWING NO. 1546-01-E-2114 REV. 4



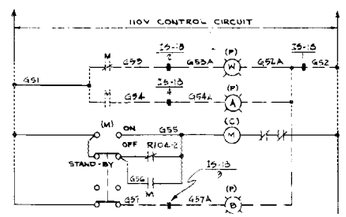
(30) SPECIAL BUILDING HOT EXHAUST SYSTEM FAN
05-391-FN-1



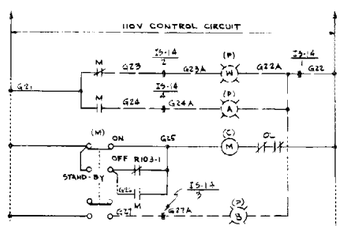
(31) SPECIAL BUILDING HOT EXHAUST SYSTEM FAN
05-391-FN-2



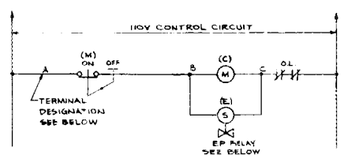
(32) CLOSED HOT OFF GAS SYSTEM EXHAUST FAN
05-391-FN-3



(33) OPEN HOT OFF GAS SYSTEM EXHAUST FAN
05-391-FN-6



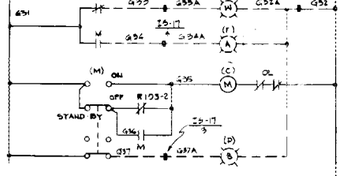
(34) CLOSED HOT OFF GAS SYSTEM EXHAUST FAN
05-391-FN-3



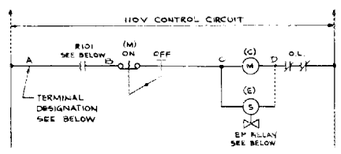
(36)

A	B	C		EP RELAY #
G62	G63	G64	01-391-AC-1	01-EP-2
G67	G68	G69	01-391-AC-3	01-EP-3
G72	G73	G74	01-391-AC-4	01-EP-5
G77	G78	G79	01-391-AC-6	01-EP-6
G82	G83	G84	01-391-AC-7	01-EP-7
G87	G88	G89	01-391-AC-8	01-EP-8
G92	G93	G94	01-391-AC-9	01-EP-11
G97	G98	G99	01-391-AC-11	01-EP-12
G102	G103	G104	01-391-AC-12	01-EP-13
G107	G108	G109	01-391-AC-13	01-EP-14

AIR CONDITIONING UNIT

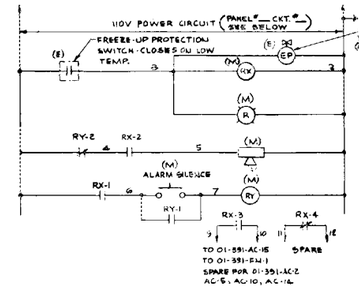


(35) CLOSED HOT OFF GAS SYSTEM EXHAUST FAN
05-391-FN-4



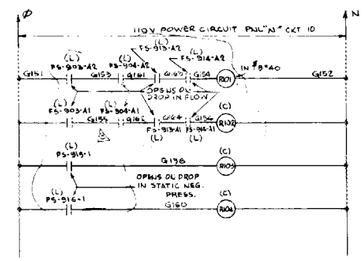
(37) AIR CONDITIONING UNIT

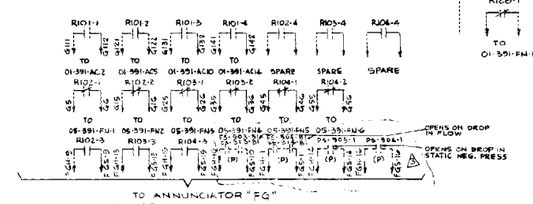
A	B	C	D		RELAY R101	EP RELAY #
G111	G112	G115	G114	01-391-AC-2	R101-1	01-EP-1
G121	G122	G123	G124	01-391-AC-5	R101-2	01-EP-4
G131	G132	G135	G134	01-391-AC-10	R101-3	01-EP-9
G141	G142	G145	G144	01-391-AC-14	R101-4	01-EP-10



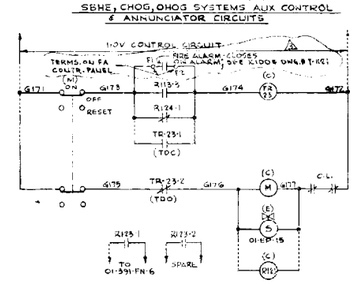
ALARM CIRCUIT FREEZE-UP PROTECTION FOR AIR CONDITIONER

EQUIPMENT #	FREEZE-UP PROTECTION SW.	AUXILIARY RELAY RX	AUXILIARY RELAY RY	PANEL, N.C.C., & CKT. NOS.	EP RELAY #
01-391-AC-2	01-FT-1	R-105	R-106	PNL #P3, N.C.C. 10, CKT. #4	01-EP-19
01-391-AC-5	01-FT-2	R-107	R-108	PNL #P-8, N.C.C. 10, CKT. #4	01-EP-20
01-391-AC-10	01-FT-3	R-109	R-110	PNL #P3, N.C.C. 10, CKT. #4	01-EP-21
01-391-AC-14	01-FT-4	R-111	R-112	PNL #P3, N.C.C. 10, CKT. #4	01-EP-22
01-391-AC-15	01-FT-5	R-113	R-114	PNL #P3, CKT. #4	—
01-391-FN-1	01-FT-6	R-115	R-116	PNL #P3, CKT. #4	—

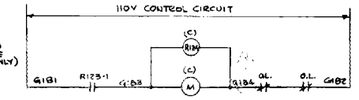




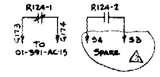
SBHE, CHOG, OHOG SYSTEMS AUX CONTROL & ANNUNCIATOR CIRCUITS

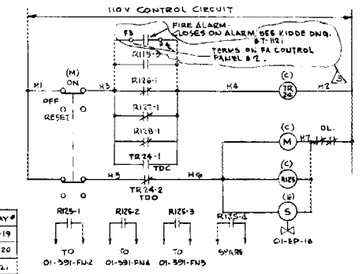


(38) AIR CONDITIONING UNIT
01-391-AC-15

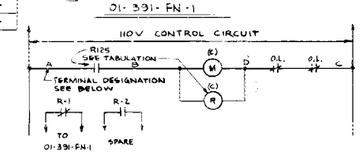


(39) RETURN AIR FAN
01-391-FN-6



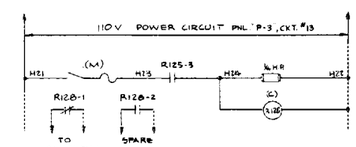


(40) SUPPLY AIR FAN
01-391-FN-1



(41) EXHAUST FAN

A	B	C	D		R-125 RELAY	R-126 RELAY
H11	H12	H13	H14	01-391-FN-2	125-1	R126
H16	H17	H18	H19	01-391-FN-4	125-2	R127



EXHAUST FAN
01-391-FN-3

NOTES
1. FOR SYMBOLS & NOTES SEE DWG# 1546-E-2113
2. FOR TYPICAL 440V MOTOR WIRING SEE DWG.# 1546-05-E-2117
3. FOR OPERATING DESCRIPTION SEE DWG.# 1546-01-E-2114.

CERTIFIED FOR CONSTRUCTION

NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. UCNC	DATE	APPR. ARC	DATE
2	ISSUED FOR PAGE 19 APPROVAL, 43363 SECTION 9A, TUBE & REVISED ANNUNCIATOR NOMENCLATURE	BM							
1	MISC. REVISIONS	JN							
0	CERTIFIED FOR CONSTRUCTION	DPG							
0	ISSUED FOR TITLE II APPROVAL	R.O.							

DRAWING NO. 1546-01-E-2115 REV. 3

REFERENCE DRAWING	NO.
ELEMENTARY CONTROL DIAGRAMS HEATING & VENTILATING EQUIP.	1546-01-E-2116

SPECIFICATION REV. SECTION # 107

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

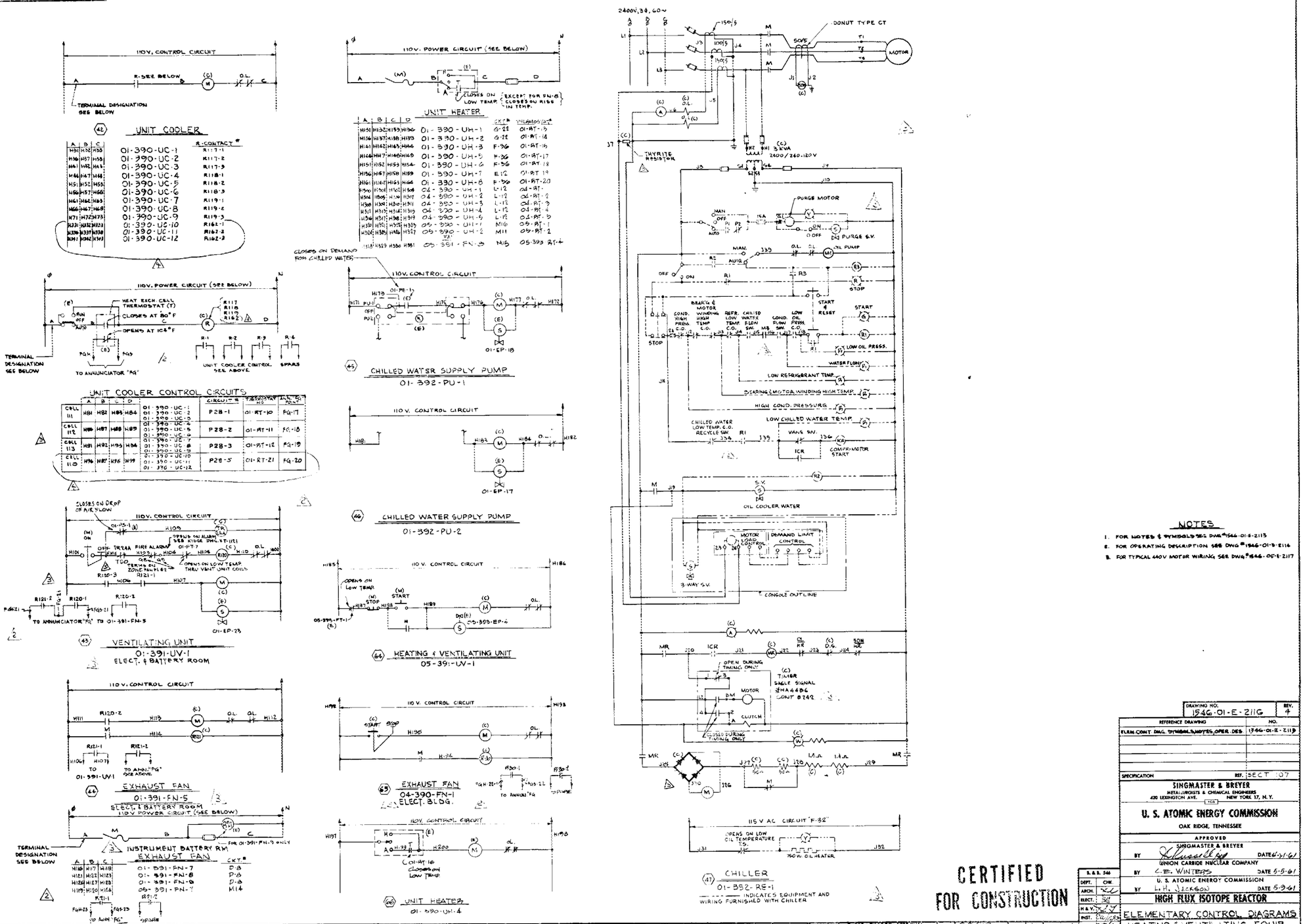
APPROVED
BY SINGMASTER & BREYER DATE 4-4-61
UNION CARBIDE NUCLEAR COMPANY
BY C. E. WILTERS DATE 4-24-61
U. S. ATOMIC ENERGY COMMISSION
BY L. H. JACKSON DATE 4-26-61

HIGH FLUX ISOTOPE REACTOR

ELEMENTARY CONTROL DIAGRAMS
HEATING & VENTILATING EQUIP.

DRAWN M.J.R. CHKD. YS DATE 4-14-61 CONTRACT NO. AT-(40-1)-3000
DATE 4-14-61 DRAWING NO. 1546-01-E-2115 REV. 3
SCALE

DRAWING NO. 1946-01-E-2112-3-10



NOTES

1. FOR NOTES & SYMBOLS SEE DWG #1946-01-E-2113
2. FOR OPERATING DESCRIPTION SEE DWG #1946-01-E-2116
3. FOR TYPICAL 440V MOTOR WIRING SEE DWG #1946-00-E-2117

CERTIFIED FOR CONSTRUCTION

NO.	REVISIONS	BY	CHK.	APPR. E&I	DATE	APPR. MECH.	DATE	APPR. ELECT.	DATE
4	ADDED 01-390-UC-10, 11, 12, FOR 4TH COOL. COIL PER I.H. JACKSON LETTER 6-2-61 (CHECKED OK BY SEW 6-5-61)	J.M.C.							
3	MISC. MINOR REVISIONS	J.M.							
2	PROCESS CHANGES TO CONSTRUCTION PACKAGE 5	V.O.							

NO.	REVISIONS	BY	CHK.	APPR. E&I	DATE	APPR. MECH.	DATE	APPR. ELECT.	DATE
2	ISSUED FOR PROJECT APPROVAL W/ ANNUNC. NUMBERING & MISC. REV.	F.C.W.				CEW		EFH	
1	REVISED UNIT HTR. & VENT. UNIT CONNS.	B.H.				N.K.		N.K.	
0	CERTIFIED FOR CONSTRUCTION	D.P.G.							
0	ISSUED FOR TITLE II APPROVAL	W.O.	M.S.			CEW		EFH	

DRAWING NO. 1946-01-E-2116 REV. 4

REFERENCE DRAWING NO.
ELEM. CONT. DWG. SYMBOLS, NOTES, OPER. DES. 1946-01-E-2113

SPECIFICATION REF. SECT. 107

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

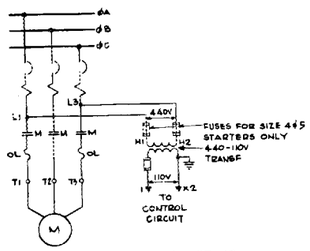
APPROVED
SINGMASTER & BREYER BY DATE 6-5-61
UNION CARBIDE NUCLEAR COMPANY BY C.E. WINTERS DATE 6-5-61
U. S. ATOMIC ENERGY COMMISSION BY L.H. JACKSON DATE 5-3-61

HIGH FLUX ISOTOPE REACTOR

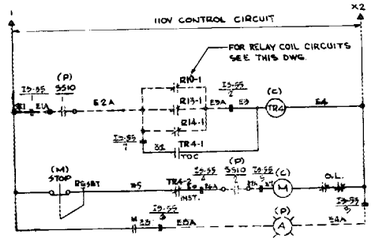
S.A.S. 546 | DEPT. CHK. | ARCH. | ELECT. | H & V. | INST. | MECH. | STRUC. | UTIL.

ELEMENTARY CONTROL DIAGRAMS
HEATING & VENTILATING EQUIP.

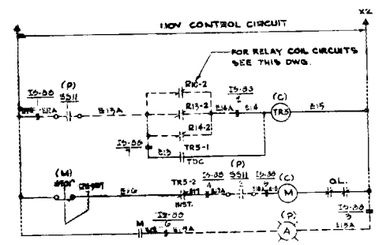
DRAWN M.J.R. CHKD. M.S. DATE 6-23-61 MCC APPROVAL DATE
DATE 4-21-61 DRAWING NO. 1946-01-E-2116 REV. 4
SCALE



TYPICAL 440V MOTOR WIRING



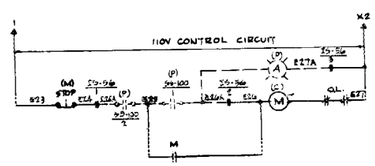
(6) POOL COOLANT PUMP 01-415-PU-9A



(7) POOL COOLANT PUMP 01-415-PU-9B

BACK LIGHTED
POOL COOLANT & POOL DEMINERALIZER PUMP CONTROL SWITCHES
23-9 & 10 & 11 & 12

IND LIGHT	CONTACT	ON	OFF-DESIGT
	1	A	
	2	X	



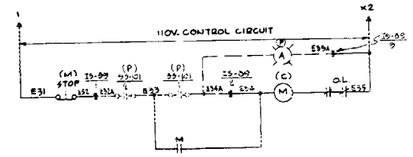
(8) PLANT DEMINERALIZER WATER STORAGE PUMP 01-415-PU-18A

BACK LIGHTED
23-100 & 23-101

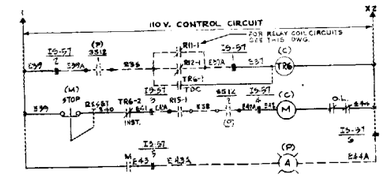
IND. LIGHT	CONTACTS		POSITIONS START	STOP
	1	X		
	2	X	X	

SPRING RETURN TO NEUTRAL POSITION (N)

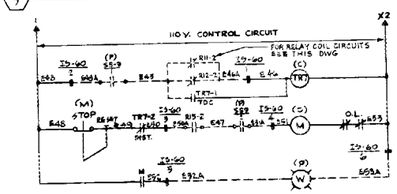
POOL SCUPPER, SURGE TANK & DEAERATOR SHUTDOWN CIRCUITS



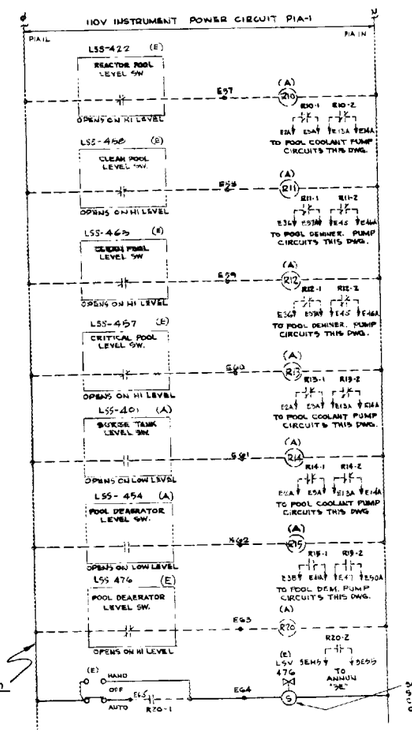
(8) PLANT DEMINERALIZER WATER STORAGE PUMP 01-415-PU-18B

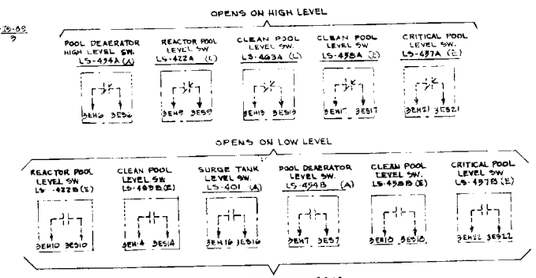


(9) POOL DEMINERALIZER PUMP 01-415-PU-7A

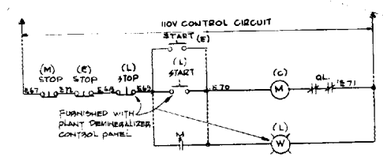


(9) POOL DEMINERALIZER PUMP 01-415-PU-7B

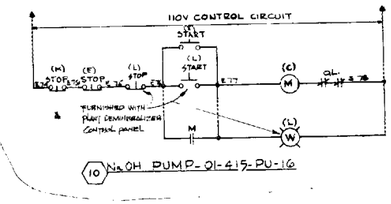




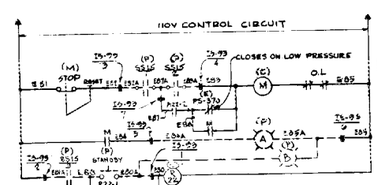
POOL LEVEL, SURGE TANK AND DEAERATOR ALARM CIRCUITS



(10) NaOH PUMP 01-415-PU-15



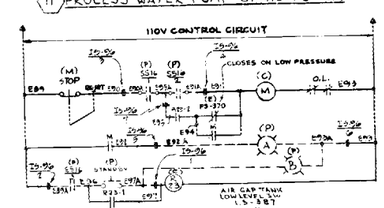
(10) NaOH PUMP 01-415-PU-16



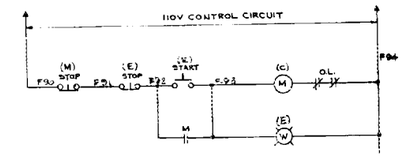
BACK LIGHTED
START-STOP STANDBY SELECTOR SWITCH
55-15 & 55-16

IND LT	CONTACT	START	STOP	STANDBY
	1	X		X
	2	X		
	3			X
	4		X	

(11) PROCESS WATER PUMP 01-415-PU-17A

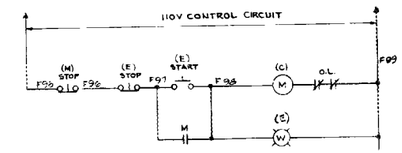


(12) PROCESS WATER PUMP 01-415-PU-17B



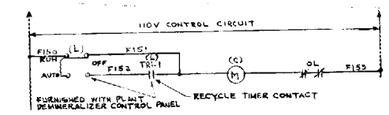
PRIMARY DEMINERALIZER RECYCLE PUMP

(25) 01-415-PU-6

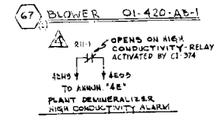


POOL DEMINERALIZER RECYCLE PUMP

(26) 01-415-PU-12



(67) BLOWER 01-420-AB-1



NOTES
1- FOR SYMBOLS, NOTES & OPERATING DESCRIPTION SEE DWGS. 1946-E-2117 & 2114

CERTIFIED FOR CONSTRUCTION

REV.	REVISIONS	BY	CHK.	APPR. ENG.	DATE	APPR. OPER.	DATE	APPR. ARC.	DATE
5	REV. PER CFC VENDOR'S DWG	L.L.							
4	REV. PER [illegible]								
3A	ISSUED FOR PROJECT PACKAGE AND REVISIONS								
3	REVISED & ISSUED FOR CONSTRUCTION STAGE 2								
2	ISSUED FOR PROJECT APPROVAL ADD. NEW TAG NO. AND NOTE DRAWING	F.C.M.							
1	MISC. REVISIONS	J.N.							
0	CERTIFIED FOR CONSTRUCTION	D.P.G.	L.L.						
0	ISSUED FOR TITLE I APPROVAL	W.K.	E.K.S.						

DRAWING NO.	REV.
1946-01-E-2117	5

REFERENCE DRAWING	NO.
ELEM. CONT. DIAG'S. SYM. NOTES & OPER. DES.	1946-01-E-2115
ELEM. CONT. DIAG'S. OPERATING DESCRIPTIONS	1946-01-E-2114

SPECIFICATION INT. SECTION 10.7

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

FOR

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER
BY DATE 3-31-61
UNION CARBIDE NUCLEAR COMPANY
BY C.E. WINTERS DATE 4-14-61
U. S. ATOMIC ENERGY COMMISSION
BY L.H. JACKSON DATE 4-13-61

HIGH FLUX ISOTOPE REACTOR

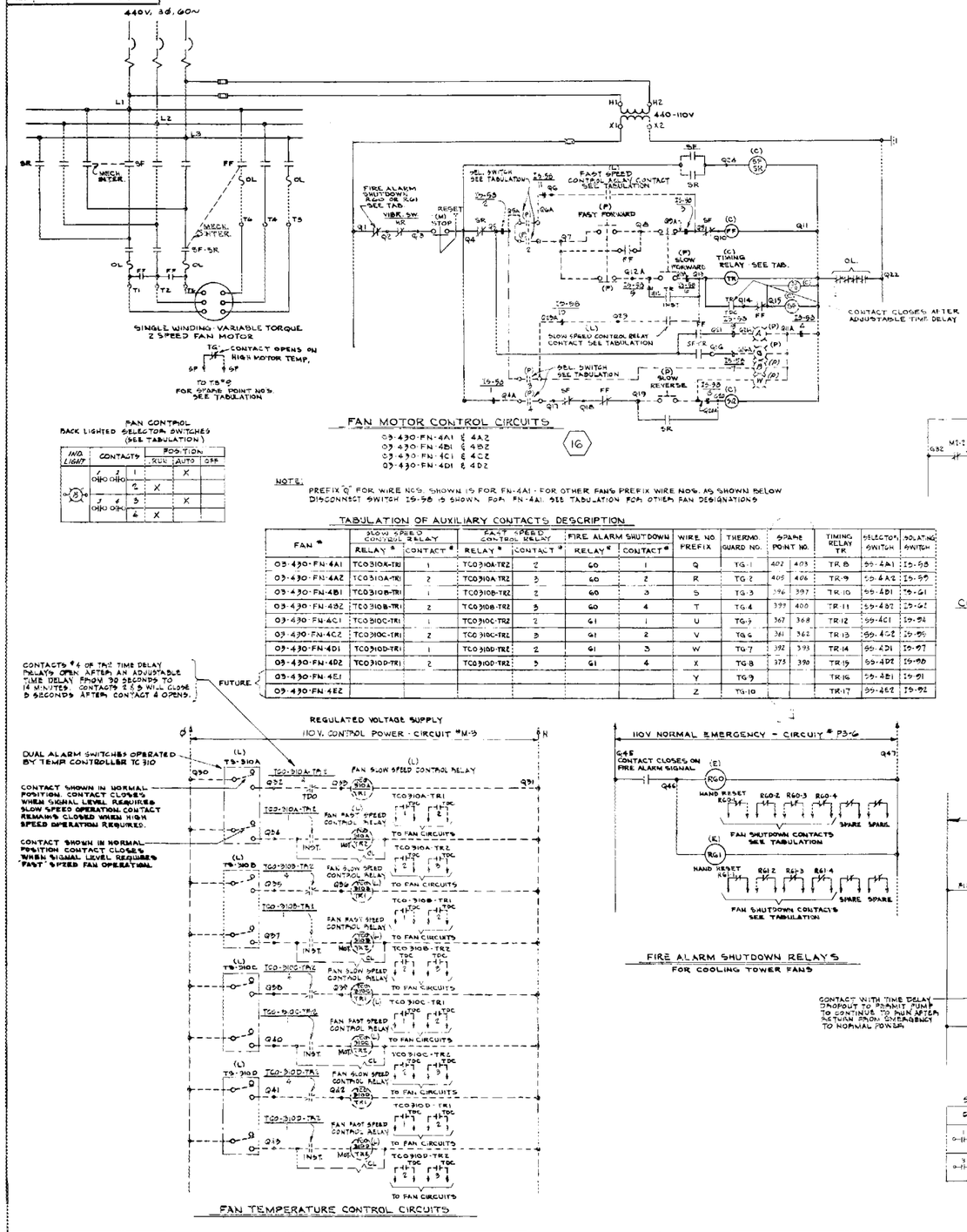
ELEMENTARY CONTROL DIAGRAM
PROCESS WATER EQUIPMENT

S. & B. 546	
DEPT.	CHK.
ARCH.	
SUPERT.	
H.B.V.	
INST.	
MECH.	
STRUC.	
UTIL.	

DRAWN A.D. CHKD E.K.S. DATE 3-31-61 COMPONENT NO. 01-415-PU-9A,B

DATE 3-31-61 DRAWING NO. 1946-01-E-2117 REV. 5

SCALE ~



FAN MOTOR CONTROL CIRCUITS

03-430-FN-4A1 & 4A2
03-430-FN-4B1 & 4B2
03-430-FN-4C1 & 4C2
03-430-FN-4D1 & 4D2

(16)

FAN CONTROL
BACK LIGHTED SELECTOR SWITCHES (SEE TABULATION)

IND. LIGHT	CONTACTS		POSITION RUN	AUTO	OFF
(8)	4	1		X	
		2	X		
	3	3		X	
		4	X		

NOTE:
PREFIX "Q" FOR WIRE NOS. SHOWN IS FOR FN-4A1 - FOR OTHER FANS PREFIX WIRE NOS. AS SHOWN BELOW
DISCONNECT SWITCH 19-98 IS SHOWN FOR FN-4A1. SEE TABULATION FOR OTHER FAN DESIGNATIONS

TABULATION OF AUXILIARY CONTACTS DESCRIPTION

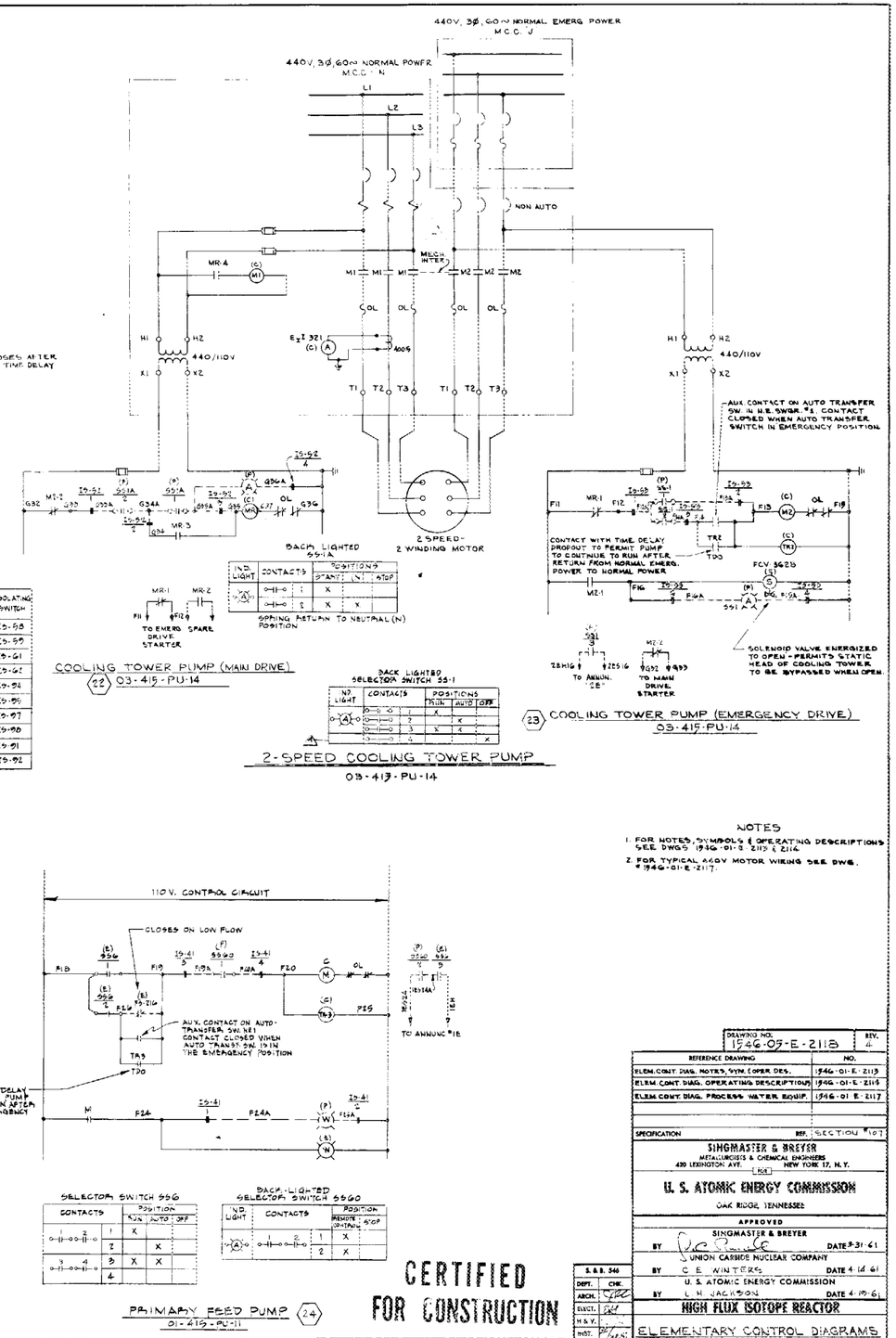
FAN #	SLOW SPEED CONTROL RELAY RELAY #	CONTACT #	FAST SPEED CONTROL RELAY RELAY #	CONTACT #	FIRE ALARM SHUT DOWN RELAY #	CONTACT #	WIRE NO PREFIX	THERMO. GUARD NO.	SPARE POINT NO.		TIMING RELAY TR.	SELECTOR SWITCH	ISOLATING SWITCH
03-430-FN-4A1	TC0310A-TR1	1	TC0310A-TR2	2	60	1	Q	TG-1	402	403	TR-8	59-4A1	19-98
03-430-FN-4A2	TC0310A-TR1	2	TC0310A-TR2	3	60	2	R	TG-2	405	406	TR-9	59-4A2	19-99
03-430-FN-4B1	TC0310B-TR1	1	TC0310B-TR2	2	60	3	S	TG-3	396	397	TR-10	59-4B1	19-61
03-430-FN-4B2	TC0310B-TR1	2	TC0310B-TR2	3	60	4	T	TG-4	399	400	TR-11	59-4B2	19-62
03-430-FN-4C1	TC0310C-TR1	1	TC0310C-TR2	2	61	1	U	TG-5	367	368	TR-12	59-4C1	19-94
03-430-FN-4C2	TC0310C-TR1	2	TC0310C-TR2	3	61	2	V	TG-6	361	362	TR-13	59-4C2	19-95
03-430-FN-4D1	TC0310D-TR1	1	TC0310D-TR2	2	61	3	W	TG-7	392	393	TR-14	59-4D1	19-97
03-430-FN-4D2	TC0310D-TR1	2	TC0310D-TR2	3	61	4	X	TG-8	375	390	TR-15	59-4D2	19-98
03-430-FN-4E1							Y	TG-9			TR-16	59-4E1	19-91
03-430-FN-4E2							Z	TG-10			TR-17	59-4E2	19-92

FUTURE

CONTACTS #4 OF TR2 TIME DELAY RELAYS OPEN AFTER AN ADJUSTABLE TIME DELAY FROM 30 SECONDS TO 14 MINUTES. CONTACTS 2 & 3 WILL CLOSE 5 SECONDS AFTER CONTACT 4 OPENS.

FAN TEMPERATURE CONTROL CIRCUITS

FIRE ALARM SHUTDOWN RELAYS
FOR COOLING TOWER FANS



IND. LIGHT	CONTACTS		POSITIONS START	N	STOP
(A)	1	1		X	
		2	X	X	

COOLING TOWER PUMP (MAIN DRIVE)
(22) 03-415-PU-14

BACK LIGHTED SELECTOR SWITCH 55-1

IND. LIGHT	CONTACTS		POSITIONS RUN	AUTO	OFF
(A)	1	1		X	
		2		X	
		3	X		
		4			X

2-SPEED COOLING TOWER PUMP
03-413-PU-14

(23) COOLING TOWER PUMP (EMERGENCY DRIVE)
03-415-PU-14

SELECTOR SWITCH 55G

CONTACTS		POSITION RUN	AUTO	OFF
1	1	X		
	2		X	
3 4	3	X	X	
	4			

BACK LIGHTED SELECTOR SWITCH 55GO

IND. LIGHT	CONTACTS		POSITION REMOTE-CONTROL	STOP
(A)	1	1	X	
		2	X	

PRIMARY FEED PUMP (24)
01-415-PU-11

NOTES

1. FOR NOTES, SYMBOLS & OPERATING DESCRIPTIONS SEE DWGS. 1946-01-3, 2115 & 2116.
2. FOR TYPICAL 440V MOTOR WIRING SEE DWG. # 1946-01-E-2117.

CERTIFIED FOR CONSTRUCTION

DRAWING NO.	1946-05-E-2118	REV. 4
REFERENCE DRAWING	NO.	
ELEM. CONT. DIAG. NOTES, SYM. & OPER. DES.	1946-01-E-2113	
ELEM. CONT. DIAG. OPERATING DESCRIPTIONS	1946-01-E-2116	
ELEM. CONT. DIAG. PROCESS WATER EQUIP.	1946-01-E-2117	
SPECIFICATION	REF. SECTION 107	

SINGMASTER & BREYER
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420 LEXINGTON AVE. NEW YORK 17, N.Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

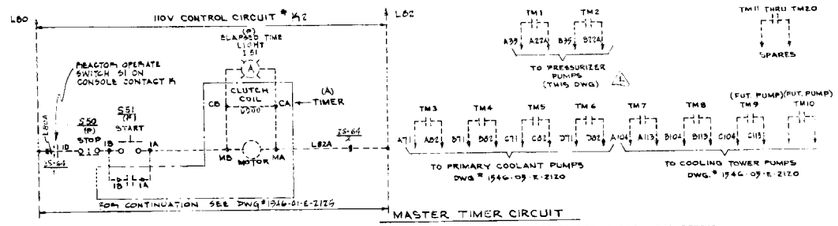
APPROVED
SINGMASTER & BREYER BY DATE 3-31-61
UNION CARBIDE NUCLEAR COMPANY BY C. E. WINTERS DATE 4-14-61
U. S. ATOMIC ENERGY COMMISSION BY L. H. JACKSON DATE 4-19-61

HIGH FLUX ISOTOPE REACTOR

ELEMENTARY CONTROL DIAGRAMS
PROCESS WATER EQUIPMENT

REVISIONS	
2	ISSUED FOR PHASE 2 APPROVAL, COLD SOL. WINDINGS & MISC. REVISIONS.
1	CHANGED DESIGNATION OF PU-11
0	CERTIFIED FOR CONSTRUCTION
0	ISSUED FOR TITLE II APPROVAL

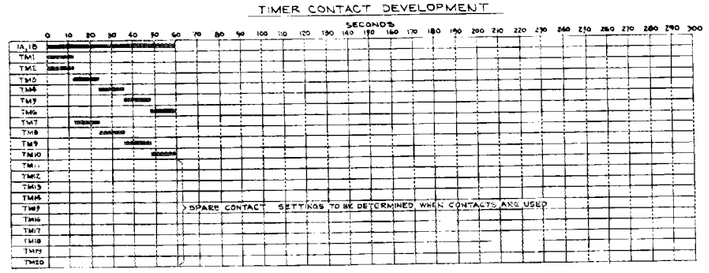
DRAWN MJR/RRS CHKD DATE 3-31-61 SCALE
DRAWING NO. 1946-05-E-2118 REV. 4



MASTER TIMER CIRCUIT

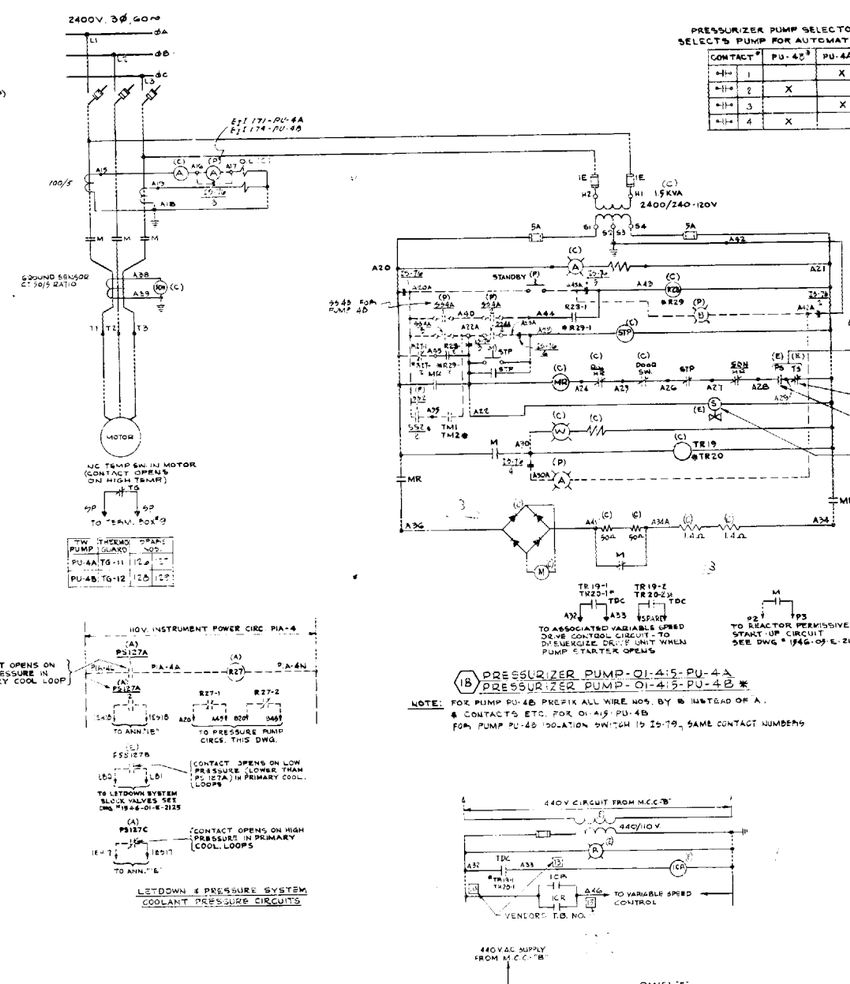
TIMER SHALL BE EAGLE SIGNAL MULTIFLEX TYPE CONSISTING OF 1 MOTOR DRIVING 3-7 CONTACT TIMERS OR EQUAL.

TIMER CONTACT DEVELOPMENT



BACK LIGHTED
PRIMARY COOLANT CLEAN UP PUMP SWITCHES 55200 & 55201

INC. LT.	CONTACTS		POSITION ON	OFF
		1	X	
		2		X



LETDOWN & PRESSURE SYSTEM COOLANT PRESSURE CIRCUITS

PRESSURIZER PUMP SELECTOR SW. SS2
SELECTS PUMP FOR AUTOMATIC SEQUENCE

CONTACT #	PU-4B	PU-4A
1		X
2	X	
3		X
4	X	

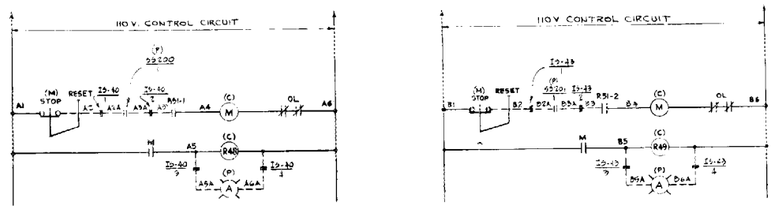
BACK LIGHTED
PRESSURIZER PUMP CONTROL SS-4A & SS-4B

CONTACTS		POSITION START	STOP	IND. LT.
	1	X	X	
	2	X	X	
	3	X		
	4		X	

SPRING RETURN TO NEUTRAL (N) POSITION

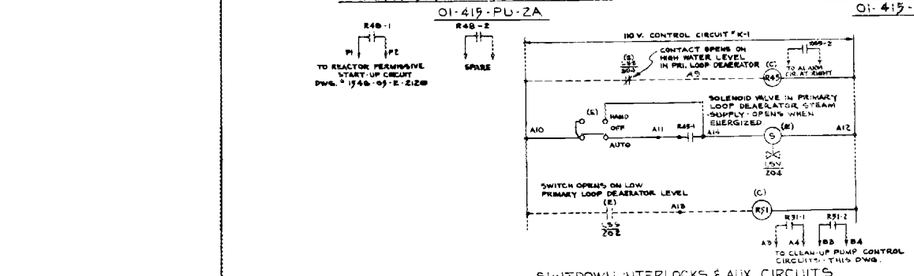
(18) PRESSURIZER PUMP-01-415-PU-4A / PRESSURIZER PUMP-01-415-PU-4B *

NOTE: FOR PUMP PU-4B PREFIX ALL WIRE NOS. BY ⊗ INSTEAD OF A.
& CONTACTS ETC. FOR 01-415-PU-4B.
FOR PUMP PU-4B LOCATION SWITCH IS 25-79, SAME CONTACT NUMBERS

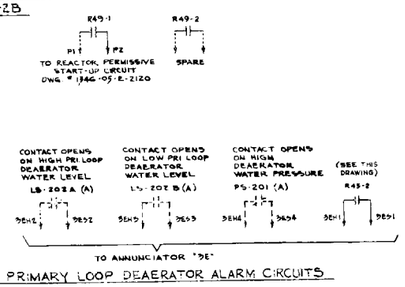


PRIMARY COOLANT CLEAN-UP PUMP 01-415-PU-2A

PRIMARY COOLANT CLEAN-UP PUMP 01-415-PU-2B

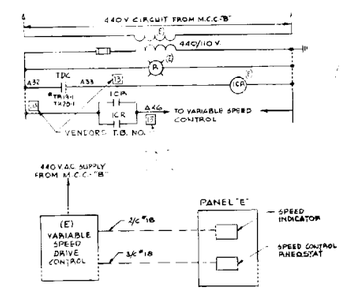


SHUTDOWN INTERLOCKS & AUX. CIRCUITS



PRIMARY LOOP DEAERATOR ALARM CIRCUITS

(17) PRIMARY COOLANT CLEAN-UP PUMPS & PRIMARY LOOP DEAERATOR



SPEED CONTROL & INDICATION

VARIABLE SPEED DRIVE FOR PUMP 01-415-PU-4A
VARIABLE SPEED DRIVE FOR PUMP 01-415-PU-4B*

SEE DWG. E-2131

NOTES

1. FOR SYMBOLS, NOTES & OPERATING DESCRIPTIONS SEE DWG. # 1546-E-2115
2. FOR TYPICAL 440V MOTOR WIRING SEE DWG # 1546-03-E-2117

CERTIFIED FOR CONSTRUCTION

DRAWING NO.	REV.
1546-01-E-2119	5

REFERENCE DRAWING	NO.
ELEM. CONT. DIAGS., NOTES, SYM. & OPER. DES.	1546-E-2115
ELEM. CONT. DIAGRAMS - PROCESS WATER EQUIP.	1546-03-E-2120

SPECIFICATION NO. SECTION 107

SINGMASTER & BREYER
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U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER BY DATE 2-21-61
UNION CARBIDE NUCLEAR COMPANY BY C. E. WINTERS DATE 4-14-61
U. S. ATOMIC ENERGY COMMISSION BY L. H. JACKSON DATE 4-19-61

HIGH FLUX ISOTOPE REACTOR

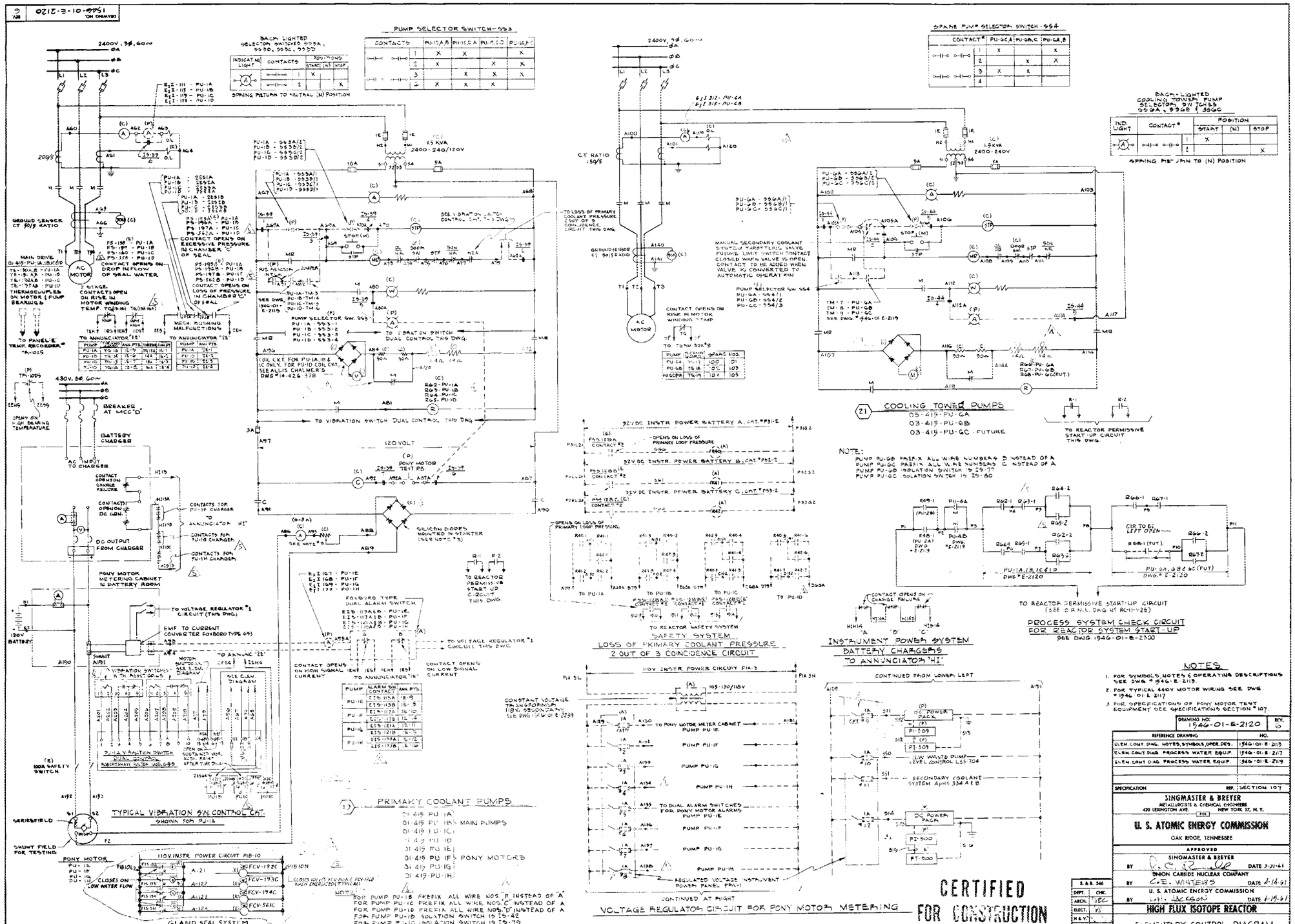
ELEMENTARY CONTROL DIAGRAM
PROCESS WATER EQUIPMENT

DRAWN A. CHKD. DATE 3/29/61 DRAWING NO. 1546-01-E-2119 REV. 5
SCALE

NO.	REVISIONS	BY	CHK.	APP. E&S	DATE	APP. MECH.	DATE	APP. ELEC.	DATE
5	REV. PER CFC VENDOR'S DWGS	L.L.							
4	REVISIONS FOR FOURTH COOLANT PUMP	JMC							
3									
2A	ISSUED FOR PRINT, PATCHES AND OTHER REVISIONS								
1	ISSUED FOR CONSTRUCTION - REVISED PRESS. CONT. METHOD	V.O.							
1	ISSUED FOR PRINT & APPROVAL - ADDED DRAWING NOS. ANY TIMER CANCEL NOS.	PCM							
0	CERTIFIED FOR CONSTRUCTION	DMS							
0	ISSUED FOR TITLE & APPROVAL	MJR							

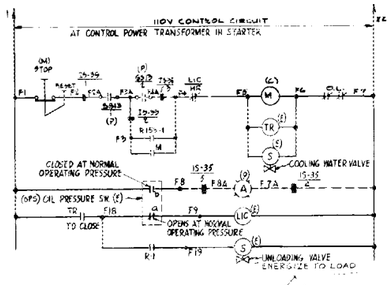
	DATE	CHK.	APP. E&S	DATE	APP. MECH.	DATE	APP. ELEC.	DATE
E. & S. SAS								
ARCH.								
ELECT.								
H & V.								
INST.								
MECH.								
STRUC.								
UTIL.								

DRAWING NO. 1546-01-E-2120 REV. 0

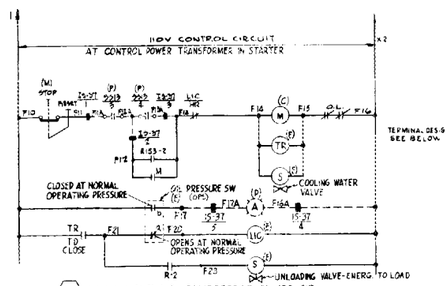


042

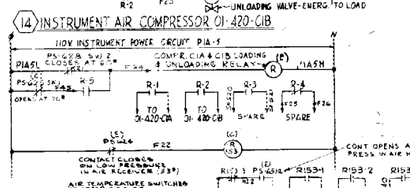
1546-01-E-2124
ON DRAWING



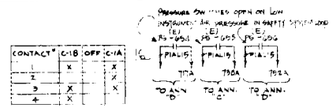
13 INSTRUMENT AIR COMPRESSOR 01-420-C1A



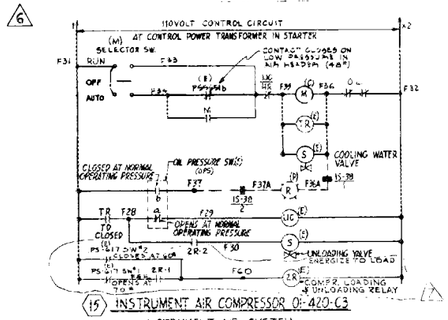
14 INSTRUMENT AIR COMPRESSOR 01-420-C1B



INSTRUMENT AIR COMPRESSOR ASSOCIATE ALARMS

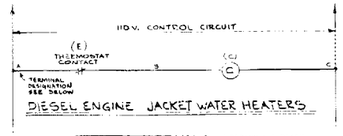


INSTRUMENT AIR COMPRESSOR SELECTOR SWITCH "SS13"



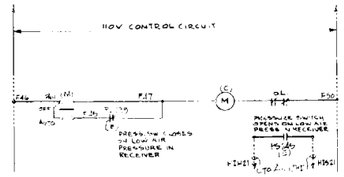
15 INSTRUMENT AIR COMPRESSOR 01-420-C3

INSTRUMENT AIR SYSTEM

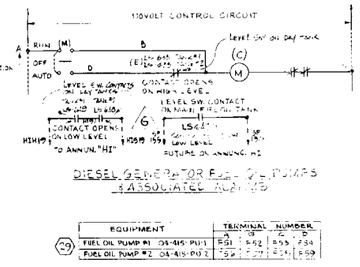


DIESEL ENGINE JACKET WATER HEATERS

EQUIPMENT	TERMINAL NUMBER A	B	C
HEATER FOR DIESEL GEN 04-D-1	F38	F39	F40
HEATER FOR DIESEL GEN 04-D-2	F41	F42	F43

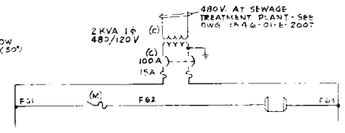


24 DIESEL GENERATOR #2 AIR COMPRESSOR

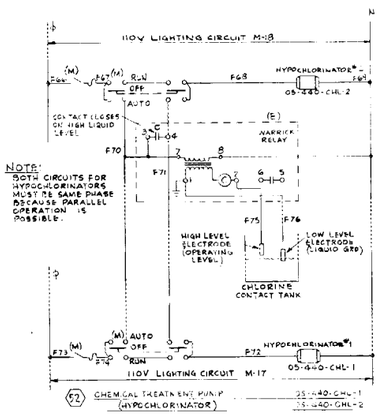


DIESEL GENERATOR FUEL OIL PUMPS & ASSOCIATED ALARMS

EQUIPMENT	TERMINAL NUMBER A	B	C	D
FUEL OIL PUMP #1 04-415-PU-1	F51	F52	F53	F54
FUEL OIL PUMP #2 04-415-PU-2	F55	F56	F57	F58

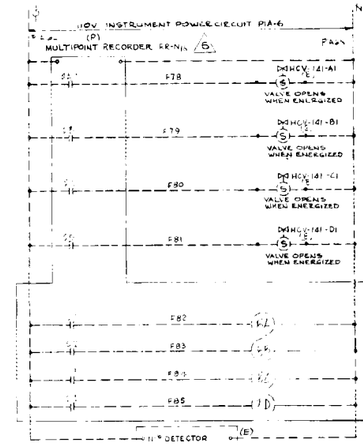


48 COMMINUTOR 05-450-COM-1

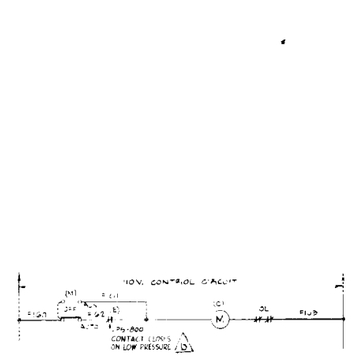


52 CHEMICAL TREATMENT PUMP (HYPOCHLORINATOR) 05-440-CHL-1, 05-440-CHL-2

SEWAGE TREATMENT SYSTEM

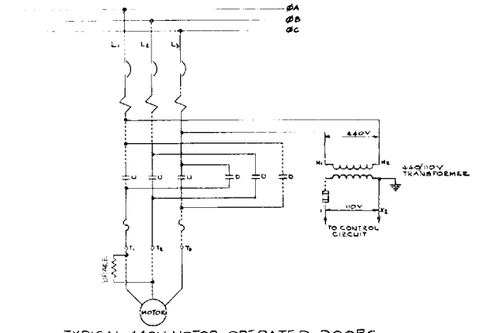


N16 MONITORING CIRCUITS

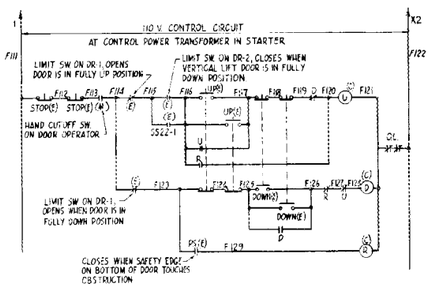


69 FIRE PROTECTION AIR COMPRESSOR 05-420-C-2

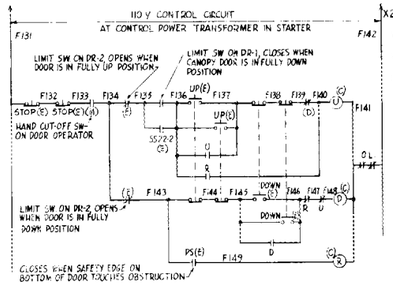
46 SEWAGE TREATMENT BLOWER 05-420-AB-1



TYPICAL 440V MOTOR OPERATED DOORS POWER CIRCUIT



50 MOTOR OPERATED CANOPY DOOR #220 01-375-DR-1



51 MOTOR OPERATED VERTICAL LIFT DOOR #219 01-375-DR-2

NOTES

1. FOR SYMBOLS, NOTES & OPERATING DESCRIPTIONS SEE DWG. #1546-01-E-2113
2. FOR TYPICAL 440V MOTOR WIRING SEE DWG. #1546-05-E-2117
3. S1, S2, S3 & S4 ARE CONTACTS ON THE MULTIPOINT RECORDER. THE CONTACTS WILL OPERATE TO STEP THE RECORDER AND SOLENOID VALVES FROM POINT TO POINT. AN INTERNAL SWITCH ON THE RECORDER WILL PERMIT THE RECORDER TO STOP AT A SELECTED POINT WITHOUT STEPPING

CONTACTS	INTERLOCK OVERIDE	INTER LOCK
1	X	
2	X	
3		X
4		X

INTER LOCK OVERIDE SELECTOR SWITCH SS 22 FOR MOTOR OPERATED DOORS 01-390-DR-1, 01-390-DR-2

CERTIFIED FOR CONSTRUCTION

NO.	REVISIONS	BY	CHK.	APPD. E.E.	DATE	APPD. CONS.	DATE	APPD. ARC.	DATE
7	REV. PER CFC VENDOR'S DWG.	L.L.							
6	REV. CONTR. & DOORS PER VENDOR DWGS.	LTG	DG						
5	ISSUED FOR INITIAL PACKAGE BIDS		DG						
4	GENERAL REVISIONS								
3	REVISED ELEMENTARIES (30) (49) (51)	GW		JRP	4-19-61				
2	REVISED CERTIFIED FOR CONSTRUCTION PACKAGE 5	VO							
1	ISSUED FOR PHASE 2 APPROVAL ADDED 10 ALARM SHOTS, 125V. ANNUNC. NOS., MISC. REVISIONS	RCM							
4	REVISED ELEMENTARIES (30) (49) (51)	GW		JRP	4-19-61				
3	REVISED CERTIFIED FOR CONSTRUCTION PACKAGE 5	VO							
2	ADDED AIR COMPRESS 05-420-C-2	RCM							
1	MINOR CHANGES, ADDED NOTE 4	RA							
0	CERTIFIED FOR CONSTRUCTION								
5	ISSUED FOR TITLE II APPROVAL								

NO.	REVISIONS	BY	CHK.	APPD. E.E.	DATE	APPD. CONS.	DATE	APPD. ARC.	DATE
2	ADDED AIR COMPRESS 05-420-C-2	RCM							
1	MINOR CHANGES, ADDED NOTE 4	RA							
0	CERTIFIED FOR CONSTRUCTION								
5	ISSUED FOR TITLE II APPROVAL								

S. & B. 546
DIFT. CHK.
ARCH. DGC
ELECT. JJ
H & V.
INST.
MECH.
STRUC.
UTIL.

DRAWING NO. 1546-01-E-2124 REV. 7

REFERENCE DRAWING	NO.

SPECIFICATION REF. SECTION 107

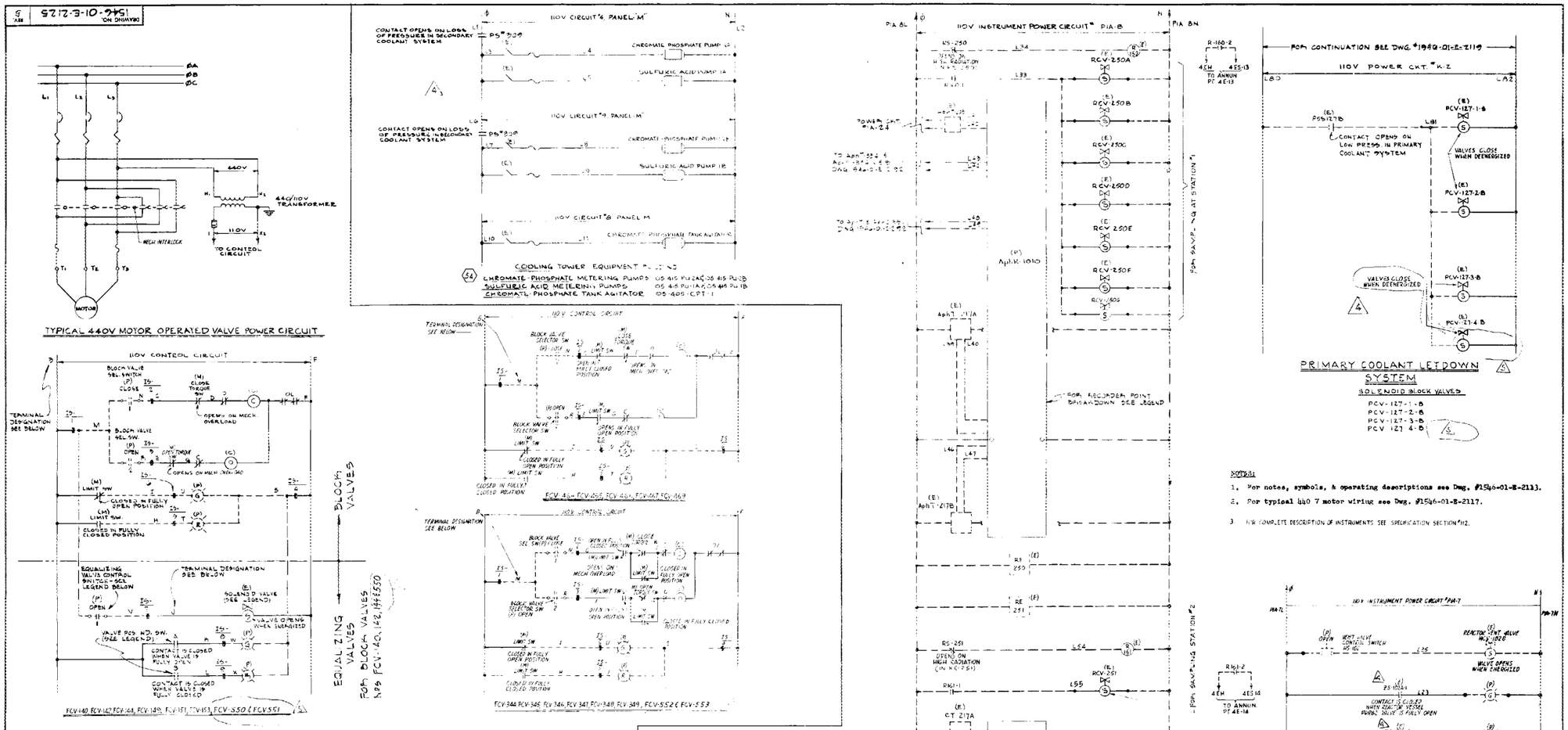
SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
430 LEXINGTON AVE. NEW YORK 17, N.Y.

FOR
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER
BY DATE 4-28-61
UNION CARBIDE NUCLEAR COMPANY
BY C.E. WINTERS DATE 5-12-61
U. S. ATOMIC ENERGY COMMISSION
BY L. H. JACKSON DATE 5-17-61

HIGH FLUX ISOTOPE REACTOR
ELEMENTARY CONTROL DIAGRAMS
MISCELLANEOUS EQUIPMENT

DRAWN E.R.S. 61 CHKD. M.S. DATE 4-28-61 CONTRACT NO. AT-(40-1)-1640
DATE 4-28-61 DRAWING NO. 1546-01-E-2124 REV. 7
SCALE ~



BLOCK VALVE LEGEND

EQUIP. NO.	TERMINAL NOS. B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V	W	X	BLOCK VALVE SELECTOR SWITCH	POSITION SWITCH
FCV-140	M2	K55	K54	K55	M56	K57	K55	M58	K10	K11	K12	M12A	K59A	A59A	M60	A60A	M12A	K61A	M12A	K10A	K11A	M12A	H5-140	Z5-81
FCV-142	K7	K10	K9	K10	K11	K55	K59	K24	K59	K56	K57	K17A	K18A	A55A	M12A	A60A	M12A	K61A	M12A	K10A	K11A	M12A	H5-142	Z5-48
FCV-144	K62	K55	K56	K55	K56	K57	K56	K59	K40	K41	K42	M62A	K63A	A59A	M64A	A60A	M62A	K61A	M62A	K10A	K11A	M62A	H5-144	Z5-49
FCV-149	K7	K10	K11	K10	K11	K55	K59	K56				K67A	K68A	K69A	M70A	A60A	M67A	K61A	M70A				H5-149	Z5-52
FCV-151	K40	K55	K54	K55	K56	K57	K56	K59				K41A	K59A	K69A	M42A	A60A	M40A	K61A	M42A				H5-151	Z5-49
FCV-153	K72	K73	K74	K75	K76	K77	K75	K78				K71A	K79A	K79A	K80A	K79A	K78A	K81A	K79A				H5-153	Z5-52
FCV-350	K82	K83	K84	K85	K86	K87	K85	K89				K82A	K90A	K89A	K86A	A60A	K88A	K81A	K89A				H5-350	Z5-53
FCV-550	K92	K93	K94	K95	K96	K97	K95	K99				K92A	K90A	K99A	K96A	A60A	K98A	K81A	K99A				H5-350	Z5-87
FCV-551	K102	K103	K104	K105	K106	K107	K105	K109				K102A	K90A	K109A	K106A	A60A	K108A	K81A	K109A				H5-350	Z5-90
FCV-552	K112	K113	K114	K115	K116	K117	K115	K119				K112A	K90A	K119A	K116A	A60A	K118A	K81A	K119A				H5-350	Z5-94
FCV-553	K122	K123	K124	K125	K126	K127	K125	K129				K122A	K90A	K129A	K126A	A60A	K128A	K81A	K129A				H5-350	Z5-97
FCV-346	K132	K133	K134	K135	K136	K137	K135	K139				K132A	K90A	A55A	K134A	A60A	K138A	K81A					H5-348	Z5-91
FCV-347	K142	K143	K144	K145	K146	K147	K145	K149	K150	K151	K151	K142A	K143A	K155A	K144A	A60A	K148A	K81A	K150A	K151A	K151A		H5-350	Z5-104
FCV-348	K202	K203	K204	K205	K206	K207	K205	K209				K202A	K203A	K209A	K204A	A60A	K208A	K204A					H5-331	Z5-84
FCV-349	K213	K214	K213	K215	K216	K217	K215	K219				K213A	K214A	K219A	K213A	A60A	K218A	K214A					H5-332	Z5-85
FCV-350	K223	K223	K224	K225	K226	K227	K225	K229				K223A	K224A	K229A	K226A	A60A	K228A	K224A					H5-333	Z5-86
FCV-551	K233	K233	K234	K235	K236	K237	K235	K239				K233A	K234A	K239A	K236A	A60A	K238A	K234A					H5-334	Z5-93
FCV-552	K243	K243	K244	K245	K246	K247	K245	K249				K243A	K244A	K249A	K246A	A60A	K248A	K244A					H5-335	Z5-96
FCV-553	K253	K253	K254	K255	K256	K257	K255	K259				K253A	K254A	K259A	K256A	A60A	K258A	K254A					H5-336	Z5-99
FCV-346	K102	K103	K104	K105	K106	K107	K105	K109				K102A	K103A	K109A	K104A	A60A	K108A	K109A					H5-347	Z5-102
FCV-347	K112	K113	K114	K115	K116	K117	K115	K119				K112A	K113A	K119A	K114A	A60A	K118A	K119A					H5-348	Z5-105
FCV-348	K122	K123	K124	K125	K126	K127	K125	K129				K122A	K123A	K129A	K124A	A60A	K128A	K129A					H5-349	Z5-108

EQUALIZING VALVE LEGEND

BLOCK VALVE	EQUALIZING VALVE	INSTRUMENT VALVE CONTROL SWITCH	VALVE POS. IND. SWITCH A	VALVE POS. IND. SWITCH B
FCV-140	HCV-180D	H5-180	Z5-180A	Z5-180D
FCV-142	HCV-181D	H5-181	Z5-181A	Z5-181D
FCV-144	HCV-182D	H5-182	Z5-182A	Z5-182D
FCV-550	HCV-583D	H5-583	Z5-583A	Z5-583D

BLOCK VALVE SELECTOR SWITCHES (SEE TABULATION)

CONTACTS	POSITIONS	CLOSE	STOP	OPEN
1 — 2	1	X		
	2			X

NON-SPRING RETURN

EQUALIZING VALVE CONTROL SWITCH (SEE TABULATION)

CONTACTS	POSITIONS	CLOSE	OPEN
1 — 2	1		X
	2	X	

NON-SPRING RETURN

(27) PRIMARY & SECONDARY COOLANT WATER, POOL SYSTEM & DEFECTIVE FUEL ELEMENT STORAGE BLOCK VALVES & EQUALIZING VALVES

CERTIFIED FOR CONSTRUCTION

NO.	REVISIONS	BY	CHK.	APPR. E&S	DATE	APPR. ECON.	DATE	APPR. ARC	DATE
5	ADDED VALVES FOR FOURTH COOLANT LOOP	JMK							
4	ADDED CONTROL SYSTEM DEMINERALIZER & PROCESS SAMPLE SYSTEM	DG							
3A	ISSUED FOR BIDS								
2	REVISED - CERTIFIED FOR CONSTRUCTION PACKAGE 2	VG							
2	ISSUED FOR PROJECT APPROVAL. REV. NOTES, CHANGED TITLE, ADDED PLANT DRAIN & LEVEL ALARM, DRAIN TANK SYS. & DETOURS SYS.	FLM							
1	CHANGED CKT. NO. ON REACTOR VESSEL VV	JR	HM						
0	CERTIFIED FOR CONSTRUCTION	MR							
0	ISSUED FOR TITLE & APPROVAL								

NO.	REVISIONS	BY	CHK.	APPR. E&S	DATE	APPR. ECON.	DATE	APPR. ARC	DATE

S. & B. 546

DEPT.	CHK.
ARCH.	
ELECT.	
H & V.	
INST.	
MECH.	
STRUC.	
UTIL.	

DRAWING NO. 1546-01-E-2125 REV. 5

REFERENCE DRAWING	NO.

SPECIFICATION REF. SECTION 107

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N. Y.

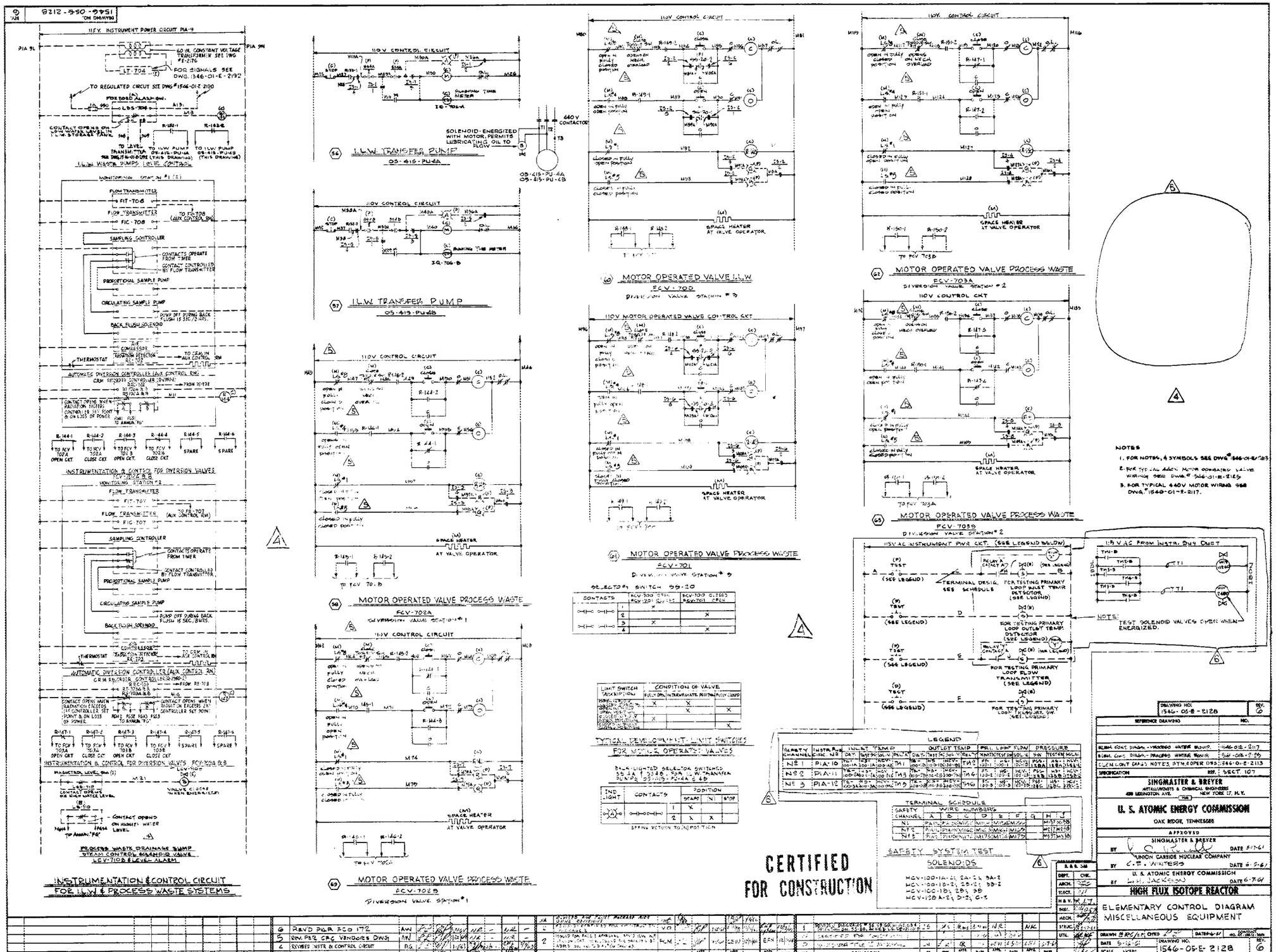
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER BY C. S. Singmaster DATE 4-25-61
UNION CARBIDE NUCLEAR COMPANY BY C. E. WINTERS DATE 5-12-61
U. S. ATOMIC ENERGY COMMISSION BY L. H. JACKSON DATE 5-17-61

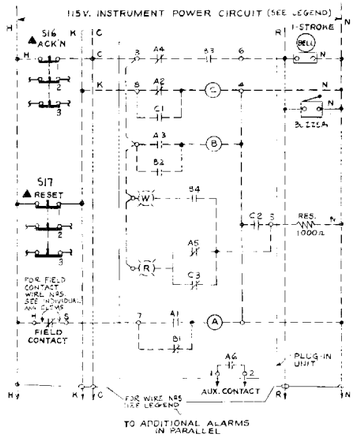
HIGH FLUX ISOTOPE REACTOR

ELEMENTARY CONTROL DIAGRAM
PROCESS WATER EQUIPMENT

DRAWN E.R.S. 6-8-61 CHKD. W.S. DATE 6-26-61 NO. CONTRACT AT(40-1)-1270
DATE 4-28-61 DRAWING NO. 1546-01-E-2125 REV. 5
SCALE ~


115V INSTRUMENT POWER CIRCUIT PIA-9
60 W. CONSTANT VOLTAGE TRANSFORMER SEE DWG #E-2176
FOR SIGNALS SEE DWG. 1546-01-E-2192
TO REGULATED CIRCUT SEE DWG #1546-01-E-2120
FOR BOTH ALARM.
CONTACT OPENS ON HIGH WATER LEVEL IN L.W. STORAGE TANK
TO LEVEL TRANSMITTER
TO I.L.W. PUMP 05-415-PU-4A (THIS DRAWING)
TO I.L.W. PUMP 05-415-PU-4B (THIS DRAWING)
I.L.W. WASTE PUMPS LEVEL CONTROL
MONITORING STATION #1
FLOW TRANSMITTER
FIT-708
FLOW TRANSMITTER
FIC-708
TO FC-708 (AUX CONTROL RM)
SAMPLING CONTROLLER
CONTACTS OPERATE FROM TIMER
CONTACT CONTROLLED BY FLOW TRANSMITTER
PROPORTIONAL SAMPLE PUMP
CIRCULATING SAMPLE PUMP
BACK FLUSH SOLENOID
PUMP OFF DURING BACK FLUSH 15 SEC./5 HRS.
AIR COMPRESSOR
THERMOSTAT
RADIATION DETECTOR
TO CRM-IN AUX CONTROL RM
AUTOMATIC DIVERSION CONTROLLER (AUX CONTROL RM)
CONTACT OPENS WHEN RADIATION EXCEEDS 1ST CONTROLLER SET POINT & ON LOSS OF POWER
TO ANNUN. PG
TO FCV 702A OPEN CKT
TO FCV 702A CLOSE CKT
TO FCV 703B OPEN CKT
TO FCV 703B CLOSE CKT
SPARE
SPARE
INSTRUMENTATION & CONTROL FOR DIVERSION VALVES FCV-702A & B
MONITORING STATION #2
FLOW TRANSMITTER
FIT-707
FLOW TRANSMITTER
FIC-707
TO FC-707 (AUX CONTROL RM)
SAMPLING CONTROLLER
CONTACTS OPERATE FROM TIMER
CONTACT CONTROLLED BY FLOW TRANSMITTER
PROPORTIONAL SAMPLE PUMP
CIRCULATING SAMPLE PUMP
BACK FLUSH SOLENOID
PUMP OFF DURING BACK FLUSH 15 SEC./8 HRS.
AIR COMPRESSOR
THERMOSTAT
RADIATION DETECTOR
TO CRM-IN AUX CONTROL RM
AUTOMATIC DIVERSION CONTROLLER (AUX CONTROL RM)
CONTACT OPENS WHEN RADIATION EXCEEDS 1ST CONTROLLER SET POINT & ON LOSS OF POWER
TO ANNUN. PG
TO FCV 703A OPEN CKT
TO FCV 703A CLOSE CKT
TO FCV 703B OPEN CKT
TO FCV 703B CLOSE CKT
SPARE
SPARE
INSTRUMENTATION & CONTROL FOR DIVERSION VALVES FCV-703A & B
MANUAL LEVEL SW. (2)
CONTACT OPENS ON HIGH WATER LEVEL
VALVE CLOSES WHEN ENERGIZED
PROCESS WASTE DRAINAGE SUMP STEAM CONTROL SOLENOID VALVE LCV-710B ELEVEL ALARM
INSTRUMENTATION & CONTROL CIRCUIT FOR I.L.W. & PROCESS WASTE SYSTEMS
110V CONTROL CIRCUIT
SOLENOID ENERGIZED WITH MOTOR, PERMITS LUBRICATING OIL TO FLOW
440V CONTACTOR
05-415-PU-4A
05-415-PU-4B
I.L.W. TRANSFER PUMP 05-415-PU-4A
I.L.W. TRANSFER PUMP 05-415-PU-4B
110V CONTROL CIRCUIT
SPACE HEATER AT VALVE OPERATOR
MOTOR OPERATED VALVE I.L.W. FCV-700
DIVERSION VALVE STATION #3
110V MOTOR OPERATED VALVE CONTROL CKT
MOTOR OPERATED VALVE PROCESS WASTE FCV-701
DIVERSION VALVE STATION #3
SELECTOR SWITCH 55-20
MOTOR OPERATED VALVE PROCESS WASTE FCV-702A
DIVERSION VALVE STATION #1
110V CONTROL CIRCUIT
MOTOR OPERATED VALVE PROCESS WASTE FCV-702B
DIVERSION VALVE STATION #1
TYPICAL DEVELOPMENT LIMIT SWITCHES FOR MOTOR OPERATED VALVES
BACK LIGHTED SELECTOR SWITCHES 55-3A & 55-4B, FOR I.L.W. TRANSFER PUMPS 05-415-PU-4A & 4B
SPRING RETURN TO (N) POSITION
110V CONTROL CIRCUIT
SPACE HEATER LT VALVE OPERATOR
MOTOR OPERATED VALVE PROCESS WASTE FCV-703A
DIVERSION VALVE STATION #2
110V CONTROL CKT
MOTOR OPERATED VALVE PROCESS WASTE FCV-703B
DIVERSION VALVE STATION #2
115V AC INSTRUMENT PWR CKT. (SEE LEGEND BELOW)
115 V AC FROM INSTR. DIST. CIRCUIT
TERMINAL DESIG. FOR TESTING PRIMARY LOOP INLET TEMP. DETECTOR (SEE LEGEND)
FOR TESTING PRIMARY LOOP OUTLET TEMP. DETECTOR (SEE LEGEND)
FOR TESTING PRIMARY LOOP FLOW TRANSMITTER (SEE LEGEND)
NOTE: TEST SOLENOID VALVES OPEN WHEN ENERGIZED.
LEGEND
TERMINAL SCHEDULE
SAFETY SYSTEM TEST
SOLENOIDS
CERTIFIED FOR CONSTRUCTION
NOTES
1. FOR NOTES, & SYMBOLS SEE DWG #1546-01-E-2183
2. FOR TYPICAL 440V MOTOR OPERATED VALVE WIRING SEE DWG #1546-01-E-2185
3. FOR TYPICAL 440V MOTOR WIRING SEE DWG #1546-01-E-2117.
DRAWING NO. 1546-05-E-2128 REV. 6
REFERENCE DRAWINGS
SINGMASTER & BREYER
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
APPROVED
UNION CARBIDE NUCLEAR COMPANY
U. S. ATOMIC ENERGY COMMISSION
HIGH FLUX ISOTOPE REACTOR
ELEMENTARY CONTROL DIAGRAM
MISCELLANEOUS EQUIPMENT
DRAWN
DATE 5-12-61
SCALE NONE
DRAWING NO. 1546-05-E-2128
REV. 6

DRAWING NO. 1946-01-E-2129 REV. 4



TYPICAL ANNUNCIATOR CIRCUIT

SEQUENCE OF OPERATION

OPERATION	FIELD CONTACT	WHITE LIGHT	RED LIGHT	HORN	COIL "A"	COIL "B"	COIL "C"
NORMAL	CLOSED	DIM	DIM	OFF	ON	ON	OFF
ABNORMAL	OPEN	ON	ON	ON	OFF	ON	ON
ACKNOWLEDGED	OPEN	OFF	ON	OFF	OFF	OFF	ON
NORMAL BEFORE RESET	CLOSED	ON	OFF	OFF	ON	ON	ON
RESET	CLOSED	DIM	DIM	OFF	ON	ON	OFF

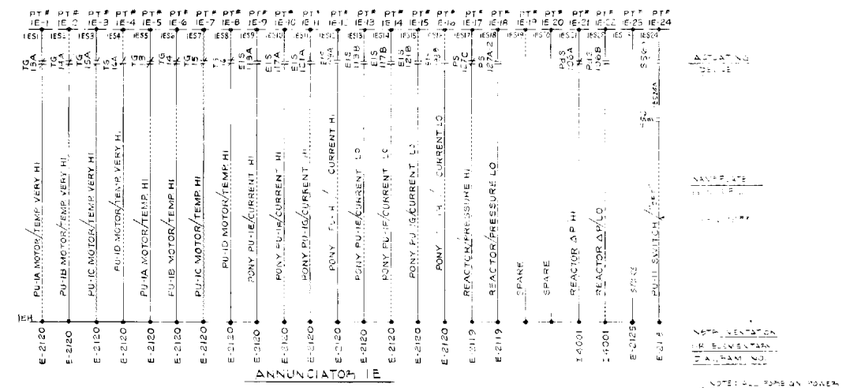
Note 1: If after step 2 normal condition returns before acknowledge button is operated the annunciator must remain in condition 2 until acknowledge button is operated, after which annunciator should go to step 4.

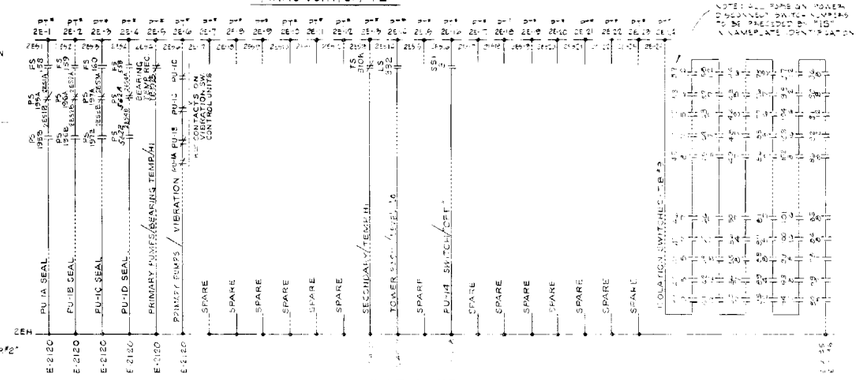
Note 2: If after step 4 abnormal condition returns before the reset button is operated the annunciator should return to step 2.

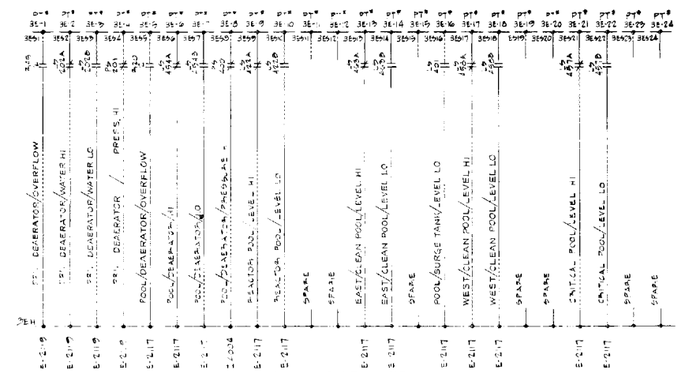
▲ ACKNOWLEDGE & RESET BUTTON } #1 FOR ANNUNCIATORS #1E, 2E, 3E, 4E

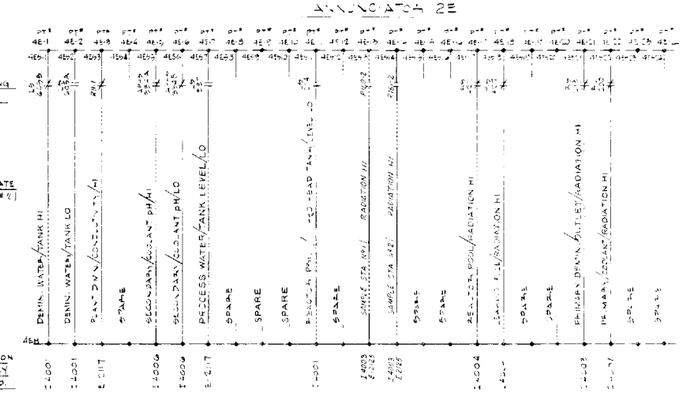
▲ ACKNOWLEDGE & RESET BUTTON } #2 FOR ANNUNCIATORS "FG", "HI", "EXP#1", "EXP#2"

▲ ACKNOWLEDGE & RESET BUTTON } #3 FOR ANNUNCIATORS #A, B, C, D







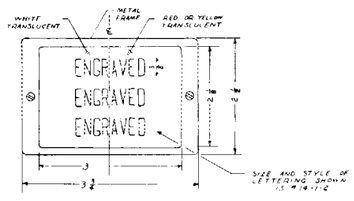


1	5	9	13	17	21
2	6	10	14	18	22
3	7	11	15	19	23
4	8	12	16	20	24

TYPICAL NUMBERING OF ANNUNCIATOR POINTS

NO SCALE

LEGEND							
ANNUNCIATOR	POWER CKT	BELL & BUZZER LOCATION	WIRE NUMBERS				
			H	K	C	R	N
1E, 2E, 3E, & 4E	P1A-13	PANEL "E"	PA1H	PA1K	PA1C	PA1R	PA1N
FG, HI, EXP#1, EXP#2	P1A-14	PANEL "F-G"	P1A LIN HANDLE	H1K	H1C	H1R	PANEL HANDLE
A, B, C, & D	P1A-15	PANEL "C"	P1A1D	70A	70A	70A	PANS



GENERAL NOTES:

1. ACTUATING DEVICES SHOWN IN THEIR DE ENERGIZED OR UNMOUNTED POSITIONS.
2. POINTS ON ANNUNCIATORS MARKED "SPARE" SHALL BE PROVIDED WITH BLANK NAMEPLATES.
3. SLANTED LINE - / - INDICATE THE NUMBER OF LINES IN ANNUNCIATOR ENGRAVING. THE ENGRAVING SHALL BE CENTERED BOTH HORIZONTALLY AND VERTICALLY.

PROCESS PANEL "E" CONSTRUCTION DETAILS	1546-01-E-4039
PROCESS PANEL "E" WIRING DIAGRAM SHT #1,2,3	1546-01-E-7301 TO 7303
ELEMENTARY CONTROL DIA'S ANNUNCIATORS	1946-01-E-2170

DRAWING NO. 1946-01-E-2129 REV. 4

REFERENCE DRAWING	NO.
ELEM. CONTROL DIA. - PROCESS WATER EQUIP.	1946-01-E-2117
ELEM. CONTROL DIA. - PROCESS WATER EQUIP.	1946-01-E-2118
ELEM. CONTROL DIA. - PROCESS WATER EQUIP.	1946-01-E-2119
ELEM. CONTROL DIA. - PROCESS WATER EQUIP.	1946-01-E-2120
ELEM. CONTROL DIA. - PROCESS WATER EQUIP.	1946-01-E-2129
SPECIFICATION REF.	SECTION 108

SINGMASTER & BREYER
METALLURGICAL & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

FOR

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER
BY [signature] DATE 9/22/61

UNION CARBIDE NUCLEAR COMPANY
BY C. E. WINTERS DATE 10/4/61

U. S. ATOMIC ENERGY COMMISSION
BY L. H. JACKSON DATE 10/3/61

CERTIFIED FOR CONSTRUCTION

S. & B. 546	
DEPT.	CHK.
ARCH.	
ELECT.	
H & V.	
INST.	
MECH.	
STRUC.	
UTIL.	

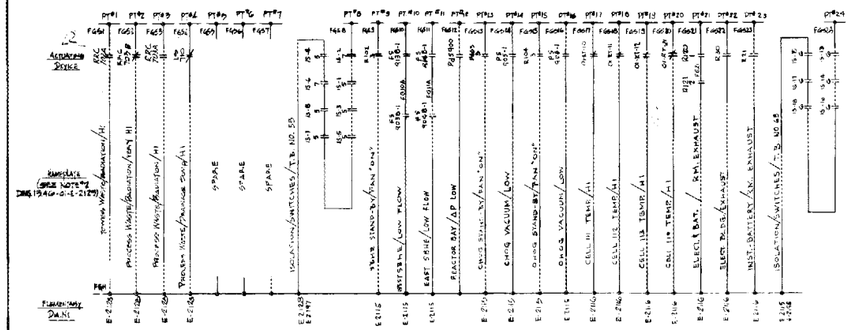
HIGH FLUX ISOTOPE REACTOR

ELEMENTARY CONTROL DIAGRAMS
ANNUNCIATORS 1E THRU 4E

DRAWN	PCM	CHKD	D.M.O.	DATE 9/21	NO. SIGNATURE
DATE	9-22-61	DRAWING NO.	1946-01-E-2129		REV. 4
SCALE	NONE				

NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. UCNC	DATE	APPR. AEC	DATE
2	MISC. REVS.								
1A	REVISED FOR PANEL PACKAGE PROC. NEW REVISIONS	DG							
0	CERTIFIED FOR CONSTRUCTION PKG #2								
3	REVISED FOR PANEL #2 & #3 APPROVAL	PCM	DMO						
4									

046



Note
FOR GENERAL NOTES & TYPICAL ANNUNCIATOR CIRCUIT SEE DWG. 1946-01-E-2129.

REFERENCE DRAWING	NO.
SIGNAL CONTROL DIAGRAMS - ANNUN. "E" TO "L"	1946-01-E-2129
INTERCONN. WIR. DIAG., PANEL-9 "F-G", "H" & "I"	1946-01-E-2139
WIRING DIAGRAM - PANEL "I"	1946-01-E-2121
WASTE SYSTEM - PANEL "F-G" WIR. DIAG.	1946-01-E-2229

SPECIFICATION REF. SECTION 108

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.
FOR
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER BY J. C. Schmidt DATE 9/22/61
UNION CARBIDE NUCLEAR COMPANY BY G.E. WINTERS DATE 10/4/61
U. S. ATOMIC ENERGY COMMISSION BY C.H. JACKSON DATE 10/12/61

HIGH FLUX ISOTOPE REACTOR

ELEMENTARY CONTROL DIAGRAMS
ANNUNCIATORS B C D F G & "H I"

DRAWN JN/BDP CHKD DMO DATE 9/21/61 DRAWING NO. 1946-01-E-2130 REV. 4
DATE 9-21-61 SCALE NONE

DRAWING NO. 1946-01-E-2130 REV. 4

CERTIFIED FOR CONSTRUCTION

NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. UCNC	DATE	APPR. ARC	DATE
4	REVD. PER FCO # 172	RWD							
3	ADDED ALARM CURRENT FOR FOURIN COOLANT LOOP, UNCANNULUS INJECTION	JMC							
2	MISC. REVS.	DO							
1A	ISSUED FOR PRIME PACKAGE NOV. ORNL REVISIONS	WAB	DMO						
0	CERTIFIED FOR CONSTRUCTION - PHASE #3	JJS	DBP						
0	ISSUED FOR PACKAGE #3 APP.	DBP	DMO						

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ARCH.
ELECT.
H & V.
INST.
MECH.
STRUC.
UTIL.

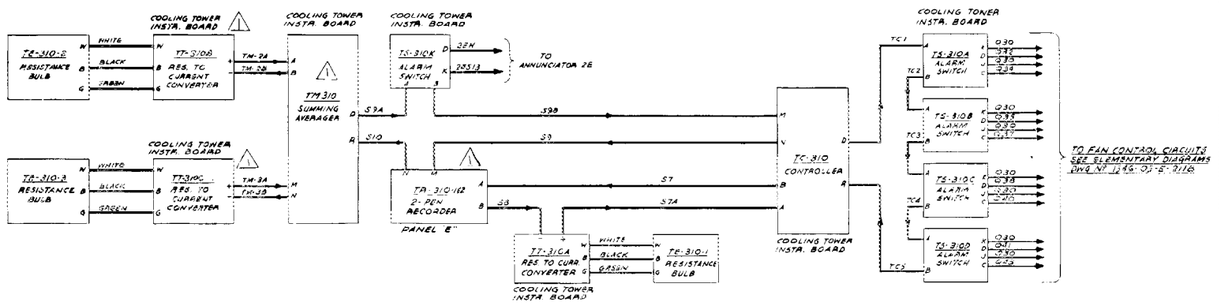
DRAWING NO. 1546-01-E-2192 REV. 3

SECONDARY WATER TEMPERATURE AT BASE OF COOLING TOWER

TEMPERATURE TRANSMISSION RECORDING & ALARM

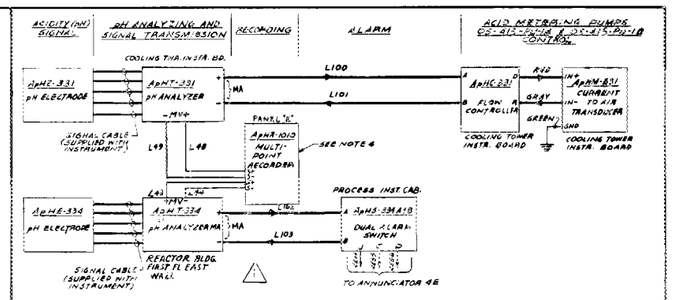
SECONDARY WATER TEMPERATURE AFTER COOLING-TOWER PUMPS

COOLING TOWER FANS SPEED CONTROL

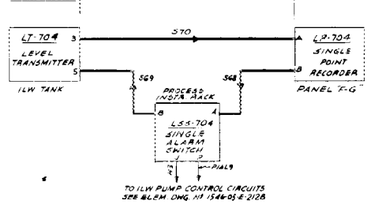


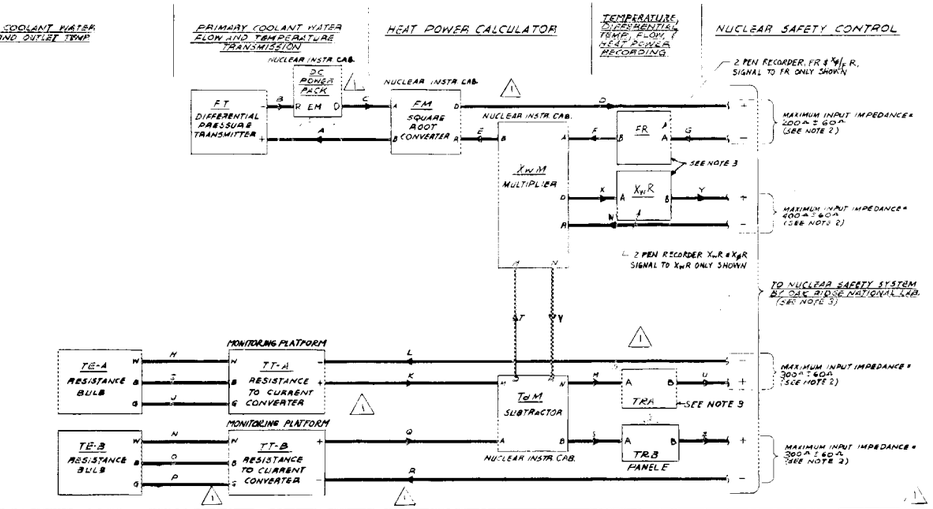
COOLING TOWER FANS TEMPERATURE CONTROL
SIGNAL CONNECTION BLOCK DIAGRAM
SEE NOTE #1

pH SIGNAL CONNECTION BLOCK DIAGRAM
SEE NOTE 1



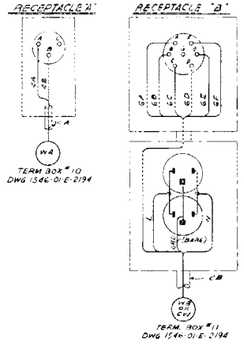
ILW TANK LEVEL
SIGNAL CONNECTION BLOCK DIAGRAM
SEE NOTE 1





CHANNEL	FT	FM	FR	XwM	ZWM	TE-A	TRA	TE-B	TRB	TWM	TRA	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	TR-B	EM
1	100-1	100-1	100-1	100-1A	100-1A	100-1A	100-1A	100-1B	100-1B	100-1A	100-1A	905	906	905A	868	867	870	868A	869W	871B	872G	870	873	820	898W	898W	896	875	876	877	872	873W	873	866	865	866W	876A	100-1B	100-1
2	100-2	100-2	100-2	100-2A	100-2	100-2A	100-2A	100-2B	100-2B	100-2A	100-2A	907	908	907A	852	853	856	852A	879W	877B	879G	876	863	864	900W	900W	898	865	866	867	868	863W	867	850	849	900A	900W	100-2B	100-2
3	100-3	100-3	100-3	100-3A	100-3	100-3A	100-3A	100-3B	100-3B	100-3A	100-3A	909	910	909A	881	885	886	880A	904W	901B	902G	899	887	888	902W	902W	900	889	890	891	892	887W	891	882	881	902A	902W	100-3B	100-3

HEAT POWER SAFETY SYSTEM
SIGNAL CONNECTION BLOCK DIAGRAM
SEE NOTE 1



SYMBOL	CONSTANT AIR MONITOR #1	#2	#3	#4	#5	#6
CONDUIT "A"	C4019	C4097	C4129	C4069	C4061	C4150
CABLE "A"	W4057	W4087	W4096	W4031	W4032	W4033
WIRE NO. 1A	CN4-1A	CN4-2A	CN4-3A	CN4-4A	CN4-5A	CN4-6A
WIRE NO 1B	CN4-1B	CN4-2B	CN4-3B	CN4-4B	CN4-5B	CN4-6B
CONDUIT "B"	C4018	C4096	C4128	—	—	—
CABLE "B"	W2116	W4086 & W4105	W4095 & W4105	—	—	—
CONCEAL "EM"	—	—	—	CN2103	CN2102	CN2119
WIRE NO. 6A	CN6-1A	CN6-2A	CN6-3A	CN6-4A	CN6-5A	CN6-6A
WIRE NO. 6B	CN6-1B	CN6-2B	CN6-3B	CN6-4B	CN6-5B	CN6-6B
WIRE NO. 6C	CN6-1C	CN6-2C	CN6-3C	CN6-4C	CN6-5C	CN6-6C
WIRE NO. 6D	CN6-1D	CN6-2D	CN6-3D	CN6-4D	CN6-5D	CN6-6D
WIRE NO. 6E	CN6-1E	CN6-2E	CN6-3E	CN6-4E	CN6-5E	CN6-6E
WIRE NO. 6F	CN6-1F	CN6-2F	CN6-3F	CN6-4F	CN6-5F	CN6-6F
WIRE NO. 1	PIAL 1B	PIAL 1G	PIAL 1G	PIAL 1F	PIAL 1F	PIAL 2B
WIRE NO. N	PIAN 1B	PIAN 1G	PIAN 1G	PIAN 1F	PIAN 1F	PIAN 2B

CONSTANT AIR MONITOR RECEPTACLES
TYPICAL CONNECTIONS

NOTES:

1. FOR POWER SUPPLY CIRCUITS TO INSTRUMENTS SEE INSTRUMENT POWER ONE LINE DIAGRAM, DWG Nº 1546-01-E-2024.
2. IF SIGNAL INPUT IMPEDANCE IS LESS THAN MAXIMUM ALLOWABLE IMPEDANCE SHOWN, ADD REQUIRED LOAD BY ADJUSTING LOAD POTENTIOMETER ON SIGNAL TRANSMITTER.
3. RECORDERS, FR-XWR, AND SAFETY SYSTEM INSTRUMENTS ARE LOCATED, FOR CHANNELS 1, 2, & 3, ON PANELS B, C & D RESPECTIVELY. OTHER INSTRUMENTS ARE LOCATED AS SHOWN.
4. APHR-1010 IS A 16 POINT RECORDER FOR ADDITIONAL POINTS NOT SHOWN SEE DWG. 1546-01-E-2125.

SYMBOLS:

→ ARROW INDICATES DIRECTION OF CURRENT.

CERTIFIED FOR CONSTRUCTION

REFERENCE DRAWING	NO.
INTERCONN WIRING DIAG - TERM BOXES 10 & 11	1546-01-E-2194
ELEMENTARY CONT DIAG - MISC EQUIPMENT	1546-05-E-2128
ELEMENTARY CONT DIAG - PROC WATER EQUIP	1546-01-E-2125
ELEMENTARY CONT DIAG - PROC WATER EQUIP	1546-05-E-2118
ONE LINE DIAGRAM - INSTRUMENT POWER	1546-01-E-2024
SPECIFICATION	NO. 108 & 112

SINGMASTER & BREYER
MECHANICAL-ELECTRICAL & CHEMICAL ENGINEERS
100 PARK AVE. NEW YORK 17, N.Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER
BY [signature] DATE 12-7-61
UNION CARBIDE NUCLEAR COMPANY
BY C. E. WINTERS DATE 12/11/61
U. S. ATOMIC ENERGY COMMISSION
BY E. F. NEWMAN DATE 12/12/61

HIGH FLUX ISOTOPE REACTOR

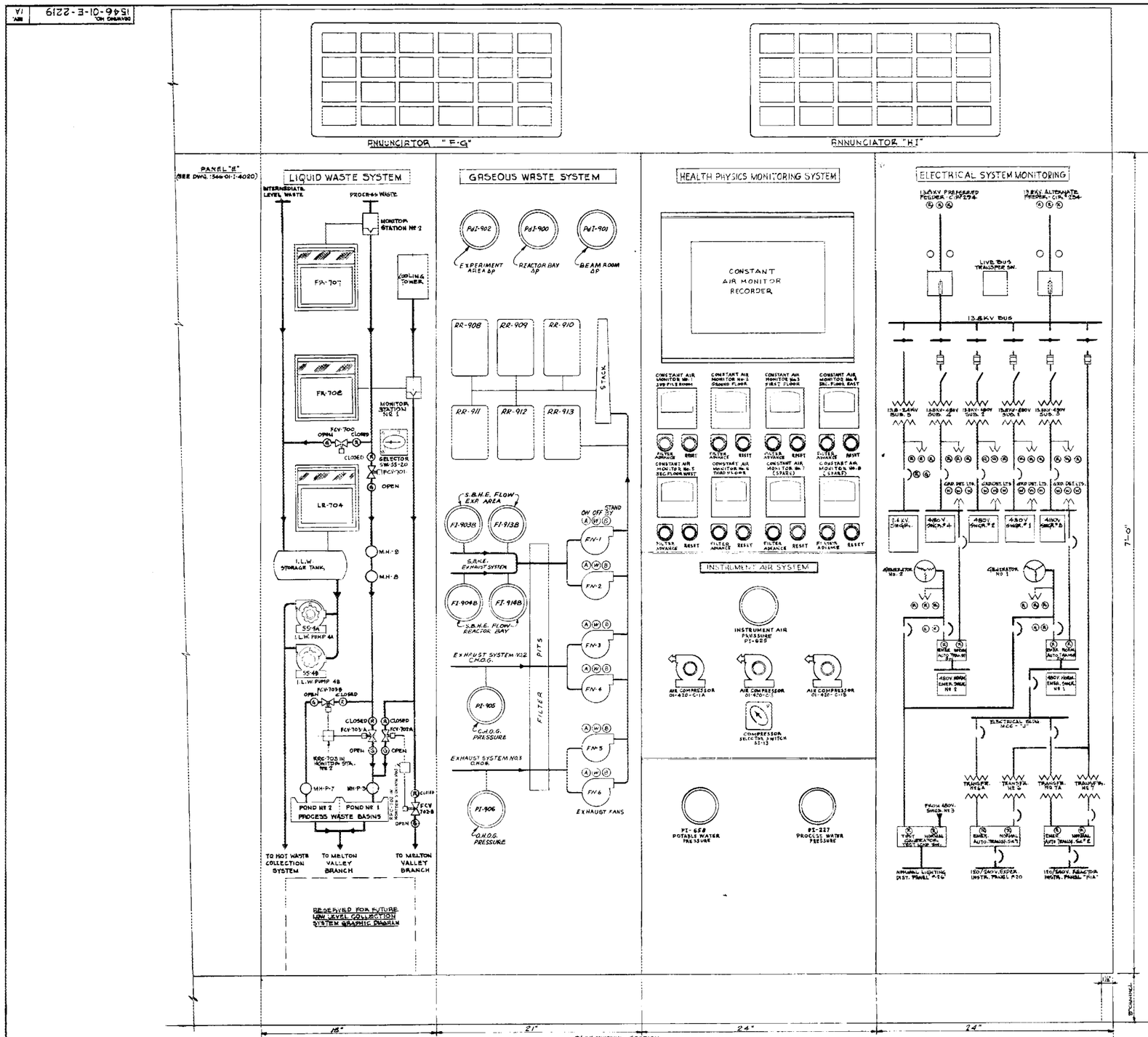
SCHEMATIC BLOCK DIAGRAM
HEAT POWER CALCULATORS AND MISCELLANEOUS INSTRUMENTATION

DRAWN VDI DATE 12-7-61 CHKD [signature] DATE 12-7-61
SCALE NONE
DRAWING NO. 1546-01-E-2192 REV. 3

NO.	REVISIONS	BY	CHK.	APPD. ELEC.	DATE	APPD. MECH.	DATE	APPD. INST.	DATE
2	REV. PER CFC VENDOR'S DWG.	L.L.	[illegible]	[illegible]	[illegible]	N/A	—	N/A	—
1	MISC CHANGES	JMC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0	CERTIFIED FOR CONSTRUCTION - PACKAGE 2	VD	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0	ISSUED FOR PACKAGE 2 APPROVAL	VD	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3	REV. PER CFC VENDOR'S DWG	L.L.	[illegible]	[illegible]	[illegible]	N/A	—	N/A	—

S. & B. 546	
DEPT.	CHK.
ARCH.	
ELECT.	[illegible]
M.E.V.	
INST.	[illegible]
MECH.	
STRUC.	
UTIL.	

DAB



NOTES:

1. FOR DETAILS OF EQUIPMENT ARRANGEMENT AND BILL OF MATERIAL FOR PANELS SEE DRAWINGS AS FOLLOWS:
   PANELS "F" & "G" - DWG. #1546-01-E-2228
   PANEL "H" - DWG. #1546-01-E-2224
   PANEL "I" - DWG. #1546-01-E-2220
2. FOR PANEL WIRING DIAGRAMS SEE DRAWINGS AS FOLLOWS:
   PANELS "F" & "G" - DWG. #1546-01-E-2229
   PANEL "H" - DWG. #1546-01-E-2225
   PANEL "I" - DWG. #1546-01-E-2221
3. FOR PANEL CONSTRUCTION DETAILS SEE DWGS. AS FOLLOWS:
   PANELS "F" & "G" - DWG. #1546-01-E-2222
   PANEL "H" - DWG. #1546-01-E-2222
   PANEL "I" - DWG. #1546-01-E-2222
4. FOR PNEUMATIC TUBING ARRANGEMENT SEE DWG. RC11-8-1

NO.	REVISIONS	BY	CHK.	APPR. R&D	DATE	APPR. ENG.	DATE	APPR. ARC.	DATE
1A	ISSUED FOR BIDS. GRNL REVISIONS	WDK							
0	CERTIFIED FOR CONSTRUCTION - PHASE #2	J.S.							
0	ISSUED FOR PACKAGE #2 APP.	P.H.							

DRAWING NO. 1546-01-E-2219 REV. 1A

REFERENCE DRAWING NO.
SEE NOTES 1, 2, 3 & 4
INTERCONNECTION WIRING DIAGRAMS - PANELS F,G,H,I 1546-01-E-2185
SPECIFICATION REF. SECT. 108 & 119

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
430 LEXINGTON AVE. NEW YORK 17, N.Y.

FOR

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER
BY DATE 9/14/61
UNION CARBIDE NUCLEAR COMPANY
BY C.E. WINTERS DATE 10/6/61
U. S. ATOMIC ENERGY COMMISSION
BY L.H. JACKSON DATE 10/13/61

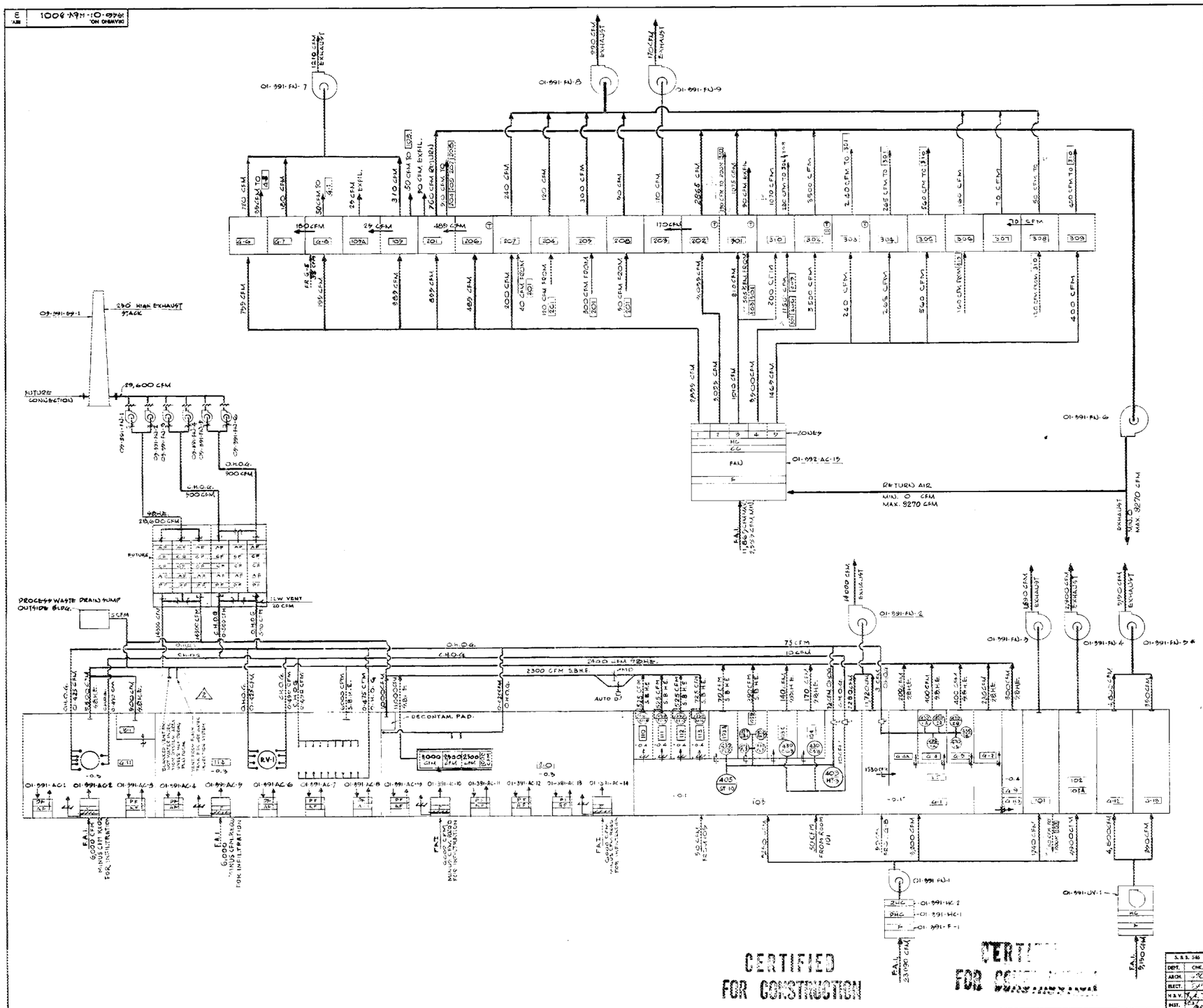
HIGH FLUX ISOTOPE REACTOR

GENERAL ARRANGEMENT
PANELS F,G,H & I

DRAWN H.W. CHKD. DATE
DATE 9-21-61 DRAWING NO. 1546-01-E-2219 REV. 1A
SCALE 3" = 1'-0"

S. & S. 546
DEPT. CHK.
ARCH.
ELECT. DAR
H & V. R.K.G.
INST. W.F.
MECH.
STRUC.

CERTIFIED



ROOM NUMBER	ROOM DESIGNATION
B-1	SUB-PILE ROOM
G-1	REACTOR & AUXILIARY POOL EQUIPMENT ROOM
G-2	PRIMARY PUMP CLEANUP COMPARTMENT
G-3	PRIMARY DEMINERALIZER EQUIPMENT COMPARTMENT
G-4	PRIMARY DEMINERALIZER EQUIPMENT COMPARTMENT
G-4A	POOL DEMINERALIZER COMPARTMENT
G-5	EQUIPMENT REMOVAL & PIPE CORRIDOR
G-6	STAFF SHOP
G-7	MEN'S TOILET
G-8	ELEVATOR HALL
G-9	PIPE TUNNEL #1
G-10	PIPE TUNNEL #2
G-11	BEAM ROOM
G-12	ELECTRICAL EQUIPMENT ROOM
G-13	BATTERY ROOM
101	HEATING & VENTILATING EQUIPMENT ROOM
102	ELECTRICAL EQUIPMENT ROOM
102A	STORAGE ROOM
102B	FIRE ALARM EQUIPMENT ROOM
103	REACTOR & AUXILIARY POOL EQUIPMENT ROOM
103A	POOL FILTER COMPARTMENT
103B	POOL DEMINERALIZER COMPARTMENT
103C	POOL DEAERATOR COMPARTMENT
104	PRIMARY DEAERATOR ROOM
105	ELEVATOR HALL
105A	VESTIBULE
110	PRIMARY PUMP & EXCHANGER CELL
111	PRIMARY PUMP & EXCHANGER CELL
112	PRIMARY PUMP & EXCHANGER CELL
113	PRIMARY PUMP & EXCHANGER CELL
114	EXPERIMENTAL AREA
201	CORRIDOR
202	AUXILIARY CONTROL ROOM
203	INSTRUMENT BATTERY ROOM
204	LOCKER ROOM
205	MEN'S TOILET
206	HEALTH PHYSICS OFFICE
207	CONTAMINATED CLOTHING ROOM
208	JANITOR'S CLOSET
209	AIR LOCK
210	REACTOR BAY
211	TRUCK AIR LOCK
301	OBSERVATION GALLERY
302	CONTROL ROOM
303	OFFICE
304	OFFICE
305	PARTS STORAGE
306	MEN'S TOILET
307	WOMEN'S TOILET
308	WOMEN'S REST ROOM
309	SPECIAL INSTRUMENT STORAGE
310	CORRIDOR

SYMBOL		LEGEND
P H C		PRE-HEAT COIL
R H C		REHEAT COIL
C C		COOLING COIL
H C		HEATING COIL
F		FILTER (FIBER GLASS)
P F		PRE-FILTER (FIBER GLASS)
A F		ABSOLUTE FILTER
C F		CHARCOAL FILTER
S H E		SPECIAL HOUSING HOT EXHAUST SYSTEM
O H O G		OPEN HOT OFF GAS SYSTEM
C H O G		CLOSED HOT OFF GAS SYSTEM
A C		AIR CONDITIONING UNIT
U V		UNIT VENTILATOR
F A I		FRESH AIR INTAKE
	P	PROCESS WATER EQUIPMENT
C F M		CUBIC FEET PER MINUTE
M D		MANUAL DAMPER
B D D		BACK DRAFT DAMPER
I L W D		INTERMEDIATE LEVEL WASTE DRAIN
F N		FANS
E S		EXHAUST STACK
		BALL VALVE
F D		FIRE DAMPER
AUTO. D		AUTOMATIC DAMPER
		REGISTERS

EQUIPMENT IDENTIFICATION
AREA NUMBER
EQUIPMENT CLASSIFICATION
EQUIPMENT SYMBOL
UNIT NUMBER
01-391-FN-1

NOTE: THIS DRAWING IS FOR GENERAL INFORMATION ONLY. THE CONTRACTOR SHALL MAKE REFERENCE TO REMARKS IN A-Y LAYOUT, EQUIPMENT DRAWINGS AND SPECIFICATIONS FOR ACTUAL EXTENT SIZES AND LOCATIONS OF DEVICES ON WORK TO BE FURNISHED & INSTALLED UNDER THE CONTRACT.

* ON NORMAL EMERGENCY POWER

THIRD FLOOR PLAN 1946-01-HEV-3008

DRAWING NO. 1946-01-HEV-3001 REV. 3

REFERENCE DRAWING	NO.
SECOND FLOOR PLAN	1946-01-HEV-3007
FIRST FLOOR PLAN	1946-01-HEV-3006
SUB PILE ROOM & ROOF PLAN	1946-01-HEV-3004
STEAM & CHILLED WATER FLOW DIAGRAM	1946-01-HEF-3015
CONTROL DIAGRAM	1946-01-HEV-3028 TO 3029
SPECIFICATION	REF.

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER
BY [signature] DATE 3-27-61
UNION CARBIDE NUCLEAR COMPANY
BY C. E. WINTERS DATE 3-27-61
U. S. ATOMIC ENERGY COMMISSION
BY R. B. SOMERS DATE 3-31-61

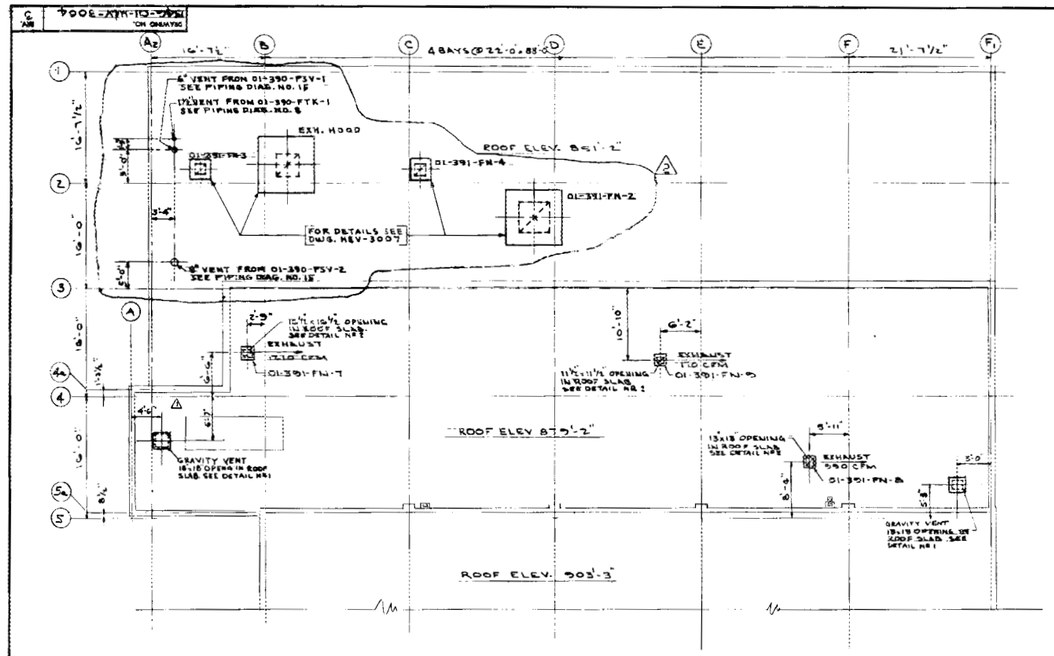
S & B No. 346

DEPT.	CHK.
ARCH.	
ELECT.	
N.S.V.	
INST.	
MECH.	
STRUC.	
UTIL.	

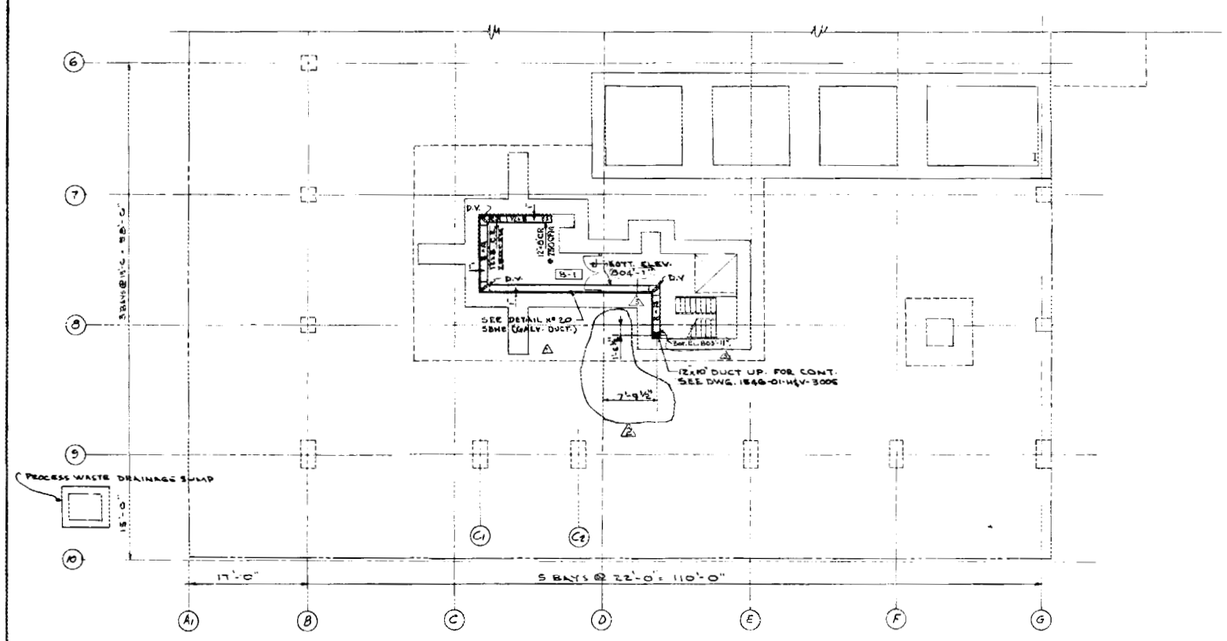
HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
HEATING & VENTILATING
AIR FLOW DIAGRAMS

DRAWN MAW CHKD. DATE 11-6-60 PROJECT NO. 346-1-1-1-1-1000
DATE 8-11-60 DRAWING NO. 1946-01-HEV-3001 REV. 3
SCALE NONE

NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. UCNC	DATE	APPR. AEC	DATE
0	ISSUED FOR TITLE & APPROVAL								
0	ISSUED FOR TITLE & APPROVAL								
0	ISSUED FOR TITLE & APPROVAL								
0	ISSUED FOR CONSTRUCTION								



ROOF PLAN



SUB-PILE ROOM @ ELEV. 793'-0"

SYMBOL	LEGEND
D.V.	DISTRIBUTIVE VALVE
C.R.	CEILING REGISTER
FN	FAN
C.F.M.	CUBIC FEET PER MINUTE

NOTE:
1. DUCT IN SUB-PILE ROOM SHALL BE SEALED AGAINST CEILING & WALL WITH CAULKING.

CERTIFIED FOR CONSTRUCTION

DRAWING NO. 1546-01-HEV-3004 REV. 3

REFERENCE DRAWING	NO.
GROUND FLOOR PLAN	1946-01-HEV-3000
THIRD FLOOR PLAN	1946-01-HEV-3002
EQUIPMENT SCHEDULES	1546-00-HEV-5001
DUCTWORK DETAILS	1546-00-HEV-3007
CONTROL DIAGRAMS	1546-01-HEV-5001-5005
SPECIFICATION H. V. & A.C.	SECTION 15GC

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

FOR

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER
BY DATE 4-27-61
UNION CARBIDE NUCLEAR COMPANY
BY C. E. WINTERS DATE 5-17-61
U. S. ATOMIC ENERGY COMMISSION
BY L. H. JACKSON DATE 5-26-61

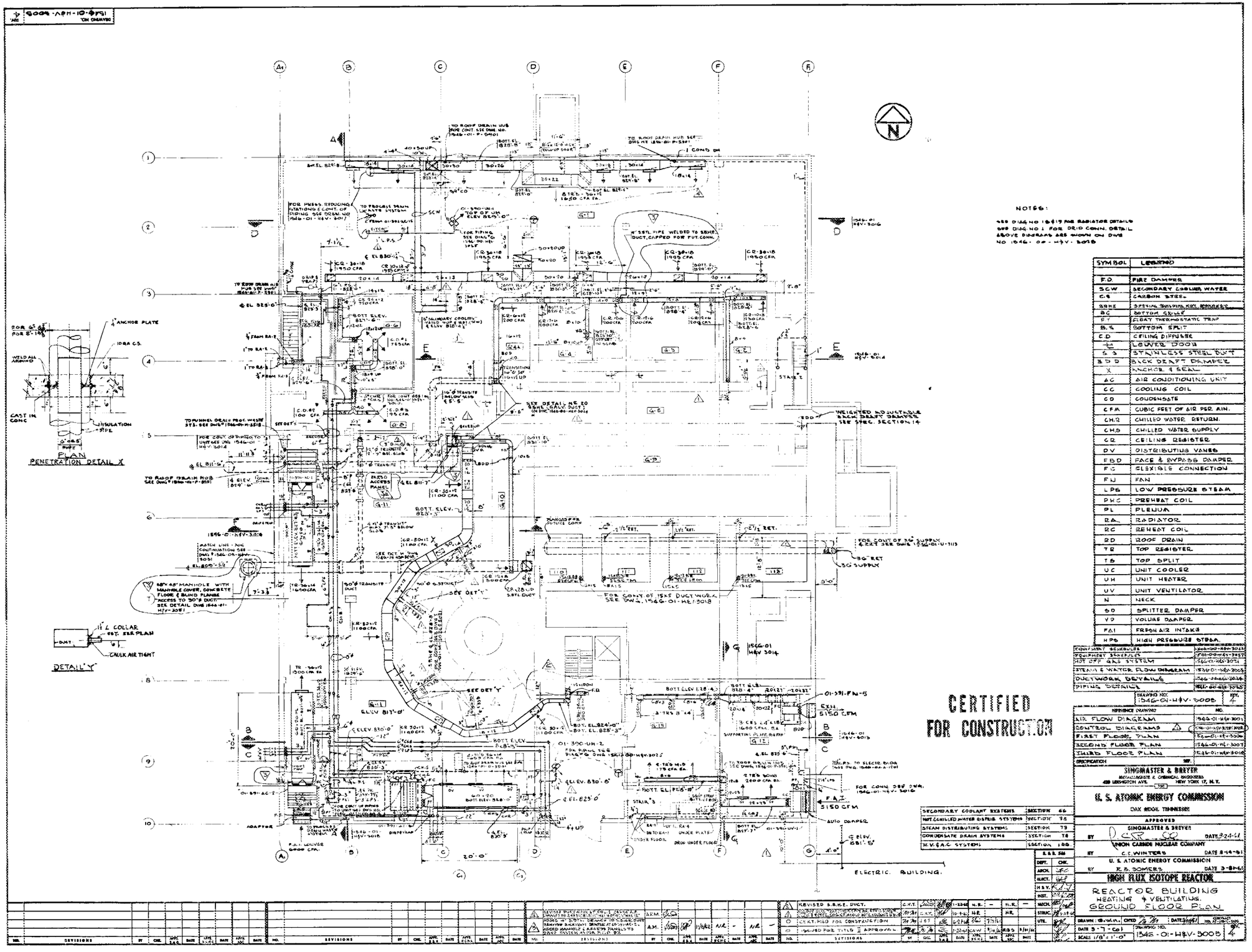
HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
HEATING & VENTILATING
SUB-PILE ROOM & ROOF PLAN

DRAWN JAM CHKD DATE 4/26/61 CONTRACT NO. 57-10-5-100
DATE 3/20/61 DRAWING NO. 1546-01-HEV-3004 REV. 3
SCALE 1/8" = 1'-0"

DEPT.	CHK.
ARCH.	
ELECT.	
H & V.	
INST.	
PIPING	
STRUC.	
UTIL.	

NO.	REVISIONS	BY	CHK.	APPR. ENG.	DATE	APPR. ARCH.	DATE	APPR. ELEC.	DATE	APPR. MEC.	DATE
1	DUCT WAS 8"x8" & SUPPORTS WAS 1"-BRL.	A.C.M.									
2	ROOF PLAN - LOCATED ROOF DRAIN, ELEV. DIM. SUPPORTS WAS 1"x1"x1/8" & ELIMINATED 1"x1/8"	C.N.T.									
3	SUB-PILE RM. - DIM. 11'x11" WAS 1'-8" (OUTSIDE DIM.) & 1'-4" (INSIDE DIM.) - ADDED 12"x10" DUCT UP FOR CONT. BATTS OMIT NO. 2 ADDED NOTE.	C.N.T.									
0	CERTIFIED FOR CONSTRUCTION										
0	ISSUED FOR TITLE 2 APPROVAL										

NO.	REVISIONS	BY	CHK.	APPR. ENG.	DATE	APPR. ELEC.	DATE	APPR. ARCH.	DATE	APPR. MEC.	DATE
1	SUB-PILE RM. - DIM. 11'x11" WAS 1'-8" (OUTSIDE DIM.) & 1'-4" (INSIDE DIM.) - ADDED 12"x10" DUCT UP FOR CONT. BATTS OMIT NO. 2 ADDED NOTE.	C.N.T.			4-12-61	N.R.	–	N.R.	–		
2	CERTIFIED FOR CONSTRUCTION					N.R.		N.R.			
0	ISSUED FOR TITLE 2 APPROVAL				4-12-61	C.E.W.	3-17-61	L.H.J.	5-26-61		



SYMBOL	LEGEND
F.D	FIRE DAMPER
SCW	SECONDARY COOLING WATER
C.S	CARBON STEEL
S.S.H.E	SPECIAL SHIELDING KOC. REQUIRED
B.C	BOTTOM SCALE
F.T	FLOAT THERMOSTATIC TRAP
B.S	BOTTOM SPLIT
C.D	CEILING DIFFUSER
	LOUVER DOOR
S.S	STAINLESS STEEL DUCT
B.D.D	BACK DRAFT DAMPER
X	ANCHOR & SEAL
A.C	AIR CONDITIONING UNIT
C.C	COOLING COIL
C.D	CONDENSATE
C.F.M	CUBIC FEET OF AIR PER MIN.
CH.R	CHILLED WATER RETURN.
CH.S	CHILLED WATER SUPPLY
C.R	CEILING REGISTER
D.V	DISTRIBUTING VANES
F.B.D	FACE & BYPASS DAMPER
F.C	FLEXIBLE CONNECTION
F.U	FAN
L.P.S	LOW PRESSURE STEAM
P.H.C	PREHEAT COIL
PL	PLENUM
R.A	RADIATOR
R.C	REHEAT COIL
R.D	ROOF DRAIN
T.R	TOP REGISTER
T.S	TOP SPLIT
U.C	UNIT COOLER
U.H	UNIT HEATER
U.V	UNIT VENTILATOR
N	NECK
S.D	SPLITTER DAMPER
V.D	VOLUME DAMPER
F.A.I	FRESH AIR INTAKE
H.P.S	HIGH PRESSURE STEAM

EQUIPMENT SCHEDULES	1546-01-H&V-3023
EQUIPMENT SCHEDULES	1546-01-H&V-3027
HOT OFF GAS SYSTEM	1546-01-H&V-3024
STEAM & WATER FLOW DIAGRAM	1546-01-H&V-3005
DUCTWORK DETAILS	1546-01-H&V-3014
PIPING DETAILS	1546-01-H&V-3015

DRAWING NO. 1546-01-H&V-3003 REV. 4

REFERENCE DRAWING	NO.
AIR FLOW DIAGRAM	1546-01-H&V-3001
CONTROL DIAGRAMS	1546-01-H&V-3028/3029
FIRST FLOOR PLAN	1546-01-H&V-3006
SECOND FLOOR PLAN	1546-01-H&V-3007
THIRD FLOOR PLAN	1546-01-H&V-3008
SPECIFICATION	NO.

SECONDARY COOLANT SYSTEMS	SECTION	66
HOT & CHILLED WATER DISTRIB. SYSTEMS	SECTION	72
STEAM DISTRIBUTING SYSTEMS	SECTION	73
CONDENSATE DRAIN SYSTEMS	SECTION	78
H.V. & A.C. SYSTEMS	SECTION	100

E & S. 566
DFT. CHK.
ARCH. JFC
ELECT. GLF
H&V. CJV
INST. CJV
MECH. GLF
STRUC. JFC
UTIL. GLF

SINGMASTER & BREYER
MECHANICAL-STATE & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

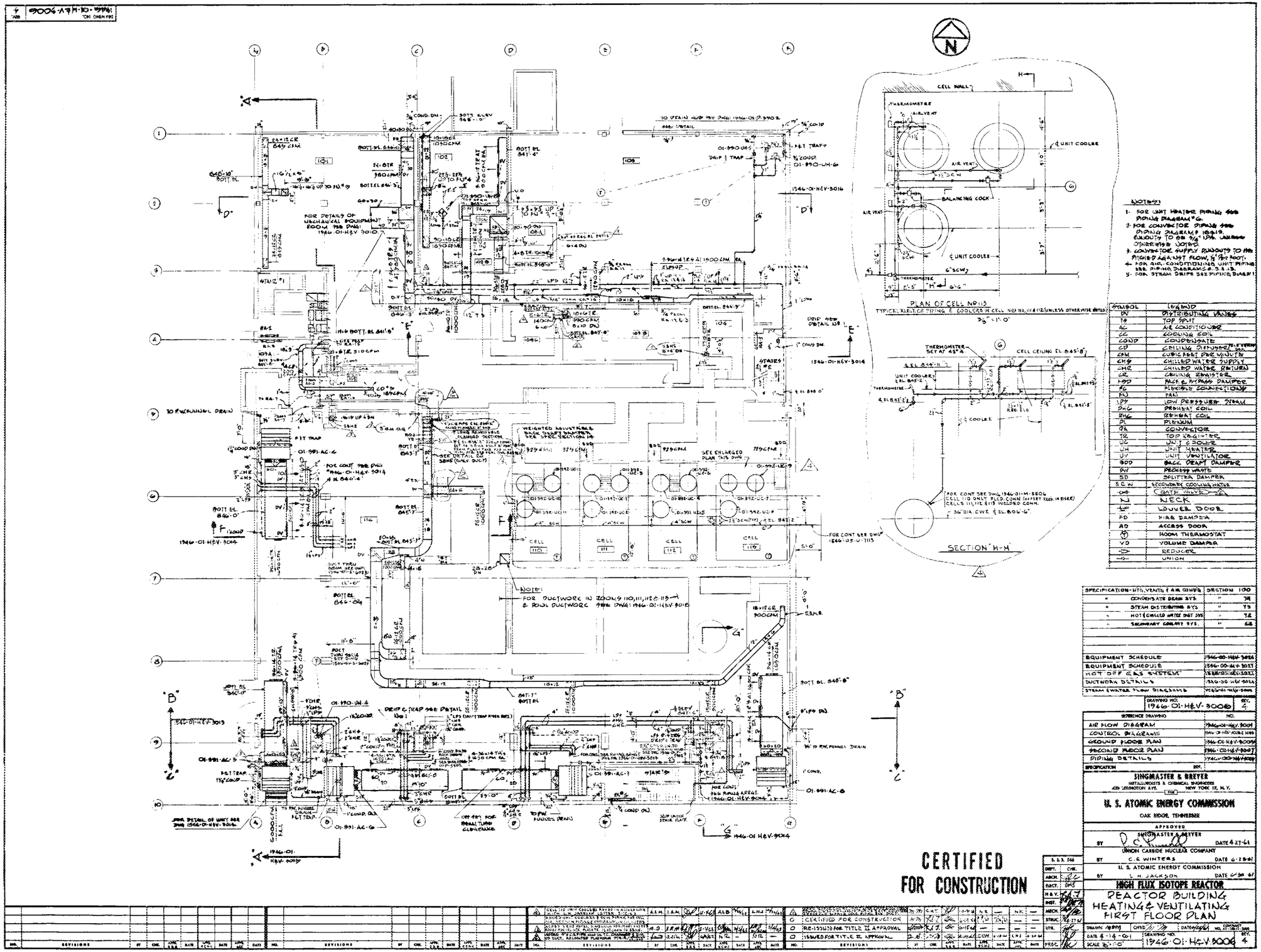
APPROVED
SINGMASTER & BREYER
BY D.C.R. DATE 9-24-61
UNION CARBIDE NUCLEAR COMPANY
BY C.C. WINTERS DATE 8-14-61
U. S. ATOMIC ENERGY COMMISSION
BY R.B. SOMERS DATE 3-8-61

HIGH FLUX ISOTOPE REACTOR

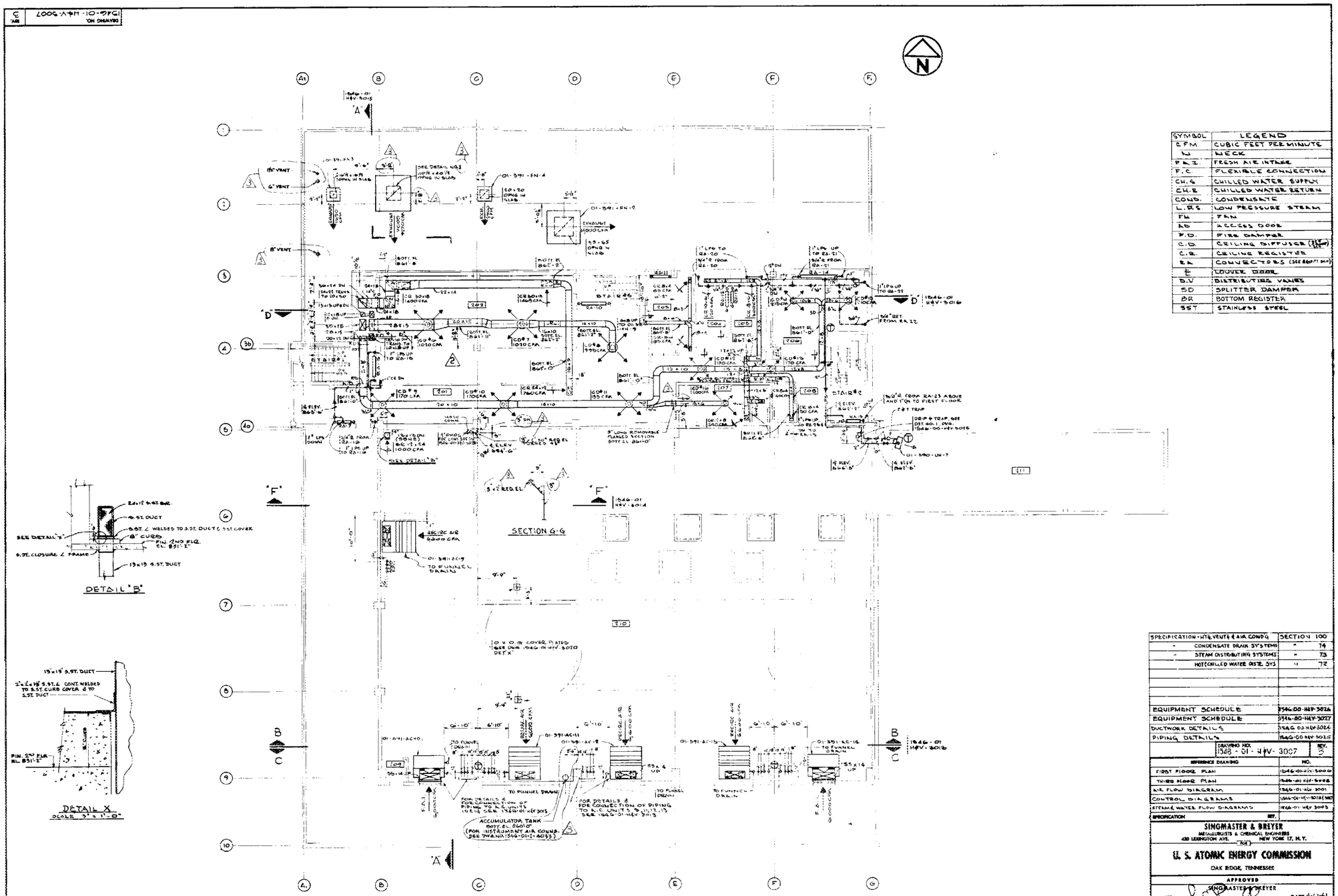
REACTOR BUILDING
HEATING & VENTILATING
GROUND FLOOR PLAN

DRAWN: B.W.M. CHKD. DATE 3-7-61
DRAWING NO. 1546-01-H&V-3003 REV. 4
SCALE 1/8"=1'-0"

NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. UCNC	DATE	APPR. ARC	DATE
4	REVISED S.S.H.E. DUCT.	G.V.T.			10-24-61	N.R.	—	N.R.	—
3	REVISED DUCTWORK & EQUIPMENT	G.V.T.			10-9-61	N.R.		N.R.	
2	REVISED DUCTWORK & EQUIPMENT	G.V.T.			6-27-61		7-7-61		
1	ISSUED FOR TITLE I APPROVAL				5-31-61		6-8-61		6-30-61
0	ISSUED FOR CONSTRUCTION				11-8-60		11-15-60		


PLAN OF CELL NO 113
TYPICAL ALL OF PIPING & COOLERS IN CELL NO 110, 111 & 112 UNLESS OTHERWISE NOTED
SECTION "H-H"
CERTIFIED FOR CONSTRUCTION
SINGMASTER & BREYER
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
UNION CARBIDE NUCLEAR COMPANY
HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
HEATING & VENTILATING
FIRST FLOOR PLAN
DRAWING NO. 1946-01-HEV-3006
SCALE 1/8"=1'0"

053



SYMBOL	LEGEND
CFM	CUBIC FEET PER MINUTE
W	NECK
F.A.I.	FRESH AIR INTAKE
F.C.	FLEXIBLE CONNECTION
CH.S	CHILLED WATER SUPPLY
CH.R	CHILLED WATER RETURN
COND.	CONDENSATE
L.P.S	LOW PRESSURE STEAM
FN	FAN
AD	ACCESS DOOR
F.D.	FIRE DAMPER
C.D.	CEILING DIFFUSER
C.R.	CEILING REGISTER
RA	CONVECTORS (SEE REF. DWG.)
⊥	LOUVER DOOR
D.V	DISTRIBUTING VANES
SD	SPLITTER DAMPER
BR	BOTTOM REGISTER
SST	STAINLESS STEEL

SPECIFICATION - HTG. VENT & AIR COND'G	SECTION 100
" CONDENSATE DRAIN SYSTEMS	" 74
" STEAM DISTRIBUTING SYSTEMS	" 73
" HOT & CHILLED WATER DIST. SYS	" 72
EQUIPMENT SCHEDULE	1546-00-HV-3026
EQUIPMENT SCHEDULE	1546-00-HV-3027
DUCTWORK DETAILS	1546-00-HV-3024
PIPING DETAILS	1546-00-HV-3025
DRAWING NO. 1546-01-HV-3007	REV. 3
REFERENCE DRAWING	NO.
FIRST FLOOR PLAN	1546-01-HV-3000
THIRD FLOOR PLAN	1546-01-HV-3008
AIR FLOW DIAGRAM	1546-01-HV-3001
CONTROL DIAGRAMS	1546-01-HV-3012 (MS)
STEAM & WATER FLOW DIAGRAMS	1546-01-HV-3003
SPECIFICATION	REF.

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
BY SINGMASTER & BREYER DATE 4-27-61
UNION CARBIDE NUCLEAR COMPANY
BY C.E. WINTERS DATE 6-28-61
U. S. ATOMIC ENERGY COMMISSION
BY H. H. JACKSON DATE 6-30-61

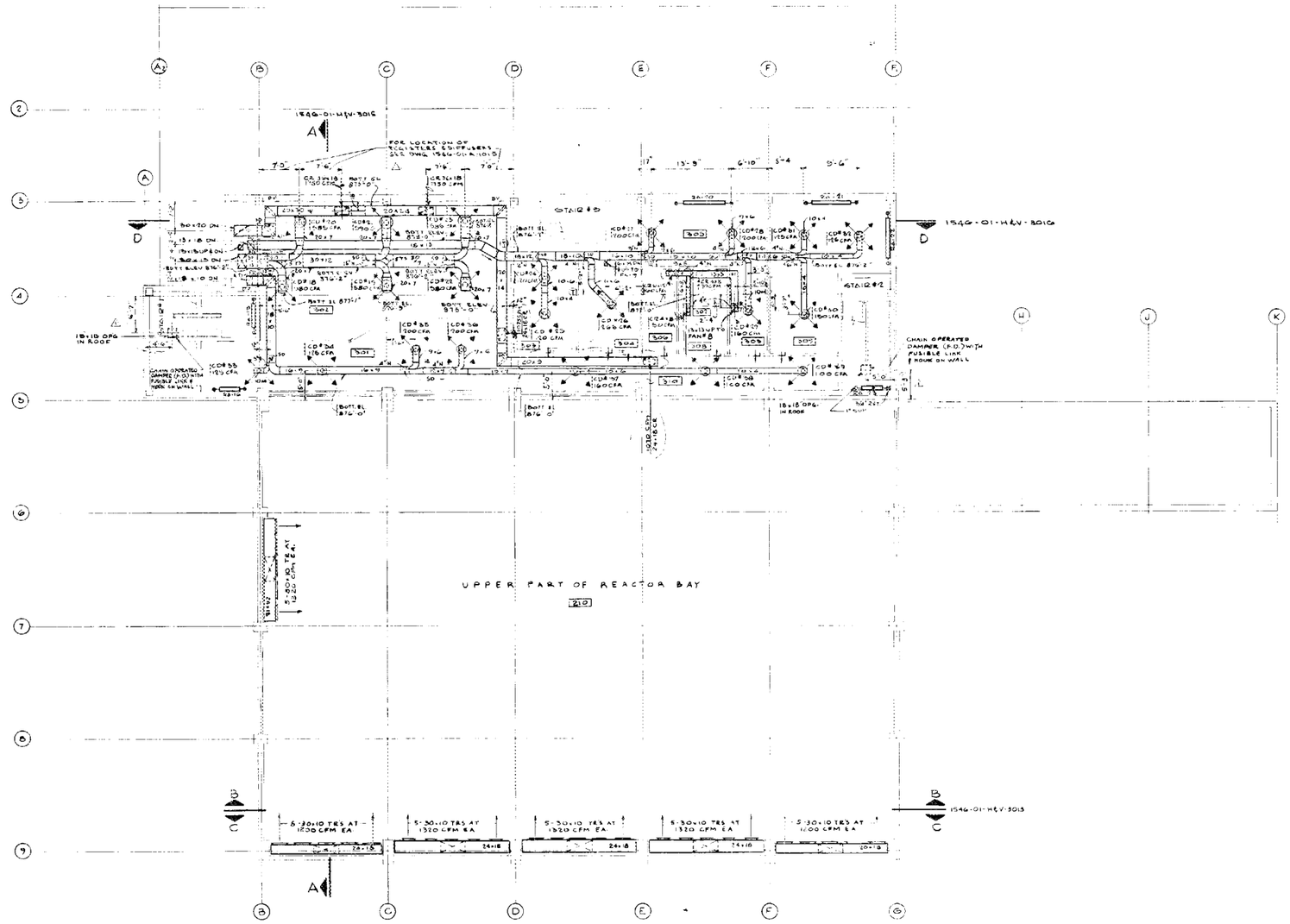
HIGH FLUX ISOTOPE REACTOR

REACTOR BUILDING
HEATING & VENTILATING
SECOND FLOOR PLAN

DRAWN G.W.N. CHKD. DATE 4-4-61
DATE 4-4-61 DRAWING NO. 1546-01-HV-3007 REV. 3
SCALE 1/8" = 1'-0"

NO.	REVISIONS	BY	CHK.	APPR. E&S	DATE	APPR. ECHC	DATE	APPR. ARC	DATE
1	RELOCATED ACCUMULATOR TANK PER DWG. 1546-01-HV-3013 AS PER FIELD REQUEST. PROVIDED VENTS THRU ROOF. ALL STY. PIPING CHANGED TO 5" RELOCATED UNION IN ROOM 207	FMD				N.R.	-	N.R.	-
2	RELOCATED DUCTWORK TO CLEAR ELEC. & PLUMBING INSTALL.	C.V.T.	A.N.M.		11-29-61	K.R.	-	N.R.	-
0	ISSUED FOR TITLE II APPROVAL								
3	ADDED DOUBLE DAMPER, REV. 4-6. CHGD. PIPE SIZE, DIM. & REF. DWG. CLEARED DUCTWORK								
2	CERTIFIED FOR CONSTRUCTION								
1	REISSUED FOR TITLE II APPROVAL								
0	ISSUED FOR TITLE II APPROVAL								

S.&B.S. 546	
DEPT.	CHK.
ARCH.	
ELECT.	
H.&V.	
INST.	
MECH.	
STRUC.	
UTIL.	



SYMBOL	LEGEND
A.D	ACCESS DOOR
C.D	CEILING DIFFUSER (SEE EQUIPT SCH)
C.R.	CEILING REGISTER
F.D	FIRE DAMPER
R.A	CONVECTOR (SEE EQUIPT. SCH.)
C.F.M.	CUBIC FEET PER MINUTE
FN	FAN
N	NECK
(T)	THERMOSTAT
	LOUVER DOOR
DV	DISTRIBUTING VANES
T.R.	TOP REGISTER
T.S.	TOP SPLIT
S.D	SPLITTER DAMPER

H.V.&A.C.	SECTION 100
CONDENSATE DRAIN SYSTEMS	" 74
STEAM DISTRIBUTING SYSTEMS	" 73
HOT & CHILLED WATER DISTR. SYS.	" 72

EQUIPMENT SCHEDULES	1546-00-H&V-3050
EQUIPMENT SCHEDULES	1546-00-H&V-3027
AIR FLOW DIAGRAM	1546-01-H&V-3001
CONTROL DIAGRAMS	1546-01-H&V-3025 & 3026
DUCTWORK DETAILS	1546-00-H&V-3024
PIPING DETAILS	1546-00-H&V-3023

DRAWING NO. 1546-01-H&V-3008 REV. 1

REFERENCE DRAWING	NO.
SECOND FLOOR PLAN	1546-01-H&V-3007
ROOF PLAN	1546-01-H&V-3009
REFLECTED CEILING PLANS & DETAILS	1546-01-A-1018
FIRST FLOOR PLAN	1546-01-H&V-3006
STEAM & WATER FLOW DIAGRAM	1546-01-H&V-3005
SPECIFICATION	REF.

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

FOR

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
BY SINGMASTER & BREYER DATE 4-27-61
UNION CARBIDE NUCLEAR COMPANY
BY C.E. WINTERS DATE 5-18-61
U. S. ATOMIC ENERGY COMMISSION
BY L.H. JACKSON DATE 5-26-61

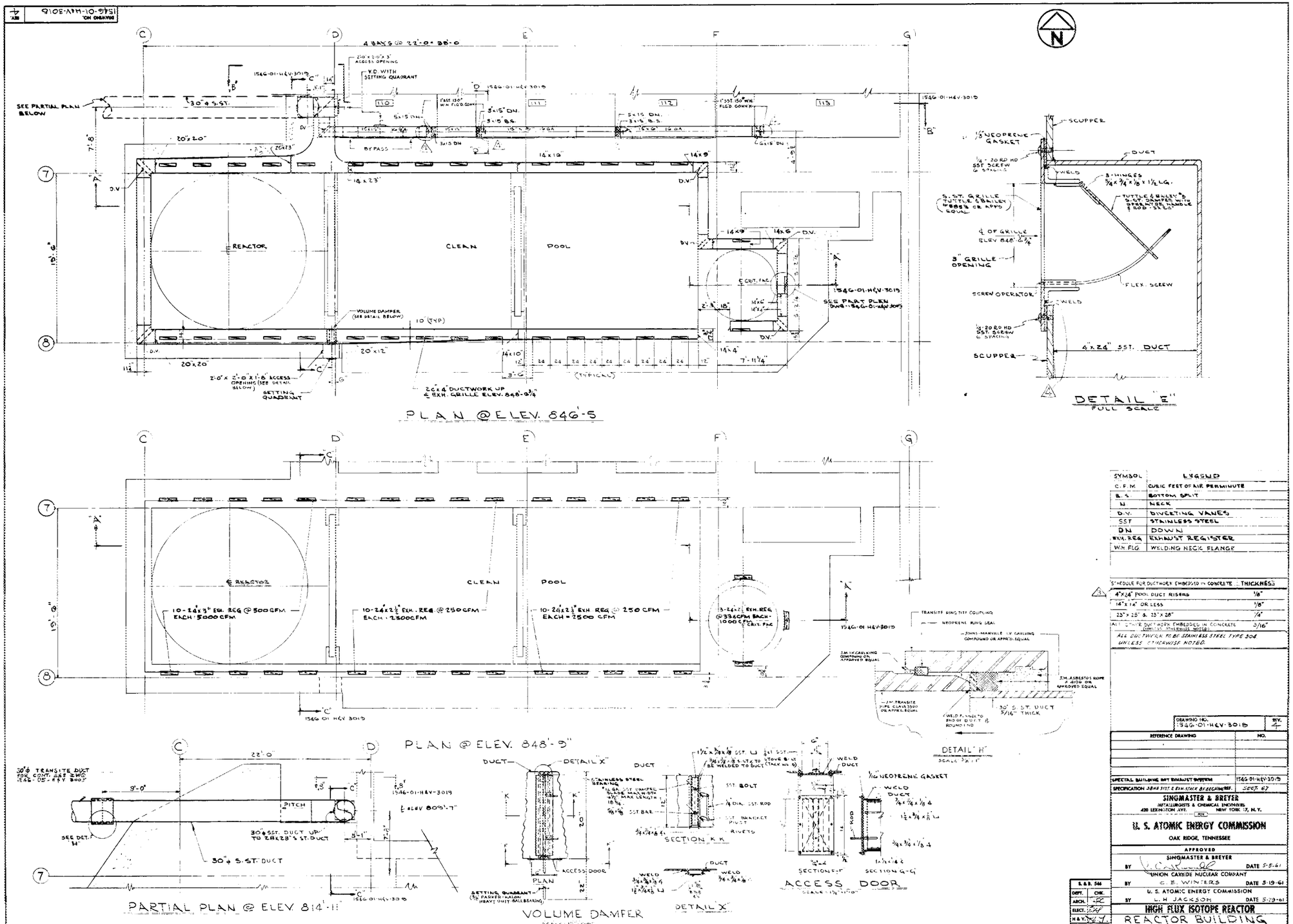
HIGH FLUX ISOTOPE REACTOR

REACTOR BUILDING
HEATING & VENTILATING
THIRD FLOOR PLAN.

S. & B. 546	
DEPT.	CHK.
ARCH.	
ELECT.	
H.&V.	
INST.	
MECH.	
STRUC.	
UTIL.	

DRAWING NO. M-1 | CHKD | DATE 6/11/61 | CONTRACT NO. AT-58-01-268
DATE 6/7/61 | DRAWING NO. 1546-01-H&V-3008 | REV. 1
SCALE 1/8" = 1'-0"

NO.	REVISIONS	BY	CHK.	APPR. S.&B.	DATE	APPR. U.C.N.C.	DATE	APPR. U.S.	DATE
1	INCORPORATE REVISIONS PER FUSIBLE LINK DOOR VENTS PER AIR FLOW DIAGRAM REFERENCED ON DWG.								
0	CERTIFIED FOR CONSTRUCTION								
0	ISSUED FOR TITLE I APPROVAL								



SYMBOL	LEGEND
C.F.M.	CUBIC FEET OF AIR PER MINUTE
B.S.	BOTTOM SPLIT
N	NECK
D.V.	DIVERTING VANES
SST	STAINLESS STEEL
DN	DOWN
EXH. REG	EXHAUST REGISTER
W.N. FLG	WELDING NECK FLANGE

SCHEDULE FOR DUCTWORK EMBEDDED IN CONCRETE	THICKNESS
4"x24" POOL DUCT RISERS	1/8"
14"x14" OR LESS	1/8"
23"x23" & 23"x28"	1/4"
ALL OTHER DUCTWORK EMBEDDED IN CONCRETE (UNLESS OTHERWISE NOTED)	3/16"

ALL DUCTWORK TO BE STAINLESS STEEL TYPE 304 UNLESS OTHERWISE NOTED.

DRAWING NO. 1546-01-HAV-3018 REV. 4

REFERENCE DRAWING	NO.
SPECIAL BUILDING HOT EXHAUST SYSTEM	1546-01-HAV-3019
SPECIFICATION 38H8 SYST. & EXH. STACK BY ELECTRIC REF.	SEPT. 67

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

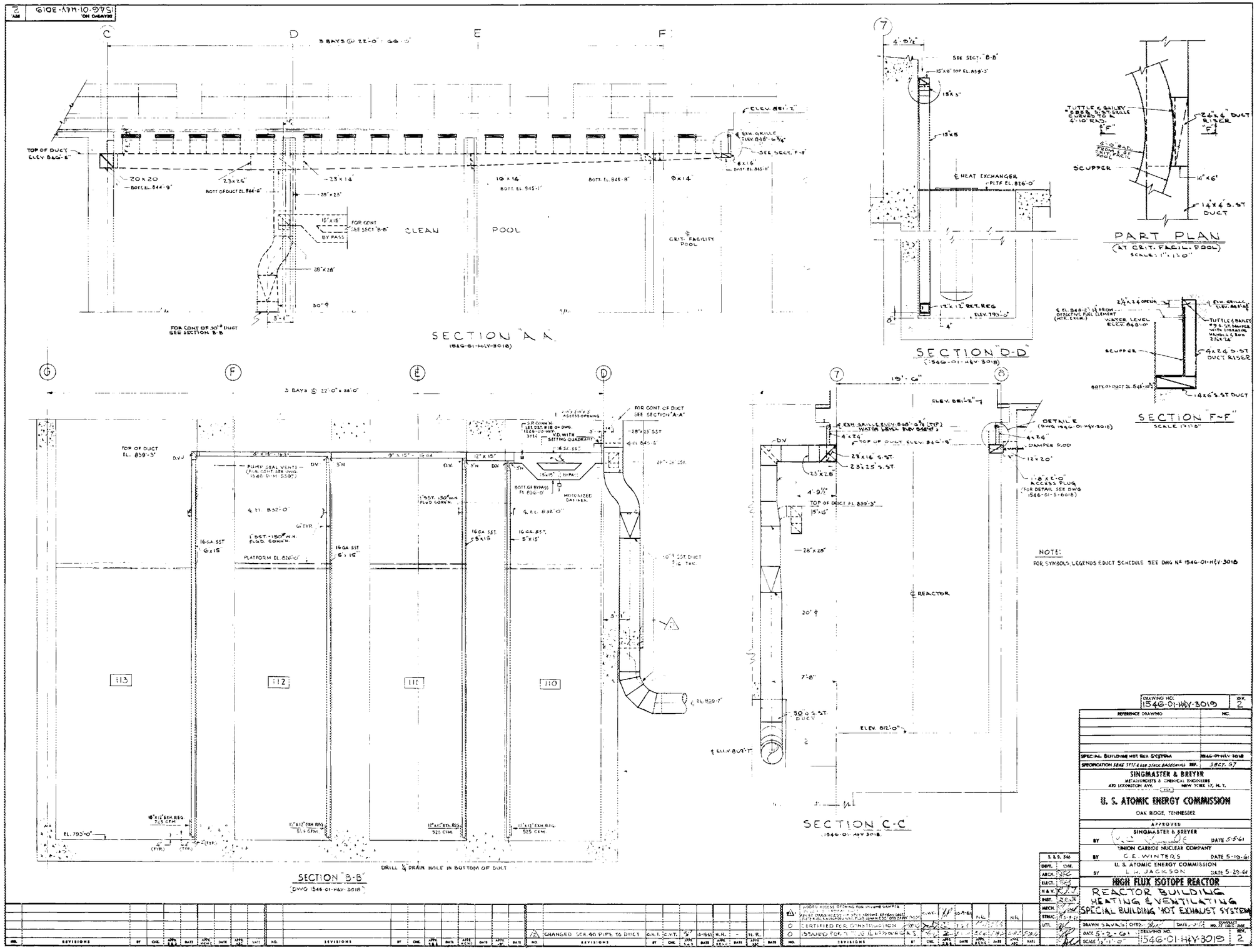
APPROVED
SINGMASTER & BREYER BY C. C. [illegible] DATE 5-5-61
UNION CARBIDE NUCLEAR COMPANY BY C. E. WINTERS DATE 5-19-61
U. S. ATOMIC ENERGY COMMISSION BY L. H. JACKSON DATE 5-29-61

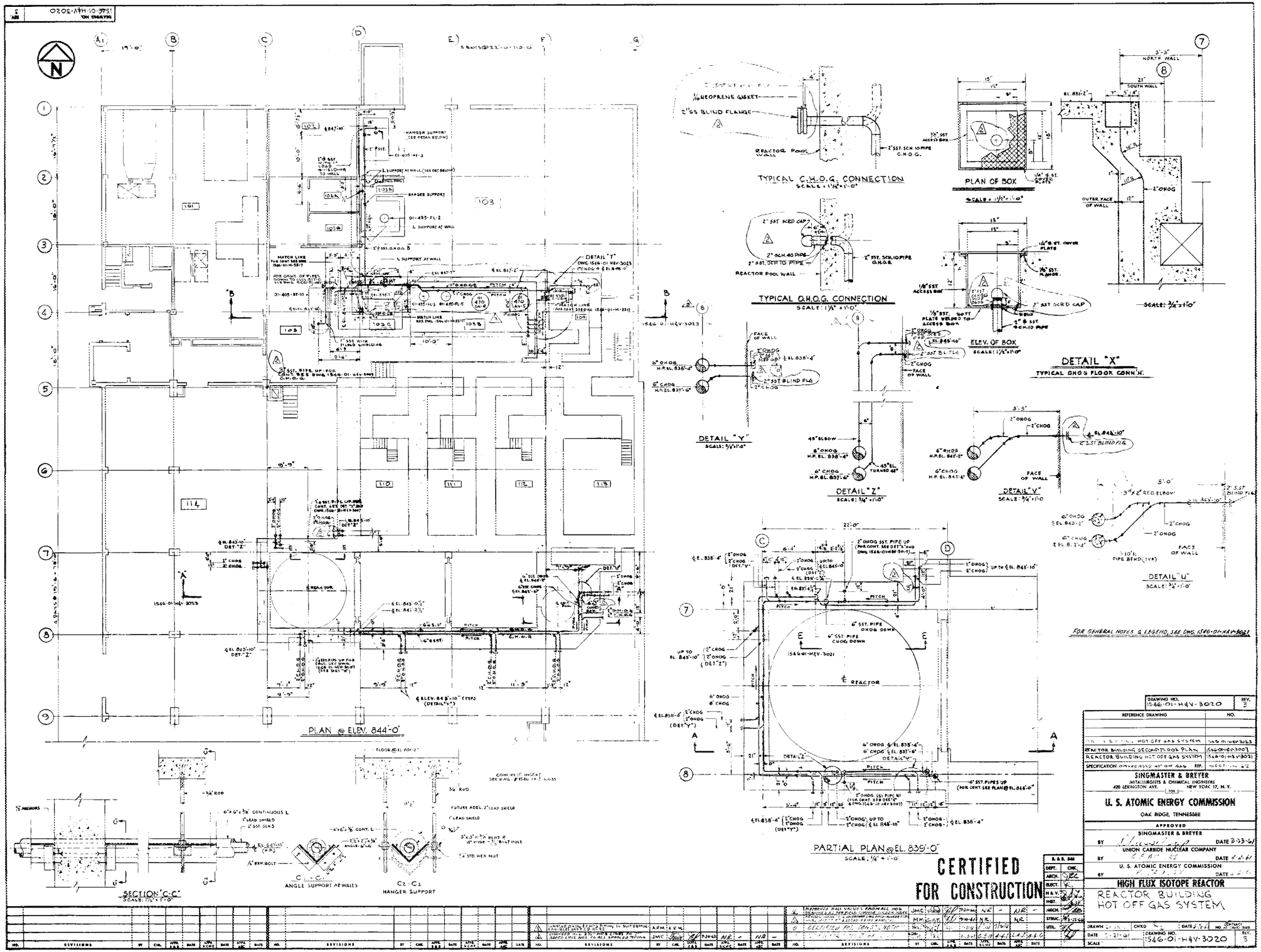
HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
HEATING & VENTILATING
SPECIAL BUILDING HOT EXHAUST SYSTEM

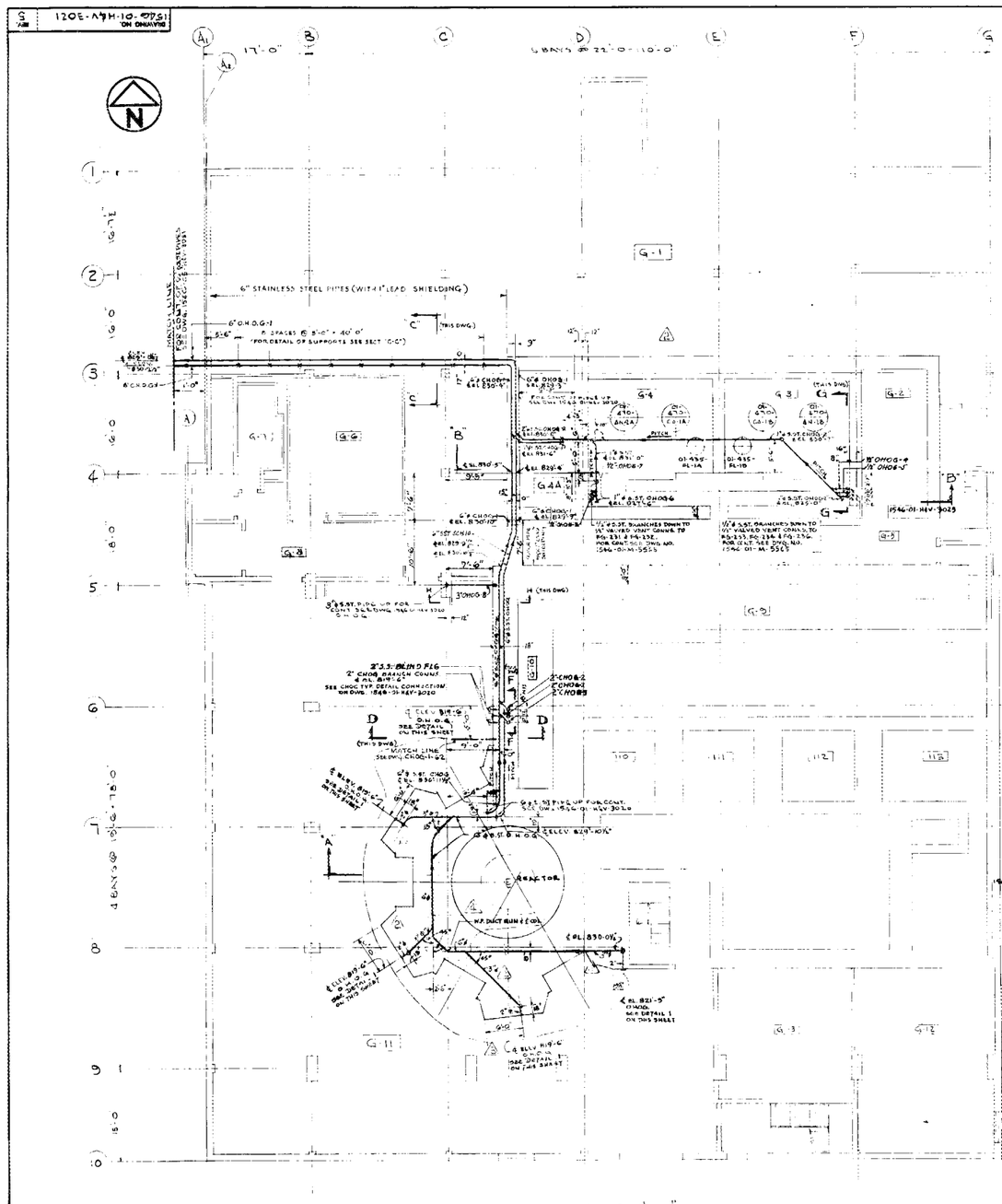
S.&B. 546	
DEPT.	CHK.
ARCH.	RC
ELECT.	SM
H&V.	SJ
INST.	GL
MECH.	
STRUC.	
UTH.	

DRAWN SAVAS CHKD. DATE 5-2-61 DRAWING NO. 1546-01-HAV-3018 REV. 4
SCALE 1/8"=1'-0" NO. 27-1801-3600

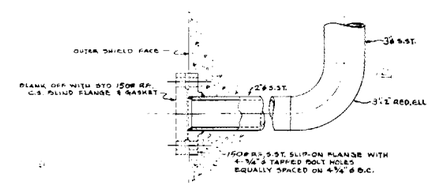
NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. UCNC	DATE	APPR. AEC	DATE
4	CHANGED SCH 40 PIPE TO DUCT 3/16 THK.	C.V.T.	C.V.T.		10-19-61	N.R.	—	N.R.	—
3	REVISED PLAN LEFT SIDE OF BUILDING ADDED ELEV. SECTION & DETAILS	IAM	C.V.T.		10-9-61	N.R.		N.R.	
2	CERTIFIED FOR CONSTRUCTION								
1	ISSUED FOR TITLE II APPROVAL	A.S.							


SECTION "A-A"
(1546-01-HEV-3018)
SECTION "B-B"
(DWG 1546-01-HEV-3018)
SECTION "C-C"
(1546-01-HEV-3018)
SECTION "D-D"
(1546-01-HEV-3018)
PART PLAN
(AT CRIT. FACIL. POOL)
SCALE: 1" = 1'-0"
SECTION "F-F"
SCALE: 1" = 1'-0"
CLEAN POOL
CRIT. FACILITY POOL
REACTOR
NOTE:
FOR SYMBOLS, LEGENDS & DUCT SCHEDULE SEE DWG No 1546-01-HEV-3018
DRILL ¼ DRAIN HOLE IN BOTTOM OF DUCT
SPECIAL BUILDING HOT EXH. SYSTEM
SINGMASTER & BREYER
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
UNION CARBIDE NUCLEAR COMPANY
HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
HEATING & VENTILATING
SPECIAL BUILDING HOT EXHAUST SYSTEM
DRAWING NO. 1546-01-HEV-3019
REV. 2

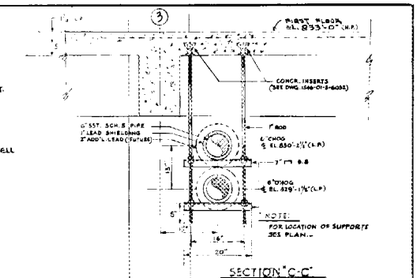

PLAN @ ELEV. 844'-0"
PARTIAL PLAN @ EL. 839'-0"
SCALE: 1/4" = 1'-0"
TYPICAL C.H.O.G. CONNECTION
SCALE: 1 1/2" = 1'-0"
TYPICAL O.H.O.G. CONNECTION
SCALE: 1 1/2" = 1'-0"
PLAN OF BOX
ELEV. OF BOX
DETAIL "X"
TYPICAL OHOG FLOOR CONN'N.
DETAIL "Y"
DETAIL "Z"
DETAIL "V"
DETAIL "U"
SECTION "C-C"
C1 - C1
ANGLE SUPPORT AT WALLS
C2 - C2
HANGER SUPPORT
REACTOR
REACTOR POOL WALL
NORTH WALL
SOUTH WALL
OUTER FACE OF WALL
FACE OF WALL
FOR GENERAL NOTES & LEGEND, SEE DWG. 1546-01-H&V-3021
CERTIFIED FOR CONSTRUCTION
DRAWING NO. 1546-01-H&V-3020
REV. 3
REFERENCE DRAWING
REACTOR BUILDING SECOND FLOOR PLAN
REACTOR BUILDING HOT OFF GAS SYSTEM
SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
APPROVED
SINGMASTER & BREYER
UNION CARBIDE NUCLEAR COMPANY
U. S. ATOMIC ENERGY COMMISSION
HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
HOT OFF GAS SYSTEM
DRAWN
CHKD
DATE
SCALE
DRAWING NO. 1546-01-H&V-3020
REV. 3



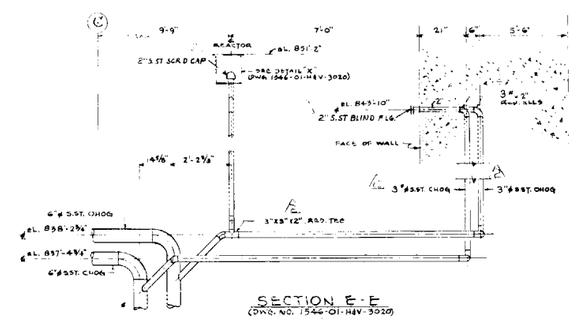
PLAN @ ELEV. 817'-0"



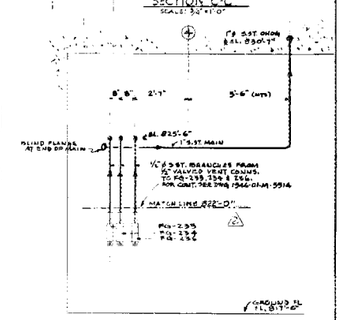
DETAIL 1
OHOG CONNECTION IN BEAM ROOM
SCALE 3"=1'-0"
(FOR TYP. OHOG & CHOG CONNS. SEE DWG. 1546-01-H&V-3020)



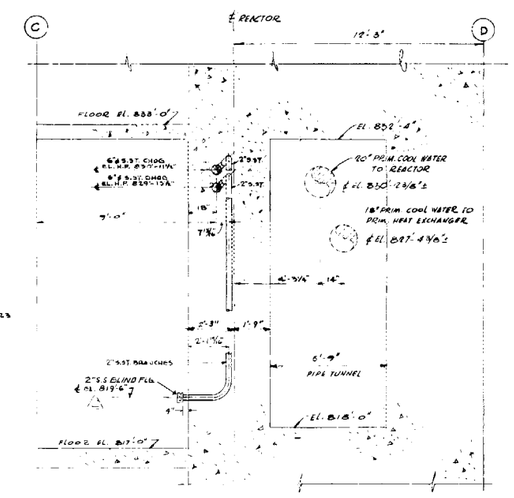
SECTION "C-C"
SCALE 3/8"=1'-0"



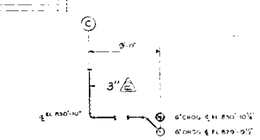
SECTION E-E
(DWG. NO. 1546-01-H&V-3020)
SCALE 1/2"=1'-0"



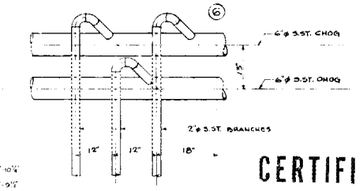
SECTION G-G
SCALE 3/8"=1'-0"



SECTION D-D
SCALE 3/8"=1'-0"



SECTION H-H
NO SCALE



SECTION F-F
SCALE 3/4"=1'-0"

SYMBOL	LEGEND
O.H.O.G.	OPEN HOT OFF-GAS
C.H.O.G.	CLOSED HOT OFF-GAS
S.ST.	STAINLESS STEEL
H.P.	HIGH POINT

GENERAL NOTES:

1- WHERE POSSIBLE USE LONG RADIUS BENDS INSTEAD OF STD. WELD ELLS. ALL PIPE BENDS SHALL HAVE A MINIMUM BENDING RADIUS EQUAL TO 5X NOMINAL PIPE DIAMETER.
2- EXCEPT WHERE OTHERWISE NOTED, PIPE PITCH SHALL BE 1" IN 40'-0" IN THE DIRECTION OF FLOW.
3- ALL H.O.G. PIPING EMBEDDED IN CONCRETE SHALL BE SST. 304 L - SCHEDULE 10. ALL OTHER H.O.G. PIPING SHALL BE SST. 304 L - SCHEDULE 5 UNLESS OTHERWISE NOTED

CERTIFIED FOR CONSTRUCTION

REFERENCE DRAWING	NO.
REACTOR BUILDING HOT OFF GAS SYSTEM	1546-01-H&V-3019
REACTOR BUILDING HOT OFF GAS SYSTEM	1546-01-H&V-3020
SPECIFICATION H.O.T. EXH. GAS SYS. REF.	SECT. 62

DRAWING NO. 1546-01-H&V-3021 REV. 5

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER BY [signature] DATE 3-13-61
UNION CARBIDE NUCLEAR COMPANY BY C.E. WINTERS DATE 4-4-61
U. S. ATOMIC ENERGY COMMISSION BY L.H. JACKSON DATE 4-6-61

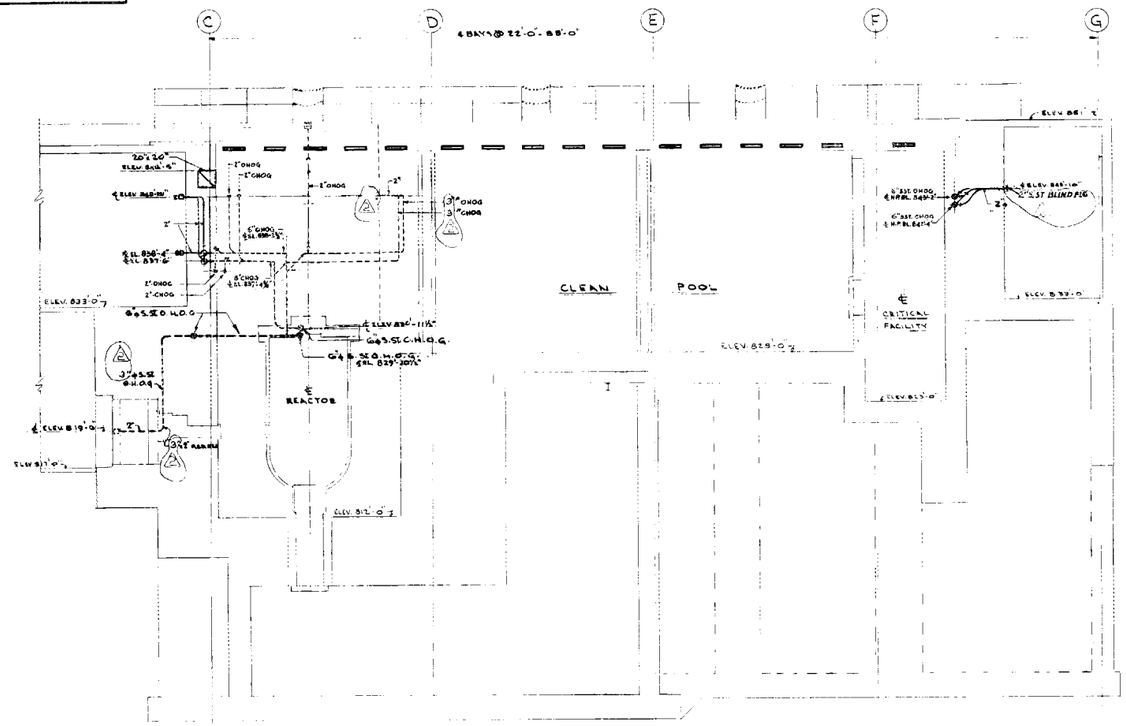
HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
HOT OFF GAS SYSTEM

E.&B. 546	
DEPT.	CHK.
ELEC.	
H.&V.	
INST.	
MECH.	
STRUC.	
UTIL.	

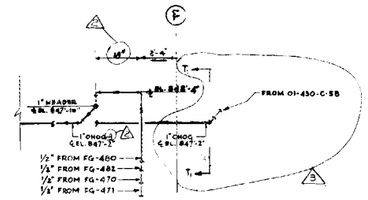
DRAWN SAV.A.S. CHKD [illegible] DATE 7-5-60 APP. AT CRITICAL PATH
DATE 2-28-60 DRAWING NO. 1546-01-H&V-3021 REV. 5
SCALE 1/8"=1'-0"

NO.	REVISIONS	BY	CHK.	APPR. E&B	DATE	APPR. ECNS	DATE	APPR. MFG.	DATE
4	REVISED BRANCHES								
3	REVISED RUN OF 2"d S.ST. OHOG DUCT	EMD	[illegible]	[illegible]	11/16/60	N.R.	—	N.R.	—
2	CORRECTED REACTOR SHIELD OUTLINE AND OHOG PIPING LAYOUT	JPC	[illegible]	[illegible]	[illegible]	N.R.	—	N.R.	—
1	CHANGED ALL 3/4" HOR. LINES TO 3/4" ABOVE NORMAL FLOOR, ADDED BLIND FLANGE	JPC	[illegible]	[illegible]	12-29-60	N.R.	—	N.R.	—

NO.	REVISIONS	BY	CHK.	APPR. E&B	DATE	APPR. ECNS	DATE	APPR. MFG.	DATE
4	REMOVED RAD. VALVES FROM ATMOS. & ADDED 1" VALVED VENT CONNS. TO REACTOR	JPC	[illegible]	[illegible]	7-29-60	N.R.	—	N.R.	—
3	[illegible]	EMD	[illegible]	[illegible]	10-7-60	N.R.	—	N.R.	—
2	CORRECTION FOR CONSTRUCTION	EMD	[illegible]	[illegible]	7-21-60	—	—	—	—
1	ISSUED FOR FIT-UP & APPROVAL	[illegible]	[illegible]	[illegible]	7-12-60	C.E.W.	7-14-61	L.H.J.	7-16-61

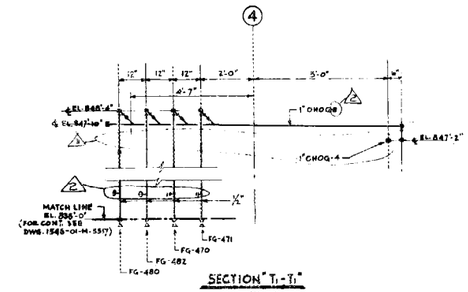


SECTION "A-A" (1546-01-H&V-3020 & 3021)



DETAIL "T"

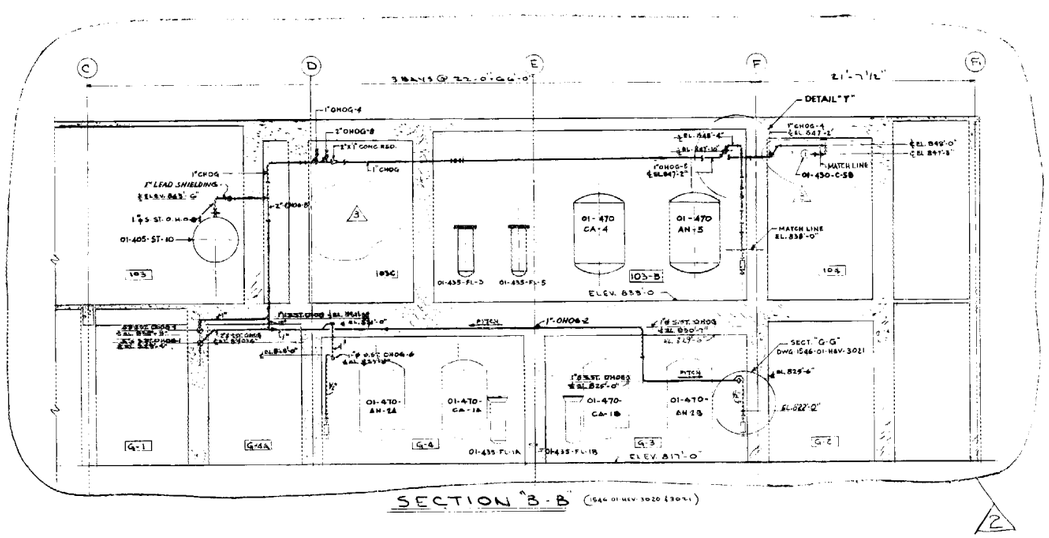
SCALE: 1/2" = 1'-0"



SECTION "T_1-T_1"

SCALE: 1/2" = 1'-0"

NOTE
1 - FOR GENERAL NOTES & LEGEND SEE DWG. NO. 1546-01-H&V-3021



SECTION "B-B" (1546-01-H&V-3020 & 3021)

CERTIFIED FOR CONSTRUCTION

NO.	REVISIONS	BY	CHK.	APPR. E.&A.	DATE	APPR. MECH.	DATE	APPR. ARC.	DATE
2	CONSIDERABLE CHANGES PRINC. TO SUIT DEMONSTRATION PLANT T.T.C. 01-HL-15	A.E.M.	A.E.M.	[illegible]	[illegible]	N.R.	-	N.R.	-
1	CHANGED ALL 2" & NOW CONES TO 2" STANDARD UNIVERSAL TRAP & SPECIAL FITTINGS	JMC	[illegible]	[illegible]	[illegible]	N.R.	-	N.R.	-

NO.	REVISIONS	BY	CHK.	APPR. E.&A.	DATE	APPR. MECH.	DATE	APPR. ARC.	DATE
3	APPROVED FOR CONSTRUCTION UNANALYZED FOR FIELD CONNECTIONS UNDER 1000	JMC	[illegible]	[illegible]	7-24-61	N.R.	-	N.R.	-
2	CONNECTION DIMENSION PROVIDED TO SUIT ADJACENT ELEV. & EXPL. N.R.	MM	C.W.T.	[illegible]	10-26-61	N.R.		N.R.	
1	CERTIFIED FOR CONSTRUCTION	PWD	[illegible]	[illegible]	7-21-61	[illegible]	[illegible]		
0	ISSUED FOR THE II APPROVAL	[illegible]	[illegible]	[illegible]	3-13-61	CGW	4-6-61	LNJ	4-6-61

S. & B. 546	
DIST.	CHK.
ARCH.	
ELECT.	
H.&V.	
ENGT.	
MECH.	
STRUC.	
UTIL.	

DRAWING NO. 1546-01-H&V-3023 REV. 3

REFERENCE DRAWING	NO.
REACTOR BUILDING HOT OFF GAS SYSTEM	~~1546-01-H&V-3020~~
REACTOR BUILDING HOT OFF GAS SYSTEM	1546-01-H&V-3021
SPECIFICATION HOT OFF GAS SYSTEMS REF.	SECTION G2

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N. Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED

BY SINGMASTER & BREYER DATE 3-13-61
UNION CARBIDE NUCLEAR COMPANY
BY C. E. WINTERS DATE 4-4-61
U. S. ATOMIC ENERGY COMMISSION
BY L. H. JACKSON DATE 4-6-61

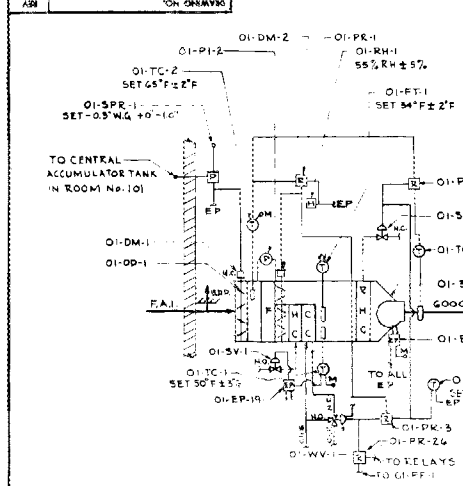
HIGH FLUX ISOTOPE REACTOR

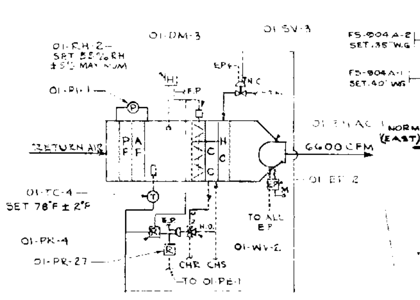
REACTOR BUILDING
HOT OFF GAS SYSTEM

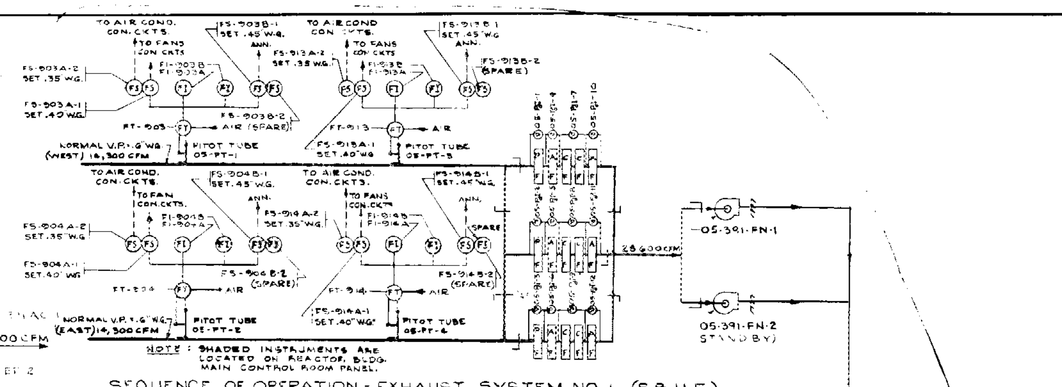
DRAWN S.N.V.&S	CHKD [illegible]	DATE [illegible]			
DATE 5-10-61	DRAWING NO. 1546-01-H&V-3023				REV. 3
SCALE 1/2" = 1'-0"					

060

REV.	DRAWING NO.
1	1546-01-H&V-3028







SEQUENCE OF OPERATION-A.C. SYST. No. 1

SEQUENCE THE SAME FOR SYST. Nos 2 & 3 EXCEPT FOR CORRESPONDING CONTROL ITEM Nos. SEE SCHEDULE BELOW.

100% F.A.I. A.C. UNIT NO. 01-391-AC-2

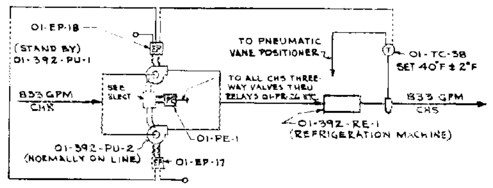
THIS UNIT SHALL HAVE A START-STOP SWITCH AND SHALL THRU PRESSURE SWITCHES FS-903A-2, FS-913A-2, FS-904A-2 OR FS-914A-2 BE DE-ENERGIZED WHEN THE FLOW IN EITHER EXHAUST MAIN UPSTREAM OF THE S.B.H.E. FILTER PIT CAN NOT BE MAINTAINED NORMAL WITH THE S.B.H.E. EXHAUST FANS 05-391-FN-1 AND/OR 05-391-FN-2, OR WHEN SAME FANS ARE NOT OPERATING. WHEN THE A.C. UNIT FAN BECOMES DEENERGIZED THE F.A.I. DAMPER 01-OD-1 SHALL CLOSE, MODULATING WATER VALVE 01-WV-1 SHALL OPEN, MODULATING STEAM VALVE 01-SV-2 SHALL CLOSE; STATIC PRESSURE REGULATOR 01-SPR-1 SHALL CONTROL THE MODULATING DAMPER MOTOR 01-DM-1 TO MAINTAIN +0.5" WG PRESSURE IN THE ROOM SERVED. THE ADJUSTABLE GRAVITY RELIEF DAMPER SHALL OPEN ON A NEGATIVE PRESSURE GREATER THAN -.4" W.G. TEMPERATURE CONTROLLER 01-TC-2 SHALL THRU PNEUMATIC RELAYS 01-PR-1 AND 01-PR-2 SELECT SUMMER OR WINTER OPERATION.

WINTER OPERATION:
TEMPERATURE CONTROLLER 01-TC-1 SHALL THRU ELECTRIC PNEUMATIC RELAY 01-EP-19 CONTROL THE MODULATING STEAM VALVE 01-SV-1 TO MAINTAIN THE SET PREHEAT COIL LEAVING AIR TEMPERATURE. ROOM THERMOSTAT 01-RT-1 SHALL IN CONJUNCTION WITH THE LOW LIMIT TEMPERATURE CONTROLLER 01-TC-3 CONTROL MODULATING STEAM VALVE 01-SV-2 TO MAINTAIN THE ROOM SET TEMPERATURE AND SUPPLY AIR MINIMUM TEMPERATURE RESPECTIVELY. FREEZE PROTECTION THERMOSTAT 01-FT-1 SHALL ACTUATE THE LOCAL ALARM WHEN THE TEMPERATURE FALLS BELOW ITS SET POINT AND THRU RELAY 01-EP-19 OPEN FULLY STEAM VALVE 01-SV-1.

SUMMER OPERATION:
ROOM THERMOSTAT 01-RT-1 SHALL IN SEQUENCE THRU PNEUMATIC RELAY 01-PR-3, CONTROL THE MODULATING WATER VALVE 01-WV-1 AND THE MODULATING STEAM VALVE 01-SV-2 TO MAINTAIN THE ROOM SET TEMPERATURE. THE LOW LIMIT TEMPERATURE CONTROLLER 01-TC-3 SHALL THRU RELAY 01-PR-2 BECOME INOPERATIVE. HUMIDISTAT 01-RH-1 SHALL ON A RISE IN HUMIDITY ABOVE THE SET POINT, CONTROL THE BY PASS DAMPER MOTOR 01-DM-2 TO CLOSE THE BY PASS DAMPER AND ON A CONTINUED RISE IN HUMIDITY SHALL OVERRIDE ROOM THERMOSTAT 01-RT-1 AND CONTROL THE MODULATING WATER VALVE TO MAINTAIN THE RELATIVE HUMIDITY AT ITS SET POINT. AT THIS TIME THE ROOM THERMOSTAT 01-RT-1 SHALL OPEN THE STEAM VALVE 01-SV-2 TO PROVIDE REHEAT AND MAINTAIN RELATIVE HUMIDITY. A CALL FOR OPENING WATER VALVE 01-WV-1 THRU RELAY 01-PR-26 SHALL START THE CHILLED WATER PUMP (SEE CHILLED WATER PUMP CONTROL DIAGRAM).

100% RETURN AIR A.C. UNIT NO. 01-391-AC-1

THIS UNIT SHALL HAVE A START-STOP SWITCH. TEMPERATURE CONTROLLER 01-TC-4 IN THE RETURN AIR SHALL CONTROL IN SEQUENCE THE MODULATING STEAM VALVE 01-SV-3 AND THE MODULATING WATER VALVE 01-WV-2 TO MAINTAIN THE SET TEMP. HUMIDISTAT 01-RH-2 IN THE RETURN AIR SHALL ON A RISE ABOVE THE SET POINT CONTROL THE BY-PASS DAMPER MOTOR TO CLOSE THE BY PASS DAMPER AND ON A CONTINUED RISE SHALL OVERRIDE THE TEMPERATURE CONTROLLER 01-TC-4 THRU RELAY 01-PR-4 AND CONTROL THE MODULATING WATER VALVE TO MAINTAIN THE RELATIVE HUMIDITY AT ITS SET POINT. A CALL FOR OPENING WATER VALVE 01-WV-2 SHALL THRU RELAY 01-PR-27, START THE CHILLED WATER PUMP (SEE CHILLED WATER PUMP CONTROL DIAGRAM).

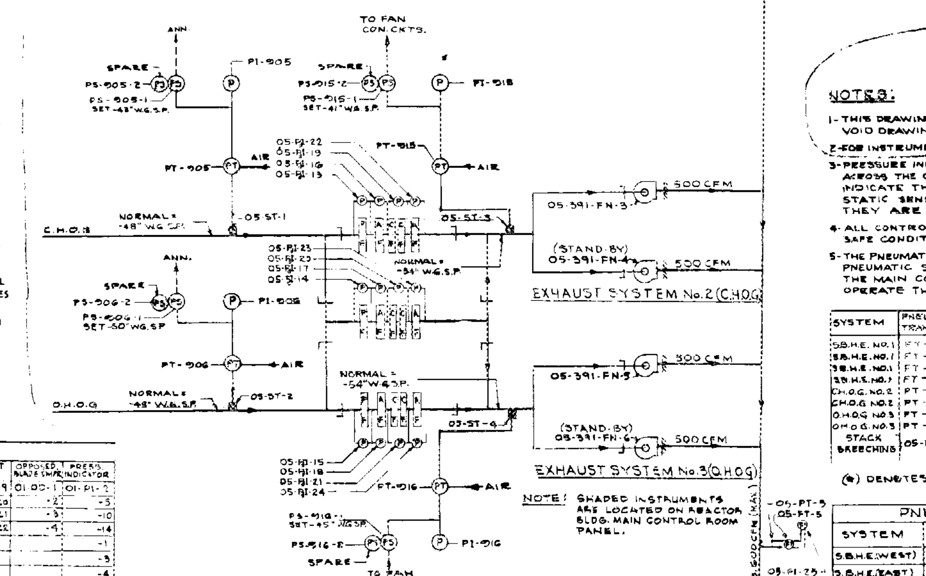


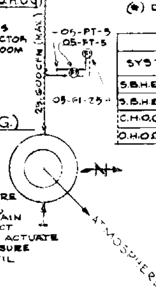
SEQUENCE OF OPERATION CHILLED WATER SYSTEM

CHILLED WATER PUMPS 01-392-PU-1 AND 01-392-PU-2 SHALL EACH HAVE A START-STOP SWITCH. THE PUMP 01-392-PU-2 (NORMALLY ON LINE) SHALL THRU RELAY 01-PE-1 AND THRU ANY OR ALL A.C. UNIT CHS THREE WAY VALVES AND THEIR RESPECTIVE RELAYS BE ENERGIZED. TEMPERATURE CONTROLLER 01-TC-38 SHALL RECEIVE MAIN AIR THRU 01-EP-17 AND OR 01-EP-18 AND SHALL CONTROL THE THE OPERATION OF THE REFRIGERATION MACHINE TO MAINTAIN THE SET CHILLED WATER SUPPLY (CHS) TEMPERATURE.

SEQUENCE OF OPERATION - EXHAUST SYSTEM NO. 1 (S.B.H.E.)
EXHAUST FANS 05-391-FN-1 & 05-391-FN-2

THESE FANS SHALL EACH HAVE A START-STOP, STAND-BY SWITCH. FAN 05-391-FN-1 SHALL OPERATE WHILE FAN 05-391-FN-2 SHALL BE STAND-BY. A DECREASE BELOW THE NORMAL .6" W.G. IN FLOW IN THE WEST OR THE EAST DUCT, IS SENSED BY PITOT TUBES 05-PT-1 AND 05-PT-3 IN THE WEST DUCT, AND 05-PT-2 AND 05-PT-4 IN THE EAST DUCT, WHICH TRANSMITS THE SIGNAL TO THE FLOW TRANSMITTERS (SEE NOTE 5) FT-903, FT-913, FT-904 AND FT-914. A DECREASE IN FLOW TO .45" W.G. VELOCITY PRESSURE IN THE WEST DUCT, SHALL SHALL THRU THE PNEUMATIC TRANSMITTERS FT-903 AND FT-913, ACTUATE THE VISUAL AND AUDIBLE ALARM SWITCHES FS-903B-1 AND FS-913B-1 IN THE MAIN CONTROL ROOM. A FURTHER DECREASE IN FLOW TO .40" W.G. VELOCITY PRESSURE SHALL THRU SWITCHES FS-903A-1 AND FS-913A-1 ON THE FAN SHED CONTROL PANEL, ENERGIZE FAN 05-391-FN-2 WHICH SHALL CONTINUE TO RUN UNTIL MANUALLY DE-ENERGIZED. A DECREASE IN FLOW TO .45" W.G. VELOCITY PRESSURE IN THE EAST DUCT, SHALL THRU THE PNEUMATIC TRANSMITTERS FT-904 AND FT-914 ACTUATE THE VISUAL AND AUDIBLE ALARM SWITCHES FS-904B-1 AND FS-914B-1 IN THE MAIN CONTROL ROOM. A FURTHER DECREASE IN FLOW TO .40" W.G. VELOCITY PRESSURE SHALL THRU SWITCHES FS-904A-1 AND FS-914-A-1 ON THE FAN SHED CONTROL PANEL, ENERGIZE FAN 05-391-FN-2, WHICH SHALL CONTINUE TO RUN UNTIL MANUALLY DE-ENERGIZED. A FURTHER DECREASE IN FLOW TO .35" W.G. VELOCITY PRESSURE IN THE WEST DUCT AND/OR THE EAST DUCT, OR UPON FAILURE OR DE-ENERGIZING OF EXHAUST FANS 05-391-FN-1 AND 05-391-FN-2, SHALL THRU SWITCHES FS-903A-2 AND FS-913A-2 FOR THE WEST DUCT AND SWITCHES FS-904A-2 AND FS-914A-2 FOR THE EAST DUCT, ON THE FAN SHED CONTROL PANEL, DE-ENERGIZE AC UNITS 01-391-AC-2, 01-391-AC-5, 01-391-AC-10 AND 01-391-AC-14 IN THE REACTOR BUILDING.





SEQUENCE OF OPERATION - EXHAUST SYSTEM NO. 2 (C.H.O.G.)
EXHAUST FANS 05-391-FN-3 & 05-391-FN-4

THESE FANS SHALL EACH HAVE A MANUAL START-STOP, STAND-BY SWITCH. FAN 05-391-FN-3 SHALL BE IN OPERATION WHILE FAN 05-391-FN-4 SHALL BE STAND-BY. A DECREASE IN NEGATIVE STATIC PRESSURE IN THE C.H.O.G. DUCT IS SENSED BY THE STATIC SENSING TIPS 05-ST-1 AND 05-ST-3, WHICH TRANSMITS THE SIGNAL TO THE PNEUMATIC PRESSURE TRANSMITTERS (SEE NOTE 5) PT-905 AND PT-915. UPON A DECREASE IN NEGATIVE STATIC PRESSURE IN THE C.H.O.G. DUCT, THE SIGNAL IS RECEIVED BY THE PNEUMATIC PRESSURE TRANSMITTER PT-905, WHICH SHALL ACTUATE THE VISUAL AND AUDIBLE ALARM SWITCH PS-905-1 IN THE MAIN CONTR. RM. UPON A FURTHER DECREASE IN NEGATIVE STATIC PRESSURE IN THE C.H.O.G. DUCT THE SIGNAL IS RECEIVED BY THE PNEUMATIC PRESSURE TRANSMITTER PT-915 WHICH SHALL ACTUATE PRESSURE SWITCH PS-915-1 ON THE FAN SHED CONTROL PANEL AND THRU PRESSURE SWITCH PS-915-1 ENERGIZE FAN 05-391-FN-4 WHICH SHALL CONTINUE TO RUN UNTIL MANUALLY DE-ENERGIZED.

SEQUENCE OF OPERATION - EXHAUST SYSTEM NO. 3 (O.H.O.G.)
EXHAUST FANS 05-391-FN-5 & 05-391-FN-6

THESE FANS SHALL EACH HAVE A MANUAL START-STOP, STAND-BY SWITCH. FAN 05-391-FN-5 SHALL BE IN OPERATION WHILE FAN 05-391-FN-6 SHALL BE STAND-BY. A DECREASE IN NEGATIVE STATIC PRESSURE IN THE O.H.O.G. DUCT IS SENSED BY THE STATIC SENSING TIPS 05-ST-2 AND 05-ST-4, WHICH TRANSMITS THE SIGNAL TO THE PNEUMATIC PRESSURE TRANSMITTERS (SEE NOTE 5) PT-906 AND PT-916. UPON A DECREASE IN NEGATIVE STATIC PRESSURE IN THE O.H.O.G. DUCT, THE SIGNAL IS RECEIVED BY THE PNEUMATIC PRESSURE TRANSMITTER PT-906, WHICH SHALL ACTUATE THE VISUAL AND AUDIBLE ALARM SWITCH PS-906-1 IN THE MAIN CONTR. RM. UPON A FURTHER DECREASE IN NEGATIVE STATIC PRESSURE IN THE O.H.O.G. DUCT THE SIGNAL IS RECEIVED BY THE PNEUMATIC PRESSURE TRANSMITTER PT-916 WHICH SHALL ACTUATE PRESSURE SWITCH PS-916-1 ON THE FAN SHED CONTROL PANEL AND THRU PRESSURE SWITCH PS-916-1 ENERGIZE FAN 05-391-FN-6 WHICH SHALL CONTINUE TO RUN UNTIL MANUALLY DE-ENERGIZED.

AIR CONDITIONING "CONTROL EQUIPMENT SCHEDULE"

SYSTEM NUMBER	UNIT NUMBER	TEMPERATURE CONTROLLERS			ST. PRESS. REGULATOR	PNEUMATIC RELAYS				DAMPER PNEUM. MOTOR		STEAM VALVE		ROOM THERMOST.	WATER VALVE	HUMIDISTAT	FREEZE STAT	ELECT-PNEUMAT RELAY		OPPOSED BLADE DMPR.	PRESS. INDICATOR
A.C. SYST. 1	01-391-AC-2*	01-TC-1	01-TC-2	01-TC-3	01-SPR-1	01-PR-1	01-PR-2	01-PR-3	01-PR-26	01-DM-1	01-DM-2	01-SV-1	01-SV-2	01-RT-1	01-WV-1	01-RH-1	01-FT-1	01-EP-1	01-EP-19	01-OD-1	01-PI-2
A.C. SYST. 2	-5*	-6	-7	-8	-2	-6	-7	-8	-29	-5	-6	-5	-6	-2	-4	-4	2	-4	-20	-2	-5
A.C. SYST. 3	-10*	-15	-13	-17	-3	-13	-15	-17	-34	-11	-13	-11	-13	-3	-9	-9	3	-9	-21	-3	-10
A.C. SYST. 3	-14*	-16	-14	-18	-4	-14	-16	-18	-35	-12	-14	-12	-14	-4	-10	-10	4	-10	-22	-4	-14
A.C. SYST. 1	-1	-4				-4			-27	-3		-3			-2	-2		-2			-1
A.C. SYST. 1	-3	-5				-5			28	-4		-4			-3	-3		-3			-3
A.C. SYST. 2	-4	-9				-9			30	-7		-7			-5	-5		-5			-4
A.C. SYST. 2	-6	-10				-10			31	-8		-8			-6	-6		-6			-6
A.C. SYST. 2	-7	-11				-11			32	-9		-9			-7	-7		-7			-7
A.C. SYST. 2	-8	-12				-12			33	-10		-10			-8	-8		-8			-8
A.C. SYST. 3	-9	-19				-19			36	-15		-15			-11	-11		-11			-9
A.C. SYST. 3	-11	-20				-20			37	-16		-16			-12	-12		-12			-11
A.C. SYST. 3	-12	-21				-21			38	-17		-17			-13	-13		-13			-12
A.C. SYST. 3	-13	-22				-22			39	-18		-18			-14	-14		-14			-13

* 100% F.A.I. A.C. UNITS. (ALL OTHERS 100% RETURN AIR UNITS)

PRESSURE INDICATORS FOR FILTERS (F.W. DWYER MFG. CO. STYLE F-5)

SYSTEMS OR UNITS	TAG NO.	SERVICE	RESISTANCE CLEAN	RESISTANCE DIRTY	SCALE RANGE
S.B.H.E.	05-PI-1, 2, 3	PREFILTER	.05" W.G.	.3" W.G.	0-1" W.G.
C.H.O.G. & O.H.O.G.	05-PI-13, 14, 15	"	"	"	"
S.B.H.E.	05-PI-4, 5, 6	HIGH EFFIC.	1.1" W.G.	3.3" W.G.	0-8" W.G.
C.H.O.G. & O.H.O.G.	05-PI-16, 17, 18	"	"	"	"
S.B.H.E.	05-PI-7, 8, 9	CHARCOAL (2)	.5" W.G.	.5" W.G.	0-1" W.G.
C.H.O.G. & O.H.O.G.	05-PI-19, 20, 21	"	.68 W.G.	.68 W.G.	"
S.B.H.E.	05-PI-10, 11, 12	HIGH EFFIC.	1.1" W.G.	1.6" W.G.	0-4" W.G.
C.H.O.G. & O.H.O.G.	05-PI-22, 23, 24	"	"	"	"
100% F.A.I.	01-PI-2, 5, 10, 14	PERM. HIGH VEL.	.07" W.G.	.3" W.G.	0-1" W.G.
100% RETURN	01-PI-1, 3, 4, 6, 7, 8, 11, 12, 13	PREFILTER W/ & HIGH EFFIC.	.07" / 1.5" } 1.07" W.G.	.3" / 2.0" } 2.3" W.G.	0-4" W.G.
A.C. UNIT-01-392-AC-19	01-PI-15	PERM. LOW VEL.	.05" W.G.	.3" W.G.	0-1" W.G.
VENT SYSTEM NO. 1	01-PI-16	PL-24	"	"	"
VENT SYSTEM NO. 2	01-PI-17	PERM. HIGH VEL.	"	"	"

PRESSURE SWITCHES (BARKSDALE CO. MODEL NO. D2H-H18)

SYSTEM	SWITCH NO.	SETS CONT.	NO or NC	SERVICE	SET POINT (PSIG) *	CORRESPONDING GAUGE READING ("WG)	RANGE ADJUSTMENT
S.B.H.E.	FS-903, 904, 913, 914B-1	1	NO	OPENS @ SET PT.	2.7	.45" W.G.V.P. (85%)	0.4 TO 18 PSI
S.B.H.E.	FS-903, 904, 913, 914B-2			SPARE			
S.B.H.E.	FS-903, 904, 913, 914A-1	1	NO	OPENS " " "	2.4	.40" W.G.V.P. (80%)	0.4 TO 18 PSI
S.B.H.E.	FS-903, 904, 913, 914A-2	1	NO	OPENS " " "	2.1	.35" W.G.V.P. (75%)	0.4 TO 18 PSI
C.H.O.G.	PS-905-1	1	NO	OPENS " " "	5.5	-43" W.G.S.P.	0.4 TO 18 PSI
O.H.O.G.	PS-906-1	1	NO	OPENS " " "	6.0	-50" W.G.S.P.	0.4 TO 18 PSI
C.H.O.G.	PS-915-1	1	NO	OPENS " " "	4.92	-41" W.G.S.P.	0.4 TO 18 PSI
O.H.O.G.	PS-916-1	1	NO	OPENS " " "	5.4	-45" W.G.S.P.	0.4 TO 18 PSI
C.H.O.G.	PS-905-2, 915-2			SPARE			
O.H.O.G.	PS-906-2, 916-2			SPARE			

* OPERATING PRESSURE 3 TO 15 PSIG.

PRESSURE INDICATORS FOR SYSTEMS (U.S. GAGE CO. MODEL NO. 3155)

SYSTEM	INDICATOR NO.	OPERATING PRESSURE	NORMAL PRESS.	SCALE RANGE
S.B.H.E. (WEST)	FI-903-A, 903-B, 913-A, 913-B	3 TO 15 PSIG	.6" W.G.	0" TO 2" W.G.
S.B.H.E. (EAST)	FI-904-A, 904-B, 914-A, 914-B	3 TO 15 PSIG	.6" W.G.	0" TO 2" W.G.
C.H.O.G.	PI-905, 915	3 TO 15 PSIG	-48" TO -54" W.G.	0" TO 100" W.G.
O.H.O.G.	PI-906, 916	3 TO 15 PSIG	-48" TO -54" W.G.	0" TO 100" W.G.
S.B.H.E., C.H.O.G. & O.H.O.G. (STACK BREECHING)	05-FI-25	3 TO 15 PSIG	.4" W.G.	0" TO 2" W.G.

LEGEND

DM	DAMPER MOTOR
OD	OPPOSED BLADE DAMPER
PD	PARALLEL BLADE DAMPER
EP	ELECTRIC PNEUMATIC RELAY
PE	PNEUMATIC ELECTRIC RELAY
SV	STEAM VALVE (PNEUMATIC)
WV	3 WAY WATER VALVE (PNEUMATIC)
TC	TEMPERATURE CONTROLLER
RT	ROOM THERMOSTAT
PR	PNEUMATIC RELAY
SPR	STATIC PRESSURE REGULATOR
RH	HUMIDISTAT
SW	SUMMER-WINTER SWITCH
DA	DIRECT ACTING
RA	REVERSE ACTING
M	MAIN AIR
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
SBHE	SPECIAL BUILDING HOT EXHAUST
OHOG	OPEN HOT OFF GAS
CHOG	CLOSED HOT OFF GAS
PHC	PREHEAT COIL
RHC	REHEAT COIL
CC	COOLING COIL
W	WINTER
S	SUMMER
PI	PRESSURE INDICATOR
AF	ABSOLUTE FILTER
F	FILTER
PF	PRE FILTER
CF	CHARCOAL FILTER
RI	RADIOACTIVE INDICATOR
LL	LOW LIMIT
	ELECTRIC WIRING
	PNEUMATIC PIPING
FT	FREEZE STAT WITH SWITCH
FAI	FRESH AIR INTAKE
UC	UNIT COOLER
AC	AIR CONDITIONING UNIT
UV	UNIT VENTILATOR
RE	REFRIGERATION UNIT
STC	SUBMASTER THERMOSTAT
OMT	OUT DOOR MASTER THERMOSTAT
CHS	CHILLED WATER SUPPLY
CHR	CHILLED WATER RETURN
HC	HEATING COIL
ST	STATIC PRESSURE SENSING TIP
PT	PITOT TUBE
BDD	BACK DRAFT DAMPER OR ADJUSTABLE GRAVITY RELIEF DAMPER
UH	UNIT HEATER
MD	MANUAL DAMPER
W.G.	WATER GAGE
POS.	POSITION
FI	FLOW INDICATOR (SBHE)
FS	FLOW SWITCH
FT	FLOW TRANSMITTER
PI	PRESSURE INDICATOR (SBHE, CHOG & OHOG)
PS	PRESSURE SWITCH (CHOG & OHOG)
PT	PRESSURE TRANSMITTER

EQUIPMENT IDENTIFICATION (TAG NO.)
01-391-FN-1: AREA NUMBER (01); EQUIPMENT CLASSIFICATION (391); EQUIPMENT SYMBOL (FN); UNIT NUMBER (1)

NOTES:

1- THIS DRAWING IN CONJUNCTION WITH DRAWING 1546-01-H&V-3020 SUPERSEDES VOID DRAWING 1546-01-H&V-3002.

2- FOR INSTRUMENT AIR TIE-IN SEE DRAWING 1546-05-U-7144/1546-01-M-5512 & 1546-01-E-4032.

3- PRESSURE INDICATORS AT FILTERS SHALL INDICATE THE PRESSURE DIFFERENTIAL ACROSS THE CORRESPONDING FILTER. ALL OTHER PRESSURE INDICATORS SHALL INDICATE THE STATIC OR VELOCITY PRESSURE AT THE LOCATION OF THE STATIC SENSING TIP OR THE PITOT TUBE (VELOCITY SENSING) TO WHICH THEY ARE CONNECTED.

4- ALL CONTROL DEVICES AND CONTROLLED EQUIPMENT MUST "FAIL SAFE" TO THE MOST SAFE CONDITION OF OPERATION.

5- THE PNEUMATIC TRANSMITTERS CONVERT THE 0 TO .6" H_2O TO A 3 TO 15 PSIG PNEUMATIC SIGNAL FOR TRANSMISSION TO THE FAN SHED CONTROL PANEL AND THE MAIN CONTROL ROOM PANEL. THE 3 TO 15 PSIG SIGNAL WILL BE USED TO OPERATE THE INDICATORS AND SWITCHES AS SHOWN IN TABLE BELOW.

SYSTEM	PNEUMATIC TRANSMITTER	SWITCHES	INDICATORS
S.B.H.E. NO. 1	FT-903	FS-903A-1, FS-903A-2, FS-903B-1, FS-903B-2*	FI-903-A, FI-903-B
S.B.H.E. NO. 1	FT-904	FS-904A-1, FS-904A-2, FS-904B-1, FS-904B-2*	FI-904-A, FI-904-B
S.B.H.E. NO. 1	FT-913	FS-913A-1, FS-913A-2, FS-913B-1, FS-913B-2*	FI-913-A, FI-913-B
S.B.H.E. NO. 1	FT-914	FS-914A-1, FS-914A-2, FS-914B-1, FS-914B-2*	FI-914-A, FI-914-B
C.H.O.G. NO. 2	PT-905	PS-905-1, 905-2*	PI-905
C.H.O.G. NO. 2	PT-915	PS-915-1, 915-2*	PI-915
O.H.O.G. NO. 3	PT-906	PS-906-1, 906-2*	PI-906
O.H.O.G. NO. 3	PT-916	PS-916-1, 916-2*	PI-916
STACK BREECHING	05-FT-5	NONE	05-FI-25

(*) DENOTES SPARE SWITCHES.

PNEUMATIC TRANSMITTERS

SYSTEM	TRANSMITTER NO.	OPERATING PRESSURE	AIR OUTPUT OVER FULL RANGE	SIGNAL RANGE (IN. OF WATER)	FOXBORO CO. MODEL NO.
S.B.H.E. (WEST)	FT-903, FT-913	14 PSIA	3 TO 15 PSI	0 TO 2" W.G.	15A
S.B.H.E. (EAST)	FT-904, FT-914	14 PSIA	3 TO 15 PSI	0 TO 2" W.G.	15A
C.H.O.G.	PT-905, PT-915	14 PSIA	3 TO 15 PSI	0 TO 100" W.G.	13A
O.H.O.G.	PT-906, PT-916	14 PSIA	3 TO 15 PSI	0 TO 100" W.G.	13A

REFERENCE DRAWING	NO.
REACTOR BLDG. HTG. & VENT. CONTROL DIAG.	1546-01-H&V-3029
REACTOR BLDG. ELEM. CONTROL DIAGS. H.&V. EQUIP.	1546-01-E-2116
REACTOR BLDG. ELEM. CONTROL DIAGS. H&V EQUIP.	1546-01-E-2115
REACTOR BLDG. STEAM & WATER FLOW DIAG.	1546-01-H&V-3003
REACTOR BLDG. AIR FLOW DIAGRAM	1546-01-H&V-3001
SPECIFICATION HEATING, VENT. & AIR COND. REF.	SECTION 1.00

CERTIFIED FOR CONSTRUCTION

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

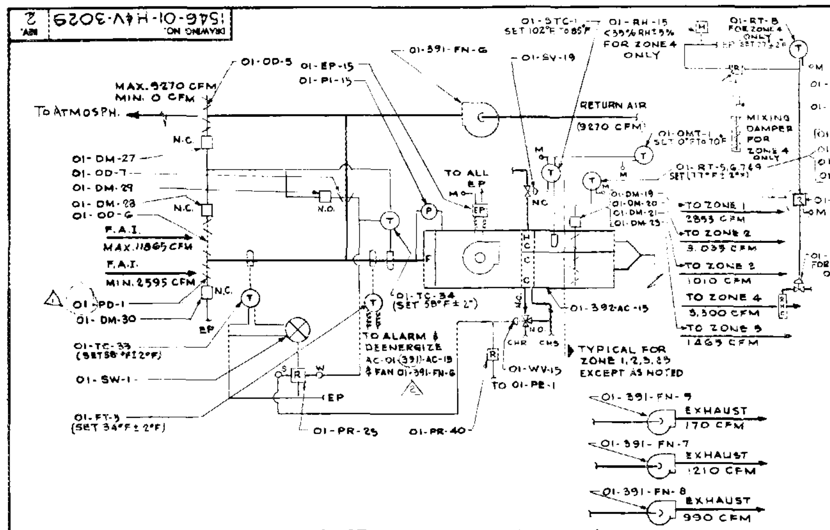
APPROVED
SINGMASTER & BREYER BY [signature] DATE 7-14-61
UNION CARBIDE NUCLEAR COMPANY BY W.L. MORGAN DATE 7-26-61
U. S. ATOMIC ENERGY COMMISSION BY L.H. JACKSON DATE 7-28-61

HIGH FLUX ISOTOPE REACTOR
HEATING & VENTILATING REACTOR BUILDING CONTROL DIAGRAM

S. & B. JOB	CHK.
DEPT.	CHK.
ARCH.	[initials]
ELECT.	[initials]
H & V.	[initials]
INST.	[initials]
MECH.	[initials]
STRUC.	[initials]
UTIL.	[initials]
PROC.	[initials]

DRAWN A.R.M. | CHKD A.K.C. / A.R.M. | DATE 7-12-61 | CONTRACT NO. AT-(40-1)-2691
DATE 7-10-61 | DRAWING NO. 1546-01-H&V-3028 | REV. 1
SCALE-NONE

NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. UCNC	DATE	APPR. AEC	DATE
1	REVISED CONTROL DIAGRAMS, SEQUENCES OF OPERATIONS, SCHEDULES, ETC. FOR ADDITION OF FLOW & PRESSURE TRANSMITTERS, AND ASSOC. EQUIP.	A.M. J.F.C.	A.R.M.	[initials]	4/1/63	[initials]	3/5/63	[initials]	4/5/63
0	CERTIFIED FOR CONSTRUCTION	A.R.M.	A.R.M.	[initials]	8-4-61	[initials]	8/4/61		
	RESUBMITTED FOR TITLE II APPROVAL	A.R.M.	A.R.M.	[initials]	7-14-61	W.L.M.	7/26/61	L.H.J.	7/28/61



A C SYSTEM NO.4 (CLEAN AREA)

SEQUENCE OF OPERATION A.C. SYSTEM NO.4

A.C. UNIT NO. 01-(391)-AC-15 AND RETURN AIR FAN NO. 01-391-FN-6
THIS UNIT AND FAN SHALL HAVE A COMMON START AND STOP SWITCH.
EXHAUST FANS 01-391-FN-7, 01-391-FN-8 AND 01-391-FN-9
THESE FANS SHALL EACH HAVE A START AND STOP SWITCH.
MANUAL SWITCH 01-SW-1 SHALL HAVE SUMMER-WINTER-AUTOMATIC (SUMMER-WINTER) POSITIONS.

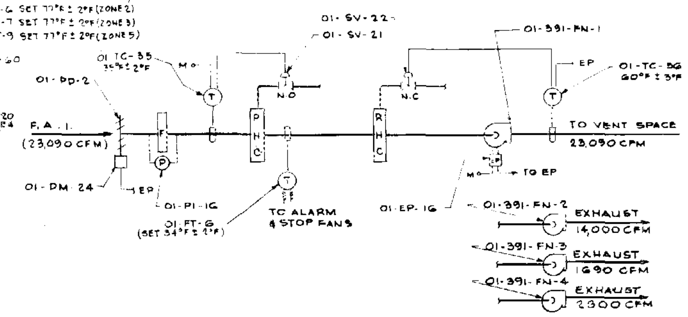
AUTOMATIC (SUMMER-WINTER) SELECTION:
TEMPERATURE CONTROLLER 01-TC-33 SHALL SET THE SYSTEM INTO THE SUMMER CYCLE WHEN THE OUTSIDE AIR TEMPERATURE IS ABOVE THE SET POINT AND SHALL SET THE SYSTEM INTO THE WINTER CYCLE WHEN THE OUTSIDE AIR TEMPERATURE IS BELOW THE SET POINT.

WINTER CYCLE:
THE MINIMUM OUTSIDE AIR DAMPER 01-PD-1 THRU RELAY 01-EP-15 AND CONTROL DAMPER MOTOR 01-DM-30 SHALL BE OPEN. TEMPERATURE CONTROLLER 01-TC-34 SHALL CONTROL THE MODULATING DAMPER MOTORS 01-DM-27, 01-DM-28 AND 01-DM-29 TO POSITION THE OUTSIDE AIR DAMPERS 01-OD-5, 01-OD-6 AND THE RETURN AIR DAMPER 01-OD-7 TO MAINTAIN THE MIXED AIR SET TEMPERATURE. SUB-MASTER CONTROLLER 01-STC-1 SHALL BE RESET BY THE OUTDOOR MASTER THERMOSTAT 01-OMT-1 AND SHALL MODULATE THE STEAM VALVE 01-SV-19 TO MAINTAIN THE HOT DECK PLENUM SET TEMPERATURE ACCORDING TO AN ADJUSTABLE SCHEDULE. THE CHILLED WATER VALVE 01-WV-15 SHALL BE CLOSED.
FREEZE PROTECTION THERMOSTAT 01-FT-5 ON A DROP BELOW ITS SET POINT SHALL DEENERGIZE THE A.C. UNIT 01-391-AC-15, FAN 01-391-FN-6 AND ACTUATE THE LOCAL ALARM.

SUMMER CYCLE:
THE MINIMUM OUTSIDE AIR DAMPER 01-PD-1 THRU RELAY 01-EP-15 AND CONTROL DAMPER MOTOR 01-DM-28 SHALL BE OPEN. TEMPERATURE CONTROLLER 01-TC-34 SHALL BE INOPERATIVE. THE HOT DECK STEAM VALVE 01-SV-19 SHALL OPERATE (AS IN WINTER). CHILLED WATER VALVE 01-WV-15 SHALL BE OPENED FULLY AND CHILLED WATER PUMP (SEE CH. WATER SYST.) SHALL (THRU SWITCH 01-PR-40) START.

ZONE CONTROL:
ZONE THERMOSTATS 01-RT-5, 01-RT-6, 01-RT-7, 01-RT-8 AND 01-RT-9 SHALL MODULATE THEIR RESPECTIVE ZONE (HOT-COLD) DAMPERS THRU DAMPER MOTORS 01-DM-19, 01-DM-20, 01-DM-21, 01-DM-22 AND 01-DM-23 RESPECTIVELY. TO MAINTAIN THE SET ZONE TEMPERATURE.

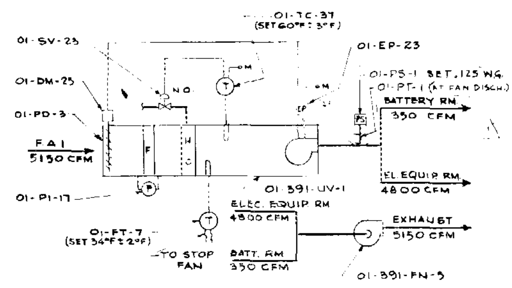
SUMMER HUMIDITY CONTROL: (ZONE 4 ONLY)
HUMIDISTAT 01-RH-15 SHALL THRU RELAY 01-PR-23 OVERRIDE ZONE THERMOSTAT 01-RT-8 TO CONTROL THE ZONE (HOT-COLD) DAMPERS AND SHALL OPERATE REHEAT COIL STEAM VALVE 01-SV-20 TO MAINTAIN THE THE HUMIDITY SET POINT.
△2 FIRE ALARM WILL SHUT DOWN UNITS 01-391-AC-15 AND 01-391-FN-6



VENT. SYSTEM NO.1 (WATER TREATMENT AREA)

SEQUENCE OF OPERATION VENTILATION SYSTEM NO.1

SUPPLY UNIT 01-391-FN-1 AND EXHAUST FANS 01-391-FN-2, 3 & 4
THESE FANS SHALL HAVE A COMMON START-STOP SWITCH. WHEN THE SUPPLY FAN 01-391-FN-1 IS ENERGIZED THE OUTSIDE AIR DAMPER 01-PD-2 SHALL THRU SWITCH 01-EP-16 AND DAMPER MOTOR 01-DM-24 SHALL OPEN. TEMPERATURE CONTROLLER 01-TC-35 SHALL MODULATE THE PREHEAT COIL STEAM VALVE 01-SV-21 TO MAINTAIN THE LEAVING AIR TEMPERATURE AT THE SET POINT. FREEZE PROTECTION THERMOSTAT (DOWNSTREAM OF THE PREHEAT COIL) SHALL ACTUATE THE LOCAL ALARM WHEN THE TEMPERATURE DROPS BELOW THE SET POINT. TEMPERATURE CONTROLLER 01-TC-36 SHALL MODULATE THE REHEAT COIL STEAM VALVE 01-SV-22 TO MAINTAIN THE SUPPLY AIR TEMPERATURE SET POINT. WHEN FAN 01-391-FN-1 IS DEENERGIZED STEAM VALVE 01-SV-22 SHALL CLOSE.



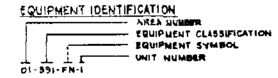
VENTILATION SYSTEM NO.2 (ELECT. RMS.)

SEQUENCE OF OPERATION VENTILATION SYSTEM NO.2

VENTILATION UNIT 01-391-UV-1 AND EXHAUST FAN 01-391-FN-5
THIS UNIT AND FAN SHALL HAVE A COMMON START-STOP SWITCH. THE FRESH AIR INTAKE DAMPER 01-PD-3 SHALL THRU SWITCH 01-EP-23 AND DAMPER MOTOR 01-DM-25 OPEN WHEN THE SYSTEM IS ENERGIZED. TEMPERATURE CONTROLLER 01-TC-37 SHALL MODULATE STEAM VALVE 01-SV-23 TO MAINTAIN THE SUPPLY AIR TEMPERATURE AT THE SET POINT. FREEZE PROTECTION THERMOSTAT 01-FT-7 (DOWN STREAM) OF THE HEATING COIL SHALL SHUT DOWN 01-391-FN-5 & 01-391-UV-1 WHEN THE TEMPERATURE DROPS BELOW THE SET POINT. △2
UPON A DROP BELOW THE SET POINT SWITCH 01-PS-1 (OR A FIRE ALARM) SHALL DEENERGIZE EXH. FAN 01-391-FN-5 & 01-391-UV-1. △2
UPON ELECTRICAL FAILURE OF EITHER 01-391-UV-1 OR 01-391-FN-5 THE OTHER SHALL BE DEENERGIZED AND THE AUDIBLE AND VISUAL ALARM IN THE MAIN CONTROL ROOM SHALL BE ACTUATED.

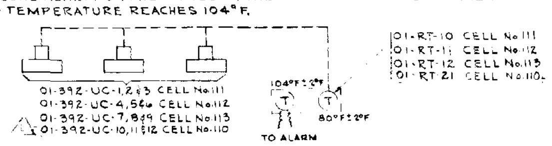
LEGEND

	SYMBOL	LEGEND
D.M.		DAMPER MOTOR
O.D.		OPPOSED BLADE DAMPER
P.D.		PARALLEL BLADE DAMPER
E.P.		ELECTRIC PNEUMATIC RELAY
P.E.		PNEUMATIC ELECTRIC RELAY
S.V.		STEAM VALVE (PNEUMATIC)
W.V.		3 WAY VALVE WATER (PNEUMATIC)
T.C.		TEMPERATURE CONTROLLER
R.T.		ROOM THERMOSTAT
P.R.		PNEUMATIC RELAY
S.P.R.		STATIC PRESSURE REGULATOR
R.H.		HUMIDISTAT
S.W.		SUMMER WINTER SWITCH
F.N.		FAN
S.T.C.		SUBMASTER TEMPERATURE CONTROLLER
D.A.		DIRECT ACTING
R.A.		REVERSE ACTING
M.		MAIN AIR
N.C.		NORMALLY CLOSED
N.O.		NORMALLY OPEN
S.B.H.E.		SPECIAL BUILDING HOT EXHAUST
O.H.O.G.		OPEN HOT OFF GAS
C.H.O.G.		CLOSED HOT OFF GAS
P.H.C.		PREHEAT COIL
R.H.C.		REHEAT COIL
C.C.		COOLING COIL
W.		WINTER
S.		SUMMER
P.I.		PRESSURE INDICATOR
A.F.		ABSOLUTE FILTER
F.		FILTER
P.F.		PRE FILTER
C.F.		CHARCOAL FILTER
R.I.		RADIOACTIVE INDICATOR
L.L.		LOW LIMIT
		ELECTRIC WIRING
		PNEUMATIC PIPING
F.T.		FREEZESTAT
F.A.I.		FRESH AIR INTAKE
U.C.		UNIT COOLER
A.C.		AIR CONDITIONING UNIT
U.V.		HEATING & VENTILATING UNIT △2
P.S.		PRESSURE INDICATOR (WITH SWITCH)
R.E.		REFRIGERATION UNIT
STC		SUBMASTER THERMOSTAT
OMT		OUTDOOR MASTER THERMOSTAT
C.H.S.		CHILLED WATER SUPPLY
C.H.R.		CHILLED WATER RETURN
H.C.		HEATING COIL
		STATIC TIP
P.T.		PITOT TUBE
B.D.D.		BACK DRAFT DAMPER OR ADJ. GRAVITY RELIEF DAMPER
UH		UNIT HEATER
MD		MANUAL DAMPER
W.G.		WATER GAGE
POS.		POSITION



SEQUENCE OF OPERATION
CELL COOLING SYSTEM (PUMP EXCHANGER CELLS)

A DUAL THERMOSTAT IN EACH ROOM SHALL ENERGIZE THE UNIT COOLER FANS WHEN THE SPACE TEMPERATURE REACHES 80°F; AND ACTUATE THE AUDIBLE AND VISUAL ALARM ON THE PANEL IN THE MAIN CONTROL ROOM WHEN AND IF TEMPERATURE REACHES 104°F.

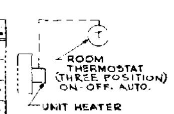


TYPICAL CELL COOLING SYSTEM
(PUMP & HEAT EXCHANGER CELLS NO. 111, 112, 113 & 110)

NOTES

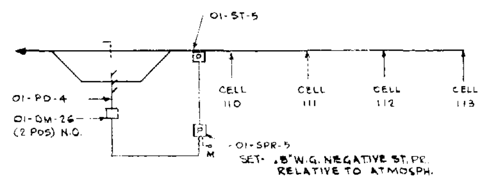
1. THIS DWG. IN CONJUNCTION WITH DWG. 1546-01-H&V-3028 SUPERSEDES VOID DWG. 1546-01-3002.
2. FOR INSTRUMENT AIR TIE-IN SEE DWG. 1546-05-U-7144
3. PRESSURE INDICATORS AT FILTERS SHALL INDICATE THE PRESSURE DIFFERENTIAL ACROSS THE CORRESPONDING FILTER.

UNIT HEATER TAG NUMBER	UNIT HEATER THERMOSTAT No.	UNIT HEATER LOCATION	QUANTITY OF UNIT HEATERS	QUANT. OF THERMOSTATS	SET TEMP. °F
01-390-UH-1	01-RT-13	G-1	1	1	60°
01-390-UH-2	01-RT-14	G-11	1	1	78°
01-390-UH-3	01-RT-15	101	1	1	60°
01-390-UH-4	01-RT-16	114	1	1	78°
01-390-UH-5	01-RT-17	103	1	1	60°
01-390-UH-6	01-RT-18	103	1	1	60°
01-390-UH-7	01-RT-19	211	1	1	60°
01-390-UH-8	01-RT-20	102	1	1	60°
04-390-UH-1	04-RT-1	GEN.RM. #1	1	1	70°
04-390-UH-2	04-RT-2	GEN.RM. #2	1	1	70°
04-390-UH-3	04-RT-3	SWITCH GE. RM	1	1	60°
04-390-UH-4	04-RT-4	" "	1	1	60°
04-390-UH-5	04-RT-5	" "	1	1	60°



UNIT HEATER SEQUENCE OF OPERATION

ALL UNIT HEATERS AS SCHEDULED ABOVE.
EACH UNIT HEATER (FAN) SHALL HAVE A LOCAL START-STOP SWITCH.
AUTOMATIC OPERATION
UPON A DROP IN TEMPERATURE BELOW THE SET POINT THE FAN WILL START. UPON A RISE IN TEMPERATURE ABOVE THE SET POINT THE FAN SHALL STOP.



SEQUENCE OF OPERATION
HEAT EXCHANGER CELLS EXHAUST STATIC PRESSURE CONTROL DAMPER.

UPON A DROP IN STATIC PRESSURE BELOW IT'S SET POINT STATIC PRESSURE REGULATOR 01-SPR-5 SHALL OPERATE DAMPER MOTOR 01-DM-26 TO FULLY OPEN DAMPER 01-PD-4 TO BY PASS THE MANUAL BALANCE DAMPER.
DAMPER 01-PD-4 SHALL, THRU DAMPER MOTOR 01-DM-26 OPEN ON FAILURE OF CONTROL AIR.

CERTIFIED FOR CONSTRUCTION

NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. UCNC	DATE	APPR. AEC	DATE
△3	CELL 110 COOLER ADDITION. REVISED IN ACCORD WITH L.H. JACKSON LETTER 2-12-63. ADDED TO SEQUENCE OF OPER. FOR AC SYST. No.4. ADDED TO SEQUENCE OF OPER. FOR VENT. SYST. No.2	A.R.M.	A.R.M.	[illegible]	4-4-63	ALB	4/26/63	LHJ	4/26/63
△2	ADDED [illegible] THERMOSTAT IN CELL COOLING [illegible] AC SYST. No.4 DIAGRAM	A.R.M.	A.R.M.	[illegible]	4-9-63				
△1	[illegible] 01-PD-1, 01-TC-35 TO 01-TC-36 UNIT VENT. TO HTG. EVENT UNITS. ADD. 01-PS-1, 01-PT-1 [illegible] SEQUENCE OF OPN.	A.R.M.	A.R.M. C.V.T.	[illegible]	10-5-61	N.R.		N.R.	
0	CERTIFIED FOR CONSTRUCTION	A.R.M.	A.R.M.	[illegible]	8-4-61	[illegible]	8/4/61		
0	RESUBMITTED FOR TITLE II APPROVAL	A.R.M.	A.R.M.	[illegible]	7-14-61	W.L.M.	7/26/61	L.H.J.	7-28-61

S. & B. 546	
DEPT.	CHK.
ARCH.	[illegible]
ELECT.	[illegible]
H & V.	[illegible]
INST.	[illegible]
MECH.	[illegible]
STRUC.	[illegible] 7-14-61
UTIL.	[illegible]
PROC.	[illegible]

DRAWING NO. 1546-01-H&V-3029 REV. 2

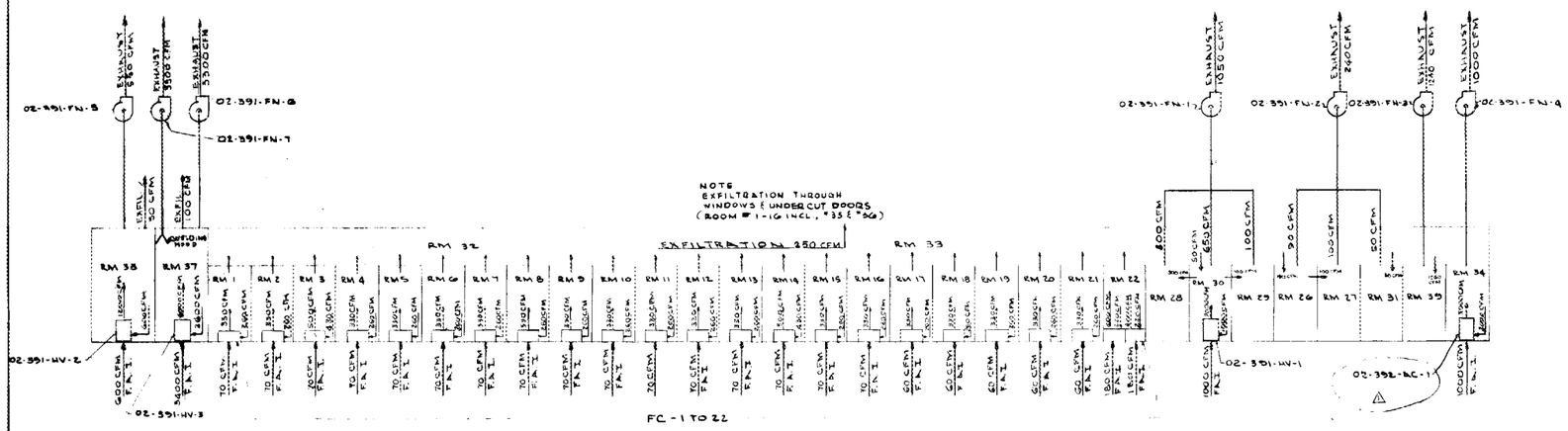
REFERENCE DRAWING	NO.
REACTOR BLDG. HTG. & VENT. CONTROL DIAG.	1546-01-H&V-3028
REACTOR BLDG. ELEM. CONTROL DIAGS. H&V EQUIP.	1546-01-E-2116
REACTOR BLDG. ELEM. CONTROL DIAGS. H&V EQUIP.	1546-01-E-2115
REACTOR BLDG. STEAM & WATER FLOW DIAG.	1546-01-H&V-3003
REACTOR BLDG. AIR FLOW DIAGRAM	1546-01-H&V-3001
SPECIFICATION HEATING, VENT. & AIR COND. REF.	SECTION 100

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.
FOR
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

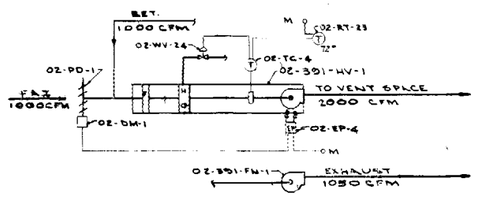
APPROVED
SINGMASTER & BREYER BY [signature] DATE 7-14-61
UNION CARBIDE NUCLEAR COMPANY BY W.L. MORGAN DATE 7-26-61
U. S. ATOMIC ENERGY COMMISSION BY L.H. JACKSON DATE 7-28-61

HIGH FLUX ISOTOPE REACTOR
HEATING & VENTILATING
REACTOR BUILDING
CONTROL DIAGRAM

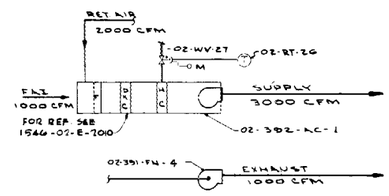
DRAWN F.G. & A.R.M. CHK'D A.R.M. DATE 7-14-61 CONTRACT NO. AT-(40-1)-2429
DATE 7-14-61 DRAWING NO. 1546-01-H&V-3029 REV. 2
SCALE NONE



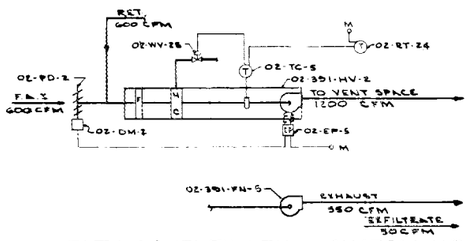
AIR FLOW DIAGRAM OFFICE & MAINTENANCE BUILDING



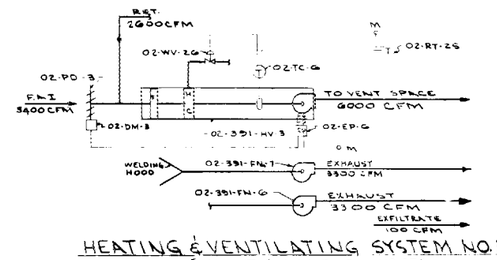
HEATING & VENTILATING SYSTEM NO. 1
(LOCKER ROOM NO. 30)



AIR CONDITIONING SYSTEM NO. 5
(LUNCH ROOM NO. 36)

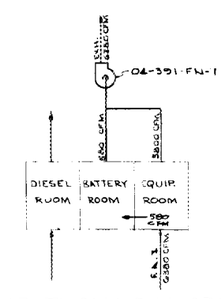


HEATING & VENTILATING SYSTEM NO. 2
(LABORATORY NO 38)



HEATING & VENTILATING SYSTEM NO. 3
(MAINT. & ASSEMBLY NO. 37)

NOTE: WHEN FAN # 02-391-FN-6 IS ENERGIZED FAN # 02-391-FN-7 IS DENERGIZED.
WHEN FAN # 02-391-FN-7 IS ENERGIZED FAN # 02-391-FN-6 IS DENERGIZED.



AIR FLOW DIAGRAM
ELECTRICAL EQUIPMENT BUILDING

CERTIFIED FOR CONSTRUCTION

NO.	REVISIONS	BY	CHK.	APPR. E&E	DATE	APPR. MECH.	DATE	APPR. ARC.	DATE
0	CERTIFIED FOR CONSTRUCTION								
0	ISSUED FOR TITLE & APPROVAL								
0	ISSUED FOR TITLE I PRELIM. PROPOSAL								
0	ISSUED FOR TITLE I APPROVAL								

NO.	REVISIONS	BY	CHK.	APPR. E&E	DATE	APPR. MECH.	DATE	APPR. ARC.	DATE

NO.	REVISIONS	BY	CHK.	APPR. E&E	DATE	APPR. MECH.	DATE	APPR. ARC.	DATE

NO.	REVISIONS	BY	CHK.	APPR. E&E	DATE	APPR. MECH.	DATE	APPR. ARC.	DATE

S.&B. 546	
DEPT.	CHK.
ARCH.	
ELECT.	
H.&V.	
INST.	
MECH.	
STRUC.	
UTIL.	

ROOM DESIGNATION

ROOM NO.	OFFICE & MAINTENANCE BUILDING
1 THRU 21	OFFICES
22	CONFERENCE ROOM
26	WOMEN'S REST ROOM
27	WOMEN'S TOILET
28	MEN'S TOILET
29	SHOWERS
30	LOCKER ROOM
31	JANITOR CLOSET
32	CORRIDOR
33	CORRIDOR
34	LUNCH ROOM
37	MAINTENANCE & ASSEMBLY ROOM
38	LABORATORY
39	UTILITY ROOM
	ELECTRICAL BUILDING
1	DIESEL ROOM
2	BATTERY ROOM
3	ELECTRICAL EQUIPMENT ROOM

SYMBOL	LEGEND
H C	HEATING COIL
D X C	DIRECT EXPANSION COOLING COIL
F A I	FRESH AIR INTAKE
F	FILTER
P D	PARALLEL BLADE DAMPER
D M	DAMPER MOTOR
E P	ELECTRIC PNEUMATIC RELAY
M	MAKE AIR
M V	MOTOR CONTROL VALVE
T C	TEMPERATURE CONTROLLER
R T	ROOM THERMOSTAT
C F M	CUBIC FEET PER MINUTE
H V	HEATING & VENTILATING UNIT
— — —	ELECTRIC WIRING
SW	SWITCH
FC	FAN COIL UNIT
AC	AIR CONDITIONING UNIT

EQUIPMENT IDENTIFICATION

AREA NUMBER
EQUIPMENT CLASSIFICATION
EQUIPMENT SYMBOL
UNIT NUMBER

02-391-FN-1

NOTE: THIS DRAWING IS FOR GENERAL INFORMATION ONLY. THE CONTRACTOR SHALL MAKE REFERENCE TO RELATED H&V LAYOUT, EQUIPMENT DRAWINGS AND SPECIFICATIONS FOR ACTUAL EXTENT SIZES AND LOCATIONS OF SERVICES OR WORK TO BE FURNISHED & INSTALLED UNDER THE CONTRACT.

SEQUENCE OF OPERATION

HEATING & VENTILATING SYSTEM NO. 1 (LOCKER ROOM)

H&V UNIT NO. 02-391-HV-1 AND EXHAUST FAN NO. 02-391-FN-1 SHALL HAVE A COMMON START AND STOP BUTTON. WHEN THE UNIT IS ENERGIZED, THE FRESH AIR INLET DAMPER 02-PD-1 SHALL OPEN. WHEN THE UNIT IS DEENERGIZED THE FRESH AIR DAMPER SHALL CLOSE. ROOM THERMOSTAT 02-RT-23 ACTING THROUGH A TEMPERATURE CONTROLLER 02-TC-4 SHALL MAINTAIN THE ROOM TEMPERATURE.

HEATING VENTILATING SYSTEM NO. 2 (LABORATORY)

H&V UNIT NO. 02-391-HV-2 AND EXHAUST FAN NO. 02-391-FN-5 SHALL HAVE A COMMON START AND STOP BUTTON. WHEN THE UNIT IS ENERGIZED THE FRESH AIR INLET DAMPER 02-PD-2 SHALL OPEN. WHEN THE UNIT IS DEENERGIZED THE FRESH AIR DAMPER SHALL CLOSE. ROOM THERMOSTAT 02-RT-24 ACTING THROUGH A TEMPERATURE CONTROLLER 02-TC-5 SHALL MAINTAIN THE ROOM TEMPERATURE.

HEATING VENTILATING SYSTEM NO. 3 (MAINT. & ASSEMBLY)

H&V UNIT NO. 02-391-HV-3 AND EXHAUST FAN NO. 02-391-FN-6 SHALL HAVE A COMMON START AND STOP BUTTON. WHEN THE UNIT IS ENERGIZED, THE FRESH AIR INLET DAMPER 02-PD-3 SHALL OPEN. WHEN THE UNIT IS DEENERGIZED THE FRESH AIR DAMPER SHALL CLOSE. ROOM THERMOSTAT 02-RT-25 ACTING THROUGH A TEMPERATURE CONTROLLER 02-TC-6 SHALL MAINTAIN THE ROOM TEMPERATURE.

AIR CONDITIONING SYSTEM NO. 5 (LUNCH ROOM)

THIS SELF CONTAINED PACKAGED AIR CONDITIONING UNIT 02-392-AC-1 AND THE EXHAUST FAN 02-391-FN-4 SHALL HAVE A COMMON START AND STOP BUTTON. A ROOM THERMOSTAT 02-RT-26 SHALL CONTROL THE MODULATING HOT WATER VALVE 02-MV-27 TO MAINTAIN THE WINTER ROOM TEMPERATURE.

DRAWING NO.	REV.
1546-02-H&V-3041	4

REFERENCE DRAWING	NO.
OVERLINE AND WIRE DIAGRAM & H.V. DIAGRAM OFFICE & MAINTENANCE BLDG.	1546-02-E-2010
ELECTRICAL PLOT PLAN & ELEVATIONS	1546-02-A-1201
OFFICE & MAINT. FLOW & CONTROL DIAGRAM	1546-02-H&V-3043
SPECIFICATION HEAT'G, VENT. & AIR COND'G	SPEC. T. 10.0

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER
BY S. Kuselberg DATE 3-26-61
UNION CARBIDE NUCLEAR COMPANY
BY C. E. WINTERS DATE 3-8-61
U. S. ATOMIC ENERGY COMMISSION
BY L. H. JACKSON DATE 4-6-61

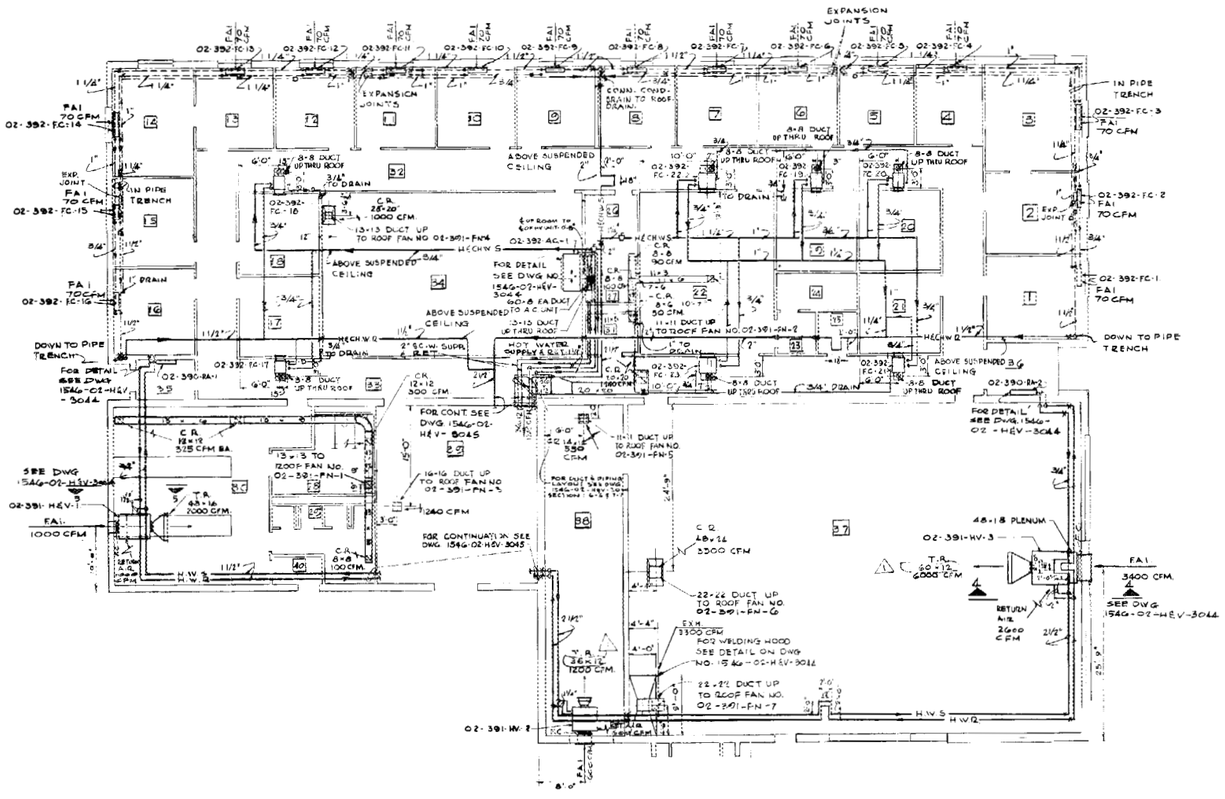
HIGH FLUX ISOTOPE REACTOR

OFFICE AND MAINTENANCE BUILDING
AIR FLOW & CONTROL DIAGRAMS

DRAWN BY: CHECKED BY: DATE: 12-2-60 DRAWING NO. 1546-02-H&V-3041 REV. 4
SCALE: NONE

DRAWING NO. 1546-02-HEV-3043

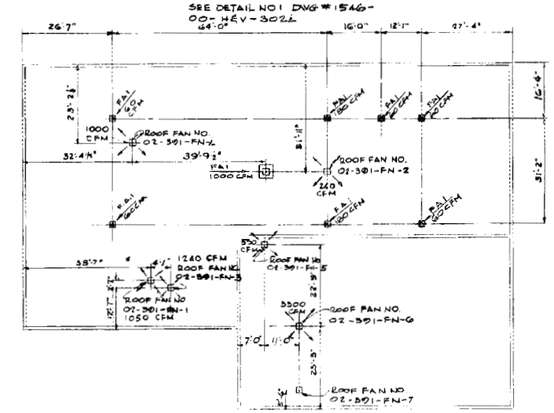
FOR FAN COIL UNIT CABINET OR CONCEALED TYPE
TYPICAL DETAIL SEE DWG 1546-02-HEV-3044



GROUND FLOOR PLAN

SCALE 3/8" = 1'-0"

FOR FRESH AIR INTAKE DETAIL
SEE DETAIL NO 1 DWG # 1546-00-HEV-3022



ROOF PLAN

SCALE 1/8" = 1'-0"

SYMBOLS

FAI	FRESH AIR INTAKE
	ROOF EXHAUST FAN
C.R.	CEILING REGISTER
T.R.	TOP REGISTER
	BALANCING VALVE
SCW	SECONDARY COOLANT WATER
H.W.S.	HOT WATER SUPPLY
H.W.R.	HOT WATER RETURN
H & CH.W.S.	HOT & CHILLED WATER SUPPLY
H & CH.W.R.	HOT & CHILLED WATER RETURN
- - - -	PIPE IN PIPE TRENCH
X	ANCHORS
	PIPE GUIDE
	EXPANSION JOINT

CERTIFIED FOR CONSTRUCTION

OFFICE & MAINTENANCE BLDG EQUIPMENT SCHEDULE	1546-02-HEV-3000
DRAWING NO. 1546-02-HEV-3043	REV. 1
REFERENCE DRAWING	NO.
DUCTWORK DETAILS	1546-00-HEV-3044
OFF. & MAINTENANCE BLDG. SECTIONS & DETAILS	1546-02-HEV-3041
GROUND FLOOR & ROOF PLANS	1546-02-A-1101
FLOOR FRAMING	1546-02-S-6159
OFFICE & MAINTENANCE BLDG EQUIPMENT RM. DETAILS - SH. 1	1546-02-HEV-3045
SPECIFICATION HVAC	REF. SECTION 100

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

FOR

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER
BY C. A. [illegible] DATE 3-7-61
UNION CARBIDE NUCLEAR COMPANY
BY C. E. WINTERS DATE 3-27-61
U. S. ATOMIC ENERGY COMMISSION
BY R. G. SOMERS DATE 3-31-61

HIGH FLUX ISOTOPE REACTOR

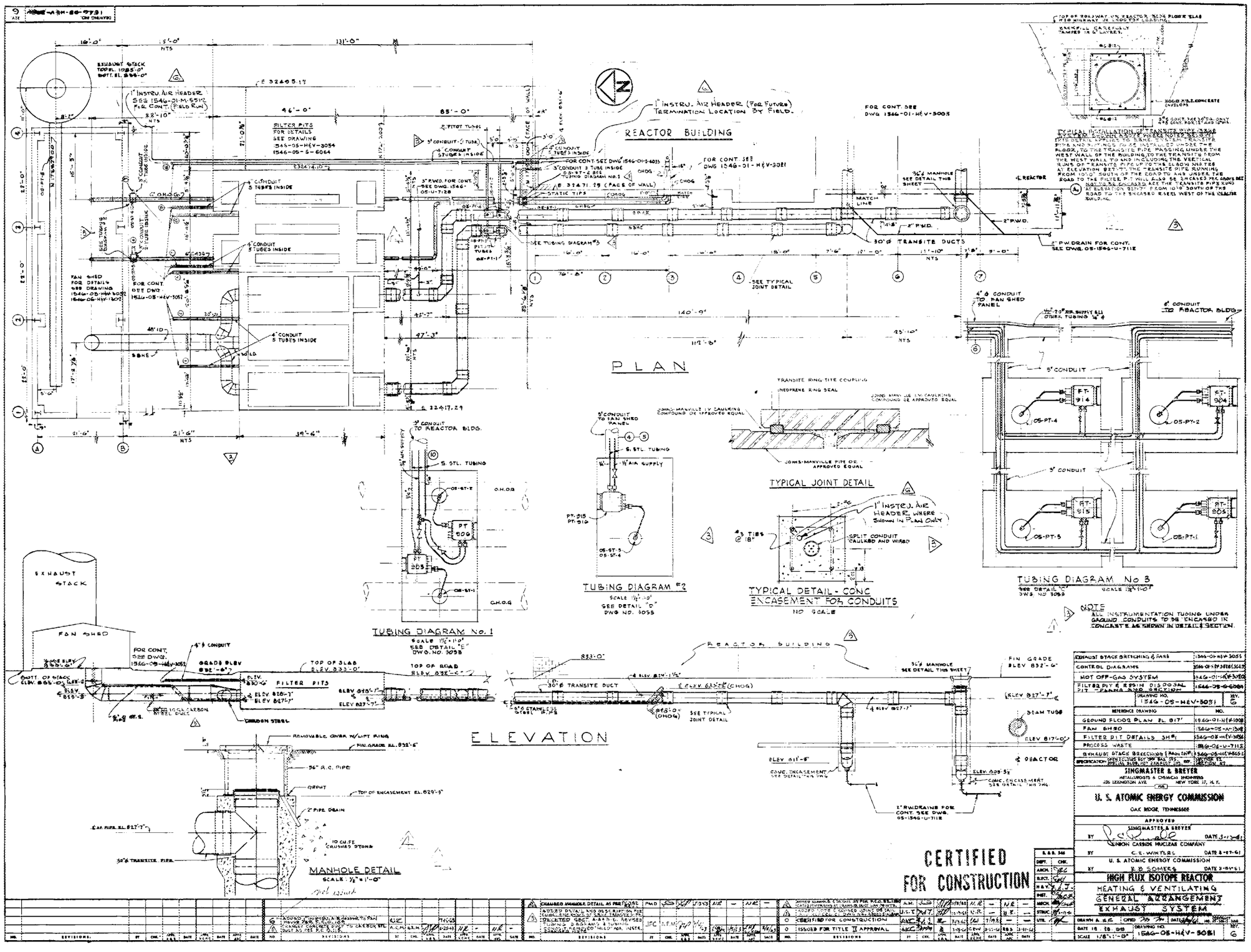
OFFICE & MAINTENANCE BUILDING
HEATING & VENTILATION
GROUND FLOOR & ROOF PLAN

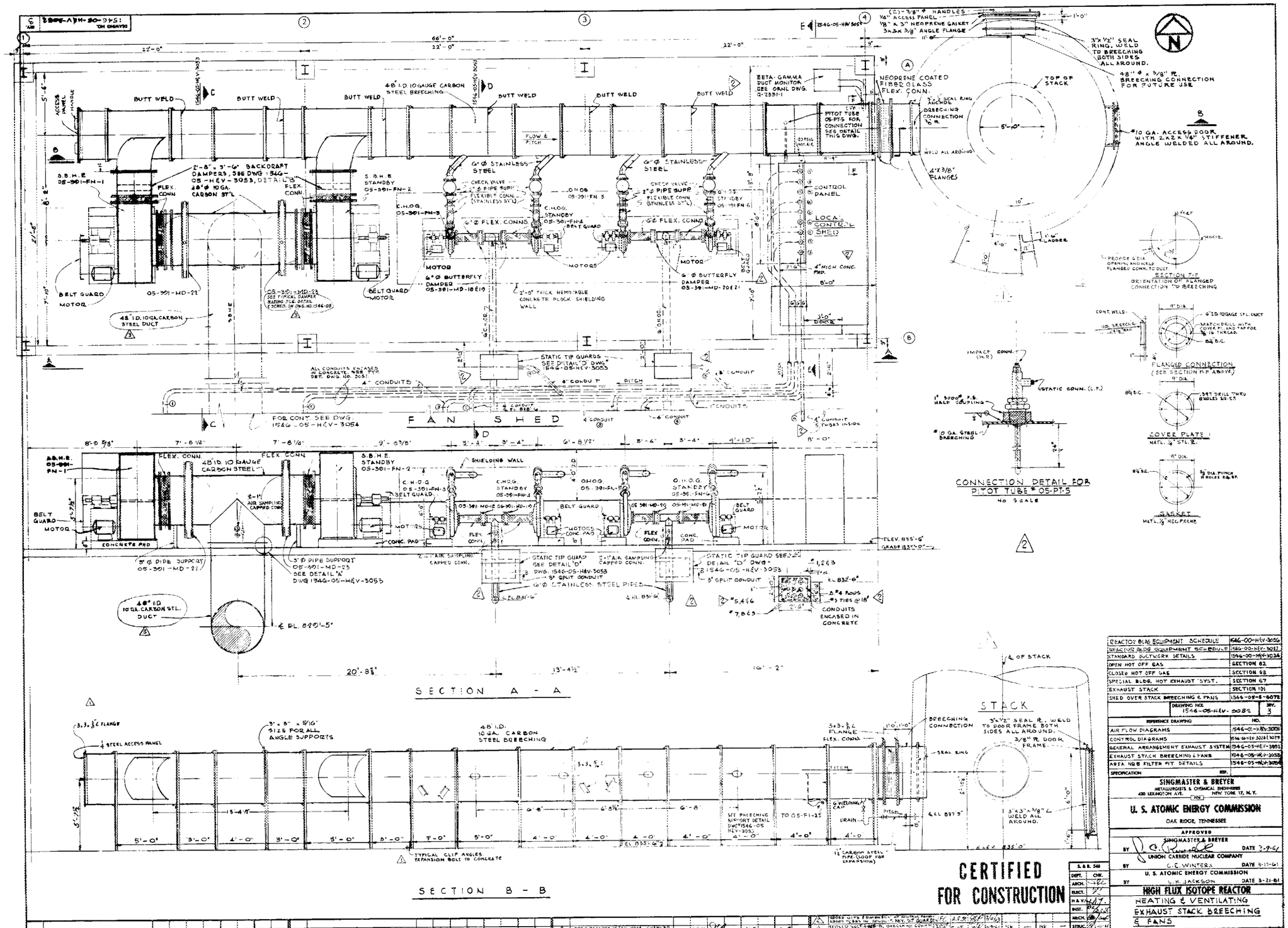
DRAWN AKC	CHKD M.M.
DATE 3-3-61	DRAWING NO. 1546-02-HEV-3043
SCALE AS SHOWN	REV. 1

S. & B. 546
DEPT. CHK.
ARCH.
ELECT.
H & V
INST.
MECH.
STRUC.
UTIL.

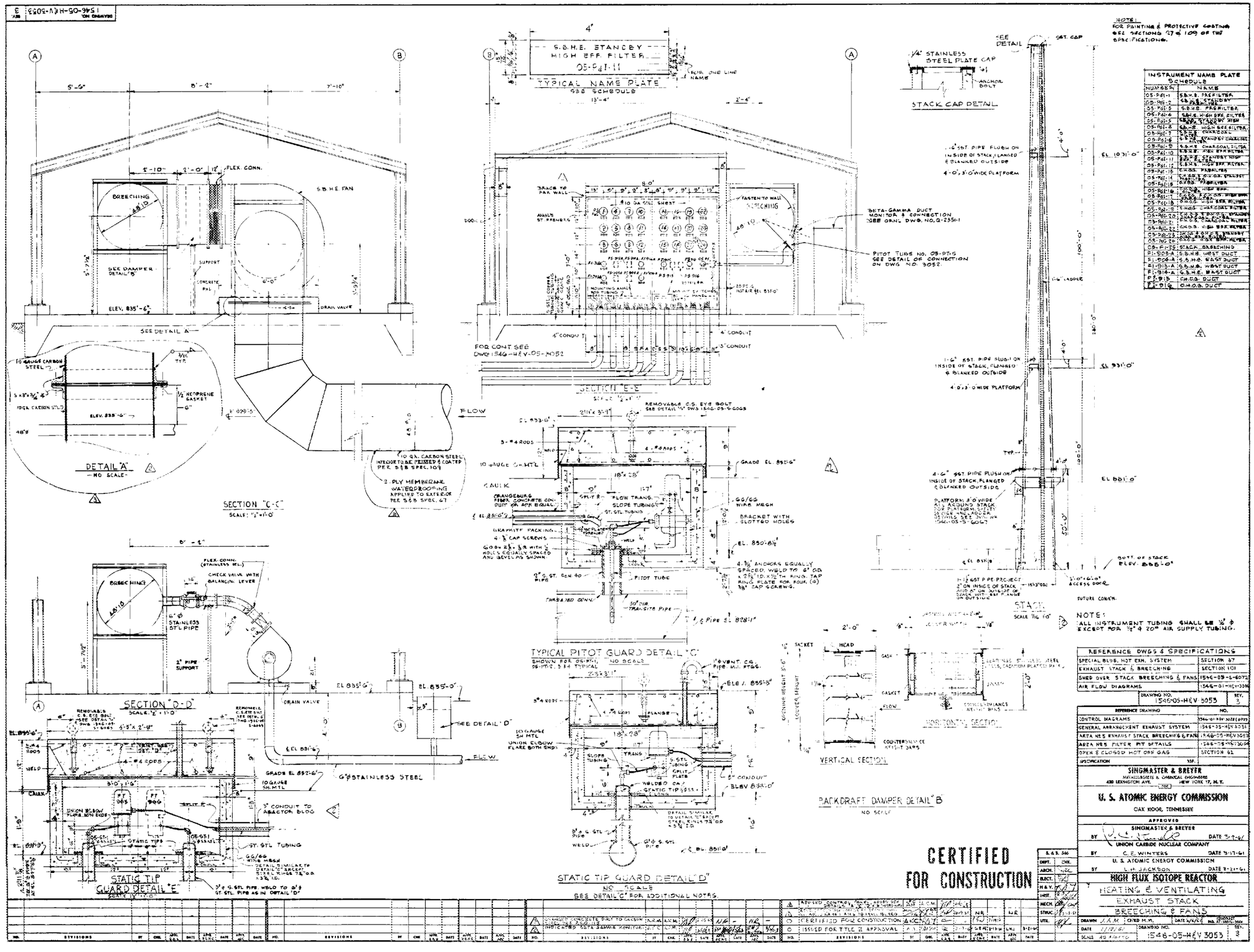
NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. UCNC	DATE	APPR. AEC	DATE
1	CHANGED REGISTER SIZE	AKC	[illegible]	[illegible]	[illegible]	NR	7-7-61	NR	
2	CERTIFIED FOR CONSTRUCTION	AKC	[illegible]	[illegible]	[illegible]	[illegible]	3-27-61		
3	ISSUED FOR TITLE & APPROVAL	AKC	[illegible]	NM	[illegible]	[illegible]	3-3-61	[illegible]	3-3-61

064


REACTOR BUILDING
PLAN
ELEVATION
TUBING DIAGRAM No. 1
TUBING DIAGRAM #2
TUBING DIAGRAM No 3
TYPICAL JOINT DETAIL
TYPICAL DETAIL - CONC ENCASEMENT FOR CONDUITS
MANHOLE DETAIL
EXHAUST STACK
FAN SHED
FILTER PITS
30" ø TRANSITE DUCTS
CERTIFIED FOR CONSTRUCTION
SINGMASTER & BREYER
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
HIGH FLUX ISOTOPE REACTOR
HEATING & VENTILATING
GENERAL ARRANGEMENT
EXHAUST SYSTEM
DRAWING NO. 1546-05-HV-3051
SCALE 1/8"=1'-0"


FAN SHED
SECTION A - A
SECTION B - B
STACK
CONNECTION DETAIL FOR PITOT TUBE # 05-PT-5
No SCALE
FLANGED CONNECTION
COVER PLATE
GASKET
SECTION F-F
ORIENTATION OF FLANGED CONNECTION TO BREECHING
CERTIFIED FOR CONSTRUCTION
REACTOR BLDG. EQUIPMENT SCHEDULE 1546-00-HEV-3056
REACTOR BLDG. EQUIPMENT SCHEDULE 1546-00-HEV-3082
STANDARD DUCTWORK DETAILS 1546-00-HEV-3034
OPEN HOT OFF GAS SECTION 62
CLOSED HOT OFF GAS SECTION 63
SPECIAL BLDG. HOT EXHAUST SYST. SECTION 67
EXHAUST STACK SECTION 101
SHED OVER STACK BREECHING & FANS 1546-05-S-8072
DRAWING NO. 1546-05-HEV-3052 REV. 3
AIR FLOW DIAGRAMS 1546-01-HEV-3003
CONTROL DIAGRAMS 1546-01-HEV-3029
GENERAL ARRANGEMENT EXHAUST SYSTEM 1546-05-HEV-3051
EXHAUST STACK BREECHING & FANS 1546-05-HEV-3053
ARTA NEW FILTER PIT DETAILS 1546-05-HEV-3054
SINGMASTER & BREYER
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
APPROVED
UNION CARBIDE NUCLEAR COMPANY
U. S. ATOMIC ENERGY COMMISSION
HIGH FLUX ISOTOPE REACTOR
HEATING & VENTILATING
EXHAUST STACK BREECHING & FANS
DRAWN AKC CHKD DATE 2/10/61
DRAWING NO. 1546-05-HEV-3052
SCALE 3/8" = 1'-0"
REV. 3

DRAWING NO. 1546-05-H&V-3053 REV. 3



INSTRUMENT NAME PLATE SCHEDULE	
NUMBER	NAME
05-PdI-1	S.B.H.E. PRE FILTER
05-PdI-2	S.B.H.E. STANDBY PRE FILTER
05-PdI-3	S.B.H.E. PRE FILTER
05-PdI-4	S.B.H.E. HIGH EFF. FILTER
05-PdI-5	S.B.H.E. STANDBY HIGH EFF. FILTER
05-PdI-6	S.B.H.E. HIGH EFF. FILTER
05-PdI-7	S.B.H.E. CHARCOAL
05-PdI-8	S.B.H.E. STANDBY CHARCOAL FILTER
05-PdI-9	S.B.H.E. CHARCOAL FILTER
05-PdI-10	S.B.H.E. HIGH EFF. FILTER
05-PdI-11	S.B.H.E. STANDBY HIGH EFF. FILTER
05-PdI-12	S.B.H.E. HIGH EFF. FILTER
05-PdI-13	C.H.O.G. PRE FILTER
05-PdI-14	C.H.O.G. STANDBY PRE FILTER
05-PdI-15	C.H.O.G. PRE FILTER
05-PdI-16	C.H.O.G. HIGH EFF.
05-PdI-17	C.H.O.G. STANDBY HIGH EFF.
05-PdI-18	C.H.O.G. HIGH EFF. FILTER
05-PdI-19	C.H.O.G. CHARCOAL FILTER
05-PdI-20	C.H.O.G. STANDBY CHARCOAL FILTER
05-PdI-21	C.H.O.G. CHARCOAL FILTER
05-PdI-22	C.H.O.G. HIGH EFF. FILTER
05-PdI-23	C.H.O.G. STANDBY HIGH EFF. FILTER
05-PdI-24	C.H.O.G. HIGH EFF. FILTER
05-FI-25	STACK BREECHING
FI-906-A	S.B.H.E. WEST DUCT
FI-906-A	S.B.H.E. EAST DUCT
FI-915-A	S.B.H.E. WEST DUCT
FI-915-A	S.B.H.E. EAST DUCT
FI-915	C.H.O.G. DUCT
FI-916	C.H.O.G. DUCT

REFERENCE DWGS & SPECIFICATIONS	
SPECIAL BLDG. HOT EXH. SYSTEM	SECTION 67
EXHAUST STACK & BREECHING	SECTION 101
SHED OVER STACK BREECHING & FANS	1546-09-S-6072
AIR FLOW DIAGRAMS	1546-01-H&V-3036
DRAWING NO. 1546-05-H&V-3053	REV. 3

REFERENCE DRAWING	NO.
CONTROL DIAGRAMS	1546-01-H&V-3028 (2 DWGS)
GENERAL ARRANGEMENT EXHAUST SYSTEM	1546-05-H&V-3051
AREA NO. 5 EXHAUST STACK BREECHING & FANS	1546-05-H&V-3052
AREA NO. 5 FILTER PIT DETAILS	1546-05-H&V-3054
OPEN & CLOSED HOT OFF GAS	SECTION 82
SPECIFICATION	NO.

SINGMASTER & BREYER
INGENIEURS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

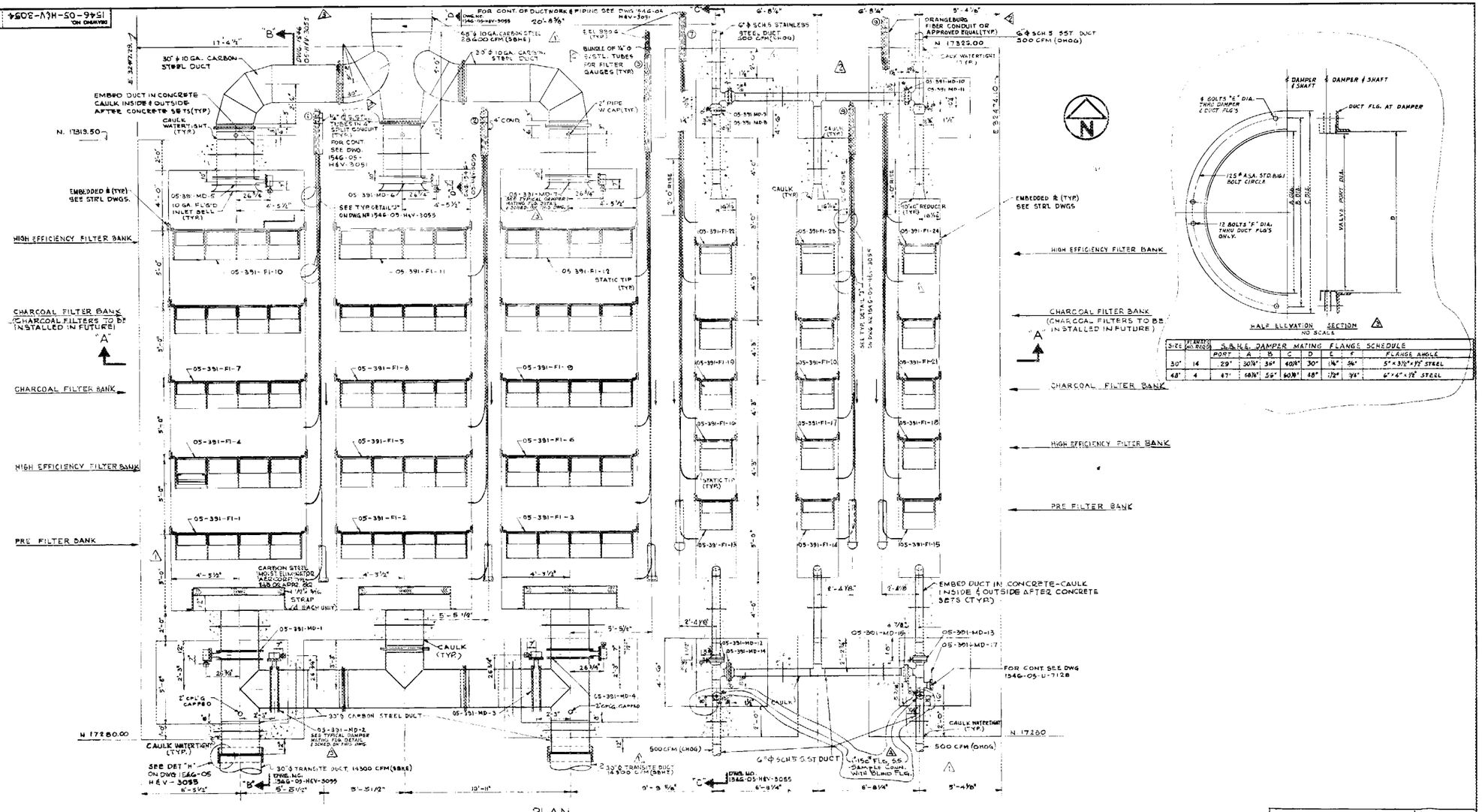
APPROVED
SINGMASTER & BREYER
BY DATE 5-17-61
UNION CARBIDE NUCLEAR COMPANY
BY C. E. WINTERS DATE 5-17-61
U. S. ATOMIC ENERGY COMMISSION
BY L. H. JACKSON DATE 5-21-61

S. & B. 346	
DEPT.	CHK.
ARCH.	
ELECT.	
H & V.	
INST.	
MECH.	
STRUC.	
UTIL.	

NO.	REVISIONS	BY	CHK.	APP. ENG.	DATE	APP. ENG.	DATE	APP. ARC.	DATE
1	SINGMASTER CONCRETE DUCT TO CARBON STEEL DUCT PER S&B SPEC. 109								
2	INSTALLED BETA GAMMA MONITOR								
3	REVISED CONTROL DIAGRAMS ADDED SEE DETAILS								
4	CERTIFIED FOR CONSTRUCTION								
5	ISSUED FOR TTLC II APPROVAL								

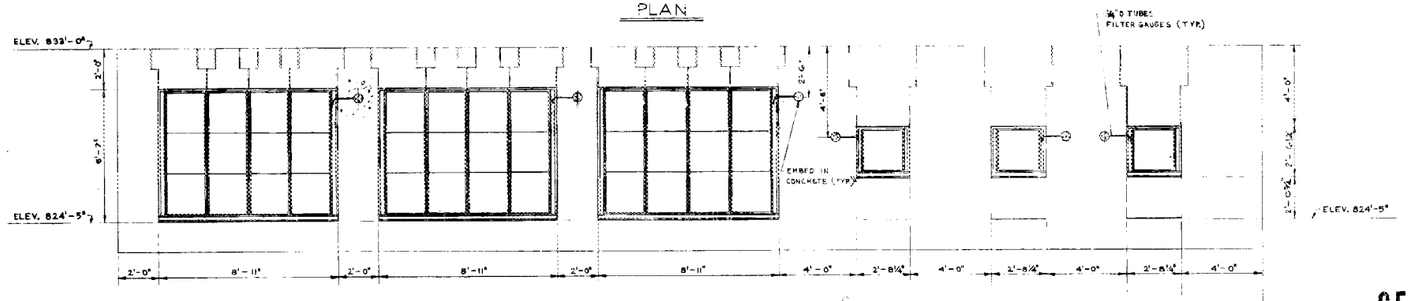
067

DRAWING NO. 1546-05-HEV-3054



S.&H.E. DAMPER MATING FLANGE SCHEDULE

SIZE	FLANGE NO. REQ'D	PORT	A	B	C	D	E	F	FLANGE ANGLE
30"	14	29"	30 7/8"	36"	40 7/8"	30"	1 1/4"	3/4"	5" × 3 1/2" × 1/2" STEEL
48"	4	47"	48 7/8"	55"	60 7/8"	48"	1 1/2"	3/4"	6" × 4" × 1/2" STEEL



CERTIFIED FOR CONSTRUCTION

SPECIFICATION SPECIAL BLDG. HOT EXHAUST	SECTION 67
SPECIFICATION OPEN & CLOSED HOT OFF GAS	SECTION 66
DRAWING NO. 1546-05-HEV-3054	REV.

REFERENCE DRAWING	NO.
FLOW DIAGRAM LIQUID WASTES (PROCESS WASTE & ILW)	1546-05-U-7149
FILTER PIT & RESIN DISPOSAL PIT PLANS & SECTION	1546-05-S-1006
GENERAL ARRANGEMENT EXHAUST SYST.	1546-05-HEV-3051
FILTER PIT DETAILS	1546-05-HEV-3052
FILTER PIT DETAILS	1546-05-HEV-3053
SPECIFICATION	REF.

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

FOR

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER
BY R. Russell DATE 6-2-61
UNION CARBIDE NUCLEAR COMPANY
BY C. E. WINTERS DATE 6-19-61
U. S. ATOMIC ENERGY COMMISSION
BY R. B. SOMERS DATE 6-30-61

HIGH FLUX ISOTOPE REACTOR

HEATING & VENTILATING
FILTER PIT DETAILS

S. & S. 546

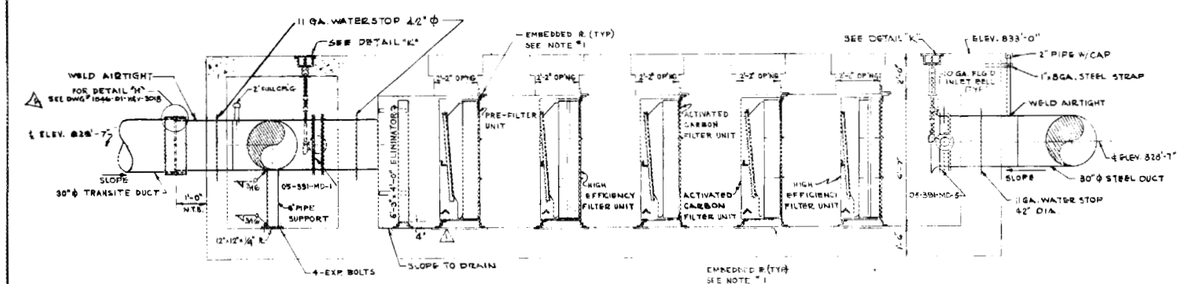
DEPT.	CHK.
ARCH.	
ELECT.	
H & V.	
INST.	
MECH.	
STRUC.	
UTIL.	

NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. UCNC	DATE	APPR. AEC	DATE
1	ADDED 6" SAMPLE CONNECTION AND 6" GAS & PAD. 1/6/61								
2	REVISED SAMPLE CONNECTION 6" TO 1" CARBON STEEL & ADDED 1" CARBON STEEL BLOWOFF 1/11/61	A.R.M.	A.R.M.		1-17-61				
3	MOVED 6" SAMPLE CONNECTION	A.R.M.	A.R.M.		2-23-61	N.R.	—	N.R.	—
4	REVISED FLANGE SIZES								
0	CERTIFIED FOR CONSTRUCTION	F.G.							
0	ISSUED FOR TITLE II APPR.	A.K.C.			6-2-61	C.R.W.	6-19-61	R.D.S.	6-20-61

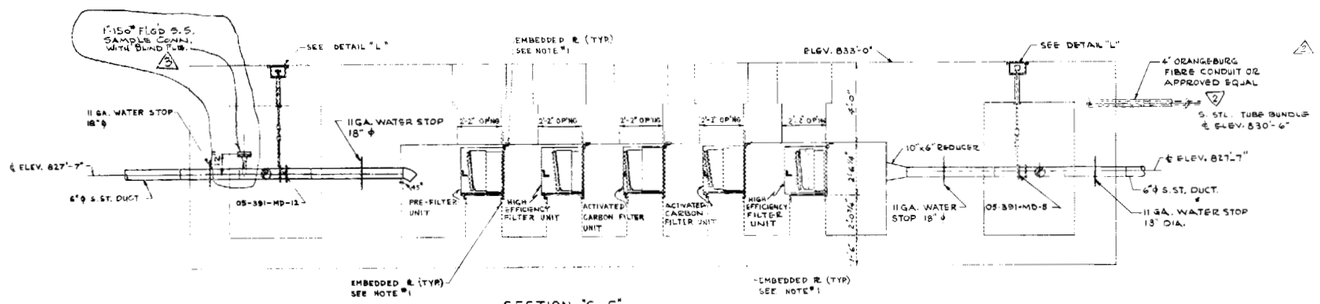
NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. UCNC	DATE	APPR. AEC	DATE

DRAWN A.T.	CHKD.
DATE 4-27-61	DRAWING NO. 1546-05-HEV-3054
SCALE 3/8" = 1'-0"	REV. 3

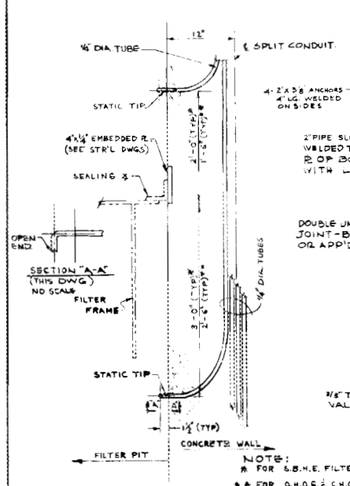
068



SECTION "B-B"
SCALE: 3/8"=1'-0"
DWG# 3054

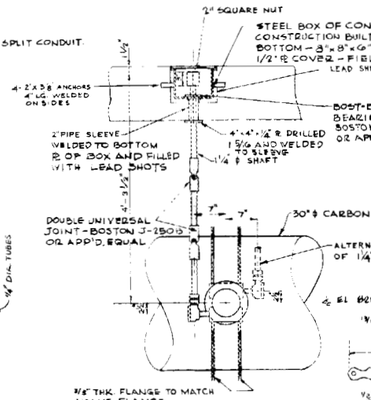


SECTION "C-C"
SCALE: 3/8"=1'-0"
DWG# 3054

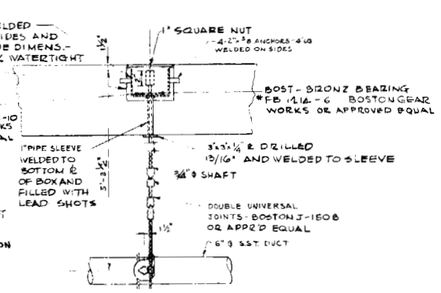


NOTE:
FOR G.B.H.E. FILTER PITS
FOR O.H.O.G. & C.H.O.G. FILTER PITS
TUBING EMBEDDED IN CONCRETE
& "KLIN" IN SPLIT CONDUIT EMBEDDED IN CONCRETE TO BE ST. STL.

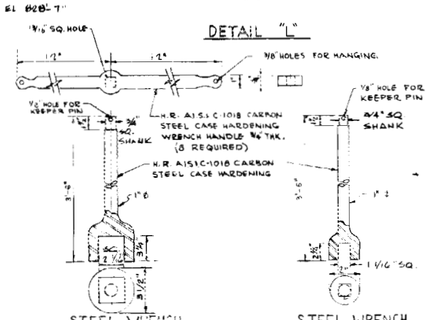
DETAIL "J"
NO SCALE



DETAIL "K"
SCALE: 1"=1'-0"

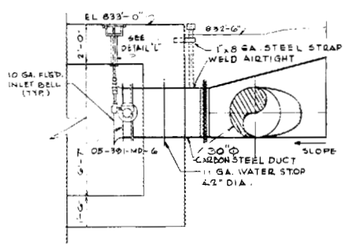


DETAIL "L"



STEEL WRENCH
FOR 30" DAMPERS
(4 REQUIRED)
SCALE: 3"=1'-0"

STEEL WRENCH
FOR 6" DAMPERS
(4 REQUIRED)
SCALE: 3"=1'-0"



SECTION D - D
SCALE: 3/8"=1'-0"

NOTES:
1. FOR EMBEDDED PLATES SEE DRAWINGS 1546-05-S-GOGL & 1546-05-S-GOGS

CERTIFIED FOR CONSTRUCTION

NO.	REVISIONS	BY	CHK.	APPR. ELEC.	DATE	APPR. CONC.	DATE	APPR. MEC.	DATE
3	TUBING SHOWN MADE CLEAR.	JFC	A.K.M.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	DELETED SLINGER & CABLE NOTE. REVISED CASING FOR ELIMINATOR.	Mm	A.K.M.	[illegible]	[illegible]	N.R.	—	N.R.	—
1	CERTIFIED FOR CONSTRUCTION	J.J.P.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	—
0	ISSUED FOR TITLE & APPROVAL	A.K.C.	[illegible]	[illegible]	5-22-61	C.E.W.N.W.	6-8-61	[illegible]	[illegible]

DRAWING NO.	1546-05-H&V-3055
REV.	3

REFERENCE DRAWING	NO.
SINGER MFG. CO. - CARBON DISPOSAL PIT PLANS, SECTIONS & DETAILS	1546-05-S-3000-A
AREA 105 FILTER PIT DETAILS	1546-05-S-3001-A
AREA 105 FILTER PIT DETAILS	1546-05-H&V-3018
SPECIFICATION - OPEN & CLOSED HOT OFF GAS	SECTION 62
SPECIFICATION - SPECIAL BLDG. HOT EXH.	SECTION 67
UTILITY PLAN - YARD PIPING	1046-05-U-7112
SPECIFICATION	REF.

SINGMASTER & BREYER
INSTALLATIONS & CHEMICAL ENGINEERS
488 LEXINGTON AVE. NEW YORK 17, N.Y.

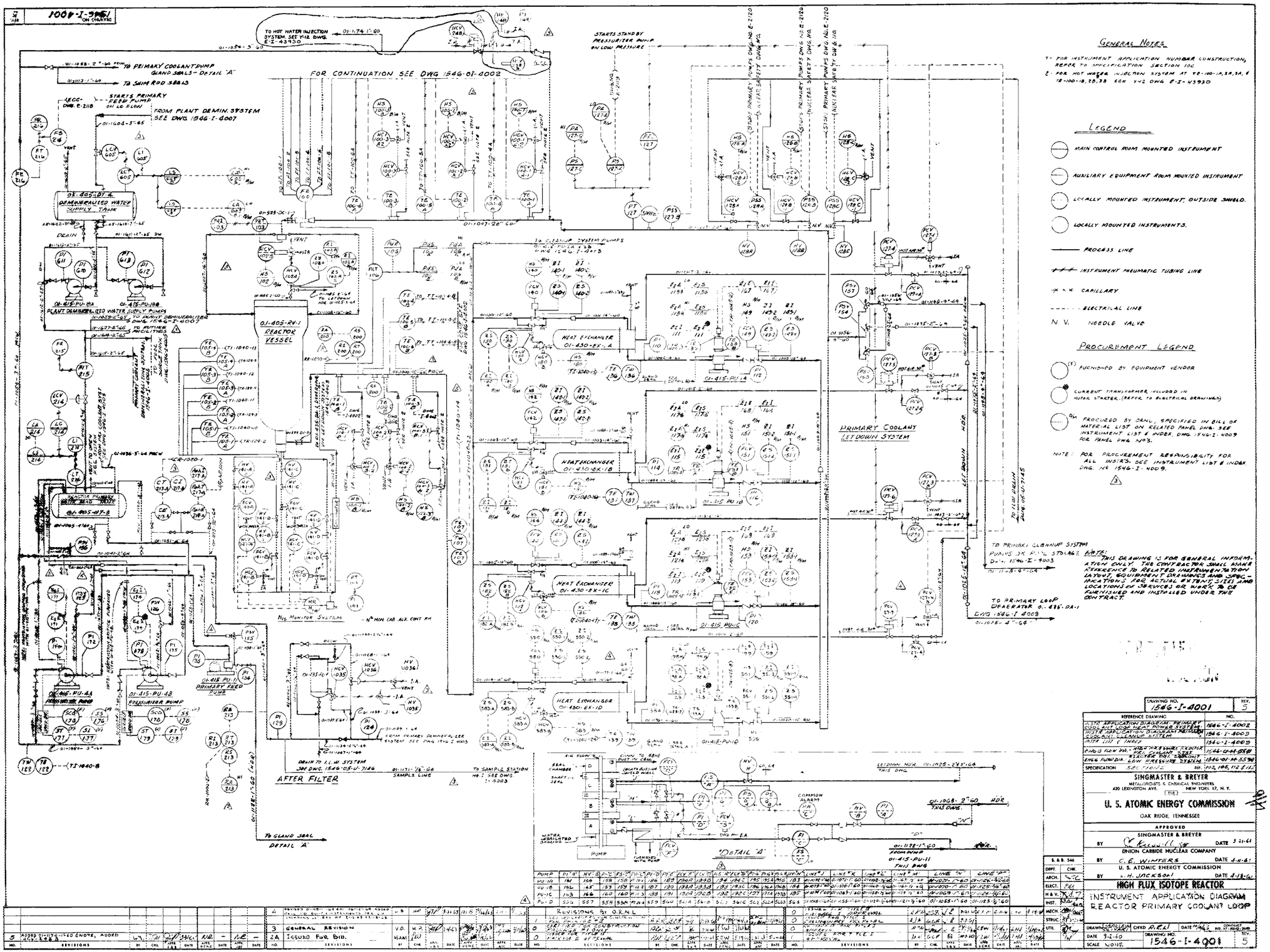
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER
BY [signature] DATE 6-2-61
UNION CARBIDE NUCLEAR COMPANY
BY C. S. WINTERS DATE 6-16-61
U. S. ATOMIC ENERGY COMMISSION
BY R. B. SOMERS DATE 6-23-61

HIGH FLUX ISOTOPE REACTOR
HEATING & VENTILATING
FILTER PIT DETAILS

S. & B. 340		
DEPT.	CHK.	
ARCH.	[illegible]	
ELECT.	[illegible]	
H & V.	[illegible]	
DISP.	[illegible]	
ARCH.	[illegible]	
STRUC.	[illegible]	6-23-61
UTIL.	[illegible]	

DRAWN A.T. CHKD. [illegible] DATE 5-1-61 APPROVALS NO. BY DATE
DATE 4-18-61 DRAWING NO. 1546-05-H&V-3055 REV. 3
SCALE AS NOTED



General Notes

1- FOR INSTRUMENT APPLICATION NUMBER CONSTRUCTION, REFER TO SPECIFICATION SECTION 10C

2- FOR HOT WATER INJECTION SYSTEM AT TE-100-1A,2A,3A, & TE-100-1B,2B,3B SEE Y-12 DWG E-I-43930

Legend

- MAIN CONTROL ROOM MOUNTED INSTRUMENT
- AUXILIARY EQUIPMENT ROOM MOUNTED INSTRUMENT
- LOCALLY MOUNTED INSTRUMENT, OUTSIDE SHIELD.
- LOCALLY MOUNTED INSTRUMENTS.
- PROCESS LINE
- INSTRUMENT PNEUMATIC TUBING LINE
- CAPILLARY
- ELECTRICAL LINE
- N.V. NEEDLE VALVE

Procurement Legend

- (F) FURNISHED BY EQUIPMENT VENDOR
- CURRENT TRANSFORMER INCLUDED IN MOTOR STARTER. (REFER TO ELECTRICAL DRAWINGS)
- (S) PROCURED BY SANL, SPECIFIED IN BILL OF MATERIAL LIST ON RELATED PANEL DWG. SEE INSTRUMENT LIST & INDEX, DWG. 1546-I-4009 FOR PANEL DWG. NO'S.

NOTE: FOR PROCUREMENT RESPONSIBILITY FOR ALL INSTRS. SEE INSTRUMENT LIST & INDEX DWG. NO. 1546-I-4009.

DRAWING NO.	1546-I-4001
REV.	5
REFERENCE DRAWING	NO.
01-STD APPLICATION DIAGRAM PRIMARY COOL. SYS. LOW HEAT POWER SYSTEM	1846-I-4002
01-STD APPLICATION DIAGRAM PRIMARY COOL. SYS. CLEANUP SYSTEM	1846-I-4003
INSTR. LIST & INDEX	1546-I-4009
P.&I.D. FLOW DIA.	1546-01-M-5578
P.&I.D. FLOW DIA. LOW PRESSURE SYSTEM	1546-01-M-5579
SPECIFICATION	SP. 10C, 10E, 10F, 10G, 10H, 10J

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N. Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

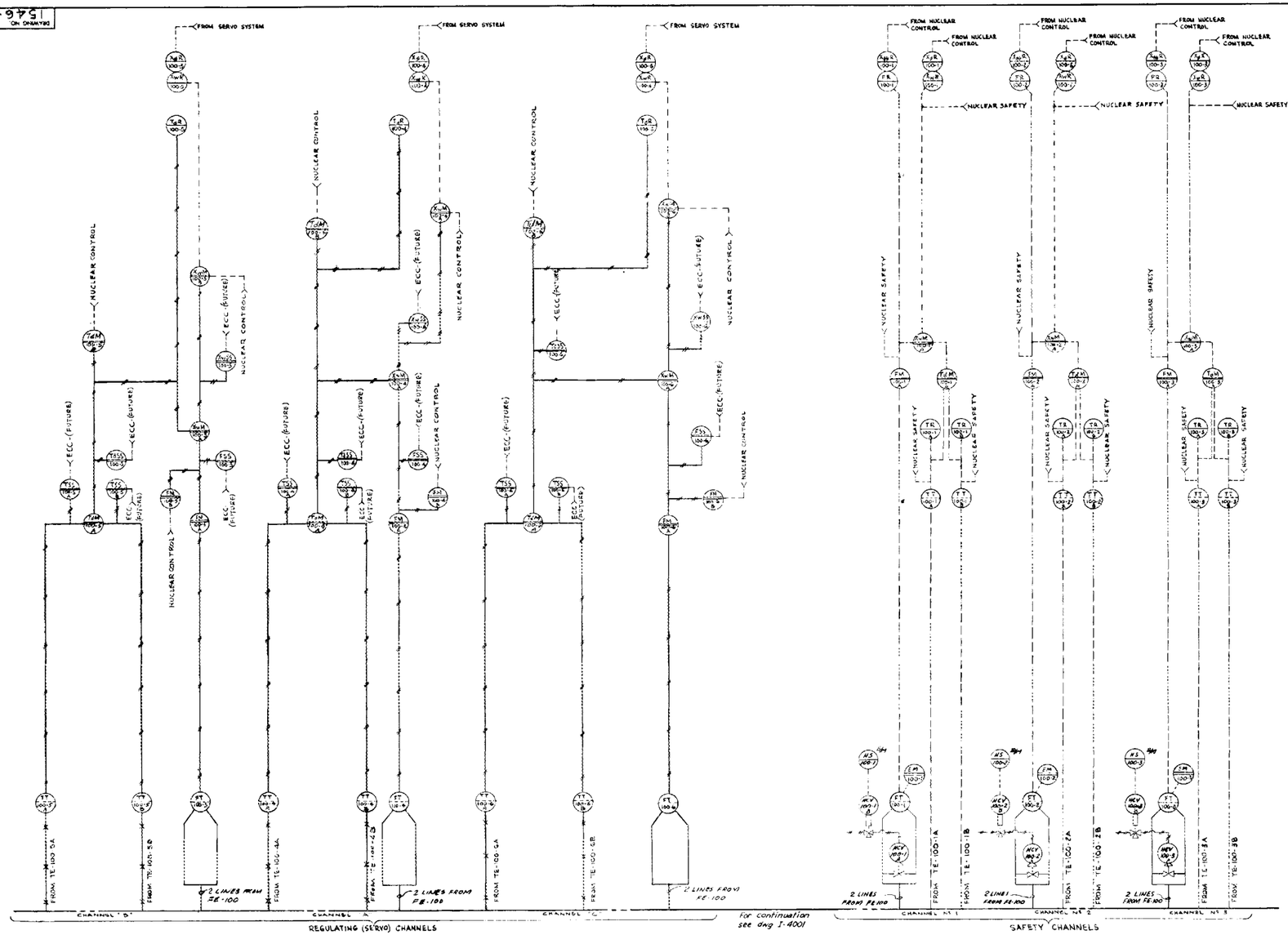
APPROVED
SINGMASTER & BREYER BY R. Kellwell DATE 3-21-61
UNION CARBIDE NUCLEAR COMPANY BY C. E. WINTERS DATE 4-11-61
U. S. ATOMIC ENERGY COMMISSION BY L. H. JACKSON DATE 4-13-61

HIGH FLUX ISOTOPE REACTOR
INSTRUMENT APPLICATION DIAGRAM
REACTOR PRIMARY COOLANT LOOP

DRAWING	CHKD O.E.K.
DATE 9-2-60	
SCALE NONE	
DRAWING NO.	1546-I-4001
REV.	5

NO.	REVISIONS	BY	CHK.	APPR.	DATE
5	ADDED 01-1174-1-160 ENOVE, ADDED				
4	REVISED 01-1071-1-160 ADDED				
3	GENERAL REVISION				
2A	ISSUED FOR BID.				
0	REVISIONS BY O.R.N.L.				

070



GENERAL NOTES

1. FOR GENERAL NOTES & LEGEND, SEE DWG #1546-I-4001

DRAWING NO. 1546-I-4002	REV. 3

REFERENCE DRAWING	NO.
INSTRUMENT APPLICATION DIAGRAM: REACTOR PRIMARY COOLANT LOOP	1546-I-4001
INSTRUMENT LIST & INDEX	1546-I-4009
SPECIFICATION SECTION	REF. 100, 108, 108 & 110

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U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER BY C. R. Gale DATE 2-7-61
UNION CARBIDE NUCLEAR COMPANY BY C. E. WINTERS DATE 3-30-61
U. S. ATOMIC ENERGY COMMISSION BY L. H. JACKSON DATE 8-2-61

HIGH FLUX ISOTOPE REACTOR

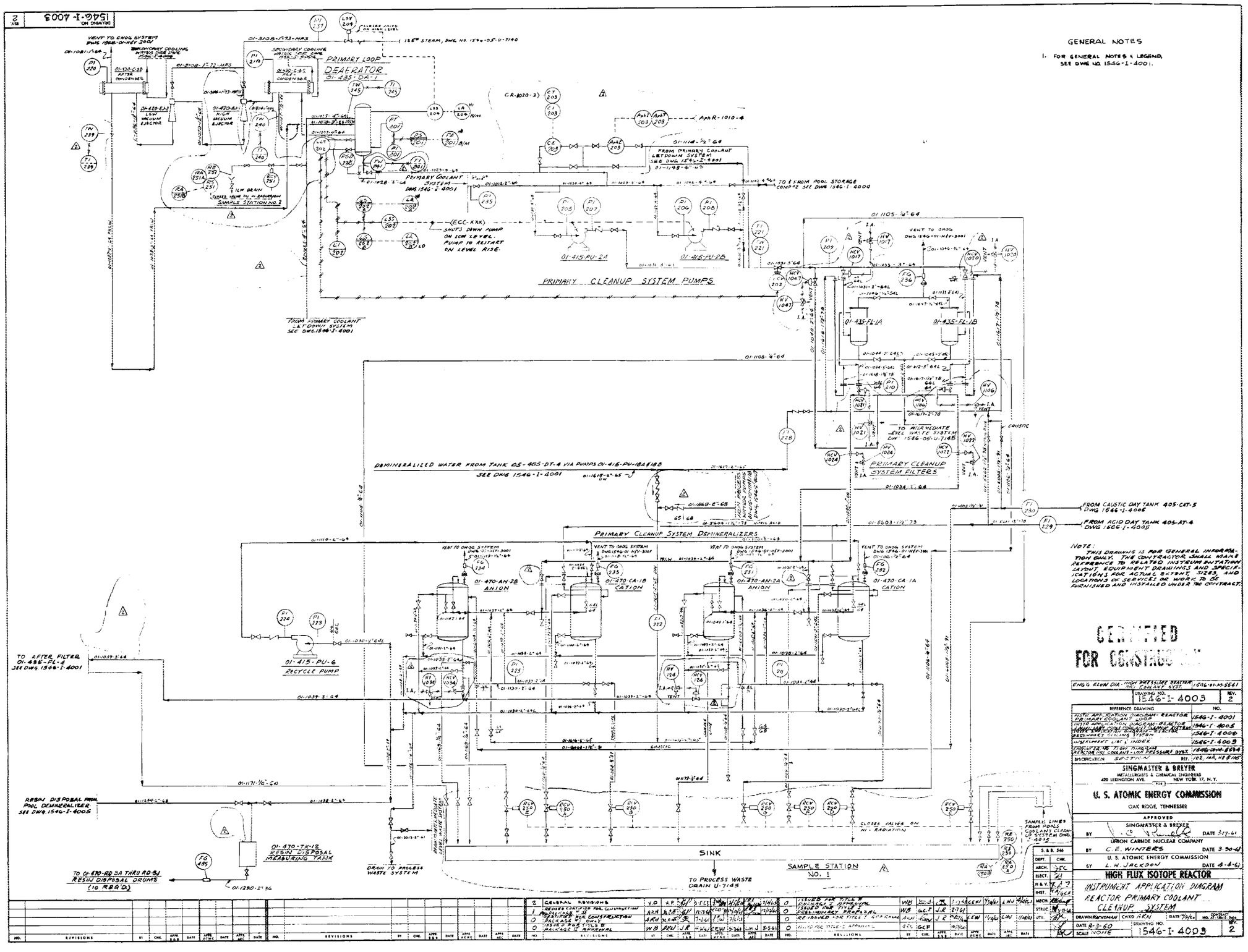
INSTRUMENT APPLICATION DIAGRAM
REACTOR PRIMARY COOLANT SYSTEM
(HEAT POWER SYSTEMS)

DRAWN JWD CHKD ARW DATE 10-4-60 DRAWING NO. 1546-I-4002 REV. 3
SCALE NONE

S. & B. 546
DEPT. CHK.
ARCH. SEC
ELECT. SEC
H. & V. SEC
INST. SEC
MECH. SEC
STRUC. SEC
UTIL. SEC

CERTIFIED FOR CONSTRUCTION

NO.	REVISIONS	BY	CHK.	APPR. C&B	DATE	APPR. ENGR.	DATE	APPR. ARC	DATE
3	ADDED CHANNEL DESIGNATIONS & A & B CHANNELS	VO	WP						
2A	ISSUED FOR BID.	JAW							
	REVISIONS BY ORNL								
1	REVISED & ISSUED FOR CONSTRUCTION FOR "RELEASE"	ARW							
0	ISSUED FOR TITLE II	ARW							
0	REVISED FOR TITLE II PRELIMINARY APPROVAL	AJA	GCR						
0	ISSUED FOR TITLE I	ARW							
0	ISSUED FOR TITLE I	ARW	GCP						



GENERAL NOTES

1. FOR GENERAL NOTES & LEGEND SEE DWG NO. 1546-I-4001.

NOTE: THIS DRAWING IS FOR GENERAL INFORMATION ONLY. THE CONTRACTOR SHALL MAKE REFERENCE TO RELATED INSTRUMENTATION LAYOUT EQUIPMENT DRAWINGS AND SPECIFICATIONS FOR ACTUAL SIZING, SIZES, AND LOCATIONS OF SERVICES OR WORK TO BE FURNISHED AND INSTALLED UNDER THE CONTRACT.

CERTIFIED FOR CONSTRUCTION

ENGG FLOW DIA - HIGH PRESSURE REACTOR PRIMARY COOLANT SYST. 1546-01-M-5661

DRAWING NO. 1546-I-4003 REV. 2

REFERENCE DRAWING	NO.
INSTR. APPLICATION DIAGRAM - REACTOR PRIMARY COOLANT LOOP	1546-I-4001
INSTR. APPLICATION DIAGRAM - REACTOR PRIMARY COOLANT CLEANUP SYSTEM	1546-I-4005
INSTR. APPLICATION DIAGRAM - REACTOR SECONDARY COOLING SYSTEM	1546-I-4006
INSTRUMENT LIST & INDEX	1546-I-4003
REACTOR HP FLOW DIAGRAM	1546-01-M-5664
REACTOR PRI. COOLANT - HIGH PRESSURE SYST.	1546-01-M-5661
SPECIFICATION SP-7174-N	REV. 102, 105, 112 & 115

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

FOR

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED

SINGMASTER & BREYER BY [signature] DATE 3-17-61

UNION CARBIDE NUCLEAR COMPANY BY C. E. WINTERS DATE 3-30-61

U. S. ATOMIC ENERGY COMMISSION BY L. H. JACKSON DATE 4-4-61

S. & B. 546

DEPT.	CHK.
ARCH.	FC
ELECT.	[illegible]
H & V.	[illegible]
INST.	[illegible]
MECH.	[illegible]
STRUC.	[illegible]
UTIL.	[illegible]

HIGH FLUX ISOTOPE REACTOR

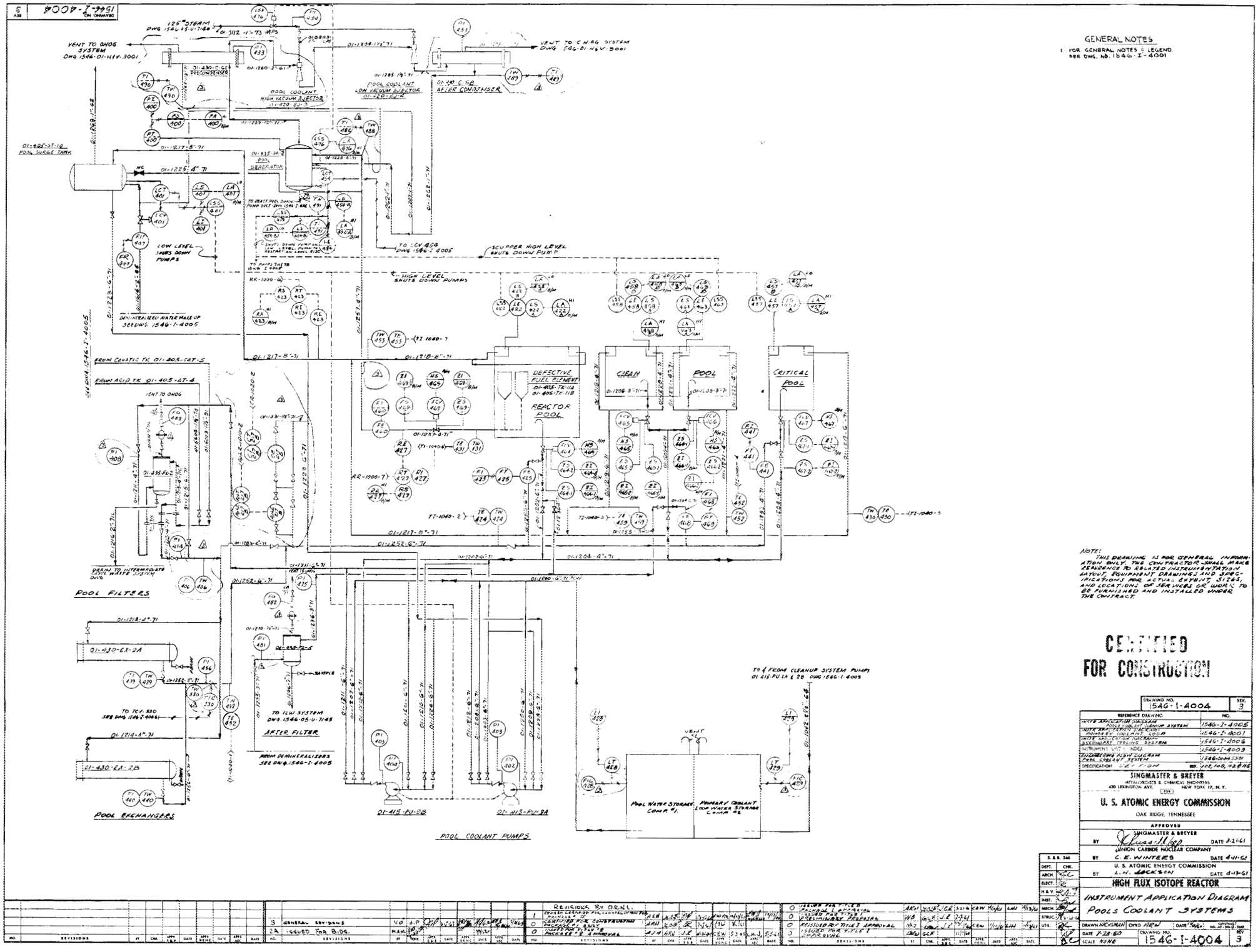
INSTRUMENT APPLICATION DIAGRAM
REACTOR PRIMARY COOLANT CLEANUP SYSTEM

DRAWN [illegible] CHKD [illegible] DATE [illegible] NO. [illegible] COMPLETE DWG. NO. [illegible] REV.

DATE 8-3-60 DRAWING NO. 1546-I-4003 REV. 2

SCALE NONE

NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. ECNC	DATE	APPR. AEC	DATE
2	GENERAL REVISIONS	V.O.	H.P.	[illegible]	3-17-61	[illegible]	[illegible]	[illegible]	[illegible]
1	REVISED CONTROL FOR CONSTRUCTION	S.R.H.	[illegible]	[illegible]	11-15-60	[illegible]	[illegible]	[illegible]	[illegible]
0	PACKAGE "B" DWG. FOR CONSTRUCTION	S.R.H.	[illegible]	[illegible]	7-1-60	[illegible]	7/6/60	[illegible]	[illegible]
0	PACKAGE "B" DWG. ISSUED FOR TITLE II	W.B.	[illegible]	J.R.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0	PACKAGE "B" APPROVAL	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0	ISSUED FOR TITLE I	W.B.	[illegible]	J.R.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0	FINAL ISSUE FOR TITLE I	W.B.	[illegible]	J.R.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0	PRELIMINARY PROPOSAL	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0	RE-ISSUED FOR TITLE I APPROVAL	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0	ISSUED FOR TITLE I APPROVAL	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

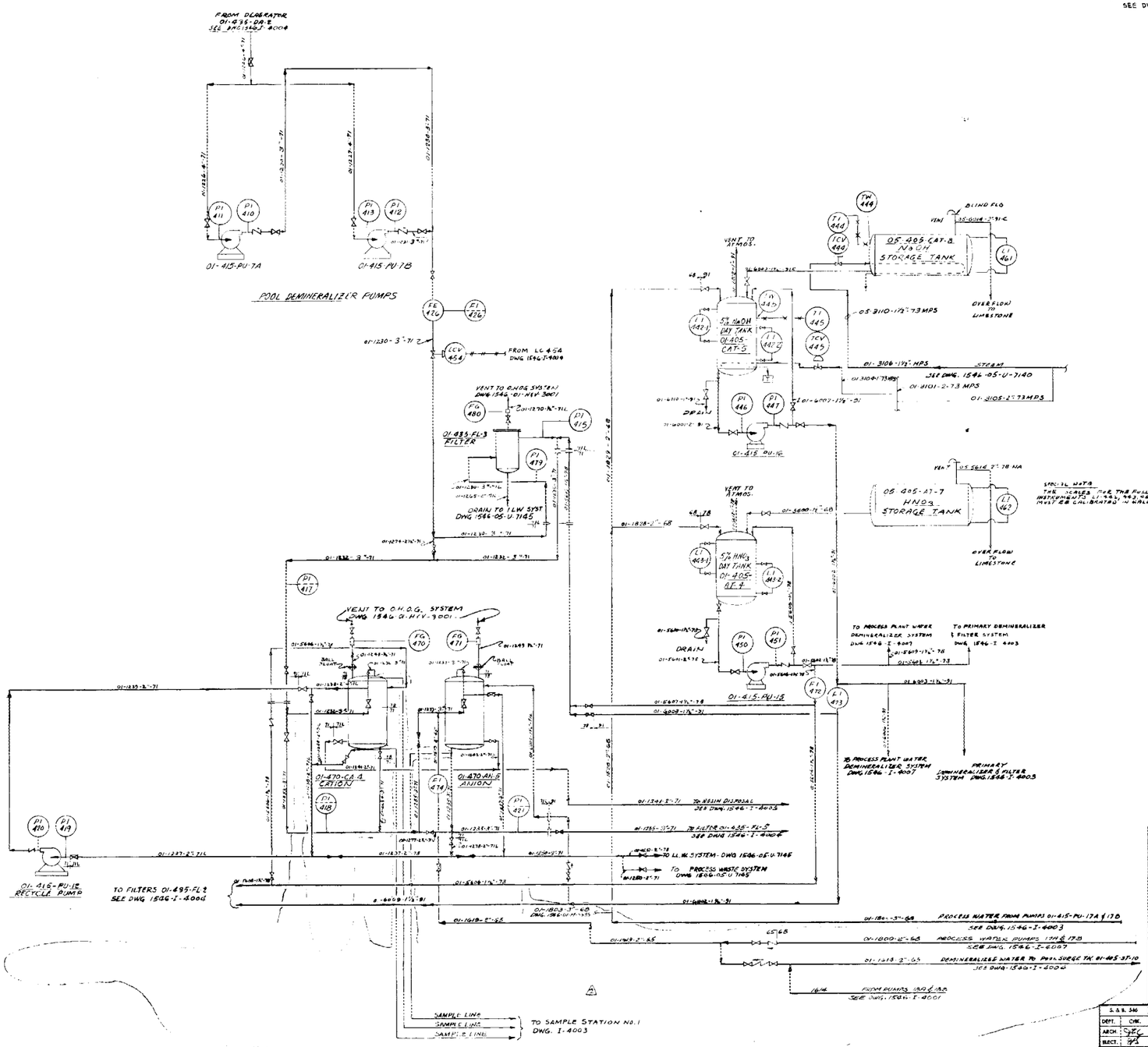


NOTE:
THIS DRAWING IS FOR GENERAL INFORMATION ONLY. THE CONTRACTOR SHALL MAKE REFERENCE TO RELATED INSTRUMENTATION LAYOUT, EQUIPMENT DRAWINGS AND SPECIFICATIONS FOR ACTUAL EXPANT SIZES, AND LOCATIONS OF SERVICES OR WORK TO BE FURNISHED AND INSTALLED UNDER THE CONTRACT.

DRAWING NO. 1546-I-4005 REV 2

GENERAL NOTES

1. FOR GENERAL NOTES & LEGEND, SEE DWG. NO. 1546-I-4001



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CERTIFIED FOR CONSTRUCTION

REFERENCE DRAWING	NO.
NOTE APPLICATION DIAGRAM PRIMARY COOLANT CLEANUP SYSTEM	1546-I-4003
NOTE APPLICATION DIAGRAM - PRIMARY COOLANT SYSTEM	1546-I-4006
INSTRUMENT LIST & INDEX	1546-I-4000
INTERLOCKING TIMER DIAGRAM POOL CLEANUP SYSTEM	1546-01-M-5561

SPECIFICATION SECTION REF. 102, 108, 113 & 116

SINGMASTER & BREYER
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420 LEXINGTON AVE. NEW YORK 17, N. Y.

FOR U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER BY DATE 3-17-61
UNION CARBIDE NUCLEAR COMPANY BY C.E. WINTERS DATE 7-30-61
U. S. ATOMIC ENERGY COMMISSION BY L.H. JACKSON DATE 8-8-61

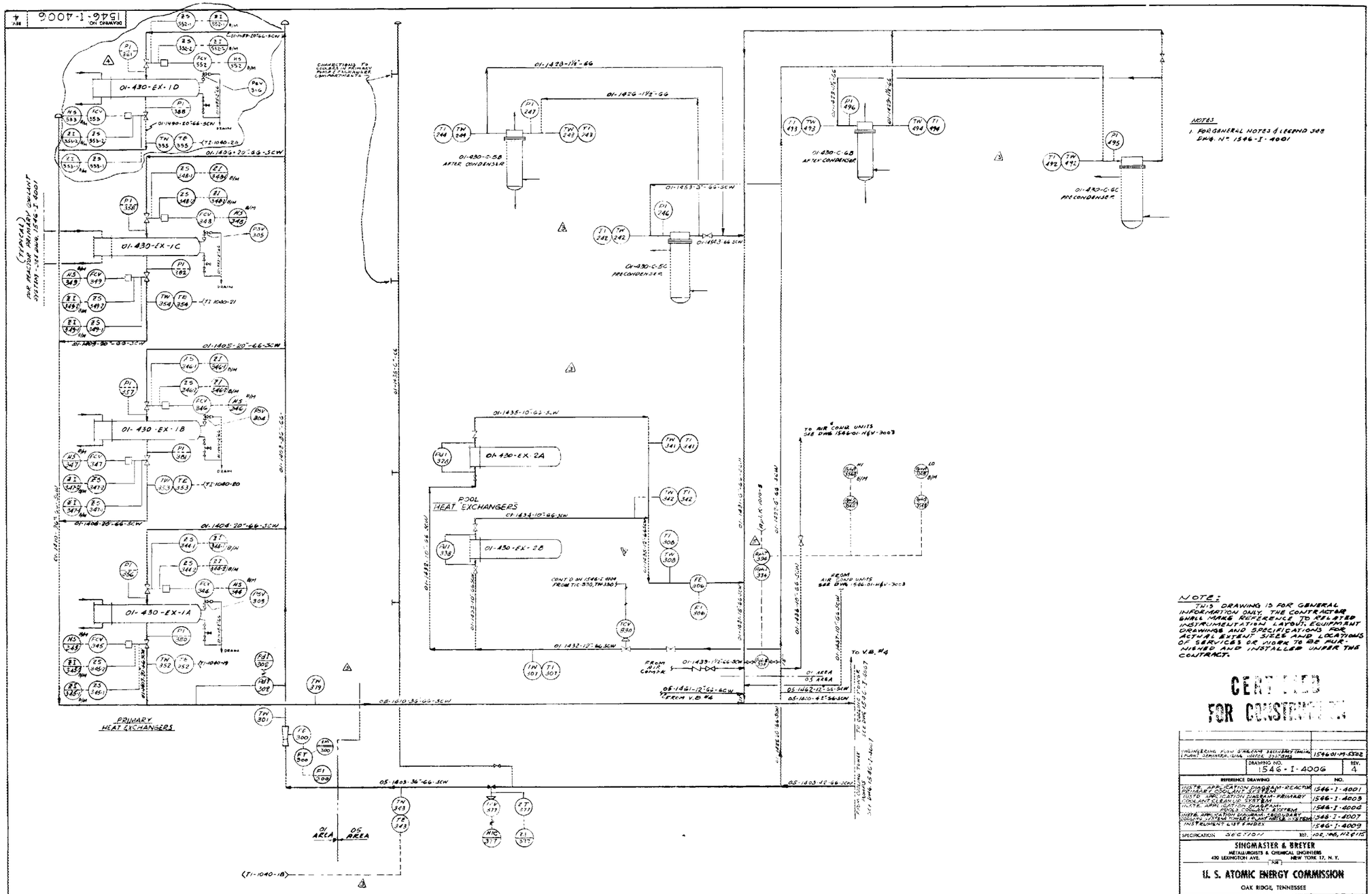
HIGH FLUX ISOTOPE REACTOR

INSTRUMENT APPLICATION DIAGRAM
POOLS COOLANT CLEANUP SYSTEM

DRAWN BACKMAN CHKD ARN DATE 8-2-60 DRAWING NO. 1546-I-4005 REV 2
SCALE NONE

NO.	REVISIONS	BY	CHK.	APPR. ELEC.	DATE	APPR. MECH.	DATE	APPR. INST.	DATE
2	GENERAL REVISION	V.O.	H.P.						
1	REVISED CERTIFIED FOR CONSTRUCTION PHASE I & II	ARN	JCB						
0	CERTIFIED FOR CONSTRUCTION	ARN	JCB						
0	ISSUED FOR REVIEW	WB	ARN	J.R.					
0	PACKAGE II APPROVAL								
0	ISSUED FOR PACKAGE I APPROVAL	ARN	JCB	J.R.	7-17-61	CEW	7/19/61	LHJ	7/19/61
0	ISSUED FOR PACKAGE I APPROVAL	WB	GCF	J.R.	7-7-61				
0	REVISED FOR PACKAGE I APPROVAL	ARN	JCB	J.R.	7-7-61	CEW	7/19/61	LHJ	7/19/61
0	ISSUED FOR PACKAGE I APPROVAL	ARN	JCB		10-1-60				
0	ISSUED FOR PACKAGE I APPROVAL	ARN	JCB		10-1-60				

S. & B. 346	
DEPT.	CHK.
ARCH.	
ELECT.	
H. & V.	
INST.	
MECH.	
STRUC.	
UTIL.	



NOTE: THIS DRAWING IS FOR GENERAL INFORMATION ONLY. THE CONTRACTOR SHALL MAKE REFERENCE TO RELATED INSTRUMENTATION LAYOUT, EQUIPMENT DRAWINGS AND SPECIFICATIONS FOR ACTUAL EXTENT, SIZES AND LOCATIONS OF SERVICES OR WORK TO BE FURNISHED AND INSTALLED UNDER THE CONTRACT.

CERTIFIED FOR CONSTRUCTION

ENGINEERING FLOW DIAGRAM SECONDARY COOLING PLANT SEWAGE, GAS, WATER SYSTEMS	1546-01-M-5502
DRAWING NO. 1546-I-4006	REV. 4
REFERENCE DRAWING	NO.
NOTES AND LEGEND	1546-I-4001
INSTRUMENT APPLICATION DIAGRAM-REACTOR PRIMARY COOLANT SYSTEM	1546-I-4002
INSTRUMENT APPLICATION DIAGRAM-PRIMARY COOLANT SERVICE SYSTEM	1546-I-4003
INSTR. APPL. DIAGRAM-FLOW CHART-PRIMARY COOLANT SYSTEM	1546-I-4004
INSTR. APPL. DIAGRAM-FLOW CHART-SECONDARY COOLING SYSTEM	1546-I-4005
INSTRUMENT LIST AND INDEX-PRIMARY COOLANT SYSTEM	1546-I-4007
INSTRUMENT LIST AND INDEX-SECONDARY COOLING SYSTEM	1546-I-4008
INSTRUMENT LIST AND INDEX	1546-I-4009
SPECIFICATION SECTION	102, 105, 112, 115

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER BY [signature] DATE 3-17-61
UNION CARBIDE NUCLEAR COMPANY BY C. E. WINTERS DATE 3-20-61
U. S. ATOMIC ENERGY COMMISSION BY L. H. JACKSON DATE 8-8-61

HIGH FLUX ISOTOPE REACTOR

INSTRUMENT APPLICATION DIAGRAM
SECONDARY COOLING SYSTEM

S. & B. 546 | DEPT. CHK. | ARCH. | ELECT. | H & V. | INST. | MECH. | STRUC. | UTIL.

DRAWN WHOBS MAY CHKD. [illegible] DATE [illegible] NO. [illegible]
DATE 8-5-50 DRAWING NO. 1546-I-4006 REV. 4
SCALE None

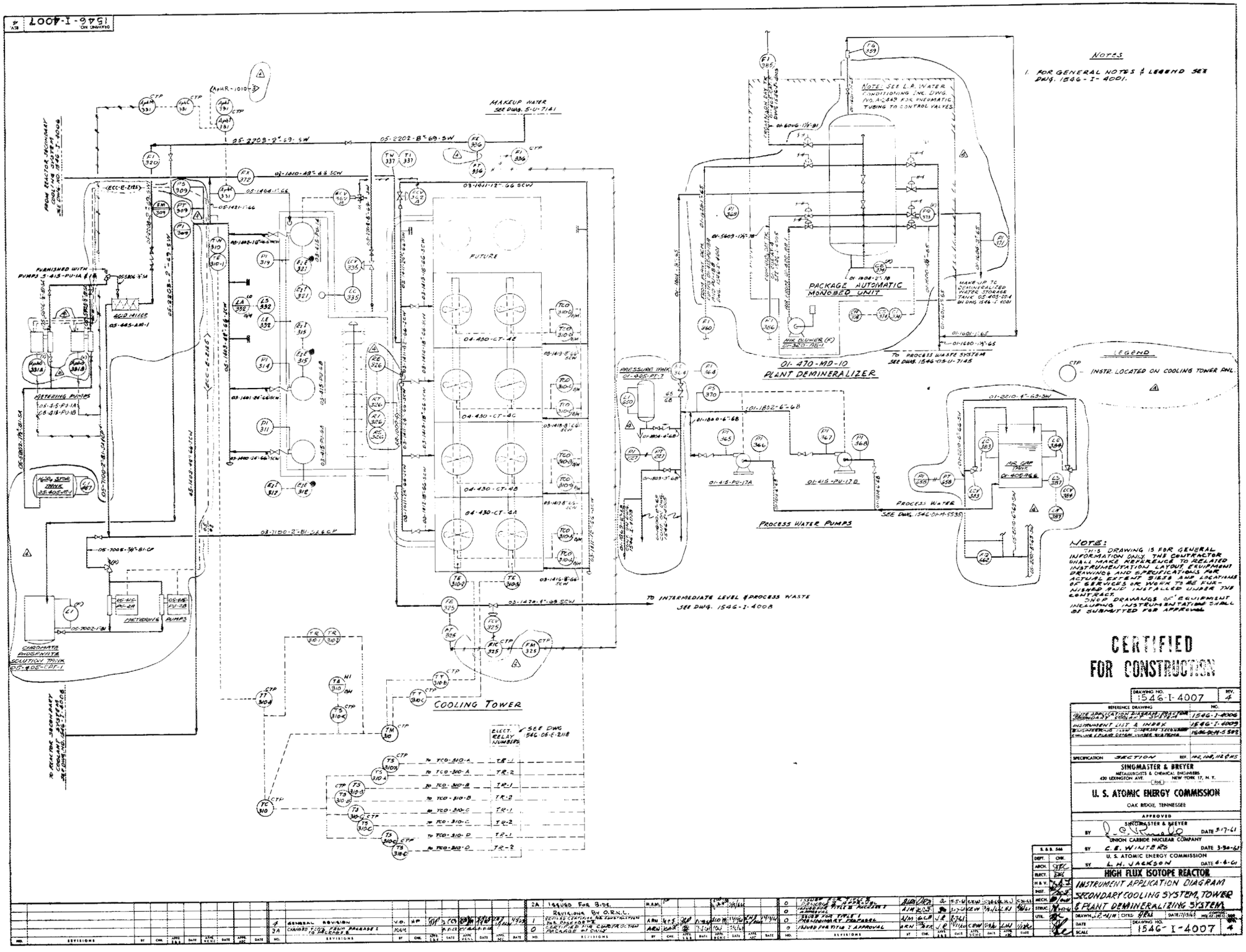
NO.	REVISIONS	BY	CHK.	APPD. ENG.	DATE	APPD. ARCH.	DATE	APPD. ELEC.	DATE
4	ADDED ENG. NO. 1546-01-ISOTOPE-E ASSOCIATED NOTES PER L.H. JACKSON LETTER DT. 3-3-61	V.B.	N.P.	[illegible]	3-14-61	A.L.D.	3-14-61	L.N.J.	3-14-61
3	GENERAL REVISION	V.B.	N.P.	[illegible]	2-6-61	[illegible]	[illegible]	[illegible]	[illegible]
2A	ISSUED FOR BIDS.	M.A.M.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

NO.	REVISIONS	BY	CHK.	APPD. ENG.	DATE	APPD. ARCH.	DATE	APPD. ELEC.	DATE
1	REVISED & CERTIFIED FOR CONSTRUCTION	A.R.J.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0	ISSUED FOR CONSTRUCTION	A.R.J.	[illegible]	[illegible]	7-6-60	[illegible]	[illegible]	[illegible]	[illegible]
0	PACKAGE A-2 ONLY	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0	ISSUED FOR TITLE I	W.B.	A.R.J.	[illegible]	[illegible]	C.E.W.	[illegible]	L.N.J.	[illegible]
	PACKAGE 2 APPROVAL								

NO.	REVISIONS	BY	CHK.	APPD. ENG.	DATE	APPD. ARCH.	DATE	APPD. ELEC.	DATE
0	ISSUED FOR TITLE II	A.R.J.	[illegible]	[illegible]	[illegible]	C.E.W.	[illegible]	L.N.J.	[illegible]
0	PACKAGE I APPROVAL	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0	ISSUED FOR TITLE I	W.B.	G.C.F.	J.Z.	2-7-61	[illegible]	[illegible]	[illegible]	[illegible]
	PRELIMINARY PROPOSAL								
0	REVISED FOR TITLE I APPROVAL	G.C.F.	[illegible]	[illegible]	[illegible]	C.E.W.	[illegible]	L.N.J.	[illegible]
	ISSUED FOR TITLE I PROPOSAL	A.R.J.	G.C.F.	[illegible]	[illegible]				

075

DRAWING NO. 1546-I-4007 REV. 4



NOTES

1. FOR GENERAL NOTES & LEGEND SEE DWG. 1546-I-4001.

NOTE:
THIS DRAWING IS FOR GENERAL INFORMATION ONLY. THE CONTRACTOR SHALL MAKE REFERENCE TO RELATED INSTRUMENTATION LAYOUT EQUIPMENT DRAWINGS AND SPECIFICATIONS FOR ACTUAL EXTENT SIZES AND LOCATIONS OF SERVICES OR WORK TO BE FURNISHED AND INSTALLED UNDER THE CONTRACT.
SHOP DRAWINGS OF EQUIPMENT INCLUDING INSTRUMENTATION SHALL BE SUBMITTED FOR APPROVAL.

CERTIFIED FOR CONSTRUCTION

DRAWING NO. 1546-I-4007 REV. 4

REFERENCE DRAWING	NO.
WATER SUPPLY & DISTRIBUTION SYSTEM	1546-I-4006
INSTRUMENT LIST & INDEX	1546-I-4009
EQUIPMENT LIST & DIAGRAM TECHNICAL CONTROL PLANT COOLING WATER SYSTEM	1546-01-M-5502

SPECIFICATION SECTION REF. HR, HR, HR & HS

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N. Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER BY R. E. Rumble DATE 3-17-61
UNION CARBIDE NUCLEAR COMPANY BY C. E. WINTERS DATE 3-30-61
U. S. ATOMIC ENERGY COMMISSION BY L. H. JACKSON DATE 4-4-61

HIGH FLUX ISOTOPE REACTOR
INSTRUMENT APPLICATION DIAGRAM
SECONDARY COOLING SYSTEM, TOWER & PLANT DEMINERALIZING SYSTEM

DRAWN J.R. 4/18/61 CHKD. DATE 7/19/61 DRAWING NO. 1546-I-4007 REV. 4
DATE
SCALE

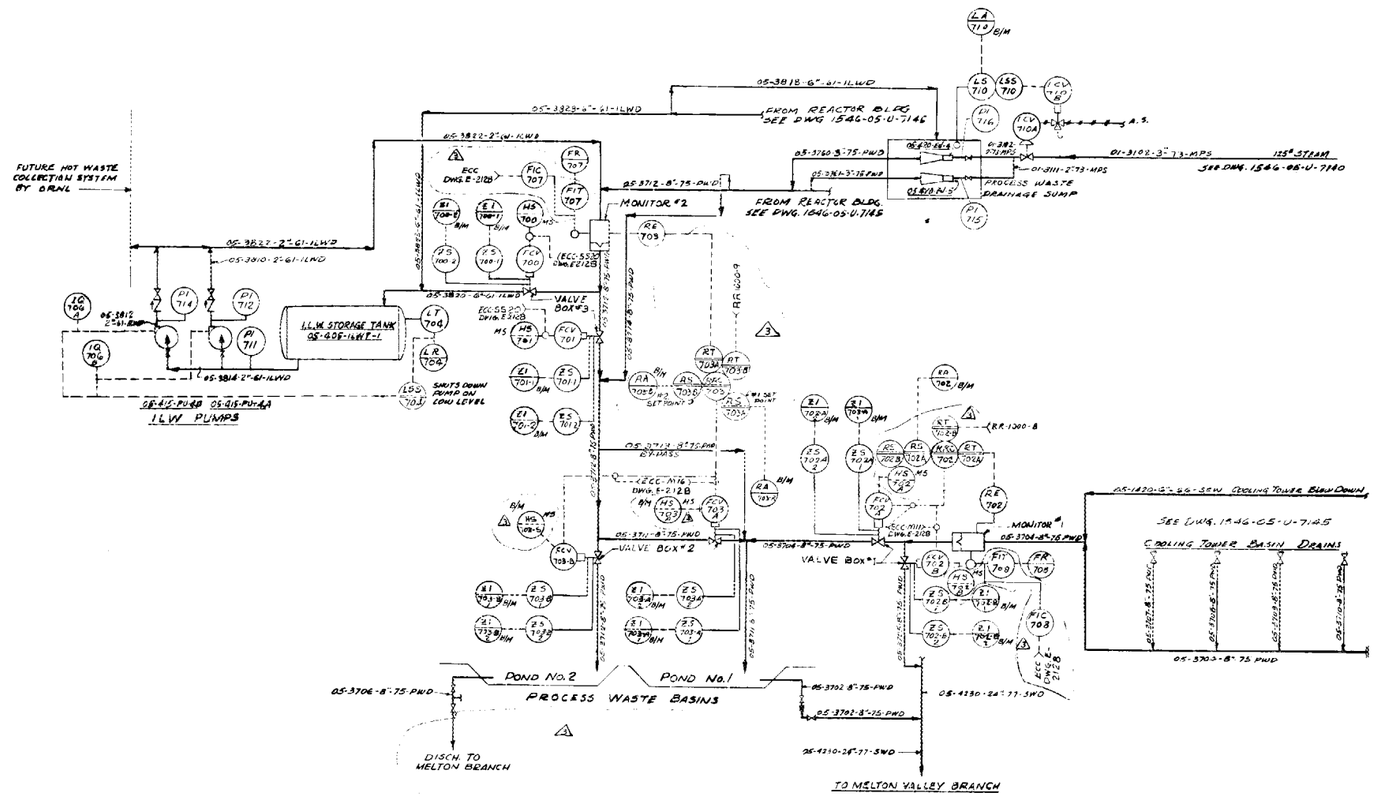
NO.	REVISIONS	BY	CHK.	APPD. ENG.	DATE	APPD. MECH.	DATE	APPD. ARC.	DATE
4	GENERAL REVISION	V.D.	HP						
3A	CHANGED FROM PHASE I TO PHASE II	NAM							
2A	ISSUED FOR BIDS	NAM							
1	REVISIONS BY O.R.N.L. REVISED CERTIFIED FOR CONSTRUCTION FOR PHASE I OF JOB	ARN							
0	CERTIFIED FOR CONSTRUCTION PHASE I OF JOB	ARN							
0	ISSUED FOR REVIEW								
0	ISSUED FOR TITLE I PRELIMINARY PURPOSE								
0	ISSUED FOR TITLE I APPROVAL								

076

DRAWING NO. 1546-I-4008 REV. 3

General Notes

1. For General Notes & Legend See Dwg. No. 1546-I-4001



LEGEND

MS - MOTOR STARTER

NOTE: THIS DRAWING IS FOR GENERAL INFORMATION ONLY. THE CONTRACTOR SHALL MAKE REFERENCE TO RELATED INSTRUMENTATION, LAYOUT, EQUIPMENT DRAWINGS AND SPECIFICATIONS FOR ACTUAL EXTENT, SIZES AND LOCATIONS OF SERVICES OR WORK TO BE FURNISHED AND INSTALLED UNDER THE CONTRACT.

CERTIFIED FOR CONSTRUCTION

DRAWING NO. 1546-I-4008 KEY. 3

REFERENCE DRAWING	NO.
PROCESS WASTE & ILW DETAILS	1546-05U-7120
ILW & PROCESS WASTE SYSTEMS	1546-05U-7140
YARD PIPING	1546-05U-7142
INSTRUMENT LIST AND INDEX	1546-I-4009
FLOW DIAGRAM - PROCESS WASTE & I.L.W.	1546-05U-7145
SPECIFICATION SECTION	REV. 100, 105, 110 & 115

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER BY J. Russell Gee DATE 3-23-61
UNION CARBIDE NUCLEAR COMPANY BY C. E. WINTERS DATE 4-17-61
U. S. ATOMIC ENERGY COMMISSION BY L. N. JACKSON DATE 4-19-61

S. & B. 546

HIGH FLUX ISOTOPE REACTOR

INSTRUMENT APPLICATION DIAGRAM
INTERMEDIATE LEVEL & PROCESS WASTE SYSTEMS

DRAWN ARN CHKD GCF DATE 1/6/61
DATE 12/22/60 DRAWING NO. 1546-I-4008 REV. 3
SCALE

NO.	REVISIONS	BY	CHK.	APP. S&B	DATE	APP. UCNC	DATE	APP. AEC	DATE
3	GENERAL REVISION	V.D.	AP						
2A	ISSUED FOR BID.								
0	ISSUED FOR TITLE II PACKAGE 2 APPROVAL	ARN	ARN	JF	2-23-61	CEW	4-17-61	LWJ	4-19-61
0	ISSUED FOR TITLE I APPROVAL	ARN		GCF	1-12-61				
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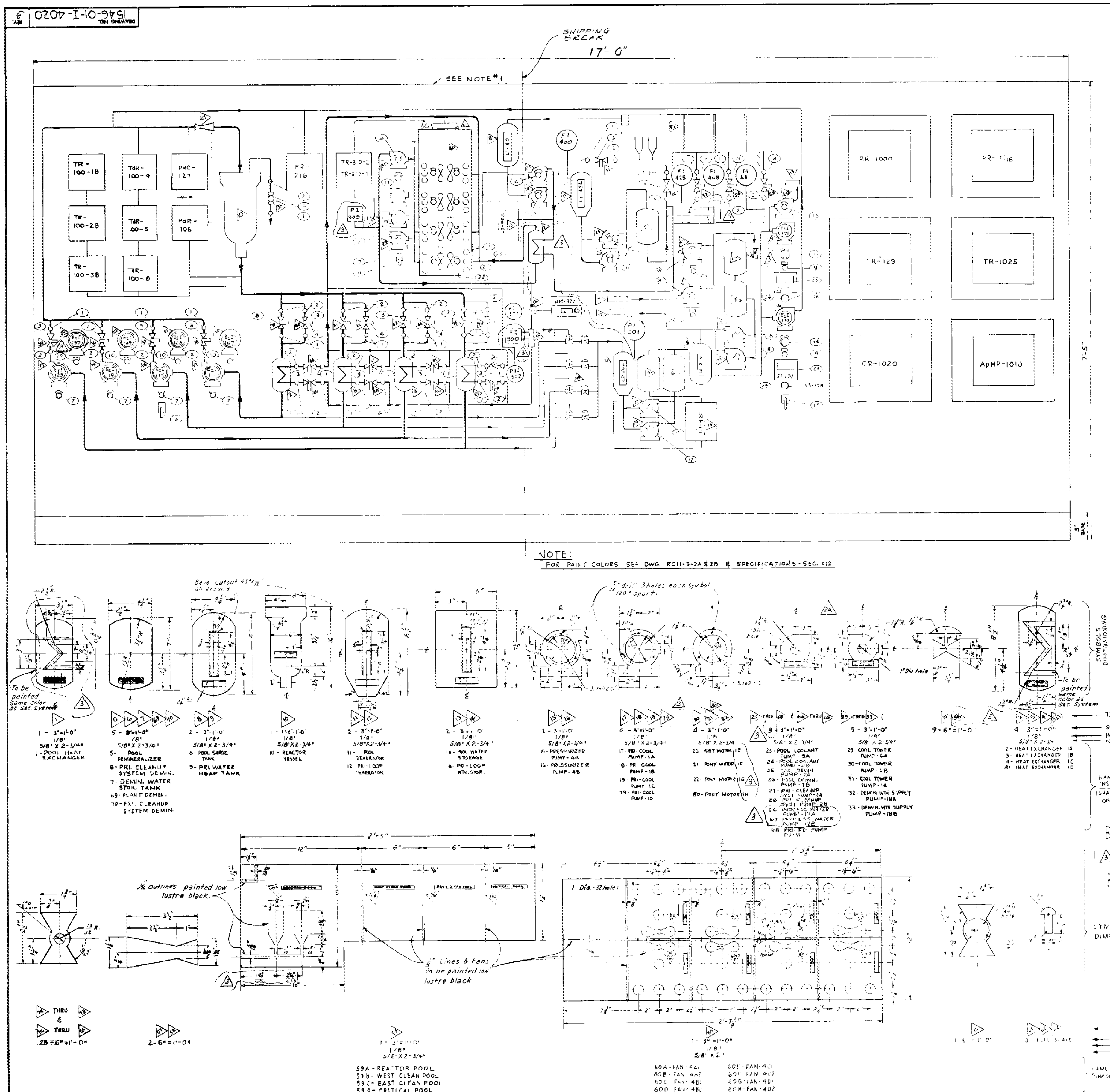


BILL OF MATERIAL

ITEM MARK NO.	QUAN.	DESCRIPTION
1	26	Indicating lamp with engraved lens for 115V operation. Lens to have word "OPEN" engraved in black letters on a green translucent background. H.R. Kirkland Co. Model # 150 with type CE lens engraving code No.7 and type S6 150 Bulb.
2	26	Indicating lamp same as item mark 1 except with word "CLOSED" engraved on a red translucent lens.
3 ‡	21	GE Type SB-1 control switch, 1 stage, no escutcheon plate required, installed on panel so that only pistol grip handle extends beyond face of panel. Switch to have 3 positions, non-spring return with contact arrangement as shown in elementary #27 Dwg. E-2125 GENERAL ELECTRIC type SB-1, special mounting required. SEE DWG RCII-5-2B
4 ‡	4	GE Type SB-1 control switch, 1 stage, no escutcheon plate required, installed on panel so that only pistol grip handle extends beyond face of panel. Switch to have 2 positions, non-spring return with contact arrangement as shown on elementary #27 Dwg. #E-2125. Special mounting required. See Dwg RCII-5-2B
5	1	One unit pushbutton station, momentary contact, one normally closed, one normally open contact, Button to be engraved "VENT", flush head, black button, Allen Bradley Bulletin 800T Cat. #A2A. Engraving to be block letters 3/16" high, white filled.
6 *	4	2 position backlighted Selector switch, escutcheon plate marked OFF-RESET-ON, Amber color lens, non-spring return 115V operation, contact arrangement to be as shown in elementary diagrams #6,#7,&#9 Dwg. No. E-2117 furnished by Company.
7 *	6	3 position, backlighted selector switch, escutcheon plate marked STOP-N-START, spring return to "N" position from either START or STOP position, Amber color lens, 110V, operation, contact arrangement as shown in elementary #19 & #21 Dwg. No. E-2117 Furnished by Company.
8 *	3	Same as item mark 7 except contact arrangement as shown in elementary #8 Dwg. No. E-2117 & elementary #22 Dwg. No. E-2118 furnished by Company
9	4	Illuminated pushbutton station, 115V operation, 1 set of 1 normally open contact & 1 normally closed contact, Name plate marked STANDBY, Blue lens Dialight Corp. Sw. 152-11. Name Plate Shall Be 1/16 Lamicoid, (Black Facings & White Core) 3/8 x 1 1/2 With 1/8 Letters. Bevel Edges 1/32 x 45°
10	4	Same as item mark 5 except legend plate marked "TEST". See elementary #19, Dwg. E-2120
11	1	3 position, 2 stage selector switch, non-spring return, escutcheon plate marked "PU-6A,B - PU-6B,C - PU-6C, A", pistol grip, contact arrangement as shown in elementary #21 Dwg. No. E-2120. General Electric Co. type SB-1.
12 *	2	Same as item mark 6 except escutcheon plate marked OFF-ON, contact arrangement as shown in elementary #17, Dwg. No. E-2119 Funished by Company
13 *	1	Same as item mark 6 except escutcheon plate marked STOP-REMOTE CONTROL contact arrangement as shown in elementary #24 Dwg. No. E-2118 Furnished by company.
14 *	2	Same as item mark 7 except contact arrangement as shown in elementary #18 Dwg. No. E-2119. Furnished by Company.
15	1	Same as item mark 11 except 2 position, escutcheon plate marked PU-4A-PU-4B, contact arrangement as shown in elementary #18 Dwg. E-2119
16	1	Same as item mark 11 except 4 position, escutcheon plate marked PU-1A, B/C -, PU-1B,C,D- PU-1C,D,A - PU-1D,A,B, contact arrangement as shown in elementary #19 Dwg. No. E-2120.
17 *	1	Same as item mark 7 except escutcheon plate marked OFF-AUTO-RUN, non-spring return, contact arrangement as shown in elementary #23 Dwg. No. E-2118. Furnished by company
18 *	2	Same as item mark 7 except escutcheon plate marked STANDBY-STOP-START, non-spring return, contact arrangement as shown in elementary #11 & #12 Dwg. No. E-2117.
19	8	Illuminated P.B. station, 115V operation, built in transformer for use with 6 volt bulb, 2 sets of tandem operated contact blocks, each contact block to have one normally open and one normally closed contact, legend plate marked "FAST-FORWARD", Amber lens, CAT. #10250T-411-C23-11P36X; Cutler-Hammer
20	8	Same as item mark 19 except legend plate marked SLOW-FORWARD, green lens, Cutler-Hammer Cat. #10250-T-411-C22-11P36X.
21	6	Same as item mark 19 except legend plate marked SLOW-REVERSE white lens, Cutler-Hammer Cat. #10250T-411-C26-1P36X.
22	8	Same as item mark 7 except escutcheon plate marked OFF-AUTO-RUN contact arrangement as shown in elementary #16, Dwg. No. E-2118.
23	2	Voltmeter for pressurizer pump speed indication furnished to the Company by the pressurizer pump Seller and furnished by the Company to the panel Seller.
24	2	Potentiometer for pressurizer pump speed control furnished to the Company by pressurizer pump Seller and furnished by the Company to the panel Seller.

* CONTACT RATING:-5 AMPERES CONTINUOUS, 20 AMPERES FOR 3 SECONDS.

‡ These switches to be installed so that when the pointer on the pistol grip is pointed in direction of green "OPEN" indicating light the valve controlled by the switch will open, And to operate similarly for the closed position.

NOTES:

1. For front view of annunciators which are located on top of this panel see Dwg. # 1546-01-I-4039.

CERTIFIED FOR CONSTRUCTION

NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. UCNC	DATE	APPR. AEC	DATE
3	Revised pump symbols for process water pumps 17A & 17B, revised no. of pump symbols, revised symbol ... Added FI 400 & 201, Chg'd. SI 300 & PI 309, chg'd. ...	MK	HP						
2A	Removed 5/16 hole in pump symbols	NB			8-31-62				
1A	ISSUED FOR BID								
	ORNL REVISIONS								
0	CERTIFIED FOR CONSTRUCTION Package 3	ARN							
0	ISSUED FOR PKG II, TITLE II APPROVAL	ARN							

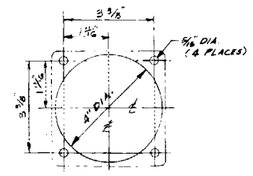
REFERENCE DRAWING	NO.
INSTRUMENT LIST AND INDEX	1546-I-4009
PROCESS PANELBOARD "E" INSTRUMENT LOCATION & TUBING CONNECTION DETAILS	1546-01-I-4021
SPECIFICATION SECTIONS	REF. 108, 112

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.
FOR
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

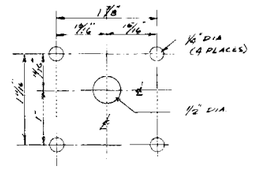
APPROVED
SINGMASTER & BREYER BY [signature] DATE 7-29-61
UNION CARBIDE NUCLEAR COMPANY BY C. E. WINTERS DATE 10-4-61
U. S. ATOMIC ENERGY COMMISSION BY L. H. JACKSON DATE 10-6-61

HIGH FLUX ISOTOPE REACTOR
PROCESS PANELBOARD "E"
GENERAL ARRANGEMENT & B/M

DRAWN FWD CHKD. H.C.F. DATE 9/25/61 CONTRACT NO. AT-(40-1)-2688
DATE 9/8/61 DRAWING NO. 1546-01-I-4020 REV. 3
SCALE 1 1/2"=1'-0" / AS NOTED



CUTOUT DETAIL
HALF SIZE
ITEMS Nº 1A, 1B, 1C, 2A, 2B, 2C, 3



CUTOUT DETAIL
FULL SIZE
ITEMS Nº 1B 24, 25, 36
37, 38, 7, 8, 9, 10,

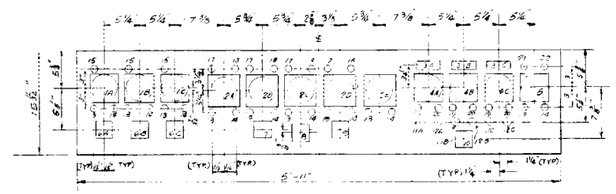
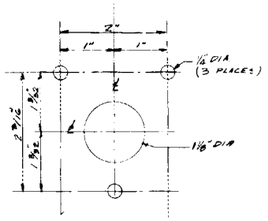
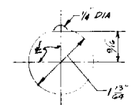


PLATE "B"
SCALE 1 1/2" = 1'-0"
Mat'l. 10 ga. Sh. St.



CUTOUT DETAIL
FULL SIZE
ITEMS Nº 6A, 6B, 6C, 23



CUTOUT DETAIL
FULL SIZE
ITEMS Nº 11A, 11B, 11C
18A, 18B, 18C, 34, 35, 29 INCL
39, 79, 96 INCL, 55, 53

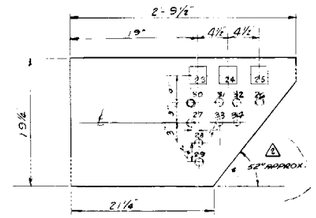
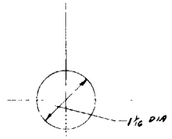
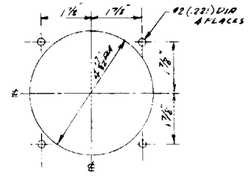


PLATE "A"
SCALE 1 1/2" = 1'-0"
Mat'l. 10 ga. Sh. St.



CUTOUT DETAIL
FULL SIZE
ITEMS Nº 13 TO 22 INCL.
33, 34, 37



CUTOUT DETAIL
HALF SIZE
ITEMS Nº 24, 28, 26, 27, 25

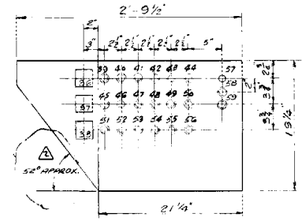
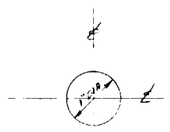


PLATE "C"
SCALE 1 1/2" = 1'-0"
Mat'l. 10 ga. Sh. St.

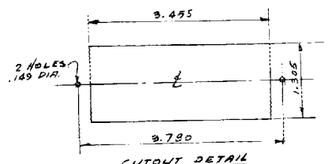
NOTES:

1. Provide 1/16" clearance between edges of all plates & Console body.
2. All plates fastened to console as shown in detail # 4 dwg. I-4040.
3. Cutout details are shown for reference only exact cutout dimensions to be verified by panel vendor.



CUTOUT DETAIL
FULL SIZE
ITEMS Nº 30, 31, 32

CUTOUT DETAIL
HALF SIZE
ITEM Nº 35A



CUTOUT DETAIL
FULL SIZE
ITEMS Nº 3A, 3B, 3C

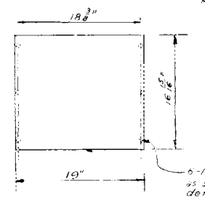


PLATE "D"
SCALE 1 1/2" = 1'-0"
Mat'l. 10 ga. Sh. St.

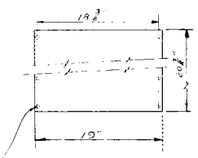


PLATE "E"
SCALE 1 1/2" = 1'-0"
Mat'l. 10 ga. Sh. St.

CERTIFIED FOR CONSTRUCTION

NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. REMC	DATE	APPR. ARC	DATE
1A	Issued For Bids	MAM							
0	CHANGE REVISIONS CERTIFIED FOR CONSTRUCTION								
1	[illegible]								
2	REVISED HANDLE REF., ADDED [illegible]	MK	MP						

NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. REMC	DATE	APPR. ARC	DATE

S. & B. 540
DEPT. CHK.
ARCH.
ELECT.
H & V.
INST.
MECH.
STRUC.
UTIL.

DRAWING NO. 1546-01-1-4023 REV. 2

REFERENCE DRAWING	NO.
BULKTOP CONSOLE EQUIPMENT LIST	1546-01-1-4041
REACTOR CONSOLE CONNECTIONS & DETS.	1546-01-1-4040
REACTOR CONSOLE LAYOUT & DETAILS	1546-01-1-4022
SPECIFICATION REACTOR CONSOLE CONTROL REF.	1546-01-1-12

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
400 LEXINGTON AVE. NEW YORK 17, N.Y.

FOR

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER
BY [signature] DATE 10-9-61
UNION CARBIDE NUCLEAR COMPANY
BY C.E. WINTERS DATE 10/9/61
U. S. ATOMIC ENERGY COMMISSION
BY L. H. JACKSON DATE 10/23/61

HIGH FLUX ISOTOPE REACTOR
REACTOR CONSOLE
INSTRUMENT ARRANGEMENT & CUTOUT DETAILS

DRAWN A.F.K. CHKD [illegible] DATE 9/21/61 CONTRACT NO. AT-(40-1)-2380
DATE 9/27/61 DRAWING NO. 1546-01-1-4023 REV. 2
SCALE AS NOTED

DRAWING NO. 1546-01-I-4041 REV. 4

Item	Equipment No.	Function	Manufacturer	Lens Type	Background	Engraving	Engraving Code No.	Name Plate
1A	FCPM1	No. 1 F.C. Position	G.E. Meter, Cat. No. 544X38					
1B	FCPM2	No. 2 F.C. Position	G.E. Meter, Cat. No. 544X38					
1C	FCPM3	No. 3 F.C. Position	G.E. Meter, Cat. No. 544X38					
2A	TR602, 603	No. 1 Shim Rod Position	Scientific-Atlanta, Inc. Model IU-6 Synchro Indicator					
2B	TR612, 613	No. 2 Shim Rod Position	Scientific-Atlanta, Inc. Model IU-6 Synchro Indicator					
2C	TR622, 623	No. 3 Shim Rod Position	Scientific-Atlanta, Inc. Model IU-6 Synchro Indicator					
2D	TR632, 633	No. 4 Shim Rod Position	Scientific-Atlanta, Inc. Model IU-6 Synchro Indicator					
2E	TR642, 643	No. 5 Shim Rod Position	Scientific-Atlanta, Inc. Model IU-6 Synchro Indicator					
3A	RRVM1	No. 1 Reg. Rod Velocity	International Instruments Inc., Meter Model 1145 BC 100 DC UA					
3B	RRVM2	No. 2 Reg. Rod Velocity	International Instruments Inc., Meter Model 1145 BC 100 DC UA					
3C	RRVM3	No. 3 Reg. Rod Velocity	International Instruments Inc., Meter Model 1145 BC 100 DC UA					
4A	DLM1	No. 1 Demand Level	G.E. Meter, Cat. No. 544X38					
4B	DLM2	No. 2 Demand Level	G.E. Meter, Cat. No. 544X38					
4C	DLM3	No. 3 Demand Level	G.E. Meter, Cat. No. 544X38					
5	M422	Reg. Rod Position	G.E. Meter, Cat. No. 544X38					
6A	S-12	No. 1 Fission Chamber Insert-Wdr. Sw.	G.E. Type SB-10 Switch					
6B	S-13	No. 2 Fission Chamber Insert-Wdr. Sw.	G.E. Type SB-10 Switch					
6C	S-14	No. 3 Fission Chamber Insert-Wdr. Sw.	G.E. Type SB-10 Switch					
7	S-8	Shim Rod Drive Selector Sw.	G.E. Type SBM Switch					
8	S-7	Shim Rod Drive Switch	G.E. Type SB-10 Switch					
9	S-9	Shim Rod Test Switch	G.E. Type SBM Switch					
10	S-11	Group Servo Demand Sw.	G.E. Type SBM Switch					
11A	S-4B	Lower Servo Demand Switch No. 1	Allen Bradley Co., Cat. No. B2B					Lower Demand
11B	S-5B	Lower Servo Demand Switch No. 2	Allen Bradley Co., Cat. No. B2B					Lower Demand
11C	S-6B	Lower Servo Demand Switch No. 3	Allen Bradley Co., Cat. No. B2B					Lower Demand
12A	S-4A	Raise Servo Demand Switch No. 1	Allen Bradley Co., Cat. No. B2B					Raise Demand
12B	S-5A	Raise Servo Demand Switch No. 2	Allen Bradley Co., Cat. No. B2B					Raise Demand
12C	S-6A	Raise Servo Demand Switch No. 3	Allen Bradley Co., Cat. No. B2B					Raise Demand
13	I121	No. 1 Fission Chamber Insert Limit Lt.	H.R. Kirkland Co., No. 150 Unit	CE	White	Insert Limit	7	
13	I221	No. 2 Fission Chamber Insert Limit Lt.	H. R. Kirkland Co., No. 150 Unit	CE	White	Insert Limit	7	
*13	I321	No. 3 Fission Chamber Insert Limit Lt.	H. R. Kirkland Co., No. 150 Unit	CE	White	Insert Limit	7	
14	I122	No. 1 Fission Chamber Wdr. Limit Light	H. R. Kirkland Co., No. 150 Unit	CE	White	Wdr. Limit	7	
14	I222	No. 2 Fission Chamber Wdr. Limit Light	H. R. Kirkland Co., No. 150 Unit	CE	White	Wdr. Limit	7	
14	I322	No. 3 Fission Chamber Wdr. Limit Lt.	H. R. Kirkland Co., No. 150 Unit	CE	White	Wdr. Limit	7	
14	I566	No. 1 Shim Rod Wdr. Limit Lt.	H. R. Kirkland Co., No. 150 Unit	CE	White	Wdr. Limit	7	
14	I567	No. 2 Shim Rod Wdr. Limit Lt.	H. R. Kirkland Co., No. 150 Unit	CE	White	Wdr. Limit	7	
14	I568	No. 3 Shim Rod Wdr. Limit Lt.	H. R. Kirkland Co., No. 150 Unit	CE	White	Wdr. Limit	7	
14	I569	No. 4 Shim Rod Wdr. Limit Lt.	H. R. Kirkland Co., No. 150 Unit	CE	White	Wdr. Limit	7	
14	I570	No. 5 Shim Rod Wdr. Limit Lt.	H. R. Kirkland Co., No. 150 Unit	CE	White	Wdr. Limit	7	
14	I421	Reg. Rod Wdr. Limit Lt.	H. R. Kirkland Co., No. 150 Unit	CE	White	Wdr. Limit	7	
15	I124	No. 1 Fission Chamber Auto Light	H. R. Kirkland Co., No. 150 Unit	CE	White	Auto	7	
15	I224	No. 2 Fission Chamber Auto Light	H. R. Kirkland Co., No. 150 Unit	CE	White	Auto	7	
15	I324	No. 3 Fission Chamber Auto Light	H. R. Kirkland Co., No. 150 Unit	CE	White	Auto	7	
17	I416	No. 1 Shim Rod Seat Light	H. R. Kirkland Co., No. 150 Unit	CE	Green	Seat	7	
17	I417	No. 2 Shim Rod Seat Light	H. R. Kirkland Co., No. 150 Unit	CE	Green	Seat	7	
17	I418	No. 3 Shim Rod Seat Light	H. R. Kirkland Co., No. 150 Unit	CE	Green	Seat	7	
17	I419	No. 4 Shim Rod Seat Light	H. R. Kirkland Co., No. 150 Unit	CE	Green	Seat	7	
18	I574	No. 1 Shim Rod Clutch Light	H. R. Kirkland Co., No. 150 Unit	CE	Red	Clutch	7	
18	I575	No. 2 Shim Rod Clutch Light	H. R. Kirkland Co., No. 150 Unit	CE	Red	Clutch	7	
13	I576	No. 3 Shim Rod Clutch Light	H. R. Kirkland Co., No. 150 Unit	CE	Red	Clutch	7	
18	I577	No. 4 Shim Rod Clutch Light	H. R. Kirkland Co., No. 150 Unit	CE	Red	Clutch	7	
19	I130	No. 1 Servo N_L Light	H. R. Kirkland Co., No. 150 Unit	CE	White	N_L	N-12, L-10	
19	I230	No. 2 Servo N_L Light	H. R. Kirkland Co., No. 150 Unit	CE	White	N_L	N-12, L-10	
19	I330	No. 3 Servo N_L Light	H. R. Kirkland Co., No. 150 Unit	CE	White	N_L	N-12, L-10	
20	I131	No. 1 Servo N_F Light	H. R. Kirkland Co., No. 150 Unit	CE	White	N_F	N-12, L-10	
20	I231	No. 2 Servo N_F Light	H. R. Kirkland Co., No. 150 Unit	CE	White	N_F	N-12, L-10	
20	I331	No. 3 Servo N_F Light	H. R. Kirkland Co., No. 150 Unit	CE	White	N_F	N-12, L-10	
21	I571	Auto Shim Insert Limit Light	H. R. Kirkland Co., No. 150 Unit	CE	White	Shim Insert	7	
22	I573	Auto Shim Wdr. Limit Light	H. R. Kirkland Co., No. 150 Unit	CE	White	Shim Insert	7	
23	S-1	Operate Switch (key)	G. E. Type SBl Switch					
24	S-18	Auto Shim Computer By-Pass Switch	G.E. Type SBM Switch					
25	S-10	Scram Switch	G.E. Type SBM Switch					
26	S-15	Scram Reset Swtich	Allen Bradley Co., Cat. No. B26					Sram Reset
27	S-50	Stop Auto Process Start Switch	Allen Bradley Co., Cat. No. B2B					Stop Auto Process Start
28	S-17	Annun. Reset Switch	Allen Bradley Co., Cat. No. B2C					Annun. Reset
29	S-16	Annun. Acknowledge Switch	Allen Bradley Co., Cat. No. B2C					Annun. Ack.
30	S 51 I 51	Start All Vital Pumps Switch and Light	Dialight Corp., No. SW152-8					Auto Process Start
31	S-2 1578	Start Request Switch and Light	Dialight Corp., No. SW152-8					Start Request
32	S-3 I580	Run Switch and Light	Dialight Corp., No. SW152NC-8					Run
33	I579	Start Light	H. R. Kirkland Co., No. 150 Unit	CE	White	Start	7	
34	I581	Servo On Light	H. R. Kirkland Co., No. 150 Unit	CE	White	Servo On	7	
35	TI-1040	Temperature Indicator	[illegible]well Instrument Co., Inc.	Installed by Company				
36	S-19	No. 1 Channel Test Permit Switch	G.E. Type SBM	Installed by Company				
37	S-20	No. 2 Channel Test Permit Switch	G.E. Type SBM	Installed by Company				
38	S-21	No. 3 Channel Test Permit Switch	G.E. Type SBM	Installed by Company				
39	HS-100-1A	Safety Test Switch	Allen Bradley Co., Cat. No. A4B					Inlet Temp.
40	HS-100-1B	Safety Test Switch	Allen Bradley Co., Cat. No. A4B					Outlet Temp.
41	HS 100-1	Safety Test Switch	Allen Bradley Co., Cat. No. A4B					Pri. Flow
42	HS-[illegible]-A	Safety Test Switch	Allen Bradley Co., Cat. No. A4B					Pri. Press.
43		Safety Test Switch	Allen Bradley Co., Cat. No. A4B					Spare
44		Safety Test Switch	Allen Bradley Co., Cat. No. A4B					Spare
45	HS-100-2A	Safety Test Switch	Allen Bradley Co., Cat. No. A4B					Inlet Temp.
46	HS-100-2B	Safety Test Switch	Allen Bradley Co., Cat. No. A4B					Outlet Temp.
47	HS-100-2	Safety Test Switch	Allen Bradley Co., Cat. No. A4B					Pri. Flow
48	HS-[illegible]	Safety Test Switch	Allen Bradley Co., Cat. No. A4B					Pri. Press.
49		Safety Test Switch	Allen Bradley Co., Cat. No. A4B					Spare
50		Safety Test Switch	Allen Bradley Co., Cat. No. A4B					Spare
51	HS-100-3A	Safety Test Switch	Allen Bradley Co., Cat. No. A4B					Inlet Temp.
52	HS-100-3B	Safety Test Switch	Allen Bradley Co., Cat. No. A4B					Outlet Temp.
53	HS-100-3	Safety Test Switch	Allen Bradley Co., Cat. No. A4B					Pri. Flow
54	HS-[illegible]C	Safety Test Switch	Allen Bradley Co., Cat. No. A4B					Pri. Press.
55		Safety Test Switch	Allen Bradley Co. Cat. No. A4B					Spare
56		Safety Test Switch	Allen Bradley Co. Cat. No. A4B					Spare
*13	I561	No. 1 Shim Rod Insert Limit Light	H. R. Kirkland Co., No. 150 Unit	CE	White	Insert Limit	7	
13	I562	No. 2 Shim Rod Insert Limit Light	H. R. Kirkland Co., No. 150 Unit	CE	White	Insert Limit	7	
13	I563	No. 3 Shim Rod Insert Limit Light	H. R. Kirkland Co., No. 150 Unit	CE	White	Insert Limit	7	
13	I564	No. 4 Shim Rod Insert Limit Light	H. R. Kirkland Co., No. 150 Unit	CE	White	Insert Limit	7	
13	I565	No. 5 Shim Rod	H. R. Kirkland Co., No. 150 Unit	CE	White	Insert Limit	7	
13	I420	Reg. Rod Insert Limit Light	H. R. Kirkland Co.,	CE	White	Insert Limit	7	

CERTIFIED FOR CONSTRUCTION

NO.	REVISIONS	BY	CHK.	DATE
4	REMOVED ITEMS 57, 58, 59			
3	ADDED EQUIPMENT			
2	ADDED ITEMS 57, 58, 59			
1A				
1				
0	CERTIFIED FOR CONSTRUCTION FOR PACKAGE II	J. L.		

REFERENCE DRAWING	NO.
REACTOR CONSOLE-CONST. DETAILS	1546-01-I-4040
REACTOR CONSOLE-INST. ARRGT. & CUTOUT DETS.	1546-01-I-4028
SPECIFICATION REACTOR CONTROL CONSOLE REF.	SECTION 112

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N. Y.
FOR
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

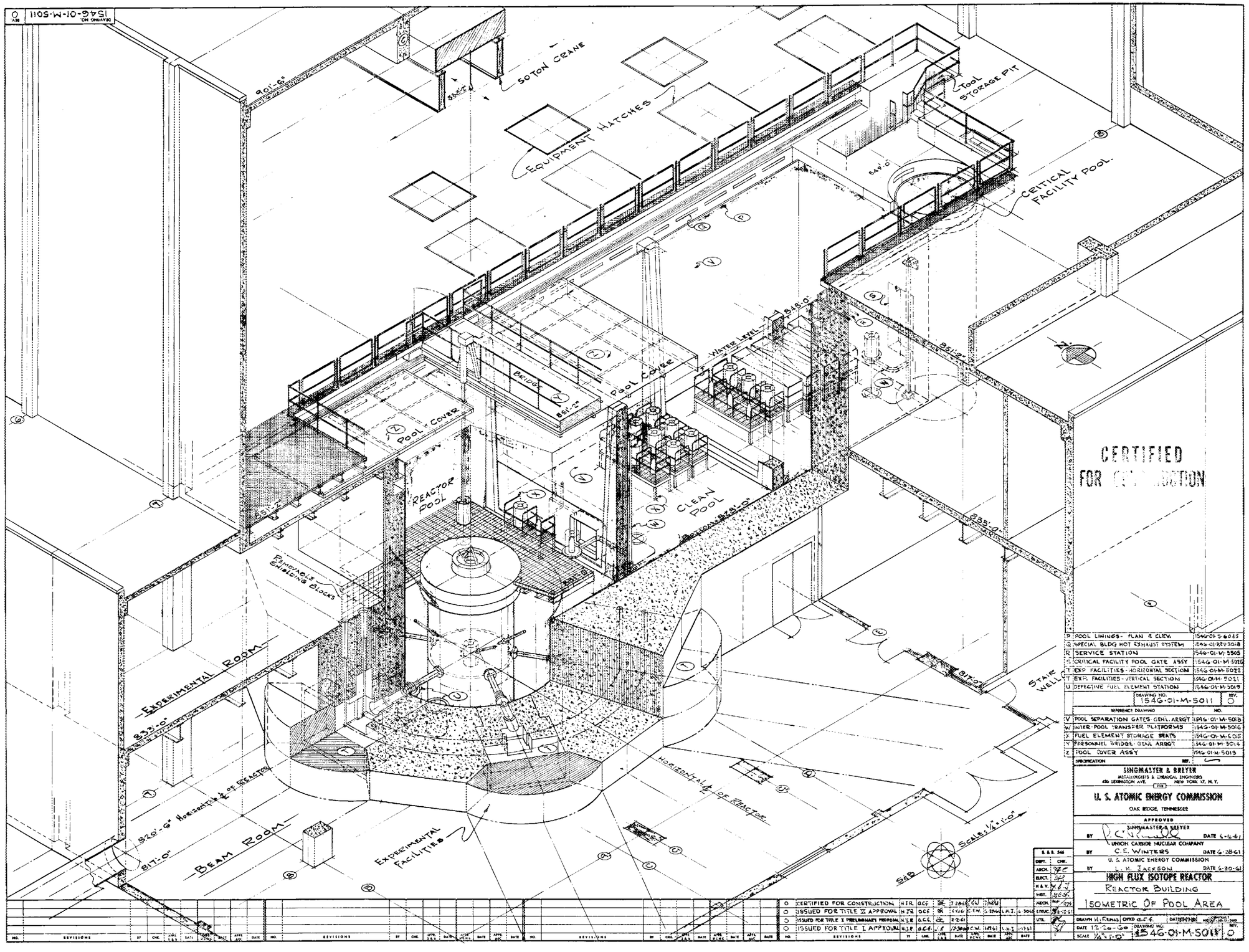
APPROVED
SINGMASTER & BREYER BY DATE 12-12-61
UNION CARBIDE NUCLEAR COMPANY BY DATE 12/13/61
U. S. ATOMIC ENERGY COMMISSION BY DATE 12/13/61

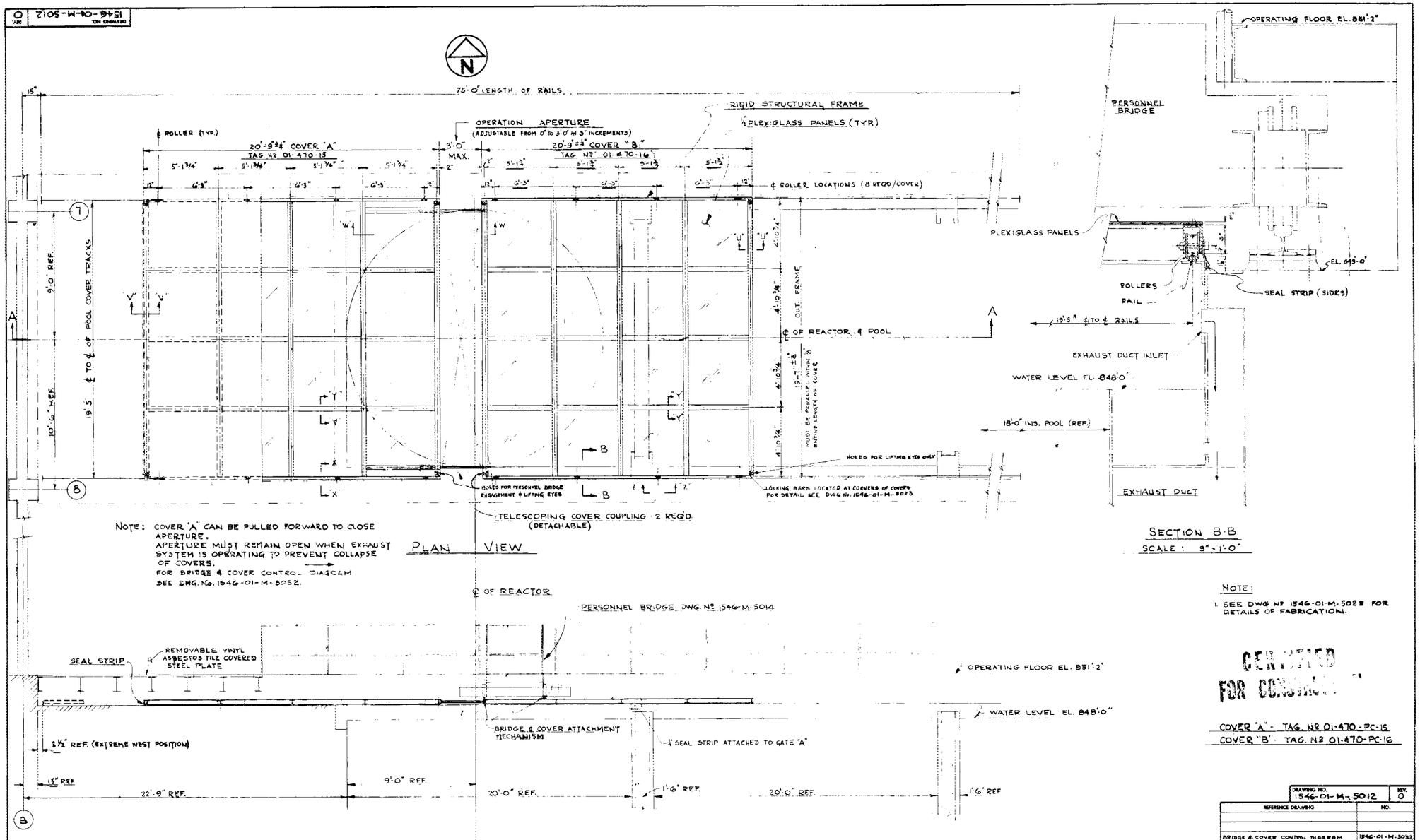
S. & B. 546 — DEPT. / CHK.: ARCH. ELECT. H & V. INST. MECH. STRUC. UTIL.

HIGH FLUX ISOTOPE REACTOR

REACTOR CONSOLE EQUIPMENT LIST

DRAWN C. B. CH'KD DATE CONTRACT NO. AT-(40-1)-2648
DATE 12-12-61 DRAWING NO. 1546-01-I-4041 REV. 4
SCALE NONE


50 TON CRANE
EQUIPMENT HATCHES
TOOL STORAGE PIT
CRITICAL FACILITY POOL
POOL COVER
BRIDGE
WATER LEVEL
REACTOR POOL
CLEAN POOL
REMOVABLE SHIELDING BLOCKS
EXPERIMENTAL ROOM
BEAM ROOM
EXPERIMENTAL FACILITIES
HORIZONTAL ℄ OF REACTOR
STAIR WELL
CERTIFIED FOR CONSTRUCTION
SCALE: 1/4" = 1'-0"
1546-01-M-5011
REV. 0
P POOL LININGS - PLAN & ELEV. 1546-01-S-6045
Q SPECIAL BLDG HOT EXHAUST SYSTEM 1546-01-REF-3018
R SERVICE STATION 1546-01-M-5505
S CRITICAL FACILITY POOL GATE ASSY 1546-01-M-5016
T EXP. FACILITIES - HORIZONTAL SECTION 1546-01-M-5022
T EXP. FACILITIES - VERTICAL SECTION 1546-01-M-5021
U DEFECTIVE FUEL ELEMENT STATION 1546-01-M-5019
REFERENCE DRAWING NO.
V POOL SEPARATION GATES GENL. ARRGT 1546-01-M-5018
W INTER-POOL TRANSFER PLATFORMS 1546-01-M-5016
X FUEL ELEMENT STORAGE RACKS 1546-01-M-5015
Y PERSONNEL BRIDGE - GENL. ARRGT 1546-01-M-5014
Z POOL COVER ASSY 1546-01-M-5019
SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
APPROVED
SINGMASTER & BREYER
BY C. E. WINTERS DATE 6-4-61
UNION CARBIDE NUCLEAR COMPANY
BY C. E. WINTERS DATE 6-28-61
U. S. ATOMIC ENERGY COMMISSION
BY L. H. JACKSON DATE 6-20-61
HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
ISOMETRIC OF POOL AREA
DRAWN H. KEMAS
DATE 12-20-60
SCALE 1/4" = 1'-0"
DRAWING NO. 1546-01-M-5011
REV. 0
0 CERTIFIED FOR CONSTRUCTION
0 ISSUED FOR TITLE II APPROVAL
0 ISSUED FOR TITLE I PRELIMINARY PROPOSAL
0 ISSUED FOR TITLE I APPROVAL
REVISIONS



NOTE:

1. SEE DWG Nº 1546-01-M-5028 FOR DETAILS OF FABRICATION.

CERTIFIED FOR CONSTRUCTION

COVER "A" - TAG. Nº 01-470-PC-15
COVER "B" - TAG. Nº 01-470-PC-16

DRAWING NO.	REV.
1546-01-M-5012	0

REFERENCE DRAWING	NO.
BRIDGE & COVER CONTROL DIAGRAM	1546-01-M-5052
POOL COVER - SECT. & DETAILS	1546-01-M-5023
PERSONNEL BRIDGE - GENL. ARRGT	1546-01-M-5014
SPECIFICATION REF.	SECTIONS 1 TO 10

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N. Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER
BY [signature] DATE 2-20-61
UNION CARBIDE NUCLEAR COMPANY
BY C. E. WINTERS DATE 12-13-61
U. S. ATOMIC ENERGY COMMISSION
BY R. B. SONERS DATE 2-15-61

S & B. 546

DEPT.	CHK.
ARCH.	
ELECT.	
H & V.	
INST.	
MECH.	
STRUC.	
UTIL.	

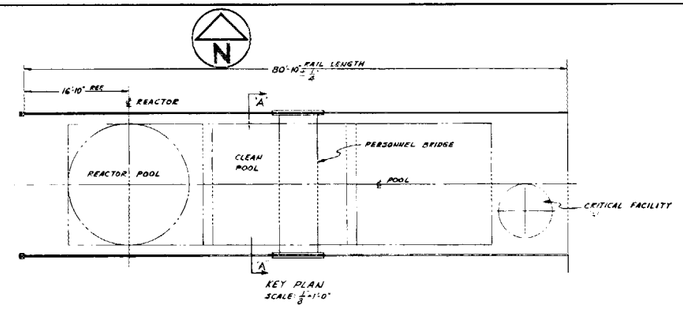
HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
POOL COVER
ASSEMBLY

DRAWN B.C.G. CHKD H.W. DATE 11-21-60
SCALE AS NOTED
DRAWING NO. 1546-01-M-5012

NO.	REVISIONS	BY	CHK.	APPR. E&B	DATE	APPR. ECNC	DATE	APPR. UCC	DATE
0	CERTIFIED FOR CONSTRUCTION	H.W.	CCG			TEB	2/1/61	TJ	2/1/61
0	ISSUED FOR TITLE II APPROVAL	B.C.G.	H.W.			CEW	3-13-61	R.B.S.	3-15-61
0	ISSUED FOR TITLE I PRELIMINARY REVIEW	B.C.G.	H.W.						
0	RE-ISSUED FOR TITLE I APPROVAL	B.C.G.	H.W.			C.E.W.	8-14-60	L.H.J.	11-15-60

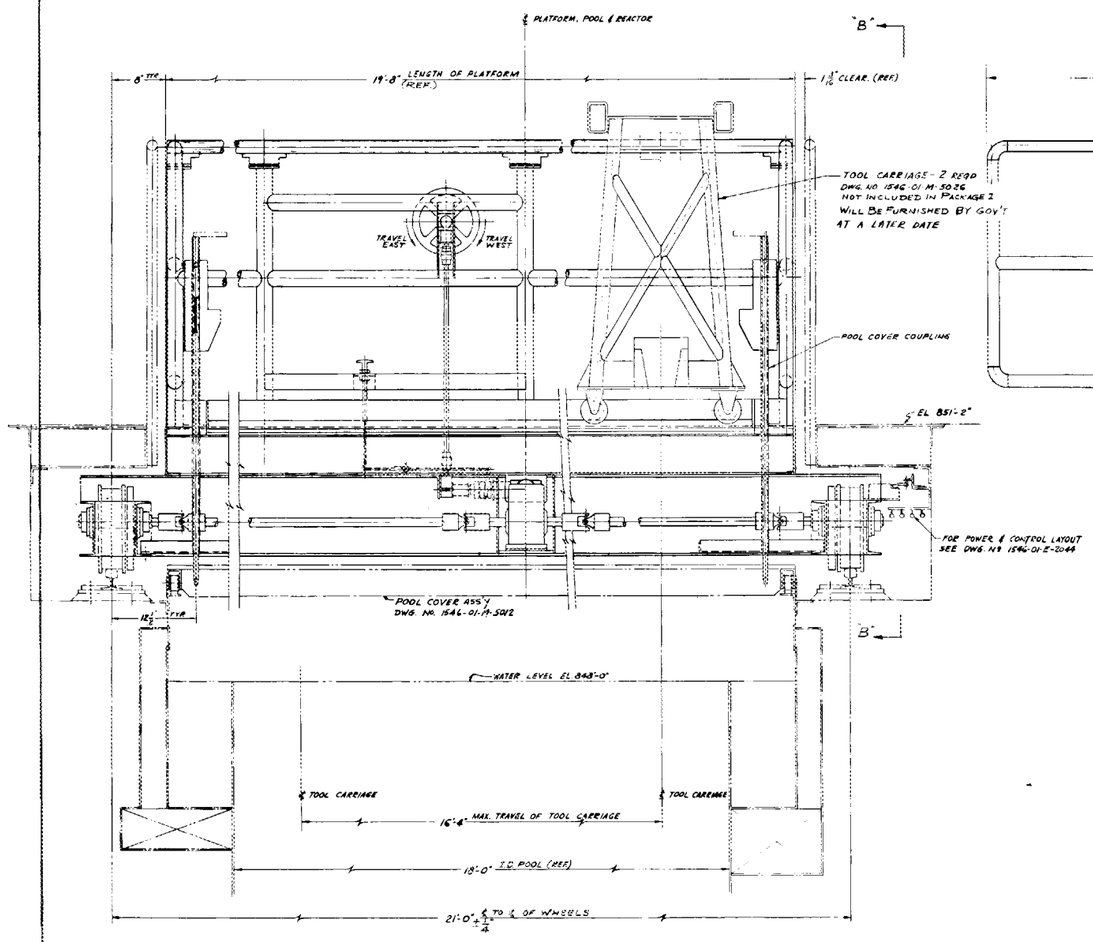
082

DRAWING NO. 1546-01-M-5014 REV. 1

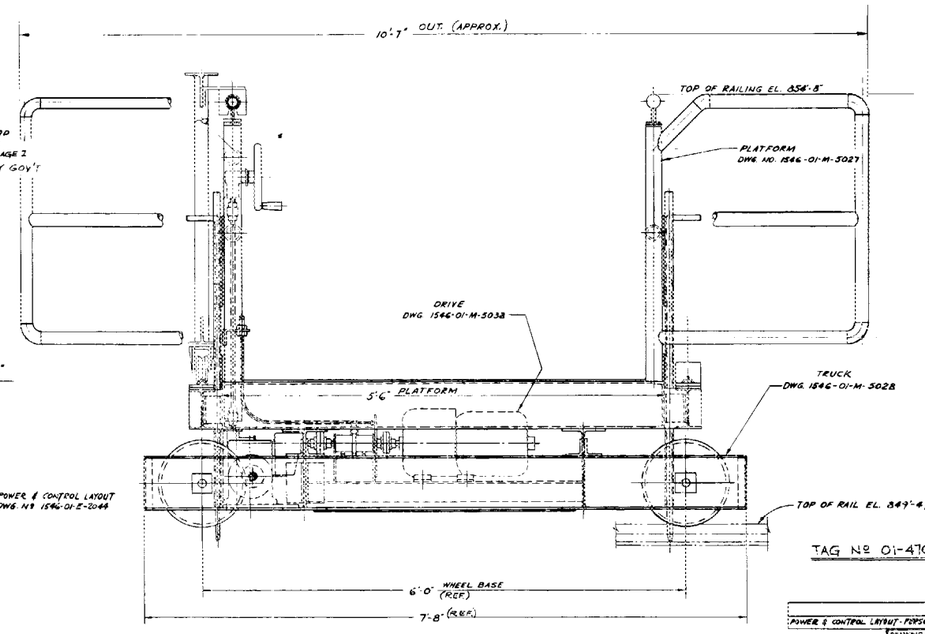


GENERAL NOTES:

1. WELDED CONSTRUCTION UNLESS OTHERWISE NOTED.
2. ALL WELDS TO BE CONTINUOUS UNLESS OTHERWISE NOTED.
3. MATERIAL SHALL BE CARBON STEEL IN ACCORDANCE WITH SPECIFICATION SECTION 32.
4. ALL EXPOSED CARBON STEEL SURFACES SHALL BE PREPARED, CLEANED & PAINTED IN ACCORDANCE WITH SPECIFICATION SECTION 32 UNLESS OTHERWISE NOTED.
5. TOLERANCES UNLESS OTHERWISE NOTED SHALL BE ±1/64
6. FOR ELECTRICAL POWER & CONTROL CIRCUIT SEE DWG. 1546-01-E-2044.
7. FOR BRIDGE & COVER TRAVEL CONTROL DIAGRAM SEE DWG. 1546-01-M-5052.
8. (1) ALL WELDS TO BE GROUND SMOOTH



SECTION "A-A"



VIEW "B-B"

TAG Nº 01-470-PB-18

CERTIFIED FOR CONSTRUCTION

POWER & CONTROL LAYOUT - PERSONNEL BRIDGE	1546-01-E-2044
DRAWING NO. 1546-01-M-5014	REV. 1

REFERENCE DRAWING	NO.
PERSONNEL BRIDGE & COVER TRAVEL CONTROL DIAG.	1546-01-M-5052
PERSONNEL BRIDGE - TOOL CARRIAGE ASS'Y & DET.	1546-01-M-5026
PERSONNEL BRIDGE - PLATFORM ASS'Y & DET.	1546-01-M-5027
PERSONNEL BRIDGE - TRUCK ASS'Y & DET.	1546-01-M-5028
PERSONNEL BRIDGE - DRIVE ASS'Y & DET.	1546-01-M-5038
SPECIFICATION REF.	SECTION 32

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER
BY [signature] DATE 6-13-61
UNION CARBIDE NUCLEAR COMPANY
BY C. E. WINTERS DATE 4-26-61
U. S. ATOMIC ENERGY COMMISSION
BY L. H. JACKSON DATE 4-26-61

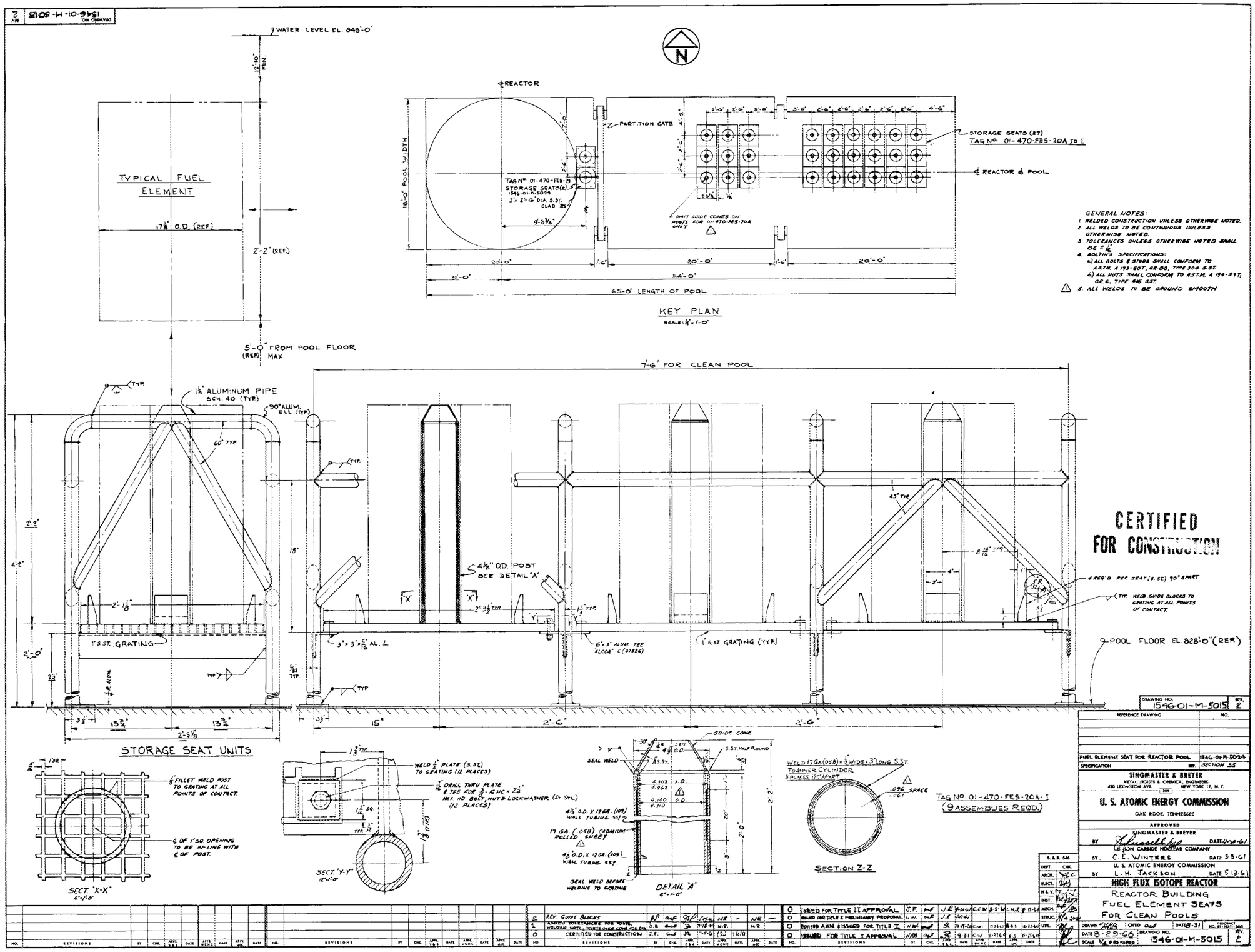
HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
PERSONNEL BRIDGE
GENERAL ARRANGEMENT

S. & B. 546	
DEPT.	CHK.
ARCH.	
ELECT.	
H & V.	
INST.	
MECH.	
STRUC.	
UTIL.	

NO.	REVISIONS	BY	CHK.	APPR. S.&B.	DATE	APPR. UCCO	DATE	APPR. ARC	DATE
1	ADDED NOTE "B"	DB	GLF	DK	9-18-61	N.R.		N.R.	
0	CERTIFIED FOR CONSTRUCTION	MP	GLF	SR	7-13-61	[illegible]	[illegible]		
0	ISSUED FOR TITLE II APPROVAL	MP	GLF	[illegible]	4-26-61	C.E.W.	4-26-61	L.H.J.	4-26-61

DRAWN M.J.P. CHKD GLF DATE 3-11-61 CONTRACT NO. AT-(40-1)-2689
SCALE 1/8"=1'-0" DRAWING NO. 1546-01-M-5014 REV. 1

083



GENERAL NOTES:

1. WELDED CONSTRUCTION UNLESS OTHERWISE NOTED.
2. ALL WELDS TO BE CONTINUOUS UNLESS OTHERWISE NOTED.
3. TOLERANCES UNLESS OTHERWISE NOTED SHALL BE ± 1/16".
4. BOLTING SPECIFICATIONS:
   a.) ALL BOLTS & STUDS SHALL CONFORM TO A.S.T.M. A 193-50T, GR-B8, TYPE 304 S.S.T.
   b.) ALL NUTS SHALL CONFORM TO A.S.T.M. A 194-51T, GR.6, TYPE 416 S.ST.
5. △ ALL WELDS TO BE GROUND SMOOTH

CERTIFIED FOR CONSTRUCTION

DRAWING NO.	REV.
1546-01-M-5015	2

REFERENCE DRAWING	NO.
FUEL ELEMENT SEAT FOR REACTOR POOL	1546-01-M-5024
SPECIFICATION	NO. SECTION 35

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N. Y.

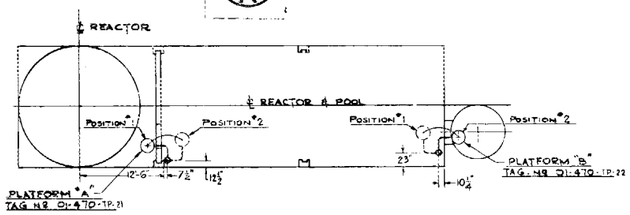
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER BY DATE 4-20-61
UNION CARBIDE NUCLEAR COMPANY BY C. E. WINTERS DATE 5-5-61
U. S. ATOMIC ENERGY COMMISSION BY L. H. JACKSON DATE 5-13-61

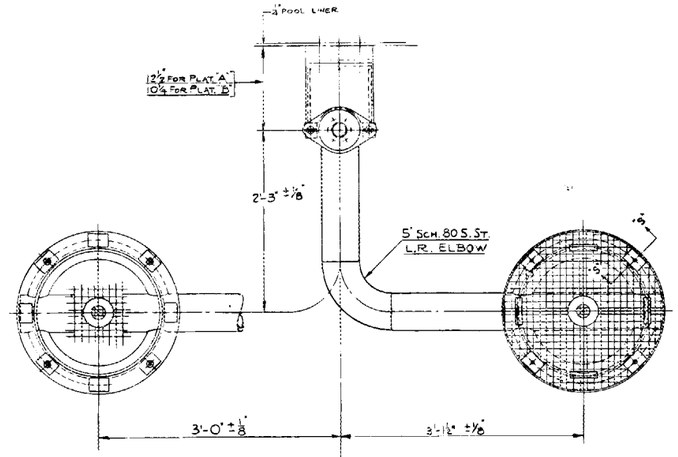
HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
FUEL ELEMENT SEATS
FOR CLEAN POOLS

DRAWN DATE 8-29-66 CHKD DATE 8-31 CONTRACT NO. AT-(40-1)-3608
DRAWING NO. 1546-01-M-5015 REV. 2
SCALE 1/8 & AS NOTED

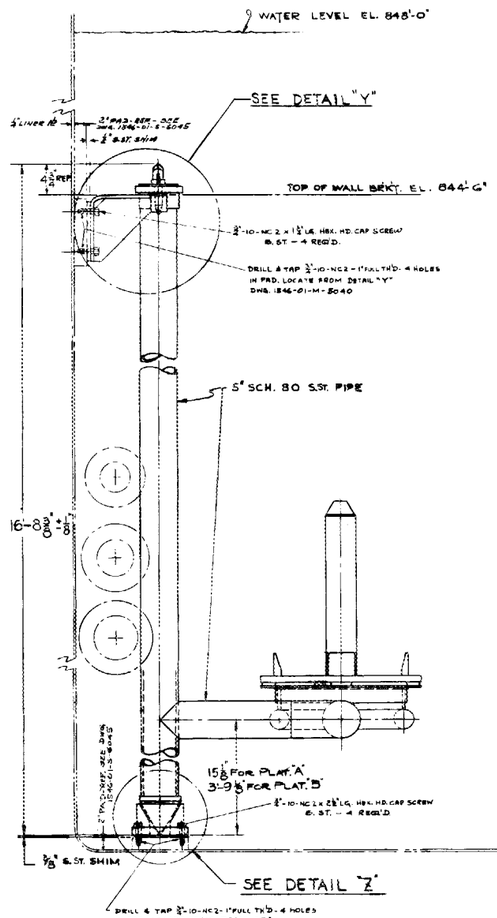
NO.	REVISIONS	BY	CHK.	APPR. S.&B.	DATE	APPR. UCNC	DATE	APPR. AEC	DATE
2	REV. GUIDE BLOCKS								
1	ADDED TOLERANCES FOR NOTE, WELDING NOTE, DELETE GUIDE CONE FOR EXA.								
0	CERTIFIED FOR CONSTRUCTION								
0	ISSUED FOR TITLE II APPROVAL	J.F.							
0	ISSUED FOR TITLE I PRELIMINARY PROPOSAL								
0	REVISED AAN & ISSUED FOR TITLE I								
0	ISSUED FOR TITLE I APPROVAL								

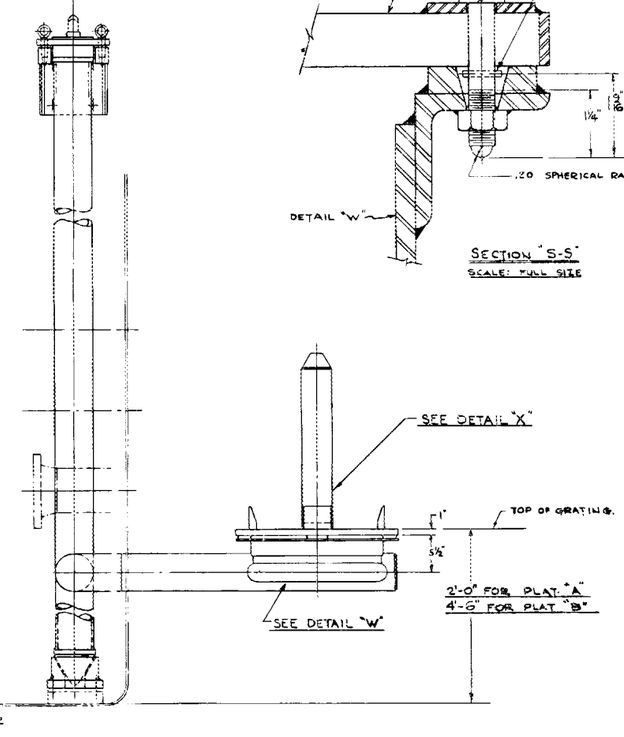


KEY PLAN & OPERATION DIAGRAM
SCALE: 1/8" = 1'-0"



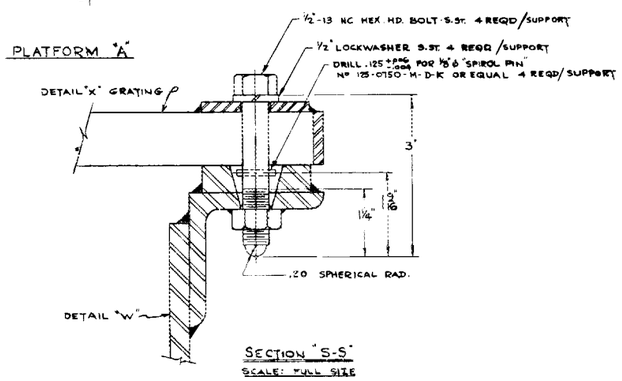
PLATFORM "B"
(OPPOSITE HAND)





SCALE: 1½" = 1'-0"

PLATFORM "A"



SECTION "S-S"
SCALE: FULL SIZE

NOTES

1. FOR SECTIONS & DETAILS SEE DWG. 1546-01-M-5040
2. SEE SECTION 34 OF THE CONTRACT SPECIFICATION FOR MATERIALS, FABRICATION, WELDING, INSTALLATION, & TESTING.

PLATFORM "A" - TAG NO. 01-470-TP-21
PLATFORM "B" - TAG NO. 01-470-TP-22

DRAWING NO. 1546-01-M-5016	REV. 0
REFERENCE DRAWING	NO.
POOL LINING - PLAN & ELEVATIONS	1546-01-S-5045
INTER-POOL TRANSFER PLAT. DETAILS	1546-01-M-5040
SPECIFICATION	REF. SECTION 34

SINGMASTER & BREYER
MECHANICISTS & CHEMICAL ENGINEERS
430 LEXINGTON AVE. NEW YORK 17, N.Y.

FOR

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

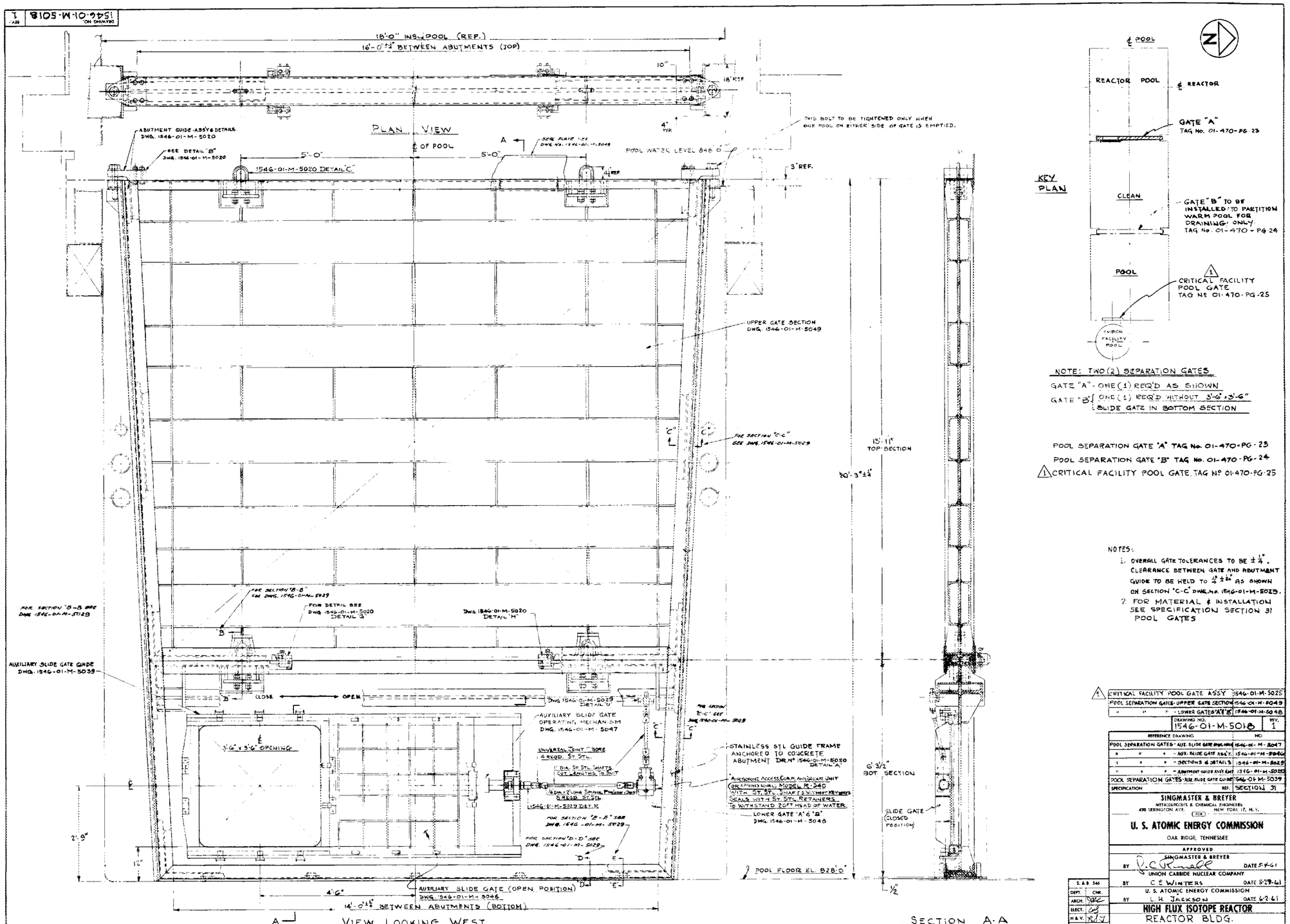
APPROVED
SINGMASTER & BREYER
BY C. S. Pinelli DATE 1-27-61
UNION CARBIDE NUCLEAR COMPANY
BY C. E. WINTERS DATE 4-10-61
U. S. ATOMIC ENERGY COMMISSION
BY L. H. JACKSON DATE 4-13-61

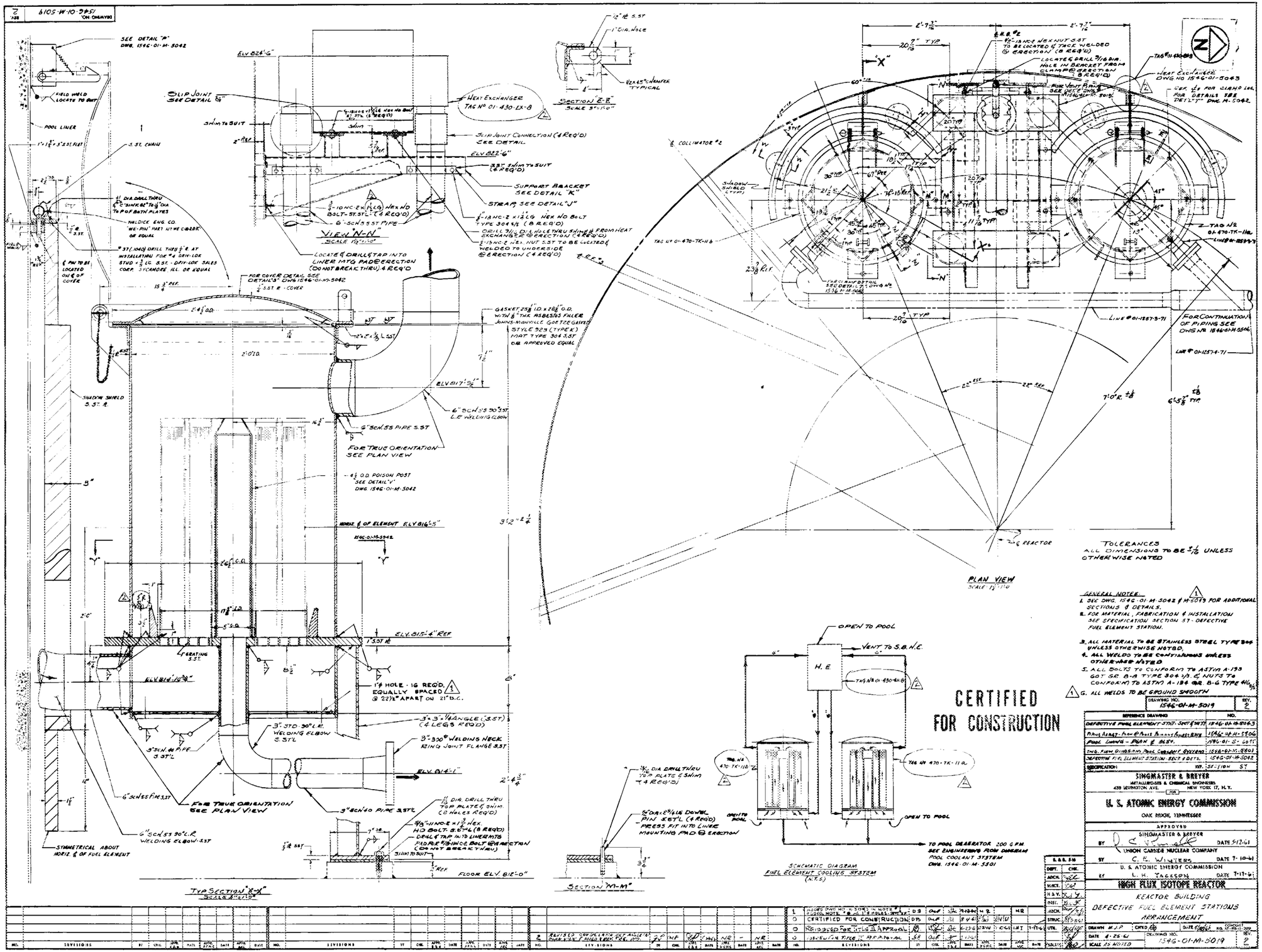
HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
INTER POOL TRANSFER
PLATFORMS FOR FUEL ELEMENTS

S. & B. 546
DEPT. CHK.
ARCH. DWG
ELECT. ECL
H & V. Y.
INST.
MECH.
STRUC.
UTIL.

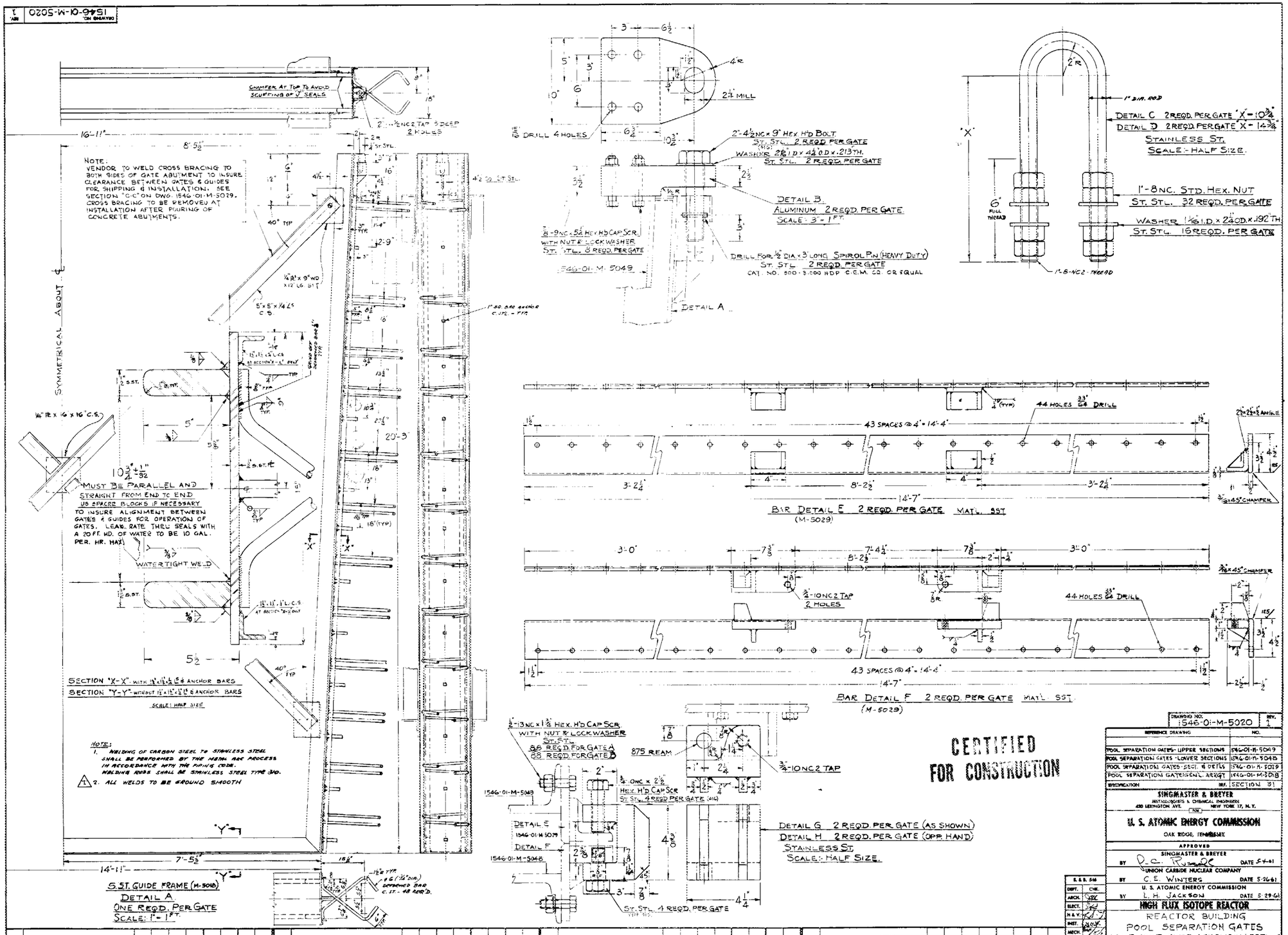
DRAWN G.C.S. CHKD DATE 3-1-61 NO. CONTRACT
DATE 1-14-61 DRAWING NO. 1546-01-M-5016 REV. 0
SCALE AS NOTED

NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. ELECT.	DATE	APPR. CONS.	DATE	APPR. ARC.	DATE
0	CERTIFIED FOR CONSTRUCTION	J.F.	DWF	GR	7-5-61	[illegible]	7/10/61				
0	ISSUED FOR TITLE II APPROVAL	J.F.	RCF	[illegible]	3-27-61	CEW	4-10-61	LHJ	4-13-61		


1546-01-M-5018
18'-0" INS. POOL (REF.)
16'-0 3/4" BETWEEN ABUTMENTS (TOP)
PLAN VIEW
℄ OF POOL
ABUTMENT GUIDE ASSY & DETAILS DWG. 1546-01-M-5020
SEE DETAIL "B" DWG. 1546-01-M-5020
1546-01-M-5020 DETAIL "C"
SEAL PLATE SEE DWG. No. 1546-01-M-5049
POOL WATER LEVEL 848'-0"
THIS BOLT TO BE TIGHTENED ONLY WHEN ONE POOL ON EITHER SIDE OF GATE IS EMPTIED.
UPPER GATE SECTION DWG. 1546-01-M-5049
SEE SECTION "C-C" SEE DWG. 1546-01-M-5029
13'-11" TOP SECTION
20'-3" ±1/4"
6'-3 1/2" BOT. SECTION
SLIDE GATE (CLOSED POSITION)
FOR SECTION "B-B" SEE DWG. 1546-01-M-5029
FOR DETAIL SEE DWG 1546-01-M-5020 DETAIL "G"
DWG. 1546-01-M-5020 DETAIL "H"
FOR SECTION "B-B" SEE DWG. 1546-01-M-5029
AUXILIARY SLIDE GATE GUIDE DWG. 1546-01-M-5039
CLOSE
OPEN
DWG 1546-01-M-5029 DETAIL "D"
AUXILIARY SLIDE GATE OPERATING MECHANISM DWG. 1546-01-M-5047
3'-6" x 3'-6" OPENING
UNIVERSAL JOINT "BORE" & REQ'D. ST. STL.
1" DIA. ST. STL. SHAFTS CUT LENGTHS TO SUIT
4" DIA. x 2" LONG SPIRAL PIN REQ'D. ST. STL.
1546-01-M-5029 DET. N
STAINLESS STL GUIDE FRAME ANCHORED TO CONCRETE ABUTMENT DR. No. 1546-01-M-5020 DETAIL "A"
AIRBORNE ACCESS. CORP. ANTI-GEAR UNIT ON ATTACHED SHAFT MODEL R-240 WITH ST. ST. SHAFTS WITH KEYWAYS SEALS WITH ST. STL. RETAINERS TO WITHSTAND 20FT HEAD OF WATER.
LOWER GATE "A" & "B" DWG. 1546-01-M-5048
FOR SECTION "E-E" SEE DWG. 1546-01-M-5029
FOR SECTION "D-D" SEE DWG. 1546-01-M-5029
AUXILIARY SLIDE GATE (OPEN POSITION) DWG. 1546-01-M-5046
4'-6"
14'-0 1/4" BETWEEN ABUTMENTS (BOTTOM)
VIEW LOOKING WEST
POOL FLOOR EL. 828'-0"
SECTION A-A
℄ POOL
REACTOR POOL
℄ REACTOR
GATE "A" TAG No. 01-470-PG-23
KEY PLAN
CLEAN
GATE "B" TO BE INSTALLED TO PARTITION WARM POOL FOR DRAINING ONLY. TAG No. 01-470-PG-24
POOL
CRITICAL FACILITY POOL GATE TAG No 01-470-PG-25
CRITICAL FACILITY POOL
NOTE: TWO (2) SEPARATION GATES
GATE "A" - ONE (1) REQ'D AS SHOWN
GATE "B" ONE (1) REQ'D WITHOUT 3'-6" x 3'-6" SLIDE GATE IN BOTTOM SECTION
POOL SEPARATION GATE "A" TAG No. 01-470-PG-23
POOL SEPARATION GATE "B" TAG No. 01-470-PG-24
1 CRITICAL FACILITY POOL GATE TAG No 01-470-PG-25
NOTES:
1. OVERALL GATE TOLERANCES TO BE ±1/4". CLEARANCE BETWEEN GATE AND ABUTMENT GUIDE TO BE HELD TO 1/2 ±1/8" AS SHOWN ON SECTION "C-C" DWG. No. 1546-01-M-5029.
2. FOR MATERIAL & INSTALLATION SEE SPECIFICATION SECTION 31 POOL GATES
CRITICAL FACILITY POOL GATE ASSY 1546-01-M-5025
POOL SEPARATION GATES-UPPER GATE SECTION 1546-01-M-5049
" " " - LOWER GATES "A" & "B" 1546-01-M-5048
DRAWING NO. 1546-01-M-501B REV. 1
REFERENCE DRAWING NO.
POOL SEPARATION GATES-AUX. SLIDE GATE OPER. MECH. 1546-01-M-5047
" " " - AUX. SLIDE GATE ASS'Y. 1546-01-M-5046
" " " - SECTIONS & DETAILS 1546-01-M-5029
" " " - ABUTMENT GUIDE ASSY & DET. 1546-01-M-5020
POOL SEPARATION GATES-AUX. SLIDE GATE GUIDE 1546-01-M-5039
SPECIFICATION REF. SECTION 31
SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
430 LEXINGTON AVE. NEW YORK 17, N.Y.
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
APPROVED
SINGMASTER & BREYER BY DATE 5-4-61
UNION CARBIDE NUCLEAR COMPANY BY C E WINTERS DATE 5-29-61
U. S. ATOMIC ENERGY COMMISSION BY L. H. JACKSON DATE 6-2-61
HIGH FLUX ISOTOPE REACTOR
REACTOR BLDG.
POOL SEPARATION GATES
GENERAL ARRANGEMENT
DRAWN CCA CHKD WJR DATE 12-6-60
DATE 12-6-60 DRAWING NO. 1546-01-M-501B REV. 1
SCALE 1/8" = 1'-0"
S & B 560
DEPT. CHK.
ARCH.
ELECT.
H & V.
INST.
MECH.
STRUC.
UTIL.
PRO.
0 CERTIFIED FOR CONSTRUCTION
0 ISSUED FOR TITLE II APPROVAL
0 ISSUED FOR TITLE I PRELIMINARY PROPOSAL
0 RE-ISSUED FOR TITLE I APPROVAL
1 ADDED CRITICAL FACILITY POOL GATE
NO. REVISIONS BY CHK. APPR. S&B DATE APPR. U.C.N.C. DATE APPR. AEC DATE


CERTIFIED FOR CONSTRUCTION
PLAN VIEW
SCALE 1/2" = 1'-0"
TYP SECTION "X-X"
SECTION "M-M"
SECTION "E-E"
VIEW "N-N"
SCHEMATIC DIAGRAM
FUEL ELEMENT COOLING SYSTEM
(N.T.S.)
TOLERANCES
ALL DIMENSIONS TO BE ±1/16 UNLESS OTHERWISE NOTED
GENERAL NOTES
1. SEE DWG. 1546-01-M-5042 & M-5043 FOR ADDITIONAL SECTIONS & DETAILS.
2. FOR MATERIAL, FABRICATION & INSTALLATION SEE SPECIFICATION SECTION ST - DEFECTIVE FUEL ELEMENT STATION.
3. ALL MATERIAL TO BE STAINLESS STEEL TYPE 304 UNLESS OTHERWISE NOTED.
4. ALL WELDS TO BE CONTINUOUS UNLESS OTHERWISE NOTED
5. ALL BOLTS TO CONFORM TO ASTM A-193 GRT GR B-8 TYPE 304 S/S & NUTS TO CONFORM TO ASTM A-194 GR. B-6 TYPE 410 S/S
6. ALL WELDS TO BE GROUND SMOOTH
DRAWING NO. 1546-01-M-5019
REV. 2
SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
APPROVED
SINGMASTER & BREYER
UNION CARBIDE NUCLEAR COMPANY
C. E. WINTERS
U. S. ATOMIC ENERGY COMMISSION
L. H. JAGESON
HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
DEFECTIVE FUEL ELEMENT STATIONS
ARRANGEMENT
DRAWN M.J.P.
DATE 4-25-61
SCALE AS NOTED
DRAWING NO. 1546-01-M-5019
REV. 2

DRAWING NO. 1546-01-M-5020 REV. 1



CERTIFIED FOR CONSTRUCTION

NO.	REVISIONS	BY	CHK.	APPR. E&S	DATE	APPR. MECH	DATE	APPR. ARC	DATE
1	ADDED NOTE #2	DB			9-18-61	N.R.		N.R.	
0	CERTIFIED FOR CONSTRUCTION	H.W.			7-5-61		7/7/61		
0	ISSUED FOR TITLE II APPROVAL	J.F.			5-9-61	CEW	5-9-61	L.H.T.	5-29-61

DRAWING NO.	REV.
1546-01-M-5020	1

REFERENCE DRAWING	NO.
POOL SEPARATION GATES-UPPER SECTIONS	1546-01-M-5049
POOL SEPARATION GATES-LOWER SECTIONS	1546-01-M-5045
POOL SEPARATION GATES-SECT. & DETS	1546-01-M-5029
POOL SEPARATION GATES-GENL. ARRGT	1546-01-M-2018
SPECIFICATION	REF. SECTION 31

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

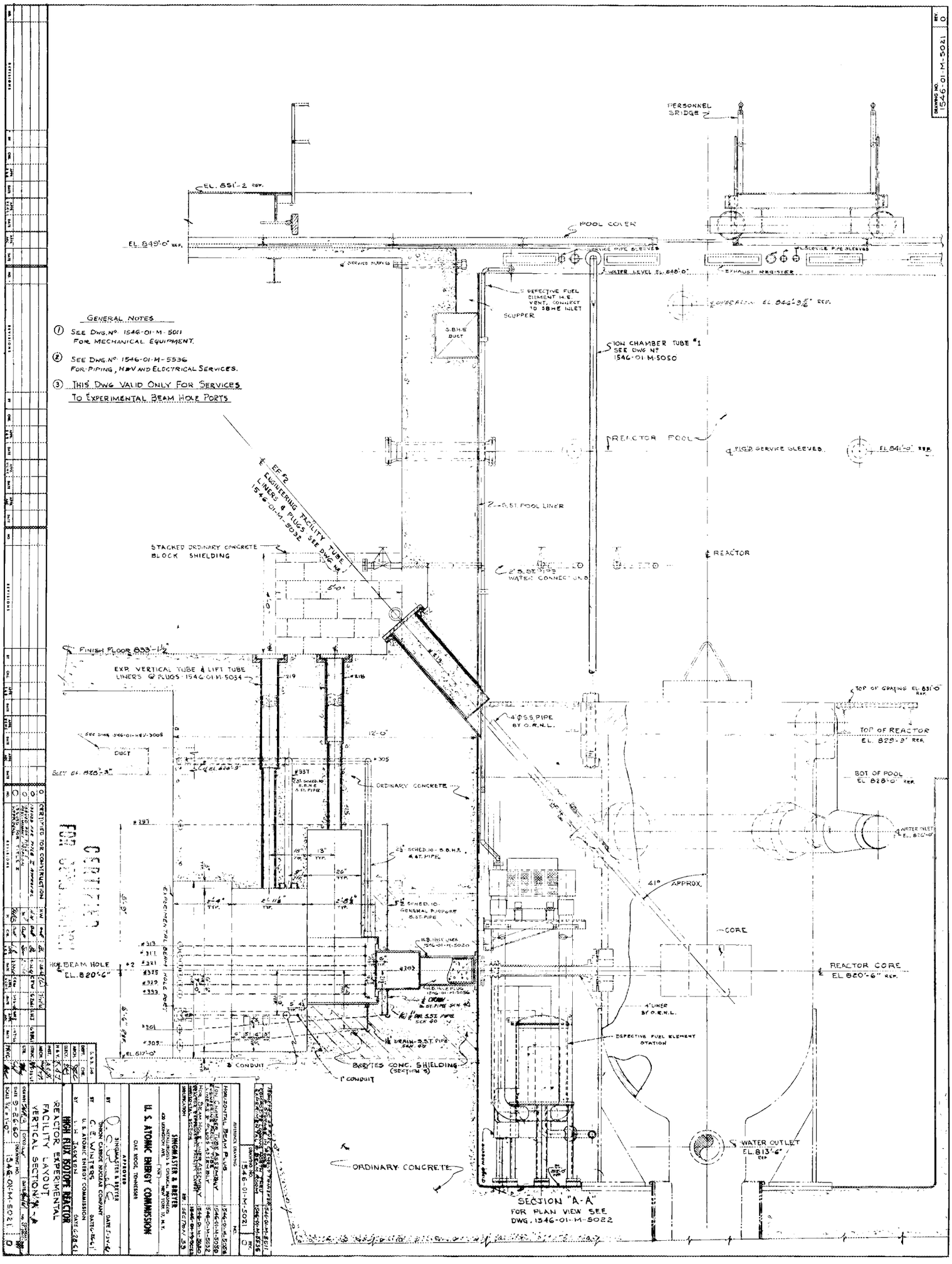
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER BY D. C. Russell DATE 5-9-61
UNION CARBIDE NUCLEAR COMPANY BY C. E. WINTERS DATE 5-26-61
U. S. ATOMIC ENERGY COMMISSION BY L. H. JACKSON DATE 5-29-61

HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
POOL SEPARATION GATES
ABUTMENT GUIDE ASSEMBLY & DETAILS

DRAWN J.F.	CHKD J.W.P.	DATE 4-7-61	COMPUTER NO. 27-10-11
DATE 3-10-61	DRAWING NO. 1546-01-M-5020		REV. 1
SCALE AS NOTED			

E. & B. 546
DEPT. CHK.
ARCH.
ELECT.
H & V.
INST.
MECH.
STRUC.
UTIL.
PRO


GENERAL NOTES
① SEE DWG. Nº 1546-01-M-5011 FOR MECHANICAL EQUIPMENT.
② SEE DWG. Nº 1546-01-M-5536 FOR PIPING, H&V AND ELECTRICAL SERVICES.
③ THIS DWG VALID ONLY FOR SERVICES TO EXPERIMENTAL BEAM HOLE PORTS
PERSONNEL BRIDGE
EL. 851'-2 REF.
EL. 849'-0 REF.
POOL COVER
SERVICE PIPE SLEEVES
WATER LEVEL EL. 848'-0"
EXHAUST REGISTER
DEFECTIVE FUEL ELEMENT H.E. VENT, CONNECT TO 38" H.E. INLET
SCUPPER
S.B.H.E. DUCT
ION CHAMBER TUBE #1 SEE DWG Nº 1546-01-M-5050
REACTOR POOL
PLUG SERVICE SLEEVES
EL. 841'-0" REF.
2"-S.S.T. POOL LINER
EF #2 LIGHTERING FACILITY TUBE LINERS & PLUGS SEE DWG Nº 1546-01-M-5032
STACKED ORDINARY CONCRETE BLOCK SHIELDING
2" S.S.T. PIPE WATER CONNECTION
REACTOR
FINISH FLOOR 853'-1½"
EXP. VERTICAL TUBE & LIFT TUBE LINERS & PLUGS 1546-01-M-5034
4" Ø S.S. PIPE BY O.R.N.L.
TOP OF GRATING EL. 831'-0" REF.
TOP OF REACTOR EL. 829'-3" REF.
BOT OF POOL EL. 828'-0" REF.
WATER INLET EL. 820'-0"
DUCT
ORDINARY CONCRETE
41° APPROX.
CORE
REACTOR CORE EL. 820'-6" REF.
HOT BEAM HOLE EL. 820'-6"
EXPERIMENTAL BEAM HOLE PORT
4" LINER BY O.R.N.L.
DEFECTIVE FUEL ELEMENT STATION
CONDUIT
1" CONDUIT
BARITES CONC. SHIELDING (SECTION "B")
ORDINARY CONCRETE
WATER OUTLET EL. 813'-6" REF.
SECTION "A-A"
FOR PLAN VIEW SEE DWG. 1546-01-M-5022
HIGH FLUX ISOTOPE REACTOR
REACTOR EXPERIMENTAL FACILITY LAYOUT VERTICAL SECTION "A-A"
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
SINGMASTER & BREYER
UNION CARBIDE NUCLEAR COMPANY
1546-01-M-5021
DRAWING NO. 1546-01-M-5021
REV. 0

CERTIFIED FOR CONSTRUCTION

REACTOR POOL

TUNNEL "T2"
FLOOR EL. 818'-0"-REF.

EXPERIMENTAL BEAM HOLE PORT

DEFECTIVE FUEL ELEMENT STATIONS

EXPT. ACCESS HOLE FROM ABOVE

℄ BEAM HOLE #2 (RADIAL 400 M BEAM)

NOTE: ⚠ ALL WELDS TO BE GROUND SMOOTH

FOR ADDITIONAL REFERENCE DRAWINGS SEE 1546-01-M-5021.

THIS DWG VALID ONLY FOR SERVICES TO EXPERIMENTAL BEAM HOLE PORTS WORK DWGS M-5021, M-5022, M-5053 & M-5054 WITH PENETRATIONS & EMBEDMENTS SCHEDULE - DWG NO 1546-01-5-6080

NO.	REVISIONS	BY	CHK.	APPR. ELEC.	DATE	APPR. MECH.	DATE	APPR. ARC.	DATE
1	ADDED WELD NOTE & DWG. Nº	DB	GAF						
0	CERTIFIED FOR CONSTRUCTION	HW	GAF						
0	ISSUED FOR TITLE II APPROVAL	HW	GAF						

PENETRATIONS & EMBEDMENTS SCHEDULE	1546-01-5-6080
HOT OFF GAS SYSTEM	1546-01-M-5021
DRAWING NO. 1546-01-M-5022	REV. 1

REFERENCE DRAWING	NO.
PIPING & ARRGT. PLAN PRIMARY LOOP & SERVICE BUILDING PIPE & CONDUITS	1546-01-M-5811
PIPING & ARRGT. DRAINAGE SYS. GROUND FLOOR REACTOR BLDG. & PRIMARY BLDG.	1546-01-M-5820
[illegible]	1545-01-M-8058
[illegible]	1546-01-M-8058
[illegible]	1546-01-M-8021
SPECIFICATION	SECTION J3

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N. Y.

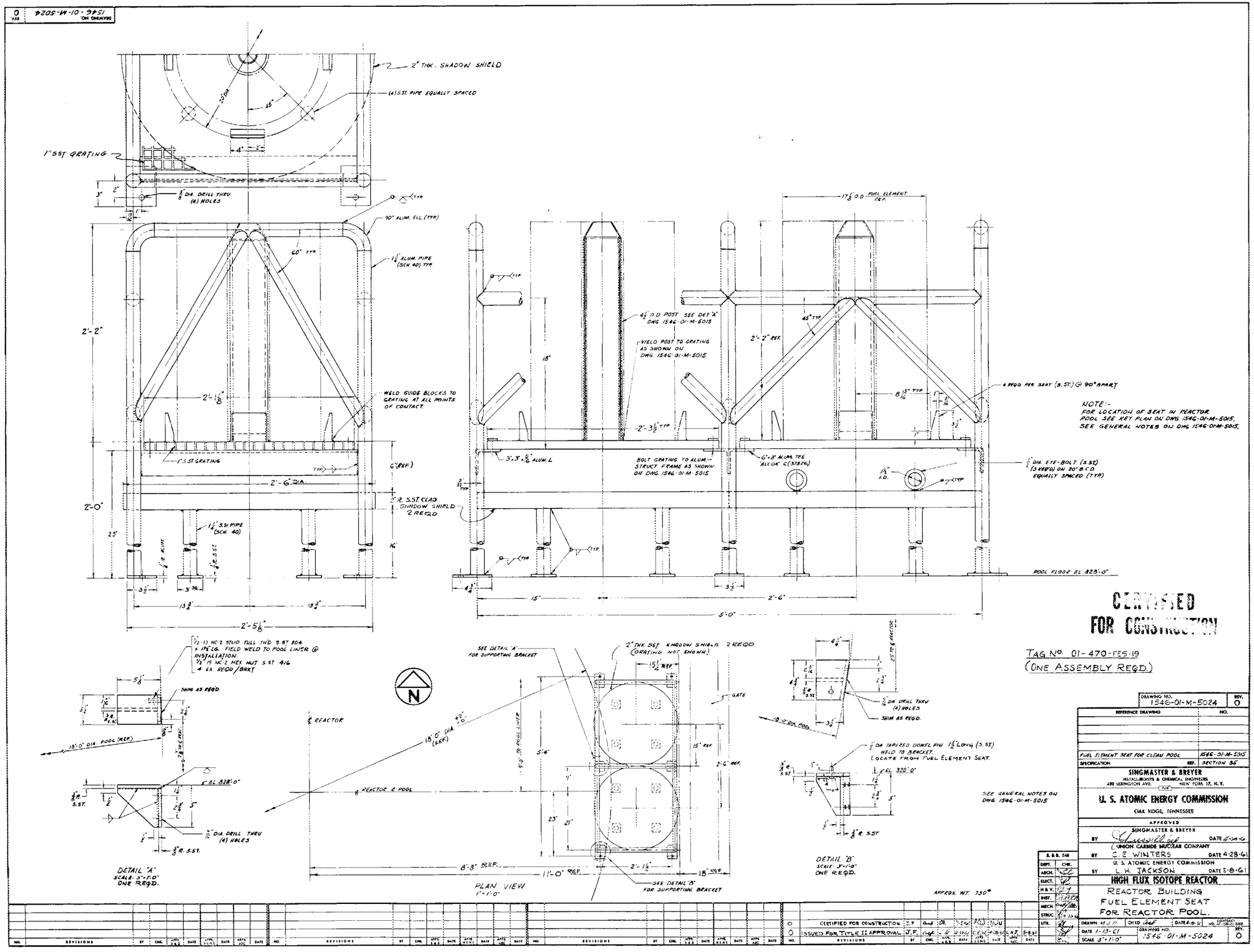
FOR

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER BY [signature] DATE 5-24-61
UNION CARBIDE NUCLEAR COMPANY BY C. E. WINTERS DATE 6-16-61
U. S. ATOMIC ENERGY COMMISSION BY L. H. JACKSON DATE 6-28-61

HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
REACTOR EXPERIMENTAL FACILITY LAYOUT
HORIZONTAL SECTION

DRAWN H.W. CHKD [illegible] DATE 4-14-61 SCALE 1/4"=1'-0"
DRAWING NO. 1546-01-M-5022 REV. 1



CERTIFIED FOR CONSTRUCTION

TAG No. 01-470-FES-19
(ONE ASSEMBLY REQD.)

DRAWING NO. 1546-01-M-5024	REV. 0
REFERENCE DRAWING	NO.
FUEL ELEMENT SEAT FOR CLEAN POOL	1546-01-M-5015
SPECIFICATION	REF. SECTION 3.6

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

FOR

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

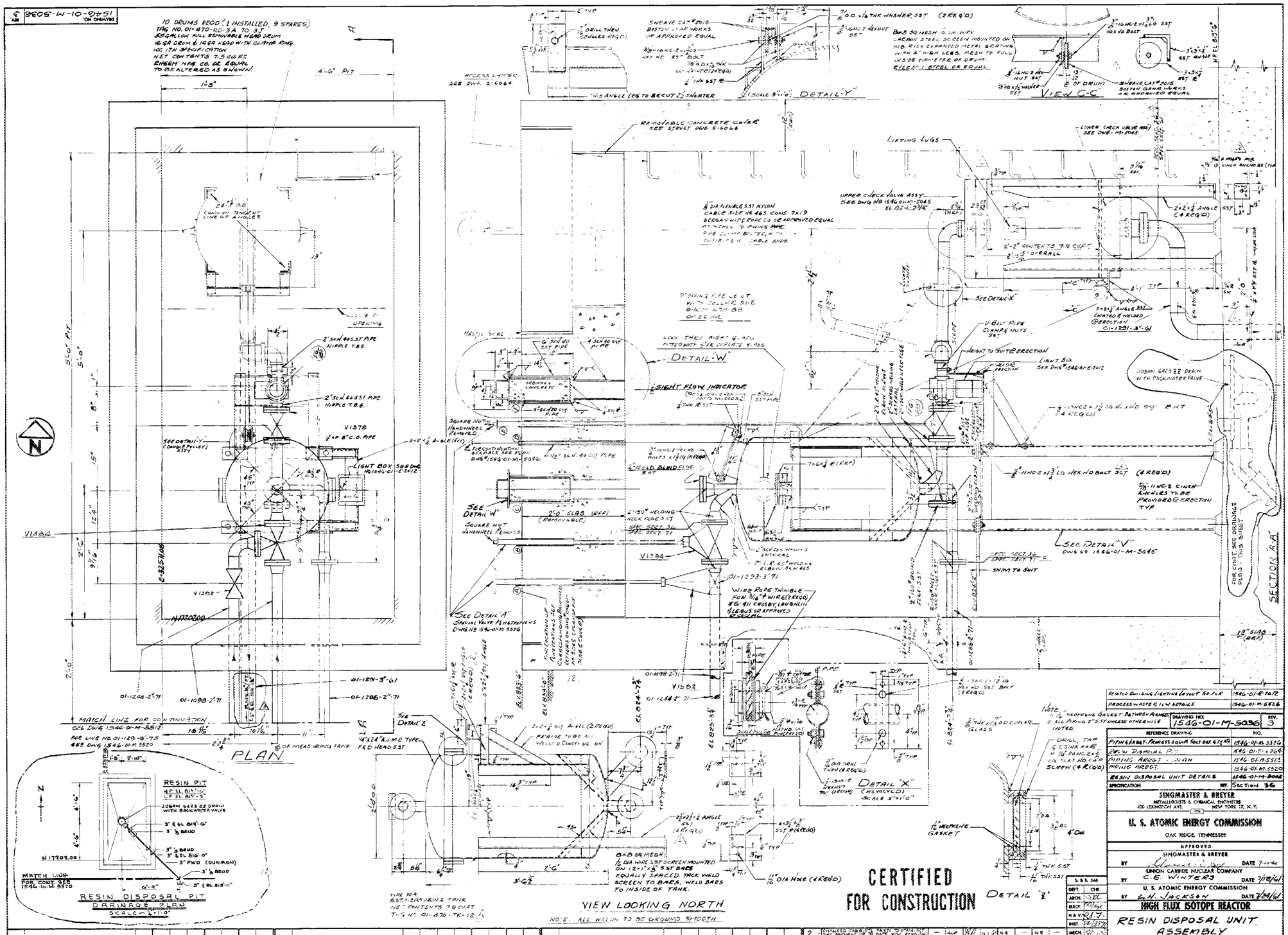
APPROVED
SINGMASTER & BREYER
BY C. Campbell Gil DATE 4-20-61
UNION CARBIDE NUCLEAR COMPANY
BY C. E. WINTERS DATE 4-28-61
U. S. ATOMIC ENERGY COMMISSION
BY L. H. JACKSON DATE 5-8-61

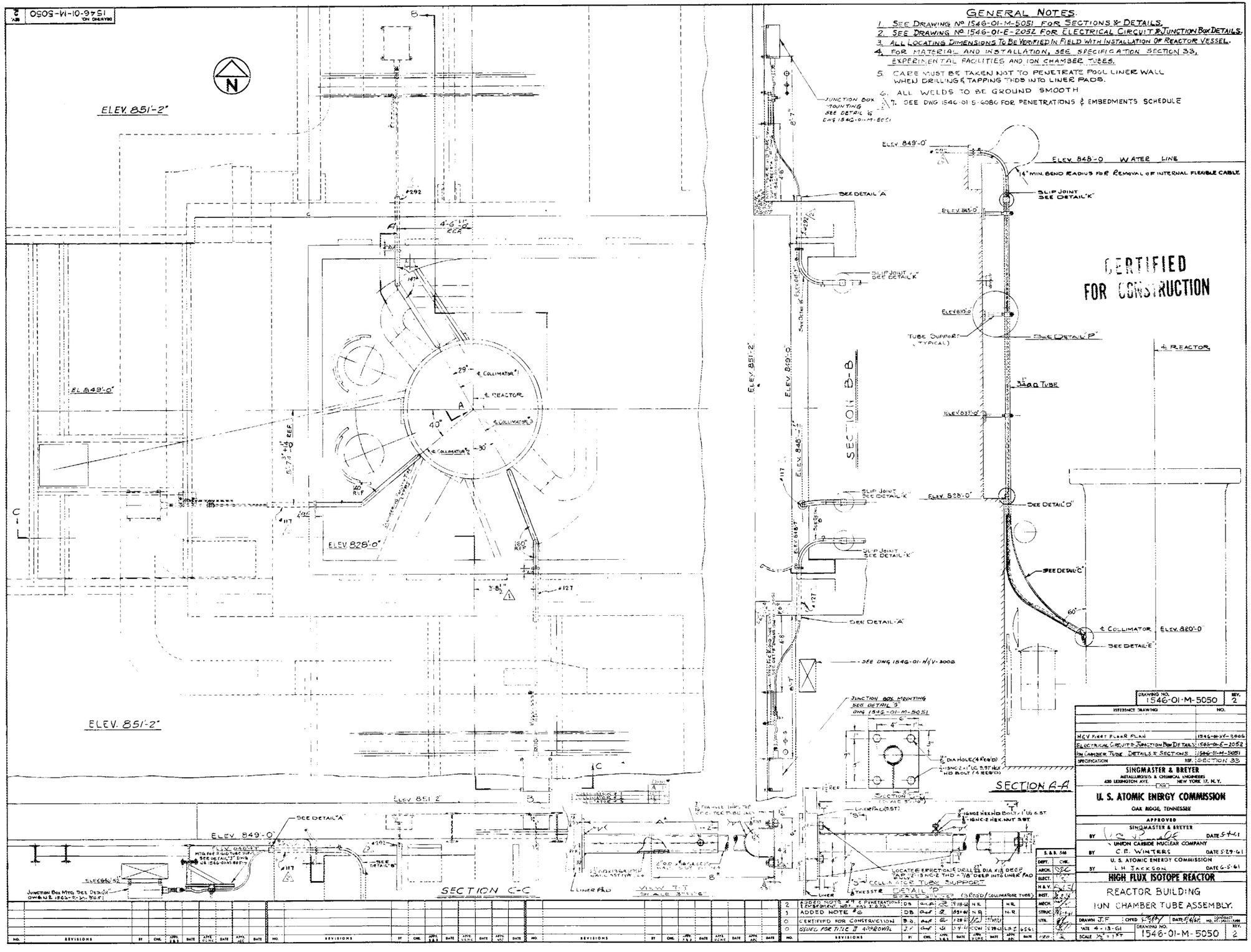
S. & B. 546
DEPT. CHK.
ARCH.
ELECT.
H & V.
INST.
MECH.
STRUC.
UTIL.

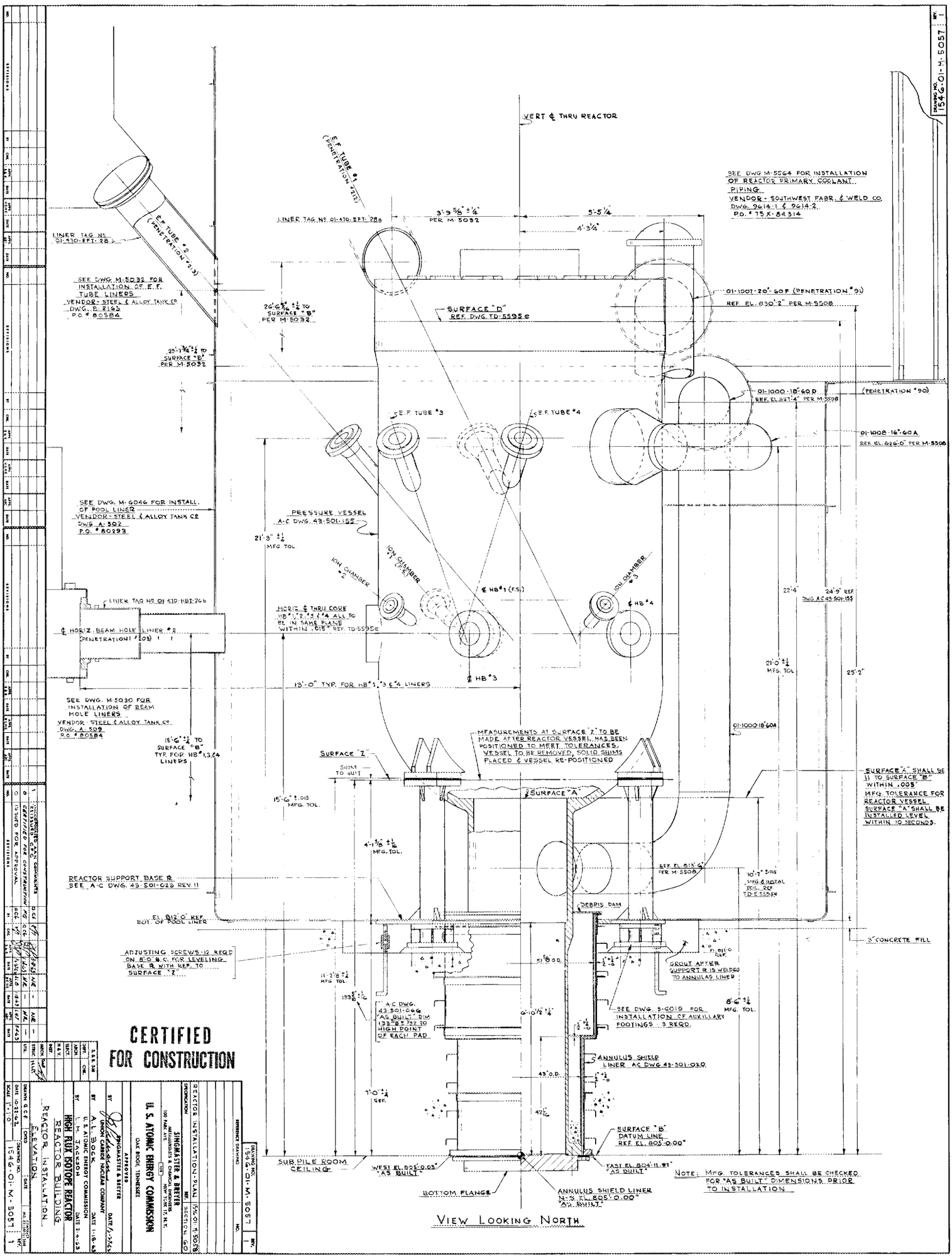
HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
FUEL ELEMENT SEAT
FOR REACTOR POOL.

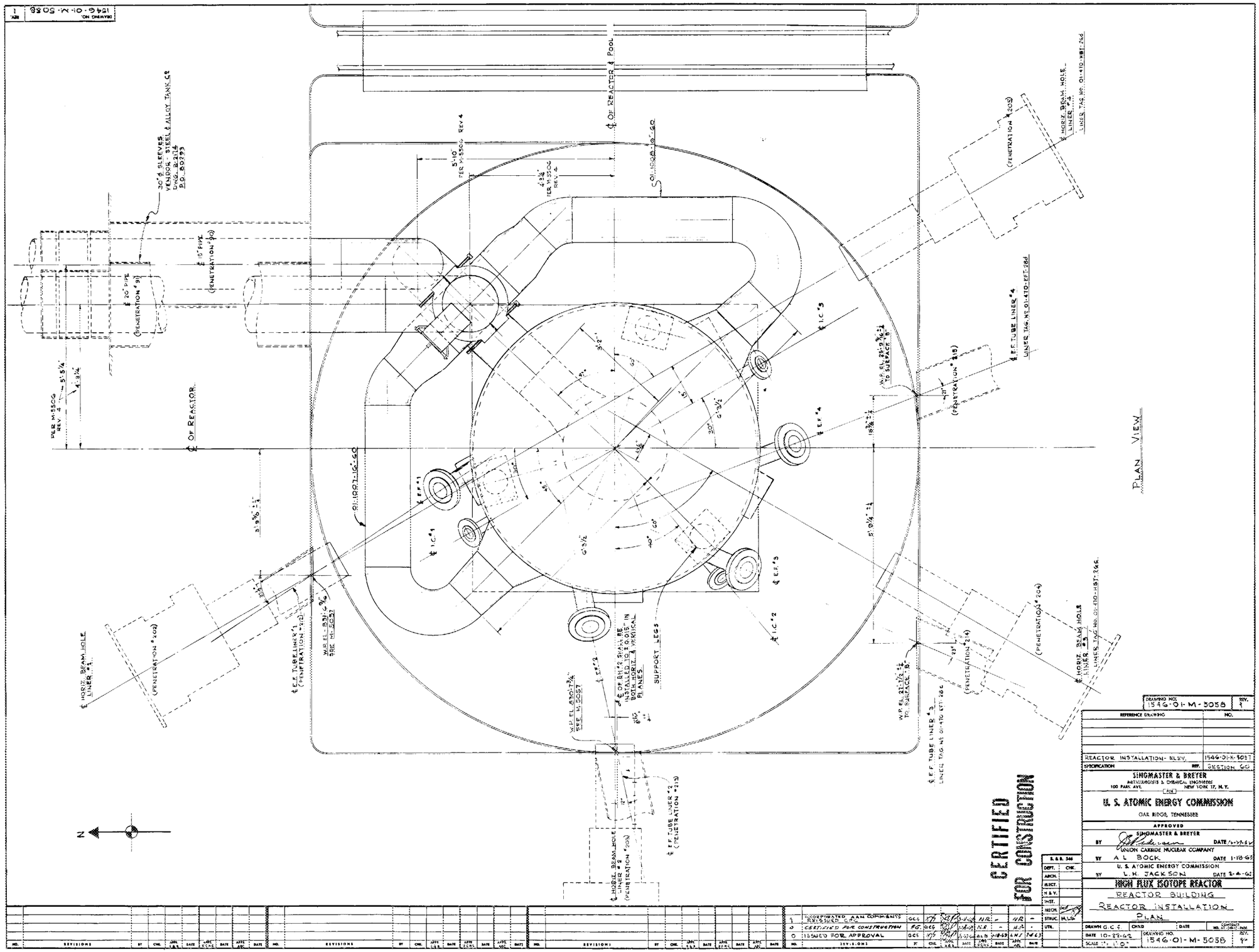
DRAWN M.J.P. CH'KD J.C.F. DATE 4-4-61 CONTRACT NO. AT-(40-1)-1000
DATE 1-13-61 SCALE 3"=1'-0"
DRAWING NO. 1546-01-M-5024 REV. 0

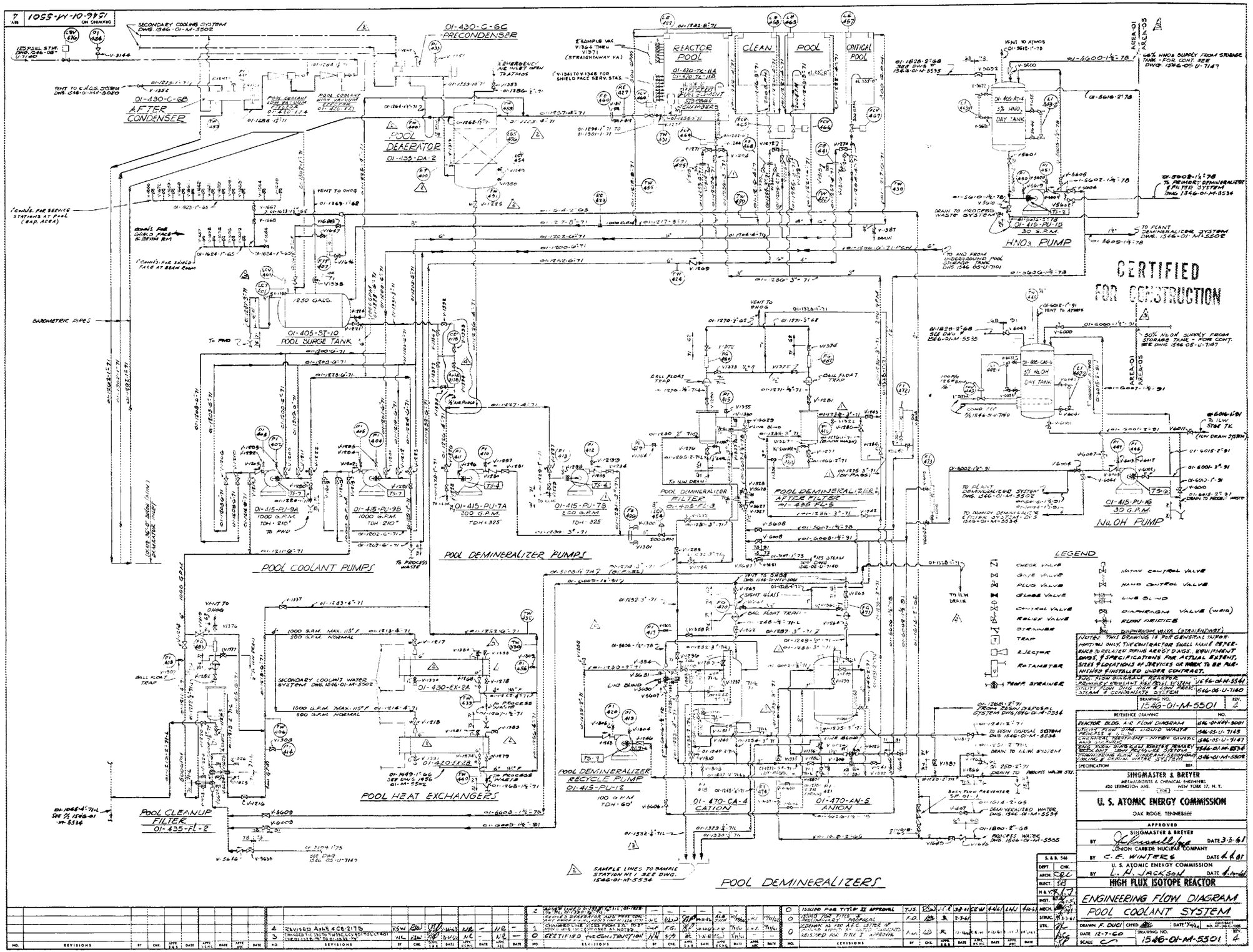
NO.	REVISIONS	BY	CHK.	APPR. ARCH	DATE	APPR. ELECT	DATE	APPR. MECH	DATE	APPR. ARC	DATE
0	CERTIFIED FOR CONSTRUCTION	J.F.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]				
0	ISSUED FOR TITLE II APPROVAL	J.F.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	N.J.	5-8-61

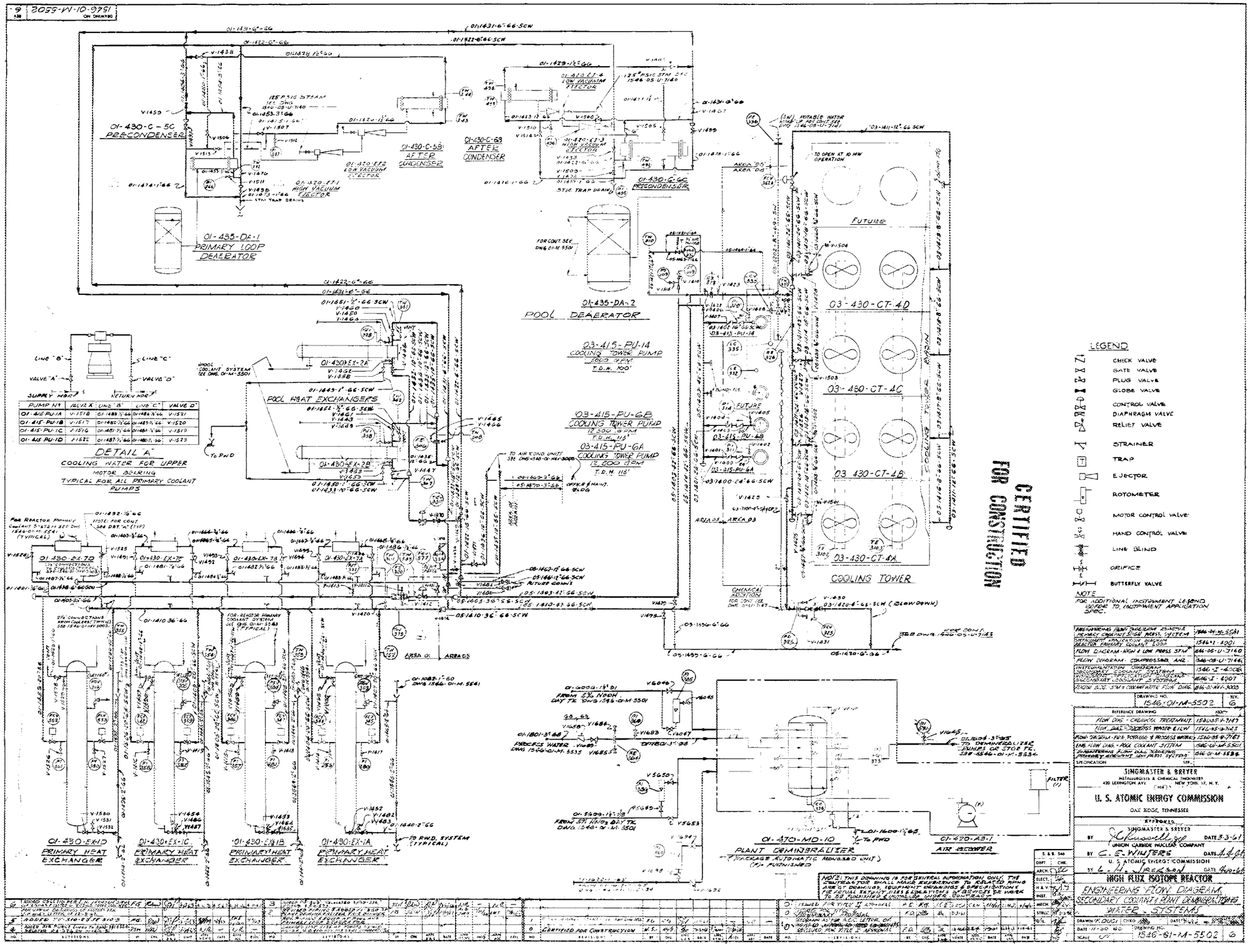

PLAN
VIEW LOOKING NORTH
SECTION "A-A"
DETAIL "Y"
VIEW C-C
DETAIL "W"
SIGHT FLOW INDICATOR
DETAIL "X"
DETAIL "Z"
RESIN DISPOSAL PIT DRAINAGE PLAN
RESIN DISPOSAL PIT
CERTIFIED FOR CONSTRUCTION
SINGMASTER & BREYER
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
HIGH FLUX ISOTOPE REACTOR
RESIN DISPOSAL UNIT ASSEMBLY
1546-01-M-5036

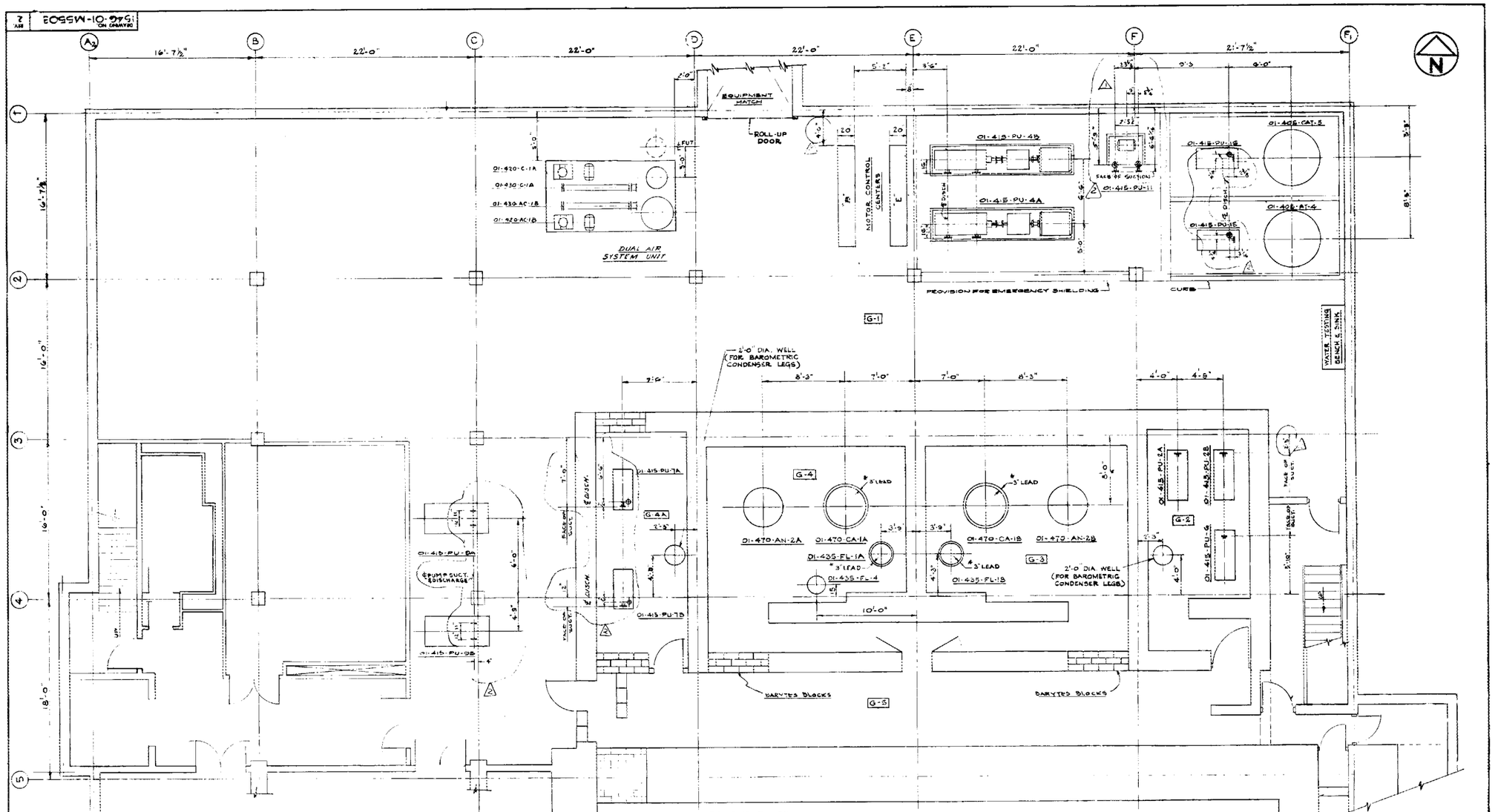

GENERAL NOTES.
1. SEE DRAWING No 1546-01-M-5051 FOR SECTIONS & DETAILS.
2. SEE DRAWING No 1546-01-E-2052 FOR ELECTRICAL CIRCUIT & JUNCTION BOX DETAILS.
3. ALL LOCATING DIMENSIONS TO BE VERIFIED IN FIELD WITH INSTALLATION OF REACTOR VESSEL.
4. FOR MATERIAL AND INSTALLATION, SEE SPECIFICATION SECTION 33, EXPERIMENTAL FACILITIES AND ION CHAMBER TUBES.
5. CARE MUST BE TAKEN NOT TO PENETRATE POOL LINER WALL WHEN DRILLING & TAPPING THDS INTO LINER PADS.
6. ALL WELDS TO BE GROUND SMOOTH
7. SEE DWG 1546-01-S-6080 FOR PENETRATIONS & EMBEDMENTS SCHEDULE
CERTIFIED FOR CONSTRUCTION
ELEV. 851'-2"
EL. 849'-0"
ELEV. 828'-0"
ELEV. 849'-0"
ELEV. 851'-2"
℄ COLLIMATOR
℄ REACTOR
SEE DETAIL "A"
SEE DETAIL "B"
SEE DETAIL "C"
SEE DETAIL "D"
SEE DETAIL "E"
SEE DETAIL "K"
SEE DETAIL "P"
SEE DWG 1546-01-H&V-3006
SECTION C-C
SECTION B-B
SECTION A-A
ELEV. 849'-0"
ELEV. 848'-0 WATER LINE
ELEV. 845'-0"
ELEV. 828'-0"
ELEV. 820'-0"
SLIP JOINT SEE DETAIL "K"
TUBE SUPPORT (TYPICAL)
3½" ø TUBE
℄ COLLIMATOR
SEE DETAIL "E"
JUNCTION BOX MOUNTING SEE DETAIL "S" DWG 1546-01-M-5051
LINER PAD
COLLIMATOR TUBE SUPPORT
DETAIL "D"
DRAWING NO. 1546-01-M-5050 REV. 2
REFERENCE DRAWING NO.
HGV FIRST FLOOR PLAN 1546-01-H-V-3006
ELECTRICAL CIRCUIT & JUNCTION BOX DETAILS 1546-01-E-2052
ION CHAMBER TUBE DETAILS & SECTIONS 1546-01-M-5051
SPECIFICATION REF. SECTION 33
SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
APPROVED
SINGMASTER & BREYER BY DATE 5-4-61
UNION CARBIDE NUCLEAR COMPANY BY C. B. WINTERS DATE 5-29-61
U. S. ATOMIC ENERGY COMMISSION BY L. H. JACKSON DATE 6-5-61
HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
ION CHAMBER TUBE ASSEMBLY.
DRAWN J.F. CHKD DATE 4-13-61 DRAWING NO. 1546-01-M-5050 REV. 2
SCALE 1/2" = 1 FT
2 ADDED NOTE #7 & PENETRATIONS & EMBEDMENT NOS. A41 & B24
1 ADDED NOTE #6
0 CERTIFIED FOR CONSTRUCTION
0 ISSUED FOR TITLE I APPROVAL
REVISIONS BY CHK. APPD. DATE


VERT ℄ THRU REACTOR
E.F. TUBE #1 (PENETRATION #12)
E.F. TUBE #2 (PENETRATION #13)
LINER TAG No. 01-410-EFT-28b
LINER TAG No. 01-410-EFT-28
SEE DWG. M-5032 FOR INSTALLATION OF E.F. TUBE LINERS
VENDOR - STEEL & ALLOY TANK CO
DWG. P-2165
P.O. # 80584
SEE DWG. M-5064 FOR INSTALLATION OF REACTOR PRIMARY COOLANT PIPING
VENDOR - SOUTHWEST FABR. & WELD CO.
DWG. 9614-1 & 9614-2
P.O. # 75X-84314
3'-3 5/8" ± 1/4" PER M-5032
5'-5 1/4"
4'-3 1/4"
26'-6 7/8" ± 1/4" TO SURFACE "B" PER M-5032
SURFACE "D" REF. DWG. TD-5595C
01-1007-20"-60F (PENETRATION #91)
REF. EL. 630'-2" PER M-5508
21'-7 3/8" ± 1/4" TO SURFACE "B" PER M-5032
01-1000-18"-60P
REF. EL. 621'-4" PER M-5508
(PENETRATION #90)
E.F. TUBE #3
E.F. TUBE #4
01-1008-16"-60A
REF. EL. 626'-0" PER M-5508
SEE DWG. M-6046 FOR INSTALL. OF POOL LINER
VENDOR - STEEL & ALLOY TANK CO
DWG. A-502
P.O. #80293
PRESSURE VESSEL
A-C DWG. 43-501-155
21'-8" ± 1/4" MFG TOL.
ION CHAMBER #2
ION CHAMBER #1 (F.S.)
ION CHAMBER #3
℄ HB #1 (F.S.)
℄ HB #4
LINER TAG No. 01-410-HBT-26b
℄ HORIZ. BEAM HOLE LINER #2 (PENETRATION #103)
HORIZ. ℄ THRU CORE HB #1, 2, #3 & #4 ALL TO BE IN SAME PLANE WITHIN .015" REF. TD-5595C
22'-4"
24'-9" REF DWG A-C 43-501-155
21'-0" ± 1/4" MFG. TOL.
25'-2"
13'-0" TYP. FOR HB #1, #3 & #4 LINERS
℄ HB #3
SEE DWG. M-5030 FOR INSTALLATION OF BEAM HOLE LINERS
VENDOR - STEEL & ALLOY TANK CO
DWG. A-509
P.O. #80584
15'-6" ± 1/4" TO SURFACE "B" TYP. FOR HB #1, 3, & 4 LINERS
01-1000-18"-60M
MEASUREMENTS AT SURFACE "Z" TO BE MADE AFTER REACTOR VESSEL HAS BEEN POSITIONED TO MEET TOLERANCES. VESSEL TO BE REMOVED, SOLID SHIMS PLACED & VESSEL RE-POSITIONED
SURFACE "Z"
SHIM TO SUIT
SURFACE "A"
SURFACE "A" SHALL BE ⊥ TO SURFACE "B" WITHIN .005"
MFG. TOLERANCE FOR REACTOR VESSEL SURFACE "A" SHALL BE INSTALLED LEVEL WITHIN 10 SECONDS.
15'-6" ± .015 MFG. TOL.
4'-1 5/8" ± 1/4" MFG. TOL.
REF. EL. 619'-6" PER M-5508
10'-7" ± .005 MFG & INSTAL TOL. REF TD-5595C
REACTOR SUPPORT BASE ℄ SEE A-C DWG. 43-501-029 REV. 11
DEBRIS DAM
EL. 612'-0" REF. BOT. OF POOL LINER
3" CONCRETE FILL
ADJUSTING SCREWS - 12 REQD ON B.C. FOR LEVELING BASE ℄ WITH REF. TO SURFACE "Z"
GROUT AFTER SUPPORT IS IS WELDED TO ANNULAS LINER
51 5/8" O.D.
11'-2 7/8" ± 1/4" MFG. TOL.
133 3/8" ± 1/16"
A-C DWG. 43-501-066 AS BUILT - RIM 133 3/8" ± 1/32" TO HIGH POINT OF EACH PAD
SEE DWG. 3-6019 FOR INSTALLATION OF AUXILLARY FOOTINGS - 3 REQD.
8'-6" ± 1/4" MFG. TOL.
6'-10 1/2" ± 1/4"
ANNULUS SHIELD LINER A-C DWG 43-501-030
49" O.D.
7'-0" ± 1/4" REF.
42" O.D.
SURFACE "B" DATUM LINE REF. EL. 605'-0.00"
SUB PILE ROOM CEILING
WEST EL. 605'-0.03" "AS BUILT"
EAST EL. 604'-11.91" "AS BUILT"
BOTTOM FLANGE
ANNULUS SHIELD LINER N-S EL. 605'-0.00" "AS BUILT"
NOTE: MFG. TOLERANCES SHALL BE CHECKED FOR "AS BUILT" DIMENSIONS PRIOR TO INSTALLATION
VIEW LOOKING NORTH
CERTIFIED FOR CONSTRUCTION
HIGH FLUX ISOTOPE REACTOR
REACTOR INSTALLATION
ELEVATION
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
APPROVED
DATE 1/3/56
REACTOR INSTALLATION PLAN
1546-01-M-5057
DRAWING NO. 1546-01-M-5057
REV. 1


PLAN VIEW
CERTIFIED FOR CONSTRUCTION
℄ OF REACTOR & POOL
℄ OF REACTOR
30"ϕ SLEEVES
VENDOR - STEEL & ALLOY TANK CO
DWG. B-2114
P.O. 80799
20" PIPE
(PENETRATION #9)
10" PIPE
(PENETRATION #10)
PER M-5506 REV 4
5'-10"
PER M-5506 REV 4
4'-3¼"
PER M-5506 REV 4
5'-5¼"
4'-3¼"
01-1097-16'-6"
01-1097-9'-6"
I.C. #1
I.C. #2
I.C. #3
I.C. #5
E.F. #1
E.F. #2
E.F. #3
E.F. #4
E.F. TUBE LINER #1
(PENETRATION #212)
W.P. EL. 831'-6¾"
SEE M-5057
E.F. TUBE LINER #2
(PENETRATION #213)
W.P. EL. 830'-7¾"
SEE M-5057
℄ OF R.H. 2 SHAFTS BE INSTALLED TO PLACE IN BOTH VERTICAL & HORIZONTAL PLANES
SUPPORT LEGS
E.F. TUBE LINER #3
LINER TAG NO. 01-410-EFT-286
W.P. EL. 821'-1¼"
TO SURFACE "B"
E.F. TUBE LINER #4
LINER TAG NO. 01-410-EFT-284
W.P. EL. 831'-1¼"
TO SURFACE "B"
HORIZ. BEAM HOLE
LINER #1
(PENETRATION #202)
HORIZ. BEAM HOLE
LINER #2
(PENETRATION #203)
HORIZ. BEAM HOLE
LINER #3
LINER TAG NO. 01-410-HBT-266
(PENETRATION #204)
HORIZ. BEAM HOLE
LINER #4
LINER TAG NO. 01-410-HBT-264
(PENETRATION #205)
(PENETRATION #214)
(PENETRATION #215)
N
DRAWING NO. 1546-01-M-5058 REV. 1
REFERENCE DRAWING NO.
REACTOR INSTALLATION - BLDG.
1546-01-M-5057
SPECIFICATION REF. SECTION G.G.
SINGMASTER & BREYER
INTERNATIONAL CONSULTING ENGINEERS
100 PARK AVE. NEW YORK 17, N.Y.
FOR
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
APPROVED
BY SINGMASTER & BREYER DATE 1-17-63
UNION CARBIDE NUCLEAR COMPANY
BY A. L. BOCK DATE 1-18-63
U. S. ATOMIC ENERGY COMMISSION
BY L. H. JACKSON DATE 2-4-63
HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
REACTOR INSTALLATION
PLAN
DRAWN G.C.S. CHKD DATE
DATE 10-29-62 DRAWING NO. 1546-01-M-5058 REV. 1
SCALE 1" = 1'-0"
S.&B. 546
DEPT. CHK.
ARCH.
ELECT.
H & V.
INST.
MECH.
STRUC.
UTIL.
NO. REVISIONS BY CHK. APPD. DATE
1 INCORPORATED A&M COMMENTS
0 CERTIFIED FOR CONSTRUCTION
0 ISSUED FOR APPROVAL


1055-M-10-9951
SECONDARY COOLING SYSTEM DWG 1546-01-M-5502
01-430-C-6C PRECONDENSER
01-430-C-6B AFTER CONDENSER
POOL DEAERATOR 01-435-DA-2
REACTOR POOL
CLEAN POOL
CRITICAL POOL
01-405-ST-10 POOL SURGE TANK
1250 GALS.
BAROMETRIC PIPES
01-415-PU-9A 1000 G.P.M. TDH = 210'
01-415-PU-9B 1000 G.P.M. TDH 210'
01-415-PU-7A 200 G.P.M. TDH = 325'
01-415-PU-7B 200 G.P.M. TDH = 325
POOL COOLANT PUMPS
POOL DEMINERALIZER PUMPS
01-415-PU-12 POOL DEMINERALIZER RECYCLE PUMP 100 G.P.M. TDH = 60'
01-420-EX-2A
01-420-EX-2B
POOL HEAT EXCHANGERS
POOL CLEANUP FILTER 01-435-FL-2
POOL DEMINERALIZER FILTER 01-435-FL-3
POOL DEMINERALIZER AFTER FILTER 01-435-FL-5
01-470-CA-4 CATION
01-470-AN-5 ANION
POOL DEMINERALIZERS
01-415-PU-10 30 G.P.M.
HNO3 PUMP
01-415-PU-16 30 G.P.M.
NaOH PUMP
CERTIFIED FOR CONSTRUCTION
LEGEND
CHECK VALVE
GATE VALVE
PLUG VALVE
GLOBE VALVE
CONTROL VALVE
RELIEF VALVE
STRAINER
TRAP
EJECTOR
ROTAMETER
TEMP. STRAINER
MOTOR CONTROL VALVE
HAND CONTROL VALVE
LINE BLIND
DIAPHRAGM VALVE (WEIR)
FLOW ORIFICE
NOTE: THIS DRAWING IS FOR GENERAL INFORMATION ONLY. THE CONTRACTOR SHALL MAKE REFERENCE TO RELATED PIPING ARRGT DWGS., EQUIPMENT DWGS. & SPECIFICATIONS FOR ACTUAL ELEVATIONS, SIZES, LOCATIONS OF DEVICES OR WORK TO BE FURNISHED & INSTALLED UNDER CONTRACT.
DRAWING NO. 1546-01-M-5501 REV. 4
SIMGMASTER & BREYER
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
APPROVED
UNION CARBIDE NUCLEAR COMPANY
U. S. ATOMIC ENERGY COMMISSION
HIGH FLUX ISOTOPE REACTOR
ENGINEERING FLOW DIAGRAM
POOL COOLANT SYSTEM
DRAWN F. DUCI
DATE 12-7-60
SCALE
1546-01-M-5501
REV. 4

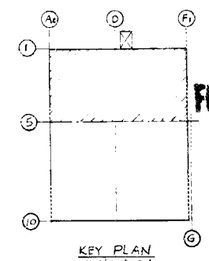

01-430-C-5C
PRECONDENSER
01-430-C-5B
AFTER CONDENSER
01-430-C-6B
AFTER CONDENSER
01-430-C-6C
PRECONDENSER
01-435-DA-1
PRIMARY LOOP DEAERATOR
01-435-DA-2
POOL DEAERATOR
POOL HEAT EXCHANGERS
03-415-PU-14
COOLING TOWER PUMP
03-415-PU-6B
COOLING TOWER PUMP
03-415-PU-6A
COOLING TOWER PUMP
03-430-CT-4D
03-430-CT-4C
03-430-CT-4B
03-430-CT-4A
COOLING TOWER
FUTURE
01-430-EX-7D
01-430-EX-7C
01-430-EX-7B
01-430-EX-7A
01-430-EX-1D
PRIMARY HEAT EXCHANGER
01-430-EX-1C
PRIMARY HEAT EXCHANGER
01-430-EX-1B
PRIMARY HEAT EXCHANGER
01-430-EX-1A
PRIMARY HEAT EXCHANGER
01-470-MD-10
PLANT DEMINERALIZER
01-420-AS-1
AIR STRIPPER
DETAIL "A"
COOLING WATER FOR UPPER MOTOR BEARING
TYPICAL FOR ALL PRIMARY COOLANT PUMPS
LEGEND
CHECK VALVE
GATE VALVE
PLUG VALVE
GLOBE VALVE
CONTROL VALVE
DIAPHRAGM VALVE
RELIEF VALVE
STRAINER
TRAP
EJECTOR
ROTOMETER
MOTOR CONTROL VALVE
HAND CONTROL VALVE
LINE BLIND
ORIFICE
BUTTERFLY VALVE
NOTE
FOR ADDITIONAL INSTRUMENT LEGEND REFER TO INSTRUMENT APPLICATION SPEC.
CERTIFIED FOR CONSTRUCTION
DRAWING NO. 1546-01-M-5502
REV 6
SINGMASTER & BREYER
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
UNION CARBIDE NUCLEAR COMPANY
HIGH FLUX ISOTOPE REACTOR
ENGINEERING FLOW DIAGRAM
SECONDARY COOLANT PLANT DRAINAGE
WATER - SYSTEMS



EQUIPMENT LIST

ITEM	DESCRIPTION
01-406-CAT-4	NITRIC ACID DAY TANK
01-406-CAT-5	CAUSTIC DAY TANK
01-420-AR-6	INSTR. AIR RECEIVER
01-430-AC-1A	INSTR. AIR AFTERCOOLER
01-430-AC-1B	INSTR. AIR AFTERCOOLER
01-415-PU-2A & 2B	PRIMARY SYSTEM CLEAN UP PUMPS
01-415-PU-4A & 4B	PRIMARY SYSTEM PRESSURIZER PUMPS
01-415-PU-6	PRIMARY DEMINERALIZING RECYCLE PUMP
01-415-PU-7A & 7B	PRIM. DEMINERALIZER PUMPS
01-415-PU-9A & 9B	PR. L. COOLANT PUMPS
01-415-PU-11	PRIMARY SYSTEM PULSA FEED PUMP
01-415-PU-15	NITRIC ACID DAY TANK PUMP
01-415-PU-16	CAUSTIC DAY TANK PUMP
01-420-C-1A & 1B	INSTRUMENT AIR COMPRESSOR
01-420-AD-1	INSTRUMENT AIR DRYER
01-435-FL-1A & 1B	PRIMARY CLEANUP SYSTEM FILTERS
01-435-FL-4	PRIMARY SYSTEM DEMINERALIZE AFTER FILTER
01-470-AN-2A & 2B	PRIMARY LOW DEMINERALIZER (CATION)
01-470-AN-2A & 2B	PRIMARY LOW DEMINERALIZER (ANION)

NOTE
1 △ DENOTES SHIELDING SUPPLIED BY VENDOR FOR INSTALLATION BY CONTRACTOR



KEY PLAN
SCALE 1" = 50'

CERTIFIED FOR CONSTRUCTION

DRAWING NO 15G-01-M-5503 REV. 2

REFERENCE DRAWING	NO.
REACTOR BLDG. GROUND FLOOR PLAN	15G-01-M-1005

SPECIFICATION REV.

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N. Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
BY SINGMASTER & BREYER DATE 3-4-61
UNION CARBIDE NUCLEAR COMPANY
BY C. E. WINTERS DATE 4/6/61
U. S. ATOMIC ENERGY COMMISSION
BY L. H. JACKSON DATE

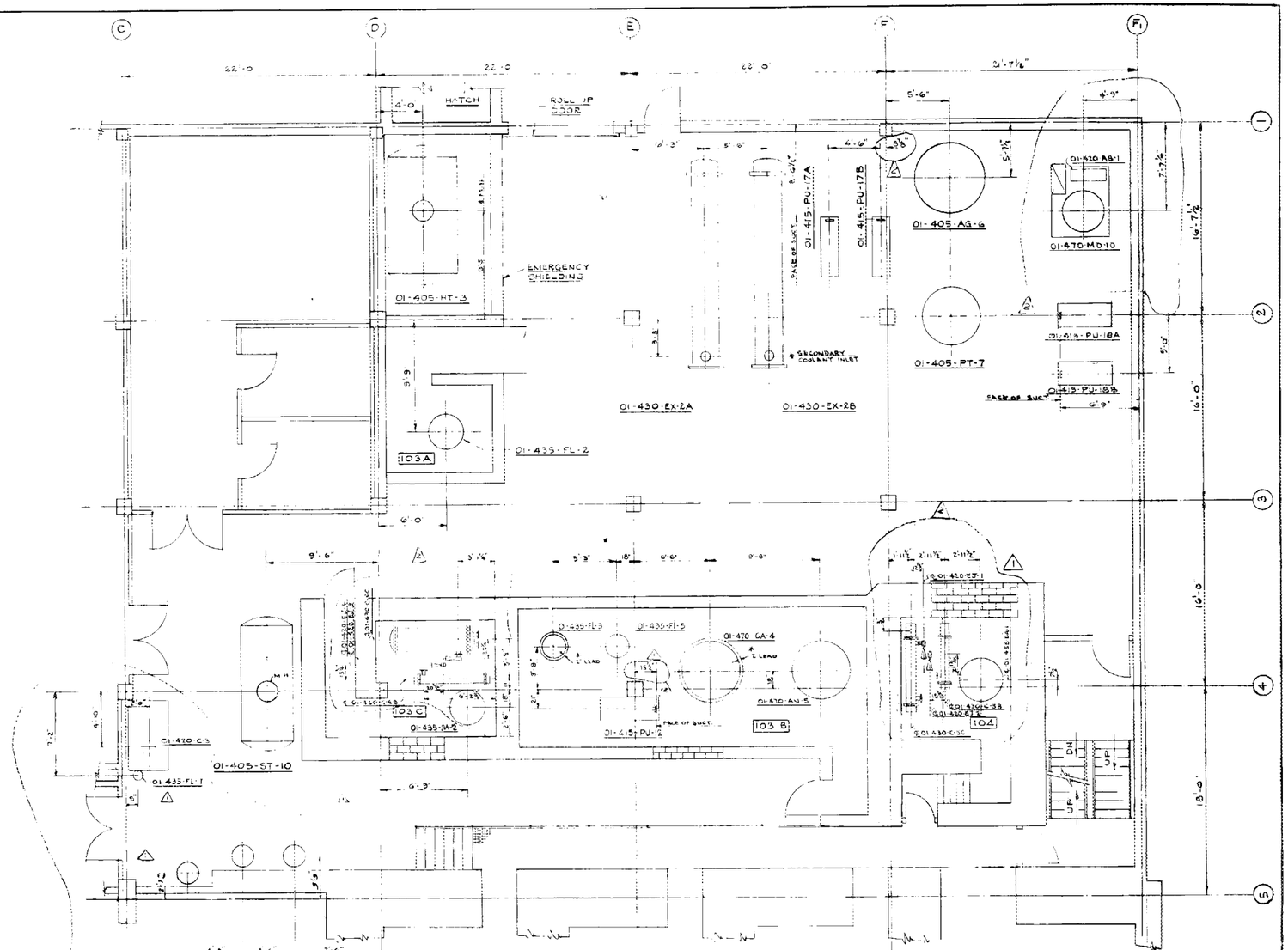
S & B 546
DEPT. CHK.
ARCH. SEC
ELECT. SEC
H & V
INST.
MECH.
STRUC.
UTIL.

HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
PROCESS EQUIPMENT ARRANGEMENT
GROUND FLOOR

DRAWN T. J. B. CHKD J. F. C. DATE 11/30/60 DRAWING NO. 15G-01-M-5503 REV. 2
DATE 11-30-60 DRAWING NO. 15G-01-M-5503
SCALE 1/4"=1'-0"

NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. ARCH.	DATE	APPR. ARC.	DATE
2	REVISED PER REQUIREMENTS IN TID 7025	M.M.	F.G.						
1	REVISED AIR COMPRESSOR EQUIPMENT TO 4.5 SCFM WITH MINOR REVISIONS	F.G.			11-4-60	N.R.		N.R.	
0	SHIELDING NOTE AND CHANGED LOCATION OF HATCH ADDED								
0	CERTIFIED FOR CONSTRUCTION	R.B.M.	N.A.B.		7/26/60				
0	ISSUED FOR TITLE II APPROVAL	M.M.			2-24-60				
0	ISSUED FOR TITLE I PRELIMINARY APPROVAL	M.M.			2-2-60				
0	REDRAWN AS PER A.E.C. LETTER OF 12-17-59 APPROVED 12-30-59 COMMENTS REISSUED FOR TITLE I APPROVAL	F.D.			11-12-60	6-8-59	1-11-60	6-8-59	1-11-60

DRAWING NO. 1546-01-M-5504 REV. 2



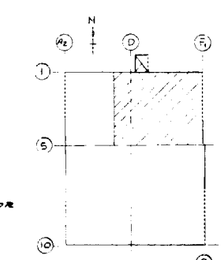
PLAN ~ ELEV. 833'-0"

EQUIPMENT LIST

ITEM	DESCRIPTION
01-405-AR-7A	EMERGENCY AIR RECEIVER
01-405-AR-7B	EMERGENCY AIR RECEIVER
01-405-AR-7C	EMERGENCY AIR RECEIVER
01-420-C-2	EMERGENCY AIR COMPRESSOR
01-405-HT-3	REACTOR PRIMARY WATER HEAD TANK
01-405-AG-6	AIR GAP TANK
01-405-PT-7	PROCESS WATER PRESSURE TANK
01-415-PU-12	POOL DEMINERALIZER SYSTEM RECYCLE PUMP
01-415-PU-17A & B	PROCESS WATER PUMPS
01-415-PU-18A & B	DEMINERALIZED WATER STORAGE PUMPS
01-430-EX-2A & B	POOL HEAT EXCHANGERS
01-435-DA-1	PRIMARY LOOP DEAERATOR
01-435-DA-2	POOL DEAERATOR
01-435-FL-2	POOL CLEANUP FILTER
01-435-FL-5	POOL DEMINERALIZER SYSTEM AFTER FILTER
01-470-CA-4	POOL DEMINERALIZER (CATION)
01-470-AN-5	POOL DEMINERALIZER (ANION)
01-470-MD-10	PLANT MONOBED DEMINERALIZER
01-430-C-3B	AFTER CONDENSER
01-405-ST-10	POOL SURGE TANK
01-435-FL-3	POOL CLEANUP FILTER
01-430-C-2B	AFTER CONDENSER
01-430-C-3C	PRECONDENSER
01-430-C-5C	PRECONDENSER
01-410-AB-1	AIR BLOWER
01-435-FL-1	AIR FILTER

CERTIFIED FOR CONSTRUCTION

NOTE
1. ▲ DENOTES SHIELDING SUPPLIED BY VENDOR FOR INSTALLATION BY CONTRACTOR



KEY PLAN
SCALE 1"=20'-0"

NO.	REVISIONS	BY	CHK.	APPR.	DATE	APPR.	DATE	APPR.	DATE
2	REVISED IN ACCORDANCE WITH CONTRACT NO. AT(40-1)-3430	M.K.	F.D.						
1	REVISED PER AEC LETTER OF APPROVAL	F.D.							
0	CERTIFIED FOR CONSTRUCTION								
0	ISSUED FOR TITLE II APPROVAL	F.D.	M.M.						
0	ISSUED FOR TITLE I PRELIMINARY PROPOSAL	M.M.							
0	REDRAWN AS PER AEC LETTER OF APPROVAL AND AS NOTED COMMENTS. REISSUED FOR TITLE I APPROVAL	F.D.							

S. & B. 546
DEPT. CHK.
ARCH.
ELECT.
H & V.
INST.
MECH.
STRUC.
UTIL.

REFERENCE DRAWING | NO.
Union Bldg. First Floor Plan | 1546-01-A-1003

SPECIFICATION | REF.

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N. Y.

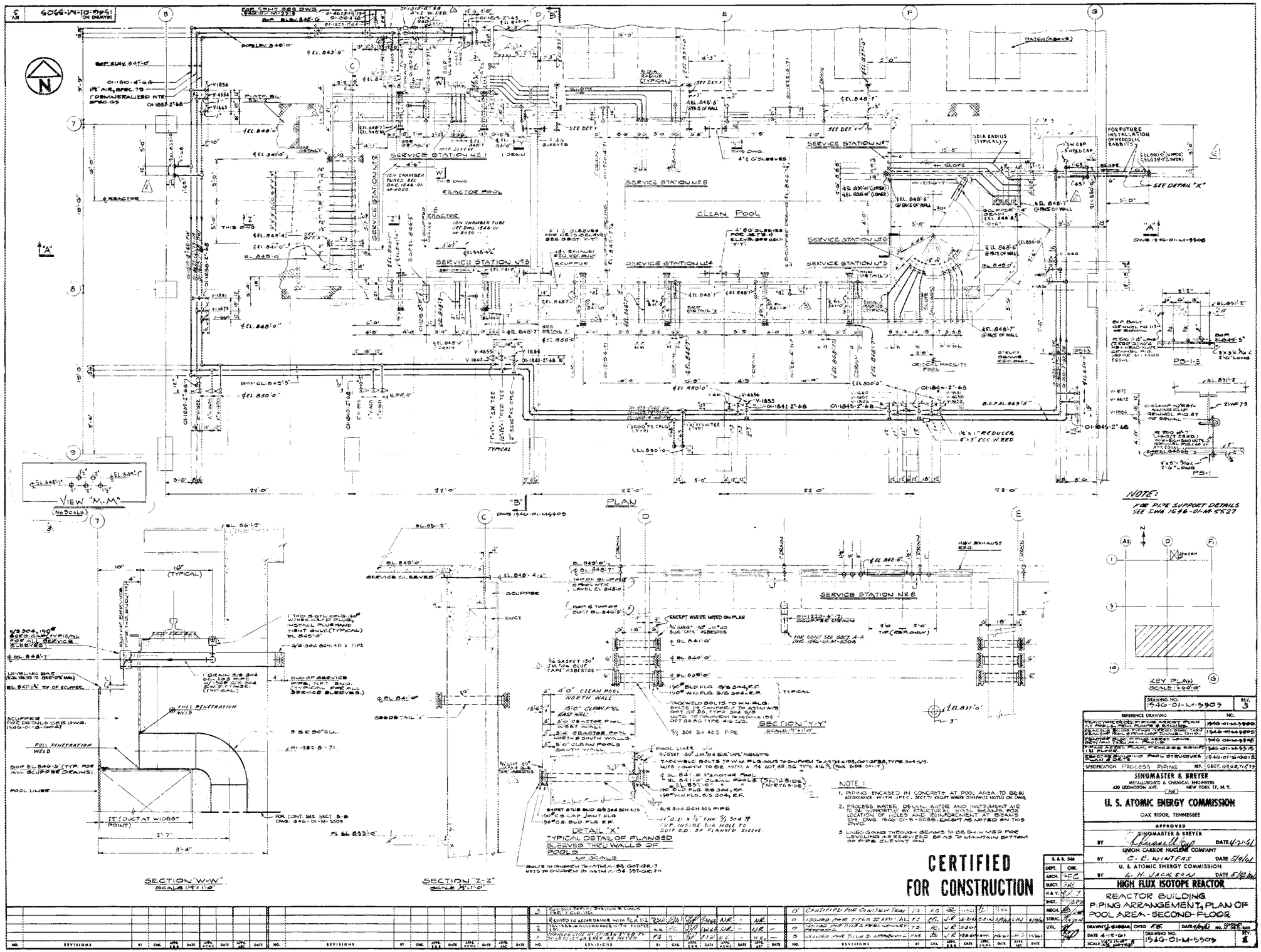
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

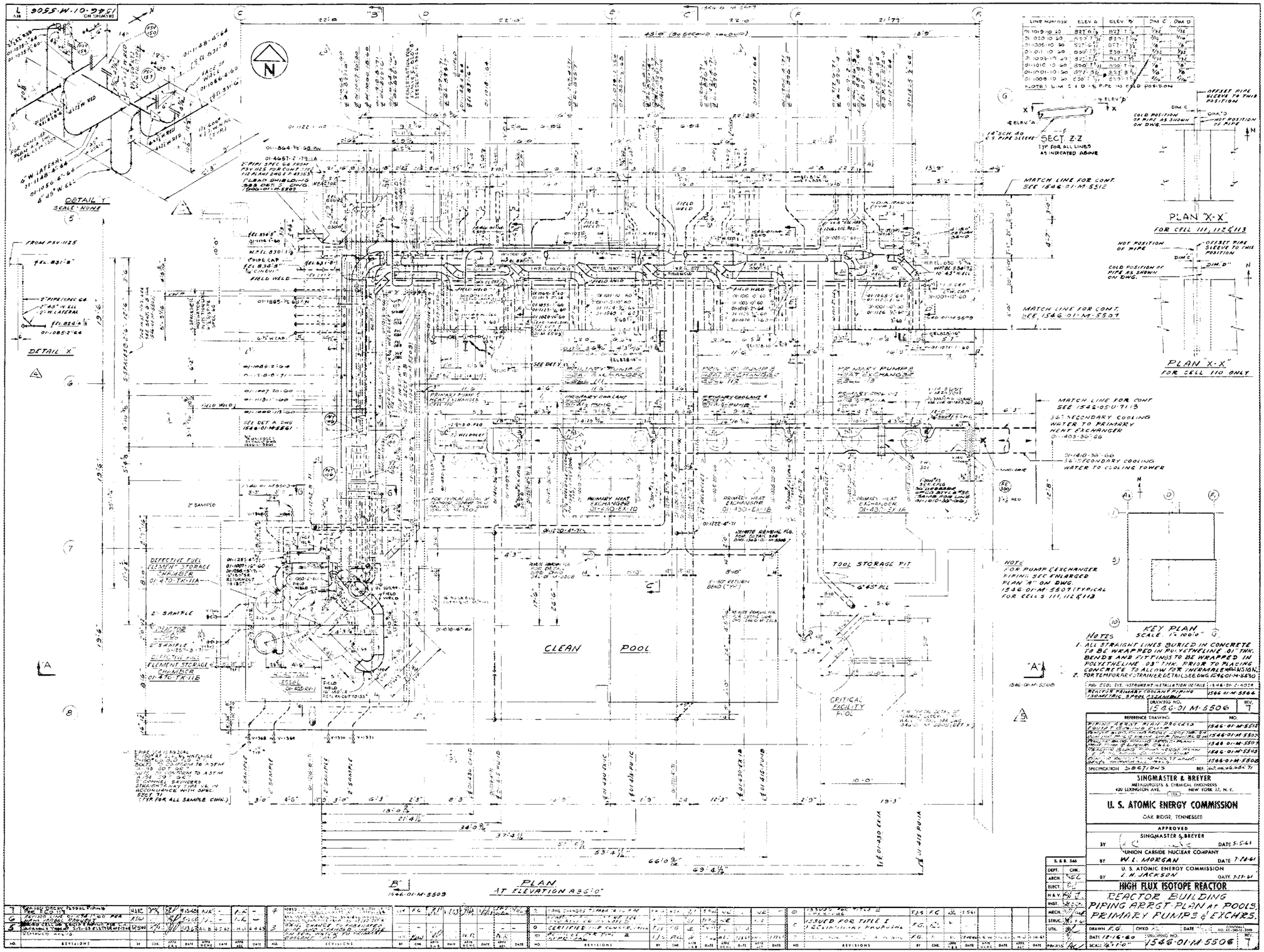
APPROVED
SINGMASTER & BREYER
BY DATE
UNION CARBIDE NUCLEAR COMPANY
BY C.E. WINTERS DATE
U. S. ATOMIC ENERGY COMMISSION
BY L.N. JACKSON DATE

HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
PROCESS EQUIPMENT ARRANGEMENT
FIRST FLOOR

DRAWN F.D. CHKD M.M. DATE
DATE 12-1-60 DRAWING NO. 1546-01-M-5504 REV. 2
SCALE 1/8"=1'-0"

DRAWING NO. 1546-01-M-5504 REV. 2


PLAN
SERVICE STATION No 1
SERVICE STATION No 2
SERVICE STATION No 3
SERVICE STATION No 4
SERVICE STATION No 5
SERVICE STATION No 6
SERVICE STATION No 7
SERVICE STATION No 8
CLEAN POOL
REACTOR POOL
REACTOR
ION CHAMBER TUBES SEE DWG. 1546-01-M-5050
FOR FUTURE INSTALLATION OF HYDRAULIC RABBITS
SEE DETAIL "X"
NOTE:
FOR PIPE SUPPORT DETAILS SEE DWG 1546-01-M-5527
VIEW "M-M"
SECTION "W-W"
SECTION "Z-Z"
SECTION "Y-Y"
DETAIL "X"
TYPICAL DETAIL OF FLANGED SLEEVES THRU WALLS OF POOL
KEY PLAN
CERTIFIED FOR CONSTRUCTION
REFERENCE DRAWING
SINGMASTER & BREYER
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
APPROVED
UNION CARBIDE NUCLEAR COMPANY
HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
PIPING ARRANGEMENT, PLAN OF POOL AREA - SECOND FLOOR
DRAWING NO. 1546-01-M-5509
REV. 3



LINE NUMBER	ELEV A	ELEV B	DIM C	DIM D
01-1013-10-60	827'-6 1/2"	827'-7 1/2"	1/32	1/16
01-1020-10-60	827'-7 1/2"	827'-7 1/2"	1/16	1/16
01-1005-10-60	827'-6 1/2"	827'-7 1/2"	1/8	1/32
01-1011-10-60	830'-7 1/2"	830'-7 1/2"	1/32	1/32
01-1009-10-60	827'-7 1/2"	827'-7 1/2"	1/16	1/32
01-1010-10-60	830'-7 1/2"	830'-7 1/2"	1/8	1/8
01-1001-10-60	827'-8 1/2"	827'-8 1/2"	1/8	1/8
01-1008-10-60	830'-7 1/2"	830'-7 1/2"	1/16	1/16

NOTES: DIM C & D = PIPE IN COLD POSITION

Notes
1. ALL STRAIGHT LINES BURIED IN CONCRETE TO BE WRAPPED IN POLYETHELINE .01" THK. BENDS AND FITTINGS TO BE WRAPPED IN POLYETHELINE .03" THK. PRIOR TO PLACING CONCRETE TO ALLOW FOR THERMAL EXPANSION.
2. FOR TEMPORARY STRAINER DETAILS SEE DWG 1546-01-M-5530

REFERENCE DRAWING	NO.
PIPING ARRGT. PLAN AT POOLS & EQUIP. CONNECTIONS	1546-01-M-5512
PRIMARY PUMP & HEAT EXCHANGER ARRGT. PLAN	1546-01-M-5507
PRIMARY HEAT EXCHANGER ARRGT. PLAN	1546-01-M-5503
PRIMARY HEAT EXCHANGER ARRGT. PLAN	1546-01-M-5504
PRIMARY HEAT EXCHANGER ARRGT. PLAN	1546-01-M-5505
PRIMARY HEAT EXCHANGER ARRGT. PLAN	1546-01-M-5508
SPECIFICATION 3067-DN3	REF. ASME, USAS, B.P.V. 7

REVISIONS	NO.
REVISED DECKS, FLOOD PIPING	7
REVISED PIPING ARRGT. PER	6
REVISED CELLS 110, 111 & 112	5
CONTINUED REVISIONS	4
REVISED PIPING ARRGT.	3
CHANGE EXCHANGER	2
CHANGES	1
CERTIFIED FOR CONSTR.	0
ISSUED FOR TITLE I	C
ISSUED FOR TITLE II	D

CERTIFIED
FOR CONSTRUCTION

PLAN "D-D"

SECTION "L-L"

SECTION "K-K"

DETAIL "W" SHOWING GLAND SEAL CONNS. ON PRIMARY COOLANT PUMPS SEE DWG. 1946-01-M-5906

PLAN "A-A"

TYPICAL PUMP & EXCHANGER CELL FOR COMPARTMENT 111 SHOWN COMPARTMENT 110, 112 & 113 SIMILAR SEE NOMENCLATURE (THIS DWG.) SEE ALSO DWG. 1946-01-M-5911

ELEVATION "C-C"

PLAN "B-B"

FOR COMPARTMENT 111, 112 & 113
FOR COMPARTMENT 110 SEE
PLAN D-D, OR DRAWING 1946-01-M-5911

NOMENCLATURE

LINE NOS. - VALVE NOS. - INSTR. NOS.

COMPARTMENT 110	COMPARTMENT 111	COMPARTMENT 112	COMPARTMENT 113
COMPARISON LINE NUMBERS			
01-1017-1-0-60	01-1009-1-0-60	01-1003-1-0-60	01-1001-1-0-60
01-1176-1-0-60	01-1006-1-0-60	01-1008-1-0-60	01-1002-1-0-60
01-1010-1-0-60	01-1011-1-0-60	01-1010-1-0-60	01-1009-1-0-60
01-1173-1-0-60	01-1054-1-0-60	01-1049-1-0-60	01-1052-1-0-60
01-1177-1-0-60	01-1057-1-0-60	01-1058-1-0-60	01-1057-1-0-60
01-1014-2-0-60	01-1015-2-0-60	01-1013-2-0-60	01-1017-2-0-60
01-1489-2-0-60	01-1400-2-0-60	01-1403-2-0-60	01-1404-2-0-60
01-1490-2-0-60	01-1409-2-0-60	01-1408-2-0-60	01-1407-2-0-60
01-1494-2-0-60	01-1443-2-0-60	01-1441-2-0-60	01-1440-2-0-60
01-1495-2-0-60	01-1442-2-0-60	01-1444-2-0-60	01-1445-2-0-60
01-1187-1-1/2-0-60	01-1187-1/2-0-60	01-1187-1/2-0-60	01-1187-1/2-0-60
01-1493-1-0-60	01-1448-1-0-60	01-1447-1-0-60	01-1450-1-0-60
01-1185-1-0-60	01-1009-1-0-60	01-1187-1-1/2-0-60	01-1187-1-1/2-0-60
	01-1131-3/4-0-60	01-1131-3/4-0-60	01-1133-3/4-0-60
01-1120-3/4-0-60	01-1158-3/4-0-60	01-1160-3/4-0-60	01-1162-3/4-0-60
01-1121-3/4-0-60	01-1180-3/4-0-60	01-1161-3/4-0-60	01-1163-3/4-0-60
01-1018-1-0-60	01-1074-1-0-60	01-1179-1-0-60	01-1178-1-0-60
01-1180-1-1/2-0-60	01-1184-1-1/2-0-60	01-1183-1-1/2-0-60	01-1182-1-1/2-0-60
01-1491-3/4-0-60	01-1403-3/4-0-60	01-1408-3/4-0-60	01-1407-3/4-0-60
01-1492-3/4-0-60	01-1444-3/4-0-60	01-1450-3/4-0-60	01-1449-3/4-0-60
	01-1187-1/2-0-60	NONE	01-1186-1/2-0-60
01-1123-3/4-0-60	01-1124-3/4-0-60	01-1125-3/4-0-60	01-1126-3/4-0-60
01-1175-3/4-0-60	01-1223-3/4-0-60	01-1164-3/4-0-60	01-1165-3/4-0-60
01-1487-1/2-0-60	01-1481-1/2-0-60	01-1482-1/2-0-60	01-1483-1/2-0-60
01-1489-1/2-0-60	01-1484-1/2-0-60	01-1485-1/2-0-60	01-1486-1/2-0-60

COMPARISON VALVE NUMBERS			
RCV-580	RCV-144	RCV-142	RCV-140
RCV-581	RCV-195	RCV-191	RCV-189
V-190	V-1128	V-1130	V-1131
V-191	V-1130	V-1129	V-1128
V-192	V-1025	V-1021	V-1020
V-193	V-1190	V-1195	V-1194
V-204	V-1173	V-1172	V-1171
RCV-558	RCV-348	RCV-346	RCV-344
RCV-559	RCV-349	RCV-347	RCV-345
V-1526	V-1416	V-1418	V-1414
V-1527	V-1419	V-1415	V-1417
V-1530	V-1454	V-1453	V-1455
V-1528	V-1457	V-1458	V-1456
V-1532	V-1516	V-1517	V-1519
V-1533	V-1515	V-1520	V-1521
V-1534	V-1547	V-1548	V-1549
V-1544	V-1847	V-1845	V-1849
V-1538	V-1839	V-1840	V-1841
V-1542	V-1843	V-1844	V-1842
V-192	V-1025	V-1027	V-1026
V-1429	V-1460	V-1459	V-1458
V-1531	V-1480	V-1484	V-1482
V-1532	V-1487	V-1485	V-1483
V-198	V-1177	V-1178	V-1176
HV-557	HV-196	HV-195	HV-194
V-196	V-1202	V-1204	V-1206
V-197	V-1205	V-1203	V-1207
V-198	V-1120	V-1121	V-1122
V-205	V-1193	V-1192	V-1191
V-206	V-142	V-144	V-146
V-207	V-143	V-145	V-147
V-201	V-126	V-128	V-127
V-199	V-193	V-197	V-195
V-200	V-1072	V-1069	V-1068
V-202	V-1065	V-1010	V-1037
HV-553	HV-193	HV-184	HV-1[illegible]
V-1534	V-1491	V-1493	V-1495
V-1535	V-1492	V-1494	V-1496
PSV-316	PSV-305	PSV-304	PSV-303
RCV-127-1A	RCV-127-2A	RCV-127-3A	RCV-127-4A
RCV-127-1B	RCV-127-2B	RCV-127-3B	RCV-127-4B
	V-1587	NONE	V-1588
HCV-583-A	HCV-182-A	HCV-181-A	HCV-180-A
V-195	V-194	V-196	V-198
V-131	V-132	V-187	V-193
FCV-1931A	FCV-1932A	FCV-1933A	FCV-1934A
FCV-1931B	FCV-1932B	FCV-1933B	FCV-1934B
V-203	V-1011	V-1138	V-1137
COMPARISON INSTR. NUMBERS			
TW-355	TW-354	TW-353	TW-352
PI-559	PI-163	PI-162	PI-161
PI-558	PI-160	PI-159	PI-158
PI-557	PI-158	PI-157	PI-156
PI-560	PI-161	PI-163	PI-159
PI-1[illegible]A	PI-192	PI-193	PI-194
PI-562	PI-167	PI-169	PI-170
PI-1[illegible]A	PI-157A	PI-158A	PI-159A
TW-139	TW-138	TW-137	TW-136
PI-356	PI-118	PI-116	PI-114
PI-355	PI-120	PI-119	PI-118
PI-361	PI-360	PI-387	PI-386
PI-396	PI-395	PI-381	PI-380

KEY PLAN

DRAWING NO. 1946-01-M-5907 REV. 7

REFERENCE DRAWING	NO.
SUPPLEMENTARY DIAGRAM-REACTOR PRIMARY COOLANT UNIT	1946-01-I-4001
SUPPLEMENTARY DIAGRAM-REACTOR SECONDARY COOLING SYSTEM	1946-01-I-4002
PRIMARY COOLANT PUMP & EXCHANGER	1946-01-M-5910
REACTOR BLDG. PIPING ARRG'T. PLAN PRIMARY PUMP & EXCHANGER	1946-01-M-5911
SPECIFICATION SECTION	NO. 00.04.05.07

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N. Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER BY [illegible] DATE 5-4-61
UNION CARBIDE NUCLEAR COMPANY BY W. L. MORGAN DATE 5-24-61
U. S. ATOMIC ENERGY COMMISSION BY L. H. JACKSON DATE 7-12-61

HIGH FLUX ISOTOPE REACTOR

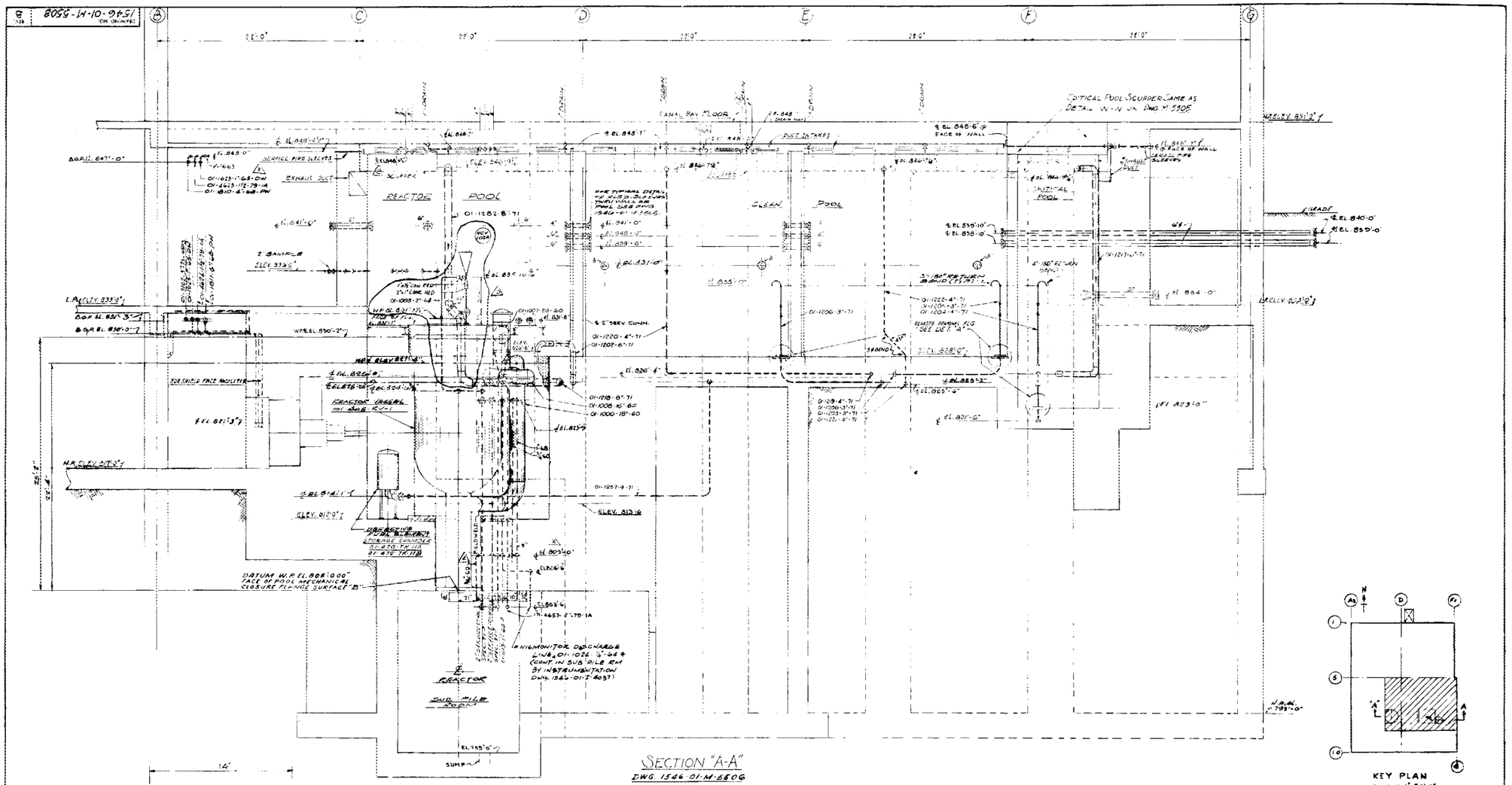
REACTOR BLDG PIPING ARRG'T PLAN PRIMARY PUMP & EXCHR. CELL.

S. & B. 546	
DEPT.	CHK.
ARCH.	
ELECT.	
H & V.	
INST.	
MECH.	
STRUC.	
UTIL.	

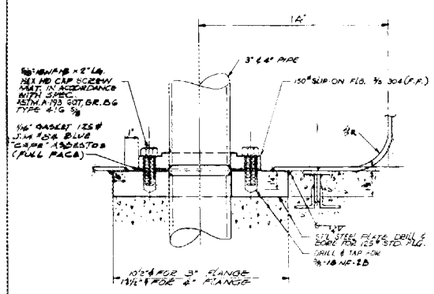
DRAWN J. SIGGIN CHKD F.G. DATE 11-14-60 NO. [illegible]
DATE 12-16-60 DRAWING NO. 1946-01-M-5907
SCALE 3/8"=1'-0"

NO.	REVISIONS	BY	CHK.	APPD. ELEC.	DATE	APPD. MECH.	DATE	APPD. STRUC.	DATE
7	REVISED DRAWN VESSEL PIPE PER ECO 117								
6	REVISED DRAWN TO REF. PLAN 3-2-61 DATA PER S&B DWG. 546-M-[illegible]								
5	ADDED COOLING WATER PIPING SERVICE ADDED PIPE & VALVES AS PER S&B DWG. 546-M-[illegible] ADDED CONC. ELEV. PER L.H. JACKSON TWX								
4	REVISED PRIMARY HEAT EXCHANGER PER S&B DWG. 546-M-[illegible]								
3	REVISED PRIMARY HEAT EXCHANGER PER S&B DWG. 546-M-[illegible]								
2	REVISED PER S&B COMMENTS 11-14-60								
1	REVISED PER S&B COMMENTS 11-9-60								
0	CERTIFIED FOR CONSTRUCTION								

NO.	REVISIONS	BY	CHK.	APPD. ELEC.	DATE	APPD. MECH.	DATE	APPD. STRUC.	DATE
3	REVISED PER S&B DWG. 546-M-[illegible]								
2	REVISED PER S&B DWG. 546-M-[illegible]								
1	REVISED PER S&B DWG. 546-M-[illegible]								
0	ISSUED FOR TITLE I APPROVAL								
0	ISSUED FOR TITLE I APPROVAL								



SECTION "A-A"
DWG. 1546-01-M-6806



DETAIL "A"
REMOTE REMOVAL FLG.

* - INDICATES AUTOCLAVE TUBING SEE SPEC. SECTION 64

NO.	REVISIONS	BY	CHK	APPR. E.&A.	DATE	APPR. ELECT.	DATE	APPR. ARCH.	DATE
3	REVISED REV. TO 4 - REVISED HEED. REVISED 01-1327-4-71 FOR P.C.O. 96	GAM	KM		4-14-71	N.R.	-	N.R.	—
2	THIS DWG. 2nd REVISED MADE FIELD REVISED IN ACCORDANCE W/ DCN 1 & DCN 2 SEE DCN.	W.R.	F.G.						
1	REVISED TO REFLECT EFFECTIVE FUEL ELEMENT EQUIP. NOS. AS LISTED	F.G.				N.R.			
0	CONFORMED FOR CONSTRUCTION	T.T.S.	F.G.						

NO.	REVISIONS	BY	CHK	APPR. E.&A.	DATE	APPR. ELECT.	DATE	APPR. ARCH.	DATE	APPR. MECH.	DATE	APPR. A/C	DATE
0	REVISED PER TITLE II DESIGN	T.J.S.	F.G.										
0	ISSUED FOR TITLE II APPROVAL	T.J.S.	F.G.										
0	ISSUED FOR TITLE I PRELIMINARY APPROVAL												
0	ISSUED FOR TITLE I APPROVAL												

S. & B. 546	
DEPT.	CHK.
ARCH.	
ELECT.	
H & V.	
INST.	
STRUC.	
UTIL.	
MECH.	

DRAWING NO. 1546-01-M-5308 REV. 5

REFERENCE DRAWING	NO.
REACTOR BLDG. PIPING ARRGT. PLAN OF POOL & CLEAN LEVEL	1546-01-M-5306
REACTOR BLDG. PIPING ARRGT. SECTION	1546-01-M-5309
REACTOR BLDG. PIPING ARRGT. PLAN OF POOL HEAT EXCHANGER	1546-01-M-5305

SPECIFICATION SECTIONS REF. §§ 2, 8, 4, 5, 6, 64

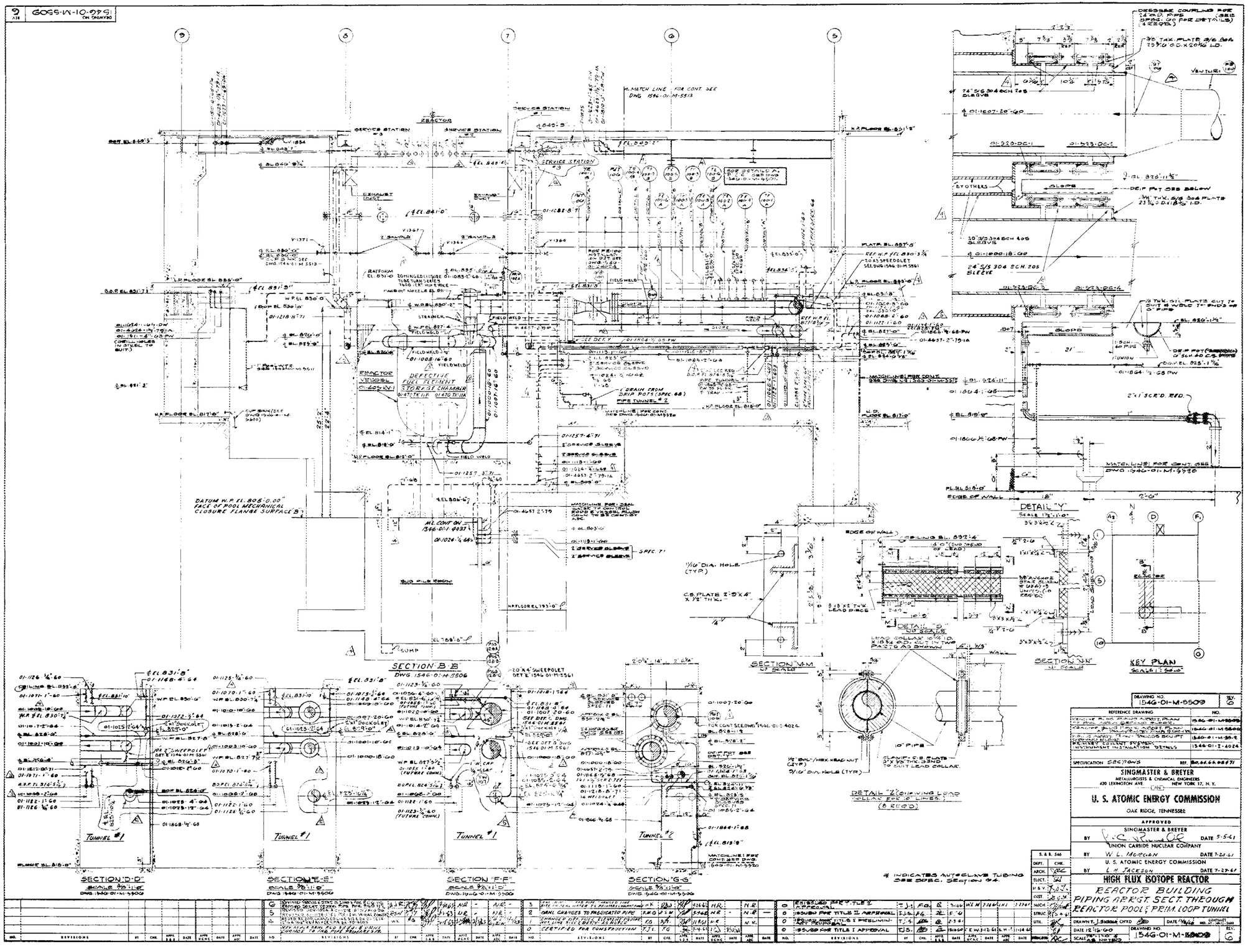
SINGMASTER & BREYER
MECHANOLOGISTS & CHEMICAL ENGINEERS
430 LEXINGTON AVE. NEW YORK 17, N. Y.

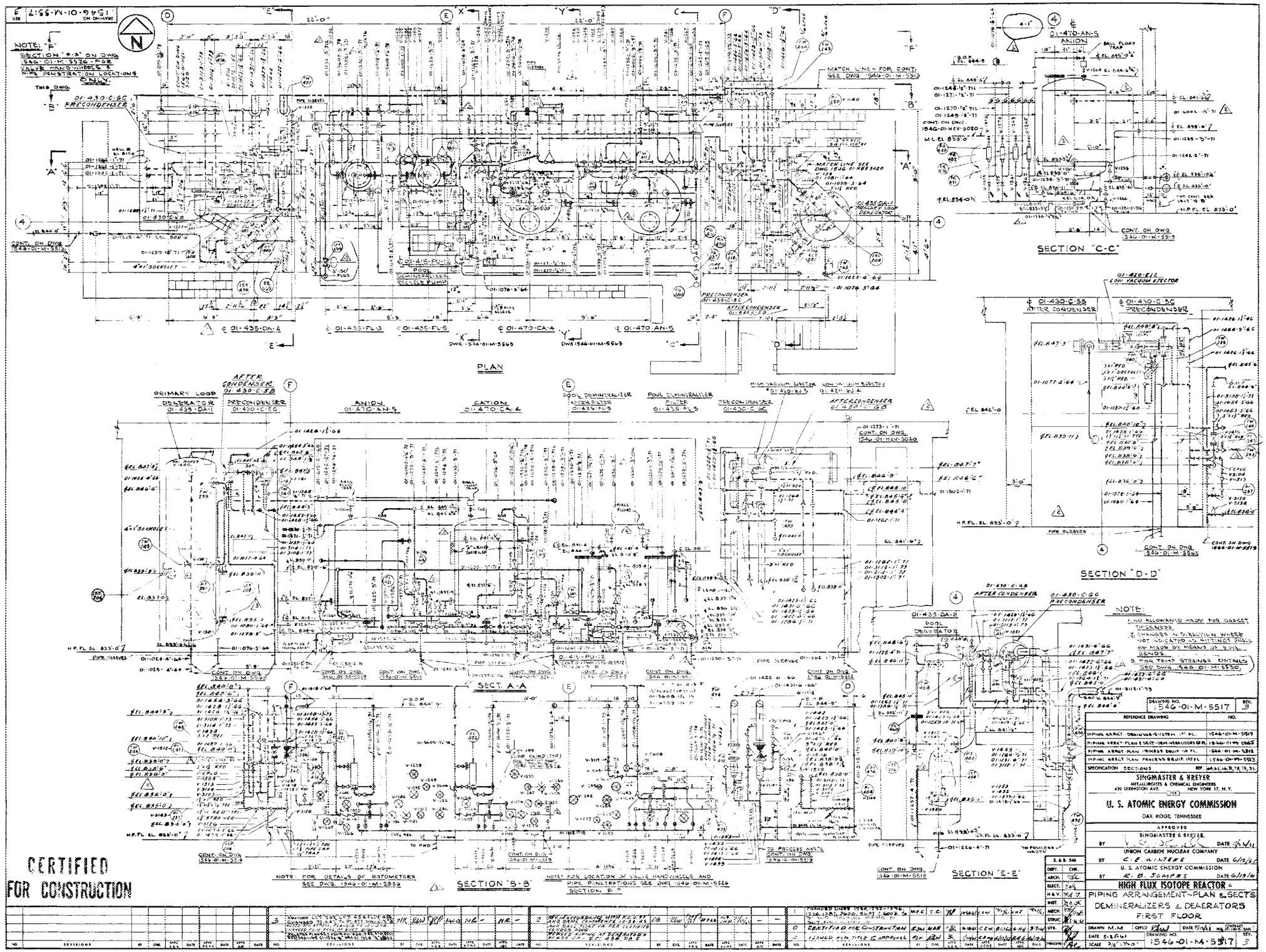
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

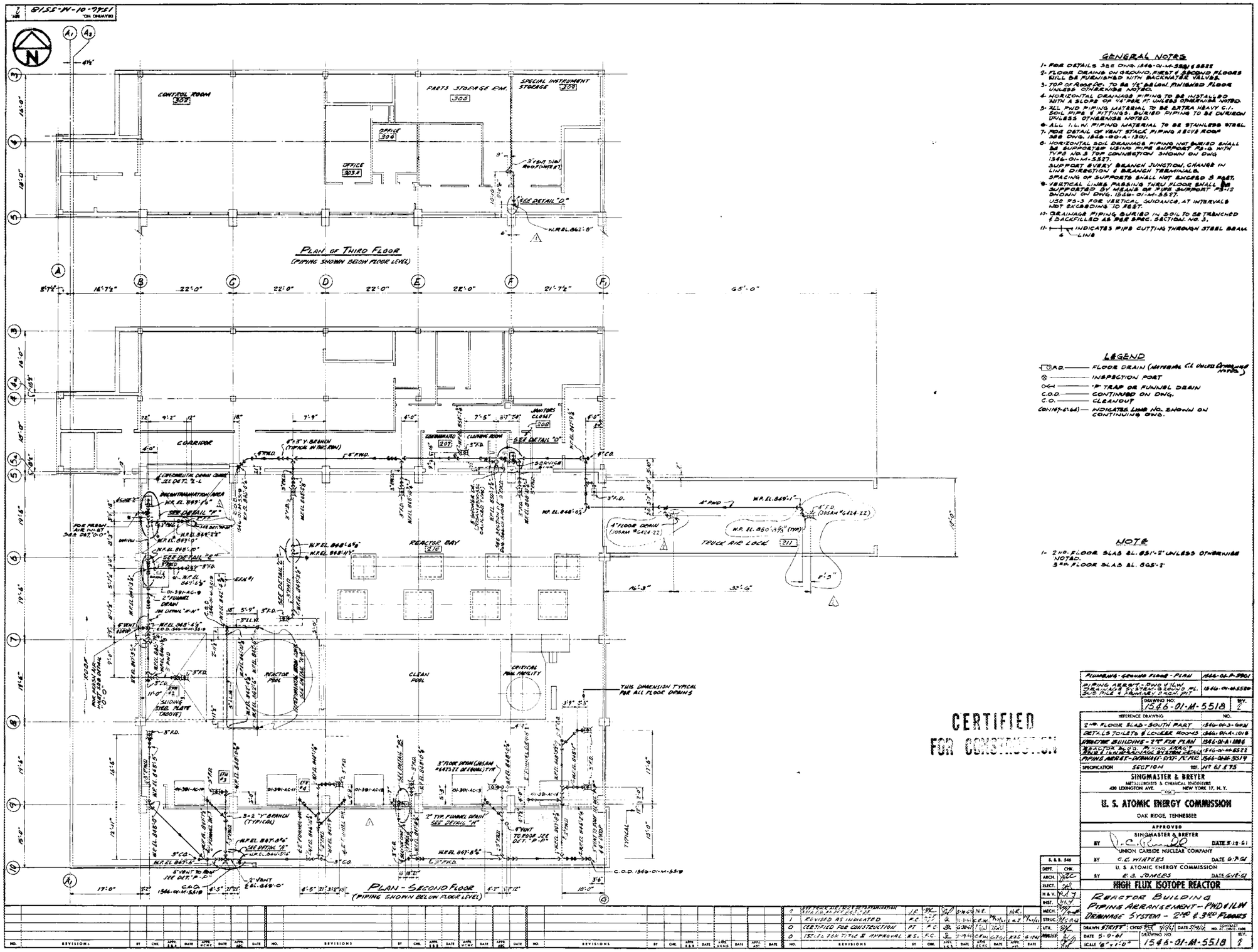
APPROVED
SINGMASTER & BREYER
BY C. C. Pulsk DATE 3-5-61
UNION CARBIDE NUCLEAR COMPANY
BY W. L. MORGAN DATE 7-26-61
U. S. ATOMIC ENERGY COMMISSION
BY L. H. JACKSON DATE 7-27-61

HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
PIPING ARRGT. LONGITUDINAL SECTION THROUGH ALL POOLS

DRAWN MM CHKD. DATE 4-4-61 NO. CONTRACT NO. 61-1-1-1 BASIS
DATE 12-16-60 DRAWING NO. 1546-01-M-5308 REV. 5
SCALE 1/4" = 1'0"


DRAWING NO. 1546-01-M-5509
REFERENCE DRAWING NO.
SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
APPROVED
SINGMASTER & BREYER
UNION CARBIDE NUCLEAR COMPANY
U. S. ATOMIC ENERGY COMMISSION
HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
PIPING ARRGT. SECT. THROUGH
REACTOR POOL; PRIM. LOOP TUNNEL
DRAWN T. J. SICKLER
DATE 12-16-60
SCALE 1/4" = 1'-0"
DRAWING NO. 1546-01-M-5509
REV. 0
SECTION "B-B"
DWG. 1546-01-M-5506
SECTION "D-D"
SECTION "E-E"
SECTION "F-F"
SECTION "G-G"
DETAIL "Y"
DETAIL "S"
DETAIL "Z"
SECTION "M-M"
SECTION "N-N"
KEY PLAN
DEFECTIVE FUEL ELEMENT STORAGE CHAMBER
REACTOR VESSEL
DATUM N.P. EL. 805'-0.00"
FACE OF POOL MECHANICAL CLOSURE FLANGE SURFACE B
TUNNEL #1
TUNNEL #2
# INDICATES AUTOCLAVE TUBING SEE SPEC. SECTION 04.


PLAN
SECTION "C-C"
SECTION "D-D"
SECTION "E-E"
SECT. A-A
SECTION "B-B"
NOTE: FOR DETAILS OF ROTOMETERS SEE DWG. 1546-01-M-5526
NOTE: FOR LOCATION OF VALVE HANDWHEELS AND PIPE PENETRATIONS SEE DWG. 1546-01-M-5526 SECTION F-F
NOTE:
1. NO ALLOWANCE MADE FOR GASKET THICKNESS.
2. CHANGES IN TRANSITION WHERE NOT INDICATED AS FITTINGS SHALL BE MADE BY MEANS OF 3 DIA. BENDS.
3. FOR TEMP STRAINER DETAILS SEE DWG. 1546-01-M-5556.
CERTIFIED FOR CONSTRUCTION
DRAWING NO. 1546-01-M-5517 REV. 3
REFERENCE DRAWING NO.
PIPING ARRGT. DRAINAGE SYSTEM 1ST FL. 1546-01-M-5519
PIPING ARRGT. PLAN & SECT. DEMINERALIZERS GR. FL. 1546-01-M-5663
PIPING ARRGT. PLAN PROCESS DRAIN 1ST FL. 1546-01-M-5513
PIPING ARRGT. PLAN PROCESS DRAIN 1ST FL. 1546-01-M-5512
SPECIFICATION SECTIONS REF. 68, 69, 70, 71, 72, 73, 74
SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
APPROVED
SINGMASTER & BREYER
BY DATE 7/4/61
UNION CARBIDE NUCLEAR COMPANY
BY C. E. WINTERS DATE 6/12/61
U. S. ATOMIC ENERGY COMMISSION
BY R. B. SOMMERS DATE 6/19/61
HIGH FLUX ISOTOPE REACTOR
PIPING ARRANGEMENT-PLAN & SECTS
DEMINERALIZERS & DEAERATORS
FIRST FLOOR
DRAWN M.M.
DATE 5-2-61
SCALE 3/8"=1'-0"
DRAWING NO. 1546-01-M-5517 REV. 3
REVISIONS
CHANGED LINES 1550, 1552-1556
CERTIFIED FOR CONSTRUCTION
ISSUED FOR TITLE & APPROVAL



GENERAL NOTES

1- FOR DETAILS SEE DWG. 1546-01-M-5521 & 5522
2- FLOOR DRAINS ON GROUND, FIRST & SECOND FLOORS WILL BE FURNISHED WITH BACKWATER VALVES.
3- TOP OF ROOF DR. TO BE 1½" BELOW FINISHED FLOOR UNLESS OTHERWISE NOTED.
4- HORIZONTAL DRAINAGE PIPING TO BE INSTALLED WITH A SLOPE OF ¼" PER FT UNLESS OTHERWISE NOTED.
5- ALL PWD PIPING MATERIAL TO BE EXTRA HEAVY C.I. SOIL PIPE & FITTINGS. BURIED PIPING TO BE CUR IRON UNLESS OTHERWISE NOTED.
6- ALL I.L.W. PIPING MATERIAL TO BE STAINLESS STEEL.
7- FOR DETAIL OF VENT STACK PIPING ABOVE ROOF SEE DWG. 1546-00-A-1301.
8- HORIZONTAL SOIL DRAINAGE PIPING NOT BURIED SHALL BE SUPPORTED USING PIPE SUPPORT PS-6 WITH TYPE NO. 3 TOP CONNECTION SHOWN ON DWG 1546-01-M-5527.
SUPPORT EVERY BRANCH JUNCTION, CHANGE IN LINE DIRECTION & BRANCH TERMINALS.
SPACING OF SUPPORTS SHALL NOT EXCEED 8 FEET.
9- VERTICAL LINES PASSING THRU FLOOR SHALL BE SUPPORTED BY MEANS OF PIPE SUPPORT PS-12 SHOWN ON DWG. 1546-01-M-5527.
USE PS-3 FOR VERTICAL GUIDANCE, AT INTERVALS NOT EXCEEDING 10 FEET.
10- DRAINAGE PIPING BURIED IN SOIL TO BE TRENCHED & BACKFILLED AS PER SPEC. SECTION NO. 3.
11- ⊢┼⊣ INDICATES PIPE CUTTING THROUGH STEEL BEAM & LINE

LEGEND

F.D. —— FLOOR DRAIN (MINERAL C.I. UNLESS OTHERWISE NOTED)
⊗ —— INSPECTION PORT
OGH —— 'P' TRAP OR FUNNEL DRAIN
C.O.D. —— CONTINUED ON DWG.
C.O. —— CLEANOUT
CONT. 1546-01-M-5521 —— INDICATES LINE NO. SHOWN ON CONTINUING DWG.

NOTE

1- 2ND. FLOOR SLAB EL. 851'-2" UNLESS OTHERWISE NOTED.
3RD. FLOOR SLAB EL. 865'-2"

CERTIFIED FOR CONSTRUCTION

PLUMBING - GROUND FLOOR - PLAN	1546-01-P-5901
PIPING ARRGT. - PWD & I.L.W. DRAINAGE SYSTEM - 2ND. FL. SUB. PILE & PRIMARY SMOH. PIT	1546-01-M-5520
DRAWING NO. 1546-01-M-5518	REV. 2

REFERENCE DRAWING	NO.
2ND. FLOOR SLAB - SOUTH PART	1546-01-3-6621
DETAILS TOILETS & LOCKER ROOMS	1546-01-A-1015
STRUCTURE BUILDING - 2ND FLR PLAN	1546-01-A-1006
REACTOR BLDG. PIPING ARRGT.	1546-01-M-5522
SMALL UNDERGROUND STORAGE TANK	1546-01-M-5523
PIPING ARRGT. - DRAINAGE SYST. 1ST FLR	1546-01-M-5519
SPECIFICATION SECTION	SEE SPEC. & TS

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
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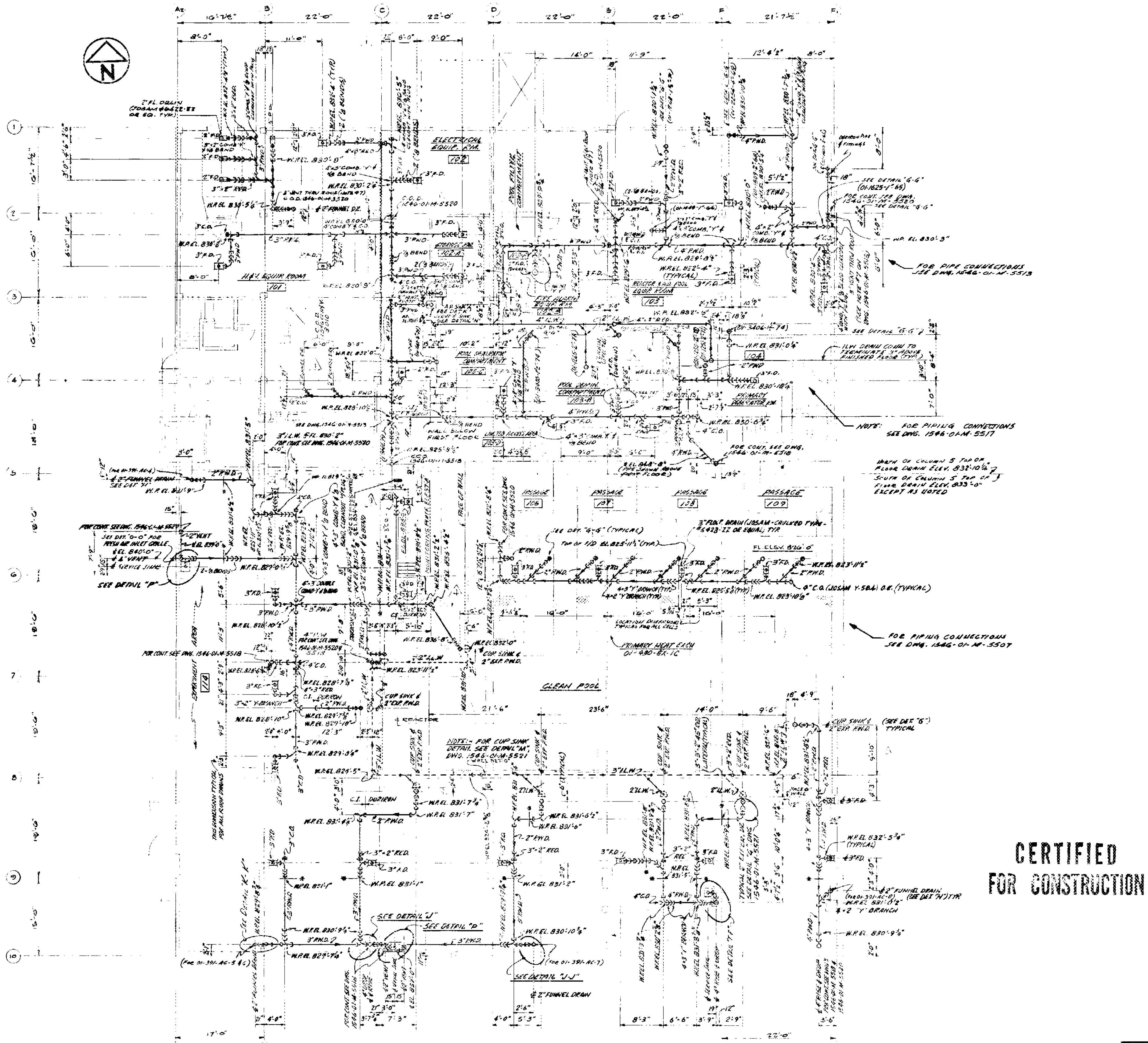
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER BY [signature] DATE 5-19-61
UNION CARBIDE NUCLEAR COMPANY
BY C. E. WHITES DATE 6-7-61
U. S. ATOMIC ENERGY COMMISSION
BY E. S. JONES DATE 6-16-61

HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
PIPING ARRANGEMENT - PWD & I.L.W.
DRAINAGE SYSTEM - 2ND & 3RD FLOORS

S. & B. 546
DRFT. CHK.
ARCH. [illegible]
ELECT. [illegible]
H. & V. [illegible]
INST. [illegible]
MECH. [illegible]
STRUC. [illegible]
UTIL. [illegible]
ARCHITECT [illegible]
DRAWN STRITT CHKD [illegible] 4/14/61 DATE 5-9-61
DATE 5-9-61 DRAWING NO. 1546-01-M-5518 REV. 2
SCALE 1/8" = 1'-0" SCHEDULE NO. 1546-01-M-5518

NO.	REVISIONS	BY	CHK.	APPR. S.&B.	DATE	APPR. U.C.N.C.	DATE	APPR. AEC	DATE
2	ADD PIPING ARRGT. & DRAINAGE SYSTEM	J.R.	[illegible]	[illegible]	5-19-61	N.E.	[illegible]	N.R.	
1	REVISED AS INDICATED	F.C.	[illegible]	[illegible]	[illegible]	C.E.W.	[illegible]	L.W.T.	[illegible]
0	CERTIFIED FOR CONSTRUCTION	P.T.	F.C.	[illegible]	6-13-61	[illegible]	[illegible]		
0	1ST. ISS. FOR TYPE II APPROVAL	E.S.	F.C.	[illegible]	3-19-61	C.E.W.	[illegible]	R.A.S.	4-19-61



PLAN - FIRST FLOOR

PIPING SHOWN BELOW FLOOR LEVEL

NOTES:-

1) FOR LEGEND & GEN. NOTES SEE DWG. 1546-01-M-5518
2. LINE INDICATES PIPE CUTTING THRU STEEL BEAM
3. FUNNEL DRAINS LOCATED NEAR COLUMN'S ARE FOR H & V UNITS. SEE DWG. 1546-01-H&V-3908
4. FIRST FLOOR SLAB L.P. ELEV. 833'-0"
5. FOR DETAILS SEE DWG'S. 1546-01-M-5521 & 5522

PIPING ARRGT. PLAN PRI. PUMP & EXCH. CELL	1546-01-M-5507
FIRST FLOOR FRAMING - NORTH PART	1546-01-S-6032
FIRST FLOOR SLAB - SOUTH PART	1546-01-S-6030
PIPE SUPPORTS	1546-01-M-5544

DRAWING NO. 1546-01-M-5519 REV. 4

REFERENCE DRAWING	NO.
PIPING ARRGT. - PLAN & SECTS, DEMIN. & DEAERATOR RMS.	1546-01-M-5517
H&V FIRST FLOOR PLAN	1546-01-H&V-3006
PIPING ARR'GT PROCESS EQUIPT.	1546-01-M-5513
PIPING ARR'GT DRNGE. SYSTEM	1546-01-M-5520
PIPING ARR'GT DRNGE. SYSTEM	1546-01-M-5518
SPECIFICATION SECTION	REF. M-31 & 75

CERTIFIED FOR CONSTRUCTION

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N. Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

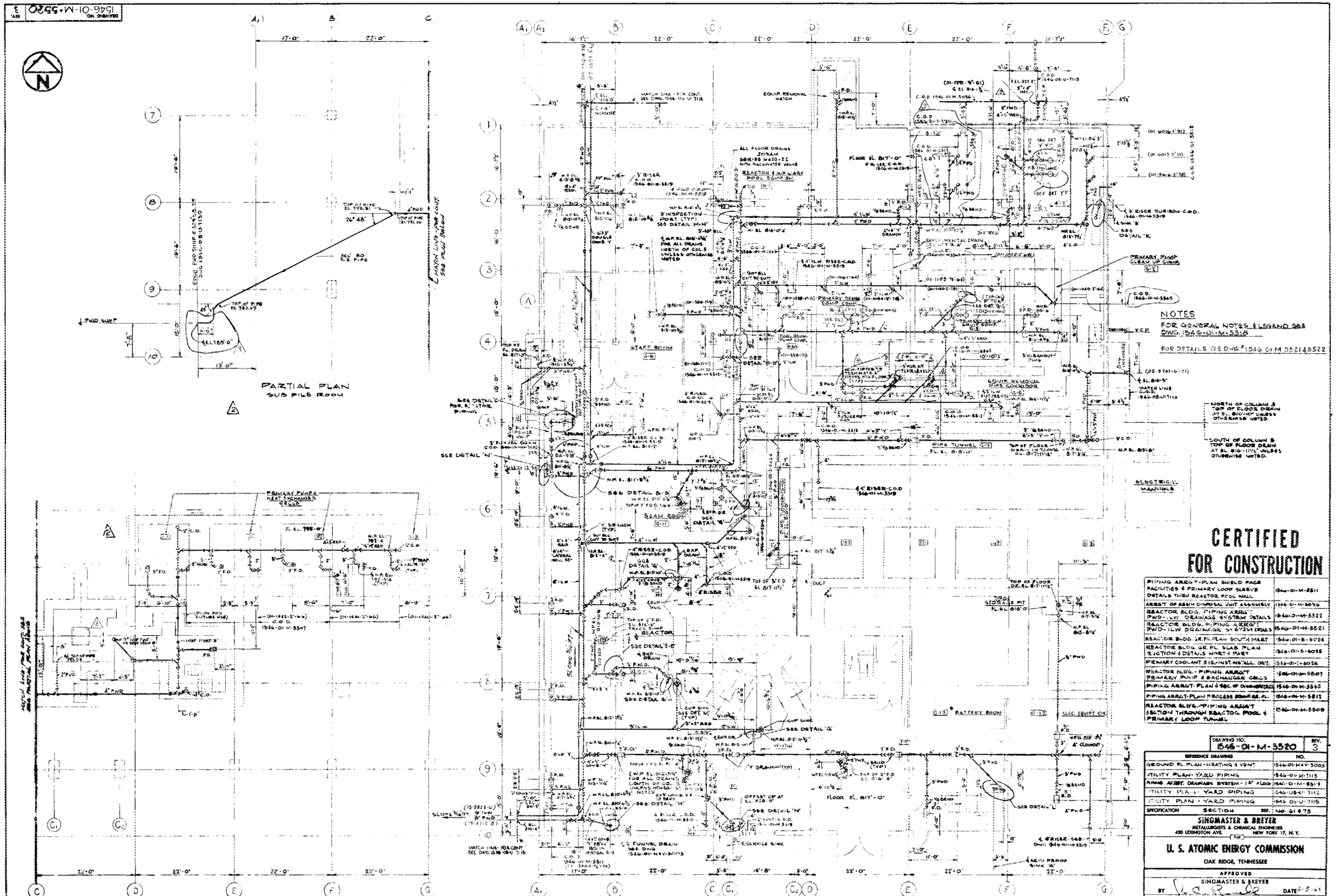
APPROVED
SINGMASTER & BREYER BY [signature] DATE 6-5-61
UNION CARBIDE NUCLEAR COMPANY BY C.E. WINTERS DATE 6-15-61
U. S. ATOMIC ENERGY COMMISSION BY R.B. JONES DATE 6-19-61

HIGH FLUX ISOTOPE REACTOR

PIPING ARRANGEMENT
DRAINAGE SYSTEM
1ST FLOOR

DRAWN T.J.G. CH'KD P.F. DATE 5/5/61 CONTRACT NO. AT-(40-1)-3006
DATE 1-24-61 SCALE 3/16" = 1'-0" DRAWING NO. 1546-01-M-5519 REV. 4

NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. UCNC	DATE	APPR. AEC	DATE
4	REROUTED 2" PWD LINE IN CELL... WITH FIELD CHANGE	H.J.R.			11-63	N.R.	-	N.R.	-
3	MOVED 3" LW AT COL. 9-6" NORTH AND CHANGED ELEV. REVISED ... ADDED ... F.D.'S AND ...	W.K.	F.G.			N.R.	-	N.R.	-
2	REV. DUR. IRON F.D. IN ROOM NOS. 107-8 & 183-8 AS PER ITEM 3 IN F.C.D. #25	J.R.				N.R.		N.R.	
1	REVISED AS INDICATED	F.C.				C.E.W.		L.H.S.	
0	CERTIFIED FOR CONSTRUCTION	P.T.	F.C.		6-5-61				
0	ISSUED FOR TITLE II APPROVAL	C.S.	P.T.						



CERTIFIED FOR CONSTRUCTION

PIPING ARRGT-PLAN SHIELD FACE FACILITIES & PRIMARY LOOP SLAB VB DETAILS THRU REACTOR POOL WALL	1546-01-M-5511
ARRGT OF RESIN DISPOSAL UNIT ASSEMBLY	1546-01-M-5076
REACTOR BLDG. PIPING ARRGT PWD-LVD DRAINAGE SYSTEM DETAILS	1546-01-M-5522
REACTOR BLDG. PIPING ARRGT PWD-ILW DRAINAGE SYSTEM DETAILS	1546-01-M-5521
REACTOR BLDG. GR. FL. PLAN SOUTH PART	1546-01-S-5024
REACTOR BLDG. GR. FL. SLAB PLAN SECTION & DETAILS NORTH & PART	1546-01-S-5055
PRIMARY COOLANT SYS. INST. INSTALL. DWG.	1546-01-I-6026
REACTOR BLDG. - PIPING ARRGT PRIMARY PUMP & EXCHANGER CELLS	1546-01-M-5507
PIPING ARRGT. PLAN & SEC. OF DISTRIBUTORS	1546-01-M-5565
PIPING ARRGT. PLAN PROCESS BOILER GR. FL.	1546-01-M-5513
REACTOR BLDG. - PIPING ARRGT SECTION THROUGH REACTOR POOL & PRIMARY LOOP TUNNEL	1546-01-M-5508

DRAWING NO. 1546-01-M-3520 REV. 3

REFERENCE DRAWING	NO.
GROUND FL. PLAN - HEATING & VENT	1546-01-H&V-3003
UTILITY PLAN - YARD PIPING	1546-01-M-7113
PIPING ARRGT. DRAINAGE SYSTEM - 1st FLOOR	1546-01-M-5519
UTILITY PLAN - YARD PIPING	1546-05-U-7112
UTILITY PLAN - YARD PIPING	1546-05-U-7115
SPECIFICATION SECTION REF.	NO. 61675

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
430 LEXINGTON AVE. NEW YORK 17, N.Y.

FOR

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER
BY R. A. Rumble DATE 6-5-61
UNION CARBIDE NUCLEAR COMPANY
BY C. B. WINTERS DATE 6/15/61
U. S. ATOMIC ENERGY COMMISSION
BY R. A. SEMMES DATE 6-19-61

S. & B. 546

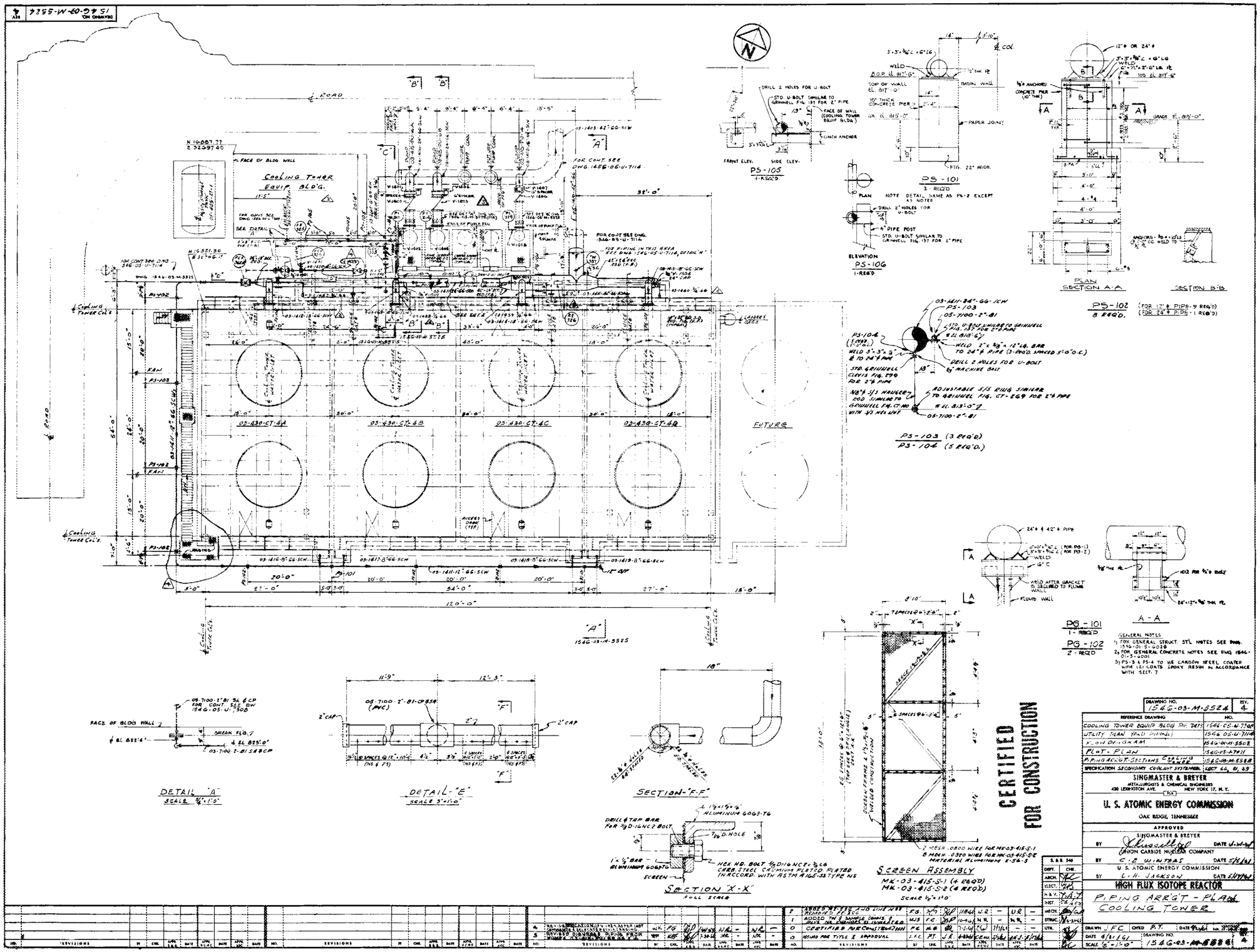
DEPT.	CHK.
ARCH.	
ELECT.	
H & V.	
INST.	
MECH.	
STRUC.	
UTIL.	

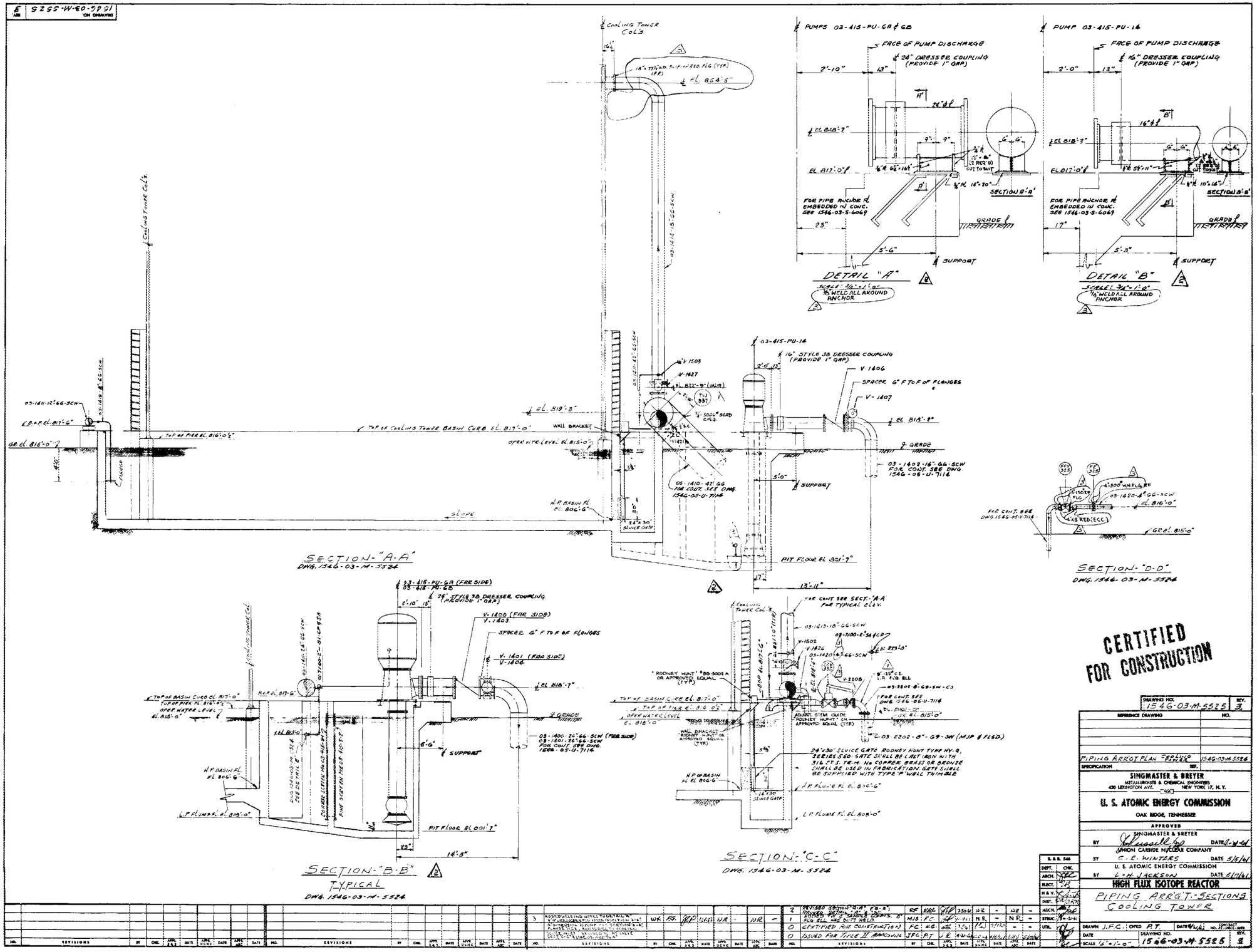
HIGH FLUX ISOTOPE REACTOR

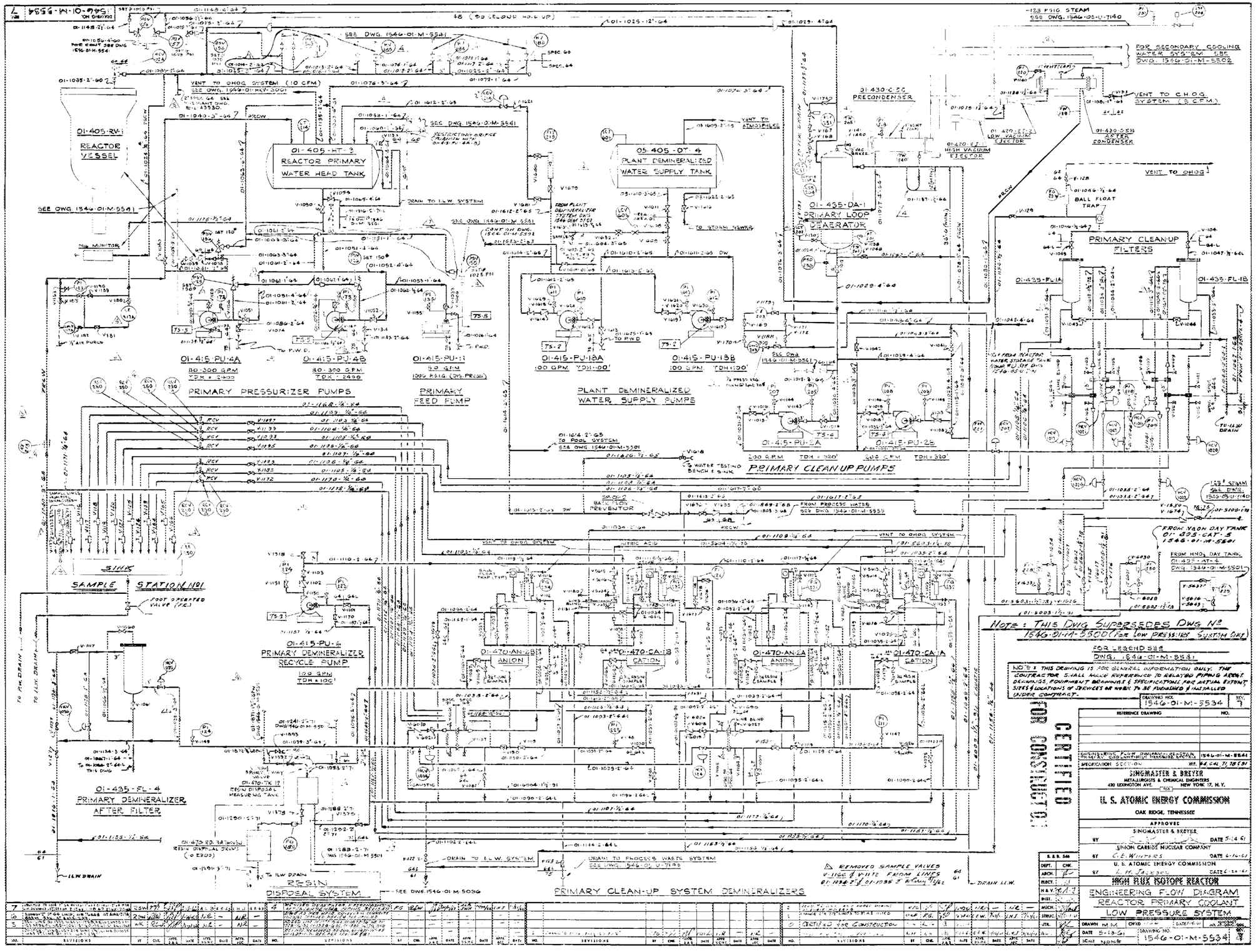
PIPING ARRANGEMENT-PWD & ILW DRAINAGE SYSTEM-GROUND FLOOR SUB PILE ROOM & PRIMARY EXCH. PIT

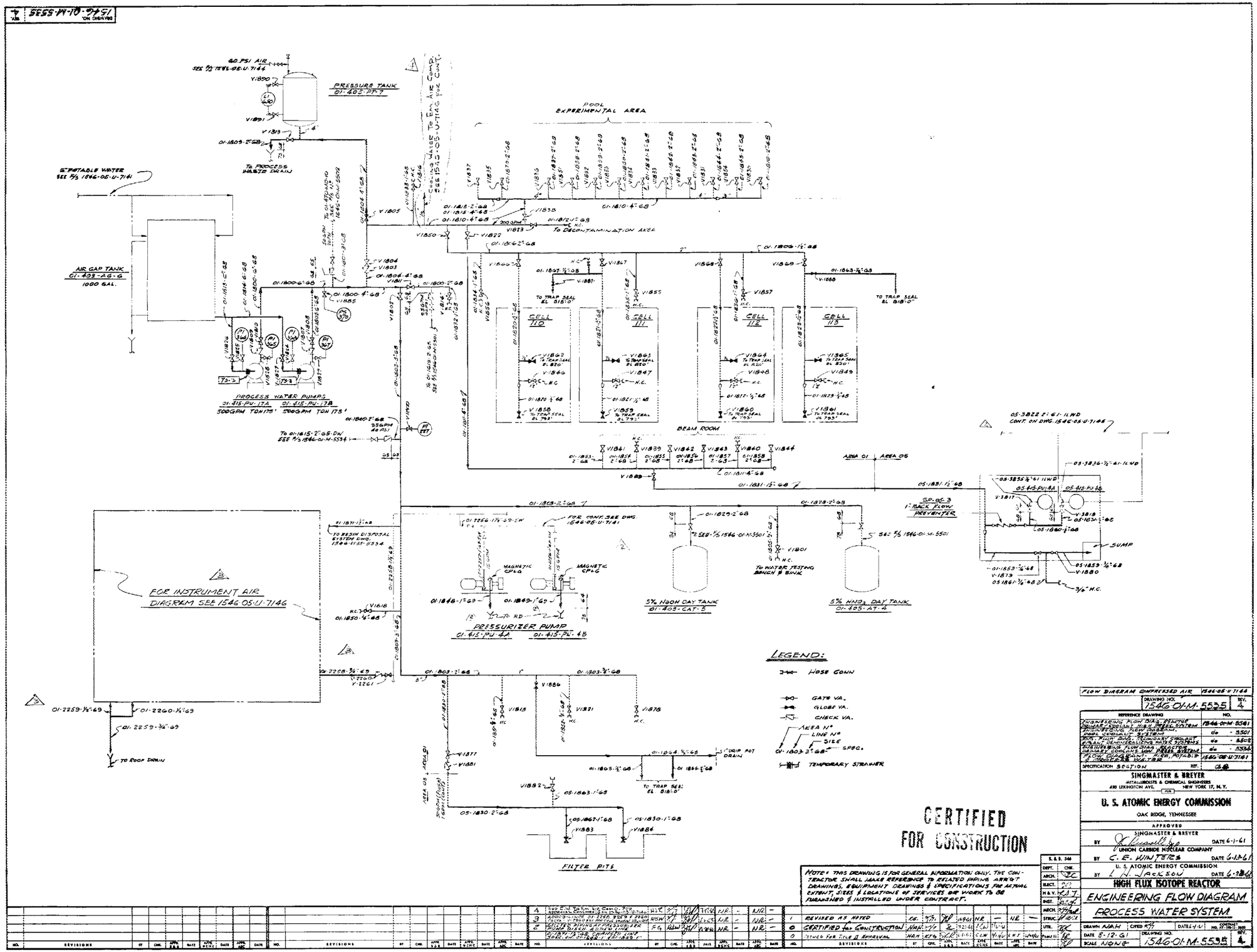
DRAWN F. DUCI CHKD F.C. DATE 4-8-61 CONTRACT NO. AT-(40-1)-1810 SAN.
DATE 1-23-61 DRAWING NO. 1546-01-M-5520 REV. 3
SCALE 3/8"=1'-0"

NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. UCNC	DATE	APPR. AEC	DATE
7	REV. TO INCORPORATE CHANGES AS PER REVISION NO. 4 ON DWG. 1546-01-M-5511	J.R.	W.K.	[illegible]	6-7-61	N.R.	—	N.R.	—
1	REVISED AS INDICATED	F.C.	[illegible]	[illegible]	[illegible]	[illegible]	—	[illegible]	—
0	CERTIFIED FOR CONSTRUCTION	F.C.	F.T.	[illegible]	[illegible]	[illegible]	—	[illegible]	—
0	ISSUED FOR TUB & APPROVAL	S.A.	F.C.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—
3	REV. TO INCORPORATE WITH REV. FOR NO. 2	W.K.	F.C.	[illegible]	[illegible]	[illegible]	—	N.R.	—
2	REVISED TO ADD DWG. NO. 61 TO PIPE TUNNEL & REVISED NO. 0 PIPING TO SUB PILE FLOOR	J.R.	F.C.	[illegible]	6-7-61	[illegible]	—	[illegible]	—

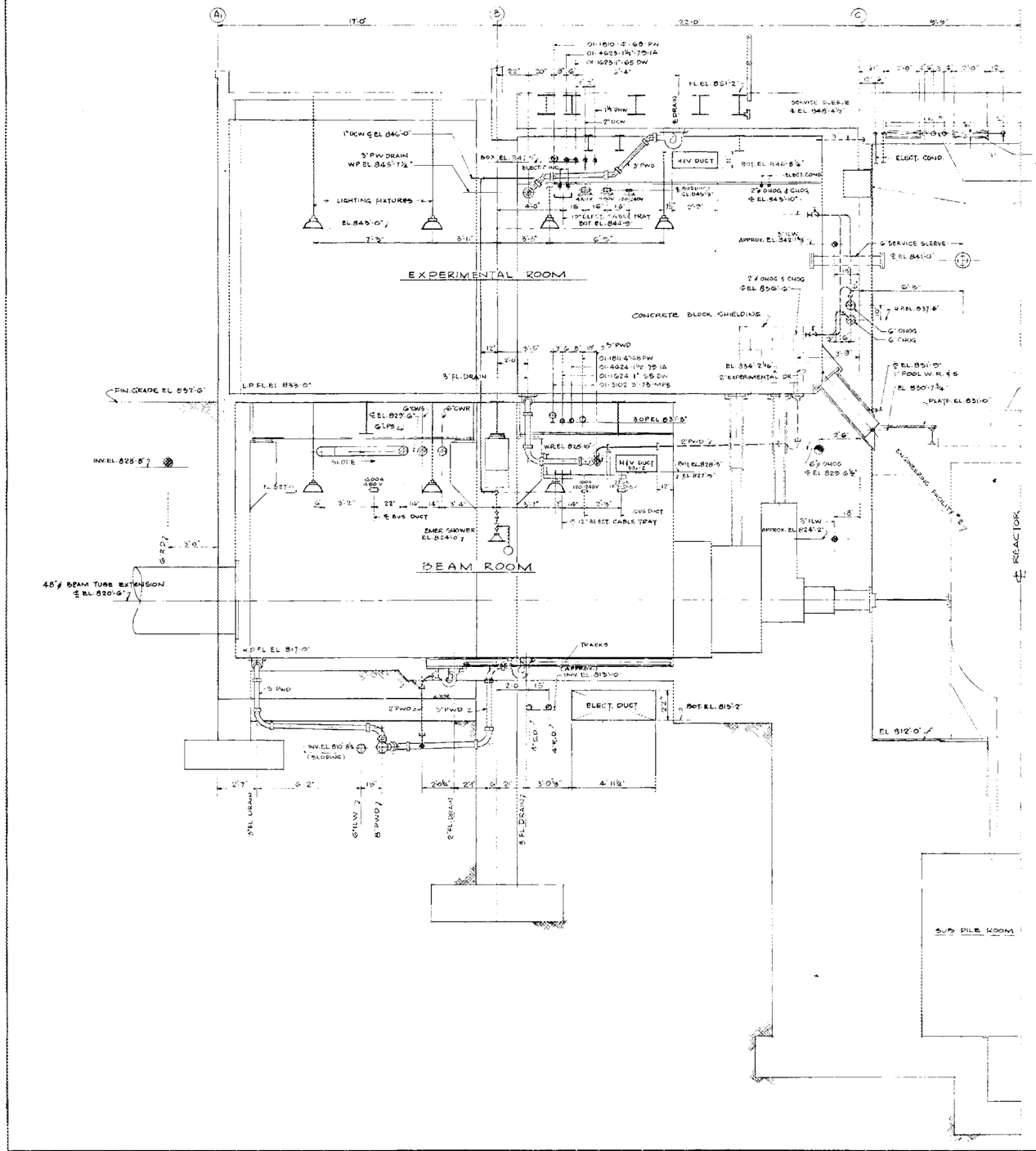

COOLING TOWER EQUIP. BLDG.
ROAD
FUTURE
03-430-CT-4A
03-430-CT-4B
03-430-CT-4C
03-430-CT-4D
PS-101
PS-102
PS-103
PS-104
PS-105
PG-101
PG-102
DETAIL "A"
DETAIL "E"
SECTION "F-F"
SECTION "X-X"
SCREEN ASSEMBLY
MK-03-415-S-1 (4 REQ'D)
MK-03-415-S-2 (4 REQ'D)
PLAN
SECTION A-A
SECTION B-B
A-A
CERTIFIED FOR CONSTRUCTION
GENERAL NOTES
1) FOR GENERAL STRUCT. STL NOTES SEE DWG. 1546-01-S-4029
2) FOR GENERAL CONCRETE NOTES SEE DWG 1546-01-S-4001
3) PS-3 & PS-4 TO BE CARBON STEEL, COATED WITH LSI COATS EPOXY RESIN IN ACCORDANCE WITH SECT. 7
DRAWING NO. 1546-03-M-5524
REV. 4
COOLING TOWER EQUIP BLDG PIPING PLAN
PLOT PLAN
PIPING ARR'GT. SECTIONS
SECONDARY COOLANT SYSTEM
SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
APPROVED
SINGMASTER & BREYER
UNION CARBIDE NUCLEAR COMPANY
U. S. ATOMIC ENERGY COMMISSION
HIGH FLUX ISOTOPE REACTOR
PIPING ARR'GT - PLAN
COOLING TOWER
DRAWN J. FC
CHKD P.T.
DATE 4/21/61
SCALE 1/8" = 1'-0"
DRAWING NO. 1546-03-M-5524
REV. 4

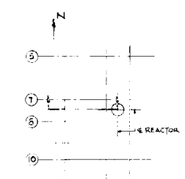

DRAWING NO. 1546-03-M-5525 REV. 3
SECTION "A-A"
DWG. 1546-03-M-5524
SECTION "B-B" TYPICAL
DWG. 1546-03-M-5524
SECTION "C-C"
DWG. 1546-03-M-5524
SECTION "D-D"
DWG. 1546-03-M-5524
DETAIL "A"
DETAIL "B"
PUMPS 03-415-PU-6A & 6B
PUMP 03-415-PU-14
FACE OF PUMP DISCHARGE
24" DRESSER COUPLING (PROVIDE 1" GAP)
16" DRESSER COUPLING (PROVIDE 1" GAP)
FOR PIPE ANCHOR & EMBEDDED IN CONC. SEE 1546-03-S-6069
SUPPORT
GRADE
COOLING TOWER COL'S
TOP OF COOLING TOWER BASIN CURB EL. 817'-0"
OPER. WTR. LEVEL EL. 815'-0"
WALL BRACKET
SLUICE GATE
PIT FLOOR EL. 801'-7"
H.P. BASIN FL. EL. 806'-6"
L.P. FLUME FL. EL. 805'-0"
SPACER 6" F TO F OF FLANGES
CERTIFIED FOR CONSTRUCTION
DRAWING NO. 1546-03-M-5525 REV. 3
REFERENCE DRAWING NO.
PIPING ARRGT PLAN 1546-03-M-5524
SPECIFICATION REF.
SINGMASTER & BREYER
INSTALLUGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
APPROVED
SINGMASTER & BREYER
UNION CARBIDE NUCLEAR COMPANY
C. E. WINTERS
U. S. ATOMIC ENERGY COMMISSION
L. H. JACKSON
HIGH FLUX ISOTOPE REACTOR
PIPING ARR'G'T.-SECTIONS
COOLING TOWER
DRAWN J.F.C. CHKD P.T.
SCALE 1/4"=1'-0"
DRAWING NO. 1546-03-M-5525 REV. 3
REVISIONS
CERTIFIED FOR CONSTRUCTION
ISSUED FOR TYPE II ANNOTATION
CERTIFIED FOR CONSTRUCTION


01-405-RV-1
REACTOR VESSEL
01-405-HT-3
REACTOR PRIMARY WATER HEAD TANK
05-405-OT-4
PLANT DEMINERALIZED WATER SUPPLY TANK
01-430-C-50
PRECONDENSER
01-435-DA-1
PRIMARY LOOP DEAERATOR
PRIMARY CLEAN-UP FILTERS
01-435-FL-1A
01-435-FL-1B
01-415-PU-4A
80-300 G.P.M.
01-415-PU-4B
80-300 G.P.M.
TDH = 2400
01-415-PU-11
90 G.P.M.
1000 P.S.I.G. (DIS. PRESS.)
PRIMARY PRESSURIZER PUMPS
PRIMARY FEED PUMP
01-415-PU-18A
100 G.P.M. TDH = 100'
01-415-PU-18B
100 G.P.M. TDH = 100'
PLANT DEMINERALIZED WATER SUPPLY PUMPS
01-415-PU-2A
01-415-PU-2B
200 G.P.M. TDH = 320'
PRIMARY CLEAN UP PUMPS
SAMPLE STATION 1191
01-415-PU-6
PRIMARY DEMINERALIZER RECYCLE PUMP
100 GPM
TDH = 100'
01-470-AN-2B
ANION
01-470-CA-2B
CATION
01-470-AN-2A
ANION
01-470-CA-2A
CATION
01-435-FL-4
PRIMARY DEMINERALIZER AFTER FILTER
RESIN DISPOSAL SYSTEM
PRIMARY CLEAN-UP SYSTEM DEMINERALIZERS
NOTE: THIS DWG SUPERSEDES DWG No 1546-01-M-5500 (For Low Pressure System Only)
FOR LEGEND SEE DWG. 1546-01-M-5531
NOTE: THIS DRAWING IS FOR GENERAL INFORMATION ONLY. THE CONTRACTOR SHALL MAKE REFERENCE TO ERECTION PIPING ISOMETRIC DRAWINGS, EQUIPMENT DRAWINGS & SPECIFICATIONS FOR ACTUAL EXTENT, SIZES & LOCATIONS OF SERVICES OR WORK TO BE FURNISHED & INSTALLED UNDER CONTRACT.
DRAWING NO. 1546-01-M-5534
REV. 7
REFERENCE DRAWING
NO.
ENGINEERING FLOW DIAGRAM REACTOR PRIMARY COOLANT HIGH PRESSURE SYSTEM
1546-01-M-5541
SPECIFICATION SECTION
SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
APPROVED
SINGMASTER & BREYER
DATE 5-24-61
UNION CARBIDE NUCLEAR COMPANY
C.E. WHITERS
DATE 6-16-61
U. S. ATOMIC ENERGY COMMISSION
L. H. JACKSON
DATE 6-26-61
HIGH FLUX ISOTOPE REACTOR
ENGINEERING FLOW DIAGRAM
REACTOR PRIMARY COOLANT
LOW PRESSURE SYSTEM
DRAWN M.M.
DATE 5-13-61
DRAWING NO. 1546-01-M-5534
SCALE NONE
CERTIFIED FOR CONSTRUCTION
REMOVED SAMPLE VALVES V-1156 & V-1172 FROM LINES 01-1038-2"G & 01-1095-2" K


DRAWING NO. 1546-01-M-5535
60 PSI AIR
PRESSURE TANK 01-403-PT-7
6" POTABLE WATER
AIR GAP TANK 01-403-AG-6 1000 GAL.
To PROCESS WASTE DRAIN
POOL EXPERIMENTAL AREA
To DECONTAMINATION AREA
CELL 110
CELL 111
CELL 112
CELL 113
TO TRAP SEAL EL 818'-0"
PROCESS WATER PUMPS 01-415-PU-17A 01-415-PU-17B
500GPM TDH 175'
BEAM ROOM
AREA 01
AREA 05
SP. 01-3 1" BACK FLOW PREVENTER
SUMP
FOR INSTRUMENT AIR DIAGRAM SEE 1546 05-U-7146
MAGNETIC CPLG
PRESSURIZER PUMP 01-415-PU-4A 01-415-PU-4B
5% NaOH DAY TANK 01-405-CAT-5
5% HNO3 DAY TANK 01-405-AT-4
TO ROOF DRAIN
DRIP POT DRAIN
FILTER PITS
LEGEND:
HOSE CONN
GATE VA.
GLOBE VA.
CHECK VA.
AREA N°
LINE N°
SIZE
SPEC.
TEMPORARY STRAINER
CERTIFIED FOR CONSTRUCTION
NOTE: THIS DRAWING IS FOR GENERAL INFORMATION ONLY. THE CONTRACTOR SHALL MAKE REFERENCE TO RELATED PIPING ARR'G'T DRAWINGS, EQUIPMENT DRAWINGS & SPECIFICATIONS FOR ACTUAL EXTENT, SIZES & LOCATIONS OF SERVICES OR WORK TO BE FURNISHED & INSTALLED UNDER CONTRACT.
FLOW DIAGRAM COMPRESSED AIR 1546-05-U-7146
DRAWING NO. 1546 01-M-5535 REV. 4
REFERENCE DRAWING NO.
ENGINEERING HIGH DENS. REACTOR PRIMARY, PERSONL, HIGH PRESS. SYSTEM 1546-01-M-5541
PRESSURIZING FLOW DIAGRAM do - 5501
POOL COOLANT SYSTEM do - 5502
HIGH FLUX DENS. SECONDARY COOLANT & PLANT DEMINERALIZING WATER SYSTEMS do - 5503
PLUMBING WASTE FLOW DIAGRAM do - 5504
PRIMARY COOLANT WATER PURIFICATION FLOW DIAGRAM 1546-05-U-7141
PROCESS WATER FLOW DIAGRAM, POTABLE & PROCESS WATER 1546-05-U-7146
SPECIFICATION SECTION REV. 05
SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
APPROVED
SINGMASTER & BREYER BY DATE 6-1-61
UNION CARBIDE NUCLEAR COMPANY BY C. E. WINTERS DATE 6-1-61
U. S. ATOMIC ENERGY COMMISSION BY L. H. JACKSON DATE 6-12-61
HIGH FLUX ISOTOPE REACTOR
ENGINEERING FLOW DIAGRAM
PROCESS WATER SYSTEM
DRAWN NJH CHKD DATE 4-1-61
DATE 5-12-61 DRAWING NO. 1546-01-M-5535 REV. 4
SCALE NONE
REVISIONS
REVISED AS NOTED
CERTIFIED for CONSTRUCTION
ISSUED FOR TITLE & APPROVAL

DRAWING NO. 1546-01-5536 REV. 0





KEY PLAN

CERTIFIED FOR CONSTRUCTION

NO.	REVISIONS	BY	CHK.	APPR. S.&B.	DATE	APPR. ARCH.	DATE	APPR. ELEC.	DATE
0	CERTIFIED FOR CONSTRUCTION	M.V.C.	F.V.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0	ISSUED FOR TITLE II APPROVAL	M.V.C.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

S. & B. 546	
DEPT.	CHK.
ARCH.	[illegible]
ELECT.	[illegible]
H & V.	[illegible]
INST.	[illegible]
MECH.	[illegible]
STRUC.	[illegible]
UTIL.	[illegible]
PROJECT	[illegible]

PLUMBING 2ND FL.	1546-01-A-5002
PLUMBING 1ST FL.	1546-01-A-5001
DRAINAGE SYSTEM GR. FL.	1546-01-M-5520
DRAINAGE SYSTEM 1ST FL.	1546-01-M-5519
DRAINAGE SYSTEM 2ND FL.	1546-01-M-5518
PIPING: SHIELD FACE FACILITIES (PRIMARY / COOLDOWN SUBNAT)	1546-01-M-5511
PIPING ARRGT. PLAN OF POOL AREA 2ND FL.	1546-01-M-5503
HOT OFF GAS SYSTEM GR. FL.	1546-01-HV-3021
HOT OFF GAS SYSTEM 1ST. FL.	1546-01-HV-3020
HEAT. & VENT. SPEC. BUILDING HOT EXH. SYS.	1546-01-HV-3018
HEATING & VENT. 1ST FL.	1546-01-HV-3006

DRAWING NO. 1546-01-M-5536 REV. 0

REFERENCE DRAWING	NO.
HEATING & VENT. GR. FL.	1546-01-HV-3015
POWER LAYOUT 1ST FL.	1546-01-E-2034
POWER LAYOUT GR. FL.	1546-01-E-2032
LIGHTING LAYOUT 1ST FL.	1546-01-E-2013
LIGHTING LAYOUT GR. FL.	1546-01-E-2012
SPECIFICATION REF.	

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

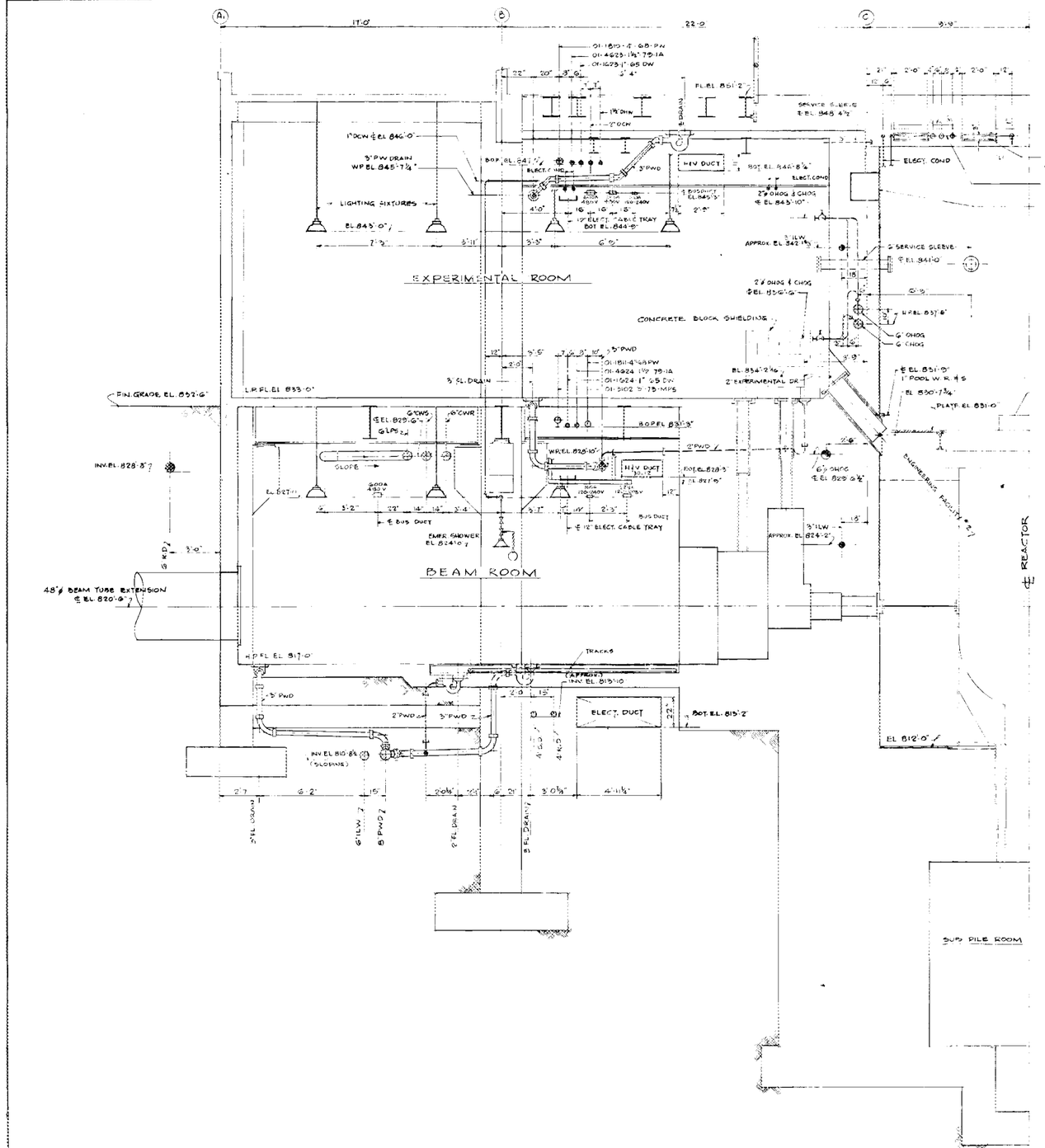
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

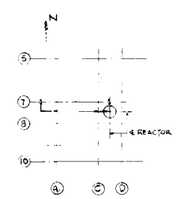
APPROVED
SINGMASTER & BREYER
BY [signature] DATE 6-1-61
UNION CARBIDE NUCLEAR COMPANY
BY C. E. WINTERS DATE 5-19-61
U. S. ATOMIC ENERGY COMMISSION
BY L. [illegible] DATE 5-26-61

HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
COMPOSITE
LOOKING NORTH
THRU EXPERIMENTAL & BEAM ROOMS

DRAWN [illegible] CHKD [illegible] DATE 6-1-61 SUBMITTED FOR APPROVAL DATE
DATE 5-11-61 DRAWING NO. 1546-01-M-5536 REV. 0
SCALE 1/8"=1'-0"

DRAWING NO. 1546 -01-5536 REV. 0





KEY PLAN

PLUMBING 2ND FL.	1546-01-A-5002
PLUMBING 1ST FL.	1546-01-A-6001
DRAINAGE SYSTEM GR. FL.	1546-01-M-5520
DRAINAGE SYSTEM 1ST FL.	1546-01-M-5517
DRAINAGE SYSTEM 2ND FL.	1546-01-M-5518
PIPING-SHIELD FACE FACILITIES (PRIMARY LOOP SYSTEM)	1546-01-M-5511
PIPING ARRGT. PLAN OF POOL AREA 2ND FL.	1546-01-M-5505
HOT OFF GAS SYSTEM GR. FL.	1546-01-HV-3021
HOT OFF GAS SYSTEM 1ST. FL.	1546-01-HV-3023
HEAT & VENT. SPEC. BUILDING 100'x 8'x H. SYS.	1546-01-HV-3018
HEATING & VENT. 1ST FL.	1546-01-HV-3006

DRAWING NO. 1546 -01-M-5536 REV. 0

REFERENCE DRAWING	NO.
HEATING & VENT. GR. FL.	1546-01-HV-3005
POWER LAYOUT 1ST FL.	1546-01-E-2036
POWER LAYOUT GR. FL.	1546-01-E-2032
LIGHTING LAYOUT 1ST FL.	1546-01-E-2013
LIGHTING LAYOUT GR. FL.	1546-01-E-2012
SPECIFICATION	REF.

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER
BY [signature] DATE 6-1-61
UNION CARBIDE NUCLEAR COMPANY
BY C.E. WINTERS DATE 6-10-61
U. S. ATOMIC ENERGY COMMISSION
BY L.H. JACKSON DATE 6-20-61

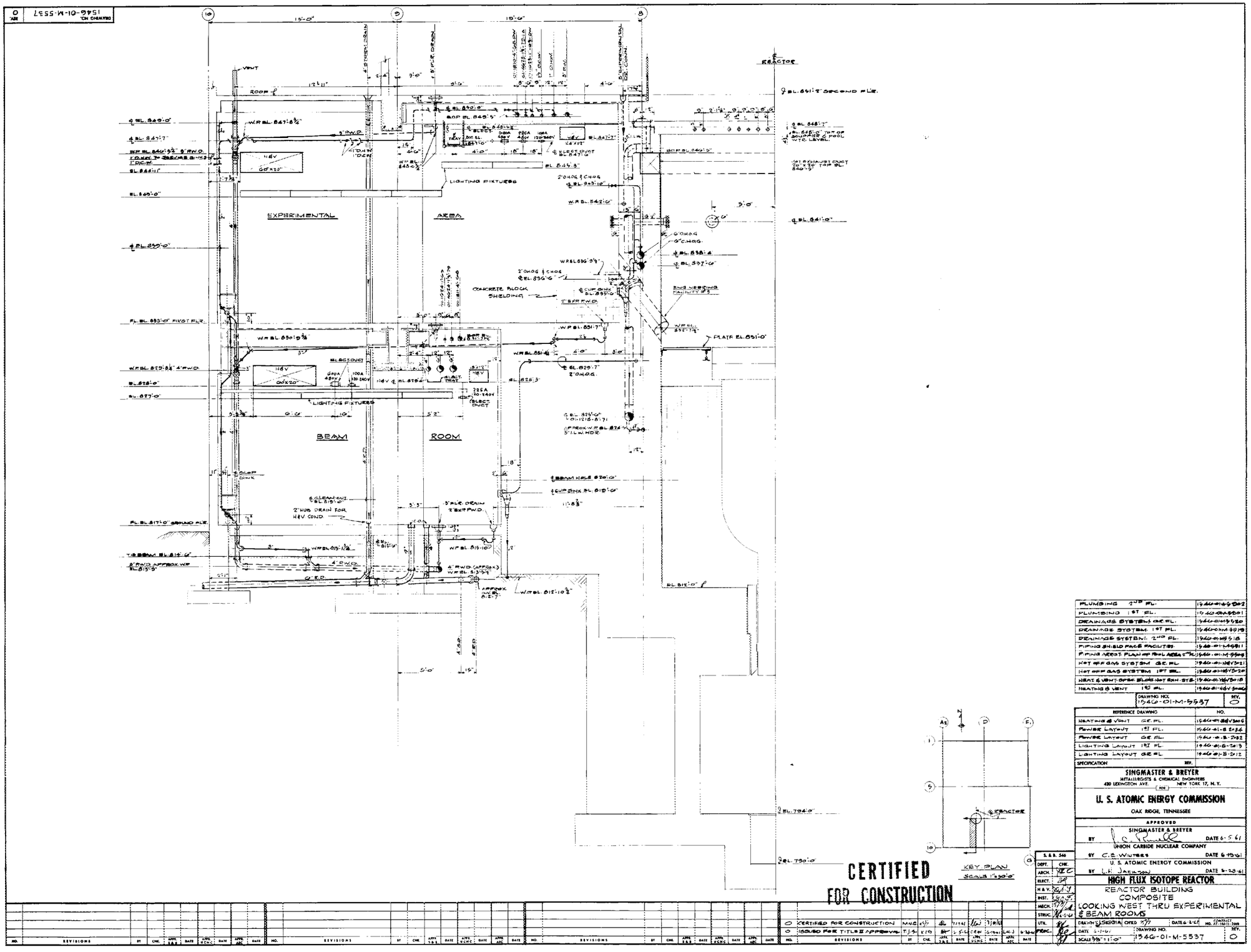
HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
COMPOSITE
LOOKING NORTH
THRU EXPERIMENTAL & BEAM ROOMS

DRAWN CHRISTIANA CHKD. [illegible] DATE 4-14-61 CONTRACT NO. AT-(40-1)-1545
DATE 5-1-61 DRAWING NO. 1546 -01-M-5536 REV. 0
SCALE 3/8"=1'-0"

CERTIFIED FOR CONSTRUCTION

S. & B. 546
DEPT. CHK.
ARCH. [illegible]
ELECT. [illegible]
H & V. [illegible]
INST. [illegible]
MECH. [illegible]
STRUC. [illegible]
UTIL. [illegible]
DRAWN [illegible] CHK. [illegible]

NO.	REVISIONS	BY	CHK.	APPR. E.&A.	DATE	APPR. M.&S.	DATE	APPR. S.&I.	DATE
0	CERTIFIED FOR CONSTRUCTION	M.V.C.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0	ISSUED FOR TITLE II APPROVAL	M.V.C.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]



PLUMBING 2ND FL.	1540-01-M-5502
PLUMBING 1ST FL.	1540-01-M-5501
DRAINAGE SYSTEM GE FL.	1540-01-M-5520
DRAINAGE SYSTEM 1ST FL.	1540-01-M-5519
DRAINAGE SYSTEM 2ND FL.	1540-01-M-5518
PIPING SHIELD PACK FACILITIES	1540-01-M-5951
PIPING AREOT PLAN OF POOL AREA 2ND FL.	1540-01-M-5958
HOT GAS SYSTEM GE FL.	1540-01-HGV-521
HOT GAS SYSTEM 1ST FL.	1540-01-HGV-520
HEAT & VENT OFFICE BLDG. HOT GAS SYS.	1540-01-HGV-5018
HEATING & VENT 1ST FL.	1540-01-HGV-5000

DRAWING NO. 1540-01-M-5537 REV. 0

REFERENCE DRAWING	NO.
HEATING & VENT GE FL.	1540-01-HGV-3005
POWER LAYOUT 1ST FL.	1540-01-E-2086
POWER LAYOUT GE FL.	1540-01-E-2082
LIGHTING LAYOUT 1ST FL.	1540-01-E-2013
LIGHTING LAYOUT GE FL.	1540-01-E-2012
SPECIFICATION	REV.

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

FOR

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

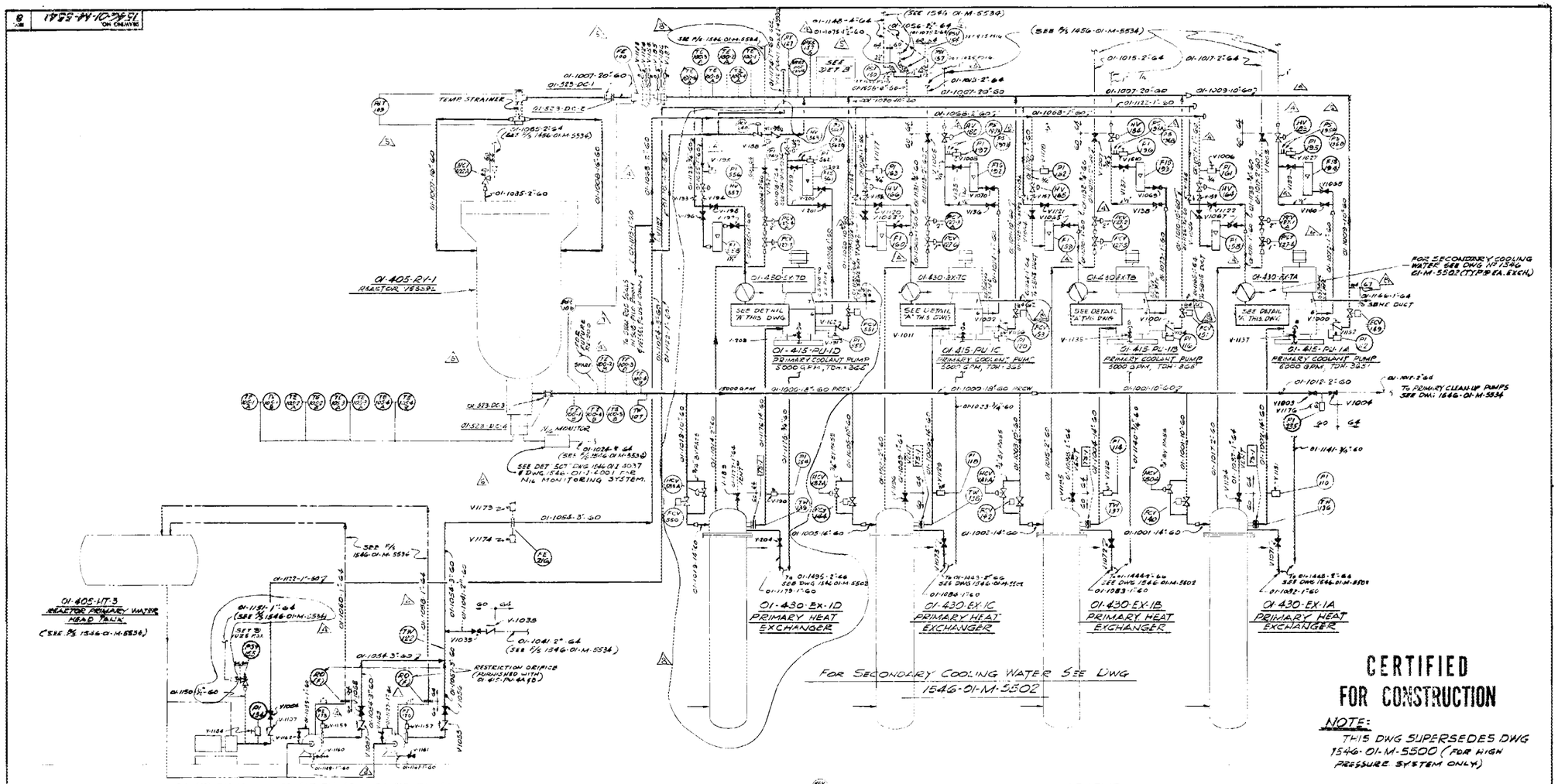
APPROVED
SINGMASTER & BREYER
BY L. S. Ruble DATE 6-5-61
UNION CARBIDE NUCLEAR COMPANY
BY C.E. Winters DATE 6-19-61
U. S. ATOMIC ENERGY COMMISSION
BY L.H. Jackson DATE 6-28-61

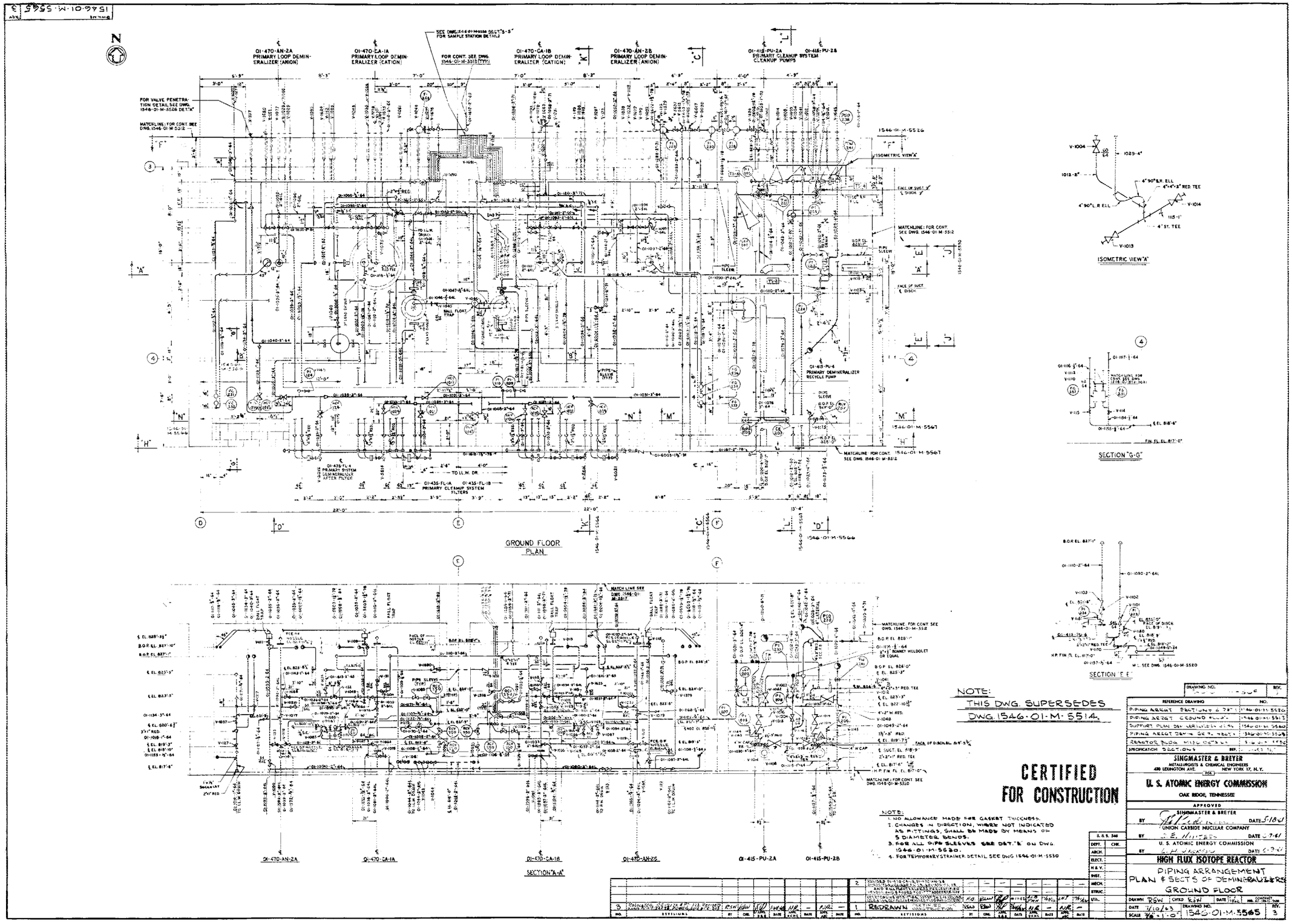
HIGH FLUX ISOTOPE REACTOR
REACTOR BUILDING
COMPOSITE
LOOKING WEST THRU EXPERIMENTAL & BEAM ROOMS

DRAWN L.S. GOTIA CHKD. DATE 6-2-61 CONTRACT NO. AT-(40-1)-3480
DATE 5-1-61 DRAWING NO. 1540-01-M-5537 REV. 0
SCALE 3/8"=1'-0"

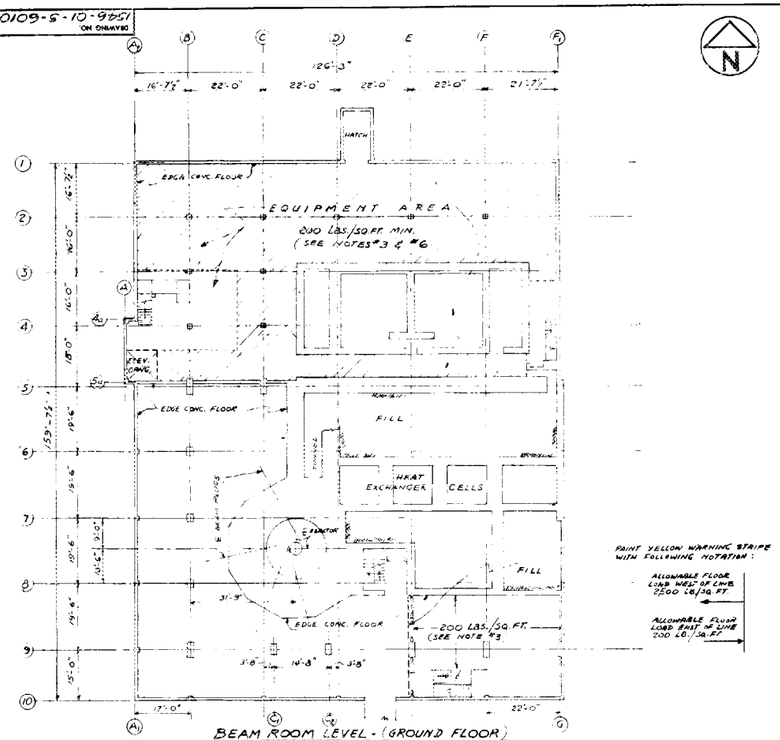
S & B. 346	
DEPT.	CHK.
ARCH.	
ELECT.	
H & V.	
INST.	
MECH.	
STRUC.	
UTIL.	
PROC.	

NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. ECNC	DATE	APPR. AEC	DATE
0	CERTIFIED FOR CONSTRUCTION	MNC							
0	ISSUED FOR TITLE II APPROVAL	TJS	KTO						

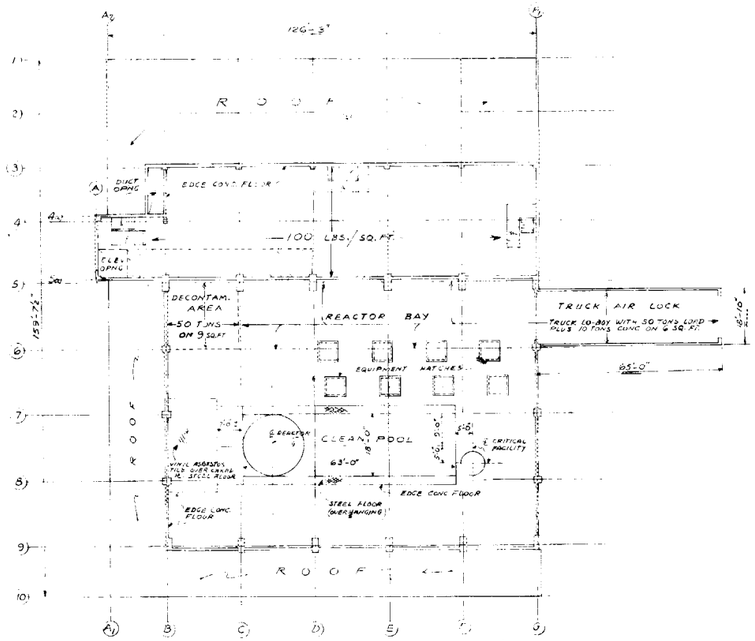

01-405-RV-1
REACTOR VESSEL
01-405-HT-3
REACTOR PRIMARY WATER HEAD TANK
01-415-PU-1D
PRIMARY COOLANT PUMP
3000 GPM, TDH = 365'
01-415-PU-1C
PRIMARY COOLANT PUMP
3000 GPM, TDH = 365'
01-415-PU-1B
PRIMARY COOLANT PUMP
3000 GPM, TDH = 365'
01-415-PU-1A
PRIMARY COOLANT PUMP
3000 GPM, TDH = 365'
01-430-EX-1D
PRIMARY HEAT EXCHANGER
01-430-EX-1C
PRIMARY HEAT EXCHANGER
01-430-EX-1B
PRIMARY HEAT EXCHANGER
01-430-EX-1A
PRIMARY HEAT EXCHANGER
FOR SECONDARY COOLING WATER SEE DWG 1546-01-M-5502
01-415-PU-1I
PRIMARY FEED PUMP
5.0 GPM
1800 PSIG (DISCH. PRESS.)
01-415-PU-4B
01-415-PU-4A
PRIMARY PRESSURIZER PUMPS
60-300 GPM
T.D.H. = 2400'
RESTRICTION ORIFICE
TEMP STRAINER
N2 MONITOR
SEE DETAIL "A" THIS DWG
DETAIL "A"
DETAIL "B"
PUMP
VALVE "J"
LINE "E"
LINE "F"
LINE "G"
VALVE "H"
VALVE "I"
VALVE "J"
PI "D"
PI "E"
FCV "F"
FCV "G"
LINE N° "E"
LINE N° "F"
LINE N° "G"
01-415-PU-1A 186 159 134-A 134-B 01-1071-1"-60 01-1162-3/4"-60 01-1163-3/4"-60 V-1160 V-1187 V-1191
01-415-PU-1B 187 190 193-A 193-B 01-1070-1"-60 01-1160-3/4"-60 01-1161-3/4"-60 V-1166 V-1165 V-1192
01-415-PU-1C 188 191 197-A 197-B 01-1069-1"-60 01-1158-3/4"-60 01-1159-3/4"-60 V-1162 V-1163 V-1193
01-415-PU-1D 559 560 561-A 561-B 01-1055-1"-60 01-1120-3/4"-60 01-1121-3/4"-60 V-206 V-207 V-205
NV-A PSS-B NCV C
128-A PSS-128A NCV128-A1
128-B PSS-128B NCV128-B1
128-C PSS-128C NCV128-C1
LEGEND
CHECK VA.
GATE VA.
PLUG VA.
GLOBE VA.
CONTROL VA.
RELIEF VA.
STRAINER
TRAP
EJECTOR
MOTOR CONTROL VA.
QUICK DISCONNECT VA.
HAND CONTROL VA.
DIAPHRAGM VA.
LINE BLIND
ROTOMETER
TEMPORARY STRAINER
(F) FURNISHED WITH RELATED EQUIPT.
OUT OF FUNCTION SEE REFERENCED DWG
WELL PENETRATIONS FOR FUTURE USE
AUTOCLAVE TUBING SPEC. SECTION 6A
BAR STOCK VA.
BELLOWS SEALED VA.
DRESSER CPLG.
NOTE: THIS DRAWING IS FOR GENERAL INFORMATION ONLY. THE CONTRACTOR SHALL MAKE REFERENCE TO RELATED PIPING AREA DRAWINGS, EQUIPMENT DRAWINGS & SPECIFICATIONS FOR ACTUAL EXTENT SIZES & LOCATIONS OF SERVICES OR WORK TO BE FURNISHED & INSTALLED UNDER CONTRACT.
CERTIFIED FOR CONSTRUCTION
NOTE: THIS DWG SUPERSEDES DWG 1546-01-M-5500 (FOR HIGH PRESSURE SYSTEM ONLY)
DISTRIBUTION APPL. DIAGRAM REACTOR PRIMARY COOLANT SYSTEM 1546-I-4003
DISTRIBUTION APPL. DIAGRAM REACTOR PRIMARY COOLANT LOW SYSTEM 1546-I-4001
DRAWING NO. 1546-01-M-5541 REV. 8
REFERENCE DRAWING NO.
AREA UTILITY PLAN YARD PIPING 1546-05-U-7101
FLOW DIAGRAM PROCESS WASTE & ILW do -7148
REACTOR BLDG. AIR FLOW DIAGRAM 1546-01-HV-5001
BUILDING SERVICE FLOW DIAG. SECONDARY COOLING & CONDENSATE WATER SYSTEM 1546-01-M-5502
ENGINEERING FLOW DIAG. PRIM. REGULATED SYSTEM do -5501
SPECIFICATION SECTION REF. 60
SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.
FOR
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
APPROVED
SINGMASTER & BREYER
BY DATE 5-24-61
UNION CARBIDE NUCLEAR COMPANY
BY C. E. WINTERS DATE 6-13-61
U. S. ATOMIC ENERGY COMMISSION
BY L. M. JACKSON DATE 7-5-61
HIGH FLUX ISOTOPE REACTOR
ENGINEERING FLOW DIAGRAM
PRIMARY REACTOR COOLANT
HIGH PRESSURE SYSTEM
DRAWN N.A.H. CHKD
DATE 8-13-61
DRAWING NO. 1546-01-M-5541
SCALE NONE
REVISIONS
NO. BY CHK. DATE


GROUND FLOOR PLAN
SECTION "A-A"
SECTION "E-E"
SECTION "G-G"
ISOMETRIC VIEW "A"
NOTE:
THIS DWG. SUPERSEDES
DWG. 1546-01-M-5514.
CERTIFIED
FOR CONSTRUCTION
NOTE:
1. NO ALLOWANCE MADE FOR GASKET THICKNESS.
2. CHANGES IN DIRECTION, WHERE NOT INDICATED AS FITTINGS, SHALL BE MADE BY MEANS OF 5 DIAMETER BENDS.
3. FOR ALL PIPE SLEEVES SEE DET. "E" ON DWG. 1546-01-M-5520.
4. FOR TEMPORARY STRAINER DETAIL SEE DWG 1546-01-M-5530
SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
APPROVED
SINGMASTER & BREYER
UNION CARBIDE NUCLEAR COMPANY
U. S. ATOMIC ENERGY COMMISSION
HIGH FLUX ISOTOPE REACTOR
PIPING ARRANGEMENT
PLAN & SECTS OF DEMINERALIZERS
GROUND FLOOR
DRAWN RGW
CHKD RGW
DATE 7/10/63
SCALE 3/8"=1'-0"
DRAWING NO. 1546-01-M-5565
REDRAWN
REVISIONS

0 | 0109-5-10-9951 ON CHANGE



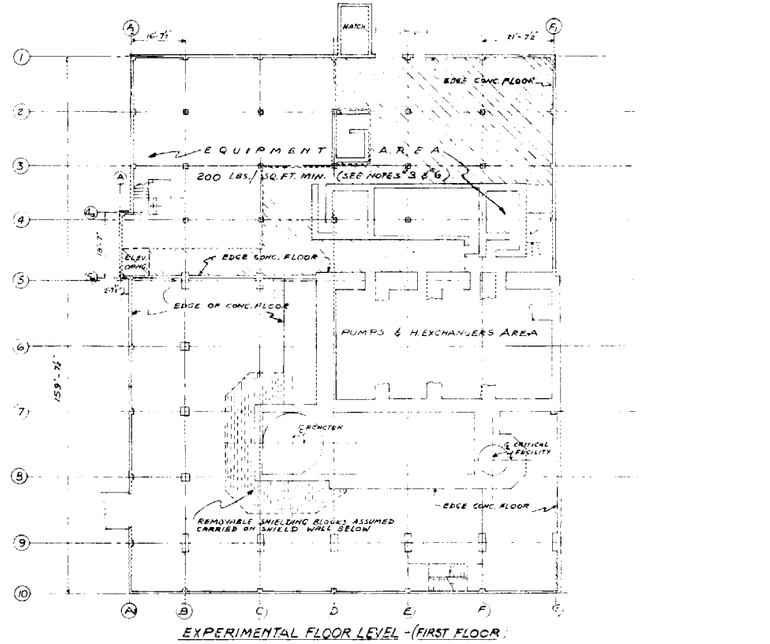
BEAM ROOM LEVEL - (GROUND FLOOR)
PLAN AT ELEVATION 817'-0"
2,300 LBS./SQ.FT. LOAD. (WITH PROVISION FOR HEAVY ROLLING LOADS FROM BEAM PLUGS AND EXPERIMENTAL OPERATION). EXCEPT AS NOTED.



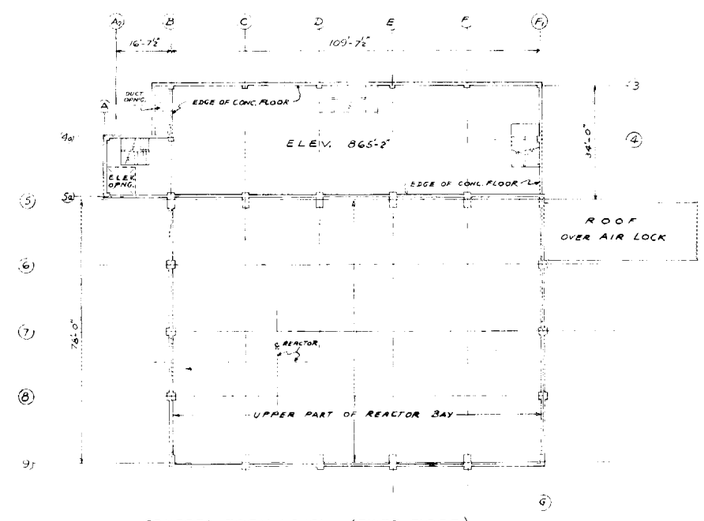
REACTOR BAY LEVEL - (SECOND FLOOR)
PLAN AT ELEVATION 851'-2"
500 LBS./SQ.FT. PLUS 10 TONS MOVING LOAD ON 6.0 SQ.FT.
EXCEPT AS NOTED

NOTES:

1. ROOF LIVE LOADING ——— 20 P.S.F.
2. ALL COLUMN LINES ARE ON ℄ OF COLUMNS EXCEPT LINES 1, 4a, 5a, 10, A, A1, A2, F, SEE ARCHITECTURAL DRAWINGS.
3. IN EQUIPMENT AREA, LOCAL FLOOR IS DESIGNED FOR 200 P.S.F. OR EQUIPMENT LOADS, IF GREATER THAN 200 P.S.F.
4. WIND LOADING 20 P.S.F.
5. MAX. CRANE CAPACITY 50 T.
6. FLOOR AREAS SHOWN THUS ▨ ARE DESIGNED FOR 5 TON ROLLING LOAD ON DOLLY WITH WHEEL SPACING 4 FT. WIDTH BY 6 FT. FROM AXLE TO AXLE (ROOMS: G1, G5, G.8 on GROUND FL., 103 & 105 on 1st FL. & 201 on 2nd FL. NORTH PART. SEE ARCH. DWGS.)



EXPERIMENTAL FLOOR LEVEL - (FIRST FLOOR)
PLAN AT ELEVATION 833'-0"
750 LBS./SQ.FT. EXCEPT AS NOTED



CONTROL ROOM LEVEL - (THIRD FLOOR)
PLAN AT ELEVATION 865'-2"
100 LBS./SQ.FT.

CERTIFIED FOR CONSTRUCTION

DRAWING NO. 1546-01-5-6010 REV. 0

REFERENCE DRAWING | NO.

SPECIFICATION | REF.

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER
BY C.E. WINTERS DATE 12-14-60
UNION CARBIDE NUCLEAR COMPANY
BY L.H. JACKSON DATE 12-15-60
U. S. ATOMIC ENERGY COMMISSION
BY DATE

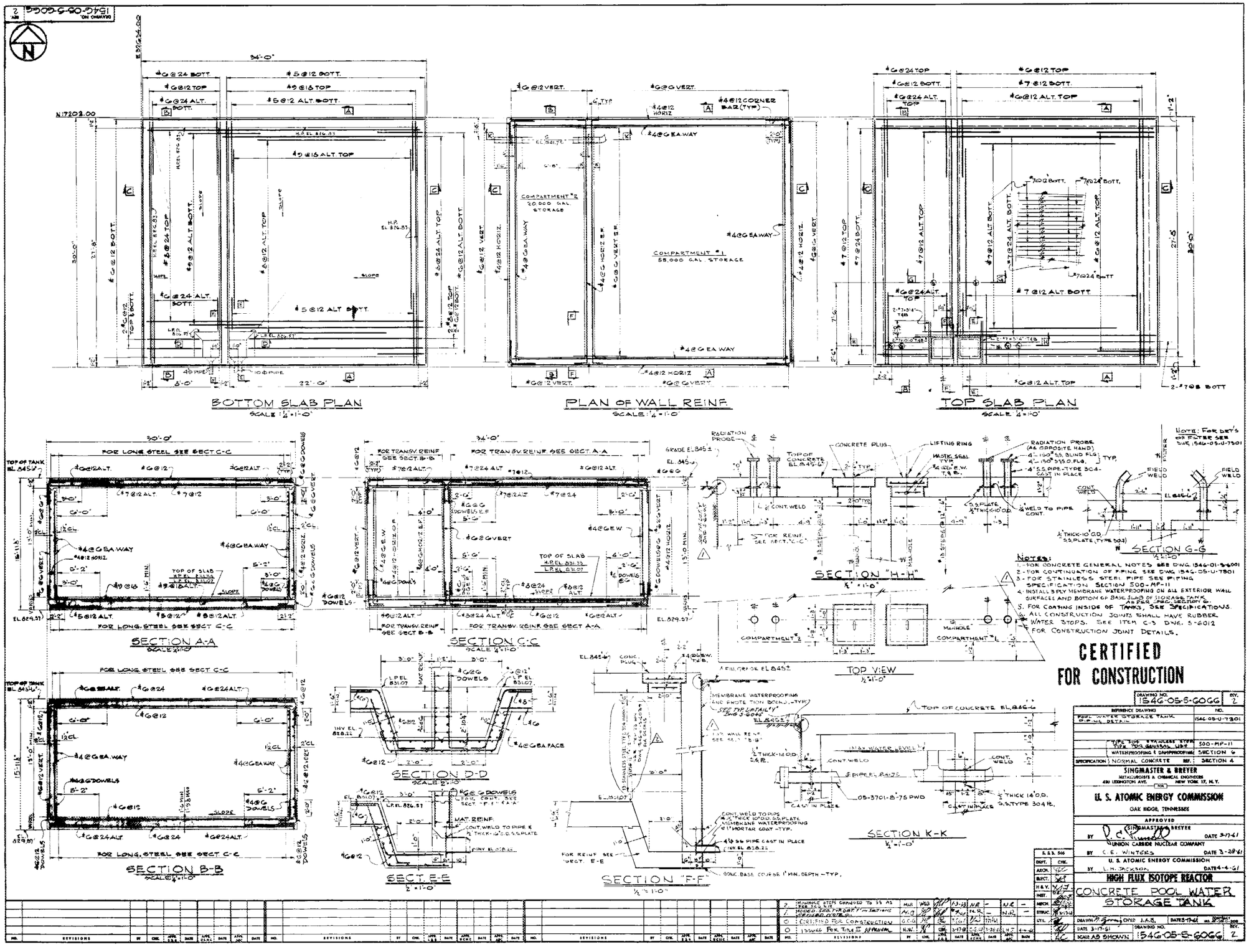
HIGH FLUX ISOTOPE REACTOR

REACTOR BUILDING
FLOOR LIVE LOADINGS

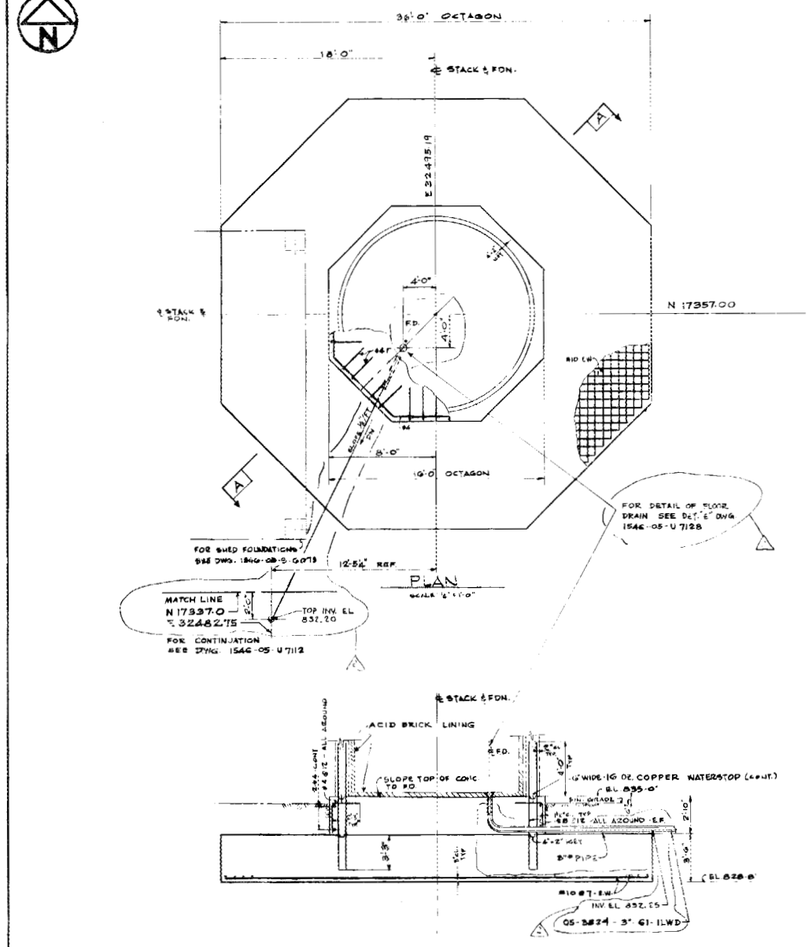
S. & B. 546 | DEPT. | CHK. | ARCH. | ELECT. | H & V. | INST. | MECH. | STRUC. | UTIL.

DRAWN: G.D. CHKD A.M. DATE 12-14-60 CONTRACT NO. AT 40-1-2649
DATE 12-1-1960 DRAWING NO. 1546-01-5-6010 REV. 0
SCALE 1/8" = 1'-0"

NO.	REVISIONS	BY	CHK.	APPR. S.&B.	DATE	APPR. U.C.N.C.	DATE	APPR. AEC	DATE
0	CERTIFIED FOR CONSTRUCTION	G.D.	A.M.	J.R.	7-5-61	C.S.W.	7/11/61		
0	ISSUED FOR TYPE 2 PRELIMINARY REVIEW	G.D.	A.M.	J.R.	1-12-61	C.S.W.	1-13-61	L.H.J.	1/13/61
0	RECEIVED & REVISED FOR TYPE 2 PRELIMINARY REVIEW	G.D.	A.M.	J.R.	12-16-60	C.S.W.	12-16-60	L.H.J.	12-17-60
0	ISSUED FOR TYPE 2 APPROVAL	G.D.	A.M.	J.C.R.	9-16-60	C.S.W.	9-26-60	L.H.J.	9-26-60

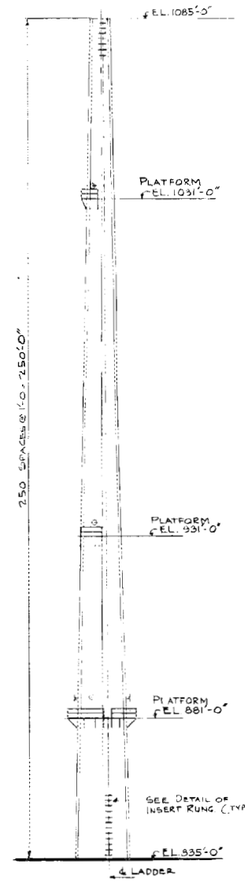

BOTTOM SLAB PLAN
SCALE: 1/4"=1'-0"
PLAN OF WALL REINF.
SCALE: 1/4"=1'-0"
TOP SLAB PLAN
SCALE: 1/4"=1'-0"
SECTION A-A
SCALE: 1/4"=1'-0"
SECTION C-C
SCALE: 1/4"=1'-0"
SECTION B-B
SCALE: 1/4"=1'-0"
SECTION D-D
SCALE: 1/2"=1'-0"
SECT. E-E
1/2"=1'-0"
SECTION "F-F"
1/2"=1'-0"
SECTION "H-H"
1/2"=1'-0"
TOP VIEW
1/2"=1'-0"
SECTION K-K
1/2"=1'-0"
SECTION G-G
1/2"=1'-0"
COMPARTMENT #2
20,000 GAL STORAGE
COMPARTMENT #1
55,000 GAL. STORAGE
FOR LONG. STEEL SEE SECT. C-C
FOR TRANSV. REINF. SEE SECT. A-A
FOR TRANSV. REINF. SEE SECT. B-B
TOP OF TANK EL. 845±
TOP OF CONCRETE EL. 845±
FINISH GRADE EL. 845±
MANHOLE
COMPARTMENT #1
COMPARTMENT #2
NOTES:
1. FOR CONCRETE GENERAL NOTES SEE DWG. 1546-01-S-6001
2. FOR CONTINUATION OF PIPING SEE DWG. 1546-05-U-7301
3. FOR STAINLESS STEEL PIPE SEE PIPING SPECIFICATION SECTION 500-MP-11
4. INSTALL 3 PLY MEMBRANE WATERPROOFING ON ALL EXTERIOR WALL SURFACES AND BOTTOM OF BASE SLAB OF STORAGE TANK AS PER SPEC. SECTION 6.
5. FOR COATING INSIDE OF TANKS, SEE SPECIFICATIONS.
6. ALL CONSTRUCTION JOINTS SHALL HAVE RUBBER WATER STOPS. SEE ITEM C-3 DWG. S-6012 FOR CONSTRUCTION JOINT DETAILS.
CERTIFIED FOR CONSTRUCTION
DRAWING NO. 1546-05-S-6066 REV. 2
REFERENCE DRAWING NO.
POOL WATER STORAGE TANK PIPING DETAIL 1546-05-U-7301
TYPE 304 STAINLESS STEEL TYPE 304 SEAMLESS 500-MP-11
WATERPROOFING & DAMPPROOFING SECTION 6
SPECIFICATION NORMAL CONCRETE REF. SECTION 4
SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.
FOR
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
APPROVED
BY SINGMASTER & BREYER DATE 3-17-61
UNION CARBIDE NUCLEAR COMPANY
BY C. E. WINTERS DATE 3-29-61
U. S. ATOMIC ENERGY COMMISSION
BY L. H. JACKSON DATE 4-4-61
HIGH FLUX ISOTOPE REACTOR
CONCRETE POOL WATER STORAGE TANK
DRAWN J.A.B. DATE 3-17-61
SCALE AS SHOWN
1546-05-S-6066 REV. 2

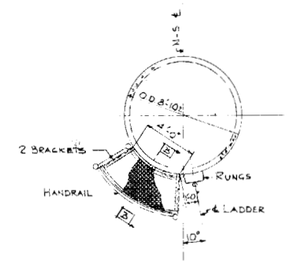
2 | L909-S-50-9761 DRAWING NO.



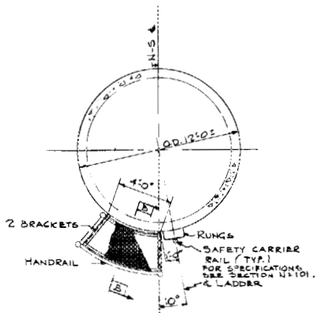
PLAN
SCALE 1/4" = 1'-0"

SECTION A-A
SCALE 1/4" = 1'-0"

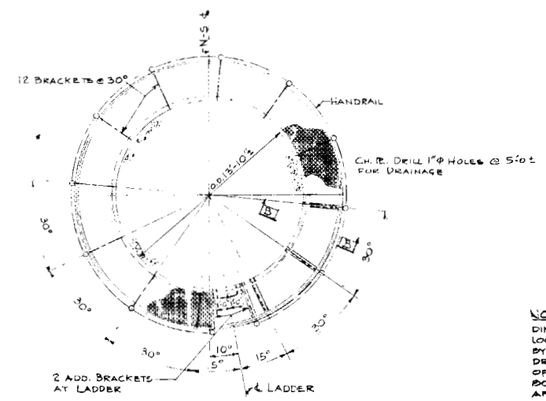




PLATFORM EL. 1031'-0"
SCALE 1/4" = 1'-0"



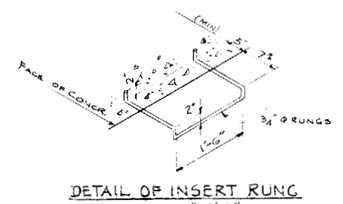
PLATFORM EL 931'-0"
SCALE 1/4" = 1'-0"



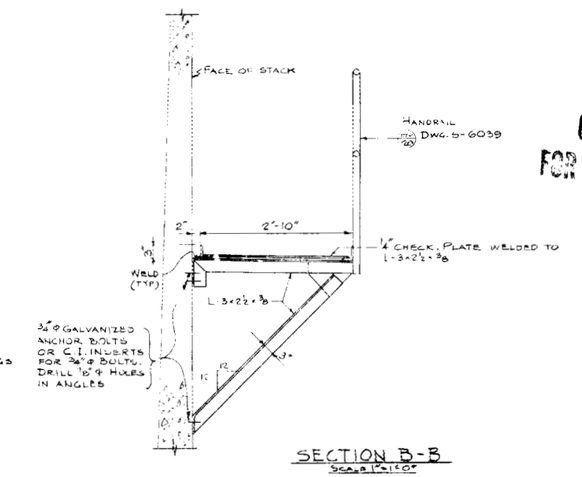
PLATFORM EL 881'-0"
SCALE 1/4" = 1'-0"

NOTE:
DIMENSIONS OF EQUIPMENT FOUNDATIONS, ANCHOR BOLT LOCATIONS AND PLATFORM DETAILS TO BE VERIFIED BY THE CONTRACTOR WITH APPROVED SHOP DRAWINGS OF EQUIPMENT. SHOP DRAWINGS OF EQUIPMENT FOUNDATIONS INCLUDING ANCHOR BOLT LOCATIONS TO BE SUBMITTED FOR APPROVAL.

NOTES
1- FOR GENERAL CONC. NOTES SEE DWG. 1546-01-S-6001
2- FOR PLOT PLAN LOCATION, SEE DWG. 1546-05-U-7002
3 FOR GENERAL STEEL NOTES SEE DWG. 1546-01-S-6073



DETAIL OF INSERT RUNG
SCALE 1" = 1'-0"



SECTION B-B
SCALE 1/4" = 1'-0"

CLASSIFIED FOR UNCLASSIFIED

DRAWING NO.	REV.
1546-05-S-6067	2

REFERENCE DRAWING	NO.
AREA SITE PLAN - SOUTH PLAN	1546-05-U-7008
SHED OVER STACK, BREECHING & FANS	1546-05-S-6073
EXHAUST STACK, BREECHING & FANS	1546-05-M-7006
EXHAUST STACK	SECTION 101
SPECIFICATION (NORMAL CONCRETE REF.)	SECTION 4

SINGMASTER & BREYER
METALLURGIST & CHEMICAL ENGINEERS
430 LEXINGTON AVE. NEW YORK 17, N.Y.

FOR

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER
BY [signature] DATE 3-7-61
UNION CARBIDE NUCLEAR COMPANY
BY C.E. WAITERS DATE 3-20-61
U. S. ATOMIC ENERGY COMMISSION
BY L.H. JACKSON DATE 3-22-61

HIGH FLUX ISOTOPE REACTOR

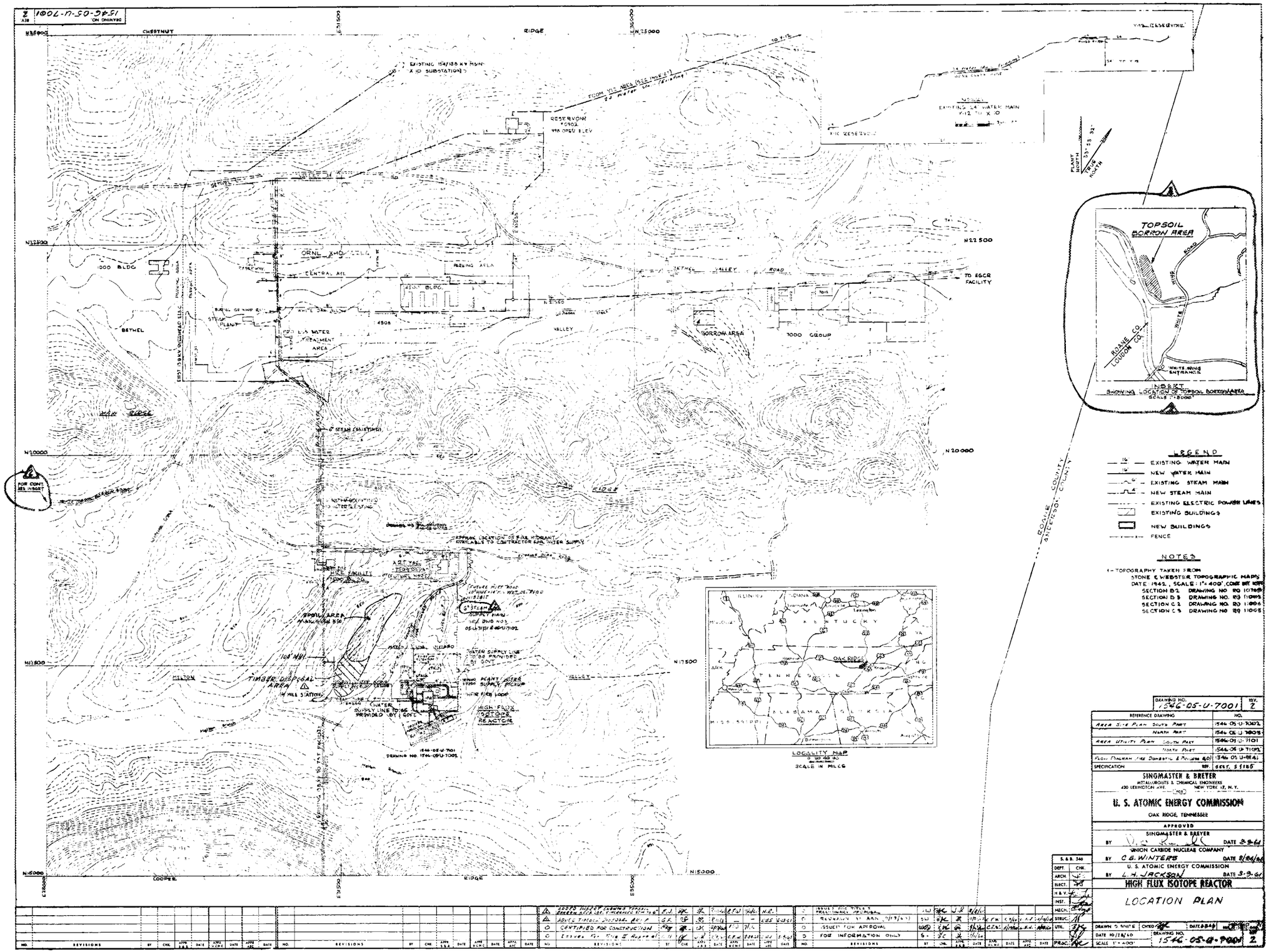
STACK FOUNDATION AND PLATFORM DETAILS

DRAWN N. LEVY	CHKD MLB	DATE 3-10-61
DATE 3-10-61	DRAWING NO. 1546-05-S-6067	REV. 2
SCALE AS NOTED		

NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. U.C.N.C.	DATE	APPR. AEC	DATE
1	PLATFORM & LADDER ADDED	BNB			4-4-61	NR		NR	
0	CERTIFIED FOR CONSTRUCTION	N.L.	MLB		3-20-61				
0	ISSUED FOR TITLE & APPROVAL	N.L.	MLB		3-10-61	CBW	3-20-61	L.H.J.	3-22-61
0	PRELIMINARY ISSUE FOR TITLE & FOUNDATION ANALYSIS	N.L.			2-17-61				
2	REVISED LAND LOCATION AS PER REV. # 16	JR							

S & B. S&B		
DEPT.	CHK.	
ARCH.		
ELECT.		
H & V.		
INST.		
ARCH.		
STRUC.		
UTIL.		

CONTINUED DWG. NO. 1546-05-S-6068 REV. 0



DRAWING NO.	REV.
1546-05-U-7001	2

REFERENCE DRAWING		NO.
AREA SITE PLAN	SOUTH PART	1546-05-U-7002
	NORTH PART	1546-05-U-7003
AREA UTILITY PLAN	SOUTH PART	1546-05-U-7101
	NORTH PART	1546-05-U-7102
FLOW DIAGRAM FIRE DOMESTIC & PROCESS H2O		1546-05-U-9145
SPECIFICATION	REF.	6657, 5118

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER BY DATE 8-9-60
UNION CARBIDE NUCLEAR COMPANY BY C. G. WINTERS DATE 8/24/60
U. S. ATOMIC ENERGY COMMISSION BY L. H. JACKSON DATE 3-9-60

HIGH FLUX ISOTOPE REACTOR

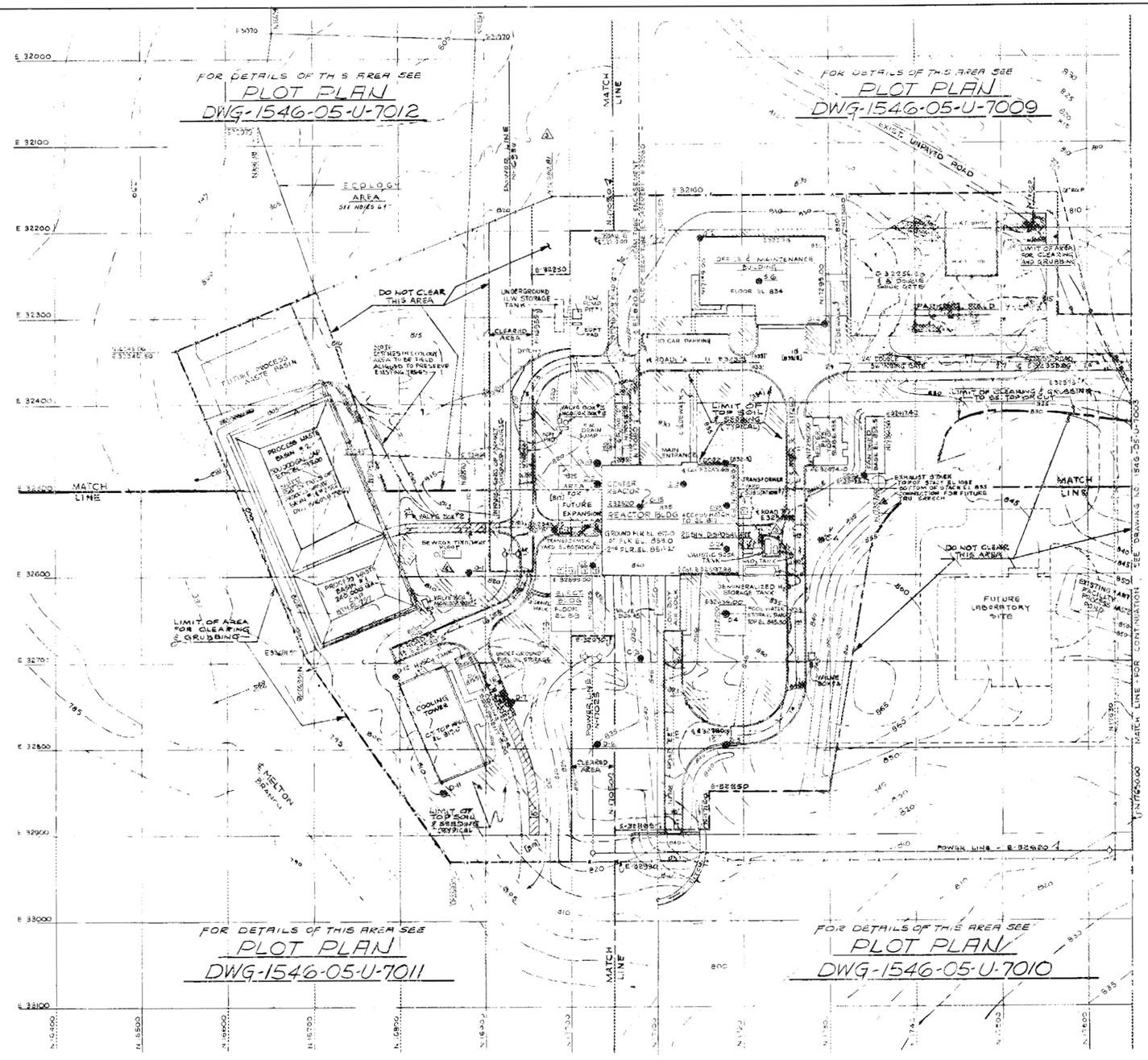
LOCATION PLAN

S. & B. 346	
DEPT.	CHK.
ARCH.	
ELECT.	
H & V.	
INST.	
MECH.	
STRUC.	
UTIL.	
PROC.	

DRAWN D. WHITE CHKD DATE 8-8-60 DRAWING NO. 1546-05-U-7001 REV. 2
DATE 10/28/60
SCALE 1" = 400'

NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. UCNC	DATE	APPR. AEC	DATE
2	ADDED INDEX OF DRAWING TOPSOIL BORROW AREA AND SEE TYPE REVISED SPECS.	E.J.							
1	ADDED TIMBER DISPOSAL AREA	G.F.							
0	CERTIFIED FOR CONSTRUCTION								
0	ISSUED FOR TITLE II REQUIREMENTS								

NO.	REVISIONS	BY	CHK.	APPR. S&B	DATE	APPR. UCNC	DATE	APPR. AEC	DATE
3	ISSUED FOR TITLE I PRELIMINARY PROPOSAL								
2	REVISION TO ARA (11/17/59)								
1	ISSUED FOR APPROVAL								
0	FOR INFORMATION ONLY								



BORING TABULATION

BORING NO.	LOCATION NORTH	LOCATION EAST	DEPTH OF BORING	TOP OF ROCK APPROX ELEV.	TYPE OF BORING
C-1	16980	32548	48.5'	803.7	FISHTAIL & CORE
C-2	17025	32390	71.8'	813.4	FISHTAIL & CORE
C-3	17080	32695	54.2'	811.4	FISHTAIL & CORE
C-4	17290	32540	39.4'	831.0	DRIVE & CORE
C-15	17080	32320	80.0	817.3	DRIVE & CORE
C-23	17150	32510	26.1'	823.1	DENNISON
C-24	17180	32370	31.2'	825.0	DRIVE SAMPLE
DC-19	17030	32470	10.5'	810.5	DRIVE SAMPLE
DC-22	17130	32470	24.1'	820.4	FISHTAIL
DC-26	17340	32485	32.2'	828.7	DRIVE & CORE
D-1	16880	32595	19.5'	799.5	DRIVE SAMPLE
D-2	17050	32495	12.4'	813.2	DRIVE SAMPLE
D-3	17150	32495	10.6'	817.3	DRIVE SAMPLE
D-4	17180	32645	24.3'	824.5	DENNISON
D-5	17180	32795	11.2'	835.2	DRIVE SAMPLE
D-6	17030	32795	17.6'	817.7	DRIVE SAMPLE
D-7	16930	32745	25.4'	802.6	DENNISON
D-11	16850	32850	19.0'	788.9	DRIVE SAMPLE
D-12	16795	32715	21.9'	788.9	DRIVE SAMPLE
S-2	17150	32210	19.5'	809.4	DRIVE SAMPLE
S-4	17295	32310	16.3'	823.8	DRIVE SAMPLE
S-6	17220	32260	25.9'	810.1	DRIVE SAMPLE

LEGEND

- ASPHALT CONC. ROADWAY
- CRUSHED STONE ROADWAY
- EXISTING CONTOUR
- FINISH GRADE CONTOUR
- 7 FT. HIGH CHAIN LINK FENCE
- CHAIN FENCE (3 STRAND)
- 6 INCH ASPHALT CURB
- CONCRETE CAR STOP
- (BIT) SPOT GRADE (FINISH GRADE)
- TRANSFORMER
- EXISTING DITCH
- NEW DITCH
- RIPRAP
- D-12 SOIL BORING
- POWER POLE - EXISTING
- POWER POLE - NEW
- R.C. HEAD WALL
- R.C. ENDWALL
- R.C.P. OR C.M.P. CULVERT
- TOP SOIL & SEEDING AREAS

NOTES:

1. PREVAILING WINDS ARE EAST-WEST IN RELATION TO PLANT NORTH.
2. NEW AND EXISTING CONTOUR INTERVAL 5 FT.
3. FOR STORM DRAINS OTHER THAN CULVERTS REFER TO DWG 1546-05-U-7101.
4. COORDINATES & DIMENSIONS APPLY TO OUTSIDE FACE OF STRUCTURE UNLESS OTHERWISE NOTED.
5. FOR BORING LOG INFORMATION - REFER TO DWG 1546-05-U-7004.
6. ACCESS TO THE ECOLOGY AREA SHALL BE LIMITED TO WORK REQUIRED BY THE CONTRACT.
7. FENCE ALIGNMENT THRU ECOLOGY AREA, AS SHOWN ON DWG. SHALL BE ADJUSTED IN FIELD TO PRESERVE ANY EXISTING TREES.
8. FOR ELEVATIONS & ARRGT. OF STORM SEWER SYSTEMS SEE DWGS 1546-05-U-7113, 15, 16, & 17. FOR DETAILS OF CATCH BASINS AND MANHOLES SEE DWG. 1546-05-U-7126

DRAWING NO. 1546-05-U-7002 REV. 5

REFERENCE DRAWING	NO.
LOCATION PLAN	1546-05-U-7001
AREA SITE PLAN (NORTH PART)	1546-05-U-7003
AREA UTILITY PLAN - SOUTH PART	1546-05-U-7101
BORING LOGS	1546-05-U-7004
SPECIFICATION	NO. 5, 104, 105, 106

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N. Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER BY C. C. [illegible] DATE 3-26-61
UNION CARBIDE NUCLEAR COMPANY BY C. E. WINTERS DATE 3-29-61
U. S. ATOMIC ENERGY COMMISSION BY G. H. JACKSON DATE 4-13-61

HIGH FLUX ISOTOPE REACTOR

AREA SITE PLAN
SOUTH PART

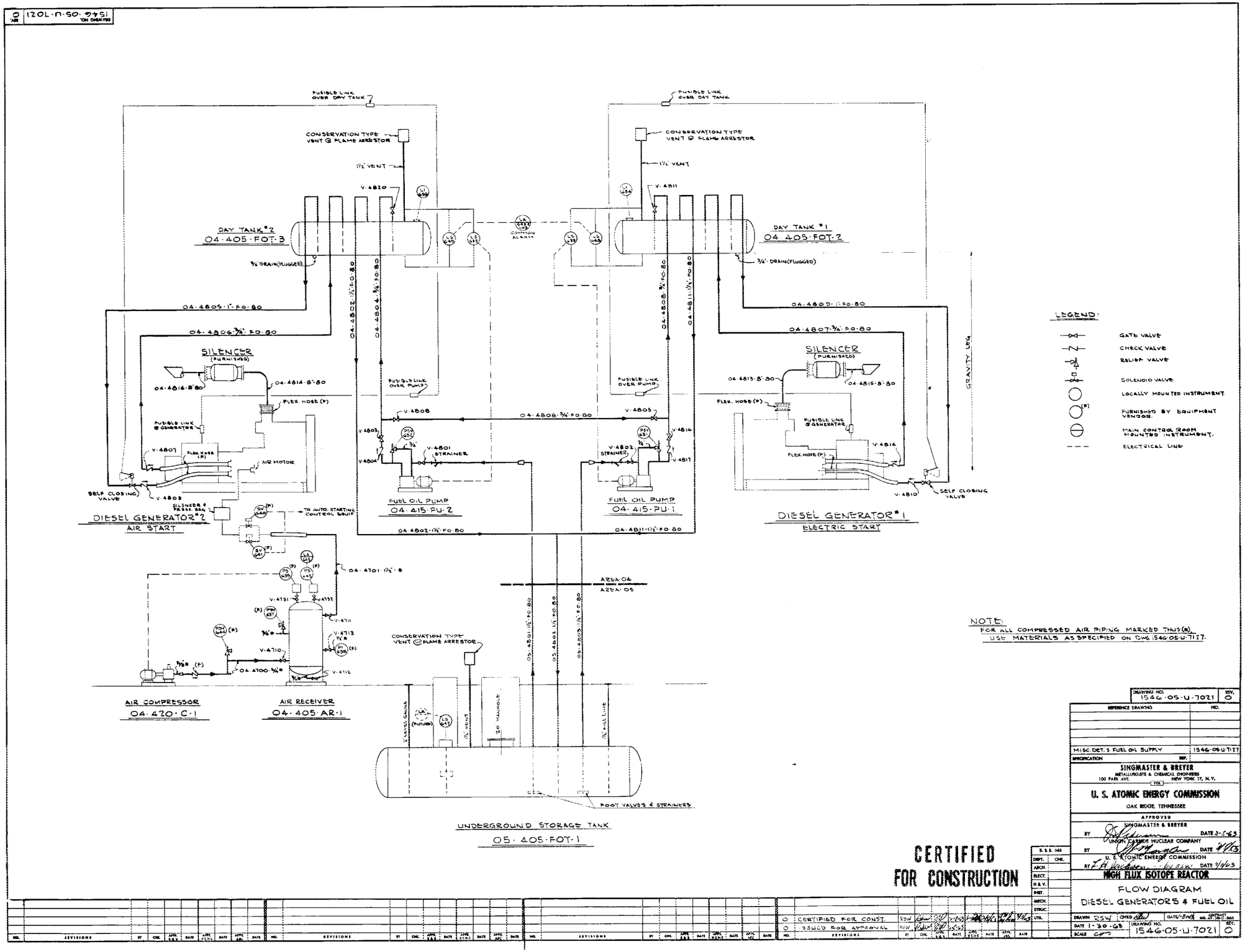
DRAWN: W.D. CHKD. [illegible] DATE 2/7/61 NO. 22-1011-1 SUBM.
DATE 7/29/60 DRAWING NO. 1546-05-U-7002 REV. 5
SCALE 1" = 50'

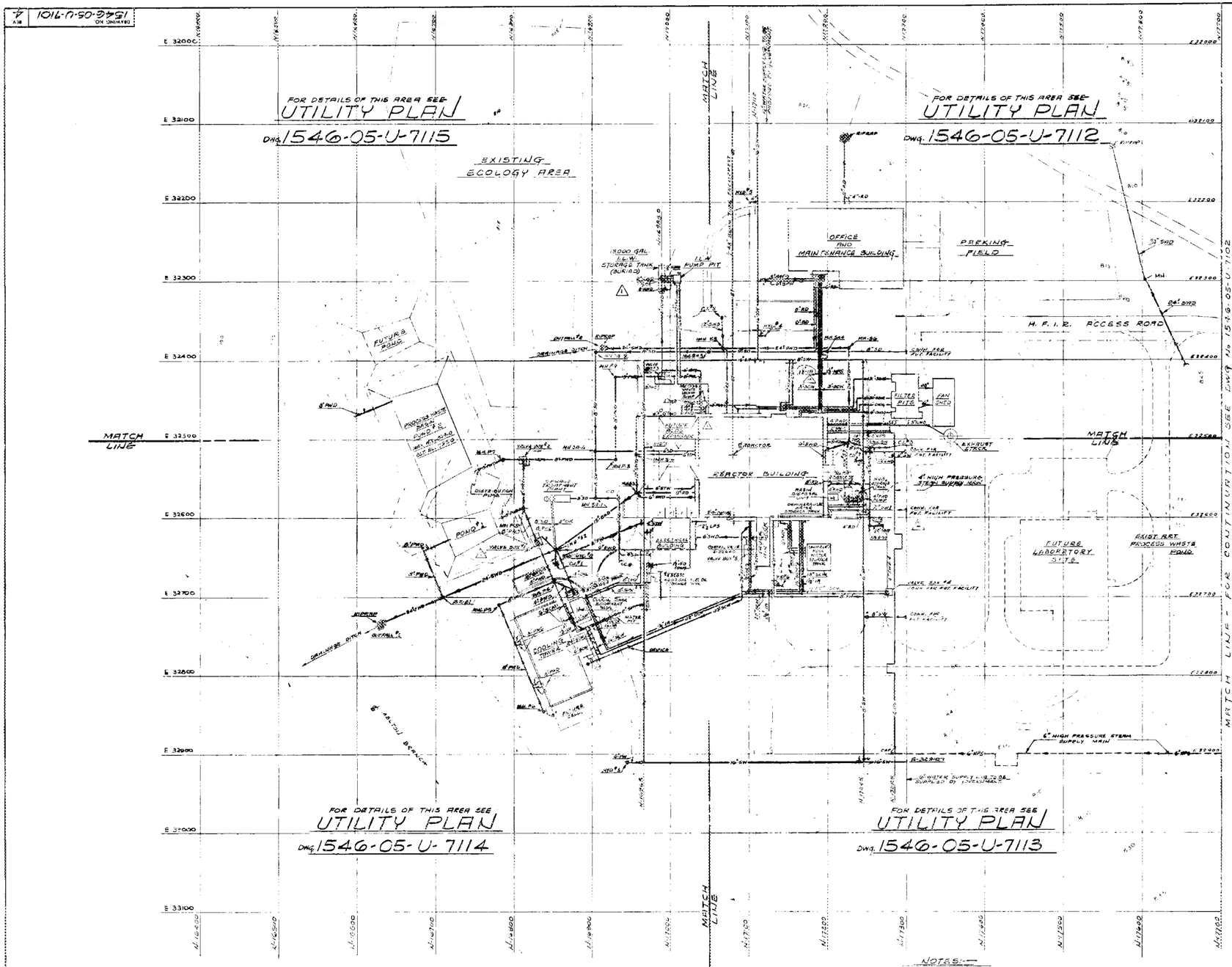
CERTIFIED FOR CONSTRUCTION

NO.	REVISIONS	BY	CHK.	APPR.	DATE	APPR.	DATE	APPR.	DATE
4	REVISED BORING HOLES AS MEASURED. ADD NEW BORING HOLES. REVISED LOCATION OF MOVED TENT TRAILS. ADDED EXISTING PROCESS FIELD.	H.A.	WD						
3	REVISED FENCE COORDINATES (2000) REPRINT AC BASE DRAWING PRT.								
2	REVISED POWER LINES AND CLEARING AND GRUBBING LIMITS.	GP	RF						
1	CERTIFIED FOR CONSTRUCTION								
0	ISSUED TO TITLE & APPROVAL								

NO.	REVISIONS	BY	CHK.	APPR.	DATE	APPR.	DATE	APPR.	DATE
0	ISSUED FOR INFORMATION								
0	ISSUED FOR INFORMATION ONLY								

E.S.S. 546		
DIRT.	CHK.	
ARCH.		
ELECT.		
H & V.		
PIPE.		
MECH.		
STRUC.		
UTIL.		
DOC.		


DAY TANK #2
04-405-FOT-3
DAY TANK #1
04-405-FOT-2
CONSERVATION TYPE VENT @ FLAME ARRESTOR
FUSIBLE LINK OVER DAY TANK
1½" VENT
V-4820
V-4811
COMMON ALARM
3/4" DRAIN (PLUGGED)
04-4805-1"-FO-80
04-4806-3/4"-FO-80
04-4802-1½"-FO-80
04-4804-3/4"-FO-80
04-4808-3/4"-FO-80
04-4809-1"-FO-80
04-4807-3/4"-FO-80
04-4811-1½"-FO-80
SILENCER (FURNISHED)
04-4816-8"-80
04-4814-8"-80
04-4813-8"-80
04-4815-8"-80
FLEX. HOSE (P)
FUSIBLE LINK @ GENERATOR
FUSIBLE LINK OVER PUMPS
V-4808
V-4805
V-4803
V-4804
V-4816
V-4817
V-4801 STRAINER
V-4802 STRAINER
V-4807
V-4814
V-4809
V-4810
AIR MOTOR
SELF CLOSING VALVE
SILENCER & PRESS. REG.
TO AUTO. STARTING CONTROL SYSTEM
FUEL OIL PUMP
04-415-PU-2
FUEL OIL PUMP
04-415-PU-1
DIESEL GENERATOR #2
AIR START
DIESEL GENERATOR #1
ELECTRIC START
GRAVITY LEG
04-4802-1½"-FO-80
04-4701-1½"-8
V-4731
V-4732
V-4711
V-4713
V-4710
V-4712
04-4700-3/4"-8
AIR COMPRESSOR
04-420-C-1
AIR RECEIVER
04-405-AR-1
AREA 04
AREA 05
05-4801-1½"-FO-80
05-4802-1½"-FO-80
05-4803-1½"-FO-80
CONSERVATION TYPE VENT @ FLAME ARRESTOR
½" LEVEL GAUGE
(FUTURE)
1½" VENT
20" MANHOLE
½" FILL LINE
FOOT VALVES & STRAINERS
UNDERGROUND STORAGE TANK
05-405-FOT-1
LEGEND:
GATE VALVE
CHECK VALVE
RELIEF VALVE
SOLENOID VALVE
LOCALLY MOUNTED INSTRUMENT
FURNISHED BY EQUIPMENT VENDOR.
MAIN CONTROL ROOM MOUNTED INSTRUMENT.
ELECTRICAL LINE
NOTE:
FOR ALL COMPRESSED AIR PIPING MARKED THUS (*)
USE MATERIALS AS SPECIFIED ON DWG. 1546-05-U-7127.
CERTIFIED FOR CONSTRUCTION
DRAWING NO. 1546-05-U-7021 REV. 0
REFERENCE DRAWING NO.
MISC. DET.'S FUEL OIL SUPPLY 1546-05-U-7127
SPECIFICATION REV.
SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
100 PARK AVE. NEW YORK 17, N.Y.
FOR
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
APPROVED
SINGMASTER & BREYER
BY DATE 3-5-63
UNION CARBIDE NUCLEAR COMPANY
BY DATE 4/1/63
U. S. ATOMIC ENERGY COMMISSION
BY DATE 3/4/63
HIGH FLUX ISOTOPE REACTOR
FLOW DIAGRAM
DIESEL GENERATORS & FUEL OIL
DRAWN RSW CHKD DATE 1-30-63
DATE 1-30-63 DRAWING NO. 1546-05-U-7021 REV. 0
SCALE
0 CERTIFIED FOR CONST. RSW
0 ISSUED FOR APPROVAL RSW
REVISIONS
S. & B. 343
DEPT. CHK.
ARCH.
ELECT.
H & V.
INST.
MECH.
STRUC.
UTIL.



LEGEND

SERVICE DESIGNATION	SPEC. SECTION	SERVICE
SCW	66	SECONDARY COOLANT WATER
PCW	71	POOL COOLANT WATER
PRCW	64	REACTOR PRIMARY COOLANT WATER
PW	69	PROCESS WATER
FW	70	FIRE WATER
SW	69	POTABLE WATER
SPW	70	SPRINKLER WATER
STW	70	STANDPIPE WATER
HPS	73	HIGH PRESSURE STEAM
MPS	73	MEDIUM PRESSURE STEAM
LPS	73	LOW PRESSURE STEAM
SD	76	SANITARY DRAIN
SWD	77	STORM WATER DRAIN
RD	77	ROOF DRAIN
PWD	75	PROCESS WASTE DRAIN
IWD	61	INTERMEDIATE LEVEL WASTE DRAIN
IA	79	INSTRUMENT AIR
OHG	66	OPEN HOT GAS
CHG	68	CLOSED HOT GAS
SDHC	61	SPECIAL BUILDING HOT DRAINAGE
FO	80	FUEL OIL
CHL	76	CHLORINE & HYPOCHLORITE
BT	77	BEAM TUBE ENCASEMENT
DW	68	DEMINERALIZED WATER
SA	81	SULFURIC ACID
SH	81	CAUSTIC SODA
CP	81	TRISODIUM PHOSPHATE

- UNDERGROUND PIPE LINE.
- ABOVE GROUND PIPE LINE.
- GATE VALVE WITH VALVE BOX.
- GATE VALVE WITH INDICATOR POST
- MANHOLE
- I.MH INLET MANHOLE
- C.I. CURB INLET
- HYDRANT
- RADIOACTIVITY MONITOR
- ANCHOR
- 960 EXISTING CONTOURS
- REDUCER
- BT BEAM TUBE ENCASEMENT
- MOV MOTOR OPERATED VALVE.
- CORPORATION COCK

NOTES:—

1 — MATCH LINES FOR YARD PIPING TAKEN AT 5'-0" FROM OUTSIDE BUILDING.
2 — FOR SITE GRADING, DRAINAGE DITCHES AND CULVERTS SEE DWG No 1546-05-U-7002.
3 — FOR DETAILS OF POST INDICATOR VALVES SEE DET 'C' DWG 1546-05-U-7128.
4 — CONTOURS SHOWN REPRESENT EXISTING GROUND.

CERTIFIED FOR CONSTRUCTION

REFERENCE DRAWING	NO.
AREA UTILITY PLAN - NORTH PART	1546-05-U-7106
AREA SITE PLAN - SOUTH PART	1546-05-U-7002
UTILITY PROFILES - STEAM DISTRIBUTION	1546-05-U-7116
UTILITY PLAN - YARD PIPING	1546-05-U-7115
UTILITY PLAN - YARD PIPING	1546-05-U-7114
UTILITY PLAN - YARD PIPING	1546-05-U-7113
UTILITY PLAN - YARD PIPING	1546-05-U-7112

DRAWING NO. 1546-05-U-7101 REV. 4

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N. Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER
BY [signature] DATE 4-20-61
UNION CARBIDE NUCLEAR COMPANY
BY C. E. WINTERS DATE 5-9-61
U. S. ATOMIC ENERGY COMMISSION
BY L. H. JACKSON DATE 5-18-61

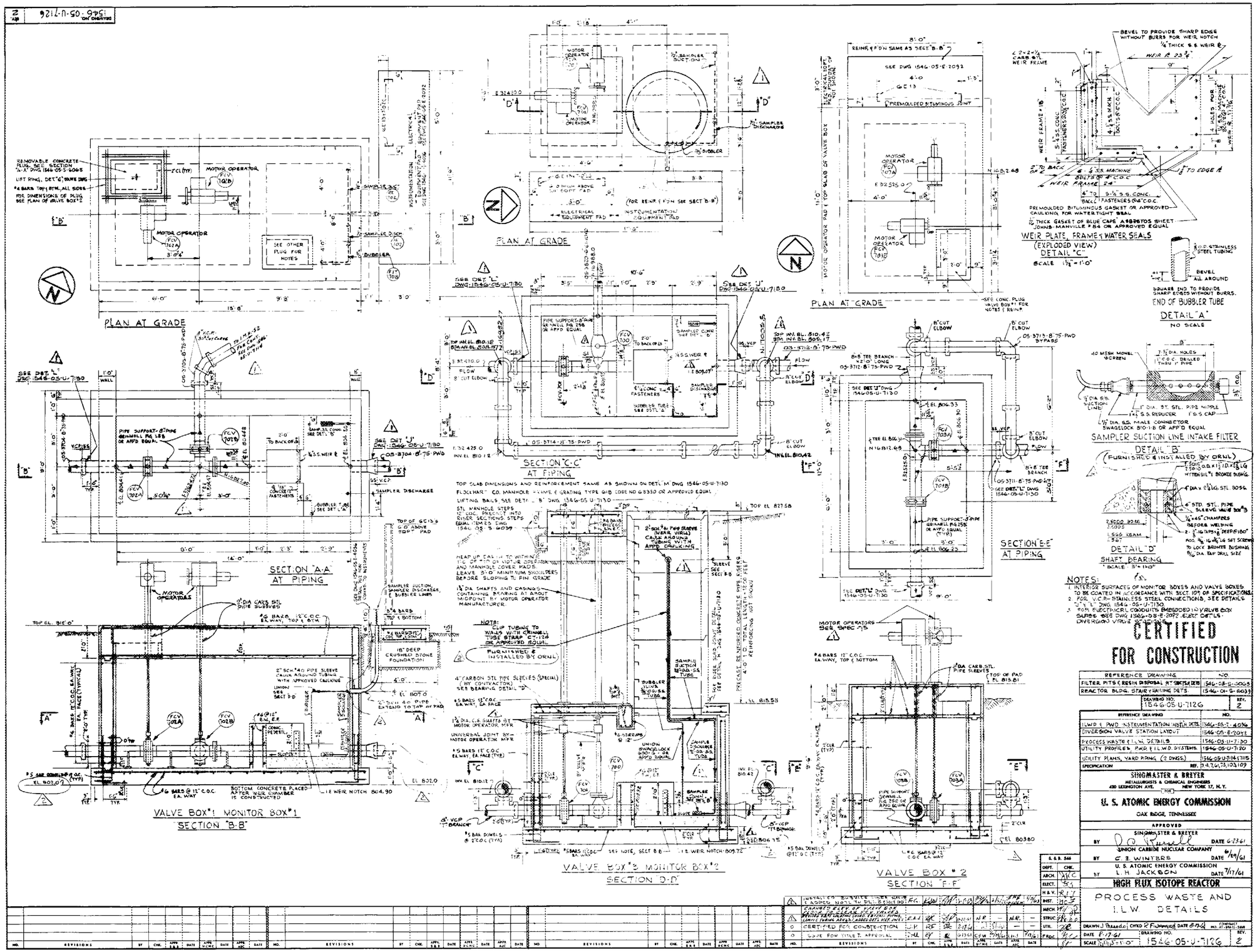
S. & B. 546
DEPT. CHK.
ARCH. [signature]
ELECT. [signature]
H & V. [signature]
INST. [signature]
MECH. [signature]
STRUC. [signature]
UTIL. [signature]

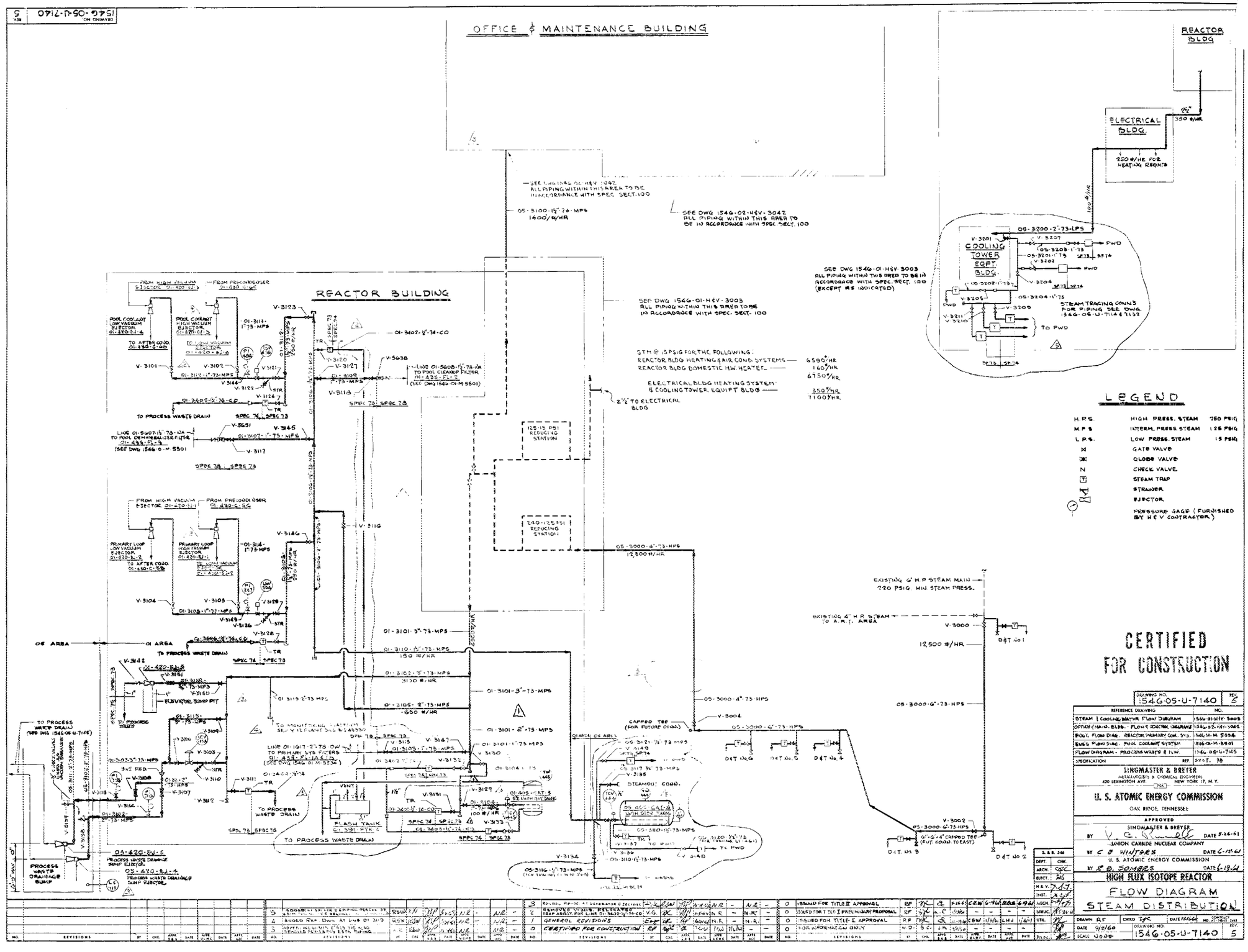
HIGH FLUX ISOTOPE REACTOR

AREA UTILITY PLAN
SOUTH PART

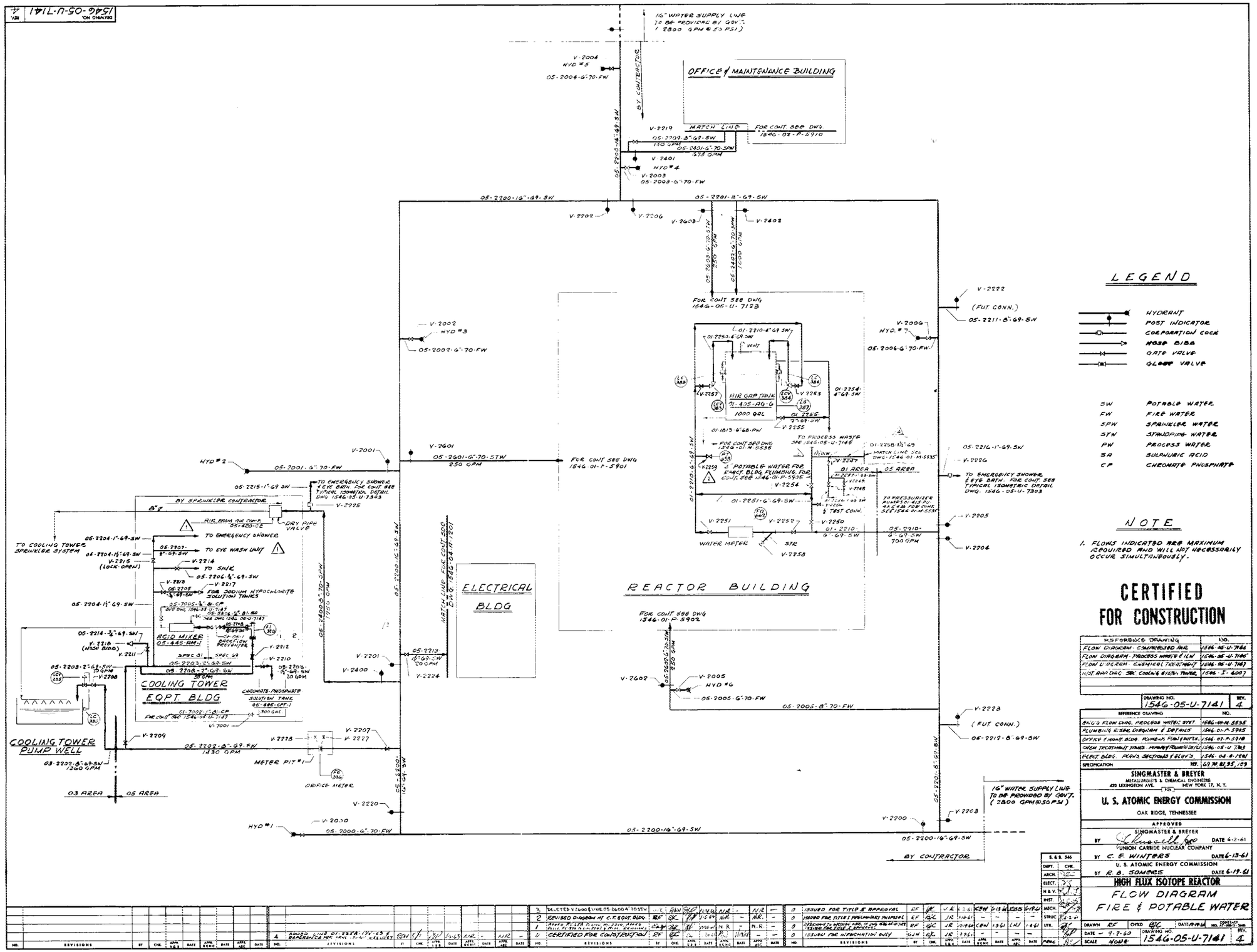
DRAWN FM DATE 12/20/60 CHKD DATE 12/20/60 NO. CONTRACT 3605
DATE July 25, 1960 DRAWING NO. 1546-05-U-7101 REV. 4
SCALE 1" = 50'

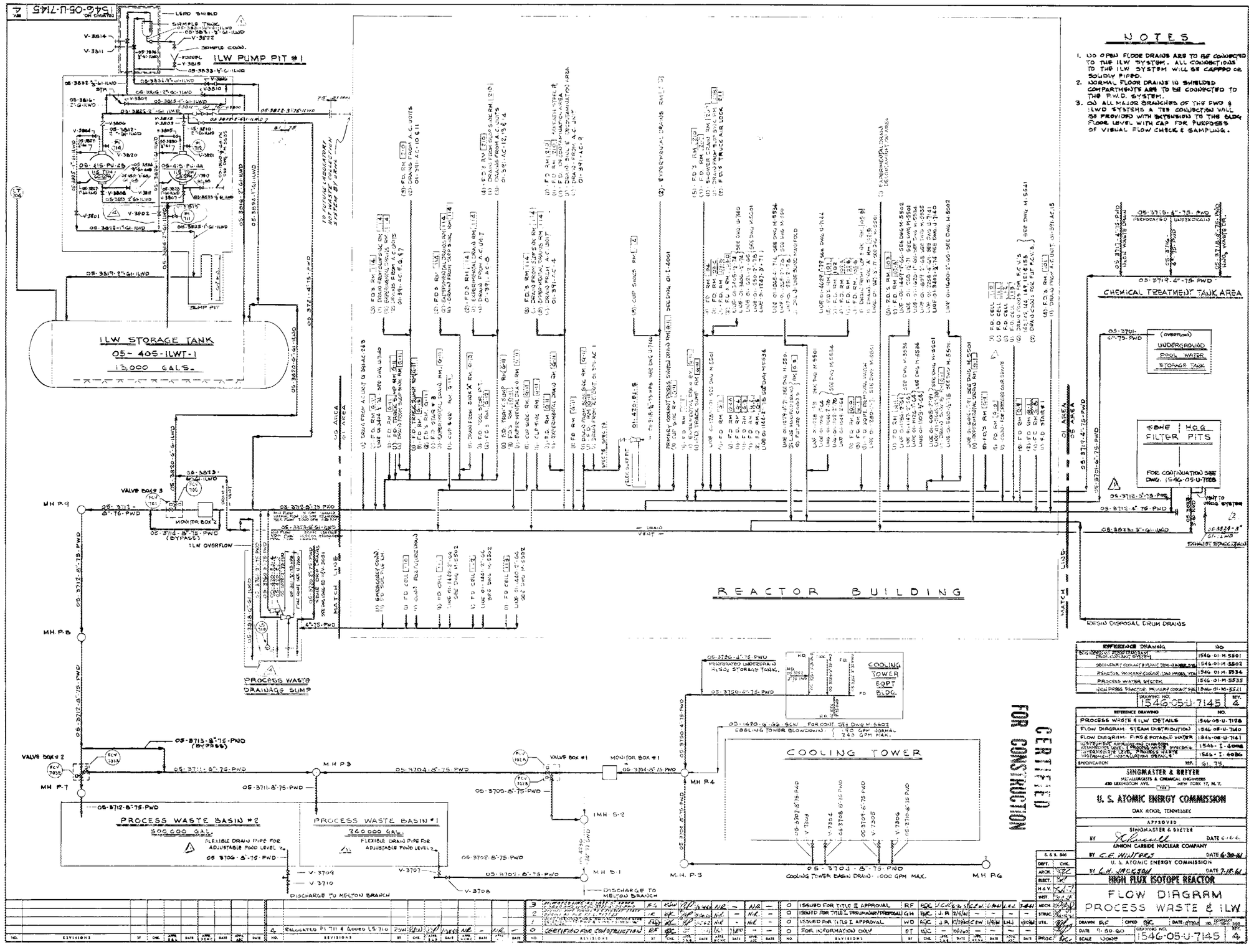
NO.	REVISIONS	BY	CHK.	APPR. S.&B.	DATE	APPR. BUREAU	DATE	APPR. AEC	DATE
4	CHANGED 1½"-IA TO 1½"-IA	RG	[signature]	[signature]	4-5-63	[signature]	[signature]	[signature]	[signature]
3	REVISED PER CHANGE 1 PERMIT CHANGE	BPF	BF	[signature]	[signature]	[signature]	[signature]	[signature]	[signature]
2	REVISED PER CH 1 & 2 & 3 TO MEET JUNE 1961 REVISED PROPOSED CONDITIONS	RLC	[signature]	[signature]	[signature]	[signature]	NR	—	NR
1	CONTROL CONDITIONS, VALVE BOX #3 AND SEAL, REVISED	[signature]	[signature]	[signature]	[signature]	[signature]	N.R.	—	N.R.
0	CERTIFIED FOR CONSTRUCTION	J.P.	[signature]	[signature]	[signature]	[signature]	[signature]	—	—
0	ISSUED FOR TITLE II APPROVAL	[signature]	[signature]	[signature]	[signature]	[signature]	[signature]	[signature]	[signature]
0	Issued for First Preliminary Present	G.T.H.	[signature]	[signature]	[signature]	—	—	—	—
0	Revised in accordance with AAN Bldgs. & AAN 58 & 59 Data Sheets	[signature]	[signature]	[signature]	[signature]	[signature]	[signature]	[signature]	[signature]
0	For Information Only	[signature]	[signature]	[signature]	[signature]	[signature]	[signature]	[signature]	[signature]

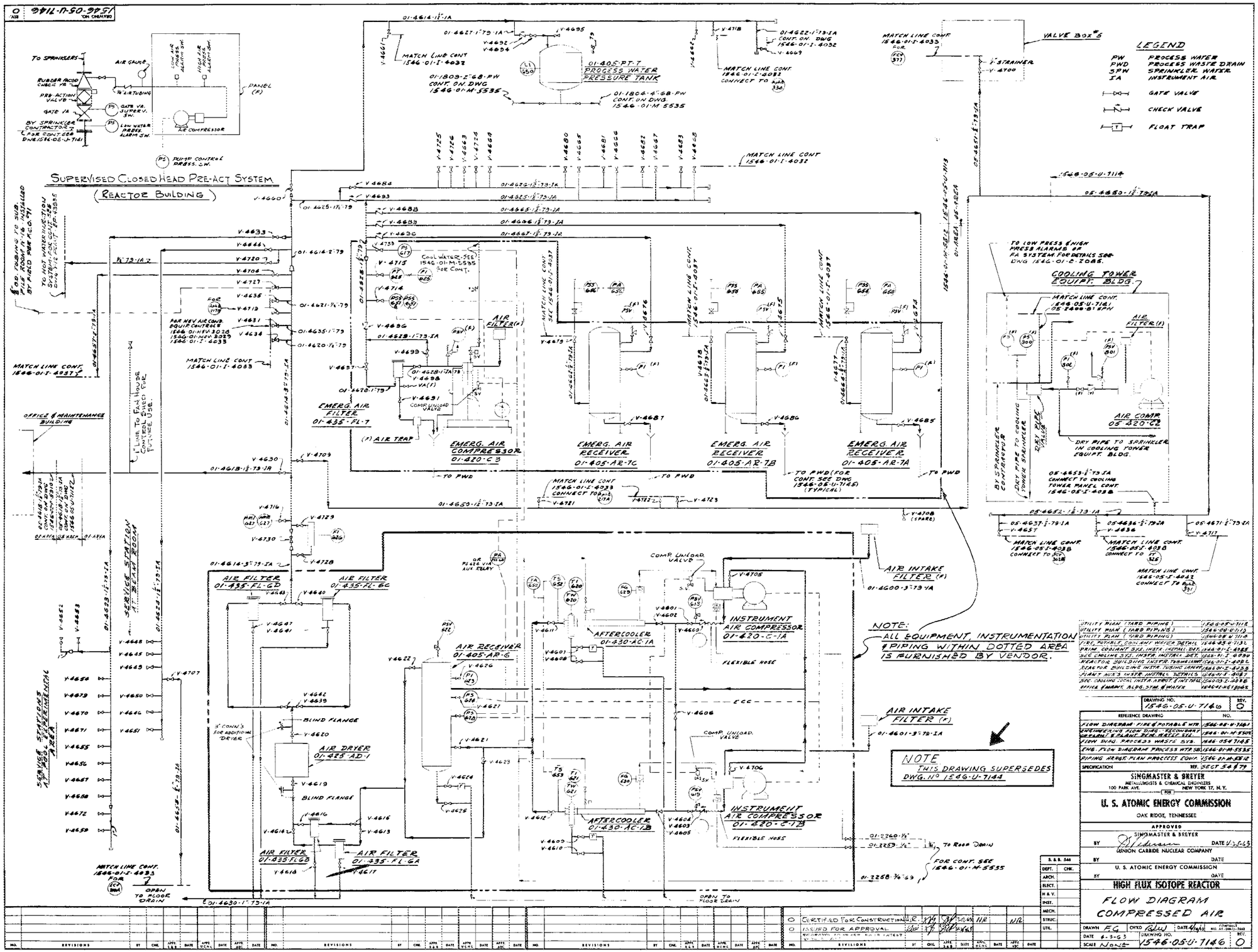

PLAN AT GRADE
SECTION "A-A" AT PIPING
VALVE BOX #1 MONITOR BOX #1
SECTION "B-B"
SECTION "C-C" AT PIPING
VALVE BOX #3 MONITOR BOX #2
SECTION "D-D"
SECTION "E-E" AT PIPING
VALVE BOX #2
SECTION "F-F"
WEIR PLATE, FRAME & WATER SEALS (EXPLODED VIEW) DETAIL "C"
SCALE 1½" = 1'-0"
END OF BUBBLER TUBE
DETAIL "A"
NO SCALE
SAMPLER SUCTION LINE INTAKE FILTER
DETAIL "B"
DETAIL "D"
SHAFT BEARING
SCALE 3" = 1'-0"
NOTES:
1. INTERIOR SURFACES OF MONITOR BOXES AND VALVE BOXES TO BE COATED IN ACCORDANCE WITH SECT. 109 OF SPECIFICATIONS.
2. FOR V.C.P.-STAINLESS STEEL CONNECTIONS, SEE DETAILS "L" & "J" DWG 1546-05-U-7130.
3. FOR ELECTRICAL CONDUITS EMBEDDED IN VALVE BOX SURFACE, SEE DWG 1546-05-E-2092, ELEC. DETS. & DIVERSION VALVE STATION LAYOUT.
CERTIFIED FOR CONSTRUCTION
REFERENCE DRAWING NO
FILTER PITS & RESIN DISPOSAL MT SKETS & DETS 1546-05-S-5003
REACTOR BLDG. STAIR & RAILING DETS. 1546-05-S-6033
DRAWING NO. 1546-05-U-7126 REV. 2
REFERENCE DRAWING NO.
I.W.D. & P.W.D. INSTRUMENTATION INSTN. DETS. 1546-05-I-4036
DIVERSION VALVE STATION LAYOUT 1546-05-E-2041
PROCESS WASTE & I.L.W. DETAILS 1546-05-U-7130
UTILITY PROFILES, P.W.D. & I.L.W.D. SYSTEMS 1546-05-U-7120
UTILITY PLANS, YARD PIPING (2 DWGS.) 1546-05-U-7114 & 7115
SPECIFICATION REF. 3, 4, 7, 61, 75, 103, 109
SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.
FOR
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
APPROVED
SINGMASTER & BREYER BY DATE 6-23-61
UNION CARBIDE NUCLEAR COMPANY BY C. E. WINTERS DATE 6/29/61
U. S. ATOMIC ENERGY COMMISSION BY L. H. JACKSON DATE 7/17/61
HIGH FLUX ISOTOPE REACTOR
PROCESS WASTE AND I.L.W. DETAILS
DRAWN J. Pizzardo CHKD F. Fitzpatrick DATE 5-17-61
DATE 5-17-61
SCALE 1/4" = 1'-0"
DRAWING NO. 1546-05-U-7126
REV. 2
REVISIONS
2 ISSUED FOR CONSTRUCTION
1 ISSUED FOR APPROVAL
0 CERTIFIED FOR CONSTRUCTION
0 ISSUE FOR TITLE I APPROVAL

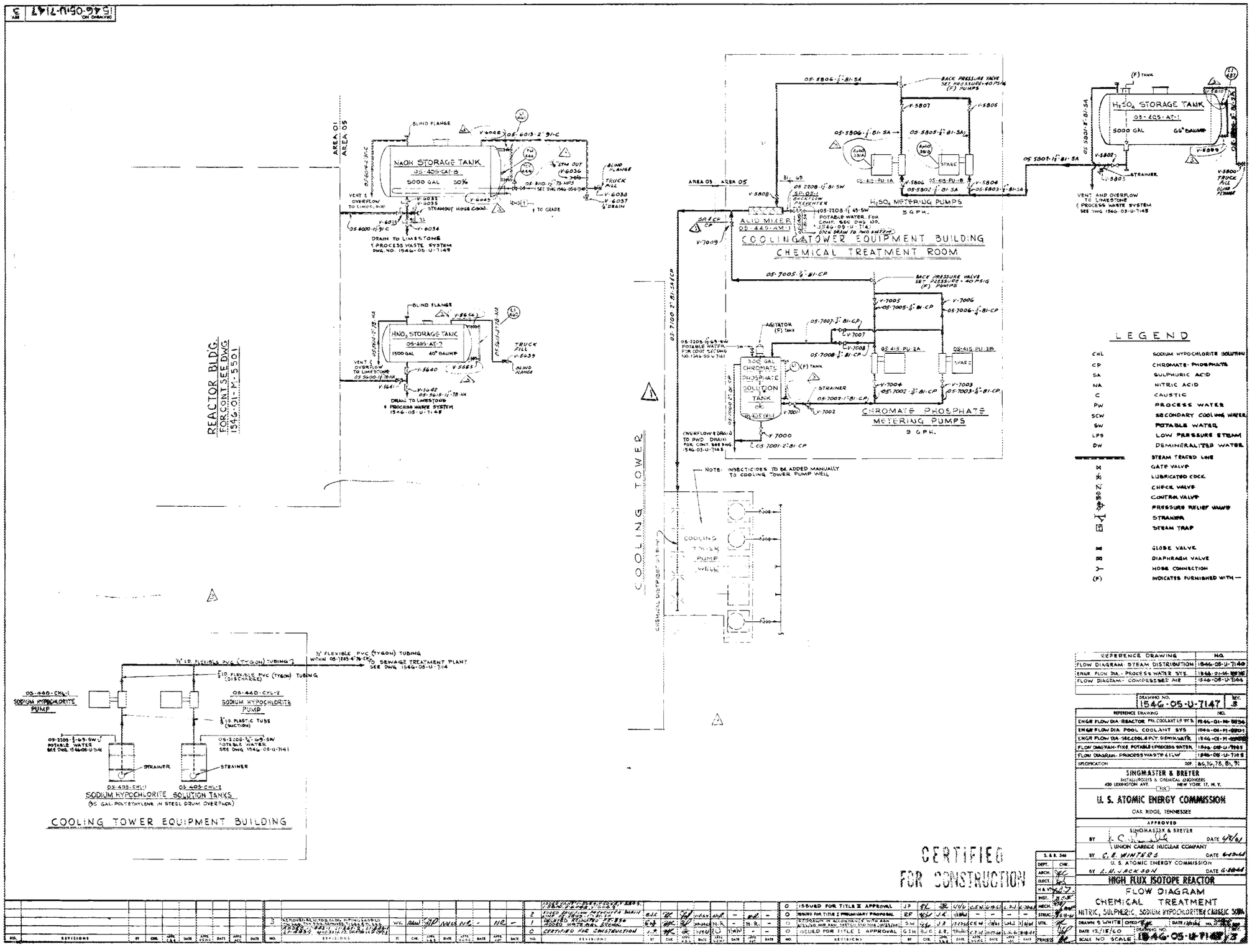

OFFICE & MAINTENANCE BUILDING
REACTOR BUILDING
REACTOR BLDG
ELECTRICAL BLDG.
COOLING TOWER EQPT. BLDG.
LEGEND
H.P.S. HIGH PRESS. STEAM 750 PSIG
M.P.S. INTERM. PRESS. STEAM 125 PSIG
L.P.S. LOW PRESS. STEAM 15 PSIG
GATE VALVE
GLOBE VALVE
CHECK VALVE
STEAM TRAP
STRAINER
EJECTOR
PRESSURE GAGE (FURNISHED BY H & V CONTRACTOR)
CERTIFIED FOR CONSTRUCTION
DRAWING NO. 1546-05-U-7140 REV 5
REFERENCE DRAWING NO.
STEAM & COOLING WATER FLOW DIAGRAM 1546-01-H&V-3003
OFFICE (H&V) BLDG. - FLOW & CONTROL DIAGRAM 1546-02-H&V-3042
BLDG. FLOW DIAG. - REACTOR (PRIMARY COM. SYS.) 1546-01-M-5556
BLDG. FLOW DIAG. - POOL COOLANT SYSTEM 1546-01-M-5551
FLOW DIAGRAM - PROCESS WASTE & H.W. 1546-05-U-7145
SPECIFICATION REF. SPEC. 78
SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
APPROVED
SINGMASTER & BREYER
UNION CARBIDE NUCLEAR COMPANY
U. S. ATOMIC ENERGY COMMISSION
HIGH FLUX ISOTOPE REACTOR
FLOW DIAGRAM
STEAM DISTRIBUTION
DRAWN R.F.
DATE 9/8/60
SCALE NONE
1546-05-U-7140
REVISIONS
ISSUED FOR TITLE II APPROVAL
ISSUED FOR TITLE I PRELIMINARY PROPOSAL
ISSUED FOR TITLE I APPROVAL
FOR INFORMATION ONLY
GENERAL REVISIONS
CERTIFIED FOR CONSTRUCTION

DRAWING NO. 1546-05-U-7141 REV. 4




ILW PUMP PIT #1
ILW STORAGE TANK
05-405-ILWT-1
13,000 GALS.
REACTOR BUILDING
PROCESS WASTE DRAINAGE SUMP
PROCESS WASTE BASIN #2
500,000 GAL.
PROCESS WASTE BASIN #1
260,000 GAL.
COOLING TOWER
COOLING TOWER EQPT BLDG.
CHEMICAL TREATMENT TANK AREA
UNDERGROUND POOL WATER STORAGE TANK
H.O.G. FILTER PITS
RESIN DISPOSAL DRUM DRAINS
DISCHARGE TO MELTON BRANCH
NOTES
1. NO OPEN FLOOR DRAINS ARE TO BE CONNECTED TO THE ILW SYSTEM. ALL CONNECTIONS TO THE ILW SYSTEM WILL BE CAPPED OR SOLIDLY PIPED.
2. NORMAL FLOOR DRAINS IN SHIELDED COMPARTMENTS ARE TO BE CONNECTED TO THE P.W.D. SYSTEM.
3. ON ALL MAJOR BRANCHES OF THE PWD & ILWD SYSTEMS A TEE CONNECTION WILL BE PROVIDED WITH EXTENSIONS TO THE BLDG FLOOR LEVEL WITH CAP FOR PURPOSES OF VISUAL FLOW CHECK & SAMPLING.
CERTIFIED FOR CONSTRUCTION
SINGMASTER & BREYER
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
UNION CARBIDE NUCLEAR COMPANY
HIGH FLUX ISOTOPE REACTOR
FLOW DIAGRAM
PROCESS WASTE & ILW
DRAWING NO. 1546-05-U-7145
REV. 4


SUPERVISED CLOSED HEAD PRE-ACT SYSTEM
(REACTOR BUILDING)
LEGEND
PW PROCESS WATER
PWD PROCESS WATER DRAIN
SPW SPRINKLER WATER
IA INSTRUMENT AIR
GATE VALVE
CHECK VALVE
FLOAT TRAP
01-405-PT-7
PROCESS WATER PRESSURE TANK
EMERG. AIR FILTER 01-435-FL-7
EMERG. AIR COMPRESSOR 01-420-C-3
EMERG. AIR RECEIVER 01-405-AR-7C
EMERG. AIR RECEIVER 01-405-AR-7B
EMERG. AIR RECEIVER 01-405-AR-7A
COOLING TOWER EQUIP. BLDG.
AIR COMP. 05-420-C-2
VALVE BOX #5
AIR INTAKE FILTER (F)
INSTRUMENT AIR COMPRESSOR 01-420-C-1A
INSTRUMENT AIR COMPRESSOR 01-420-C-1B
AFTERCOOLER 01-430-AC-1A
AFTERCOOLER 01-430-AC-1B
AIR RECEIVER 01-405-AR-6
AIR DRYER 01-425-AD-1
AIR FILTER 01-435-FL-6D
AIR FILTER 01-435-FL-6C
AIR FILTER 01-435-FL-6B
AIR FILTER 01-435-FL-6A
SERVICE STATION AT BEAM ROOM
SERVICE STATIONS AT POOL EXPERIMENTAL AREA
OFFICE & MAINTENANCE BUILDING
NOTE: ALL EQUIPMENT, INSTRUMENTATION & PIPING WITHIN DOTTED AREA IS FURNISHED BY VENDOR.
NOTE THIS DRAWING SUPERSEDES DWG. No 1546-U-7143
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
SINGMASTER & BREYER
UNION CARBIDE NUCLEAR COMPANY
HIGH FLUX ISOTOPE REACTOR
FLOW DIAGRAM COMPRESSED AIR
DRAWING NO. 1546-05-U-7146
SCALE None



REFERENCE DRAWING	NO.
FLOW DIAGRAM - STEAM DISTRIBUTION	1546-05-U-7140
ENGR FLOW DIA. - PROCESS WATER SYS.	1546-01-M-[illegible]
FLOW DIAGRAM - COMPRESSED AIR	1546-05-U-7144

DRAWING NO. 1546-05-U-7147 REV. 3

REFERENCE DRAWING	NO.
ENGR FLOW DIA - REACTOR PRI. COOLANT LP SYS.	1546-01-M-[illegible]
ENGR FLOW DIA POOL COOLANT SYS	1546-01-M-[illegible]
ENGR FLOW DIA - SEC. COOL & PLT. DEMIN. WATER	1546-01-M-[illegible]
FLOW DIAGRAM - FIRE, POTABLE & PROCESS WATER	1546-05-U-7141
FLOW DIAGRAM - PROCESS WASTE & LW	1546-05-U-7148
SPECIFICATION	REF. 86, 76, 78, 81, 91

SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.

U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE

APPROVED
SINGMASTER & BREYER BY [illegible] DATE 6/8/61
UNION CARBIDE NUCLEAR COMPANY BY C. E. WINTERS DATE 6-13-61
U. S. ATOMIC ENERGY COMMISSION BY L. M. JACKSON DATE 6-20-61

CERTIFIED FOR CONSTRUCTION

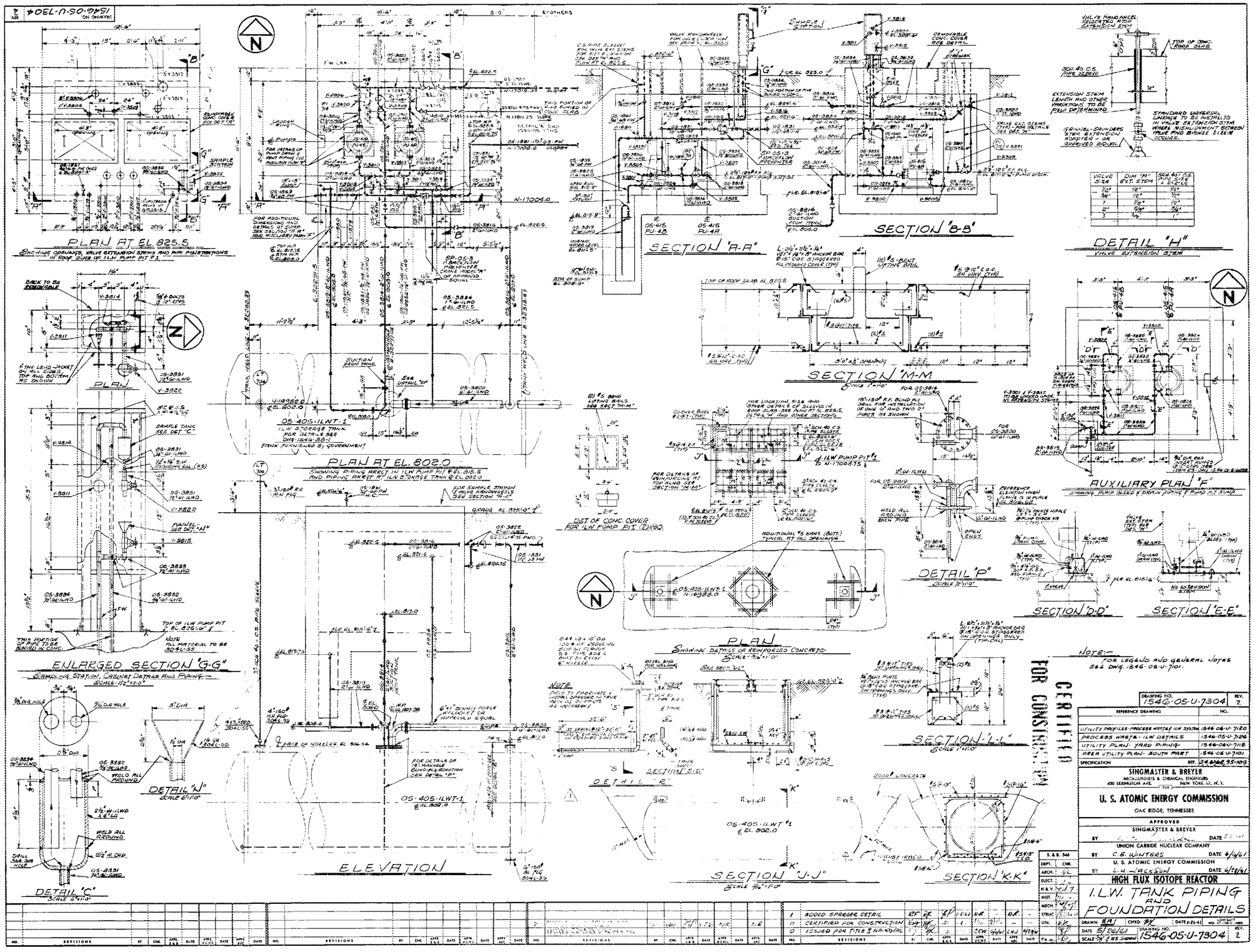
HIGH FLUX ISOTOPE REACTOR
FLOW DIAGRAM
CHEMICAL TREATMENT
NITRIC, SULPHURIC, SODIUM HYPOCHLORITE CAUSTIC SODA

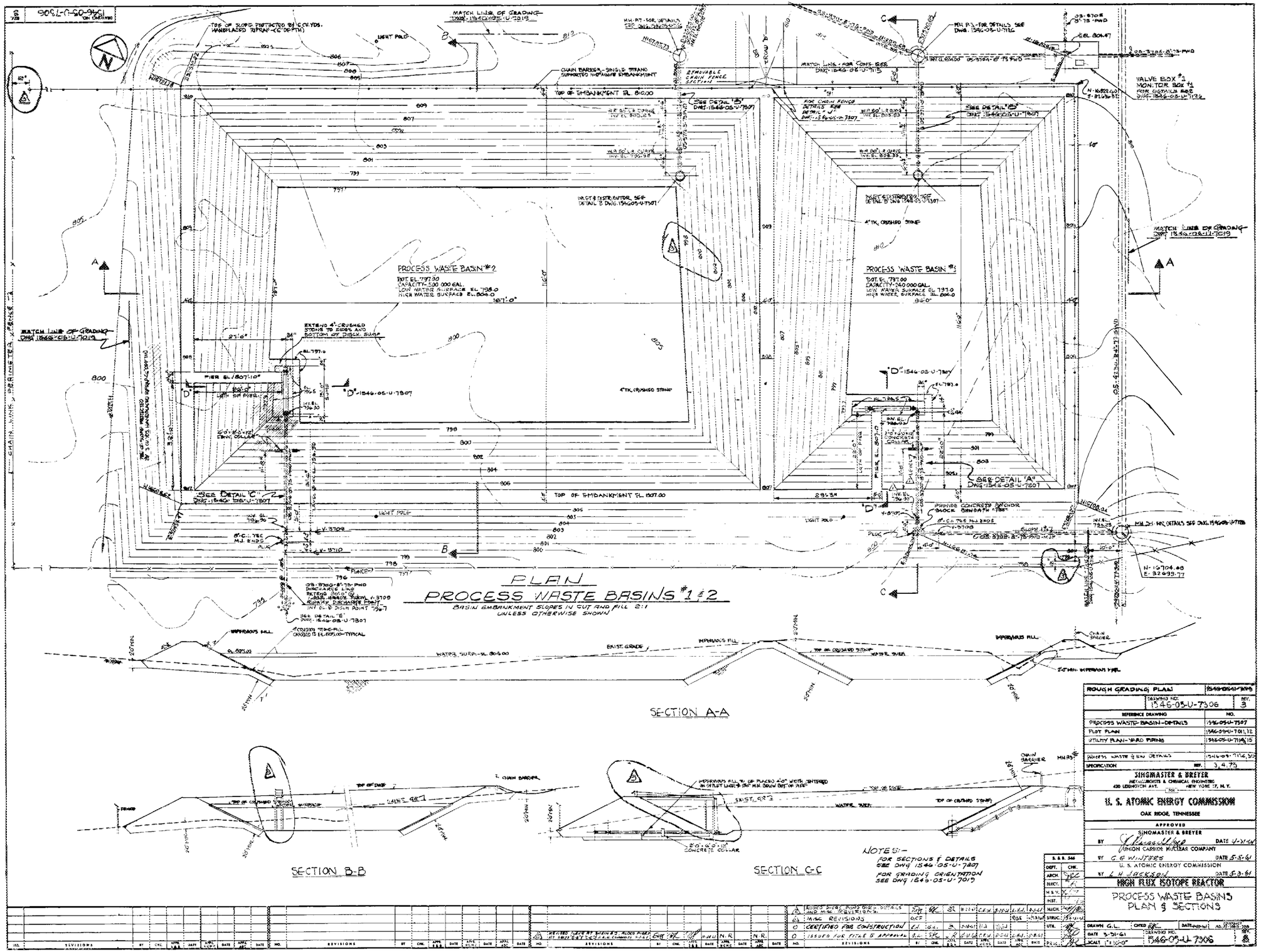
DRAWN S. WHITE CHKD. [illegible] DATE 1/29/61 DRAWING NO. 1546-05-U-7147 REV. 3
DATE 12/16/60 SCALE NO SCALE

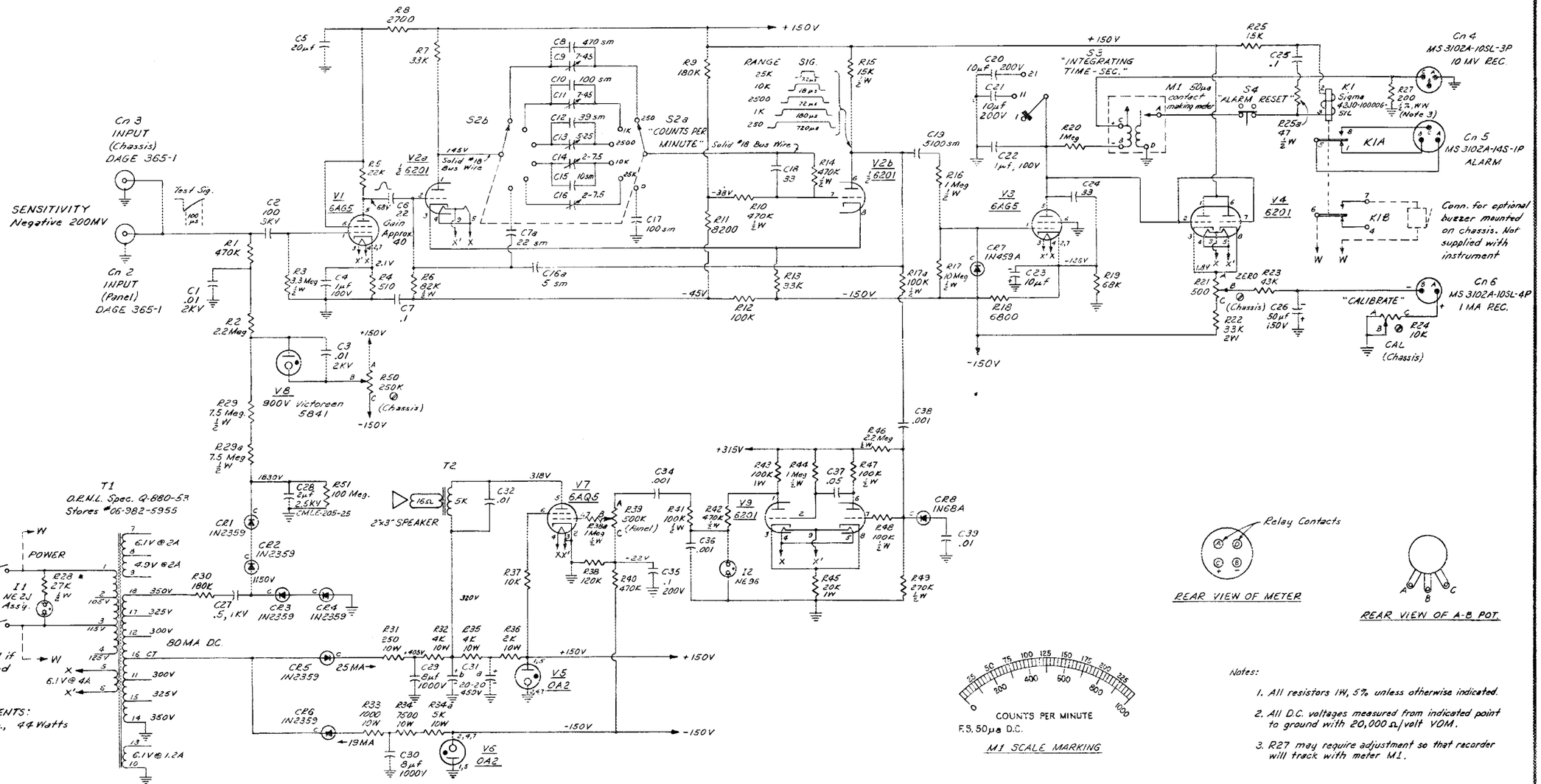
NO.	REVISIONS	BY	CHK.	APPR.	DATE	APPR.	DATE	APPR.	DATE
3	REMOVED BLIND FLANGE, PIPING ADDED [illegible]	W.K.	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	-
2	ADDED PROCESS WASTE & DRAIN	B.J.C.	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	-
1	REVISED REQUIRED FOR ISSUE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	[illegible]	-
0	CERTIFIED FOR CONSTRUCTION	J.P.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-	-

NO.	REVISIONS	BY	CHK.	APPR.	DATE	APPR.	DATE	APPR.	DATE
0	ISSUED FOR TITLE II APPROVAL	J.P.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0	ISSUED FOR TITLE I PRELIMINARY PROPOSAL	E.F.	[illegible]	[illegible]	[illegible]	-	-	-	-
0	REVISION IN ACCORDANCE WITH AEC [illegible]	D.W.	[illegible]	J.P.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
0	ISSUED FOR TITLE I APPROVAL	G.T.H.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

S. & B. 346	
DEPT.	CHK.
ARCH.	[illegible]
ELECT.	[illegible]
H & V	[illegible]
INST.	[illegible]
MECH.	[illegible]
STRUC.	[illegible]
UTIL.	[illegible]
PROJECT	[illegible]


PLAN AT EL. 825.5
SHOWING OPENINGS, VALVE EXTENSION STEMS AND PIPE PENETRATIONS IN ROOF SLAB OF I.L.W. PUMP PIT #1
PLAN
ENLARGED SECTION "G-G"
SAMPLING STATION, CABINET DETAILS AND PIPING
DETAIL "C"
DETAIL "J"
PLAN AT EL. 802.0
SHOWING PIPING ABOVE IN I.L.W. PUMP PIT @ EL. 815.5 AND PIPING ABOVE IN I.L.W. STORAGE TANK @ EL. 802.0
05-405-ILWT-1
I.L.W. STORAGE TANK
ELEVATION
SECTION "A-A"
SECTION "B-B"
SECTION "M-M"
DETAIL "H"
VALVE EXTENSION STEM
AUXILIARY PLAN "E"
SHOWING PUMP BLEED & DRAIN PIPING & PUMP AT SUMP
DETAIL "P"
SECTION "D-D"
SECTION "E-E"
DETAIL OF CONC. COVER FOR I.L.W. PUMP PIT (2) REQ.
PLAN
SHOWING DETAILS OF REINFORCED CONCRETE
DETAIL "R"
SECTION "J-J"
SECTION "K-K"
SECTION "L-L"
NOTE:- FOR LEGEND AND GENERAL NOTES SEE DWG. 1546-05-U-7101.
CERTIFIED FOR CONSTRUCTION
DRAWING NO. 1546-05-U-7304 REV. 2
REFERENCE DRAWING NO.
UTILITY PROFILES-PROCESS WASTE & I.L.W. SYSTEM 1546-05-U-7120
PROCESS WASTE - I.L.W. DETAILS 1546-05-U-7126
UTILITY PLAN - YARD PIPING 1546-05-U-7115
AREA UTILITY PLAN - SOUTH PART 1546-05-U-7101
SPECIFICATION REF. 3.6.5.5.6.2.95-109
SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.
FOR
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
APPROVED
SINGMASTER & BREYER
BY DATE
UNION CARBIDE NUCLEAR COMPANY
BY C. G. WINTERS DATE 6/6/61
U. S. ATOMIC ENERGY COMMISSION
BY L. H. JACKSON DATE 6/28/61
HIGH FLUX ISOTOPE REACTOR
I.L.W. TANK PIPING AND FOUNDATION DETAILS
DRAWN BRJ CHKD BK DATE 5/26/61
SCALE 3/8" & AS SHOWN
DRAWING NO. 1546-05-U-7304 REV. 2
1 ADDED SPARGE DETAIL
0 CERTIFIED FOR CONSTRUCTION
0 ISSUED FOR TITLE II APPROVAL
REVISIONS


PROCESS WASTE BASIN #2
BOT. EL. 797.00
CAPACITY-530 000 GAL.
LOW WATER SURFACE EL. 798.0
HIGH WATER SURFACE EL. 804.0
PROCESS WASTE BASIN #3
BOT. EL. 797.00
CAPACITY-560 000 GAL.
LOW WATER SURFACE EL. 797.0
HIGH WATER SURFACE EL. 806.0
TOP OF EMBANKMENT EL. 810.00
TOP OF EMBANKMENT EL. 807.00
4" TK. CRUSHED STONE
MATCH LINE OF GRADING
VALVE BOX #1
MON. TOR. BOX #1
PLAN
PROCESS WASTE BASINS #1 & 2
BASIN EMBANKMENT SLOPES IN CUT AND FILL 2:1
UNLESS OTHERWISE SHOWN
SECTION A-A
SECTION B-B
SECTION C-C
NOTES:-
FOR SECTIONS & DETAILS
SEE DWG 1546-05-U-7307
FOR GRADING ORIENTATION
SEE DWG 1546-05-U-7019
ROUGH GRADING PLAN
DRAWING NO. 1546-05-U-7306
REV. 3
REFERENCE DRAWING NO.
PROCESS WASTE BASIN-DETAILS 1546-05-U-7307
PLOT PLAN 1546-05-U-7101, 12
UTILITY PLAN-YARD PIPING 1546-05-U-7116, 15
PROCESS WASTE & EW DETAILS 1546-05-7116, 32
SPECIFICATION NO. 3, 4, 73
SINGMASTER & BREYER
METALLURGISTS & CHEMICAL ENGINEERS
420 LEXINGTON AVE. NEW YORK 17, N.Y.
U. S. ATOMIC ENERGY COMMISSION
OAK RIDGE, TENNESSEE
APPROVED
SINGMASTER & BREYER
BY DATE 4-21-61
UNION CARBIDE NUCLEAR COMPANY
BY G. E. WINTERS DATE 5-5-61
U. S. ATOMIC ENERGY COMMISSION
BY DATE 5-3-61
HIGH FLUX ISOTOPE REACTOR
PROCESS WASTE BASINS
PLAN & SECTIONS
DRAWN G.L.
DATE 3-31-61
SCALE 1"=10'-0"
DRAWING NO. 1546-05-U-7306
REV. 3



TEST PROCEDURE

On 10K range use a negative 5 volt test pulse from a Q-1212 Pulser. Adjust C14 for proper meter indication (18 divisions). Check wave shape at V2b - It should be approx. 18µs wide. The other ranges may be checked with a min. test signal of negative 200 MV, step rise with 100µs RC decay. Adjust appropriate trimmer condenser C9, C11, etc. to obtain correct meter readings for each range. The width of the output pulse at V2b should be as indicated for each range. This pulse should remain constant for any one range with variation in the input pulse. If 1MA recorder is to be used, remove input signal and adjust recorder zero with R21. With signal applied, make recorder track panel meter by adjusting R24.

Notes:

1. All resistors 1W, 5% unless otherwise indicated.
2. All D.C. voltages measured from indicated point to ground with 20,000 Ω/volt VOM.
3. R27 may require adjustment so that recorder will track with meter M1.

COMPANION DRAWINGS

Q-2091-2 Chassis, Side Bet. & Det.
Q-2091-3 Panel & Details
Q-2091-4 Term. Bds.
Q-2091-5 Parts List

DATE	NO.	CHANGE	BY
1-16-62	5	Cn2 & Cn3 Changed CR7 & CR8 was 1N4859 V8 was CE1038	F.M.G.
8-10-61	12	Date C33, Add R38a Chgd. T1 Stores #, C20, C21, C25, C32, R25, R25a, M1, S3, K1, Added K1B	F.M.G.
1-11-61	4	5V was 12V	F.M.G.

REVISIONS

LIMITS OR DIMENSIONS UNLESS OTHERWISE SPECIFIED
FRACTIONS ± ___ DECIMALS ± ___ ANGLES ± ___
DESIGNED
DESIGN CHECK F.M.G.
DRAWN C.E. WASGOUER
DATE 2-5-60
COMPARED

DESIGN RESPONSIBILITY F.M. GLASS

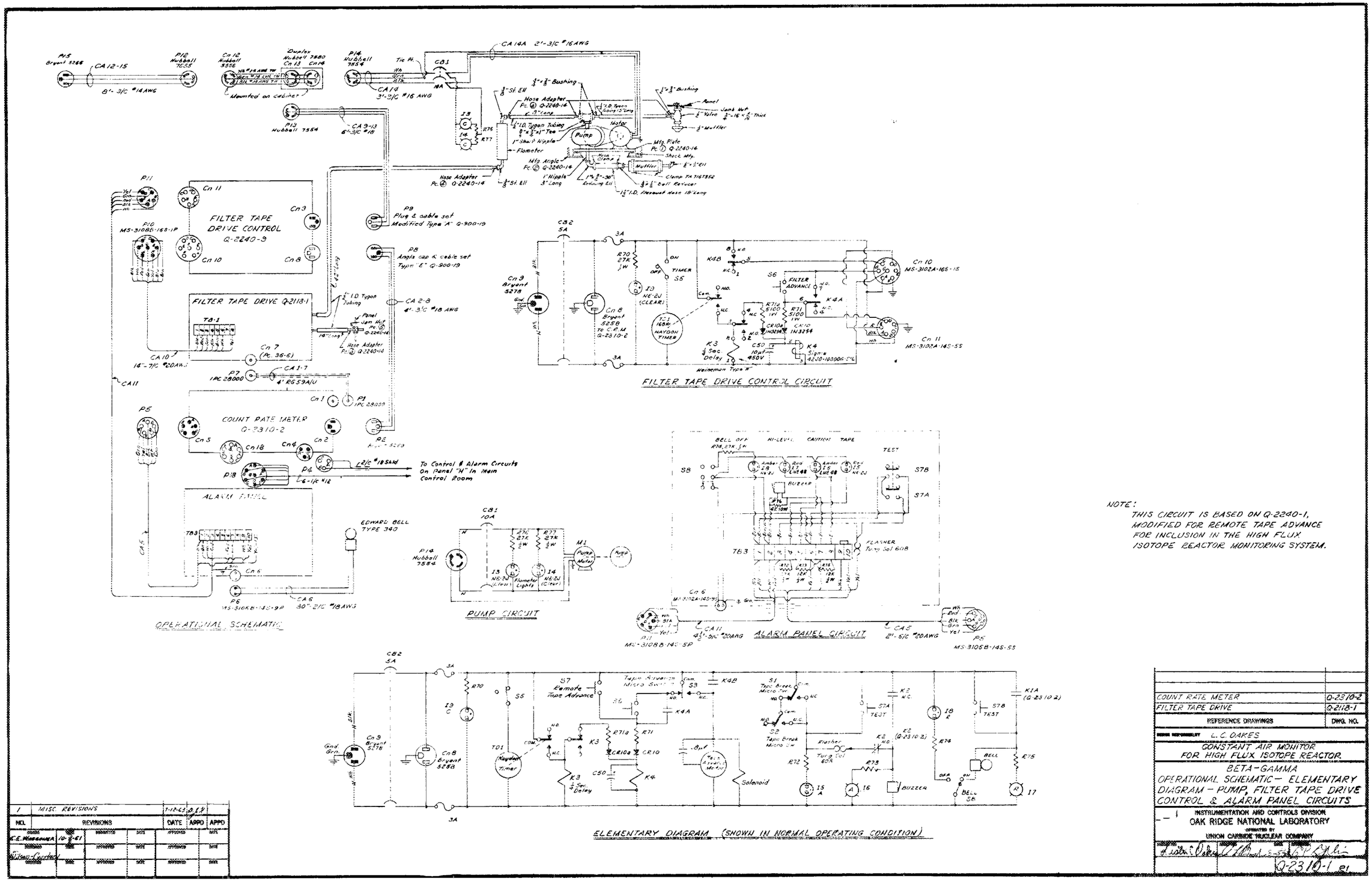
OAK RIDGE NATIONAL LABORATORY
INSTRUMENTATION AND CONTROLS DIVISION

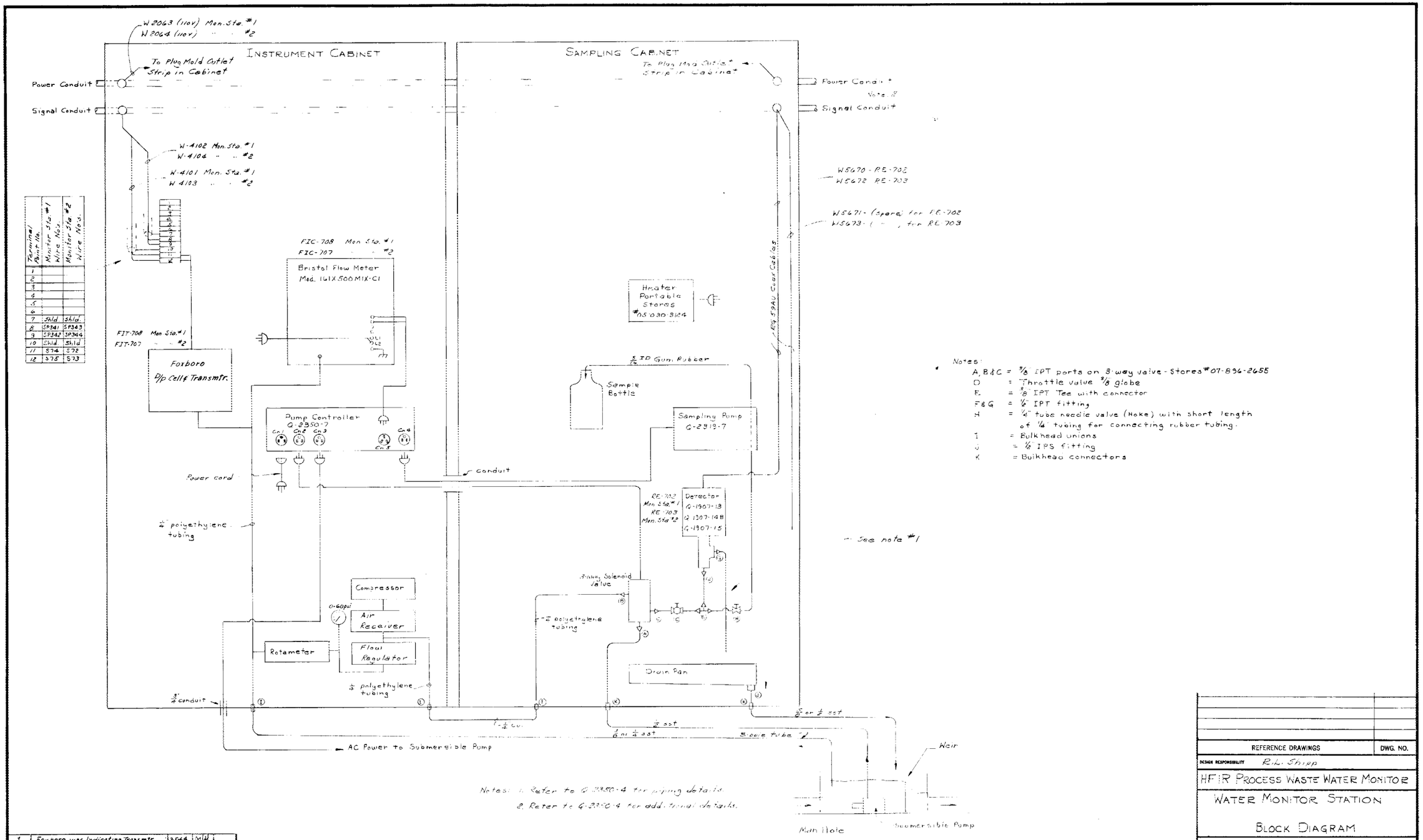
ALPHA OR BETA-GAMMA RADIATION MONITOR CIRCUIT

ACCEPTED F.M.G. | ACCEPTED H.M. Wilson | APPROVED

FIRST USED
SCALE ~

Q-2091-1 R3 D


FILTER TAPE DRIVE CONTROL Q-2240-9
FILTER TAPE DRIVE Q-2118-1
COUNT RATE METER Q-2310-2
ALARM PANEL
OPERATIONAL SCHEMATIC
PUMP CIRCUIT
FILTER TAPE DRIVE CONTROL CIRCUIT
ALARM PANEL CIRCUIT
ELEMENTARY DIAGRAM (SHOWN IN NORMAL OPERATING CONDITION)
NOTE:
THIS CIRCUIT IS BASED ON Q-2240-1, MODIFIED FOR REMOTE TAPE ADVANCE FOR INCLUSION IN THE HIGH FLUX ISOTOPE REACTOR MONITORING SYSTEM.
COUNT RATE METER Q-2310-2
FILTER TAPE DRIVE Q-2118-1
REFERENCE DRAWINGS
DWG. NO.
L. C. OAKES
CONSTANT AIR MONITOR FOR HIGH FLUX ISOTOPE REACTOR
BETA-GAMMA
OPERATIONAL SCHEMATIC — ELEMENTARY DIAGRAM — PUMP, FILTER TAPE DRIVE CONTROL & ALARM PANEL CIRCUITS
INSTRUMENTATION AND CONTROLS DIVISION
OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY
Q-2310-1 R1
MISC. REVISIONS
REVISIONS
DATE
APPD



Notes:
A, B & C = 3/8 IPT ports on 3-way valve - Stores #07-896-2655
D = Throttle valve 3/8 globe
E = 3/8 IPT Tee with connector
F & G = 1/4 IPT fitting
H = 1/4" tube needle valve (Hoke) with short length of 1/4" tubing for connecting rubber tubing.
I = Bulkhead unions
J = 1/2 IPS fitting
K = Bulkhead connectors

Notes: 1. Refer to Q-2350-4 for piping details
2. Refer to Q-2350-4 for add. typical details.

NO.	REVISIONS	DATE	APPD	APPD
1	Foxboro was Indicating Transmtr.	2-5-64		

DRAWN	DATE	SUBMITTED	DATE	APPROVED	DATE
W. L. Ingram	10-3-62				
DESIGNED	DATE	APPROVED	DATE	APPROVED	DATE
R. L. Shipp					
CHECKED	DATE	APPROVED	DATE	APPROVED	DATE
	10-8-62				

REFERENCE DRAWINGS	DWG. NO.

DESIGN RESPONSIBILITY R. L. Shipp

HFIR PROCESS WASTE WATER MONITOR

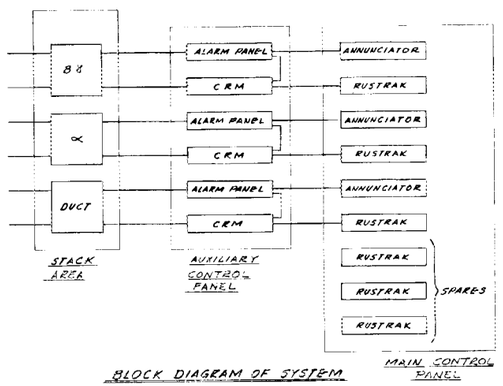
WATER MONITOR STATION

BLOCK DIAGRAM

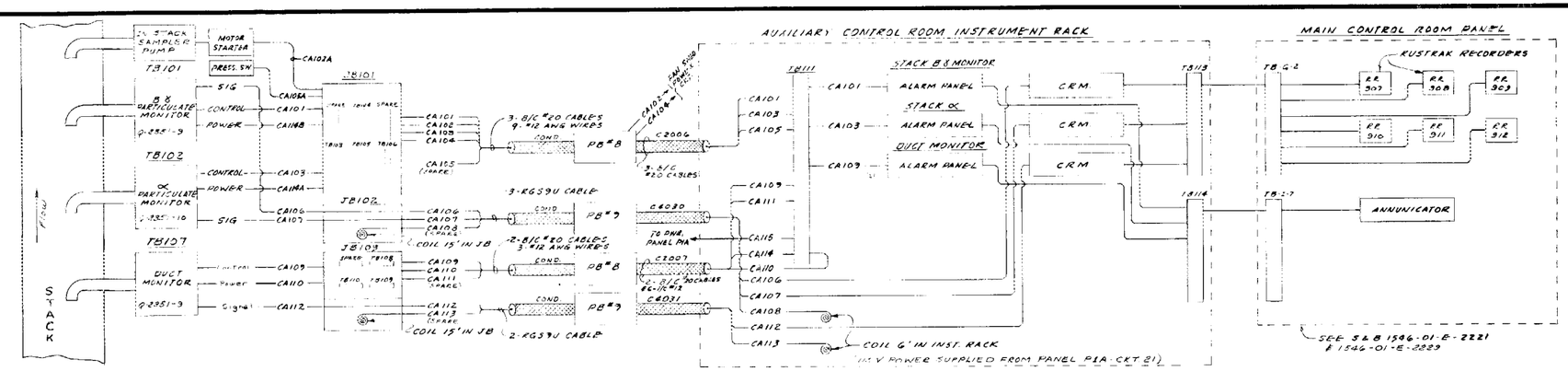
INSTRUMENTATION AND CONTROLS DIVISION
OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY

SUBMITTED R. L. Shipp | ACCEPTED | DATE | APPROVED | DATE

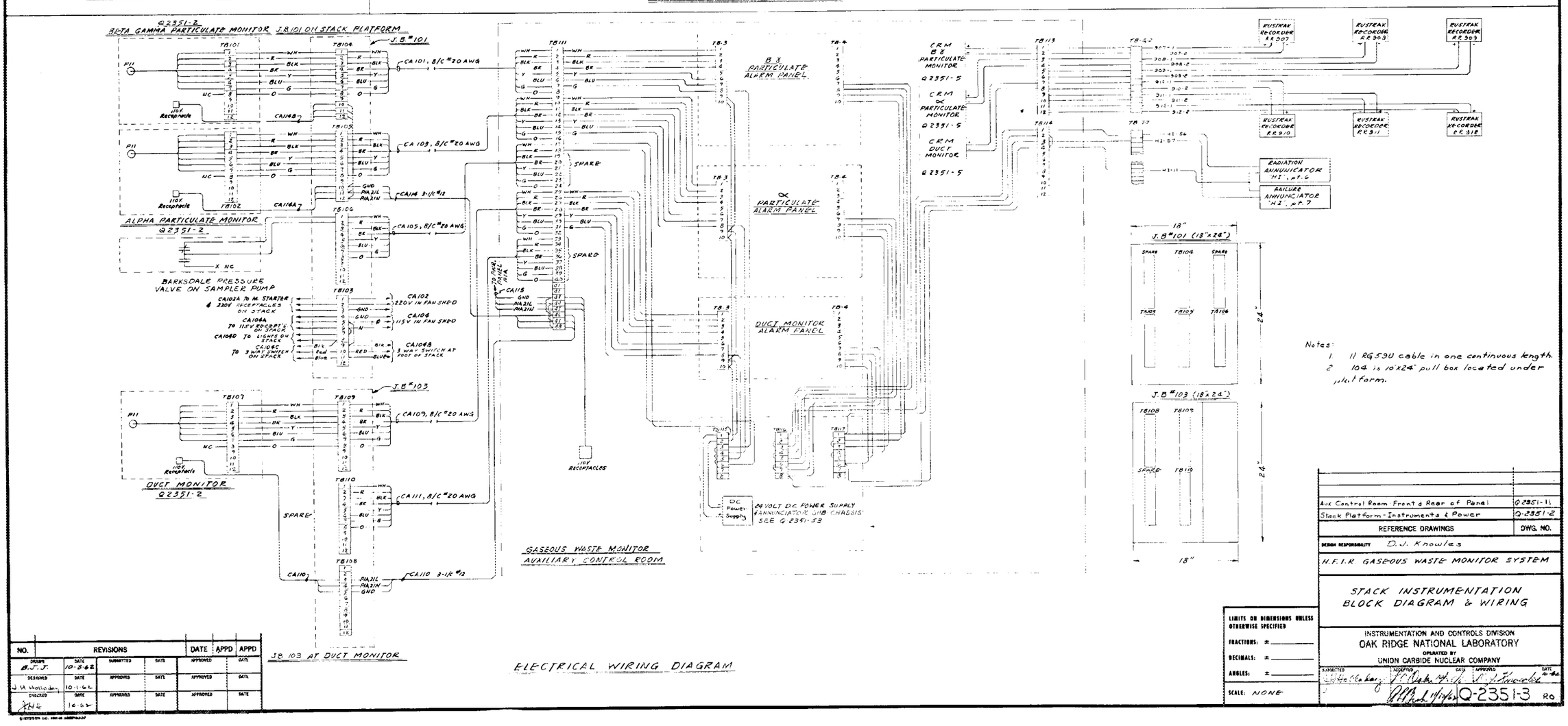
Q-2350-1 R4



BLOCK DIAGRAM OF SYSTEM



CABLING & CONDUIT NUMBERING



ELECTRICAL WIRING DIAGRAM

Notes:
1. 11 RG59U cable in one continuous length.
2. 104 is 10"x24" pull box located under platform.

Aux Control Room Front & Rear of Panel	Q2351-11
Stack Platform - Instruments & Power	Q-2351-2
REFERENCE DRAWINGS	DWG. NO.

DESIGN RESPONSIBILITY D. J. Knowles

H.F.I.R GASEOUS WASTE MONITOR SYSTEM

STACK INSTRUMENTATION BLOCK DIAGRAM & WIRING

INSTRUMENTATION AND CONTROLS DIVISION
OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY

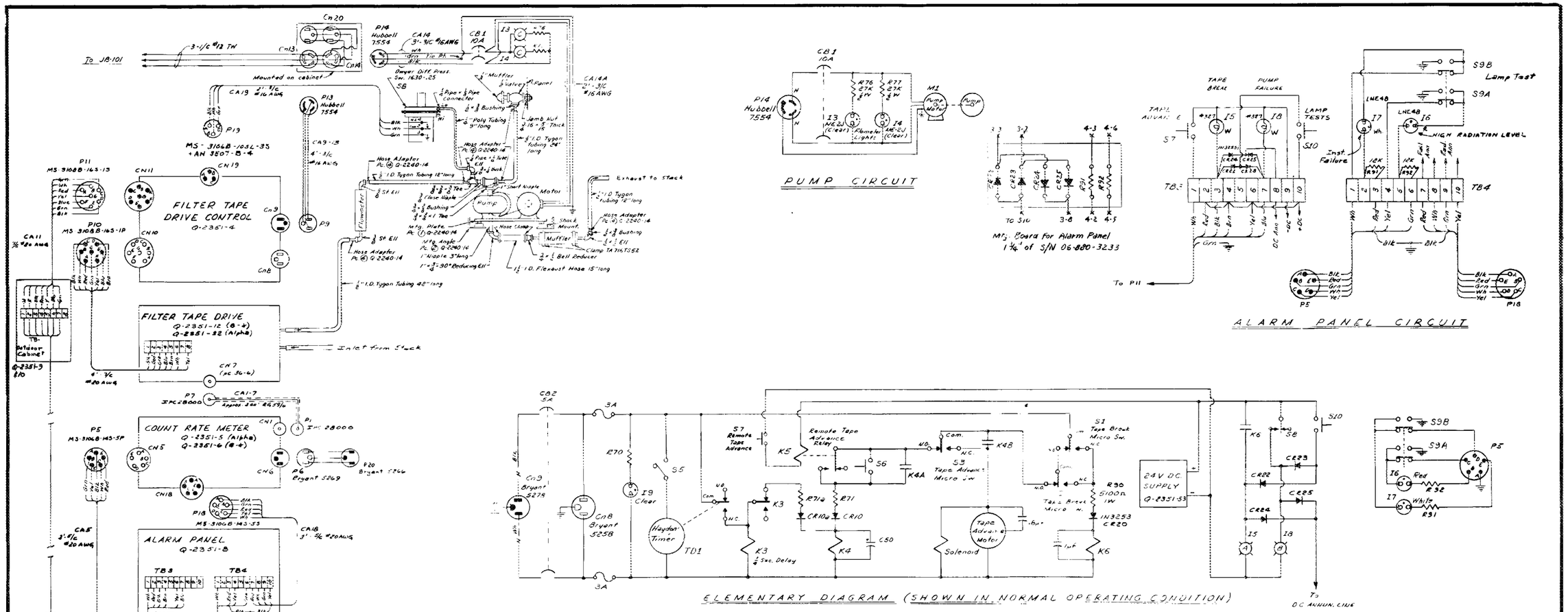
SUBMITTED	NOTED	DATE	APPROVED	DATE
				12-1-62

Q-2351-3 R0

LIMITS ON DIMENSIONS UNLESS OTHERWISE SPECIFIED
FRACTIONS: ±
DECIMALS: ±
ANGLES: ±
SCALE: NONE

NO.	REVISIONS	DATE	APPD	APPD

DRAWN B.J.T.	DATE 10-8-62	SUBMITTED	DATE	APPROVED	DATE
DESIGNED J.H. Holladay	DATE 10-1-62	APPROVED	DATE	APPROVED	DATE
CHECKED	DATE 10-62	APPROVED	DATE	APPROVED	DATE



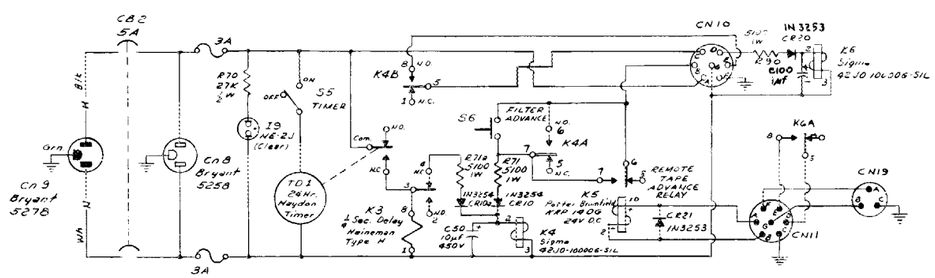
OPERATIONAL SCHEMATIC

PUMP CIRCUIT

Mt. Board for Alarm Panel 1 1/4" of S/N 06-880-3233

ALARM PANEL CIRCUIT

ELEMENTARY DIAGRAM (SHOWN IN NORMAL OPERATING CONDITION)



FILTER TAPE DRIVE CONTROL CIRCUIT

NO.	REVISIONS	DATE	APPD	APPD
2	P20 was P18, add Cn20 & rec. mtg. bd.	11-29-63		
1	Add C-100, Change Cn 10 wiring	3-28-63		

DRAWN C.C. Wagoner	DATE	SUBMITTED	DATE	APPROVED	DATE		
DESIGNED D.J. Knowles	DATE	APPROVED	DATE	APPROVED	DATE		
ENGINEERED	DATE 10-62	APPROVED	DATE	APPROVED	DATE		

Stack Instrumentation - Block Diagram & Wiring	Q-2351-3
Filter Tape Drive Control Chassis	Q-2351-7
REFERENCE DRAWINGS	DWG. NO.

DESIGN RESPONSIBILITY D. J. Knowles

HFIR GASEOUS WASTE MONITORING SYSTEMS

PARTICULATE MONITOR

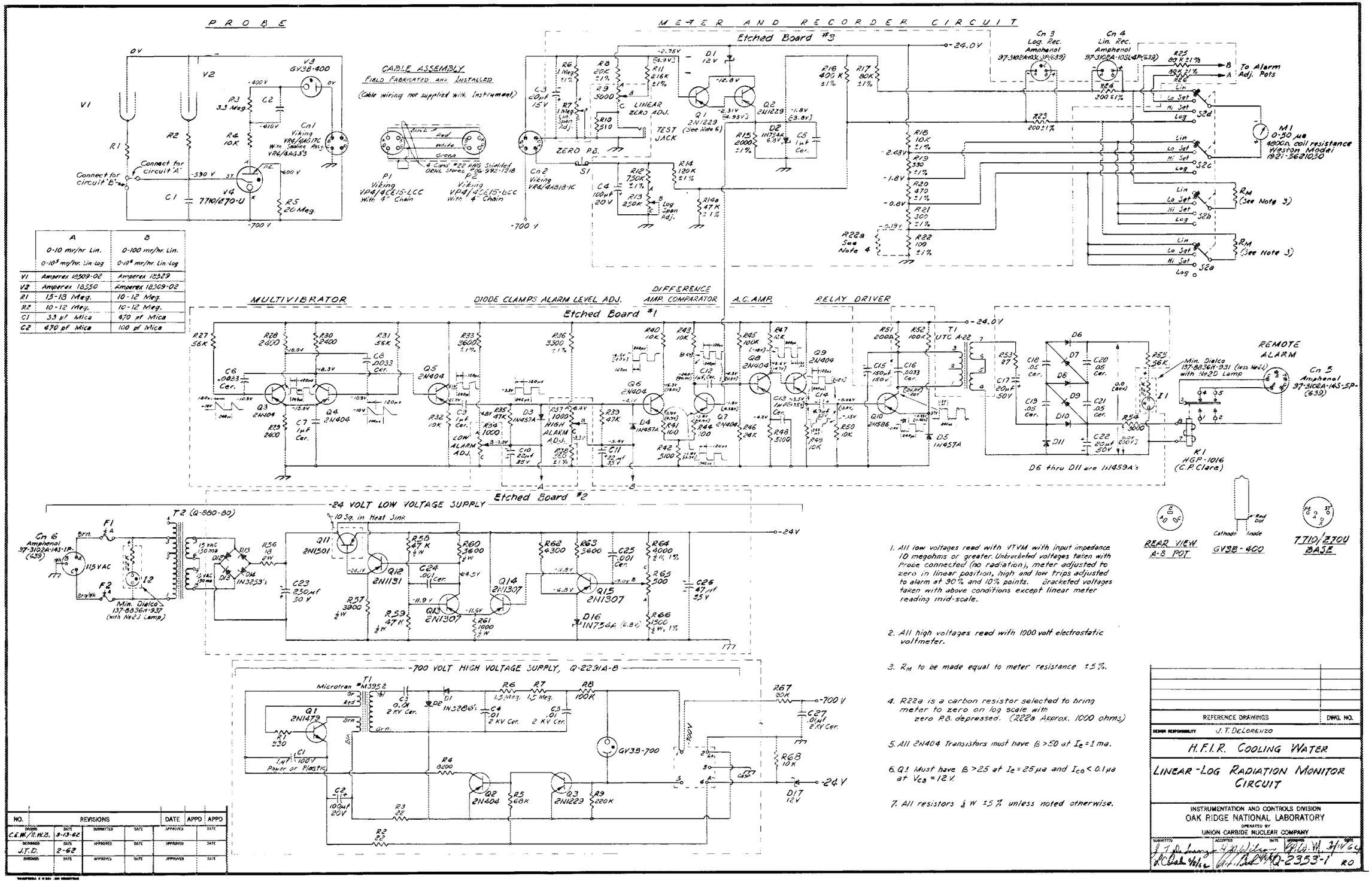
ELEMENTARY DIAGRAM

INSTRUMENTATION AND CONTROLS DIVISION
OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY

SUBMITTED J. H. Halladay | ACCEPTED | APPROVED | DATE 10-62

Q-2351-4 R2

This dwg. derived from Q-2325-2 R0



	A 0-10 mr/hr. Lin. 0-10⁵ mr/hr. Lin-Log	B 0-100 mr/hr. Lin. 0-10⁶ mr/hr. Lin-Log
V1	Amperex 18509-02	Amperex 18529
V2	Amperex 18550	Amperex 18509-02
R1	15-18 Meg.	10-12 Meg.
R2	10-12 Meg.	10-12 Meg.
C1	3.3 μf Mica	470 μf Mica
C2	470 pf Mica	100 pf Mica

1. All low voltages read with VTVM with input impedance 10 megohms or greater. Unbracketed voltages taken with Probe connected (no radiation), meter adjusted to zero in linear position, high and low trips adjusted to alarm at 90% and 10% points. Bracketed voltages taken with above conditions except linear meter reading mid-scale.

2. All high voltages read with 1000 volt electrostatic voltmeter.

3. R_M to be made equal to meter resistance ±5%.

4. R22a is a carbon resistor selected to bring meter to zero on log scale with zero P.B. depressed. (R22a Approx. 1000 ohms)

5. All 2N404 Transistors must have $\beta > 50$ at $I_e = 1$ ma.

6. Q1 Must have $\beta > 25$ at $I_e = 25\,\mu a$ and $I_{co} < 0.1\,\mu a$ at $V_{CB} = 12$ V.

7. All resistors ½ W ±5% unless noted otherwise.

NO.	REVISIONS	DATE	APPO	APPO
DRAWN C.E.W./R.W.B.	DATE 5-13-62	SUBMITTED	DATE	APPROVED	DATE
DESIGNED J.T.D.	DATE 2-62	APPROVED	DATE	APPROVED	DATE
DESIGNED	DATE	APPROVED	DATE	APPROVED	DATE

REFERENCE DRAWINGS	DWG. NO.
DESIGN RESPONSIBILITY J. T. DeLORENZO	

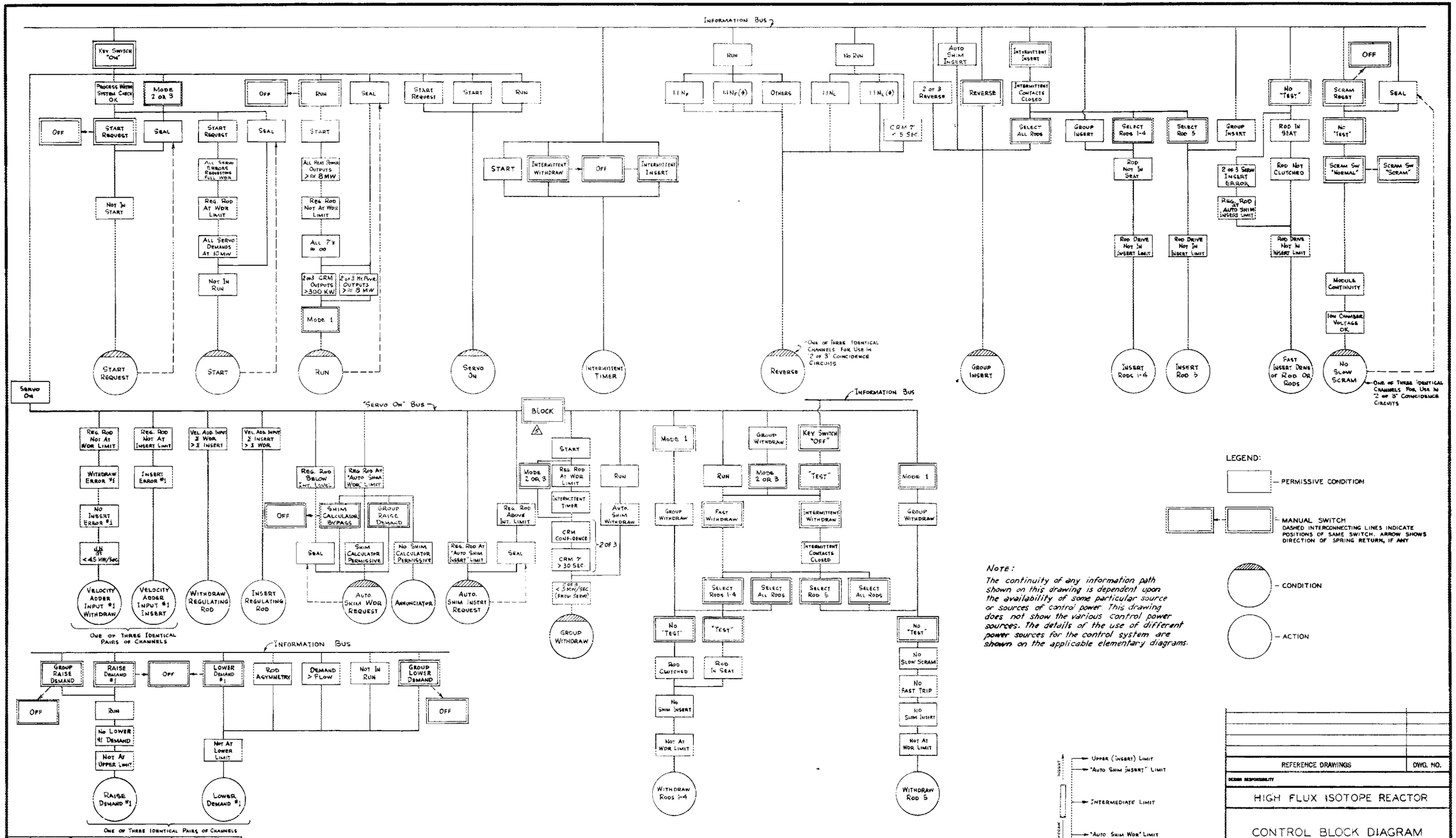
H.F.I.R. COOLING WATER

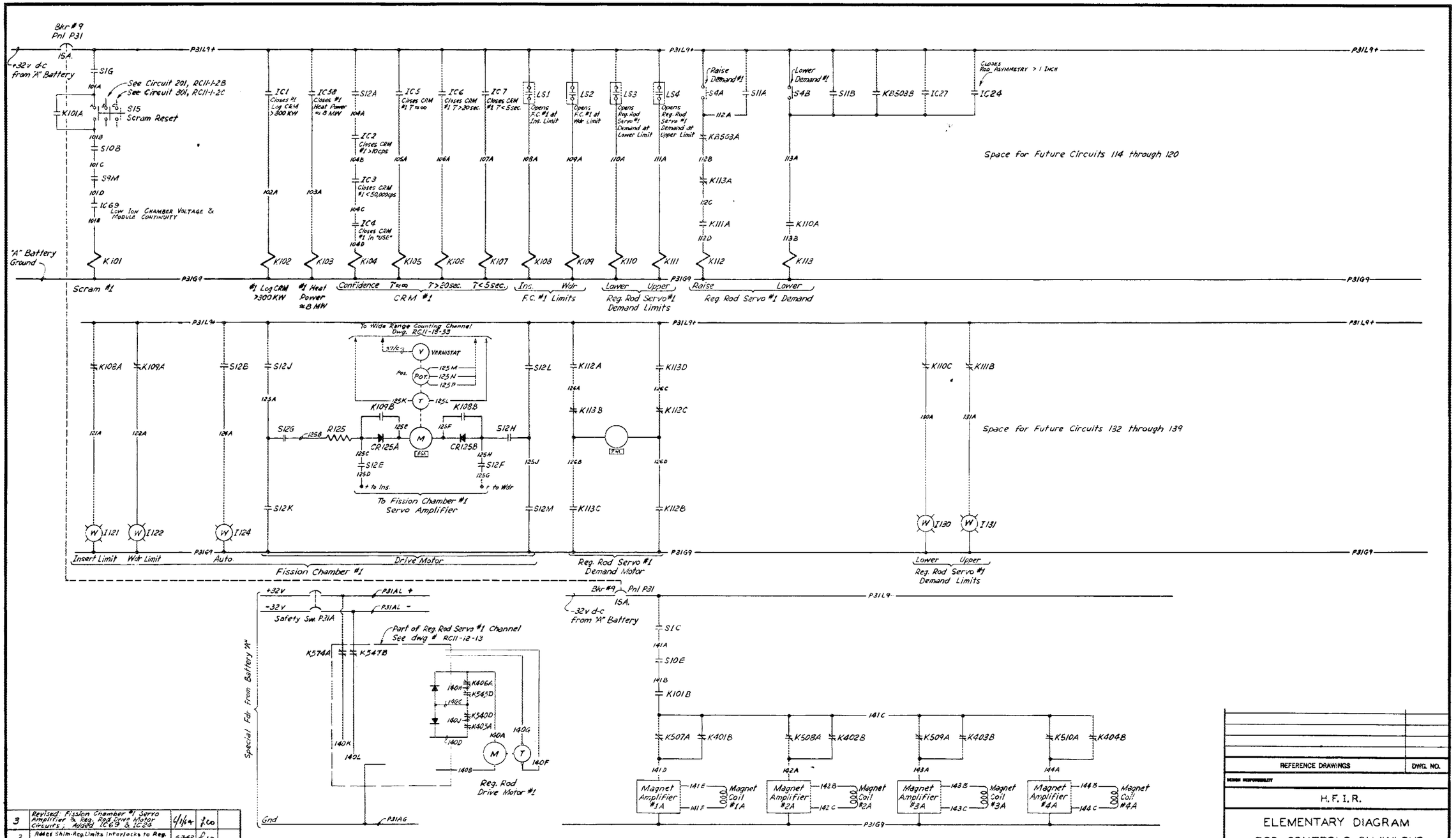
LINEAR-LOG RADIATION MONITOR CIRCUIT

INSTRUMENTATION AND CONTROLS DIVISION
OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY

SUBMITTED J. T. DeLorenzo — ACCEPTED H. A. Wilson — APPROVED G. H. Bell — DATE 3/14/62

D-2353-1 RO


INFORMATION BUS
KEY SWITCH "ON"
PROCESS WATER SYSTEM CHECK OK
MODE 2 OR 3
OFF
RUN
SEAL
START REQUEST
START
OFF
START REQUEST
SEAL
START REQUEST
SEAL
START
ALL SERVO ERRORS REDUCING FULL WDR.
ALL HEAT POWER OUTPUTS >≈ 8 MW
NOT IN START
REG. ROD AT WDR LIMIT
REG. ROD NOT AT WDR LIMIT
ALL SERVO DEMANDS AT 10 MW
ALL 7's ≈ 00
NOT IN RUN
2 OF 3 CRM OUTPUTS >300 KW
2 OF 3 HI. AVGE. OUTPUTS >≈ 8 MW
MODE 1
START REQUEST
START
RUN
SERVO ON
START
INTERMITTENT WITHDRAW
OFF
INTERMITTENT INSERT
INTERMITTENT TIMER
RUN
NO RUN
I.I.N_F
I.I.N_F(φ)
OTHERS
I.I.N_L
I.I.N_L(φ)
CRM 7' < 5 SEC
AUTO SHIM INSERT
2 OF 3 REVERSE
REVERSE
INTERMITTENT INSERT
INTERMITTENT CONTACTS CLOSED
SELECT ALL RODS
GROUP INSERT
SELECT RODS 1-4
SELECT ROD 5
GROUP INSERT
ROD NOT IN SEAT
2 OF 3 SCRM INSERT EP. ROD
REG. ROD AT AUTO SHIM INSERT LIMIT
ROD DRIVE NOT IN INSERT LIMIT
ROD DRIVE NOT IN INSERT LIMIT
REVERSE
GROUP INSERT
INSERT RODS 1-4
INSERT ROD 5
NO "TEST"
ROD IN SEAT
ROD NOT CLUTCHED
ROD DRIVE NOT IN INSERT LIMIT
FAST INSERT DRIVE OF ROD OR RODS
OFF
SCRAM RESET
SEAL
NO "TEST"
SCRAM SW "NORMAL"
SCRAM SW "SCRAM"
MODULE CONTINUITY
ION CHAMBER VOLTAGE OK
NO SLOW SCRAM
ONE OF THREE IDENTICAL CHANNELS FOR USE IN 2 OF 3 COINCIDENCE CIRCUITS
ONE OF THREE IDENTICAL CHANNELS FOR USE IN 2 OF 3 COINCIDENCE CIRCUITS
SERVO ON
"SERVO ON" BUS
INFORMATION BUS
REG. ROD NOT AT WDR LIMIT
REG. ROD NOT AT INSERT LIMIT
VEL. ADD. INPUT Σ WDR. > Σ INSERT
VEL. ADD. INPUT Σ INSERT > Σ WDR.
WITHDRAW ERROR #1
INSERT ERROR #1
NO INSERT ERROR #1
<45 MW/SEC
VELOCITY ADDER INPUT #1 WITHDRAW
VELOCITY ADDER INPUT #1 INSERT
WITHDRAW REGULATING ROD
INSERT REGULATING ROD
ONE OF THREE IDENTICAL PAIRS OF CHANNELS
REG. ROD BELOW INT. LIMIT
REG. ROD AT "AUTO SHIM" WDR. LIMIT
OFF
SHIM CALCULATOR BYPASS
GROUP RAISE DEMAND
SEAL
SHIM CALCULATOR PERMISSIVE
NO SHIM CALCULATOR PERMISSIVE
AUTO SHIM WDR REQUEST
ANNUNCIATOR
REG. ROD ABOVE INT. LIMIT
REG. ROD AT "AUTO SHIM INSERT" LIMIT
SEAL
AUTO. SHIM INSERT REQUEST
BLOCK
START
MODE 2 OR 3
REG. ROD AT WDR LIMIT
INTERMITTENT TIMER
CRM CONFIDENCE
CRM 7' > 30 SEC
2 OF 3
2 OF 3 < 5 MW/SEC (FROM SERVO)
GROUP WITHDRAW
RUN
AUTO. SHIM WITHDRAW
MODE 1
GROUP WITHDRAW
FAST WITHDRAW
SELECT RODS 1-4
SELECT ALL RODS
NO "TEST"
"TEST"
ROD CLUTCHED
ROD IN SEAT
NO SHIM INSERT
NOT AT WDR LIMIT
WITHDRAW RODS 1-4
GROUP WITHDRAW
MODE 2 OR 3
"TEST"
INTERMITTENT WITHDRAW
INTERMITTENT CONTACTS CLOSED
SELECT RODS 1-4
SELECT ALL RODS
SELECT ROD 5
SELECT ALL RODS
MODE 1
GROUP WITHDRAW
NO "TEST"
NO SLOW SCRAM
NO FAST TRIP
NO SLOW INSERT
NOT AT WDR LIMIT
WITHDRAW ROD 5
INFORMATION BUS
GROUP RAISE DEMAND
RAISE DEMAND #1
OFF
LOWER DEMAND #1
ROD ASYMMETRY
DEMAND > FLOW
NOT IN RUN
GROUP LOWER DEMAND
OFF
OFF
RUN
NO LOWER DEMAND
NOT AT UPPER LIMIT
NOT AT LOWER LIMIT
RAISE DEMAND #1
LOWER DEMAND #1
ONE OF THREE IDENTICAL PAIRS OF CHANNELS
LEGEND:
PERMISSIVE CONDITION
MANUAL SWITCH
DASHED INTERCONNECTING LINES INDICATE POSITIONS OF SAME SWITCH. ARROW SHOWS DIRECTION OF SPRING RETURN, IF ANY
CONDITION
ACTION
NOTE:
The continuity of any information path shown on this drawing is dependent upon the availability of some particular source or sources of control power. This drawing does not show the various control power sources. The details of the use of different power sources for the control system are shown on the applicable elementary diagrams.
INSERT
UPPER (INSERT) LIMIT
"AUTO SHIM INSERT" LIMIT
INTERMEDIATE LIMIT
WITHDRAW
"AUTO SHIM WDR" LIMIT
LOWER (WDR.) LIMIT
REGULATING ROD LIMIT SWITCHES
REFERENCE DRAWINGS
DWG. NO.
DESIGN RESPONSIBILITY
HIGH FLUX ISOTOPE REACTOR
CONTROL BLOCK DIAGRAM
INSTRUMENTATION AND CONTROLS DIVISION
OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY
5/24/61
RC-11-1-1C REV. 2
2 REVISED FOR DIFFERENT MODES OF OPERATION. MISCELLANEOUS REVISIONS. 6-20-63
1 ADDED ROD IN SEAT TO FAST INSERT DRIVE OF SCRAMMED ROD CHANNEL 5-29-62
NO. REVISIONS DATE APPD APPD
DRAWN 6-27-60
SUBMITTED 3/24/61
APPROVED DATE
DESIGNED DATE
APPROVED 3/24/61 DATE
APPROVED DATE
CHECKED DATE
APPROVED DATE
6 ADDED 2 of 3 BLOCK IN RUN MODE REMOVED MODE SWITCHING MONITORS 6-1-64
5 ADDED BLOCK SWITCH AND REMOVED NO STOP STARTING SWITCH 3-10-64
4 ADDED MODULE CONTINUITY AND ION CHAMBER VOLTAGE CONDITIONS TO SLOW SCRAM CKT; MISC. REVS. 2-18-64
3 ADDED NO SLOW SCRAM & NO FAST TRIP TO WITHDRAW ROD 5 ACTION, CHANGE TO GROUP WDR. START PERMISSIVE TO TIMER ACTION & TIMER PERMISSIVE TO GROUP WDR CONDITION 12-30-63



NO.	REVISIONS	DATE	APPD	APPD
3	Revised: Fission Chamber #1 Servo Amplifier & Reg. Rod Drive Motor Circuits; Added IC69 & IC23	4/1/64		
2	Added Shim-Reg. Limits Interlocks to Reg. Rod Circuit 140	6-7-62		
1	Changed Reg. Rod Drive Motor ckt. Added IC23 Designated breaker number. Minor revisions	9-18-61		

DRAWN	DATE	SUBMITTED	DATE	APPROVED	DATE
HERRELL	8-25-61		9-25-61		
DESIGNED	DATE			APPROVED	DATE
CHECKED	DATE	APPROVED	DATE	APPROVED	DATE

REFERENCE DRAWINGS	DWG. NO.

DESIGN RESPONSIBILITY

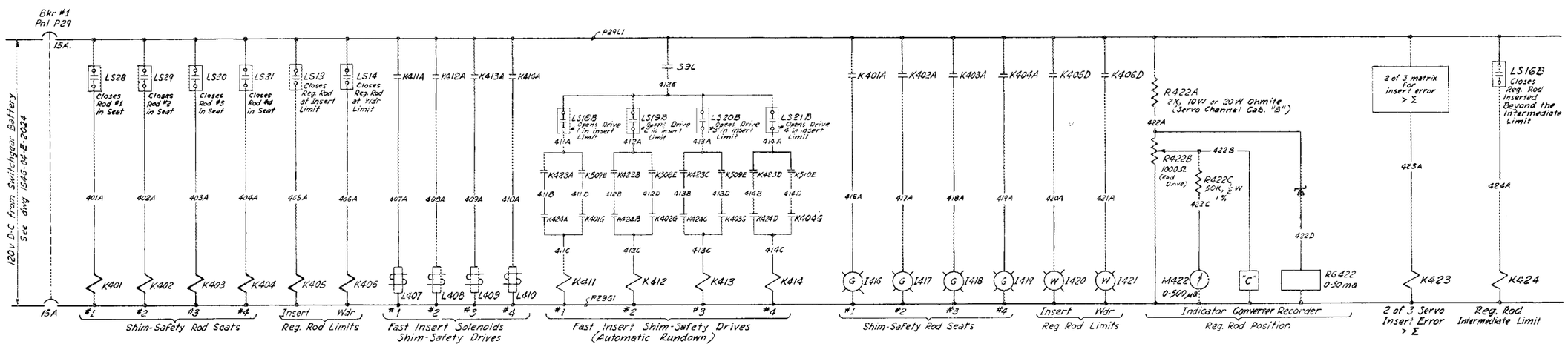
H. F. I. R.

ELEMENTARY DIAGRAM

ROD CONTROLS ON "A" BUS

INSTRUMENTATION AND CONTROLS DIVISION
OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY

SUBMITTED	ACCEPTED	DATE	APPROVED	DATE
	9/20/61			RC11-1-2A REV. 3



NO.	REVISIONS	DATE	APPD	APPD
1	Added Ckts. 407-414, 423, 424 Revised Ckt. 422	6/16/64	JWO	

DRAWN	DATE	SUBMITTED	DATE	APPROVED	DATE
HERRELL	8-25-61		8-25-61		
DESIGNED	DATE		DATE	APPROVED	DATE
			8/25/61		
CHECKED	DATE	APPROVED	DATE	APPROVED	DATE

REFERENCE DRAWINGS	DWG. NO.

DESIGN RESPONSIBILITY

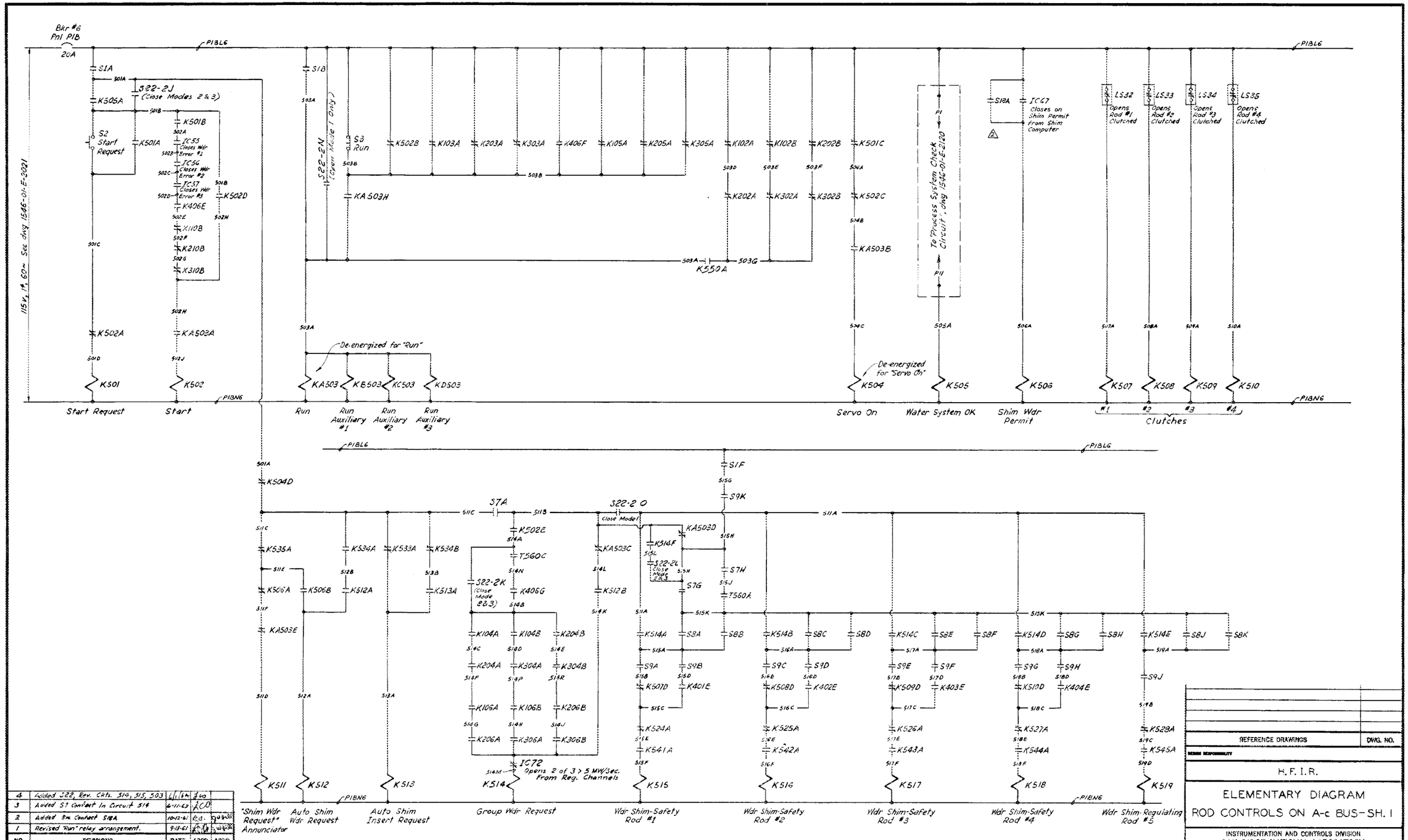
H. F. I. R.

ELEMENTARY DIAGRAM
ROD CONTROLS ON "D" BUS

INSTRUMENTATION AND CONTROLS DIVISION
OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY

SUBMITTED	ACCEPTED	DATE	APPROVED	DATE
R C Oakes		8/25/61		

RC11-1-2D REV 1



NO.	REVISIONS	DATE	APPD	APPD
4	Added S22, Rev. Ckts. 514, 515, 503	6-11-64		
3	Added S7 Contact In Circuit 514	6-11-62		
2	Added S7a Contact S18A	10-12-61		
1	Revised "Run" relay arrangement.	9-13-61		

DRAWN	DATE	SUBMITTED	DATE	APPROVED	DATE
Hewell	8-25-61		8-25-61		
DESIGNED	DATE		DATE	APPROVED	DATE
			8-25-61		
CHECKED	DATE	APPROVED	DATE	APPROVED	DATE

REFERENCE DRAWINGS | DWG. NO.

SCOPE RESPONSIBILITY

H. F. I. R.

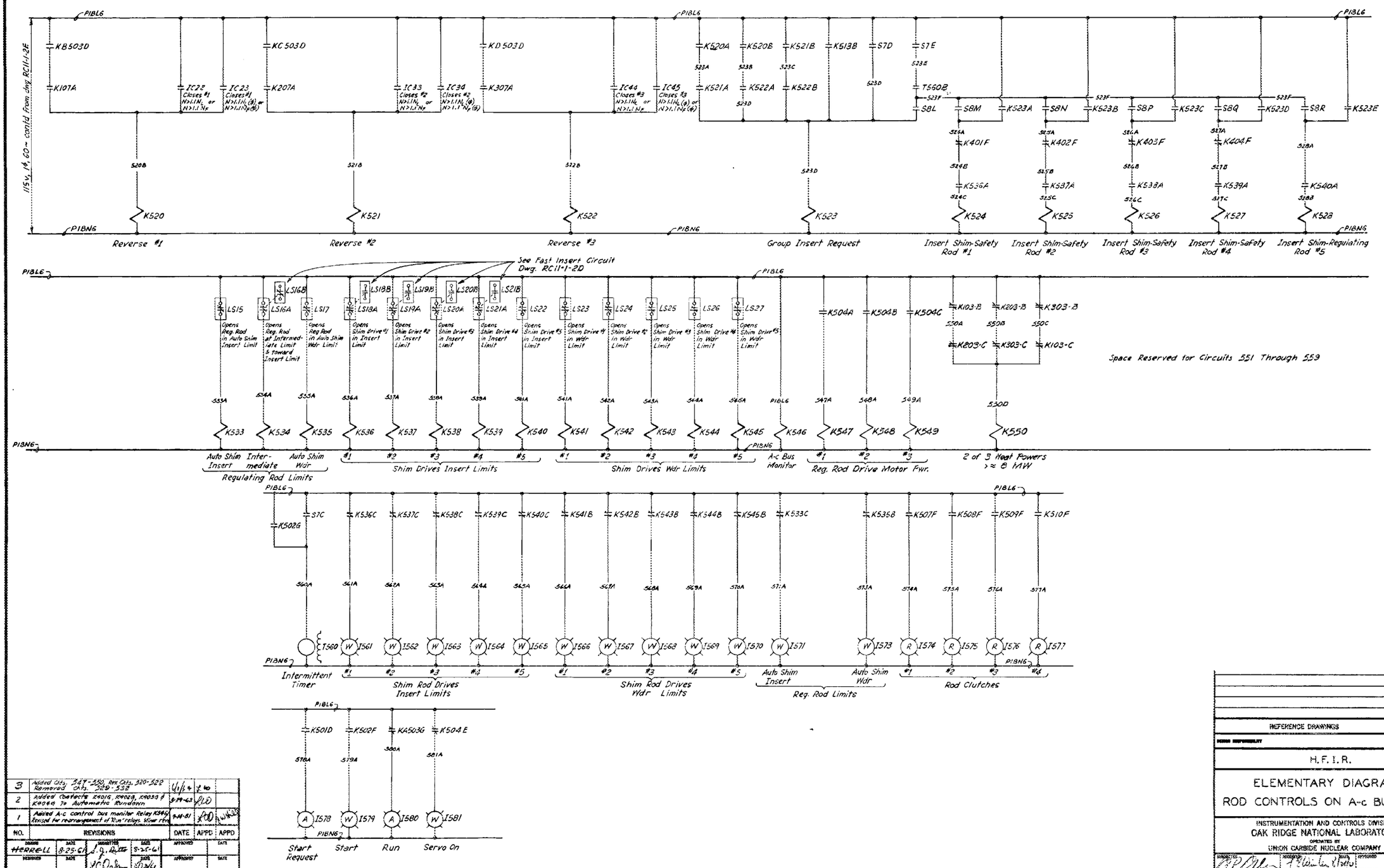
ELEMENTARY DIAGRAM

ROD CONTROLS ON A-c BUS-SH. 1

INSTRUMENTATION AND CONTROLS DIVISION
OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY

SUBMITTED | ACCEPTED | DATE | APPROVED | DATE

8/25/61 | RC:1-1-2E REV 4



NO.	REVISIONS	DATE	APPD	APPD
3	Added Ckts. 548T-550, Rem Ckts. 320-522 Removed Ckts. 529-538	4/1/64		
2	Added Contacts K401G, K402G, K403G & K404G To Automatic Rundown	5-19-63		
1	Added A-c control bus monitor Relay K546 Revised for rearrangement of 10m" relays. Minor rev	9-11-61		

DRAWN	DATE	REVIEWED	DATE	APPROVED	DATE
HERRELL	8-25-61		8-25-61		
DESIGNED	DATE	APPROVED	DATE	APPROVED	DATE
			8/29/61		

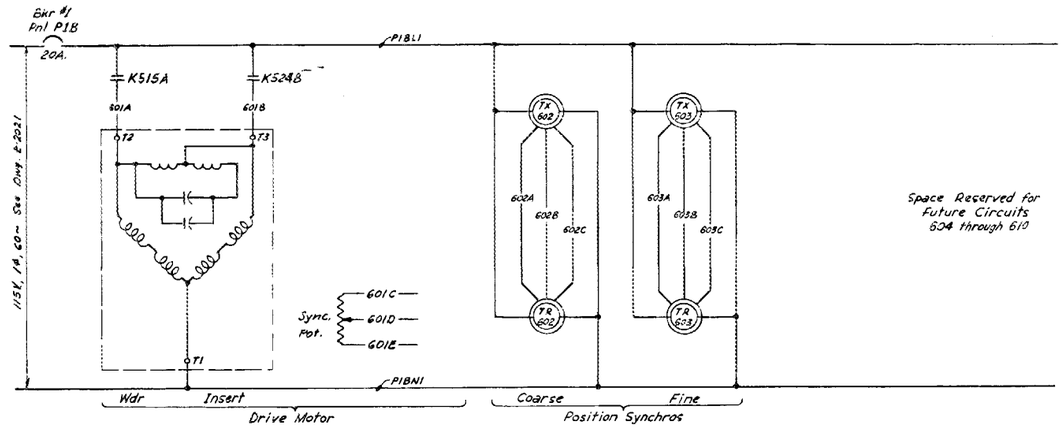
REFERENCE DRAWINGS	DWG. NO.
DESIGN RESPONSIBILITY	

H. F. I. R.

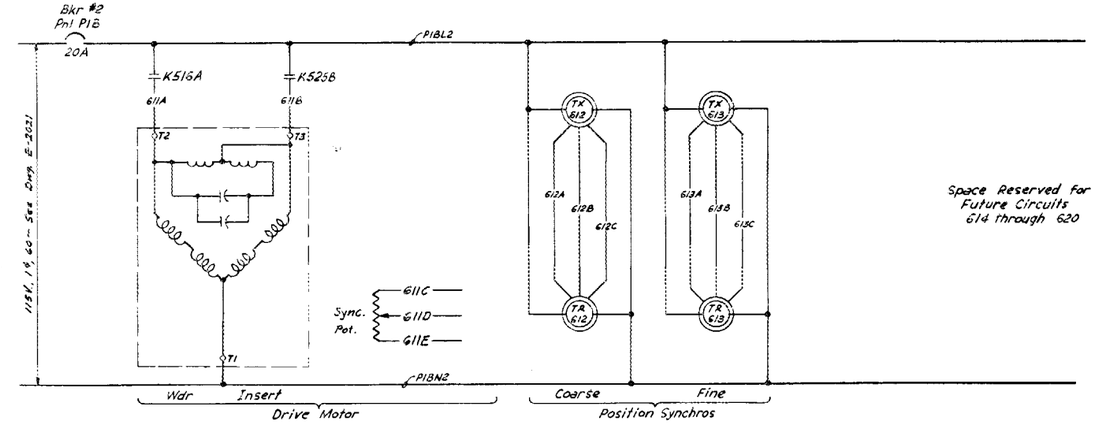
ELEMENTARY DIAGRAM
ROD CONTROLS ON A-c BUS-SH. 2

INSTRUMENTATION AND CONTROLS DIVISION
OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY

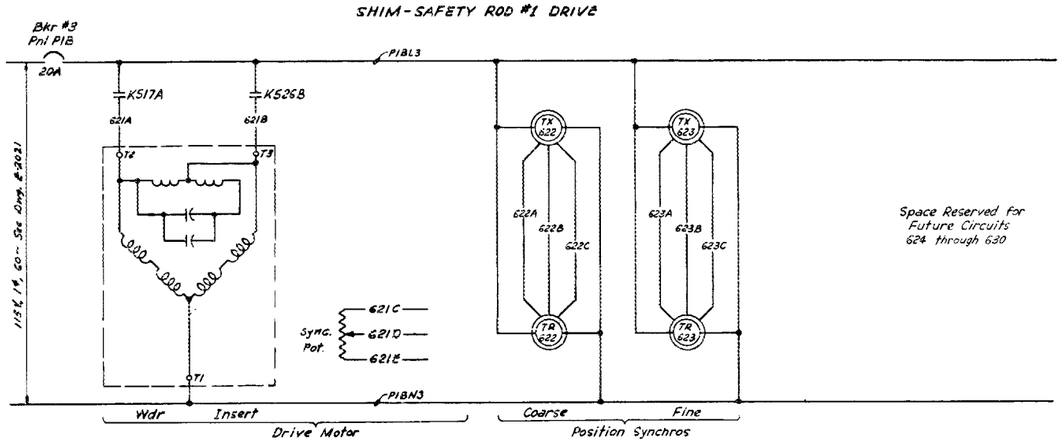
SUBMITTED	DESIGNED	DATE	APPROVED	DATE
RC Oakes		8/29/61	RC11-1-2F REV 3	



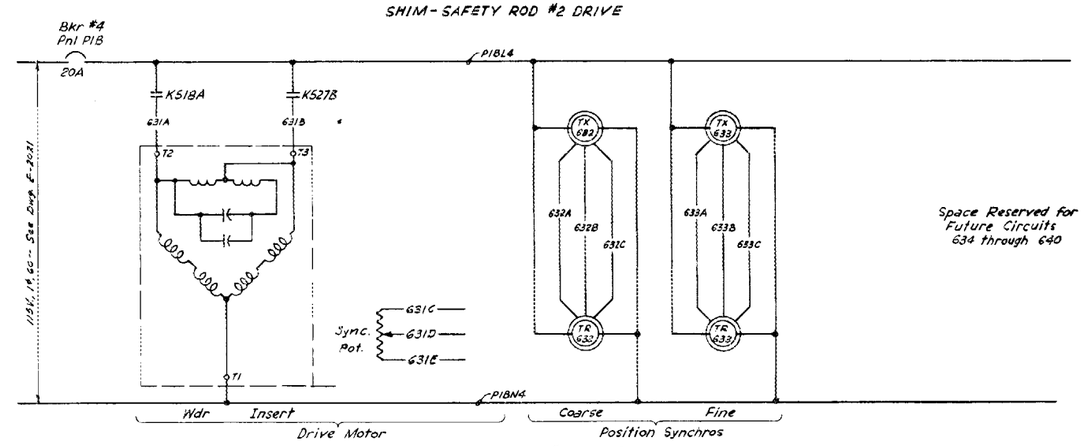
SHIM-SAFETY ROD #1 DRIVE



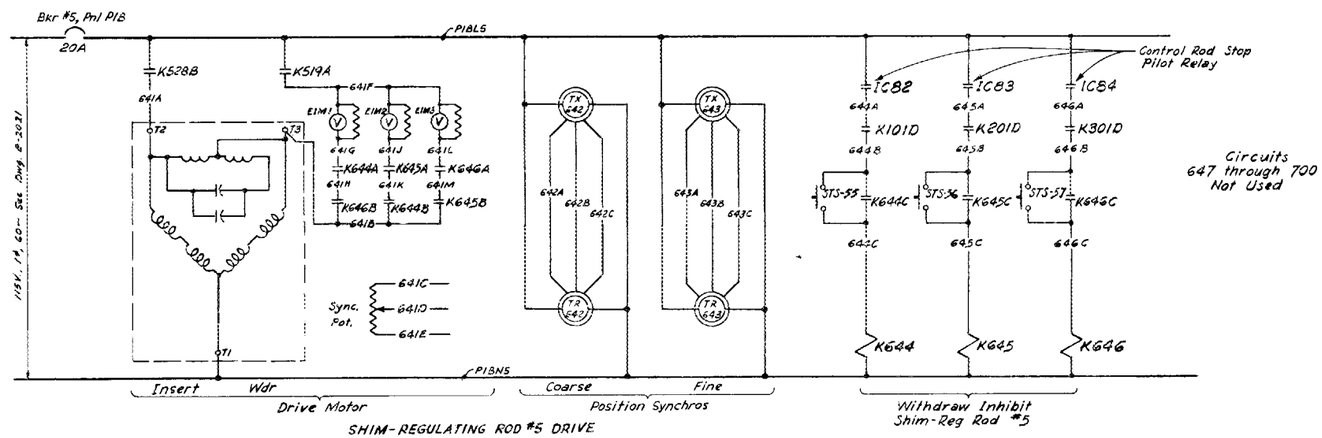
SHIM-SAFETY ROD #2 DRIVE



SHIM-SAFETY ROD #3 DRIVE



SHIM-SAFETY ROD #4 DRIVE



SHIM-REGULATING ROD #5 DRIVE

NO.	REVISIONS	DATE	APPD	APPD
2	Added Ckts. 644, 645, 646 Rev. Ckts. 601, 611, 621, 631, 641 Rem. Ckts. 604, 614, 624, 634	4/1/64	JC	
1	Added Note 1.	9-25-61	JCO	

DRAWN Herrell	DATE 8-23-61	SUBMITTED	DATE 8-25-61	APPROVED	DATE
DESIGNED	DATE	APPROVED	DATE 9/6/61	APPROVED	DATE
CHECKED	DATE	APPROVED	DATE	APPROVED	DATE

REFERENCE DRAWINGS	DWG. NO.

H.F.I.R.

ELEMENTARY DIAGRAM
SHIM ROD DRIVES

INSTRUMENTATION AND CONTROLS DIVISION
OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY

SUBMITTED	ACCEPTED	DATE	APPROVED	SIZE
		8/24/61		
	8/25/61			RC11-1-2G REV. 2

RELAYS ON 32VDC "A" BUS
See Note 1

RELAY NO.	CONTACT NO. A	B	C	D
K101	101	141	704	641
K102	503	503	Sp.	Sp.
K103	503	550	550	Sp.
K104	514	514	713	Sp.
K105	503	Sp.	Sp.	Sp.
K106	514	514	Sp.	Sp.
K107	520	707	Sp	Sp.
K108	121	125	Sp.	Sp.
K109	122	125	Sp.	Sp.
K110	113	502	130	Sp.
K111	112	131	Sp.	Sp.
K112	126	126	126	Sp.
K113	112	126	126	126

RELAYS ON 32VDC "B" BUS
See Note 1

RELAY NO.	CONTACT NO. A	B	C	D
K201	201	241	719	641
K202	503	503	Sp.	Sp.
K203	503	550	550	Sp
K204	514	514	732	Sp.
K205	503	Sp.	Sp.	Sp.
K206	514	514	Sp	Sp.
K207	521	723	Sp	Sp
K208	221	225	Sp	Sp
K209	222	225	Sp	Sp
K210	213	502	230	Sp
K211	212	231	Sp	Sp
K212	226	226	226	Sp.
K213	212	226	226	226

RELAYS ON 32VDC "C" BUS
See Note 1

RELAY NO.	CONTACT NO. A	B	C	D
K301	301	341	739	641
K302	503	503	Sp	Sp
K303	503	550	550	Sp
K304	514	514	748	Sp.
K305	503	Sp	Sp	Sp.
K306	514	514	Sp	Sp.
K307	522	742	Sp	Sp.
K308	321	325	Sp	Sp
K309	322	325	Sp	Sp
K310	313	502	330	Sp
K311	312	331	Sp	Sp.
K312	326	326	326	Sp.
K313	312	326	326	326

RELAYS ON 120VDC "D" BUS
See Note 1

RELAY NO.	CONTACT NO. A	B	C	D	E	F	G	H
K401	416	141	241	341	515	524	411	N.C.
K402	417	142	242	342	516	525	412	N.C.
K403	418	143	243	343	517	526	413	N.C.
K404	419	144	244	344	518	527	414	N.C.
K405	140	240	340	420	Sp.	Sp	Sp	Sp
K406	140	240	340	421	502	503	514	Sp
K411	407	Sp.	Sp.	Sp.				
K412	408	Sp.	Sp.	Sp.				
K413	409	Sp.	Sp.	Sp.				
K414	410	Sp.	Sp.	Sp.				
K423	411	412	413	414	Sp.	Sp.	Sp.	Sp.
K424	411	412	413	414	Sp.	Sp.	Sp.	Sp.

Save N.C. Contacts For Shim Rod Flight Test Circuits.

RELAYS ON 115VAC BUS
See Note 1

RELAY NO.	CONTACT NO. A	B	C	D	E	F	G	H	J	K	L	M
K501	501	502	504	578	Sp	Sp	Sp	Sp				
K502	501	503	504	502	514	579	560	Sp				
KA503	502	504	514	515	511	Sp	580	503	Sp	Sp	Sp	Sp
See below for "Run Auxiliary" relays KB503, KC503 and KD503												
K504	140	240	340	511	581	Sp	Sp	Sp				
K505	501	Sp	Sp	Sp								
K506	511	512	Sp	Sp								
K507	141	241	341	515	411	574	Sp	Sp				
K508	142	242	342	516	412	575	Sp	Sp				
K509	143	243	343	517	413	576	Sp	Sp				
K510	144	244	344	518	414	577	Sp	Sp				
K511	718	Sp	Sp	Sp								
K512	512	514	Sp	Sp								
K513	513	523	Sp	Sp								
K514	515	516	517	518	519	515	Sp	Sp				
K515	601	Sp	Sp	Sp								
K516	611	Sp	Sp	Sp								
K517	621	Sp	Sp	Sp								
K518	631	Sp	Sp	Sp								
K519	641	Sp	Sp	Sp								
K520	523	523	705	Sp								
K521	523	523	722	Sp								
K522	523	523	740	Sp								
K523	524	525	526	527	528	Sp	Sp	Sp				
K524	515	601	Sp	Sp								
K525	515	611	Sp	Sp								
K526	517	621	Sp	Sp								
K527	518	631	Sp	Sp								
K528	519	641	Sp	Sp								
K533	513	Sp	571	Sp								
K534	512	513	Sp	Sp								
K535	511	573	Sp	Sp								
K536	524	Sp	561	Sp								
K537	525	Sp	562	Sp								
K538	526	Sp	563	Sp.								
K539	527	Sp	564	Sp								
K540	528	Sp	565	140	240	340						
K541	515	566	Sp	Sp								
K542	516	567	Sp	Sp								
K543	517	568	Sp	Sp								
K544	518	569	Sp	Sp								
K545	519	570	Sp	140	240	340						
K546	736	Sp	Sp	Sp								
K547	140	140	Located in Servo Channel Cab. "A"									
K548	240	240	" " " " " "B"									
K549	340	340	" " " " " "C"									
K550	503	Sp.	Sp.	Sp.								
K644	641	641	Sp.	Sp.								
K645	641	641	Sp.	Sp.								
K646	641	641	Sp.	Sp.								
KB503	112	113	709	520	711	N.O.	Sp	Sp				
KC503	212	213	726	521	729	N.O.	Sp	Sp				
KD503	312	313	744	522	746	N.O.	Sp	Sp				
TIMER T560	515	523	514	Sp								

Contacts Used In Run Relay Circuits, Drawer 5, Channels "1", "2" & "3" (KB503, KC503, KD503)

INSTRUMENT CONTACT TABULATION

I.C. NO.	LOCATION	OPERATION AND SETPOINT	CIRCUIT NO.
IC1	No. 1 Servo Fiss. Ch. Channel	Closes > 300 KW	102
IC2	"	Closes > 10 cps	104
IC3	"	Closes < 50,000 cps	104
IC4	"	Closes in "USE"	104
IC5	"	Closes τ < +100 Sec.	105
IC6	"	Closes τ > 20 Sec.	105
IC7	"	Closes τ < 5 Sec.	107
IC8	No. 2 Servo Fiss. Ch. Channel	Closes > 300 KW	202
IC9	"	Closes > 10 cps	204
IC10	"	Closes < 50,000 cps	204
IC11	"	Closes in "USE"	204
IC12	"	Closes τ < +100 Sec.	205
IC13	"	Closes τ > 20 Sec.	205
IC14	"	Closes τ < 5 Sec.	207
IC15	No. 3 Servo Fiss. Ch. Channel	Closes > 300 KW	302
IC16	"	Closes > 10 cps	304
IC17	"	Closes < 50,000 cps	304
IC18	"	Closes in "USE"	304
IC19	"	Closes τ < +100 Sec.	305
IC20	"	Closes τ > 20 Sec.	305
IC21	"	Closes τ < 5 Sec.	307
IC22	No. 1 Safety Channel	Closes $N > 1.1 N_L (P_h)$ or $N > 1.1 N_F (P_h)$	520
IC23	"	Closes $N > 1.1 N_L (\phi)$ or $N > 1.1 N_F (\phi)$	520
IC24	"	Closes Asymmetry > 1 Inch	113
IC25	"		
IC26	"	Opens Flux Rate > 20 MW/Sec.	[illegible]
IC27	Reg. Rod Servo Channel "A"	Closes Demand > Demand Permitted by Flow	113
IC28	No. 1 Safety Channel	Opens ϕ/F > 1.3	708
IC29	"	Opens $\phi R > 1.1 N_L$	709
IC30	"	Opens Inlet Temp. > 135°	710
IC31	"	Opens $\phi R > 1.1 N_F$	711
IC32	"	Opens Reactor Vessel Pressure < (Later)	712
IC33	No. 2 Safety Channel	Closes $N > 1.1 N_L (P_h)$ or $N > 1.1 N_F (P_h)$	521
IC34	"	Closes $N > 1.1 N_L (\phi)$ or $N > 1.1 N_F (\phi)$	521
IC35	"	Closes Asymmetry > 1 Inch	213
IC36	"		
IC37	"	Opens Rate > 20 MW/Sec.	[illegible]
IC38	Reg. Rod Servo Channel "B"	Closes Demand > Demand Permitted by Flow	845
IC39	No. 2 Safety Channel	Opens ϕ/F > 1.3	723
IC40	"	Opens $\phi R > 1.1 N_L$	726
IC41	"	Opens Inlet Temp. > 135°	728
IC42	"	Opens $\phi R > 1.1 N_F$	729
IC43	"	Opens Reactor Vessel Pressure < (Later)	731
IC44	No. 3 Safety Channel	Closes $N > 1.1 N_L (P_h)$ or $N > 1.1 N_F (P_h)$	522
IC45	"	Closes $N > 1.1 N_L (\phi)$ or $N > 1.1 N_F (\phi)$	522
IC46	"	Closes N > Asymmetry > 1 Inch	313
IC47	"		
IC48	"	Opens Rate > 20 MW/Sec.	741
IC49	Reg. Rod Servo Channel "C"	Closes Demand > Demand Permitted by Flow	313
IC50	No. 3 Safety Channel	Opens ϕ/F > 1.3	743
IC51	"	Opens $\phi R > 1.1 N_L$	744
IC52	"	Opens Inlet Temp. > 135°	745
IC53	"	Opens $\phi R > 1.1 N_F$	746
IC54	"	Opens Reactor Vessel Pressure < (Later)	747
IC55	Reg. Rod Servo Channel "A"	Closes Withdraw Error	502
IC56	Reg. Rod Servo Channel "B"	Closes Withdraw Error	502
IC57	Reg. Rod Servo Channel "C"	Closes Withdraw Error	502
IC58	No. 1 Safety Channel	Closes Heat Power >≈ 8 MW	103
IC59	"	Opens $N > 1.1 N_L (P_h)$	709
IC60	"	Opens $N > 1.1 N_F (P_h)$	711

INSTRUMENT CONTACT TABULATION (CONT'D)

I.C. NO.	LOCATION	OPERATION AND SETPOINT	CIRCUIT NO.
IC61	No. 2 Safety Channel	Closes Heat Power >≈ 8 MW	203
IC62	"	Opens $N > 1.1 N_L (P_h)$	725
IC63	"	Opens $N > 1.1 N_F (P_h)$	729
IC64	No. 3 Safety Channel	Closes Heat Power >≈ 8 MW	303
IC65	"	Opens $N > 1.1 N_L (P_h)$	744
IC66	"	Opens $N > 1.1 N_F (P_h)$	745
IC67	Shim Computer	Closes on Shim Permit	506
IC68	Servo Channels A, B & C	2 of 3 Servo Insert Error	423
IC69	No. 1 Safety Channel	Low Ion Chamber Voltage & Module Continuity	101
IC70	No. 2 Safety Channel	Low Ion Chamber Voltage & Module Continuity	201
IC71	No. 3 Safety Channel	Low Ion Chamber Voltage & Module Continuity	301
IC72	Servo Channels A, B, & C	Opens < 5 MW/Sec. – 2 of 3	514
IC73	No. 1 Saftey Channel	Opens Low Ion Chamber Voltage	737
IC74	No. 2 Safety Channel	Opens Low Ion Chamber Voltage	735
IC75	No. 3 Safety Channel	Opens Low Ion Chamber Voltage	764

Continued on Dwg. RC11-1-2P

S1 – Operate

CONTACTS	POSITION (REAR VIEW) OPERATE	OFF*	CIRC. NO.
A (1)	X		501
B (2)		X	503
C (3)	X		141
D (4)	X		241
E (5)	X		341
F (6)		X	515
G (7)	X		101
H (8)	X		201
J (9)	X		301
K (10)	X		
L (11)	X		Sp.
M (12)	X		Sp.

See "Master Timer Circuit", dwg E-2119 (K)

* Key lock handle with key removable only in "Off" position

Momentary P.B.'s

SWITCH NO.	CONTACT N.O.	N.C.
S2	501	Sp.
S3	Sp	503
S4A	112	Sp.
S4B	113	Sp.
S5A	212	Sp.
S5B	213	Sp.
S6A	312	Sp.
S6B	313	Sp.

S18 – Shim Computer By-Pass

CONTACTS	HANDLE POSITIONS (REAR VIEW) BY-PASS	OFF	CIRC. NO.
A (1)	X		506
B (2)	X		Sp
C (3)		X	Sp
D (4)		X	Sp

Operated by lateral motion of switch handle while in "Off" position only.

S7 – Shim Rod Actuate

CONTACTS	POSITIONS (REAR VIEW) FAST WDR.	INT. WDR.	OFF	INT. INSERT	FAST INSERT	CIRC. NO.
A (1)	⊗	⊗	⊗	⊗	⊗	514
B (2)	⊗	⊗	⊗	⊗	⊗	Sp
C (3)		X		X		560
D (4)					X	523
E (5)				X		523
F (6)			X			Sp
G (7)	X					515
H (8)		X				515

Spring Returns

⊗ - Denotes closed in "pushed" position, open in "pulled"
NOTE – Switch shall not turn to wdr pos. while pulled

S9 – Raise - Test

CONTACTS	POSITIONS (REAR VIEW) TEST	NORMAL	CIRC. NO.
A (1)		X	515
B (2)	X		515
C (3)		X	516
D (4)	X		516
E (5)		X	517
F (6)	X		517
G (7)		X	518
H (8)	X		518
J (9)		X	519
K (10)	X		515
L (11)		X	529
M (12)		X	101
N (13)		X	201
P (14)		X	301
Q (15)	X		Sp
R (16)	X		Sp

S8 – Shim Rod Drive Selector

CONTACTS	POSITION (REAR VIEW) ALL	5	4	3	2	1	CIRC. NO.
A (1)						X	515
B (2)	X						515
C (3)					X		516
D (4)	X						516
E (5)				X			517
F (6)	X						517
G (7)			X				518
H (8)	X						518
J (9)		X					519
K (10)	X						519
L (11)	X						523
M (12)						X	524
N (13)					X		525
P (14)				X			526
Q (15)			X				527
R (16)		X					528
S (17)	X						Sp
T (18)	X						Sp

S10 – Scram

CONTACTS	POSITIONS (REAR VIEW) SCRAM	NORMAL	SCRAM	CIRC. NO.
A (1)		X		Sp.
B (2)		X		101
C (3)		X		201
D (4)		X		301
E (5)		X		141
F (6)		X		241
G (7)		X		341
H (8)		X		Sp
J (9)	X		X	Sp
K (10)	X		X	Sp

S11 – Group Servo Demand

CONTACTS	POSITIONS (REAR VIEW) RAISE	OFF	LOWER	CIRC. NO.
A (1)	X			112
B (2)			X	113
C (3)	X			212
D (4)			X	213
E (5)	X			312
F (6)			X	313
G (7)	X			Sp
H (8)			X	Sp

Spring Returns

S12, S13, S14 – #1, #2 & #3 Fission Chamber Auto-Manual Drive (Pull for Manual)

CONTACTS	POSITIONS (REAR VIEW) WDR	NEUTRAL	INSERT	CIRCUIT NO. S12	S13	S14
A (1)	⊗	⊗	⊗	104	204	304
B (2)	⊗	⊗	⊗	124	224	324
C (3)	⊗	⊗	⊗	Sp	Sp	Sp
D (4)	⊗	⊗	⊗	Sp	Sp	Sp
E (5)	⊗	⊗	⊗	125	225	325
F (6)	⊗	⊗	⊗	125	225	325
G (7)	○	○	○	125	225	325
H (8)	○	○	○	125	225	325
J (9)			X	125	225	325
K (10)	X			125	225	325
L (11)	X			125	225	325
M (12)			X	125	225	325
N (13)	X			Sp	Sp	Sp
P (14)			X	Sp	Sp	Sp
Q (15)		X		Sp	Sp	Sp
R (16)		X		Sp	Sp	Sp

Rotary motion only in "Pulled" position (J–R)

Spring returns to "Neutral" and to "Auto" (Pushed)

** Contacts A thru H operate by lateral motion of switch handle while in "Neutral" position only.
⊗ denotes closed in pushed (Auto), ○ denotes closed in pulled

S15, S16, S17 Momentary 3-gang P.B.'s

SWITCH NO.	CONTACT A N.O.	A N.C.	B N.O.	B N.C.	C N.O.	C N.C.
S15	101	Sp	201	Sp	301	Sp
S16	Sp	701	Sp	701	Sp	701
S17	Sp	702	Sp	702	Sp	702

NOTES:
1. Relay Tabulations show circuit numbers in which contacts are used. Underlined numbers denote normally closed contact, while others are normally open. "Sp" denotes spare contact.
2. All switch contacts shall be "break-before-make", unless otherwise noted.

NO.	REVISIONS	DATE	APPD	APPD
5	Added: IC68-75, K411-414, K423, K424, K547-550, K644-646. Removed: K529-532; Misc. Minor Revisions	1/11/64		
4	Changed S7 to Type SB-10 switch. Changed K540 & K545 to 6-pole relays.	6-11-62		
3	Used 4 Contacts On Relays K401, 2, 3 & 4	3-29-62		
2	Added Sw. S18	10-12-61		
1	Minor revisions to S9, S10 and I.C. Tabulation. Revised for rearrangement of "Run" relays. Added K546. Added spring return to Auto on S12, S13 & S14.	9-15-61		

Drawn: Herrell 8-28-61; Checked 8-28-61

REFERENCE DRAWINGS | DWG. NO.

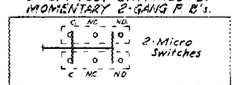
H.F.I.R.

ELEMENTARY DIAGRAM
CONTACT TABULATIONS-SHEET 1

INSTRUMENTATION AND CONTROLS DIVISION
OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY

8/28/61 — RC11-1-2H REV. 5

SAFETY TEST SWITCHES 1-57
MOMENTARY 2-GANG P B's.



SAFETY TEST SWITCH No.	CONTACT A N.O.	CONTACT A N.C.	CONTACT B N.O.	CONTACT B N.C.
1	M160	Sp	Sp	Sp
2	M160	Sp	Sp	Sp
3	M160	Sp	Sp	Sp
4	M170	Sp	Sp	Sp
5	M170	Sp	Sp	Sp
6	M170	Sp	Sp	Sp
7	M180	Sp	Sp	Sp
8	M180	Sp	Sp	Sp
9	M180	Sp	Sp	Sp
10	M157	Sp	Sp	Sp
11	M158	Sp	Sp	Sp
12	M159	Sp	Sp	Sp
13	M167	Sp	Sp	Sp
14	M168	Sp	Sp	Sp
15	M169	Sp	Sp	Sp
16	M177	Sp	Sp	Sp
17	M178	Sp	Sp	Sp
18	M179	Sp	Sp	Sp
19	M156	Sp	M157	Sp
20	M156	Sp	M158	Sp
21	M156	Sp	M159	Sp
22	M156	Sp	M157	Sp
23	M156	Sp	M158	Sp
24	M156	Sp	M159	Sp
25	M156	Sp	M157	Sp
26	M156	Sp	M158	Sp
27	M156	Sp	M159	Sp
28	M153	Sp	Sp	Sp
29	M153	Sp	Sp	Sp
30	M163	Sp	Sp	Sp
31	M163	Sp	Sp	Sp
32	M173	Sp	Sp	Sp
33	M173	Sp	Sp	Sp
34	M152	Sp	Sp	Sp
35	M152	Sp	Sp	Sp
36	M162	Sp	Sp	Sp
37	M162	Sp	Sp	Sp
38	M172	Sp	Sp	Sp
39	M172	Sp	Sp	Sp
40	M155	Sp	Sp	Sp
41	M165	Sp	Sp	Sp
42	M175	Sp	Sp	Sp
43	M154	Sp	Sp	Sp
44	M154	Sp	Sp	Sp
45	M164	Sp	Sp	Sp
46	M164	Sp	Sp	Sp
47	M174	Sp	Sp	Sp
48	M174	Sp	Sp	Sp
49	M150	Sp	M150	Sp
50	M150	Sp	M150	Sp
51	M160	Sp	M160	Sp
52	M160	Sp	M160	Sp
53	M170	Sp	M170	Sp
54	M170	Sp	M170	Sp
55	644	Sp	Sp	Sp
56	645	Sp	Sp	Sp
57	646	Sp	Sp	Sp

S22-MODE SW.

	CONTACTS HANDLE END		POSITIONS (REAR VIEW) MODE 3	MODE 2	MODE 1	CKT. NO.
S22-1	A	A (1)		X		M11
		B (2)	X	X		M12
	C	C (3)	X			M13
		D (4)			X	Sp.
	E	E (5)		X	X	Sp.
		F (6)			X	M17
	G	G (7)		X		M18
		H (8)	X			M19
S22-2	A	A (1)		X		M21
		B (2)	X	X		M22
	C	C (3)	X			M23
		D (4)			X	Sp.
	E	E (5)		X	X	Sp.
		F (6)			X	M27
	G	G (7)		X		M28
		H (8)	X			M29
	J	J (9)	X	X		501
		K (10)	X	X		514
	L	L (11)	X	X		515
		M (12)	X	X		Sp
	N	N (13)	X	X		503
		P (14)			X	511
	Q	Q (15)	X			Sp.
		R (16)		X		Sp.
S22-3	A	A (1)		X		M31
		B (2)	X	X		M32
	C	C (3)	X			M33
		D (4)			X	Sp.
	E	E (5)		X	X	Sp.
		F (6)			X	M37
	G	G (7)		X		M38
		H (8)	X			M39

INSTRUMENT CONTACT TABULATION

I.C. NO.	LOCATION	OPERATION AND SETPOINT	CIRCUIT NO.
IC76	No. 1 Safety Channel	Opens Heat Pwr. Trip > 120 MW	753
IC77	No. 2 Safety Channel	Opens Heat Pwr. Trip > 120 MW	724
IC78	No. 3 Safety Channel	Opens Heat Pwr. Trip > 120 MW	762
IC79	No. 1 Safety Channel	Opens Low Low Flow <	756
IC80	No. 2 Safety Channel	Opens Low Low Flow <	734
IC81	No. 3 Safety Channel	Opens Low Low Flow <	768
IC82	No. 1 Safety Channel	Opens Inhibit Rod #5 Withdrawal on Trip	644
IC83	No. 2 Safety Channel	Opens Inhibit Rod #5 Withdrawal on Trip	645
IC84	No. 3 Safety Channel	Opens Inhibit Rod #6 Withdrawal on Trip	646
IC85	No. 1 Safety Channel	Opens > ⅛ Scale FFED	759
IC86	No. 2 Safety Channel	Opens > ⅛ Scale FFED	737
IC87	No. 3 Safety Channel	Opens > ⅛ Scale FFED	766
IC88		Opens Asymmetry > ⅛ Inch	727
IC89	RE 200	Open Radiatio Hi	730

NO.	REVISIONS	DATE	APPD	APPD

DRAWN	DATE	SUBMITTED	DATE	APPROVED	DATE
R.W.B.	6-1-64				
DESIGNED	DATE	APPROVED	DATE	APPROVED	DATE
CHECKED	DATE	APPROVED	DATE	APPROVED	DATE

REFERENCE DRAWINGS | DWG. NO.

DESIGN RESPONSIBILITY

H. F. I. R.

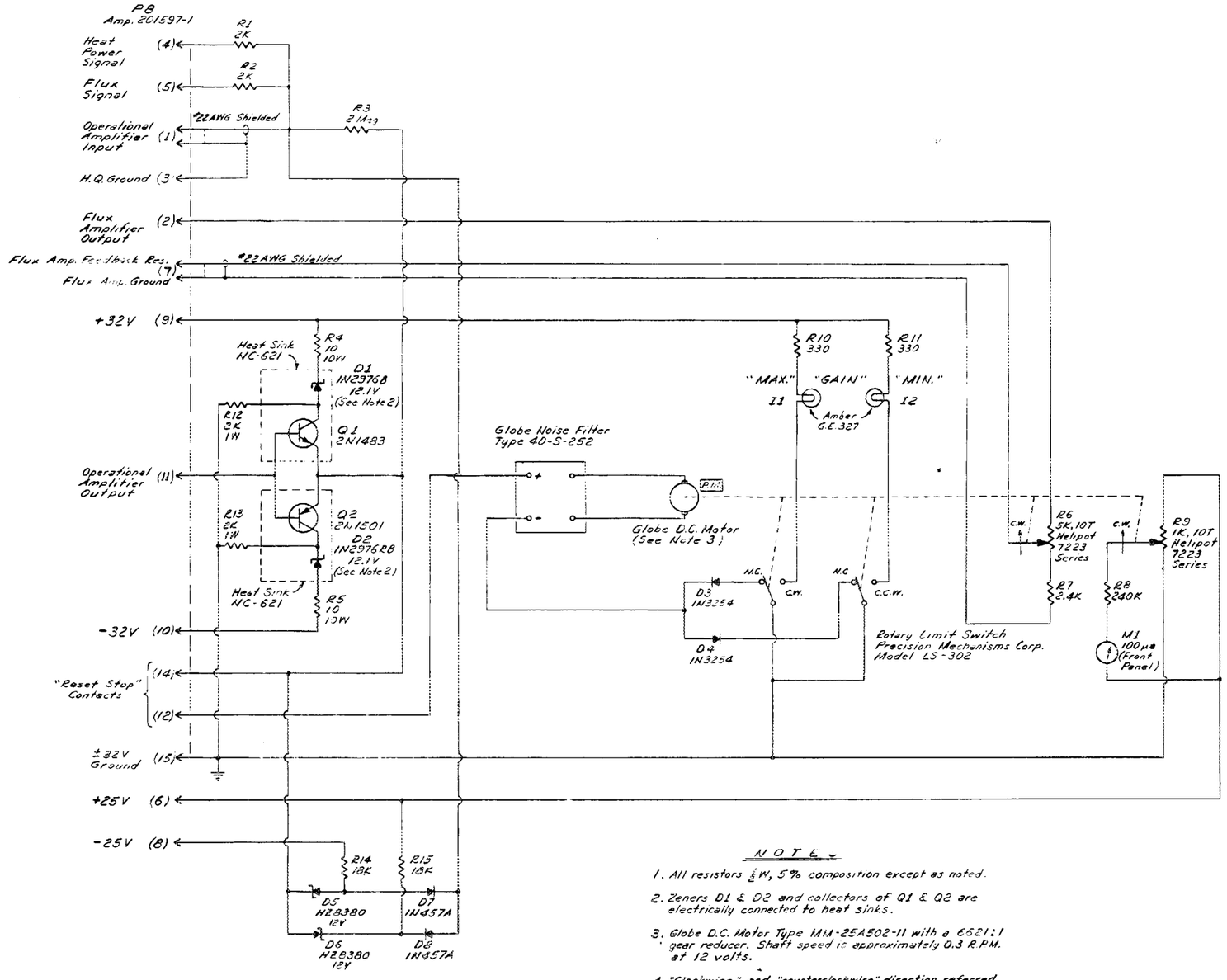
ELEMENTARY DIAGRAM
CONTACT TABULATIONS-SHEET 2

LIMITS ON DIMENSIONS UNLESS OTHERWISE SPECIFIED
FRACTIONS: ±
DECIMALS: ±
ANGLES: ±
SCALE:

INSTRUMENTATION AND CONTROLS DIVISION
OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY

SUBMITTED 6/1/64 | ACCEPTED 6-1-64 | DATE | APPROVED | DATE

RC11-1-2P REV. 0



NOTES

1. All resistors ½W, 5% composition except as noted.
2. Zeners D1 & D2 and collectors of Q1 & Q2 are electrically connected to heat sinks.
3. Globe D.C. Motor Type M14-25A502-11 with a 6521:1 gear reducer. Shaft speed is approximately 0.3 R.P.M. at 12 volts.
4. "Clockwise" and "counterclockwise" direction referred to herin are viewed from the shaft end of the device.

NO.	REVISIONS	DATE	APPD	APPD

DRAWN	DATE	SUBMITTED	DATE	APPROVED	DATE
C.E. WAGGONER	3-29-63	[illegible]	[illegible]		
DESIGNED	DATE	APPROVED	DATE	APPROVED	DATE
R. NUTT	3-29-63				
CHECKED	DATE	APPROVED	DATE	APPROVED	DATE
		D.T. Rowe	6-14-63		

PARTS LIST	RC11-9-8F
ASSEMBLY	RC11-9-8E
PRINTED CKT BOARD	RC11-9-8D
METALPHOTO PANEL	RC11-9-8C
DETAILS	RC11-9-8B
REFERENCE DRAWINGS	DWG. NO.

J.L. ANDERSON

MODULAR REACTOR INSTRUMENTATION

FLUX RESET MECHANISM CIRCUIT

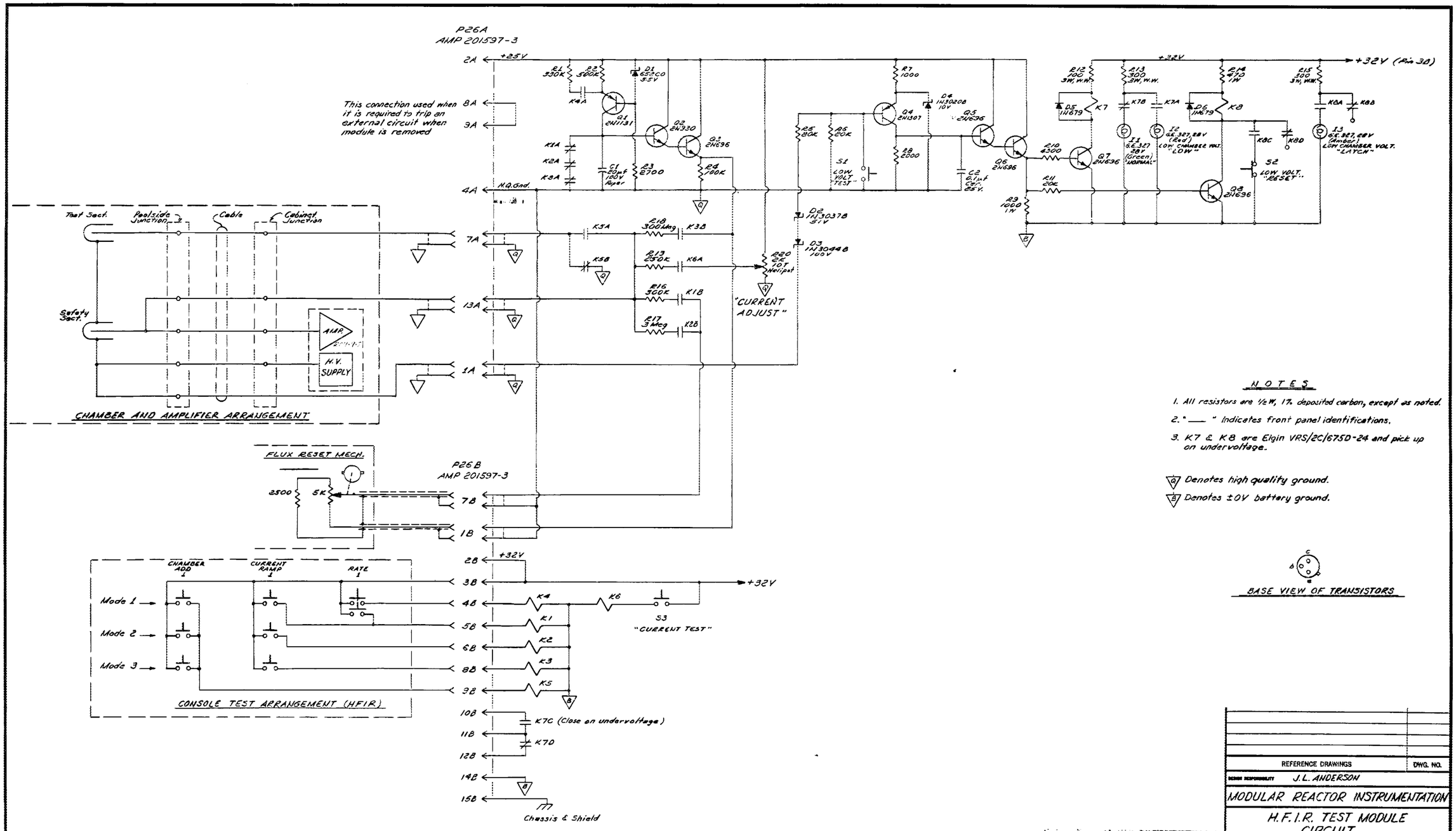
INSTRUMENTATION AND CONTROLS DIVISION
OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY

SUBMITTED	DATE	ACCEPTED	DATE	APPROVED	DATE
[illegible]	7-1-63	[illegible]	7-2-63	[illegible]	7-3-63

RC11-9-8A RO

6-25-67 RO RC-11-9-8A J.L.A.

2603-1



NOTES

1. All resistors are 1/2 W, 1% deposited carbon, except as noted.
2. "____" Indicates front panel identifications.
3. K7 & K8 are Elgin VRS/2C/6750-24 and pick up on undervoltage.

▽(a) Denotes high quality ground.
▽(b) Denotes ±0V battery ground.

BASE VIEW OF TRANSISTORS

NO.	REVISIONS	DATE	APPD	APPD
	DRAWN C.E. MAGGOWER 4-1-64 / SUBMITTED J.L. Anderson 4-7-64 / APPROVED 4-7-64			
	DESIGNED / APPROVED / APPROVED			
	CHECKED / APPROVED / APPROVED			

4-7-64 0 RC11-9-17-A J.L.A. APPROVED
REPLAS ISSUED FROM G-2630-1

REFERENCE DRAWINGS	DWG. NO.
DESIGN RESPONSIBILITY J.L. ANDERSON	

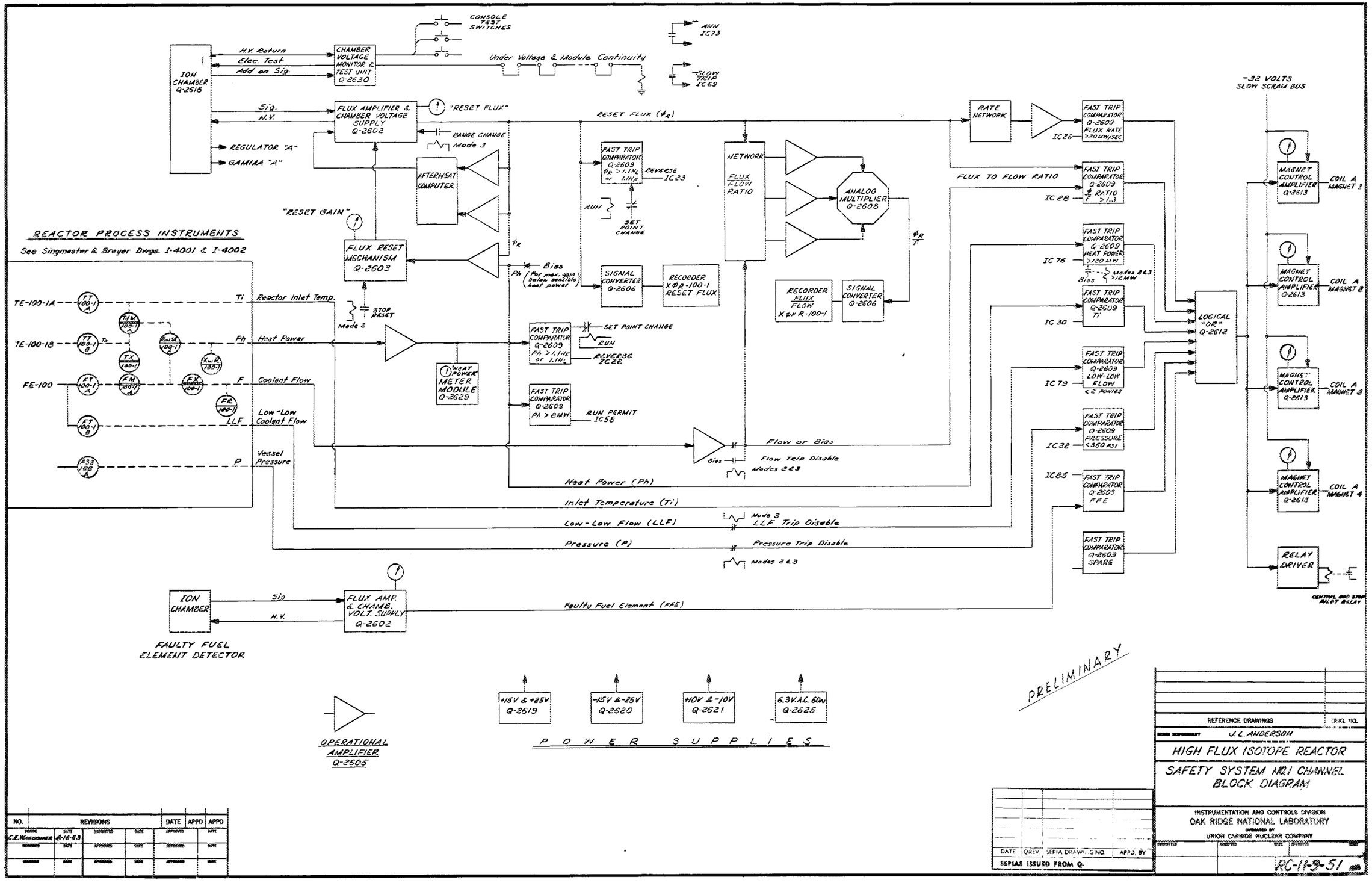
MODULAR REACTOR INSTRUMENTATION

H.F.I.R. TEST MODULE CIRCUIT

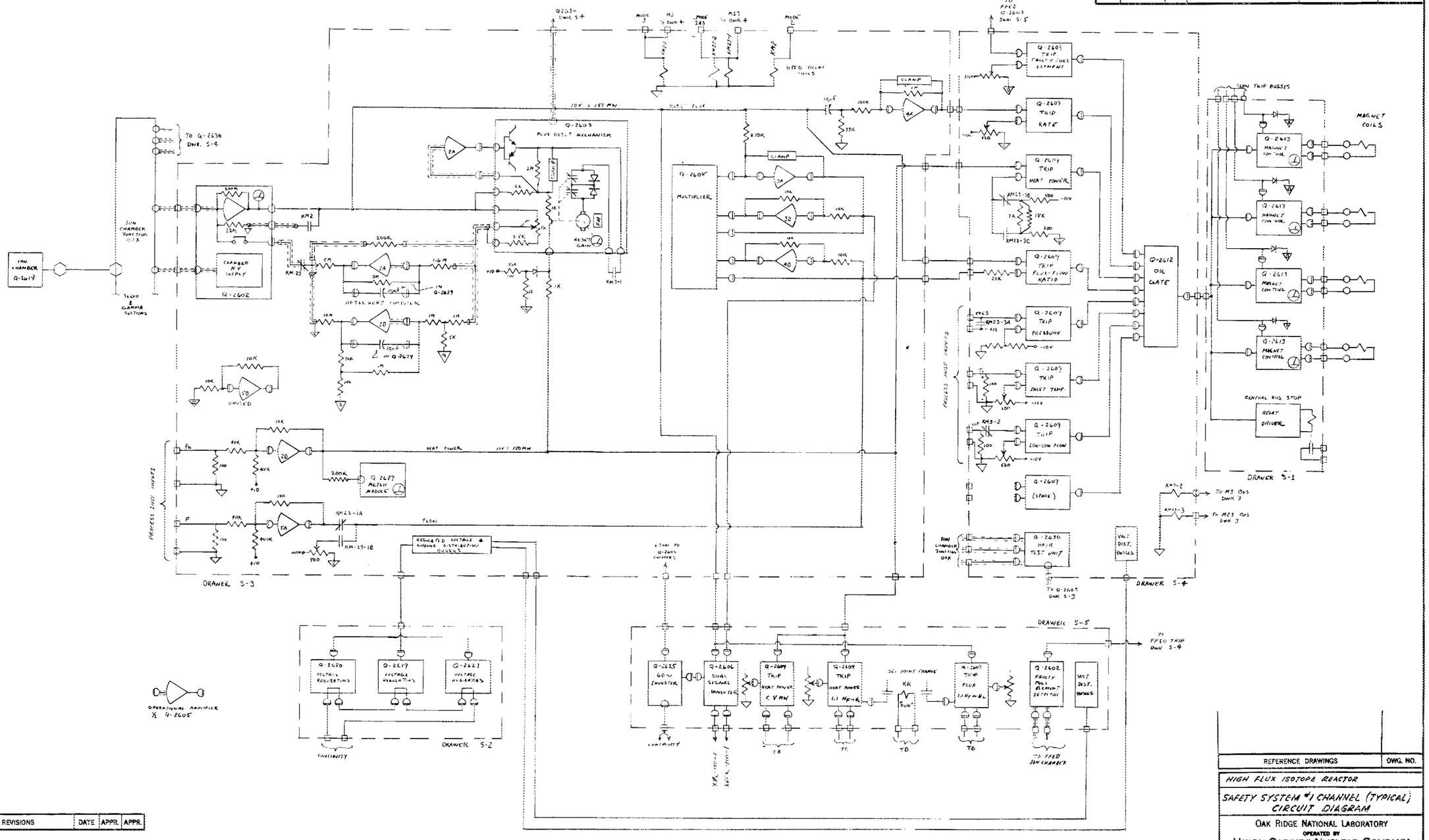
INSTRUMENTATION AND CONTROLS DIVISION
OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY

SUBMITTED 4/16/64 ACCEPTED 9-16-64 DATE APPROVED 9/16/64

RC11-9-17A R0


ION CHAMBER Q-2618
H.V. Return
Elec. Test
Add on Sig.
CHAMBER VOLTAGE MONITOR & TEST UNIT Q-2630
CONSOLE TEST SWITCHES
Under Voltage & Module Continuity
AHN IC73
SLOW TRIP IC69
Sig.
H.V.
FLUX AMPLIFIER & CHAMBER VOLTAGE SUPPLY Q-2602
"RESET FLUX"
RESET FLUX (φR)
REGULATOR "A"
GAMMA "A"
RANGE CHANGE
Mode 3
AFTERHEAT COMPUTER
"RESET GAIN"
FLUX RESET MECHANISM Q-2603
STOP RESET
Mode 3
REACTOR PROCESS INSTRUMENTS
See Singmaster & Breyer Dwgs. I-4001 & I-4002
TE-100-1A
TE-100-1B
FE-100
Ti Reactor Inlet Temp.
Ph Heat Power
F Coolant Flow
LLF Low-Low Coolant Flow
P Vessel Pressure
"HEAT POWER" METER MODULE Q-2629
Bias
Ph (For max. gain below seasible heat power)
FAST TRIP COMPARATOR Q-2609 φR > 1.1N or 1.1N
REVERSE IC23
RUN
SET POINT CHANGE
SIGNAL CONVERTER Q-2606
RECORDER XφR-100-1 RESET FLUX
FAST TRIP COMPARATOR Q-2609 Ph > 1.1N or 1.1N
SET POINT CHANGE
RUN
REVERSE IC22
FAST TRIP COMPARATOR Q-2609 Ph > 8MW
RUN PERMIT IC58
NETWORK
FLUX FLOW RATIO
ANALOG MULTIPLIER Q-2608
RECORDER FLUX FLOW XφFR-100-1
SIGNAL CONVERTER Q-2606
Flow or Bias
Bias
Flow Trip Disable
Modes 2&3
Heat Power (Ph)
Inlet Temperature (Ti)
Low-Low Flow (LLF)
Mode 3
LLF Trip Disable
Pressure (P)
Pressure Trip Disable
Modes 2&3
RATE NETWORK
IC26
FAST TRIP COMPARATOR Q-2609 FLUX RATE >20%/sec
FLUX TO FLOW RATIO
FAST TRIP COMPARATOR Q-2609 φ/F RATIO >1.3
IC 28
FAST TRIP COMPARATOR Q-2609 HEAT POWER >120 MW
IC 76
Modes 2&3 >12MW
Bias
FAST TRIP COMPARATOR Q-2609 Ti
IC 30
FAST TRIP COMPARATOR Q-2609 LOW-LOW FLOW <2 PSI/IAS
IC 79
FAST TRIP COMPARATOR Q-2609 PRESSURE <350 PSI
IC 32
IC85
FAST TRIP COMPARATOR Q-2609 FFE
FAST TRIP COMPARATOR Q-2609 SPARE
LOGICAL "OR" Q-2612
-32 VOLTS SLOW SCRAM BUS
MAGNET CONTROL AMPLIFIER Q-2613
COIL A MAGNET 1
COIL A MAGNET 2
COIL A MAGNET 3
COIL A MAGNET 4
RELAY DRIVER
CENTRAL AND STRIP PILOT RELAY
ION CHAMBER
Sig.
H.V.
FLUX AMP. & CHAMB. VOLT. SUPPLY Q-2602
Faulty Fuel Element (FFE)
FAULTY FUEL ELEMENT DETECTOR
OPERATIONAL AMPLIFIER Q-2505
+15V & +25V Q-2619
-15V & -25V Q-2620
+10V & -10V Q-2621
6.3V.A.C. 60w Q-2625
POWER SUPPLIES
PRELIMINARY
REFERENCE DRAWINGS
DWG. NO.
J.L. ANDERSON
HIGH FLUX ISOTOPE REACTOR
SAFETY SYSTEM M&I CHANNEL BLOCK DIAGRAM
INSTRUMENTATION AND CONTROLS DIVISION
OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY
RC-11-3-51
NO. REVISIONS DATE APPD APPD
C.E. Winzenmer 6-16-63
DATE QREV. SEPIA DRAWING NO. APPD. BY
SEPIAS ISSUED FROM Q-

MATERIALS LIST					
ITEM NO.	DWG. NO.	QTY.	NAME	SIZE	MATERIAL



NO.	REVISIONS	DATE	APPR.	APPR.

DRAWING NO.

DRAWN	DATE	CHECKED	DATE	APPROVED	DATE
DESIGNED	DATE	SUBMITTED	DATE	APPROVED	DATE
HEALTH PHYSICS	MEDICAL	OPERATIONS	SAFETY		
FIRE PROTECTION	RESEARCH SHOP	MAINTENANCE			

THIS DRAWING CLASSIFIED
AS
PER
SCALE:

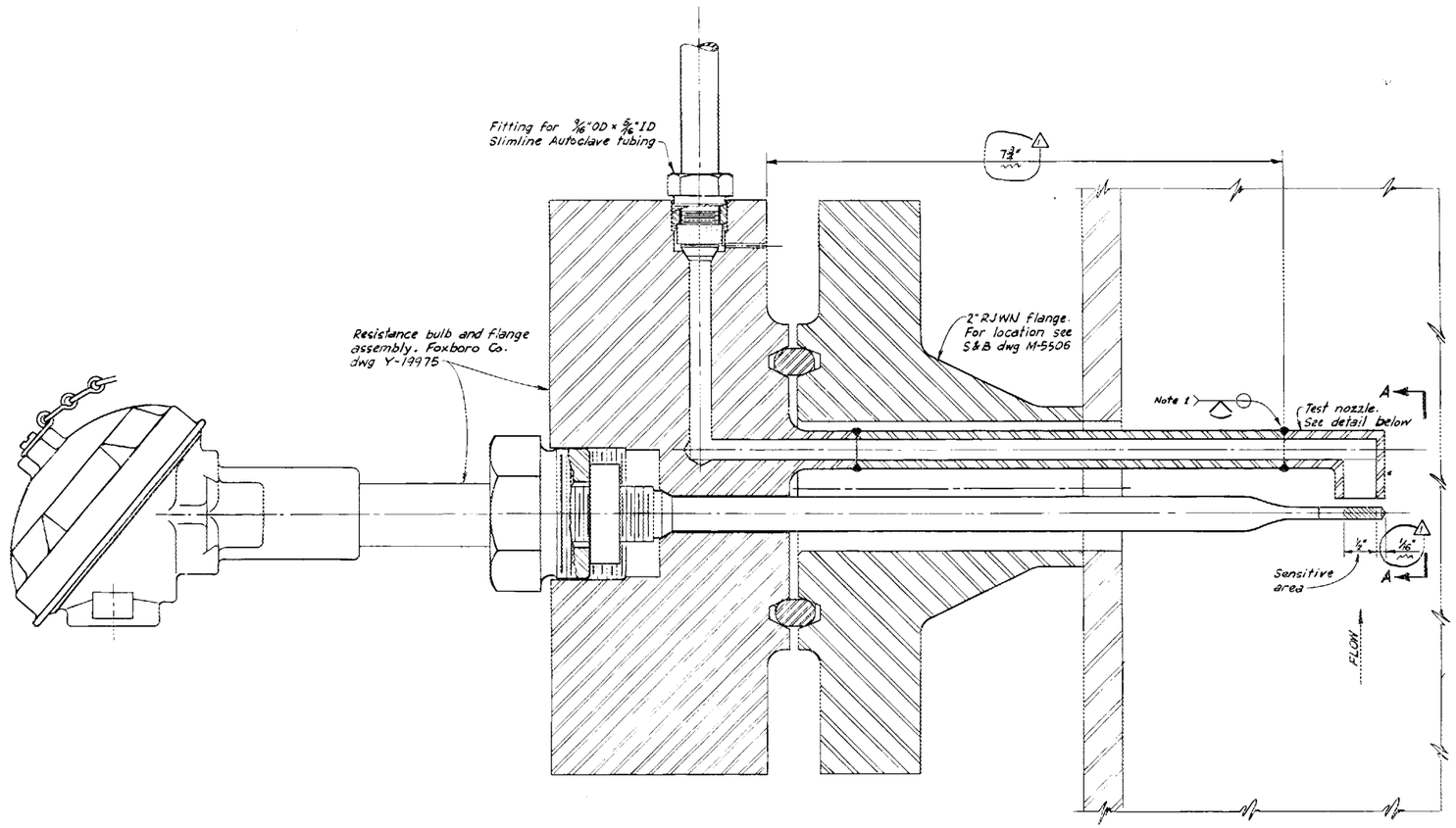
REFERENCE DRAWINGS	DWG. NO.

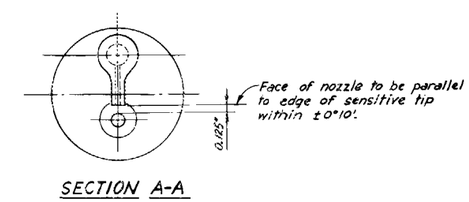
HIGH FLUX ISOTOPE REACTOR

SAFETY SYSTEM #1 CHANNEL (TYPICAL) CIRCUIT DIAGRAM

OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY
A DIVISION OF UNION CARBIDE AND CARBON CORPORATION
OAK RIDGE, TENNESSEE

SUBMITTED	ACCEPTED	APPROVED	REV
		RC11-9-53	

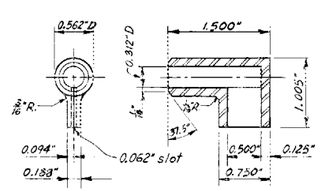




SECTION A-A

NOTES:

1. Welding to be in accordance with S&B Spec. Section 99. Liquid penetrant check per S&B Spec. M-500-MP-165. Radiography per S&B Spec. M-500-MW-6.
2. (Eight) assemblies required for the following: E-100-1A, -1B, -2A, -2B, -3A, -3B, -A Spare & -B Spare.



TEST NOZZLE

Mat'l - 347 SS S&B Spec. M-400-X-24

NO.	REVISIONS	DATE	APPD	APPD
1	Revised dimensions to agree with mfr. Increased no. of assemblies reqd.	7-15-63	[illegible]	[illegible]

DRAWN	DATE	SUBMITTED	DATE	APPROVED	DATE
T. R. Mitchell	10 Jan 63				
DESIGNED	DATE	APPROVED	DATE	APPROVED	DATE
ORIGINAL	DATE	APPROVED	DATE	APPROVED	DATE
T. Spurrio	5-11-63				

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE RECTIFIED

FRACTIONS	±	1/64"
DECIMALS	±	.005"
ANGLES	±	0° 30'

SCALE: FULL SIZE

REFERENCE DRAWINGS	DWG. NO.

DESIGN RESPONSIBILITY

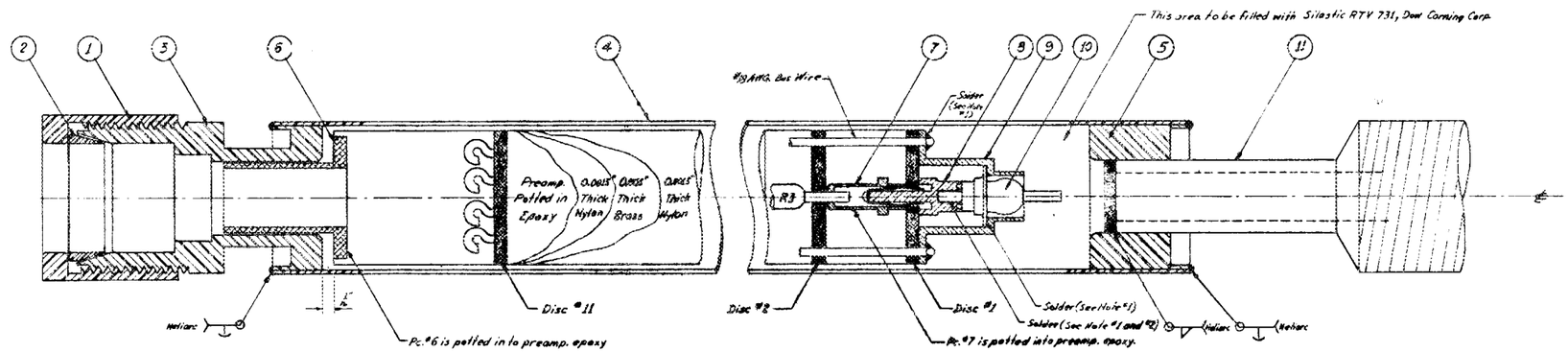
H. F. I. R.

RESISTANCE BULB WITH TEST NOZZLE ASSEMBLY & DETAILS

INSTRUMENTATION AND CONTROLS DIVISION
OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY

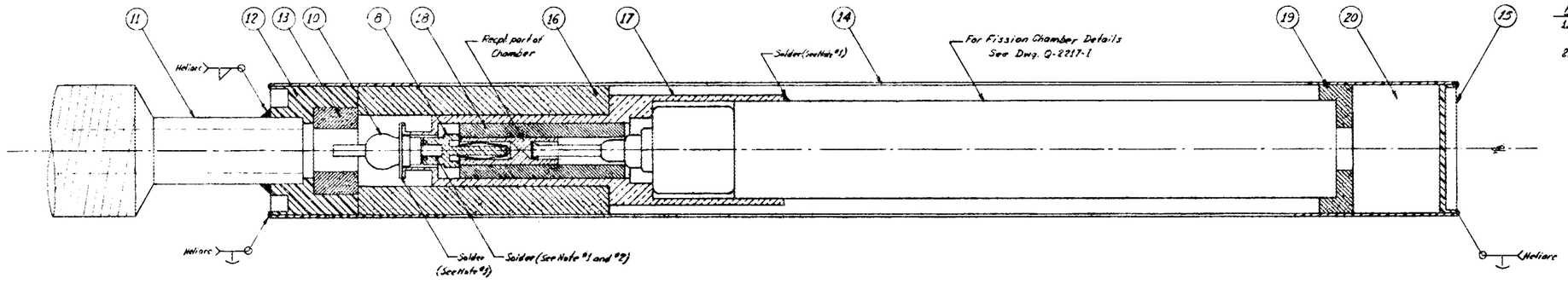
SUBMITTED | ACCEPTED | DATE | APPROVED | DATE

RC 11-11-3 R1



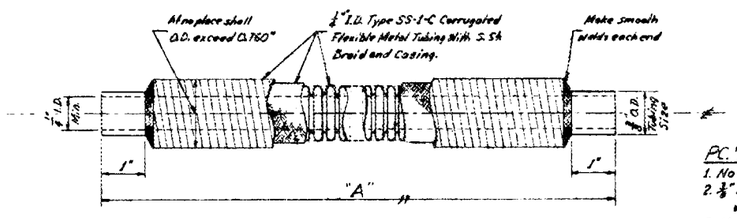
PREAMPLIFIER HOUSING

PC. NO.	NO. REQ'D.	DWG. NO.	DESCRIPTION	MATERIAL
1	1	RC11-13-4C	Nut, Crawford Fitting Co. No. 802-1 (See Detail)	S. St.
2	1	RC11-13-4C	Ferrule, Crawford Fitting Co. No. 803-1 (See Detail)	S. St.
3	1	RC11-13-4C	Preamp. Housing Neck, (See Detail)	S. St.
4	1	RC11-13-4C	Preamp. Housing, (See Detail)	S. St.
5	1	RC11-13-4C	Preamp. Housing Bottom, (See Detail)	S. St.
6	1	RC11-13-4C	Cable Stiffner, (See Detail)	S. St.
7	1	RC11-13-4C	Preamp. Signal Recpt., U.S. Engineering #370CD (See Detail)	Ber. Cpr.
8	2	RC11-13-4B	Signal Plugs, U.S. Engineering #700D (See Detail)	Ber. Cpr.
9	1	RC11-13-4C	Preamp. Front End Shield, (See Detail)	Brass
10	2	—	Signal Insulator, The United States Stoneware Co. #D-198 (See Note #2)	Ceramic
11	1	—	Coax Water tight Jacket, American Metal Hose Div. Type SSJ-C	S. St.
12	1	RC11-13-4B	Chamber Housing Top, (See Detail)	S. St.
13	1	RC11-13-4B	Coax Insulator, (See Detail)	Ceramoplastic
14	1	RC11-13-4B	Chamber Housing, (See Detail)	S. St.
15	1	RC11-13-4B	Chamber Housing Bottom, (See Detail)	S. St.
16	1	RC11-13-4B	Chamber Top Insulator, (See Detail)	Ceramoplastic
17	1	RC11-13-4B	Chamber Signal Shield, (See Detail)	Nickel
18	1	RC11-13-4B	Chamber Signal Insulator, (See Detail)	Ceramoplastic
19	1	RC11-13-4B	Chamber Bottom Insulator, (See Detail)	Ceramoplastic
20	2	RC11-13-4B	Boral End shield, (See Detail)	Boral, Al.



FISSION CHAMBER HOUSING

NOTES:
1. Before doing any soldering in side Preamp. or Chamber housings see Coax Assembly (Dwg. RC11-13-4R)
2. Cut off tube on end of Pc. #10 that goes into Pc. #8 to 1/8" long.



PC. #11
N.T.S.

PC #11 LENGTH SCHEDULE	
INSTALLATION	DIM. "A"
D.R.R.	4'-0"
H.F.I.R.	4'-6"

PC #11 NOTES:
1. No dimensions to be greater than shown.
2. 1/2" tubing centered and in straight line with SS-1-C.
3. Material to be 300 series austenitic stainless steel.
4. Dimensions not shown to be Mfg. standard.
5. Corrugated tube to be covered full length with S. St. braid and S. St. protective casing.
6. Entire length must be helium leak proof.

NO.	REVISIONS			DATE	APPD	APPD
DRAWN	DATE 11-7-62	SUBMITTED	DATE 12-5-62	APPROVED S.H.H.		DATE 1-29-63
DESIGNED	DATE 9-6-62	APPROVED	DATE	APPROVED		DATE
CHECKED	DATE	APPROVED	DATE	APPROVED		DATE

3-29-63	R0	RC11-13-4A	SHH
DATE	REV.	SEPIA DRAWING NO.	APPD. BY
SEPIAS ISSUED FROM Q-2617-1-1			

LIGHTS ON UNDERSIGNED UNLESS OTHERWISE SPECIFIED
FRACTIONS: ± 1/32"
DECIMALS: ± 0.005
ANGLES: ± —
SCALE: 3" = 1"

Fiber Glass Coax Assembly	RC11-13-4R
Preamplifier Housing Details	RC11-13-4C
Fission Chamber Housing Details	RC11-13-4B
REFERENCE DRAWINGS	DWG. NO.

DESIGN RESPONSIBILITY

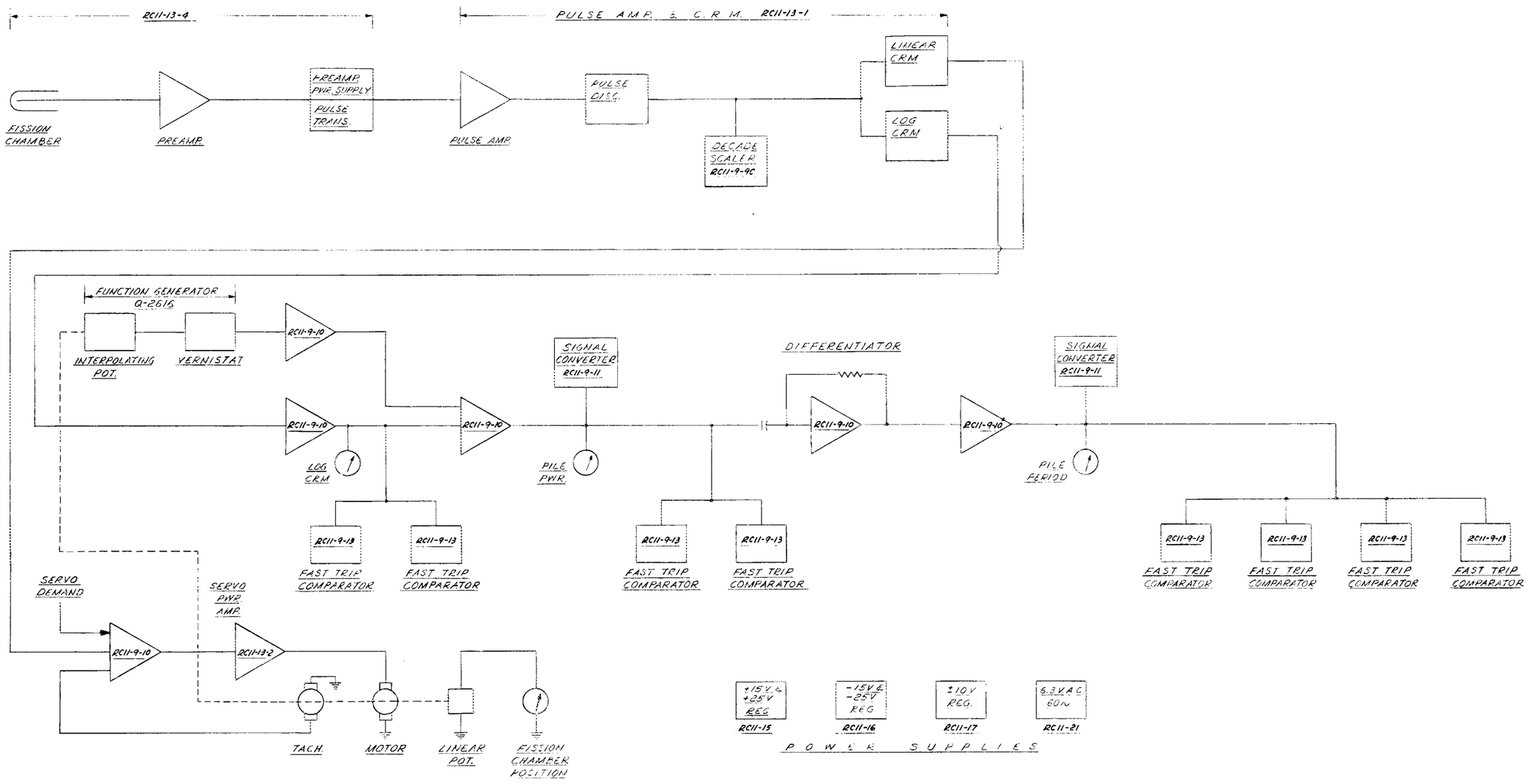
3/4 INCH FISSION CHAMBER & PREAMPLIFIER

FISSION CHAMBER & PREAMP HOUSING ASSEMBLIES

INSTRUMENTATION AND CONTROLS DIVISION
OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY

SUBMITTED | REQUESTED | DATE | APPROVED | DATE

RC11-13-4A R0



NO.	REVISIONS					DATE	APPD	APPD
DRAWN	DATE	SUBMITTED	DATE	APPROVED		DATE		
C.E. WAGGONER	2-13-65	J.L. Anderson	8-7-64	S.H. Hanauer		8-7-64		
DESIGNED	DATE	APPROVED	DATE	APPROVED		DATE		
CHECKED	DATE	APPROVED	DATE	APPROVED		DATE		

4-7-64	D	RC11-13-51	J.L.A.
SERIAL ISSUED FROM 2626-1			

REFERENCE DRAWINGS	DWG. NO.
DESIGN RESPONSIBILITY J.L. ANDERSON	

MODULAR REACTOR INSTRUMENTATION

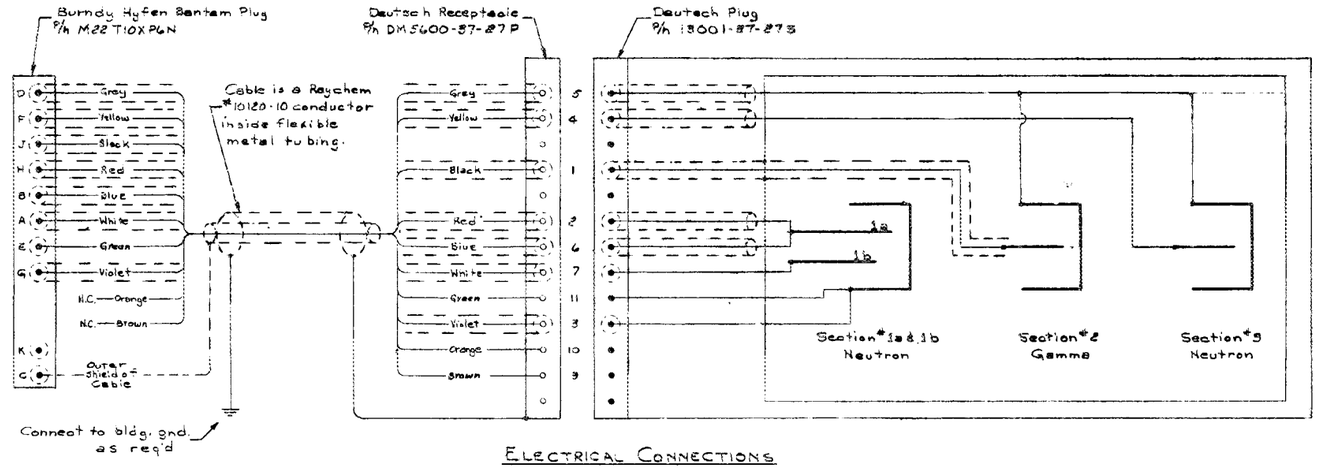
WIDE RANGE COUNTING INSTRUMENT BLOCK DIAGRAM

INSTRUMENTATION AND CONTROLS DIVISION
OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY

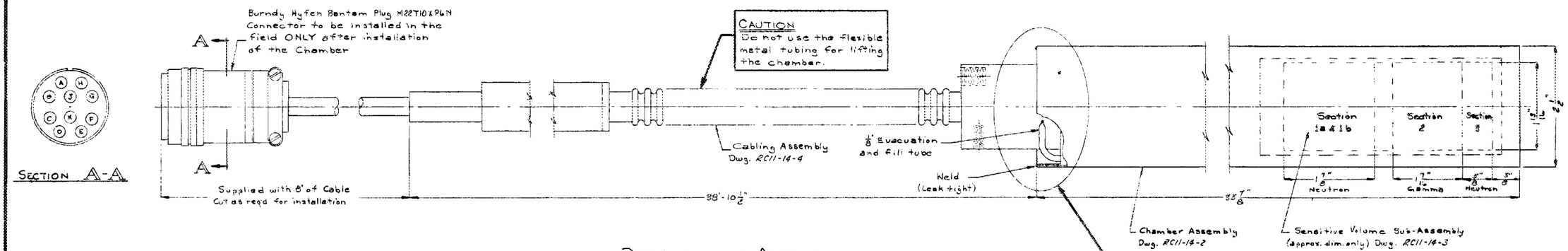
RC11-13-51 R.O.

Chamber Function	Burndy Hyfen Bantam #M22T10XP6N	Cable Raychem #10120 Color Code	Deutsch DM5400-37-27P & 13001-37-27S
Section 1a, n, signal	H	Red	2
" 1a, n, signal	B	Blue	6
" 1b, n, signal	A	White	7
" 1a & 1b, n, H.V.	G	Violet	3
" 1a & 1b, n, H.V.	E	Green	11
" 2, γ, signal	J	Black	1
" 3, n, signal	F	Yellow	4
" 2 & 3, H.V.	D	Grey	5
None	C	Cable Outer Shield	N.C.
None	K	N.C.	—
None	N.C.	Brown	8
None	N.C.	Orange	10

Note: Pins 9, 12 & 13 of Deutsch Receptacle P/N DM5400-37-27P are not used.
Pins 8, 9, 10, 12 & 13 of Deutsch Plug P/N 13001-37-27S are not used.



Electrical Connections



Dimensions and Assembly

Procedures For Assembly of cabling with Chamber.

A - Insert the Cabling Assembly into the Chamber Assembly as shown.
B - Weld the two assemblies together.
C - By pumping through the 1/8" tube, helium leak check complete assembly.
D - Evacuate and degas at 200°F. Fill with Nitrogen gas to 780 ±20mm Hg absolute at 20°C.
E - Crimp off fill tube 2" from tube exit, solder crimped end, leak test tube under water. For its protection, bend the tubing below edge of Chamber. Assembly as shown in the cutaway view.
F - Test completed Assembly according to Procedures for Dwg. RC11-14-1

Characteristics

1. Neutron Sensitive Material: Boron enriched to 92% B^{10}. Thickness of the deposit is 0.3 (±.03) mg/cm².
2. Chamber Gas: Gas Filling - Nitrogen. Gas pressure - 1000 ±20mm Hg. abs.
3. Radiation Sensitivity:
   Section 1a - (2.6 x 10⁻¹⁵ amp/nv) (1.4 x 10⁻¹² amp hr/r)
   Section 1b 1.2 x 10⁻¹⁵ amp/nv
   Section 2 - 2.6 x 10⁻¹⁸ amp hr/r
   Section 3 - (4.0 x 10⁻¹⁵ amp/nv) (2.2 x 10⁻¹⁸ amp hr/r)
4. Saturation Characteristics: at 250 volts each section > 98% saturated at 5 x 10⁻⁵ amp.
5. Limitations:
   (a) Voltage between electrodes is ±200 V. max.
   (b) Temperature: 125°C. max.
   (c) The Chamber and Cabling assembly are waterproof. The Burndy Hyfen Bantam exposed connector should not be submerged in water.

Characteristics

   (d) The Cable near the Chamber can withstand an accumulated Gamma ray dose of 5 x 10⁹ rad.
6. Electrical Resistance: Measured at the Burndy Connector with a Keithley Model 500 Megohmmeter
   (a) From pins B or H (Signal 1a) to their shields or any other pin, shield or housing > 10¹⁰ ohms.
   (b) From pin A (Signal 1b) to its shield or any other pin, shield or housing > 10¹⁰ ohms.
   (c) From pin J (Signal 2) to its shield or any other pin, shield or housing > 10¹⁰ ohms.
   (d) From pin F (Signal 3) to its shield or any other pin, shield or housing > 10¹⁰ ohms.
   (e) From pins E and G (H.V. 1) to their shields or any other pin, shield or housing > 10⁸ ohms.
   (f) From pin D (H.V. 2 & 3) to its shield or any other pin, shield or housing > 10⁸ ohms.

Characteristics

7. Capacitance with 50 ft of Cable:
   (a) Total capacitance from Signal 1a to its shield and H.V. 1 is approx. 2000 Pf.
   (b) Total capacitance from Signal 1b to its shield and H.V. 1 is approx. 2400 Pf.
   (c) Total capacitance from Signal 2 to its shield and H.V. 2 & 3 is approx. 2300 Pf.
   (d) Total capacitance from Signal 3 to its shield and H.V. 2 & 3 is approx. 1000 Pf.
8. Leakage Current from signal electrodes to Preamp or electrometer ground, at 250V. with 50 ft. of Cable:
   (a) Section 1a: < 3 x 10⁻¹⁰ amp.
   (b) Section 1b: < 5 x 10⁻¹⁰ amp.
   (c) Section 2: < 3 x 10⁻¹⁰ amp.
   (d) Section 3: < 3 x 10⁻¹⁰ amp.

NO.	REVISIONS				DATE	APPD	APPD
	H. L. M. Rice	6-15-63	D. P. Roux	6-26-63	T. L. Anderson	7-1-63	
	D. P. Roux	6-26-63					

DATE	REV.	SUPER. DRAWN. NO.	APPRD BY
7-1-63	R0	RC-11-14-1	T.L.A

SEPARS ISSUED FROM Q 2613-104-1

LIGHTS OF DIMENSIONS UNLESS OTHERWISE SPECIFIED
FRACTIONS: ±
DECIMALS: ±
ANGLES: ±
SCALE: Full

REFERENCE DRAWINGS | DWG. NO.

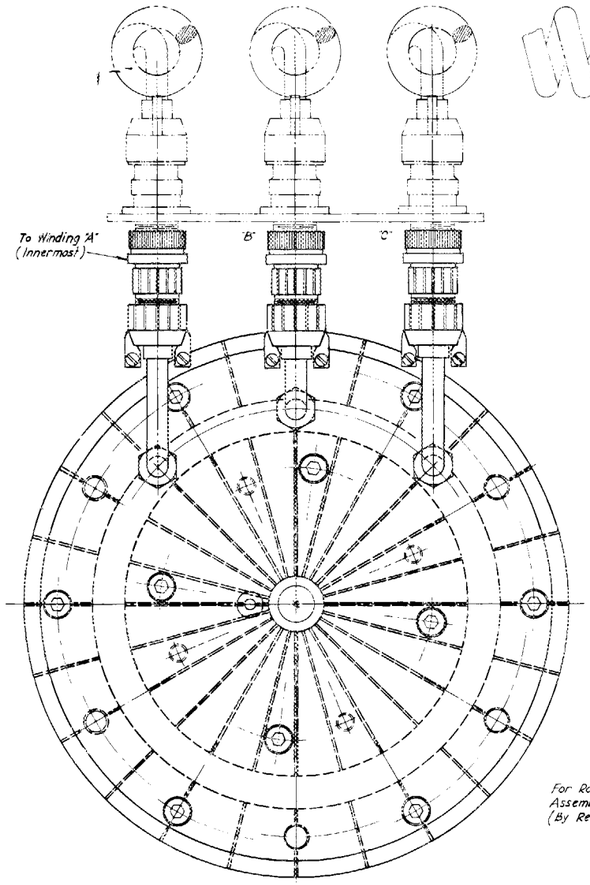
DESIGN REPRESENTATIVE D. P. Roux

PCP II Multisection Ion Chamber

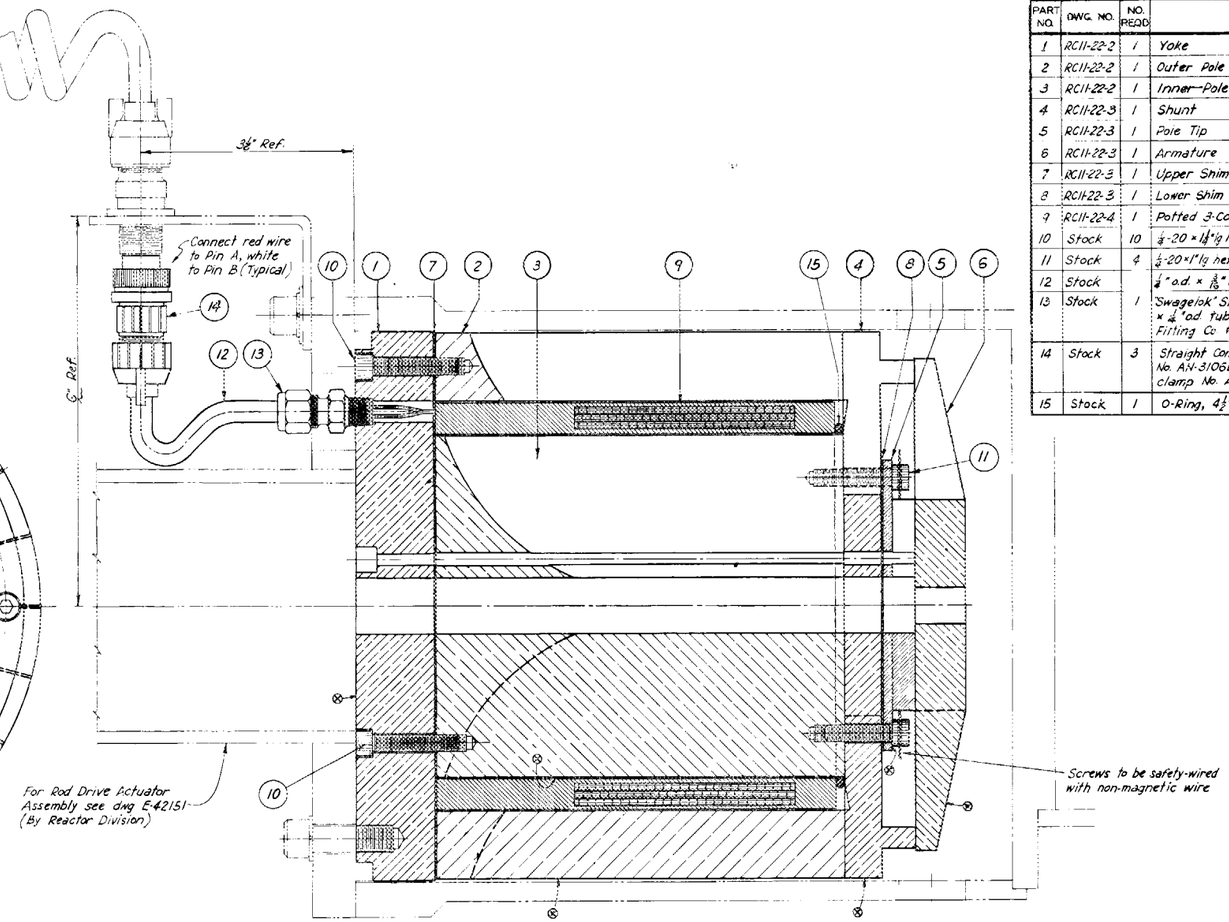
Type 104-Neutron-Gamma-Neutron Characteristics, Dimensions & External Wiring

INSTRUMENTATION AND CONTROLS DIVISION
OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY

DRAWN: D. D. Oak 7/5/63 | DESIGNED: D. P. Roux 7-5-63 | APPROVED: T. L. Anderson 7-5-63 | DATE | RC11-14-1 | R0



PLAN



COMPOSITE SECTION

PARTS LIST				
PART NO.	DWG. NO.	NO. REQD.	DESCRIPTION	MATERIAL
1	RC11-22-2	1	Yoke	Ferro-Nickel
2	RC11-22-2	1	Outer Pole	Ferro-Nickel
3	RC11-22-2	1	Inner Pole	Ferro-Nickel
4	RC11-22-3	1	Shunt	Ferro-Nickel
5	RC11-22-3	1	Pole Tip	Ferro-Nickel
6	RC11-22-3	1	Armature	Ferro-Nickel
7	RC11-22-3	1	Upper Shim	347 S.S.
8	RC11-22-3	1	Lower Shim	347 S.S.
9	RC11-22-4	1	Potted 3-Coil Assembly	——
10	Stock	10	1/4-20 × 1 1/4" lg hex soc hd mach scr	304 S.S.
11	Stock	4	1/4-20 × 1" lg hex soc hd mach scr. (Head to be drilled for safety wiring)	304 S.S.
12	Stock		1/4" o.d. × 3/16" i.d. flexible tubing	Polyethlene
13	Stock	1	Swagelok Straight Male Connector, 1/8" NPT × 1/4" o.d. tubing, non-magnetic. Crawford Fitting Co # 400-1-2-316	316 S.S.
14	Stock	3	Straight Connector Plug, 2-pin, Bendix Scinflex No. AN-3106E-10SL-4P, complete with cable clamp No. AN3057-4B & grommet No. 10-R811-4	——
15	Stock	1	O-Ring, 4 1/2" i.d. × 4 7/8" o.d. × 3/16	Neoprene

NOTE:
At inspection, items ① thru ⑨ to be stamped with assembly serial number on surface designated by ⊗.

NO.	REVISIONS				DATE	APPD	APPD
DRAWN T.A. Hearrell	DATE 5-26-64	SUBMITTED	DATE		APPROVED		DATE
DESIGNED W.D. Brown	DATE 5-26-64	APPROVED J.E. Jones Jr	DATE 5-27-64		APPROVED		DATE
CHECKED W.D. Brown	DATE 5-26-64	APPROVED	DATE		APPROVED		DATE

REFERENCE DRAWINGS	DWG. NO.
DESIGN RESPONSIBILITY W. D. Brown	

HFIR 3-COIL MAGNET

ASSEMBLY

INSTRUMENTATION AND CONTROLS DIVISION
OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY

SUBMITTED R. Oakes DATE 5/26/64 | ADDRESSED R. Pfeffer DATE 5/26/64 | APPROVED F. E. Cole DATE 5/26/64

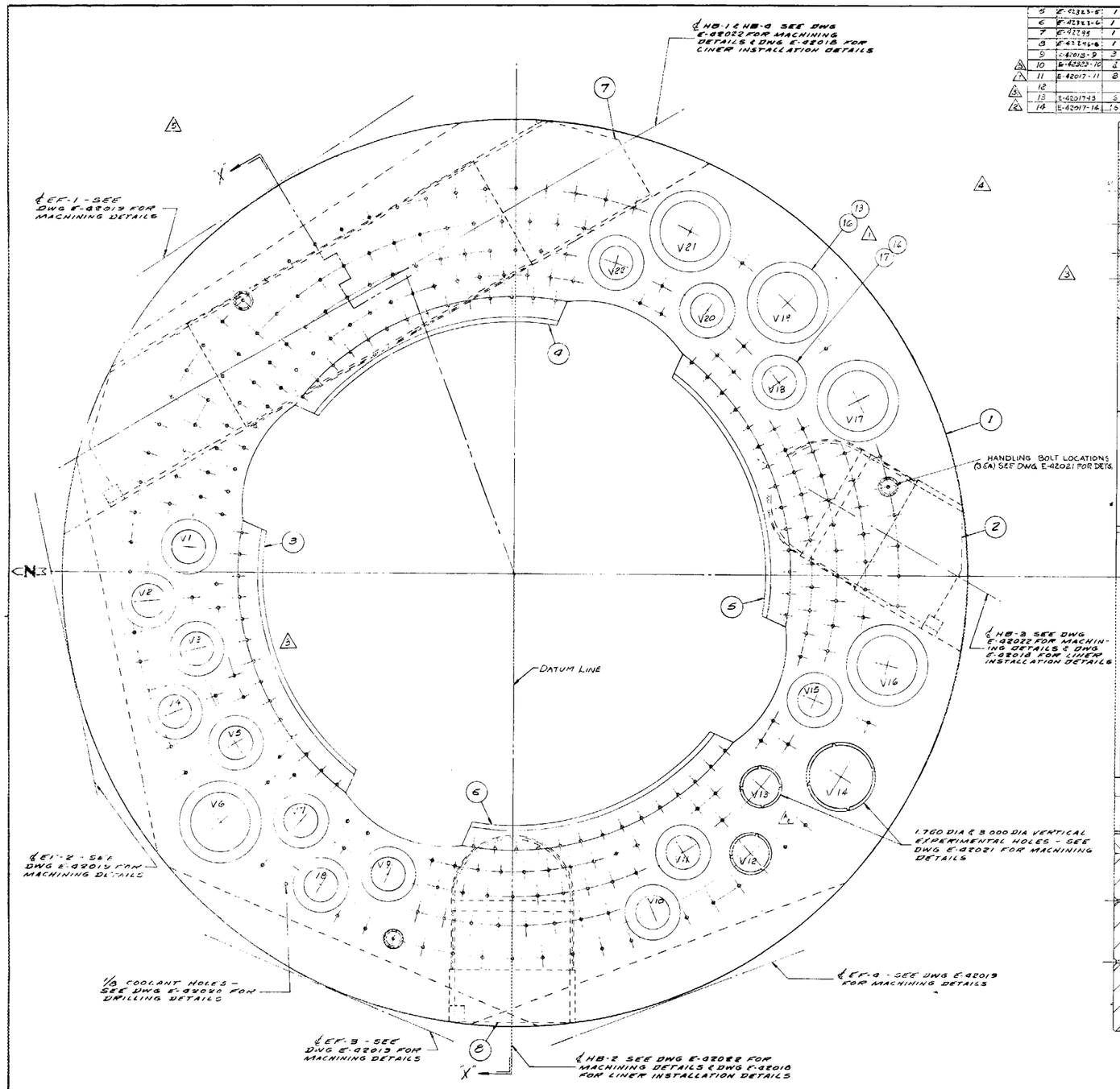
J. R. McNatt 5/26/64

RC11-22-1 R0

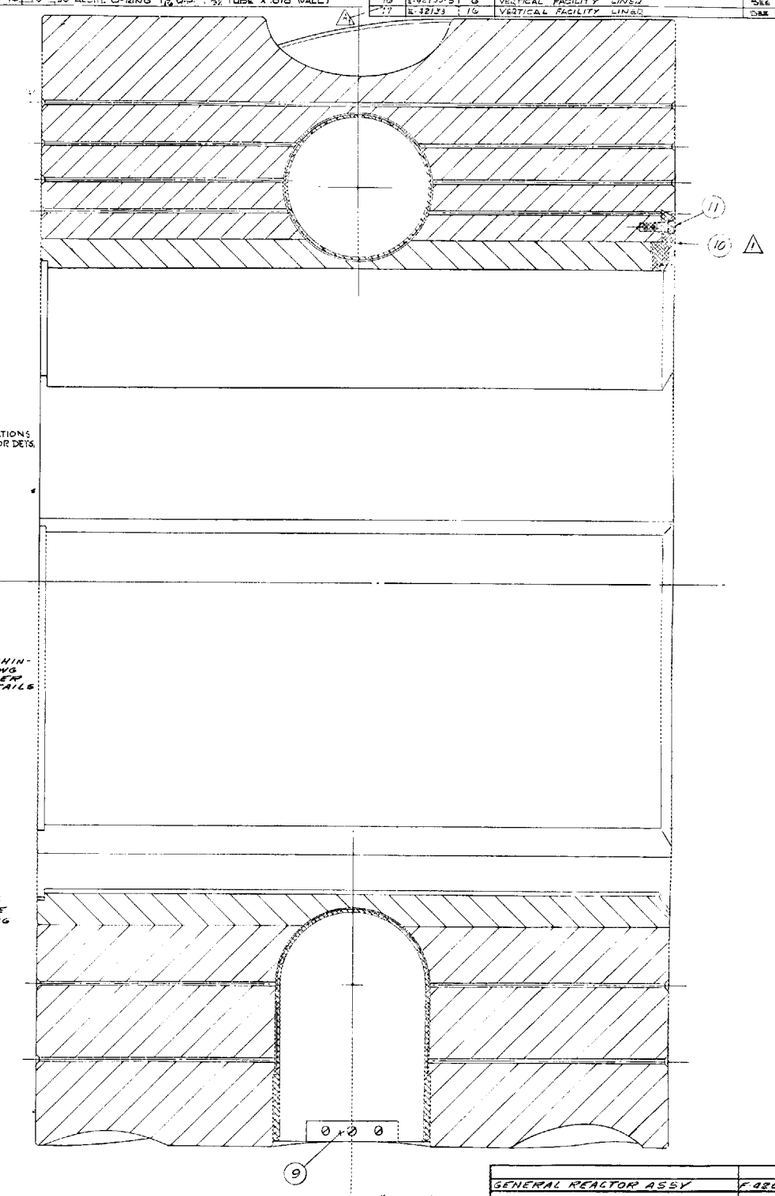
	5	E-42323-5	1	SEMI-PERMANENT REFLECTOR - SOUTH SEGMENT	BERYLLIUM
	6	E-42323-6	1	SEMI-PERMANENT REFLECTOR - WEST SEGMENT	BERYLLIUM
	7	E-42395	1	HB-1 & HB-4 LINER	SEE DETAIL
	8	E-42246-8	1	HB-2 LINER	SEE DETAIL
	9	E-42013-9	3	LOCKING PLATE	SEE DETAIL
△5	10	E-42323-10	2	LOCATING PLATE	SEE DETAIL
△1	11	E-42017-11	8	SPACER FOR SUPPORT RING (1/2" 80° CNC. CA. 1 3/8" O.D. x 1/8 LG. SHOULDER, 1/2" 20 UNF-2A 1 3/4 LG.)	416 STS OR 2024-T4
△5	12				
△2	13	E-42017-13	5	3/8 ALUM. O-RING 2 1/2 O.D. (1/2 TUBE X .010 WALL)	
△2	14	E-42017-14	19	.25 ALUM. O-RING 1 3/16 O.D. (1/2 TUBE X .010 WALL)	
	15				
	16	E-42153-5	6	VERTICAL FACILITY LINER	SEE DET.
	17	E-42123	16	VERTICAL FACILITY LINER	SEE DET.

PARTS LIST

PART NO.	DWG. NO.	NO. REQD	DESCRIPTION (NAME, SIZE, ETC.)	MATERIAL
1	E-42016	1	PERMANENT REFLECTOR	BERYLLIUM
2	E-42246-2	1	HB-3 LINER	SEE DETAIL
3	E-42323-3	1	SEMI-PERMANENT REFLECTOR - NORTH SEGMENT	BERYLLIUM
4	E-42323-4	1	SEMI-PERMANENT REFLECTOR - EAST SEGMENT	BERYLLIUM



PLAN



SECTION "X-X"

LTR.	REVISIONS	DATE	APPD	DATE	APPD
C	SEE DCN 2730	3-10-63			
B	SEE DCN 2454	3-11-63		3-11-63	
A	SEE DCN 2416	3-12-63		3-12-63	

DRAWN	DATE	SUBMITTED	DATE	APPROVED	DATE
MYERS	4-14-62		1/14/63		
DESIGNED	DATE	APPROVED	DATE	APPROVED	DATE
	3-8-63		3-11-63	Chauvenet	4-17-63
CHECKED	DATE	APPROVED	DATE	APPROVED	DATE
	3-7-63		3-3-63		

GENERAL NOTES

1. All Aluminum Materials, Fabrication, Inspection And Records Shall Conform To HFIR Procurement Notes AL-2 As Outlined On Dwg D-42015.
2. The Completed Beryllium Parts Shall Be Cleaned With Acetone And Thoroughly Dried Before Assembly.
3. This Drawing Supersedes Assy. Dwg. E-42180.
4. Items 1,3,4,5 & 6 Are Beryllium, Spec. No. JS-1-153

LIMITS ON DIMENSIONS UNLESS OTHERWISE SPECIFIED:	
FRACTIONS	± 1/64
DECIMALS	± .005
ANGLES	± 0° 30'
SCALE:	1/2 = 1"

GENERAL SPECIFICATIONS

UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES 1/64 MAX.
2. TYPE, GRADE OR FINISH OF MATERIAL MAY BE CHOSEN BY FABRICATOR.
3. ROUGHNESS HEIGHT OF MACHINED SURFACES SHALL NOT EXCEED 63 μ (FINISH SYMBOLS AND HEIGHT VALUES ARE IN ACCORDANCE WITH ASA B46.1-1955.)

GENERAL REACTOR ASSY — F 42099

REFERENCE DRAWINGS — DWG. NO.

H.F.I.R. PROJECT — BLDG. NO.

PERMANENT & SEMI-PERMANENT REFLECTOR ASSEMBLY

OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY
DIVISION OF UNION CARBIDE CORPORATION
OAK RIDGE, TENNESSEE

SUBMITTED: Job 505-3.6 — ACCEPTED: J. R. Alexander 3-8-63 — APPROVED: 3-12-63

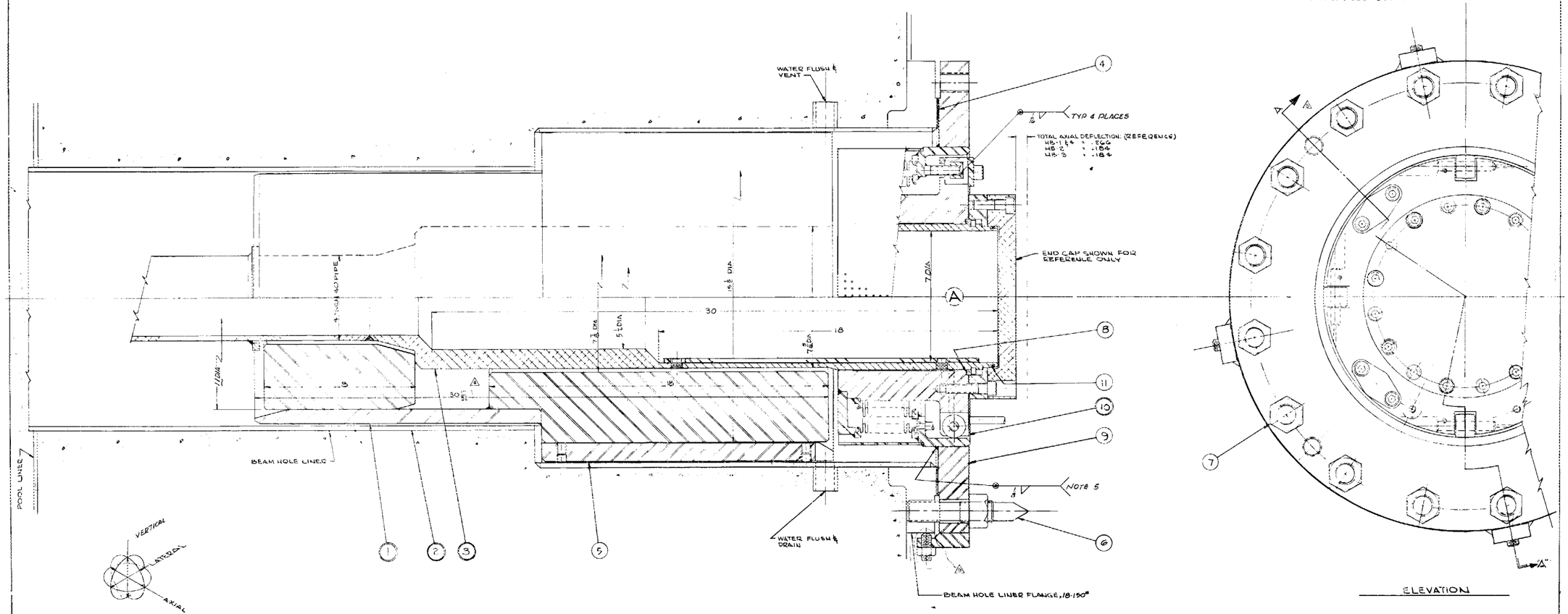
E-42017 — REV. C

PARTS LIST

PART NO.	DWG. NO.	NO. REQD	DESCRIPTION (NAME, SIZE, ETC.)	MATERIAL
1	E-42046	1	REMOVABLE SHIELD	
2	E-42046	1	BEAM HOLE LINER (SHOWN FOR REF ONLY)	
3	E-42042	1	SHIELD PENETRATION TUBE	
4	E-42091-4	1	GASKET 1/8" THICK - 25.00 x 18.10	BUNA-N-DUR 60
5	E-42069	1	ECCENTRIC SHIELD	
6	E-42069-1	16	STUD BOLT	
7	E-42091-7	16	1 1/8 UNC-2B HEAVY SEMI-FINISHED HEX NUT	ASTM-A-194 GR 2H
8	E-42091-8	1	GASKET - MARMAN (PART NO. 2B601-775A)	
9	E-42068	1	FLANGE	
10	E-42063	1	EXPANSION JOINT SUB-ASSEMBLY	
11	E-42091-11	1	O RING 7/8 X 7 1/2 X 3/4	BUNA-N-DUR 50

NOTES

1. PARTS LIST IS FOR ONE SHIELD PENETRATION ASSEMBLY - FOUR ASSEMBLIES ARE REQUIRED FOR HFIR.
2. DIMENSIONS ON THIS DRAWING ARE APPROXIMATE AND ARE SHOWN FOR REFERENCE ONLY.
3. FOR ASSEMBLY PROCEDURE SEE ES-505-4.0-10.
4. ALL WELDING, MATERIAL AND FABRICATION SHALL CONFORM TO HFIR PROCUREMENT NOTES AL-2 OR SST-2
5. WELDS SHALL CONFORM TO UCNC SPEC Y-ES-9.3-12 WITH PENETRANT INSPECTION OR CRNL SPEC PS-12, INSP MET-WR-200 SCHE.



3 TO 100 MW POWER - APPROXIMATE RELATIVE MOTION BETWEEN ℄ OF FUEL AND BEAM TUBE ℄ AT POINT ⊗

	VERTICAL	LATERAL	AXIAL
HB-1 & 4	.107	.093	.266
HB-2	.107	—	.184
HB-3	.107	.06	.184

BEAM TUBE WILL BE POSITIONED AT INITIAL ASSEMBLY SO THAT MISALIGNMENT IS APPROXIMATELY ONE-HALF OF VALUES SHOWN ABOVE AT MAXIMUM DEFLECTION CONDITIONS.

HFIR PROCUREMENT NOTES SST-2	D-42014
HFIR PROCUREMENT NOTES AL-2	D-42015
INSTALLATION ASSEMBLY	F-42027
REFERENCE DRAWINGS	DWG. NO.

HFIR - PROJECT

HORIZONTAL BEAM TUBES TYPICAL SHIELD PENETRATIONS - POOL SEAL & REMOVABLE SHIELDING ASSY

REACTOR DIVISION

OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY
DIVISION OF UNION CARBIDE CORPORATION

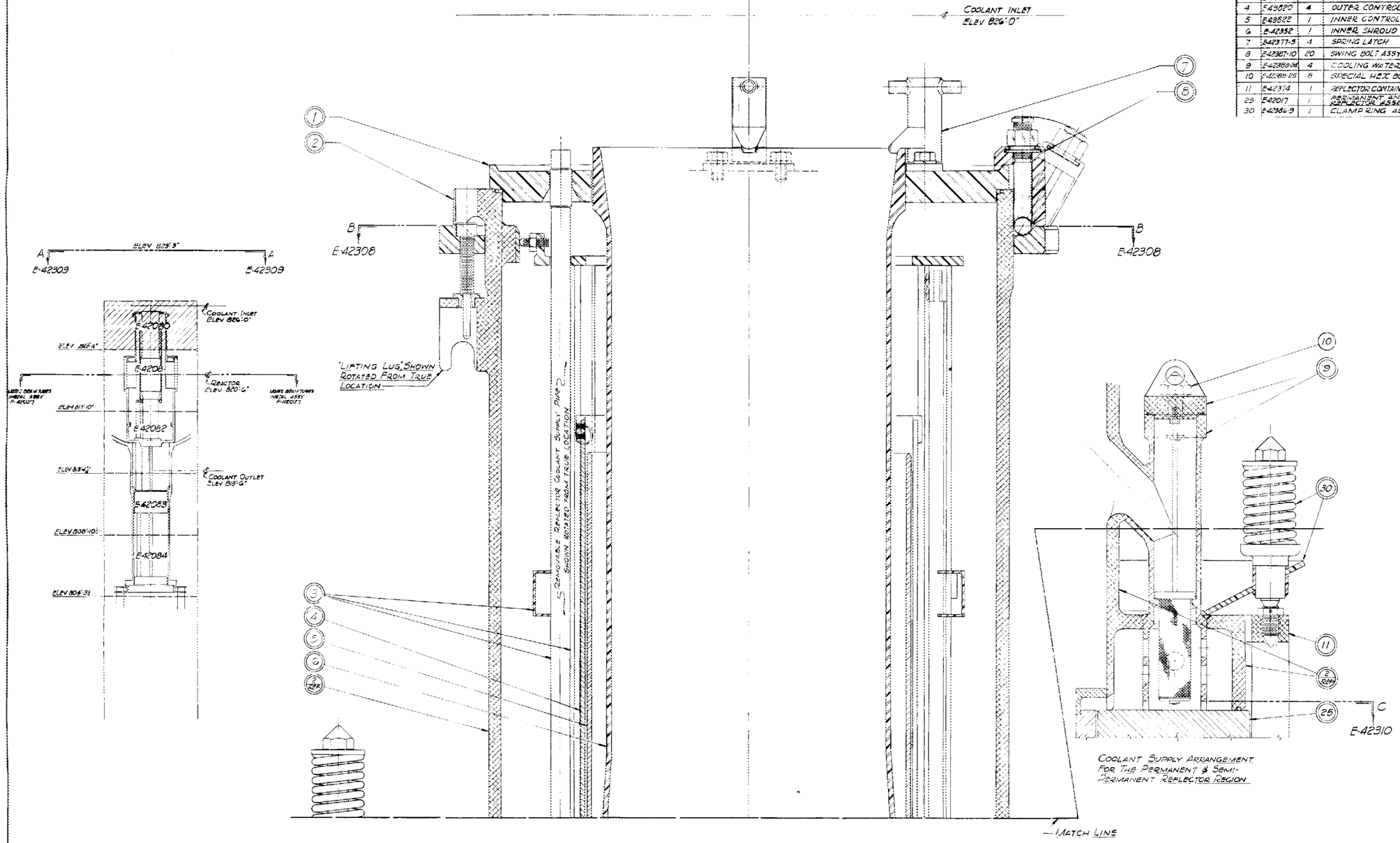
CLASSIFICATION: NOT CLASSIFIED

SCALE: 1:1

JOB 505-4.0 E-42091

LTR	REVISIONS	DATE	APPD	APPD.
C	THRU DCN 2783			
B	SEE DCN 2813	7-8-63		
A	SEE DCN 2480			

PARTS LIST			
PART NO.	DWG. NO.	NO. REQD.	DESCRIPTION (NAME, SIZE, ETC.)
1	E-42377	1	SHROUD FLANGE
2	E-42381 E-42386	1	UPPER PLENUM & OUTER SHROUD
3	E-42609	1	CONTROL ROD BEARING & TRACK ASSY: UPPER
4	E-42620	4	OUTER CONTROL ROD
5	E-42622	1	INNER CONTROL ROD
6	E-42352	1	INNER SHROUD
7	E-42377-5	4	SPRING LATCH
8	E-42367-10	20	SWING BOLT ASSY
9	E-42388-24	4	COOLING WATER INLET NOZZLE
10	E-42389-25	8	SPECIAL HEX BOLT ⅜-10 UNC
11	E-42374	1	REFLECTOR CONTAINER & PEDESTAL ASSEMBLY
25	E-42017	1	PERMANENT AND SEMI-PERMANENT REFLECTOR ASSEMBLY
30	E-42386-9	1	CLAMP RING ASSEMBLY



COOLANT SUPPLY ARRANGEMENT FOR THE PERMANENT & SEMI-PERMANENT REFLECTOR REGION

0 1 2 3 4 5 6
SCALE - INCHES

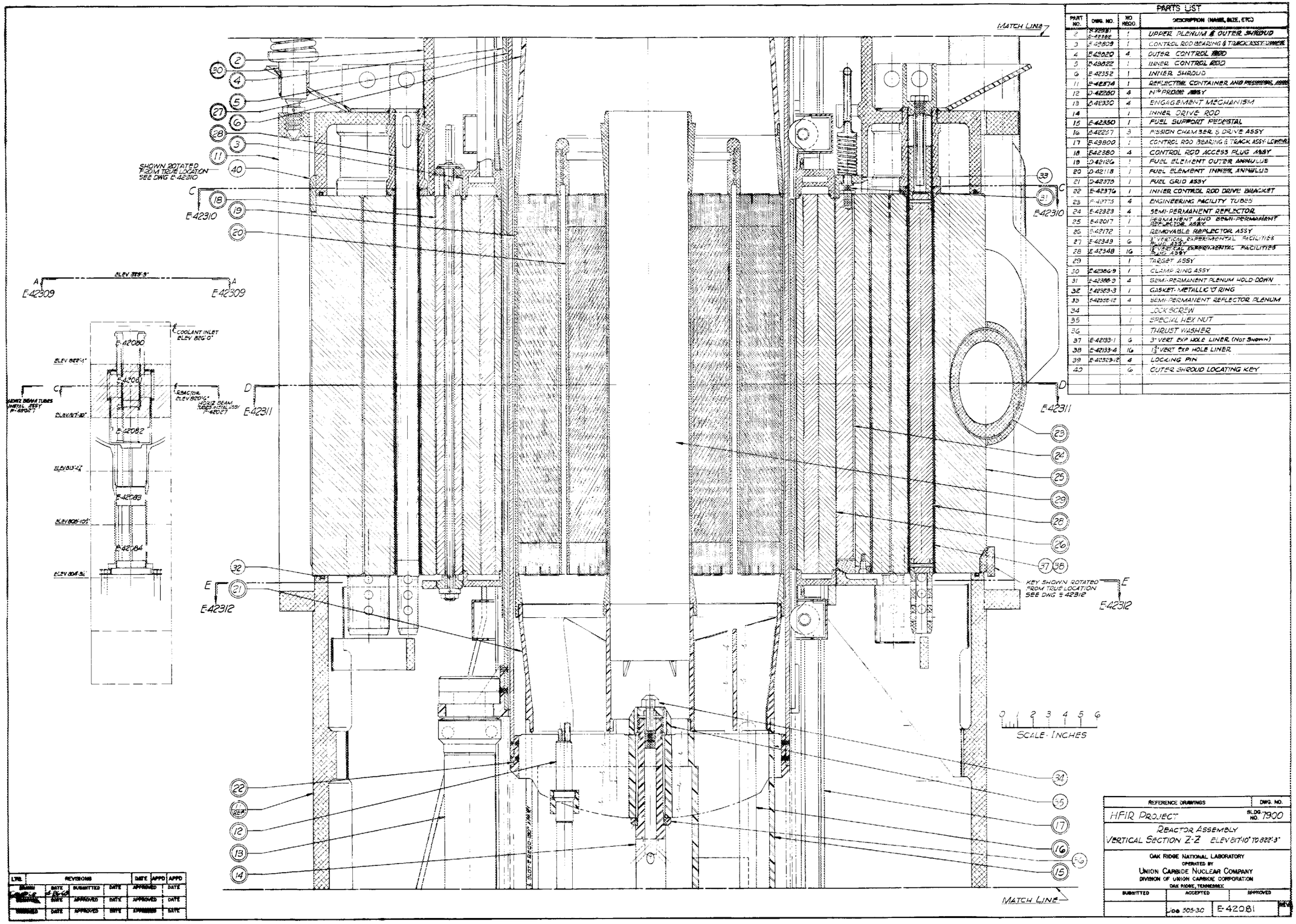
LTR.	REVISIONS			DATE	APPD	APPD
DRAWN	DATE	SUBMITTED	DATE	APPROVED	DATE	
DESIGNED	DATE	APPROVED	DATE	APPROVED	DATE	
CHECKED	DATE	APPROVED	DATE	APPROVED	DATE	

REFERENCE DRAWINGS	DWG. NO.
HFIR PROJECT	BLDG. NO. 7900

REACTOR ASSEMBLY
VERTICAL SECTION Z-Z ELEV 828'-3" TO 826'-0"
REACTOR DIVISION

OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY
DIVISION OF UNION CARBIDE CORPORATION
OAK RIDGE, TENNESSEE

SUBMITTED	ACCEPTED	APPROVED
	JOB 208-3.0	E-42080



PARTS LIST

PART NO.	DWG. NO.	NO REQD.	DESCRIPTION (NAME, SIZE, ETC)
2	E-42081	1	UPPER PLENUM & OUTER SHROUD
3	E-42809	1	CONTROL ROD BEARING & TRACK ASSY-UPPER
4	E-42820	4	OUTER CONTROL ROD
5	E-42822	1	INNER CONTROL ROD
6	E-42352	1	INNER SHROUD
11	E-42374	1	REFLECTOR CONTAINER AND PRESSURIZING ASSY
12	D-42280	4	N[illegible] PROBE ASSY
13	E-42330	4	ENGAGEMENT MECHANISM
14		1	INNER DRIVE ROD
15	E-42350	1	FUEL SUPPORT PEDESTAL
16	E-42257	3	FISSION CHAMBER & DRIVE ASSY
17	E-43800	1	CONTROL ROD BEARING & TRACK ASSY-LOWER
18	E-42380	4	CONTROL ROD ACCESS PLUG ASSY
19	D-42126	1	FUEL ELEMENT OUTER ANNULUS
20	D-42118	1	FUEL ELEMENT INNER ANNULUS
21	D-42370	1	FUEL GRID ASSY
22	E-42376	1	INNER CONTROL ROD DRIVE BRACKET
23	E-42773	4	ENGINEERING FACILITY TUBES
24	E-42323	4	SEMI-PERMANENT REFLECTOR
25	E-42017	1	PERMANENT AND SEMI-PERMANENT REFLECTOR BLOCK
26	E-42172	1	REMOVABLE REFLECTOR ASSY
27	E-42349	6	3" VERTICAL EXPERIMENTAL FACILITIES PLUG ASSY
28	E-42348	16	1 3/4" VERTICAL EXPERIMENTAL FACILITIES PLUG ASSY
29		1	TARGET ASSY
30	E-42386-9	1	CLAMP RING ASSY
31	E-42388-9	4	SEMI-PERMANENT PLENUM HOLD-DOWN
32	E-42323-3	1	GASKET-METALLIC 'O' RING
33	E-42358-12	4	SEMI-PERMANENT REFLECTOR PLENUM
34		1	LOCK SCREW
35		1	SPECIAL HEX NUT
36		1	THRUST WASHER
37	E-42133-1	6	3" VERT EXP HOLE LINER (Not Shown)
38	E-42133-4	16	1 3/4" VERT EXP HOLE LINER
39	E-42323-12	4	LOCKING PIN
40		6	OUTER SHROUD LOCATING KEY

LTR.	REVISIONS	DATE	APPD	APPD
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

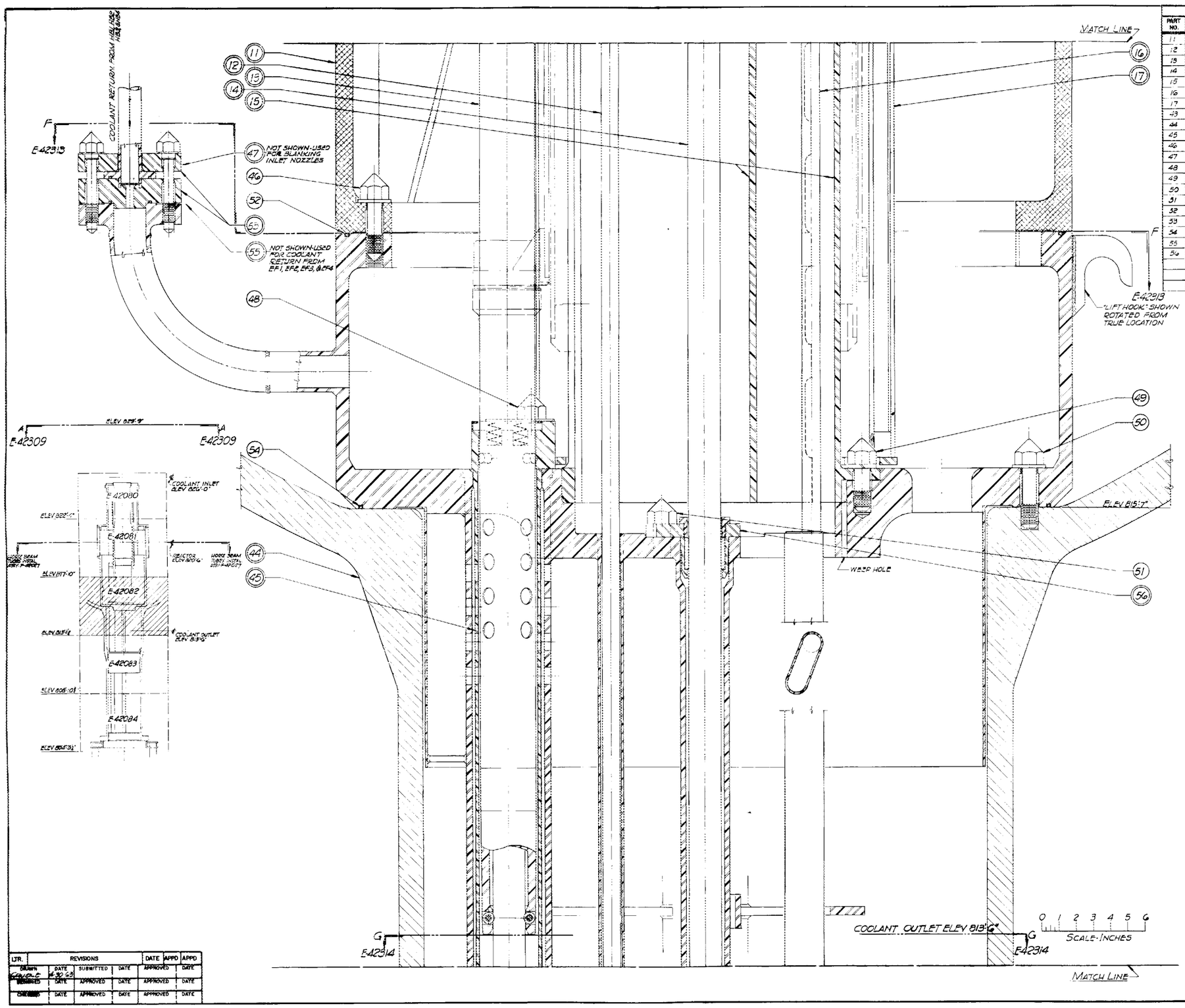
DRAWN	DATE	SUBMITTED	DATE	APPROVED	DATE
[illegible]	DATE	APPROVED	DATE	APPROVED	DATE
[illegible]	DATE	APPROVED	DATE	APPROVED	DATE

REFERENCE DRAWINGS	DWG. NO.
HFIR PROJECT	SLDG. NO. 7900

REACTOR ASSEMBLY
VERTICAL SECTION Z-Z ELEV 817'-10" TO 822'-3"

OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY
DIVISION OF UNION CARBIDE CORPORATION
OAK RIDGE, TENNESSEE

SUBMITTED	ACCEPTED	APPROVED	
	Job 505-30	E-42081	REV.



PARTS LIST			
PART NO.	DWG. NO.	NO. REQ'D.	DESCRIPTION (NAME, SIZE, ETC.)
11	E-42374	1	REFLECTOR CONTAINER & PEDESTAL ASSY
12	D-42380	4	N^{18} PROBE ASSY
13	E-42330	4	ENGAGEMENT MECHANISM
14		1	INNER DRIVE ROD
15	E-42350	1	FUEL SUPPORT PEDESTAL
16	E-42237	3	FISSION CHAMBER & DRIVE ASSY
17	E-49800	1	CONTROL ROD BEARING & TRACK ASSY - LOWER
43	E-42339	1	FUEL & REFLECTOR SUPPORT AND SLEEVE ASSEMBLY
44	E-42332	1	HFIR PRESSURE VESSEL
45	E-42335-14	4	SHOCK ABSORBER ASSY
46	[illegible]	24	BOLT-SPECIAL 1" HEX
47	[illegible]-36221	3	AUX. COOLANT NOZZLE FLANGE, BLANK
48	E-42336-13	8	BOLT-SPECIAL 1" HEX
49	E-42095-9	4	BOLT-SPECIAL 1" HEX
50	E-42364-11	12	BOLT-SPECIAL 1" HEX
51		2	BOLT-SPECIAL 1" HEX
52	E-42339-27	1	GASKET, METALLIC "O" RING
53	E-42063	4	HORIZONTAL BEAM TUBE INSTRUMENTATION FLANGE AND SLINGING WATER PIPING
54		1	GASKET, METALLIC "O" RING
55	E-42063	4	VERTICAL BEAM TUBE INSTRUMENTATION FLANGE AND SLINGING WATER PIPING
56		1	INNER CONTROL ROD-SLEEVE BEARING ASSY

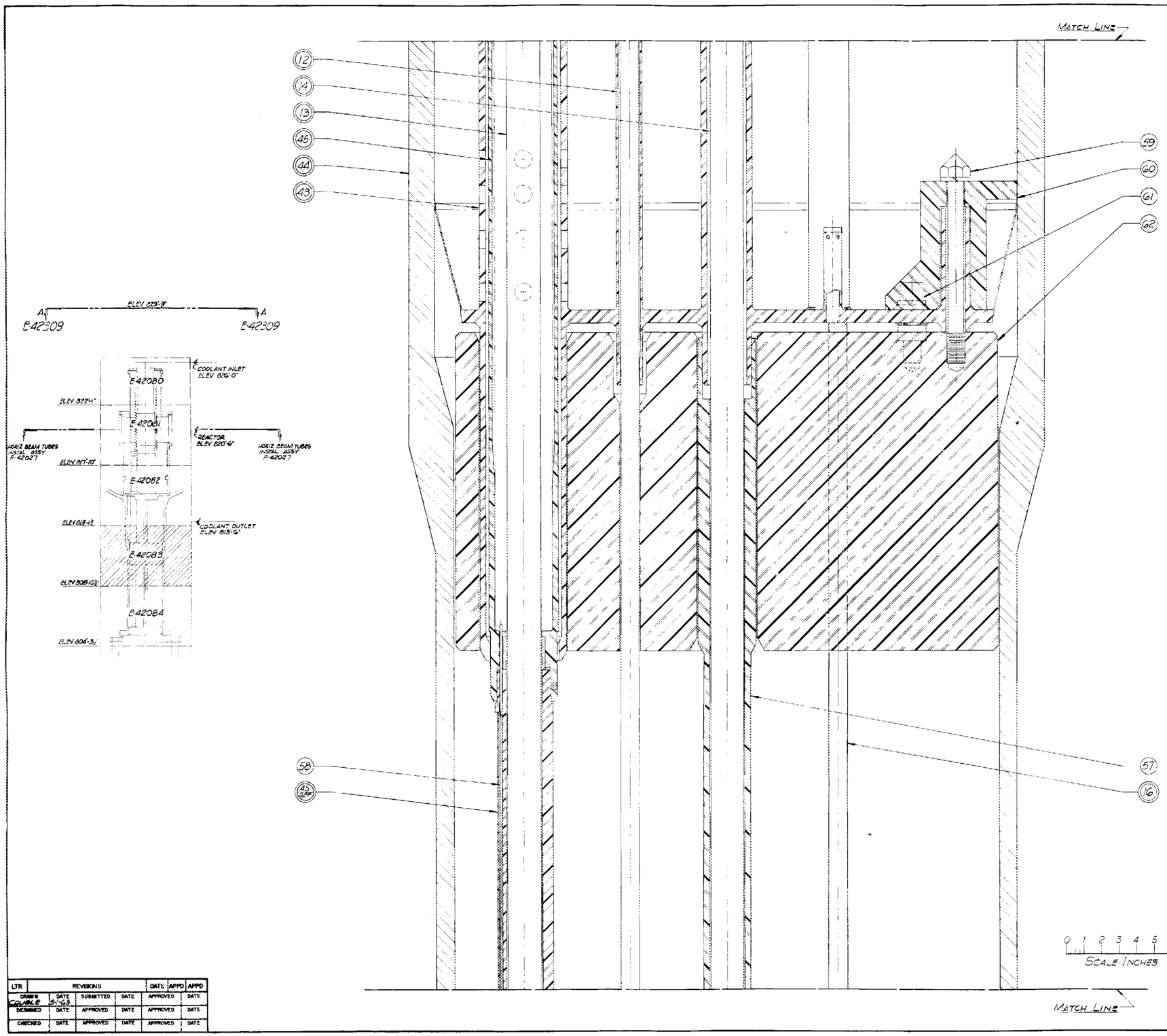
LTR.	REVISIONS			DATE	APPD	APPD
DRAWN	DATE	SUBMITTED	DATE	APPROVED		DATE
DESIGNED	DATE	APPROVED	DATE	APPROVED		DATE
CHECKED	DATE	APPROVED	DATE	APPROVED		DATE

REFERENCE DRAWINGS	DWG. NO.
HFIR PROJECT	BLDG. NO. 7900

REACTOR ASSEMBLY
VERTICAL SECTION Z-Z ELEV 813'-3" TO 817'-10"
REACTOR DIVISION

OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY
DIVISION OF UNION CARBIDE CORPORATION
OAK RIDGE, TENNESSEE

SUBMITTED	ACCEPTED	APPROVED
	JOB 505-1.0	E-42082



PARTS LIST

PART NO.	DWG. NO.	NO. REQD.	DESCRIPTION (NAME, SIZE, ETC.)
12	D-42280	4	N[14] PROBE ASSY
13	E-42330	4	ENGAGEMENT MECHANISM
14		1	INNER DRIVE ROD
16	E-42257	3	FISSION CHAMBER & DRIVE ASSY
43	E-42328	1	FUEL & REFLECTOR SUPPORT AND SLEEVE ASSEMBLY
44		1	HFIR PRESSURE VESSEL
45	E-42335-14	4	SHOCK ABSORBER ASSY
57	E-42433-5	1	INNER DRIVE ROD SHIELD
58	E-42347-10	4	SEAT SWITCH ACTUATOR
59	E-42364-10	4	BOLT
60	E-42361-5	4	SPACER LUG
61	E-42328-13	4	BOLT, 1" SOCKET HEAD
62	E-42494	1	VESSEL EXTENSION SHIELD PLUG

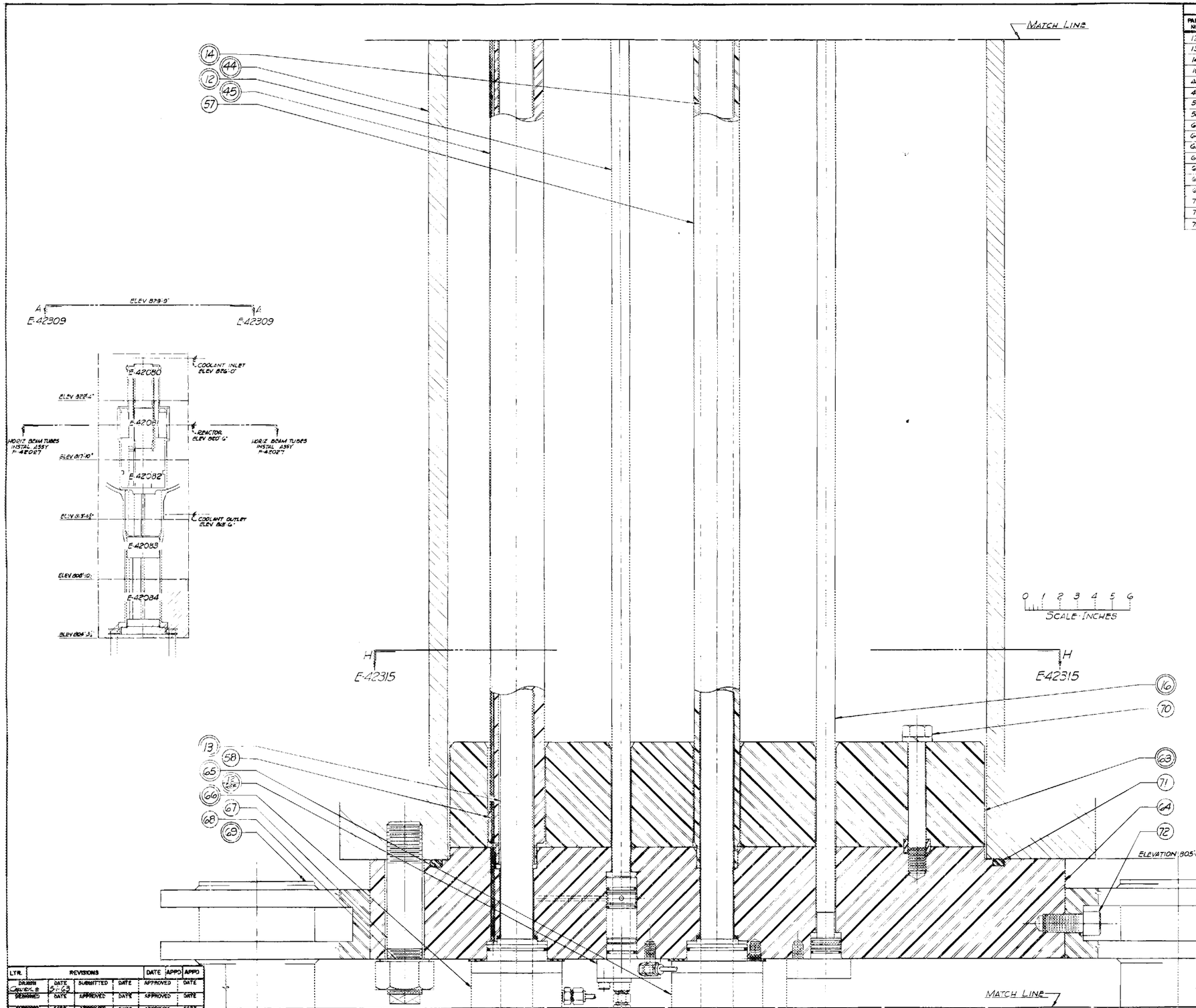
LTR.	REVISIONS			DATE	APPD	APPD
DRAWN	DATE	SUBMITTED	DATE	APPROVED	DATE	
COLAMLE	15-63					
DESIGNED	DATE	APPROVED	DATE	APPROVED	DATE	
CHECKED	DATE	APPROVED	DATE	APPROVED	DATE	

REFERENCE DRAWINGS	DWG. NO.
HFIR PROJECT	BLDG. NO. 7900

REACTOR ASSEMBLY
VERTICAL SECTION Z-Z ELEV 808'-10" TO 833'-9" REACTOR DIVISION

OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY
DIVISION OF UNION CARBIDE CORPORATION
OAK RIDGE, TENNESSEE

SUBMITTED	ACCEPTED	APPROVED	
	JOB 505-30	E-42083	REV



PARTS LIST

PART NO.	DWG. NO.	NO. REQ'D.	DESCRIPTION (NAME, SIZE, ETC.)
12	D42280	4	N¹⁶ PROBE ASSY
13	E42330	4	ENGAGEMENT MECHANISM
14		1	INNER DRIVE ROD
16	E42257	3	FISSION CHAMBER & DRIVE ASSY
44		1	HFIR PRESSURE VESSEL
45	E42335-14	4	SHOCK ABSORBER ASSY
57	E42499-5	1	INNER DRIVE ROD SHIELD
58	E42347-10	4	SEAT SWITCH ACTUATOR
63	E42493	1	LOWER HEAD SHIELDING
64	E42269	1	LOWER HEAD
65	E42346	1	INNER CONTROL ROD SEAL HOUSING ASSY
66	E42346	4	OUTER CONTROL ROD SEAL HOUSING ASSY
67		24	LOWER HEAD STUD
68		24	HEX NUT
69	D42363	4	SUPPORT COLUMN FOR CONTROL DRIVE EQUIPMENT
70	E42493-3	4	BOLT, 1" HEX
71		1	LOWER HEAD GASKET
72		28	BOLT, 1" SOCKET HEAD

LTR.	REVISIONS		DATE	APPD	APPD
DRAWN	DATE 5-1-63	SUBMITTED DATE	APPROVED	DATE	
DESIGNED	DATE	APPROVED DATE	APPROVED	DATE	
CHECKED	DATE	APPROVED DATE	APPROVED	DATE	

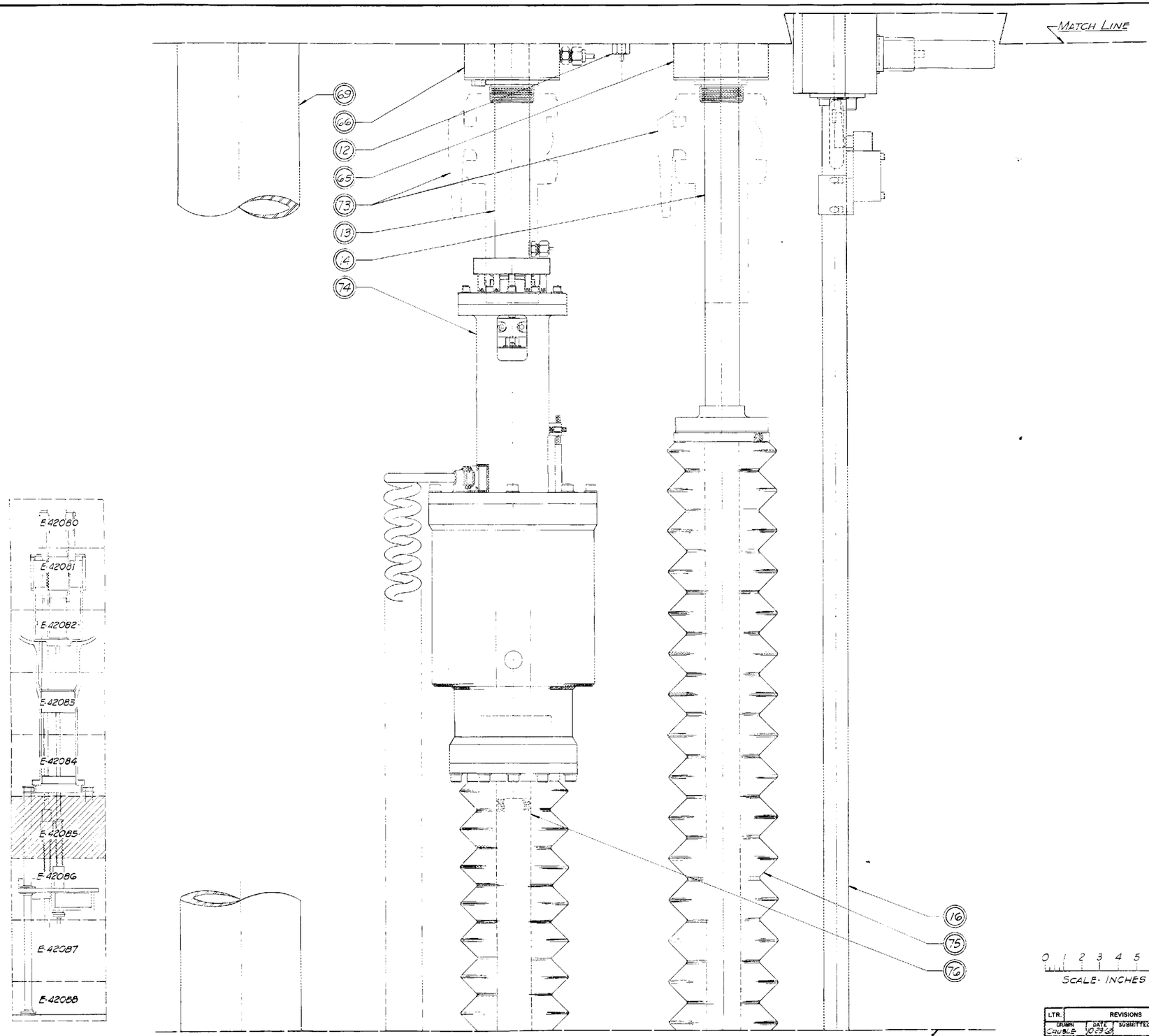
REFERENCE DRAWINGS | DWG. NO.

HFIR PROJECT | BLDG. NO. 7900

REACTOR ASSEMBLY
VERTICAL SECTION Z-Z ELEV. 804'-3" TO 808'-10"
REACTOR DIVISION

OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY
DIVISION OF UNION CARBIDE CORPORATION
OAK RIDGE, TENNESSEE

SUBMITTED	ACCEPTED	APPROVED
	Job 506-3.0	E-42084



PARTS LIST

PART NO.	DWG. NO.	NO. REQD.	DESCRIPTION (NAME, SIZE, ETC.)
12	D-42280	4	N¹⁶ PROBE ASSY
13	E-42330	4	ENGAGEMENT MECHANISM
14		1	INNER DRIVE ROD
16	E-42257	3	FISSION CHAMBER & DRIVE ASSY
65	E-42346B	1	INNER CONTROL ROD SEAL HOUSING
66	E-42346A	4	OUTER CONTROL ROD SEAL HOUSING
69	D-42363	4	PRIMARY SUPPORT COLUMN
73	E-42346B	5	VALVE
74	E-42151	4	OUTER CONTROL ROD DRIVE MAGNET ACTUATOR
75	E-47638	1	SHIM DRIVE FOR INNER CONTROL ROD
76	E-47809	4	OUTER CONTROL ROD DRIVE

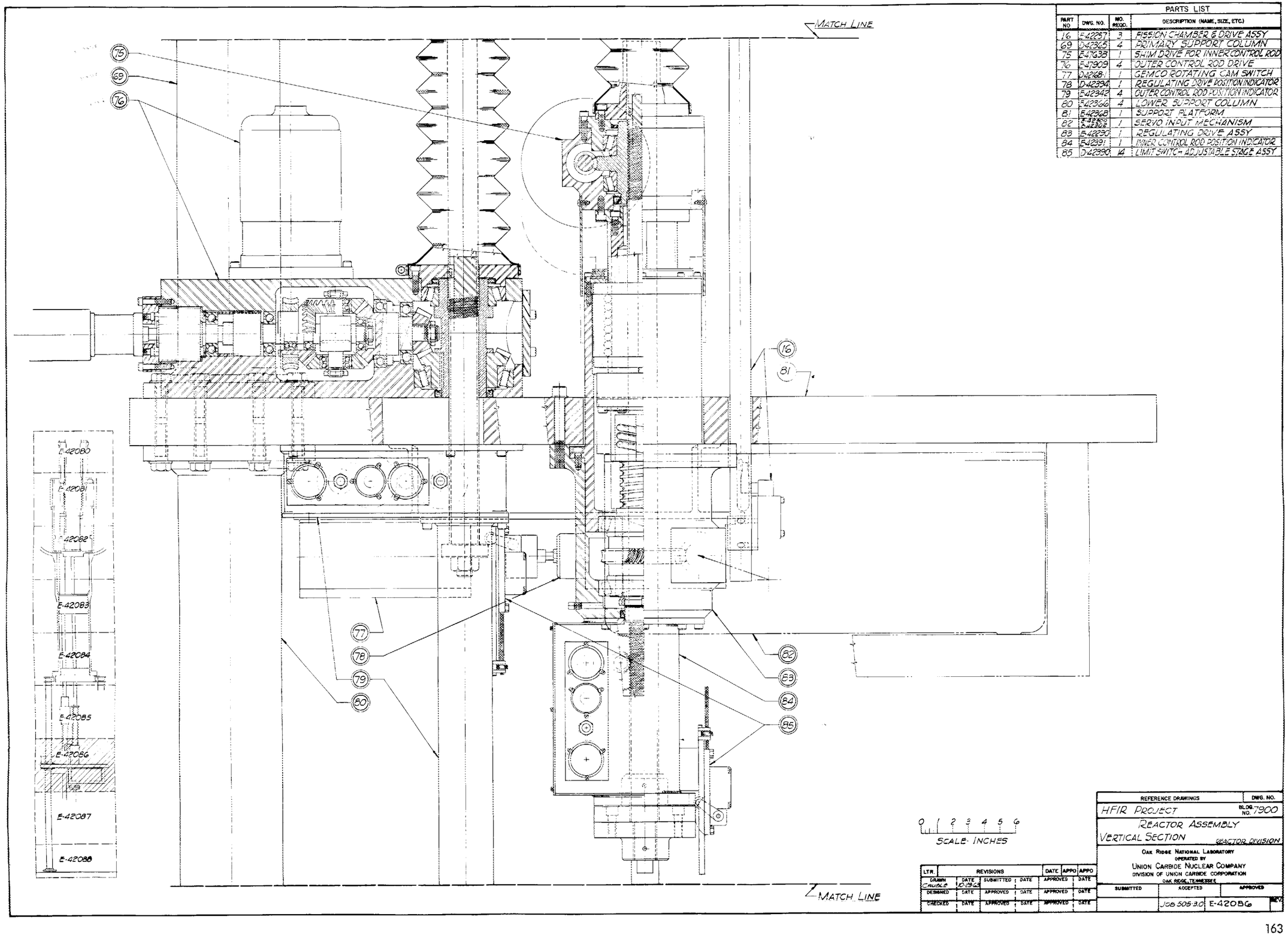
0 1 2 3 4 5 6
SCALE - INCHES

LTR.	REVISIONS			DATE	APPD	APPD
DRAWN CAUBLE	DATE 10-29-60	SUBMITTED	DATE	APPROVED		DATE
DESIGNED	DATE	APPROVED	DATE	APPROVED		DATE
CHECKED	DATE	APPROVED	DATE	APPROVED		DATE

REFERENCE DRAWINGS	DWG. NO.
HFIR PROJECT	BLDG. NO. 7900
REACTOR ASSEMBLY VERTICAL SECTION	REACTOR DIVISION

OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY
DIVISION OF UNION CARBIDE CORPORATION
OAK RIDGE, TENNESSEE

SUBMITTED	ACCEPTED	APPROVED
	JOB 505-30	E-42085



PARTS LIST

PART NO	DWG. NO.	NO. REQD.	DESCRIPTION (NAME, SIZE, ETC.)
16	E-42257	3	FISSION CHAMBER & DRIVE ASSY
69	D-42365	4	PRIMARY SUPPORT COLUMN
75	E-47638	1	SHIM DRIVE FOR INNER CONTROL ROD
76	E-47909	4	OUTER CONTROL ROD DRIVE
77	D-42168	1	GEMCO ROTATING CAM SWITCH
78	D-42394	1	REGULATING DRIVE POSITION INDICATOR
79	E-42342	4	OUTER CONTROL ROD POSITION INDICATOR
80	E-42366	4	LOWER SUPPORT COLUMN
81	E-42368	1	SUPPORT PLATFORM
82	E-42300 E-42302	1	SERVO INPUT MECHANISM
83	E-42290	1	REGULATING DRIVE ASSY
84	E-42391	1	INNER CONTROL ROD POSITION INDICATOR
85	D-42390	14	LIMIT SWITCH ADJUSTABLE STAGE ASSY

LTR.	REVISIONS		DATE	APPD	APPD
DRAWN CRUDLE	DATE 10-29-63	SUBMITTED	DATE	APPROVED	DATE
DESIGNED	DATE	APPROVED	DATE	APPROVED	DATE
CHECKED	DATE	APPROVED	DATE	APPROVED	DATE

REFERENCE DRAWINGS | DWG. NO.

HFIR PROJECT | BLDG. NO. 7900

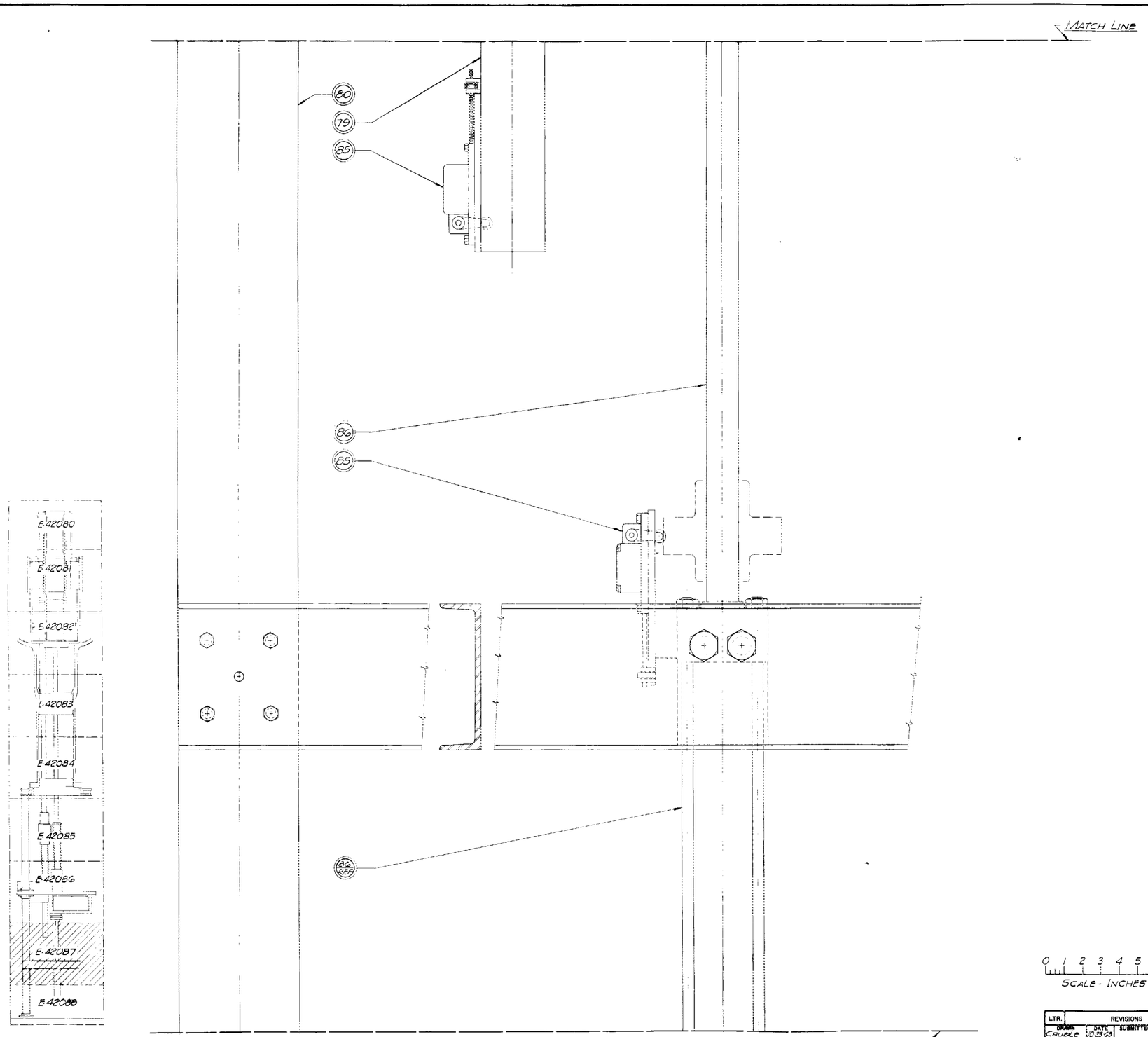
REACTOR ASSEMBLY
VERTICAL SECTION

REACTOR DIVISION

OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY
DIVISION OF UNION CARBIDE CORPORATION
OAK RIDGE, TENNESSEE

SUBMITTED	ACCEPTED	APPROVED
	JOB 505-3.0	E-42086

REV



PARTS LIST			
PART NO	DWG. NO.	NO. REQD.	DESCRIPTION (NAME, SIZE, ETC.)
79	E42342	4	OUTER CONTROL ROD POSITION INDICATOR
80	E42366	4	LOWER SUPPORT COLUMN
85	E42399	14	LIMIT SWITCH ADJUSTABLE STAGE ASSY
86	D42393	1	HYDRAULIC CYLINDER SUB-ASSY

0 1 2 3 4 5 6
SCALE - INCHES

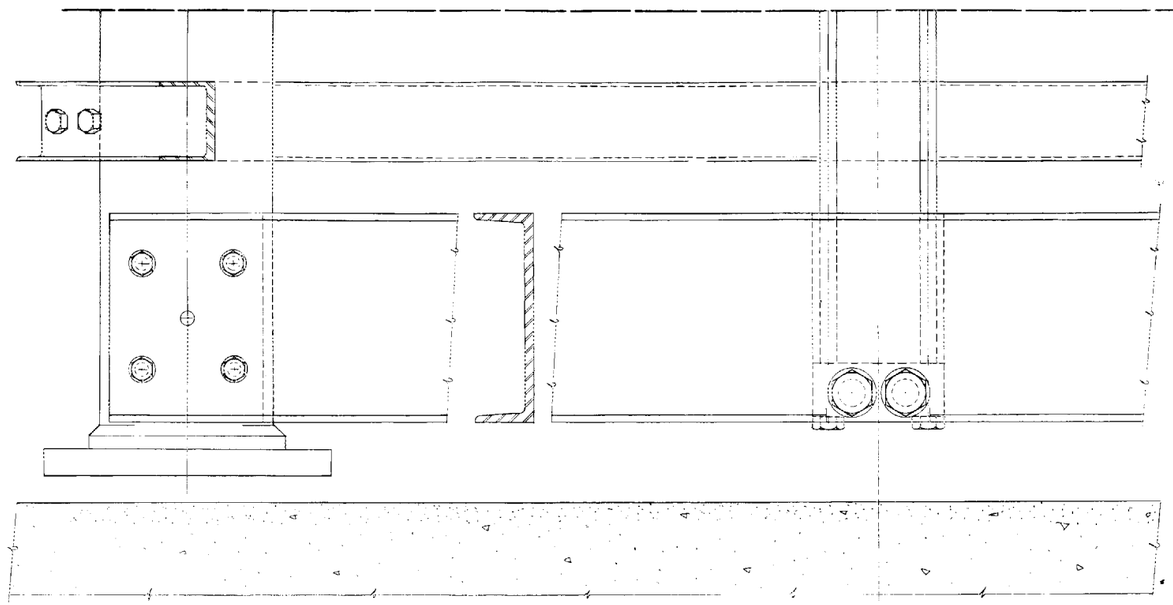
LTR.	REVISIONS			DATE	APPD	APPD
DRAWN CAUBLE	DATE 10.23.63	SUBMITTED	DATE	APPROVED	DATE	
DESIGNED	DATE	APPROVED	DATE	APPROVED	DATE	
CHECKED	DATE	APPROVED	DATE	APPROVED	DATE	

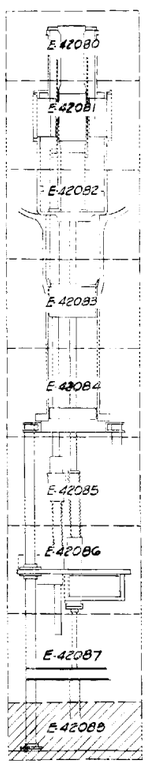
REFERENCE DRAWINGS	DWG. NO.
HFIR PROJECT	BLDG. NO. 7900

REACTOR ASSEMBLY
VERTICAL SECTION
REACTOR DIVISION

OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY
DIVISION OF UNION CARBIDE CORPORATION
OAK RIDGE, TENNESSEE

SUBMITTED	ACCEPTED	APPROVED	
	JOB 303-30	E-42087	REV.





PARTS LIST			
PART NO	DWG. NO.	NO. REQD.	DESCRIPTION (NAME, SIZE, ETC.)

0 1 2 3 4 5 6
SCALE - INCHES

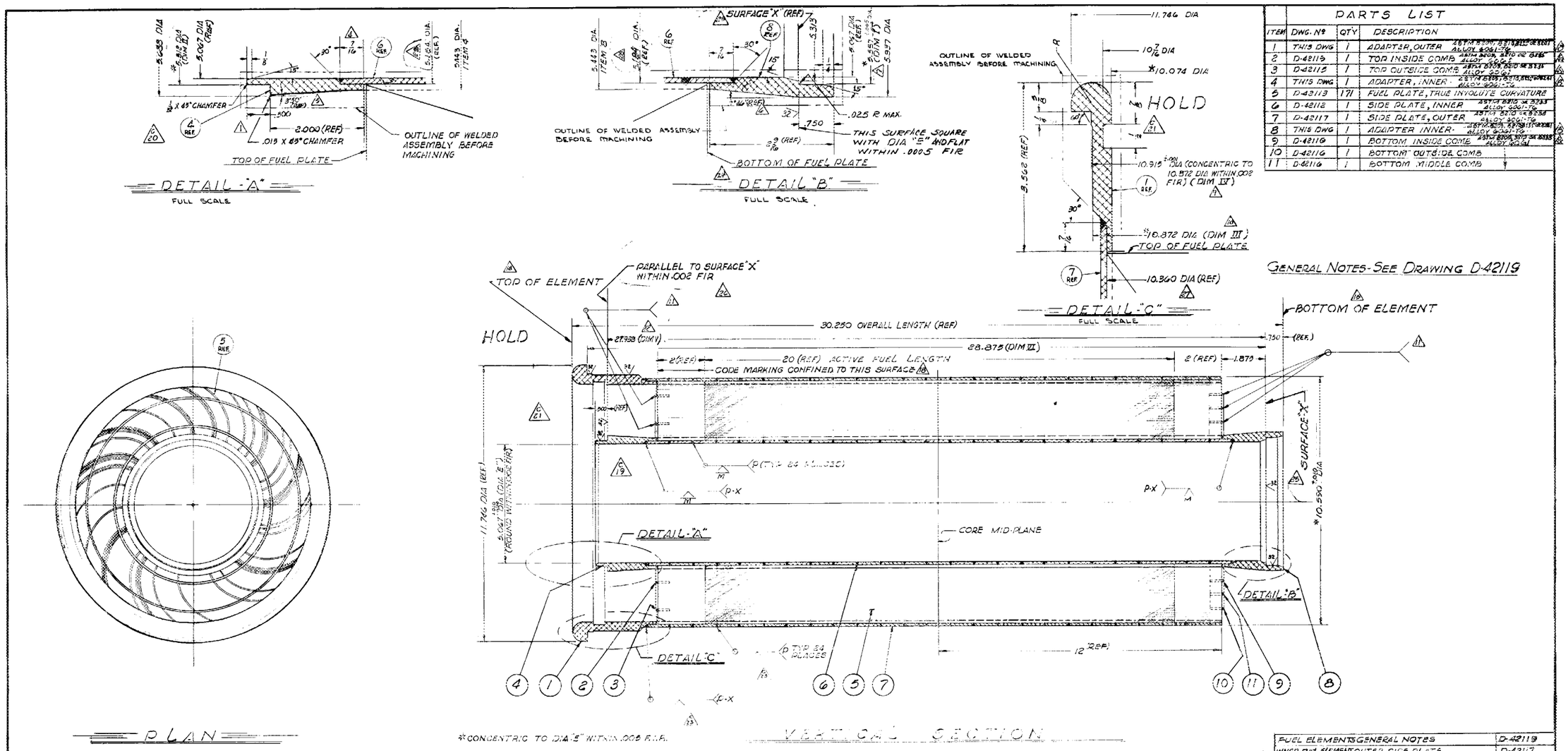
LTR.	REVISIONS			DATE	APPD	APPD
DRAWN Crable	DATE 10-29-63	SUBMITTED	DATE	APPROVED		DATE
DESIGNED	DATE	APPROVED	DATE	APPROVED		DATE
CHECKED	DATE	APPROVED	DATE	APPROVED		DATE

REFERENCE DRAWINGS	DWG. NO.
HFIR PROJECT	SLD# NO. 7900

REACTOR ASSEMBLY
VERTICAL SECTION
REACTOR DIVISION

OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY
DIVISION OF UNION CARBIDE CORPORATION
OAK RIDGE, TENNESSEE

SUBMITTED	ACCEPTED	APPROVED
	Job 505-3.0	E-42088



ITEM	DWG. Nº	QTY	DESCRIPTION
1	THIS DWG	1	ADAPTER, OUTER ASTM B209, B210 OR B221 ALLOY 6061-T6
2	D-42115	1	TOP INSIDE COMB ASTM B209, B210 OR B221 ALLOY 6061-T6
3	D-42115	1	TOP OUTSIDE COMB ASTM B209, B210 OR B221 ALLOY 6061-T6
4	THIS DWG	1	ADAPTER, INNER ASTM B209, B210, B221 OR B241 ALLOY 6061-T6
5	D-42113	171	FUEL PLATE, TRUE INVOLUTE CURVATURE
6	D-42112	1	SIDE PLATE, INNER ASTM B210 OR B233 ALLOY 6061-T6
7	D-42117	1	SIDE PLATE, OUTER ASTM B210 OR B233 ALLOY 6061-T6
8	THIS DWG	1	ADAPTER INNER ASTM B209, B210 OR B221 ALLOY 6061-T6
9	D-42116	1	BOTTOM INSIDE COMB ASTM B209, B210 OR B221 ALLOY 6061-T6
10	D-42116	1	BOTTOM OUTSIDE COMB
11	D-42116	1	BOTTOM MIDDLE COMB

*CONCENTRIC TO DIA "E" WITHIN .005 F.I.R.

GENERAL SPECIFICATIONS:
1. Break all sharp edges 1/64 max., unless otherwise specified.
2. ~~The fabricator may choose the type, grade or finish of material unless otherwise specified.~~

MACHINE FINISH SPECIFICATIONS:
1. Finish symbols are in accordance with ASA Standard B46.1-1955.
2. Roughness height values are the maximum arithmetical average deviation from the mean surface, expressed in microinches.
3. For surfaces not otherwise indicated, roughness height shall not exceed 63√.

LIMITS ON DIMENSIONS UNLESS OTHERWISE SPECIFIED:
FRACTIONS ± 1/64
DECIMALS ± .005
ANGLES ± 0°30'
WELD BEVELS ± 2°30'
SCALE: 1/2=1 & AS NOTED

FUEL ELEMENTS GENERAL NOTES	D-42119
INNER FUEL ELEMENT OUTER SIDE PLATE	D-42117
" " " BOTTOM COMBS	D-42116
" " " TOP COMBS	D-42115
" " " FUEL PLATE, TRUE INVOLUTE CURVATURE DESIGN DATA	D-42113
" " " " INNER SIDE PLATE	D-42112
H.F.I.R. OUTER FUEL ELEMENT ASSEMBLY	D-42126
REFERENCE DRAWINGS	DWG. NO.

H.F.I.R. PROJECT — SI DWG. NO. 7900

HFIR INNER FUEL ELEMENT ASSEMBLY

REACTOR DIVISION

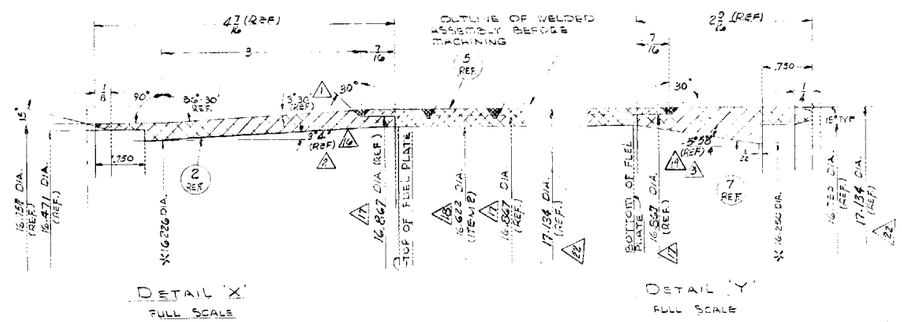
OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY
DIVISION OF UNION CARBIDE CORPORATION
OAK RIDGE, TENNESSEE

SUBMITTED M. Lundin | ACCEPTED 7-17-63 J.R. Mulhearn | APPROVED 11-12-63

JOB Nº 509-1-1 | D-42118 | REV. E

NO.	REVISIONS	DATE	APPD	APPD
E	THRU SEE DCN 2772			
D	SEE DCN 2698			
C	THRU SEE DCN 2620			
B	THRU SEE DCN 2585	9-6-63		
A	SEE DCN 2525 REC	7-23-63		

DRAWN R. WEEKS	DATE 3-8-63	SUBMITTED	DATE 7/17/63	APPROVED	DATE
DESIGNED	DATE 8/1/63	APPROVED	DATE 7/31/63	APPROVED	DATE
CHECKED	DATE 5-22-63	APPROVED	DATE 7-17-63	APPROVED	DATE



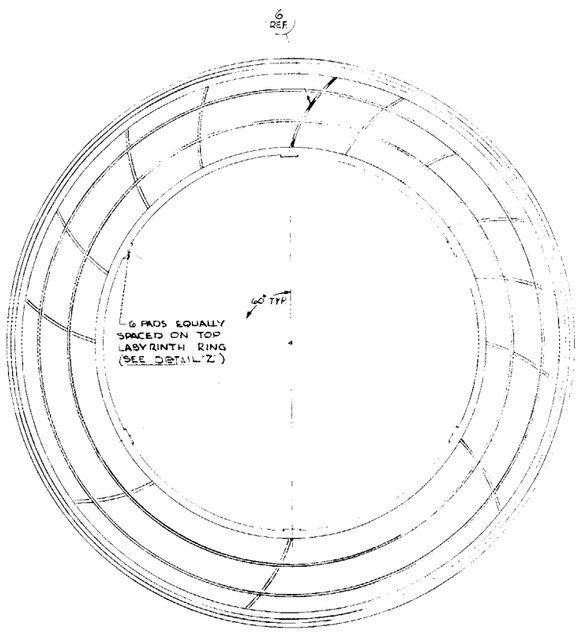
DETAIL 'X'
FULL SCALE

DETAIL 'Y'
FULL SCALE

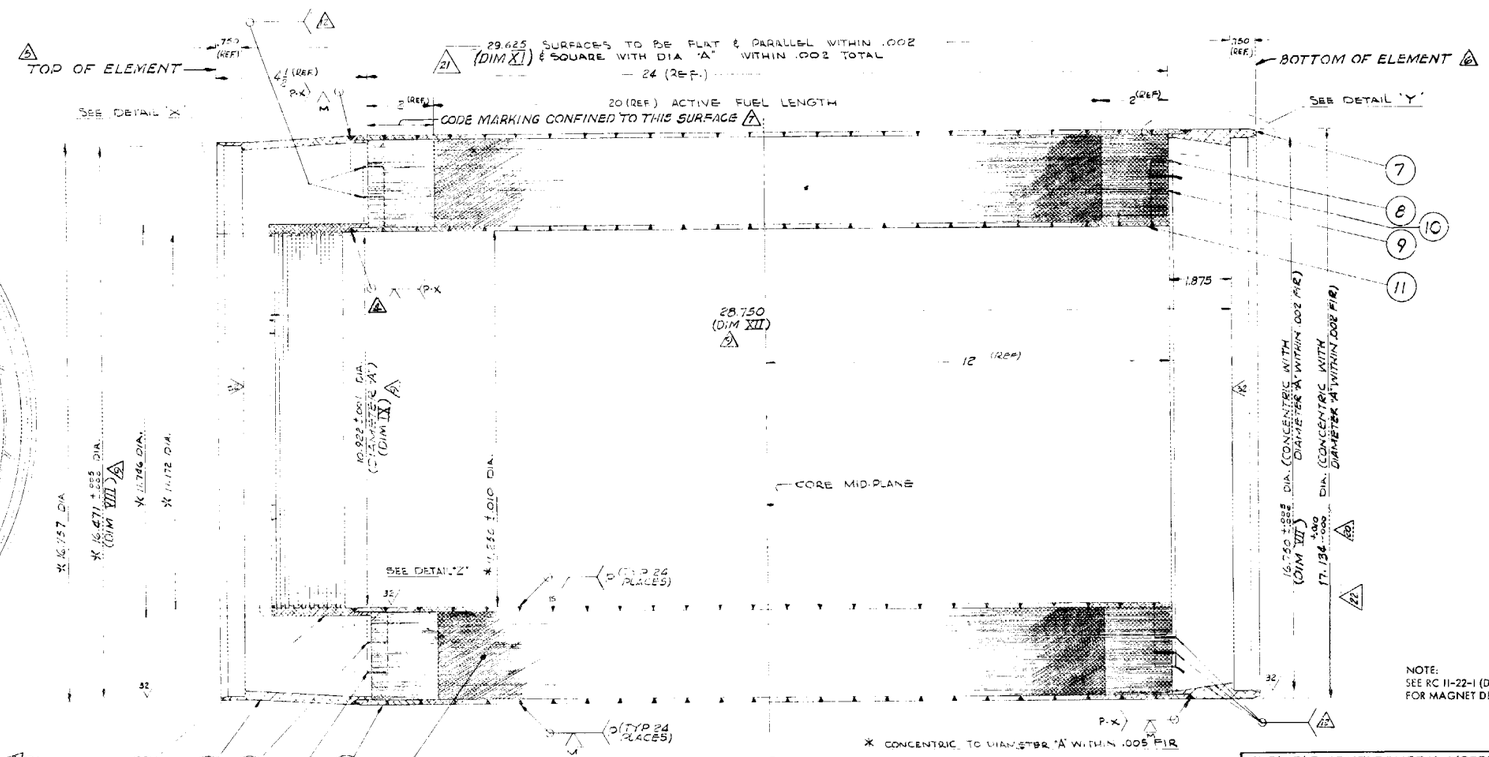
PARTS LIST

PART NO.	DWG. NO.	NO. REQD	DESCRIPTION (NAME, SIZE, ETC.)	MATERIAL
1	THIS DWG	1	ADAPTER, INNER	ASTM B209, B210, B235 OR B241 ALLOY 6061-T6
2	THIS DWG	1	ADAPTER, OUTER	ASTM B209, B210, B235 OR B241 ALLOY 6061-T6
3	D-42123	1	TOP INSIDE COMB	ASTM B209, B210 OR B235 ALLOY 6061
4	D-42123	1	TOP OUTSIDE COMB	ASTM B209, B210 OR B235 ALLOY 6061
5	D-42125	1	OUTER SIDE PLATE	ASTM B210 OR B235 ALLOY 6061-T6
6	D-42123	369	FUEL PLATE, TRUE INVOLUTE CURVATURE	
7	THIS DWG	1	ADAPTER, OUTER	ASTM B209, B210, B235 OR B241 ALLOY 6061-T6
8	D-42124	1	BOTTOM OUTSIDE COMB	ASTM B209, B210, OR B235 ALLOY 6061
9	D-42124	1	BOTTOM INSIDE COMB	ASTM B209, B210, OR B235 ALLOY 6061
10	D-42124	1	BOTTOM MIDDLE COMB	ASTM B209, B210, OR B235 ALLOY 6061
11	D-42120	1	INNER SIDE PLATE	ASTM B210 OR B235 ALLOY 6061-T6

GENERAL NOTES-SEE DRAWING D-42119

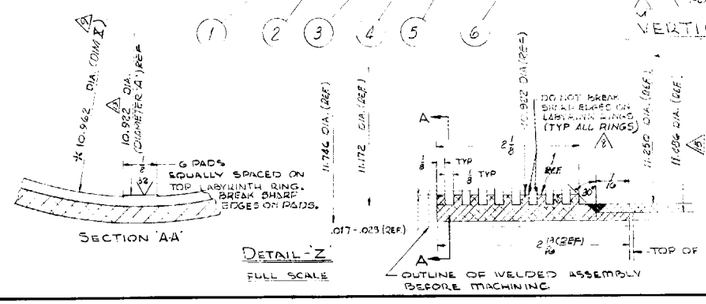


PLAN



VERTICAL SECTION

NOTE:
SEE RC 11-22-1 (DWG 153)
FOR MAGNET DETAILS



SECTION 'A-A'

DETAIL 'Z'
FULL SCALE

OUTER FUEL ELEMENT	OUTER SIDE PLATE	D-42125
" "	INNER SIDE PLATE	D-42120
" "	TOP COMBS	D-42123
" "	BOTTOM COMBS	D-42124
" "	FUEL PLATE TRUE INVOLUTE CURVATURE SEE DESIGN DETAILS	D-42121

LIMITS ON DIMENSIONS UNLESS OTHERWISE SPECIFIED	
FRACTIONS	± 1/64
DECIMALS	± .005
ANGLES	± 0° 30'
WELD FILLETS	±2° 30'
SCALE	HALF & NOTED

GENERAL SPECIFICATIONS
Unless Otherwise Specified:
1. Break all sharp edges 1/64 max.
2. Type, grade, or finish of material may be changed by fabricator.
3. Roughness height of machined surfaces shall not exceed 63 μ.
(Finish symbols and height values are in accordance with ASA B46.1-1955.)

LTR	REVISIONS	DATE	APPD	APPD
C	SEE DCN 2780			
B	THRU SEE DCN 2772	3-15-63		
A	THRU SEE DCN 2585	9-9-62		

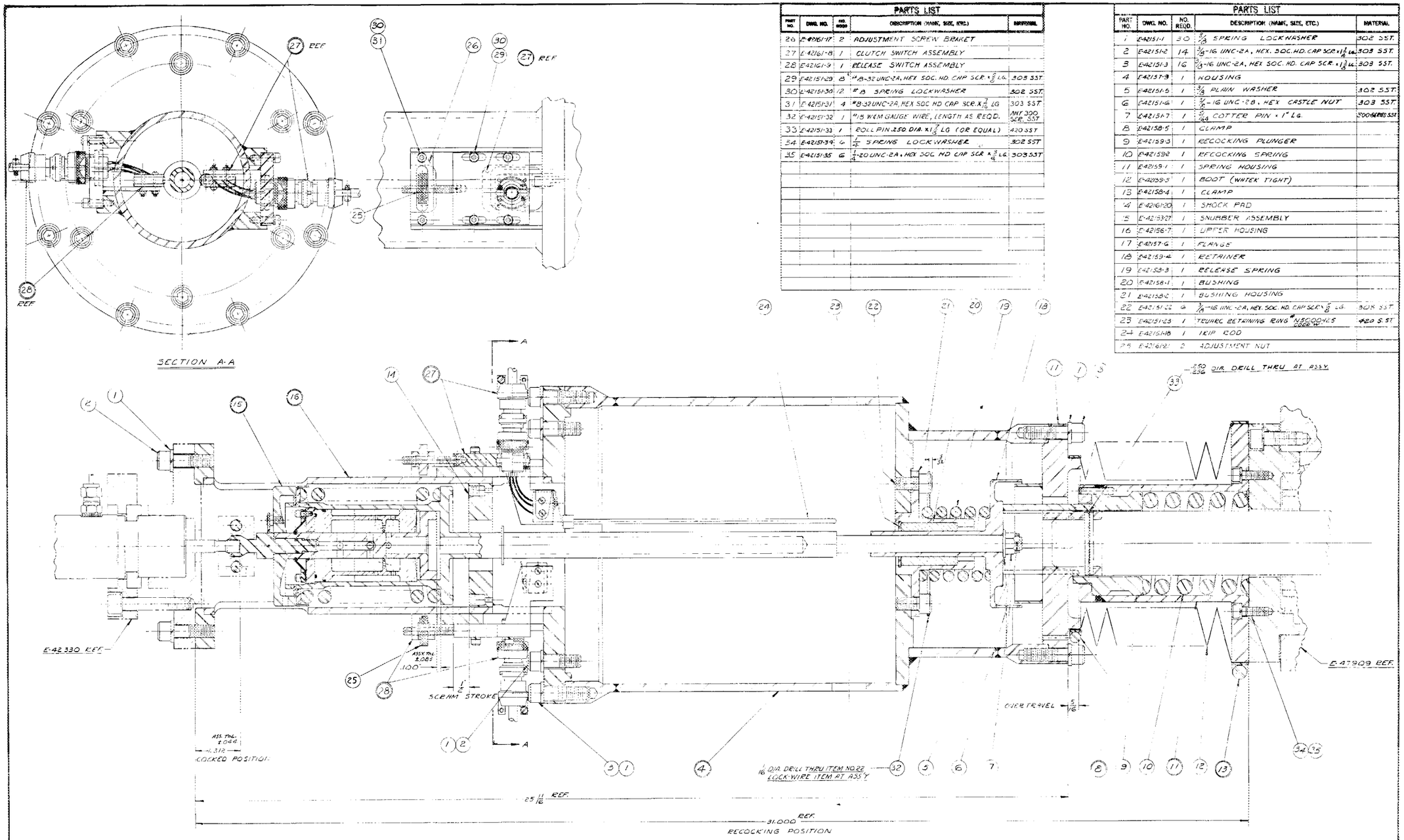
	DRAWN	DATE	SUBMITTED	DATE	APPROVED	DATE
SIG.	3.15.63			7/17/63		
	CHECKED	DATE	APPROVED	DATE	APPROVED	DATE
		8/1/63		7/2/63		
	CHECKED	DATE	APPROVED	DATE	APPROVED	DATE
COUPLE		6-22-63		7-17-63		

FUEL ELEMENTS GENERAL NOTES	D-42119
HFIR INNER FUEL ELEMENT ASSY	D-42118
REFERENCE DRAWINGS	DWG. NO.
H.F.I.R. PROJECT	BLDG. NO. 7900
HFIR OUTER FUEL ELEMENT ASSEMBLY	
REACTOR DIV.	

OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY
DIVISION OF UNION CARBIDE CORPORATION
OAK RIDGE, TENNESSEE

SUBMITTED: M.L. Lundin | ACCEPTED 7-17-63 J.R.M. Wingfield | APPROVED 11-13

JOB 505-1-1 | D-42126



PARTS LIST				
PART NO.	DWG. NO.	NO. REQD.	DESCRIPTION (NAME, SIZE, ETC.)	MATERIAL
26	E-42161-17	2	ADJUSTMENT SCREW BRACKET	
27	E-42161-8	1	CLUTCH SWITCH ASSEMBLY	
28	E-42161-9	1	RELEASE SWITCH ASSEMBLY	
29	E-42151-29	8	#8-32 UNC-2A, HEX SOC. HD. CAP SCR. × 3/8 LG.	303 SST.
30	E-42151-30	12	#8 SPRING LOCKWASHER	302 SST.
31	E-42151-31	4	#8-32 UNC-2A, HEX SOC. HD. CAP SCR. × 7/16 LG	303 SST.
32	E-42151-32	1	#18 W&M GAUGE WIRE, LENGTH AS REQ'D.	ANY 300 SER. SST.
33	E-42151-33	1	ROLL PIN .250 DIA. × 1 3/8 LG (OR EQUAL)	420 SST
34	E-42151-34	6	1/4 SPRING LOCKWASHER	302 SST
35	E-42151-35	6	1/4-20 UNC-2A, HEX SOC. HD. CAP SCR. × 3/4 LG.	303 SST

PARTS LIST				
PART NO.	DWG. NO.	NO. REQD.	DESCRIPTION (NAME, SIZE, ETC.)	MATERIAL
1	E-42151-1	30	5/8 SPRING LOCKWASHER	302 SST.
2	E-42151-2	14	5/8-16 UNC-2A, HEX. SOC. HD. CAP SCR. × 1 1/8 LG.	303 SST.
3	E-42151-3	16	5/8-16 UNC-2A, HEX SOC. HD. CAP SCR. × 1 3/8 LG.	303 SST.
4	E-42157-9	1	HOUSING	
5	E-42151-5	1	5/8 PLAIN WASHER	302 SST.
6	E-42151-6	1	5/8-16 UNC-2B, HEX CASTLE NUT	303 SST.
7	E-42151-7	1	5/64 COTTER PIN × 1" LG.	300 SERIES SST
8	E-42158-5	1	CLAMP	
9	E-42159-3	1	RECOCKING PLUNGER	
10	E-42159-2	1	RECOCKING SPRING	
11	E-42159-1	1	SPRING HOUSING	
12	E-42159-5	1	BOOT (WATER TIGHT)	
13	E-42158-4	1	CLAMP	
14	E-42161-20	1	SHOCK PAD	
15	E-42153-27	1	SNUBBER ASSEMBLY	
16	E-42156-7	1	UPPER HOUSING	
17	E-42157-6	1	FLANGE	
18	E-42153-4	1	RETAINER	
19	E-42158-3	1	RELEASE SPRING	
20	E-42158-1	1	BUSHING	
21	E-42158-2	1	BUSHING HOUSING	
22	E-42151-22	6	7/8-16 UNC-2A, HEX. SOC. HD. CAP SCR. × 5/8 LG.	303 SST.
23	E-42151-23	1	TEUNEC RETAINING RING #N5000-125 CODE "W"	420 S. ST.
24	E-42161-18	1	TRIP ROD	
25	E-42161-21	2	ADJUSTMENT NUT	

OUTER CONTROL ROD MAGNET ACTUATOR RELEASE DRAWING	E-42159
OUTER CONTROL ROD MAGNET ACTUATOR UPPER HOUSING	E-42156
REFERENCE DRAWINGS	NO.

Magnet shown in Dwg. RC 11-22-1 No. 154 in this set

NO.	REVISIONS	DATE	APPD	APPD
DRAWN	DATE / SUBMITTED / DATE / APPROVED	DATE		
DESIGNED	DATE / APPROVED / DATE / APPROVED	DATE		
CHECKED	DATE / APPROVED / DATE / APPROVED	DATE		

LIMITS ON DIMENSIONS UNLESS OTHERWISE SPECIFIED:
FRACTIONS ± 1/64
DECIMALS ± .005"
ANGLES ± 1°
SCALE: FULL

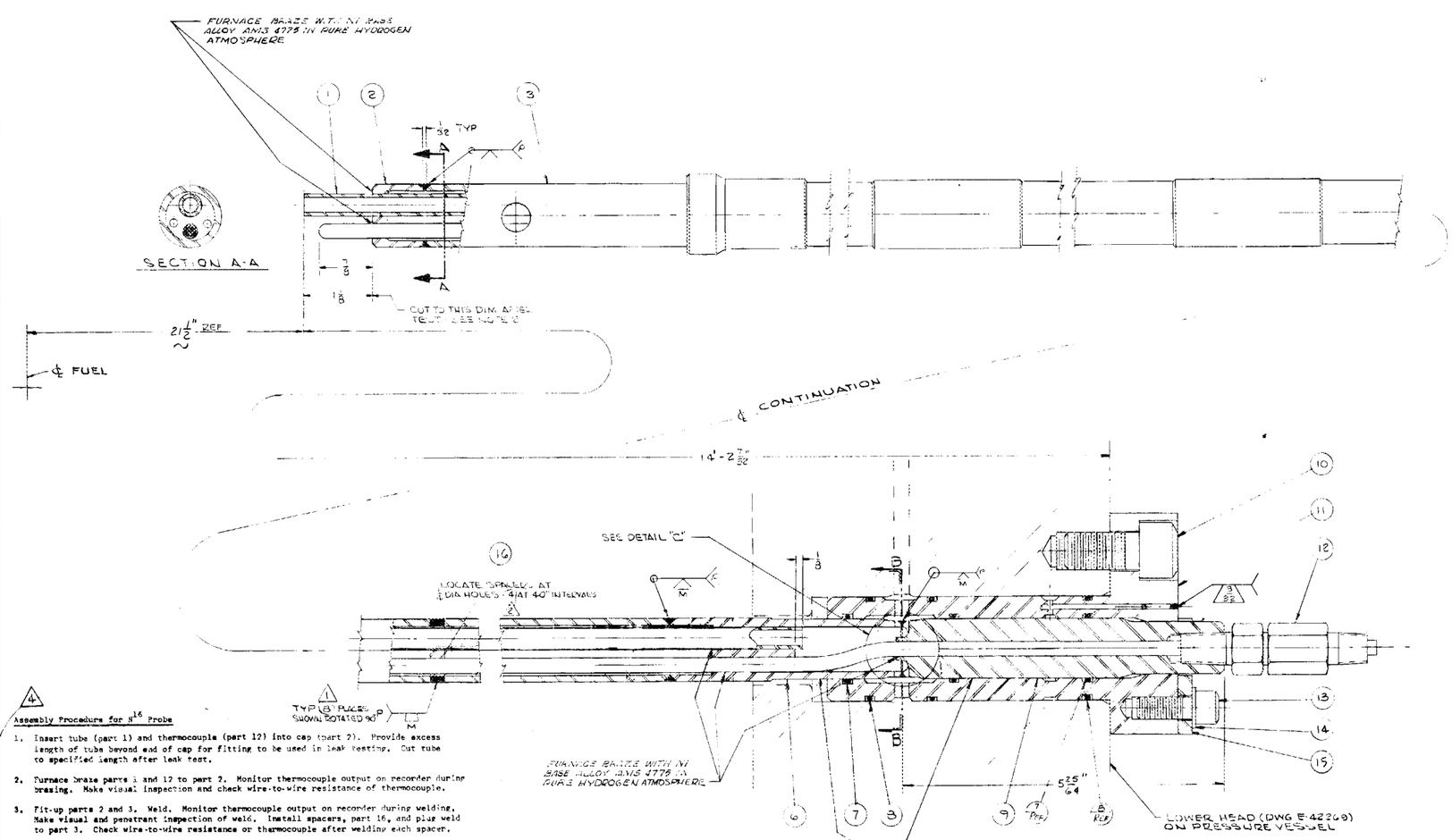
GENERAL SPECIFICATIONS
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES 1/64 MAX.
2. ~~BURRS, CHIPS, OR ROUGH SPOTS ARE NOT PERMITTED ON FABRICATION.~~
3. ROUGHNESS HEIGHT OF MACHINED SURFACES SHALL NOT EXCEED ✓ (FINISH SYMBOLS AND HEIGHT VALUES ARE IN ACCORDANCE WITH ASA B46.1-1955.)

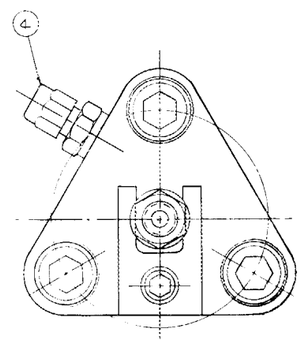
OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY
DIVISION OF UNION CARBIDE CORPORATION
OAK RIDGE, TENNESSEE

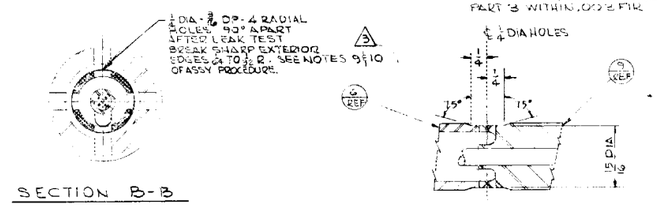
HFIR MECHANICAL CONTROLS — BLDG. NO. 7900

OUTER CONTROL ROD DRIVE MAGNET ACTUATOR ASSEMBLY
REACTOR DIVISION

SUBMITTED: J. R. Pl. APPROVED 6-3-63 — APPROVED
APPROVED: JOB # 505-60 — E 42151 — REV.







PARTS LIST

PART NO.	DWG. NO.	NO. REQD	DESCRIPTION (NAME, SIZE, ETC.)	MATERIAL
1		1	TUBE 3/8 OD x .065 WALL x 14'-0" ASTM A 269 - TYPE 347	
2	D-42281	1	CAP	
3	D-42281	1	PIPE	
4		1	CONNECTOR - SWAGELOK #400-1-OR-316 OR EQUAL	
5				
6	D-42281	1	ADAPTER	
7		3	O RING 11/16 ID x 1 3/16 OD x 3/32 NOM 70 DUROMETER BUNA-N	
8		3	O RING 1 7/16 ID x 1 9/16 OD x 3/32 NOM 70 DUROMETER BUNA-N	
9	D-42281	1	PLUG	
10		3	3/8-11 UNC-2A x 1 1/2 LG SOC HD CAP SCREW SEE NOTE 1	
11	D-42281	1	FLANGE	
12		1	THERMOCOUPLE ASSEMBLY - BY UCNC I&C DIVISION	
13		1	1/4-20 UNC-2A x 1 LG SOC HD CAP SCREW SEE NOTE 1	
14		1	3/8 SPRING LOCKWASHER	STL
15	D-42281	1	LOCK	
16	D-42281	4	SPACER	

GENERAL NOTES

1. Parts 10 and 13 - Standard Pressed Steel Company, "Unbrake" alloy steel or equal.
2. All material, welding and fabrication shall conform to HFIR procurement notes SST-2 (Dwg. D-42014).

Assembly Procedure for N^{16} Probe

1. Insert tube (part 1) and thermocouple (part 12) into cap (part 2). Provide excess length of tube beyond end of cap for fitting to be used in leak testing. Cut tube to specified length after leak test.
2. Furnace braze parts 1 and 12 to part 2. Monitor thermocouple output on recorder during brazing. Make visual inspection and check wire-to-wire resistance of thermocouple.
3. Fit-up parts 2 and 3. Weld. Monitor thermocouple output on recorder during welding. Make visual and penetrant inspection of weld. Install spacers, part 16, and plug weld to part 3. Check wire-to-wire resistance or thermocouple after welding each spacer.
4. Fit up part 6 to part 3. Weld. Monitor thermocouple output on recorder during welding. Make visual and penetrant inspection of weld. Check wire-to-wire resistance of thermocouple.
5. Furnace braze parts 1 and 12 to part 6. Monitor thermocouple output on recorder during brazing. Make visual inspection and check wire-to-wire resistance of thermocouple.
6. Bend thermocouple offset using part 9 as a bending tool. Check wire-to-wire resistance of thermocouple.
7. Fit up part 9 to part 6. Weld. Make visual and penetrant inspection of weld.
8. Furnace braze part 12 to part 9. Monitor thermocouple output on recorder during brazing. Make visual inspection and check wire-to-wire resistance of thermocouple.
9. Leak test Assembly by pressurizing through tube (part 1) to 1000 psi with helium and leak test brazed joints and weld between parts 6 and 9 by probing joints with helium leak tester having minimum sensitivity of 10^{-8} cc/sec. Throttle detector at probe for maximum sensitivity of detector.
10. Drill 4 radial holes at joint between parts 6 and 9 as shown on drawing.
11. Finish machine parts 6 and 9 as shown on drawing.

LTR	REVISIONS	DATE	APPD	APPD
A	DCN 26600 THROUGH A TEN	11-19-62		

DRAWN	DATE	CHECKED	DATE	APPROVED	DATE
	9-10-62		8-2-62		9-13-62
DESIGNED	DATE	SUBMITTED	DATE	APPROVED	DATE
			3/13/63		

GENERAL SPECIFICATIONS:
1. Break all sharp edges 1/64 max., unless otherwise specified.
2. ~~The following may be machined, made or cast, if material meets otherwise specified.~~

MACHINE FINISH SPECIFICATIONS:
1. Finish symbols are in accordance with ASA Standard B46.1-1955.
2. Roughness height values are the maximum arithmetical average deviation from the mean surface, expressed in microinches.
3. For surfaces not otherwise indicated, roughness height shall not exceed 63.

CLASSIFICATION: NOT CLASSIFIED

LIMITS ON DIMENSIONS UNLESS OTHERWISE SPECIFIED
FRACTIONS ± 1/32
DECIMALS ± .005
ANGLES ± 0° 30'
SCALE: FULL SIZE

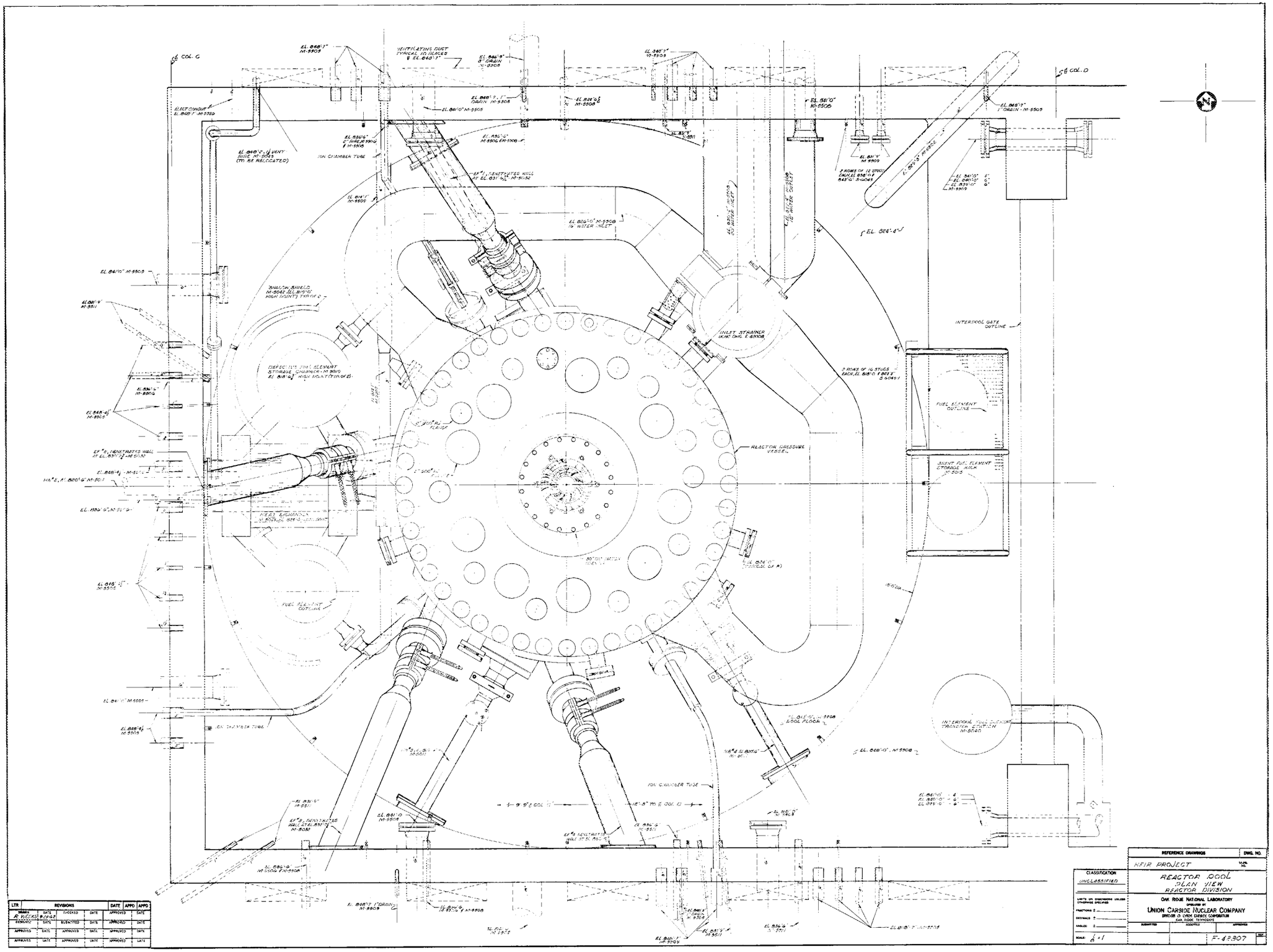
LOWER HEAD	E-42269
HFIR PROCUREMENT NOTES SST-2	D-42014
N^{16} PROBE DETAILS	D-42281
REFERENCE DRAWINGS	DWG. NO.
HFIR-PROJECT	SCALE NO. 7900

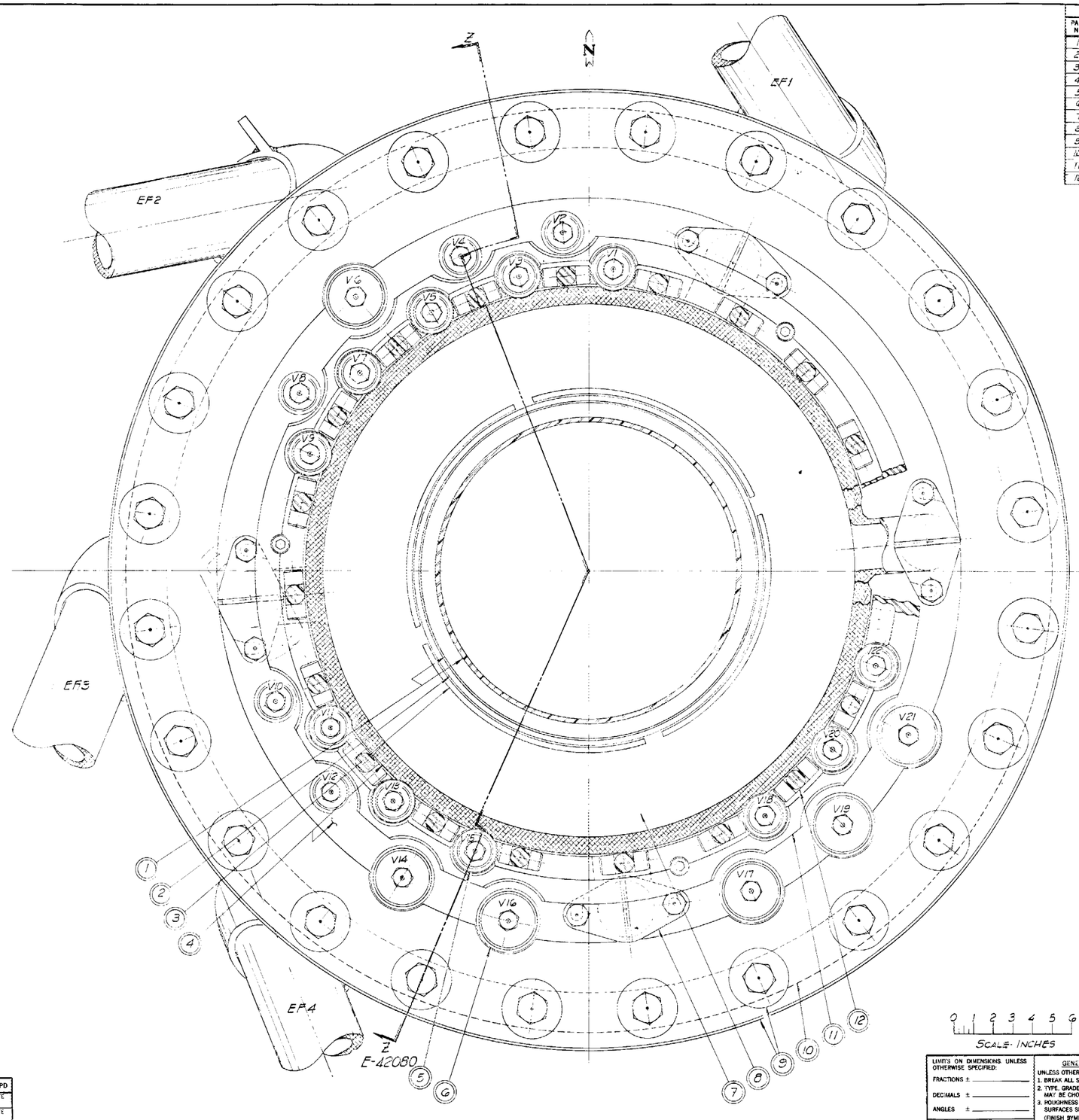
N^{16} PROBE ASSEMBLY
REACTOR DIVISION

OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY
DIVISION OF UNION CARBIDE CORPORATION
OAK RIDGE, TENNESSEE

SUBMITTED: 9/10/62 — ACCEPTED: 9-10-62 — APPROVED: 9/13/62

JOB 505-2.6 — D-42280 — REV A


℄ COL. G
℄ COL. D
VENTILATING DUCT TYPICAL 10 PLACES
ELECT CONDUIT
ION CHAMBER TUBE
SHIELDING BARRELS
INLET STRAINER
REACTOR PRESSURE VESSEL
INTERPOOL GATE OUTLINE
FUEL ELEMENT OUTLINE
SPENT FUEL ELEMENT STORAGE RACK
INTERPOOL FUEL ELEMENT TRANSFER STATION
POOL FLOOR
EL. 884'-4"
REFERENCE DRAWINGS
DWG. NO.
HFIR PROJECT
REACTOR POOL
PLAN VIEW
REACTOR DIVISION
CLASSIFICATION
UNCLASSIFIED
OAK RIDGE NATIONAL LABORATORY
UNION CARBIDE NUCLEAR COMPANY
F-42307
REVISIONS
LTR
DATE
APPD
DRAWN
CHECKED
APPROVED
SUBMITTED
SCALE: 1/4=1



PARTS LIST

PART NO.	DWG. NO.	NO. REQD.	DESCRIPTION (NAME, SIZE, ETC.)	MATERIAL
1	E-42352	1	INNER SHROUD	
2		1	INNER CONTROL ROD	
3		4	OUTER CONTROL ROD	
4	E-42381 E-42382	1	UPPER PLENUM & OUTER SHROUD	
5	E-42348	16	12¾" VERTICAL EXPERIMENT FACILITIES PLUG ASSEMBLY	
6	E-42349	6	3" VERTICAL EXPERIMENT FACILITIES PLUG ASSEMBLY	
7	E-42388-24	4	COOLING WATER INLET NOZZLE	
8		1	CONTROL ROD BEARING & TRACK ASSEMBLY, UPPER	
9	E-42386-3	1	CLAMP RING ASSEMBLY	
10	E-42314	1	REFLECTOR CONTAINER AND PEDESTAL ASSY	
11	E-42387-A	1	BOLT RETAINING RING	
12	E-42387-10	20	SWING BOLT ASSEMBLY	

0 1 2 3 4 5 6
SCALE: INCHES

LTR.	REVISIONS			DATE	APPD	APPD
DRAWN CRUSLE	DATE 3-20-69	SUBMITTED	DATE	APPROVED		DATE
DESIGNED	DATE	APPROVED	DATE	APPROVED		DATE
CHECKED	DATE	APPROVED	DATE	APPROVED		DATE

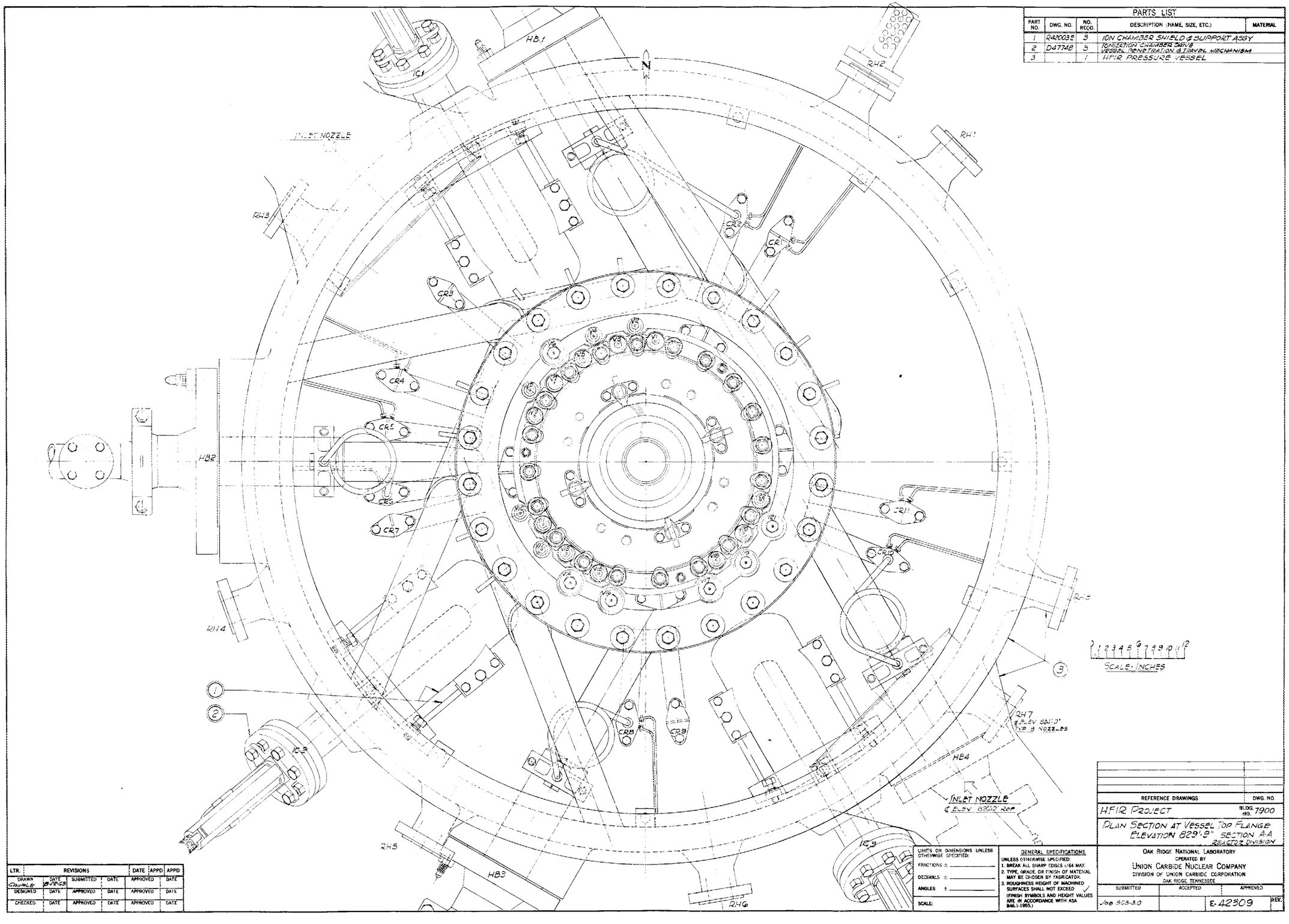
LIMITS ON DIMENSIONS UNLESS OTHERWISE SPECIFIED:
FRACTIONS ± ____
DECIMALS ± ____
ANGLES ± ____
SCALE:

GENERAL SPECIFICATIONS
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES 1/64 MAX.
2. TYPE, GRADE, OR FINISH OF MATERIAL MAY BE CHOSEN BY FABRICATOR.
3. ROUGHNESS HEIGHT OF MACHINED SURFACES SHALL NOT EXCEED ✓
(FINISH SYMBOLS AND HEIGHT VALUES ARE IN ACCORDANCE WITH ASA B46.1-1955.)

REFERENCE DRAWINGS	DWG. NO.
HFIR PROJECT	SLDG NO. 7900
PLAN SECTION THRU CONTROL ROD SHROUD AT ELEVATION 825'-SECTION B-B REACTOR DIVISION	

OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY
DIVISION OF UNION CARBIDE CORPORATION
OAK RIDGE, TENNESSEE

SUBMITTED	ACCEPTED	APPROVED
JOB 505-3.0		E-42308 REV.


PARTS LIST
PART NO. | DWG. NO. | NO. REQD. | DESCRIPTION (NAME, SIZE, ETC.) | MATERIAL
1 | R42003E | 3 | ION CHAMBER SHIELD & SUPPORT ASSY
2 | D47748 | 3 | IONIZATION CHAMBER DRIVE VESSEL PENETRATION & TRAVEL MECHANISM
3 | | 1 | HFIR PRESSURE VESSEL
N
HB.1
IC1
RH2
RH1
INLET NOZZLE
RH3
CR1
CR2
CR3
CR4
CR5
CR6
CR7
CR8
CR9
CR10
CR11
HB2
RH4
RH5
RH6
RH7
℄ ELEV 829'0"
TYP 3 NOZZLES
HB4
INLET NOZZLE
℄ ELEV 829'0" REF
HB3
IC2
IC3
SCALE-INCHES
REFERENCE DRAWINGS
DWG. NO.
HFIR PROJECT
BLDG. NO. 7900
PLAN SECTION AT VESSEL TOP FLANGE
ELEVATION 829'-2" SECTION A-A
REACTOR DIVISION
LIMITS ON DIMENSIONS UNLESS OTHERWISE SPECIFIED:
FRACTIONS ±
DECIMALS ±
ANGLES ±
SCALE:
GENERAL SPECIFICATIONS
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES 1/64 MAX.
2. TYPE, GRADE, OR FINISH OF MATERIAL MAY BE CHOSEN BY FABRICATOR.
3. ROUGHNESS HEIGHT OF MACHINED SURFACES SHALL NOT EXCEED
(FINISH SYMBOLS AND HEIGHT VALUES ARE IN ACCORDANCE WITH ASA B46.1-1955.)
OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY
DIVISION OF UNION CARBIDE CORPORATION
OAK RIDGE, TENNESSEE
SUBMITTED
ACCEPTED
APPROVED
Job 508-3.0
E-42309
REV.
LTR.
REVISIONS
DATE
APPD
APPD
DRAWN
DATE
SUBMITTED
DATE
APPROVED
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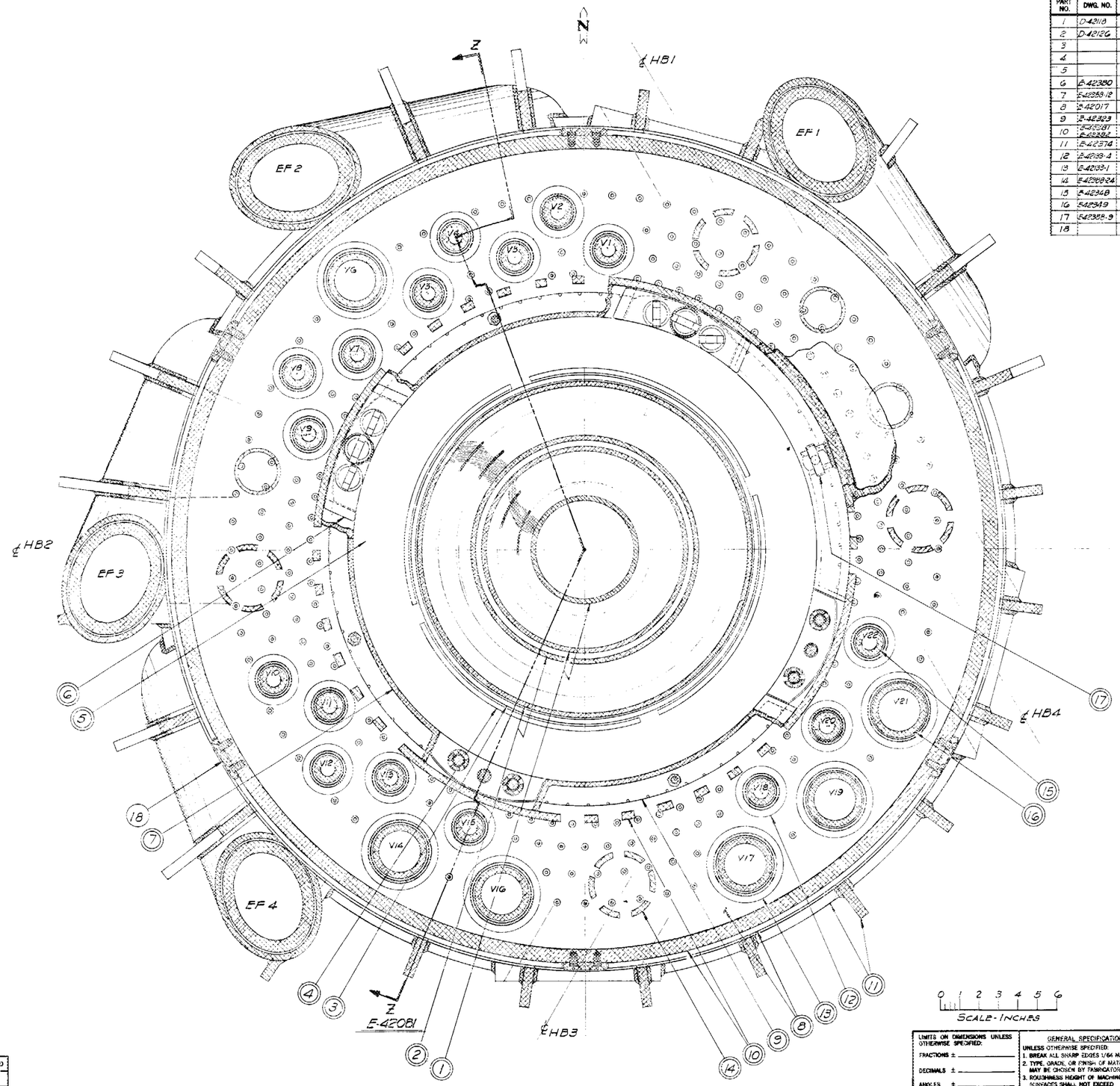
DATE



PARTS LIST				
PART NO.	DWG. NO.	NO. REQD.	DESCRIPTION (NAME, SIZE, ETC.)	MATERIAL
1	D-42118	1	FUEL ELEMENT INNER ANNULUS	
2	D-42126	1	FUEL ELEMENT OUTER ANNULUS	
3		1	INNER CONTROL ROD	
4		4	OUTER CONTROL ROD	
5		1	REMOVABLE REFLECTOR ASSEMBLY	
6	E-42380	4	CONTROL ROD ACCESS PLUG ASSEMBLY	
7	E-42269-12	4	SEMI-PERMANENT REFLECTOR PLENUM	
8	E-42017	1	REMOVABLE AND SEMI-PERMANENT REFLECTOR ASSEMBLY	
9	E-42323	4	SEMI-PERMANENT REFLECTOR	
10	E-42381 E-42382	1	UPPER PLENUM AND OUTER SHROUD ASSY	
11	E-42374	1	REFLECTOR CONTAINER AND PEDESTAL ASSY	
12	E-42133-4	16	1 3/8" VERTICAL EXPERIMENT HOLE LINER	
13	E-42133-1	6	3" VERTICAL EXPERIMENT HOLE LINER	
14	E-42388-24	4	COOLING WATER INLET NOZZLE	
15	E-42348	16	1 3/8" VERTICAL EXPERIMENT FACILITIES PLUG ASSEMBLY	
16	E-42349	6	3" VERTICAL EXPERIMENT FACILITIES PLUG ASSEMBLY	
17	E-42388-9	4	SEMI-PERMANENT PLENUM HOLD-DOWN	
18		6	OUTER SHROUD LOCATING KEY	

NO.	REVISIONS			DATE	APPD	APPD
DRAWN Cable	DATE 3-9-60	SUBMITTED	DATE	APPROVED		DATE
DESIGNED	DATE	APPROVED	DATE	APPROVED		DATE
CHECKED	DATE	APPROVED	DATE	APPROVED		DATE

0 1 2 3 4 5 6
SCALE-INCHES

REFERENCE DRAWINGS	NO.

OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY
DIVISION OF UNION CARBIDE CORPORATION
OAK RIDGE, TENNESSEE

UNITS ON DIMENSIONS UNLESS OTHERWISE SPECIFIED:
FRACTIONS ±
DECIMALS ±
ANGLES ±
SCALE:

GENERAL SPECIFICATIONS
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES 1/64 MAX.
2. TYPE, GRADE, OR FINISH OF MATERIAL MAY BE CHOSEN BY FABRICATOR.
3. ROUGHNESS HEIGHT OF MACHINED SURFACES SHALL NOT EXCEED ✓
(FINISH SYMBOLS AND HEIGHT VALUES ARE IN ACCORDANCE WITH ASA B46.1-1953.)

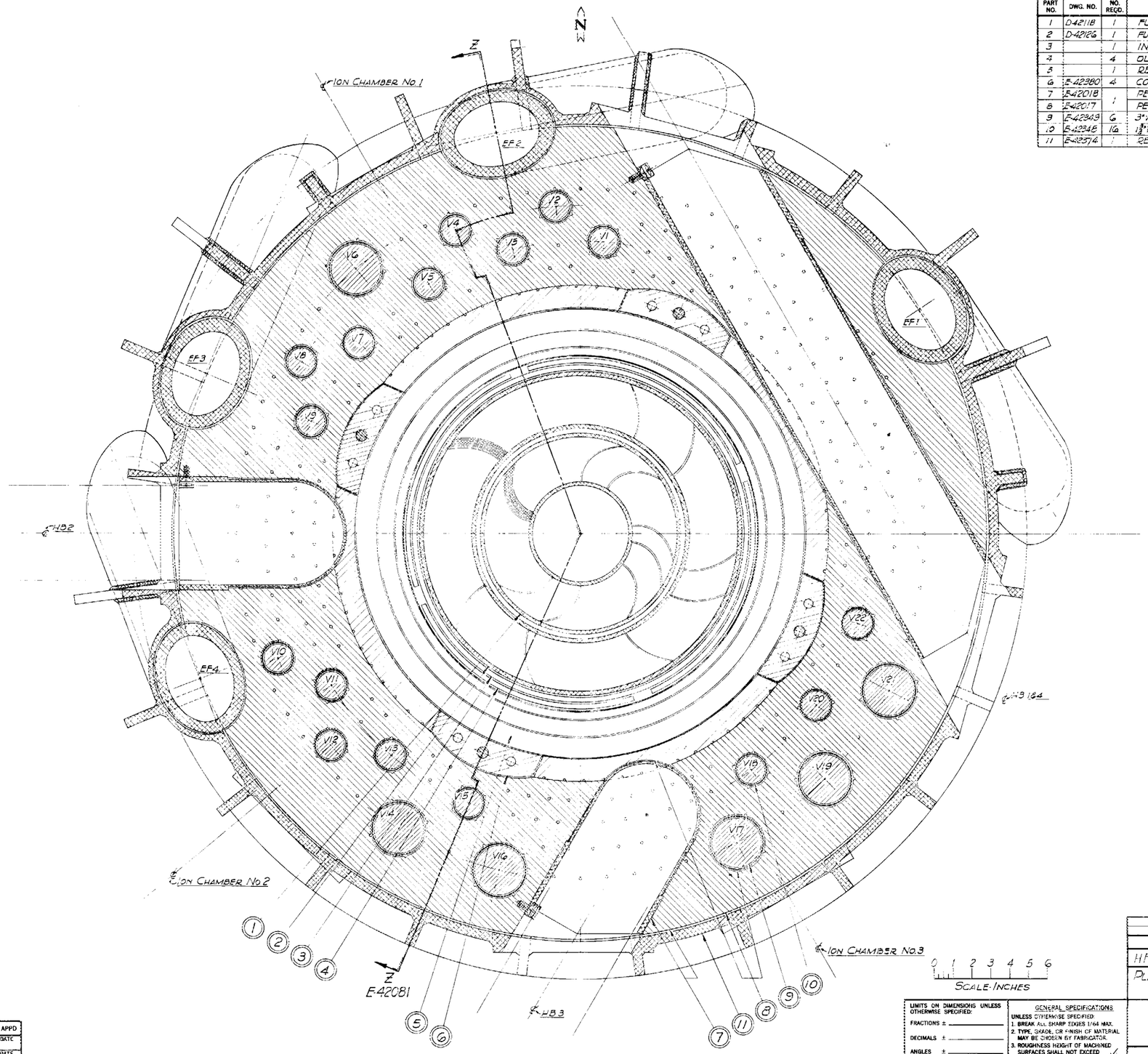
HFIR PROJECT
DWG. NO. 7900

REACTOR ASSEMBLY
PLAN SECTION ABOVE REFLECTOR
AT ELEVATION 821'-9 3/8" - SECTION C-C

SUBMITTED	APPROVED	APPROVED
APPROVED	Jae 805-9.0	E 42310

173

PARTS LIST				
PART NO.	DWG. NO.	NO. REQ'D.	DESCRIPTION (NAME, SIZE, ETC.)	MATERIAL
1	D-42118	1	FUEL ELEMENT INNER ANNULUS	
2	D-42126	1	FUEL ELEMENT OUTER ANNULUS	
3		1	INNER CONTROL ROD	
4		4	OUTER CONTROL ROD	
5		1	REMOVABLE REFLECTOR ASSEMBLY	
6	E-42380	4	CONTROL ROD ACCESS PLUG ASSEMBLY	
7	E-42018	1	PERMANENT REFLECTOR-PB LINERS INSTALLATION	
8	E-42017		PERMANENT AND SEMI-PERMANENT REFLECTOR ASSEMBLY	
9	E-42349	6	3" VERTICAL EXPERIMENT FACILITIES PLUG ASSEMBLY	
10	E-42346	16	1½" VERTICAL EXPERIMENT FACILITIES PLUG ASSEMBLY	
11	E-42374	1	REFLECTOR CONTAINER AND PEDESTAL ASSY	



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SCALE-INCHES

LTR.	REVISIONS			DATE	APPD	APPD
DRAWN Gouble	DATE 9-2-53	SUBMITTED	DATE	APPROVED		DATE
DESIGNED	DATE	APPROVED	DATE	APPROVED		DATE
CHECKED	DATE	APPROVED	DATE	APPROVED		DATE

LIMITS ON DIMENSIONS UNLESS OTHERWISE SPECIFIED:
FRACTIONS ±
DECIMALS ±
ANGLES ±
SCALE:

GENERAL SPECIFICATIONS
UNLESS OTHERWISE SPECIFIED
1. BREAK ALL SHARP EDGES 1/64 MAX.
2. TYPE, GRADE, OR FINISH OF MATERIAL MAY BE CHOSEN BY FABRICATOR.
3. ROUGHNESS HEIGHT OF MACHINED SURFACES SHALL NOT EXCEED ✓
(FINISH SYMBOLS AND HEIGHT VALUES ARE IN ACCORDANCE WITH ASA B46.1-1955.)

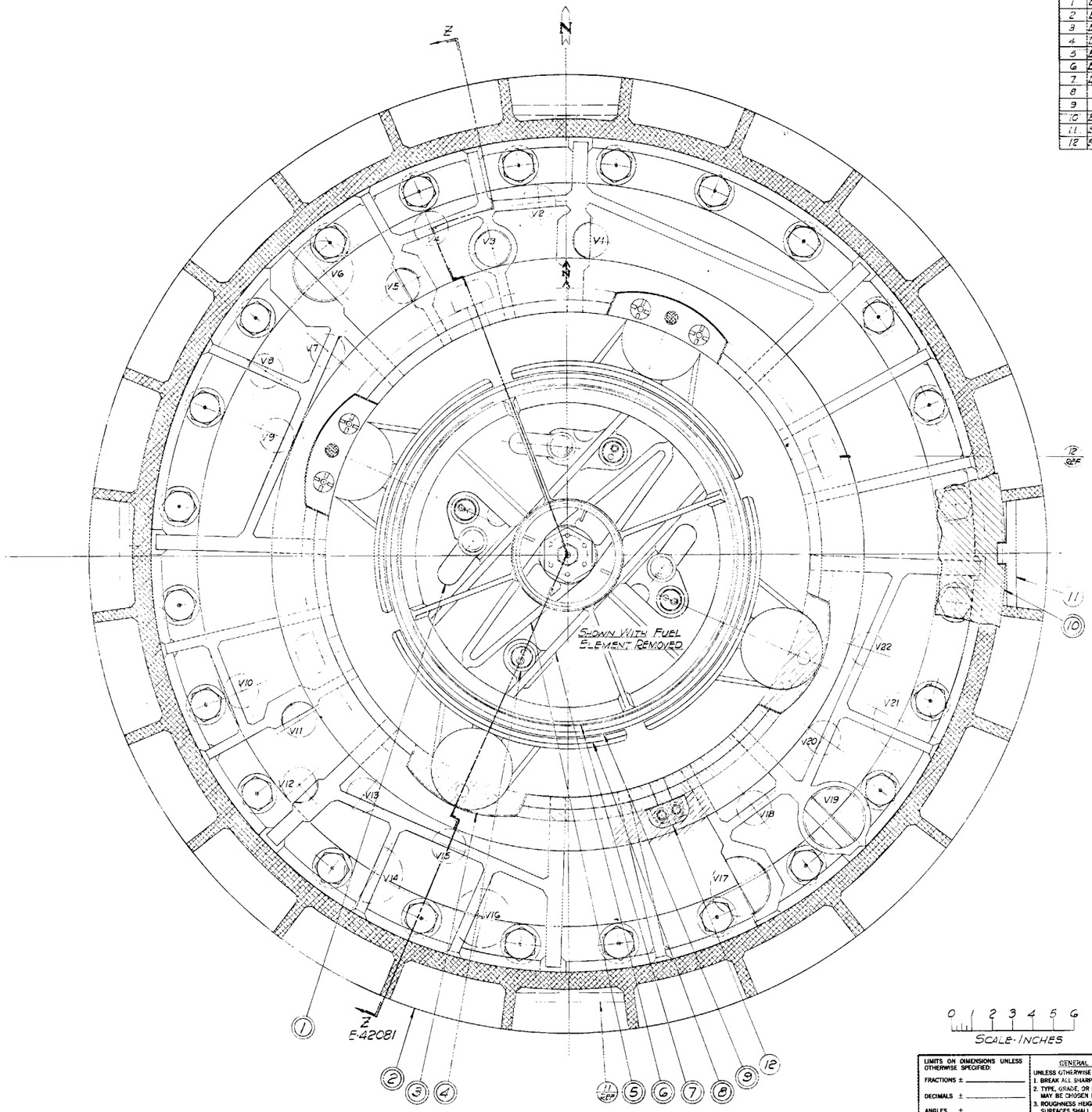
REFERENCE DRAWINGS	DWG. NO.
HFIR PROJECT	B.DG. NO. 7300

PLAN SECTION AT REFLECTOR MIDPLANE
ELEVATION 820'6" SECTION C-D
REACTOR DIVISION

OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY
DIVISION OF UNION CARBIDE CORPORATION
OAK RIDGE, TENNESSEE

SUBMITTED	ACCEPTED	APPROVED
	JOB 505-30	E-42311

PARTS LIST				
PART NO.	DWG. NO.	NO. REQD.	DESCRIPTION (NAME, SIZE, ETC.)	MATERIAL
1	E42257	3	FISSION CHAMBER & DRIVE ASSEMBLY	
2	E42374	1	REFLECTOR CONTAINER & PEDESTAL ASSEMBLY	
3	E42380	4	CONTROL ROD ACCESS PLUG ASSEMBLY	
4	D42280	4	N[10] PROBE ASSEMBLY	
5	E42376	1	INNER CONTROL ROD DRIVE BRACKET	
6	E42350	1	FUEL SUPPORT PEDESTAL	
7	D42375	1	FUEL GRID ASSEMBLY	
8		4	OUTER CONTROL ROD	
9		1	INNER CONTROL ROD	
10	E42017	1	PERMANENT & SEMI-PERMANENT REFLECTOR ASSEMBLY	
11	S42373-3	4	KEY	
12	S42323-10	4	LOCATING PLATE	



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SCALE-INCHES

LTR.	REVISIONS			DATE	APPD	APPD
DRAWN	DATE	SUBMITTED	DATE	APPROVED		DATE
DESIGNED	DATE	APPROVED	DATE	APPROVED		DATE
CHECKED	DATE	APPROVED	DATE	APPROVED		DATE

LIMITS ON DIMENSIONS UNLESS OTHERWISE SPECIFIED:
FRACTIONS ± ____
DECIMALS ± ____
ANGLES ± ____
SCALE:

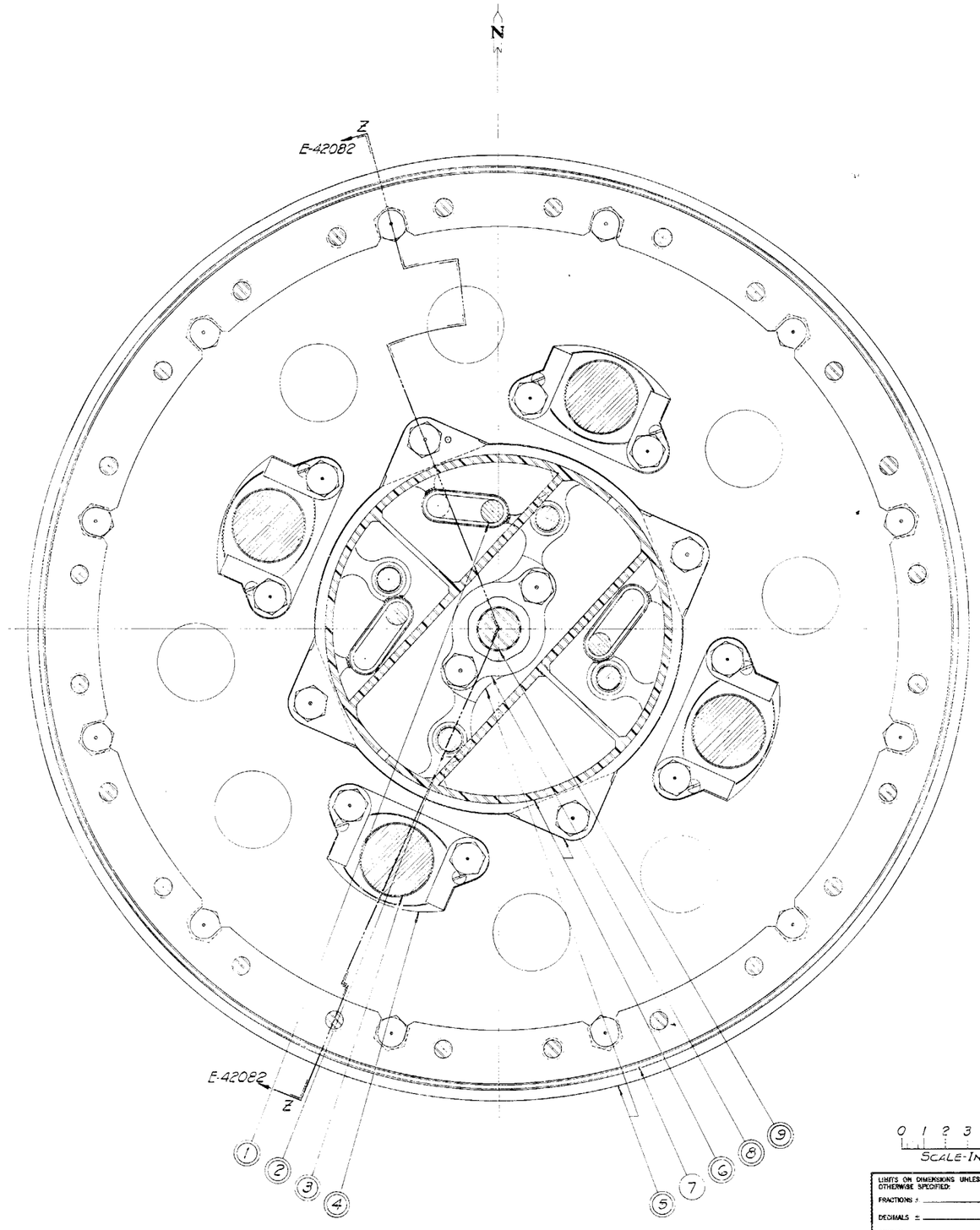
GENERAL SPECIFICATIONS
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES 1/64 MAX.
2. TYPE, GRADE, OR FINISH OF MATERIAL MAY BE CHOSEN BY FABRICATOR.
3. ROUGHNESS HEIGHT OF MACHINED SURFACES SHALL NOT EXCEED ✓ (FINISH SYMBOLS AND HEIGHT VALUES ARE IN ACCORDANCE WITH ASA B46.1-1955.)

REFERENCE DRAWINGS	DWG. NO.
HFIR PROJECT	BLDG. NO. 7900

PLAN SECTION BELOW REFLECTOR AT ELEVATION 819'5 1/2" SECTION E-E
REACTOR DIVISION

OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY
DIVISION OF UNION CARBIDE CORPORATION
OAK RIDGE, TENNESSEE

SUBMITTED	ACCEPTED	APPROVED	
Job 505-30		E-42312	REV.



PARTS LIST				
PART NO.	DWG. NO.	NO. REQ'D.	DESCRIPTION (NAME, SIZE, ETC.)	MATERIAL
1	E-42257	3	FISSION CHAMBER & DRIVE ASSY	
2	D-42280	4	N^{16} PROBE ASSY	
3		4	OUTER CONTROL DRIVE ASSY	
4	E-42235-14	4	SHOCK ABSORBER ASSY	
5	E-42237 E-42238	1	FUEL & REFLECTOR SUPPORT AND SLEEVE ASSY	
6	E-42250	1	FUEL SUPPORT PEDESTAL	
7	E-42274-3	1	GASKET, METALLIC 'O' RING	
8		1	INNER CONTROL ROD SLEEVE BEARING ASSY	
9		1	INNER CONTROL ROD DRIVE ASSY	

0 1 2 3 4 5 6
SCALE-INCHES

NO.	REVISIONS			DATE	APPD	APPD
DRAWN CHUBLE 10-1-63	DATE	SUBMITTED	DATE	APPROVED		DATE
DESIGNED	DATE	APPROVED	DATE	APPROVED		DATE
CHECKED	DATE	APPROVED	DATE	APPROVED		DATE

UNITS ON DIMENSIONS UNLESS OTHERWISE SPECIFIED:
FRACTIONS ± _____
DECIMALS ± _____
ANGLES ± _____
SCALE:

GENERAL SPECIFICATIONS
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES 1/64 MAX.
2. TYPE, GRADE, OR FINISH OF MATERIAL MAY BE CHOSEN BY FABRICATOR.
3. ROUGHNESS HEIGHT OF MACHINED SURFACES SHALL NOT EXCEED ✓
(FINISH SYMBOLS AND HEIGHT VALUES ARE IN ACCORDANCE WITH ASA B46.1-1955.)

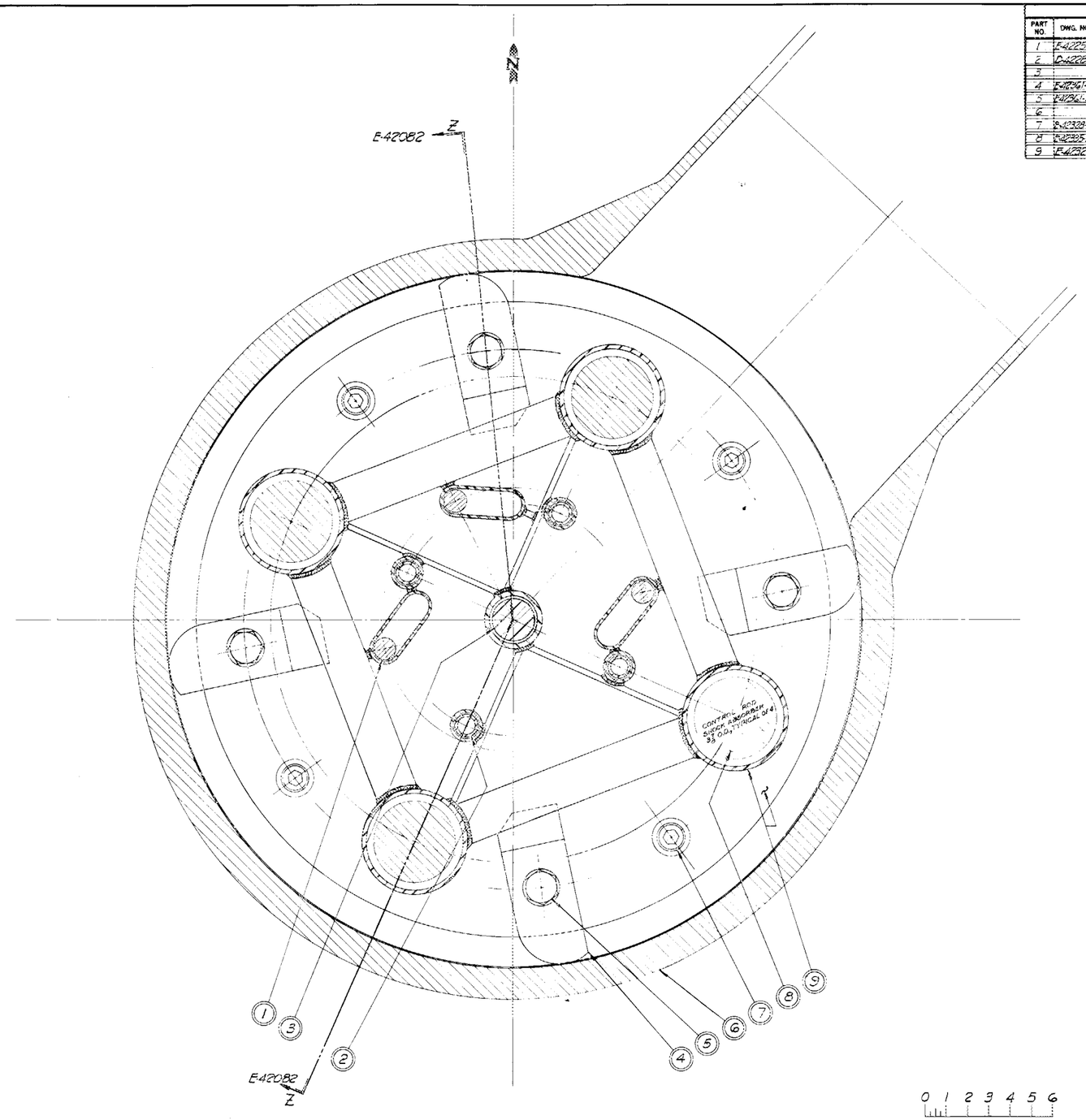
REFERENCE DRAWINGS | NO.

OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY
DIVISION OF UNION CARBIDE CORPORATION
OAK RIDGE, TENNESSEE

HFIR PROJECT
BLDG. NO. 7900

PLAN SECTION AT CORE SUPPORT UPPER FLANGE ELEV 817'-0" SECTION F-F
REACTOR DIVISION

SUBMITTED | APPROVED | APPROVED
APPROVED | JOB 505-30 | E 42313 | REV.



PARTS LIST				
PART NO.	DWG. NO.	NO. REQD.	DESCRIPTION (NAME, SIZE, ETC.)	MATERIAL
1	E-42257	3	FISSION CHAMBER & DRIVE ASSY	
2	C-42280	3	N¹⁶ PROBE ASSY	
3		1	INNER CONTROL DRIVE ASSY	
4	E-42261-5	4	SPACER LUG	
5	E-42261-10	4	BOLT	
6		1	HFIR PRESSURE VESSEL	
7	E-42328-13	4	BOLT, 1" SOCKET HEAD	
8	E-42328-14	4	SHOCK ABSORBER ASSY	
9	E-42328	1	FUEL & REFLECTOR SUPPORT AND SLEEVE ASSY	

0 1 2 3 4 5 6
SCALE - INCHES

REFERENCE DRAWINGS	DWG. NO.
H.F.I.R. PROJECT	BLDG. NO. 7900

PLAN SECTION AT ℄ WATER OUTLET - ELEV. 813'-6"
SECTION G-G
REACTOR SYSTEM

UNITS ON DIMENSIONS UNLESS OTHERWISE SPECIFIED:
FRACTIONS ±
DECIMALS ±
ANGLES ±
SCALE:

GENERAL SPECIFICATIONS
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES 1/64 MAX.
2. TYPE, GRADE, OR FINISH OF MATERIAL MAY BE CHOSEN BY FABRICATOR.
3. ROUGHNESS HEIGHT OF MACHINED SURFACES SHALL NOT EXCEED ✓
(FINISH SYMBOLS AND HEIGHT VALUES ARE IN ACCORDANCE WITH ASA (B46.1-1955.)

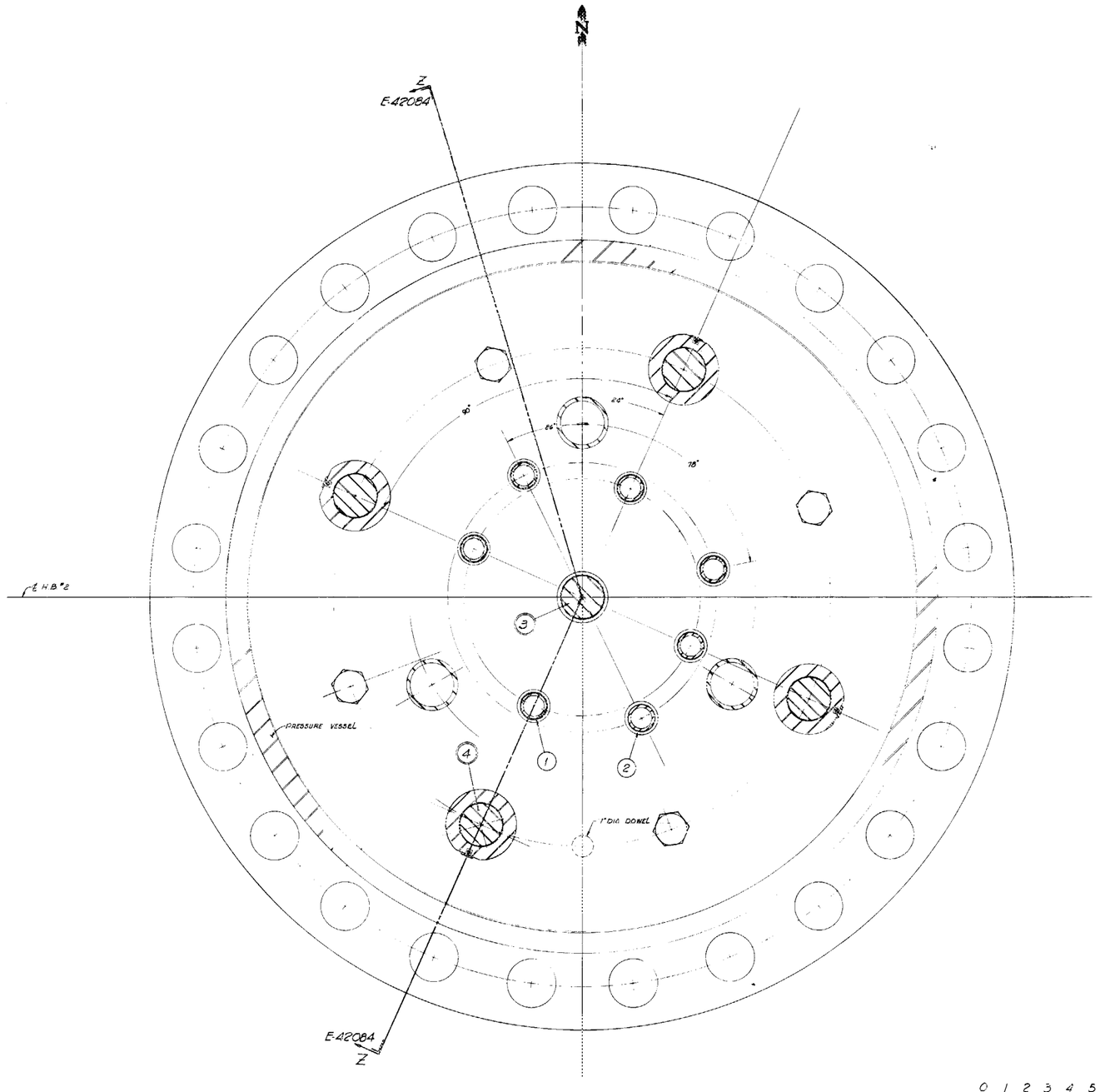
OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY
DIVISION OF UNION CARBIDE CORPORATION
OAK RIDGE, TENNESSEE

SUBMITTED	ACCEPTED	APPROVED
JOB No. 505-8-0		E- 42314

REV

LTR.	REVISIONS			DATE	APPD	APPD
DRAWN	DATE	SUBMITTED	DATE	APPROVED		DATE
DESIGNED	DATE	APPROVED	DATE	APPROVED		DATE
CHECKED	DATE	APPROVED	DATE	APPROVED		DATE

PARTS LIST				
PART NO.	DWG. NO.	NO. REQ'D.	DESCRIPTION (NAME, SIZE, ETC.)	MATERIAL
1	D-42260	4	NiL DROBE ASSY	
2	E-42257	8	FISSION CHAMBER & DRIVE ASSY	
3		1	INNER CONTROL ROD DRIVE ASSEMBLY	
4		4	OUTER CONTROL ROD DRIVE ASSEMBLY	



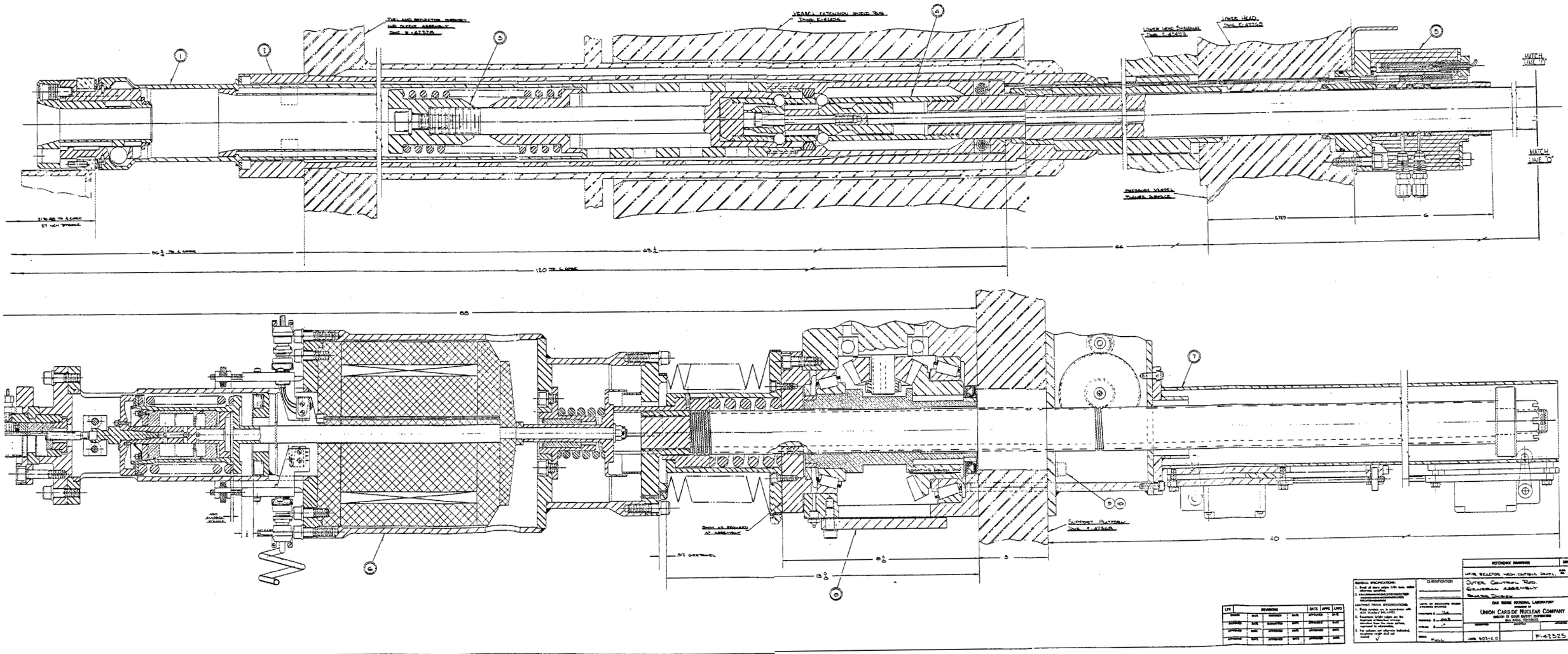
0 1 2 3 4 5 6
SCALE-INCHES

LIMITS ON DIMENSIONS UNLESS OTHERWISE SPECIFIED: FRACTIONS ± DECIMALS ± ANGLES ± SCALE:	GENERAL SPECIFICATIONS UNLESS OTHERWISE SPECIFIED: 1. BREAK ALL SHARP EDGES 1/64 MAX. 2. TYPE, GRADE, OR FINISH OF MATERIAL MAY BE CHOSEN BY FABRICATOR. 3. ROUGHNESS HEIGHT OF MACHINED SURFACES SHALL NOT EXCEED 125 (FINISH SYMBOLS AND HEIGHT VALUES ARE IN ACCORDANCE WITH ASA B46.1-1955.)

REACTOR ASSEMBLY, VERTICAL SECTION 22	E-42084
REFERENCE DRAWINGS	DWG. NO.
H.F.I.R. PROJECT	BLDG. NO.
PLAN SECTION BELOW SHIELD PLUG - "DOWN" - AT ELEV. 306" SECTION H-H REACTOR DIVISION	
OAK RIDGE NATIONAL LABORATORY OPERATED BY UNION CARBIDE NUCLEAR COMPANY DIVISION OF UNION CARBIDE CORPORATION OAK RIDGE, TENNESSEE	
SUBMITTED / ACCEPTED / APPROVED	
JOB # 503-30	E-42315

LTR.	REVISIONS			DATE	APPD	APPD
DRAWN R. WEBBER	DATE 1/13/60	SUBMITTED	DATE	APPROVED	DATE	
DESIGNED	DATE	APPROVED	DATE	APPROVED	DATE	
[illegible]	DATE	APPROVED	DATE	APPROVED	DATE	

PARTS LIST				
PART NO	DWG NO	NO REQ'D	DESCRIPTION (NAME, SIZE, ETC.)	MATERIAL
1	E-41553-B	1	PISTON AND CONTROL ROD ASSEMBLY	
2	E-41542-B	1	SHOCK ABSORBER ASSEMBLY	
3	E-41544-B	1	SCRAM SPRING ASSEMBLY	
4	E-41580	1	ENGAGEMENT MECHANISM	
5	E-41545-A	1	OUTER CONTROL ROD SEAL HOUSING ASSY	
6	E-41541	1	MAGNET ACTUATOR ASSEMBLY	
7	E-41543	1	POSITION INDICATOR MOUNTING ASSY	
8	E-41555	1	OUTER CONTROL ROD DRIVE	



LTR	REVISIONS			DATE	APPD	APPD
DRAWN	DATE	DESIGNED	DATE	APPROVED	DATE	
ALLOWED	DATE	SUBMITTED	DATE	APPROVED	DATE	
APPROVED	DATE	APPROVED	DATE	APPROVED	DATE	
APPROVED	DATE	APPROVED	DATE	APPROVED	DATE	

GENERAL SPECIFICATIONS:
1. Base of assembly within 1/64 max. radius of machined surface.
2. [illegible]

MACHINE FINISH SPECIFICATIONS:
1. Finish symbols are in accordance with ASA B46.1-1955 standard.
2. Roughness height values are the maximum arithmetical average deviations, in micro-inches, expressed in micro-inches.
3. For surfaces not otherwise indicated, roughness height shall not exceed ✓

CLASSIFICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE:
FRACTIONS ± [illegible]
DECIMALS ± [illegible]
ANGLES ± [illegible]
SCALE FULL

REFERENCE DRAWINGS — DWG. NO.

MTR REACTOR HIGH CONTROL SHUTL. SYS. 2 [illegible]

OUTER CONTROL ROD
GENERAL ASSEMBLY
REACTOR DIVISION

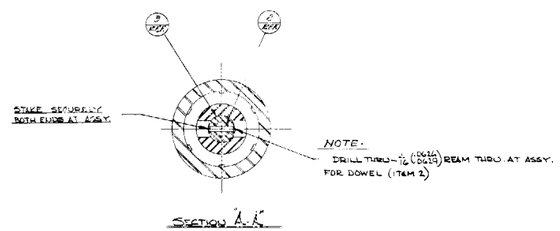
OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY
DIVISION OF UNION CARBIDE CORPORATION
OAK RIDGE, TENNESSEE

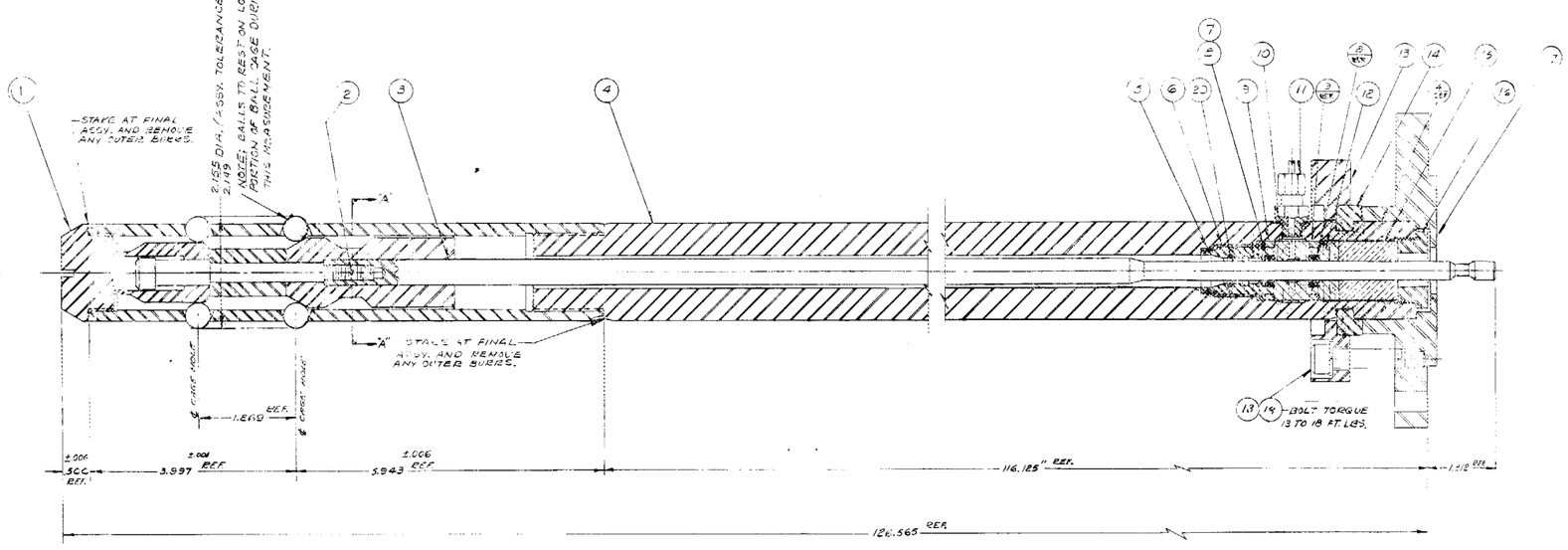
DESIGNED — APPROVED

JOB 801-E.0 — F-42525

PARTS LIST

PART NO.	DWG. NO.	NO. REQ'D.	DESCRIPTION (NAME, SIZE, ETC.)	MATERIAL
1	E-42333-D	1	BALL ENGAGEMENT MECHANISM ASSY.	
2	E-42330-2	1	1/16 DIA. PIN X 7/16 LG.	304 S.ST.
3	E-42331-4	1	PUSH ROD	
4	E-42329-1	1	DRIVE TUBE	
5	E-42330-5	1	O-RING, 11/16 × 13/16 × 1/16 PARKER # 2-17	BUNA-N DUROMETER 70
6	E-42329-3	1	BACKUP SEAL HOUSING	
7	E-42330-7	8	NON EXTRUSION RING PALMETTO GT 6054	PHENOLIC
8	E-42330-8	2	GT PALMETTO RING NO 6054	BUNA-N DUROMETER 70
9	E-42330-9	2	O-RING, 7/8 × 1 1/8 × 1/8 PARKER # 2-212	BUNA-N DUROMETER 70
10	E-42330-10	1	O-RING, 5/16 × 7/16 × 1/16 PARKER # 2-111	BUNA-N DUROMETER 70
11	E-42330-11	1	O SEAL STRAIGHT THD. CONN. SWAGELOK #200-1-OR-316	316 S.ST.
12	E-42329-2	1	PUSH ROD SEAL HOUSING	
13	E-42331-2	1	SPLIT RING RETAINER FLANGE	
14	E-42331-6	1	DRIVE TUBE SPLIT RING	
15	E-42331-3	1	BUSHING	
16	E-42331-6	1	RETAINER PLUG	
17	E-42331-1	1	DRIVE TUBE CONN. FLANGE	
18	E-42330-18	8	3/8-16 UNC-2A SOC. HD. CAP SCREW X 1 7/16 LG.	303 S. STL.
19	E-42330-19	8	3/8 NOM. INTERNAL TOOTH LOCK WASHER	302 S. STL.
20	E-12330-20	1	O RING - 3/8 O.D. X 1/2 I.D. X 1/16 PARKER # 2-14	BUNA-N DUROMETER 70





LTR.	REVISIONS	DATE	APPD	APPD

DRAWN	DATE	SUBMITTED	DATE	APPROVED	DATE		
DESIGNED	DATE	APPROVED	DATE	APPROVED	DATE		
CHECKED	DATE	APPROVED	DATE	APPROVED	DATE		

REFERENCE DRAWINGS	DWG. NO.
HFIR MECHANICAL CONTROLS	BLDG. NO. 7900

OUTER CONTROL ROD DRIVE ENGAGEMENT MECHANISM ASSEMBLY

REACTOR DIVISION

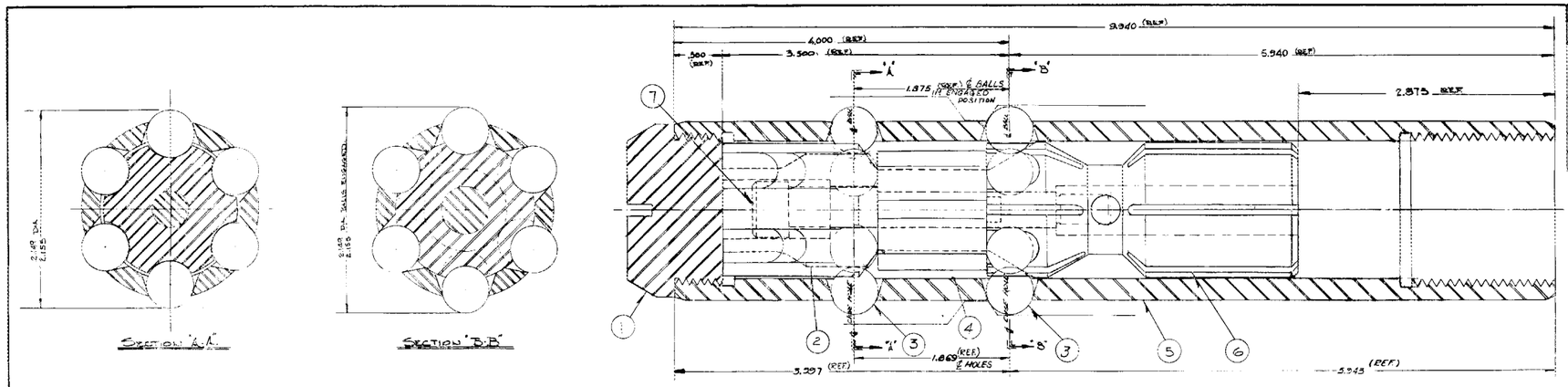
LIMITS ON DIMENSIONS UNLESS OTHERWISE SPECIFIED:
FRACTIONS ± 1/64
DECIMALS ± .006
ANGLES ± 0°-30'
SCALE: FULL

GENERAL SPECIFICATIONS
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES 1/64 MAX.
2. ~~DIMENSIONS DISCLOSE FOR MATERIAL WHICH CAN BE CHOSEN BY FABRICATOR.~~
3. ROUGHNESS HEIGHT OF MACHINED SURFACES SHALL NOT EXCEED (FINISH SYMBOLS AND HEIGHT VALUES ARE IN ACCORDANCE WITH ASA B46.1-1955.)

OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY
DIVISION OF UNION CARBIDE CORPORATION
OAK RIDGE, TENNESSEE

SUBMITTED	ACCEPTED	APPROVED

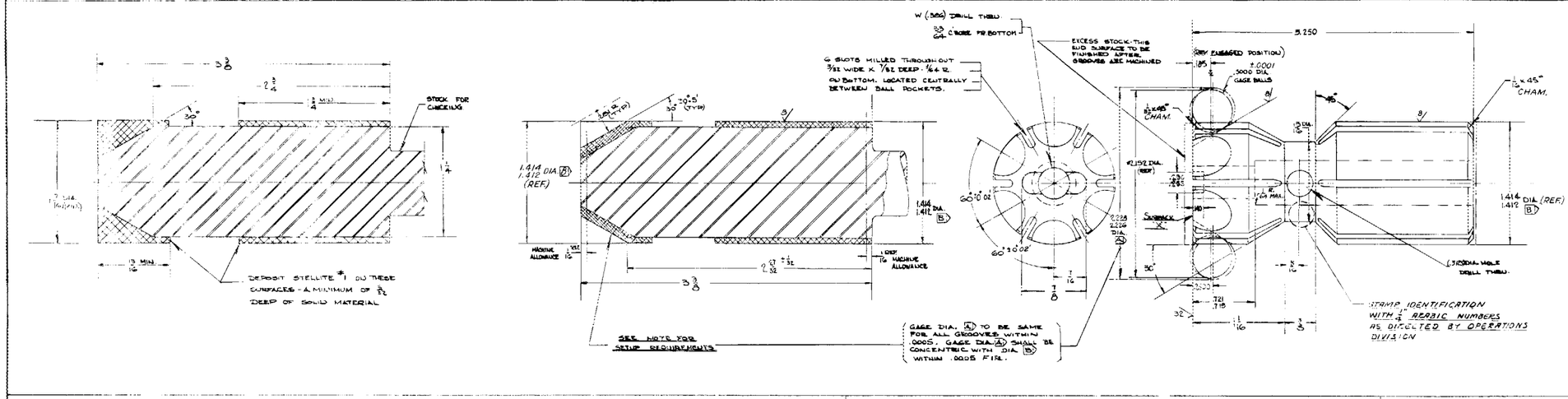
JOB# 505-60 | E-42330



PARTS LIST				
PART NO.	DWG. NO.	NO. REQD.	DESCRIPTION (NAME, SIZE, ETC.)	MATERIAL
1	E-42333-13	1	CAP	
2	E-42333-11	1	PLUNGER (TOP)	
* 3	E-42333-3	12	BEARING BALLS (.5000 ± .0001 DIA)	STELLITE STAR J
4	E-42333-14	1	PLUNGER (MIDDLE)	
5	E-42333-16	1	CAGE	
6	E-42333-9	1	PLUNGER (BOTTOM)	
7	E-42333-12	1	BOLT	

* NOTE: PROCUREMENT OF STELLITE BALLS SHALL CONFORM TO D-42092

ASSEMBLY DRAWING NO. E-42330
TITLE OUTER CONTROL ROD DRIVE BALL ENGAGEMENT MECHANISM
MATERIAL —
SCALE 2X

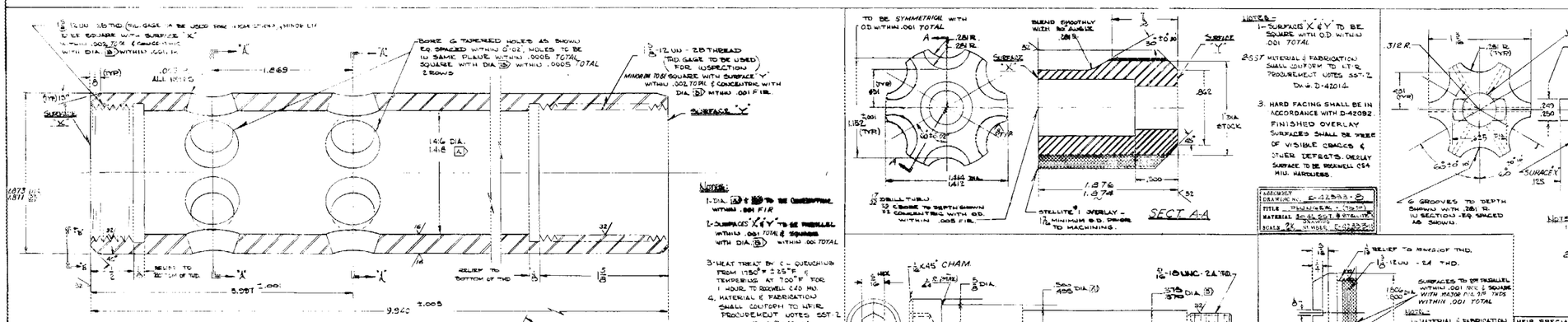


TO INCREASE DIA "X"	FACE SURFACE "X"
.001	.000866
.002	.001732
.003	.002598
.004	.003464
.005	.004330
.010	.008660

ANGLE RELATIONSHIP BETWEEN FINISHING SURFACE "X"

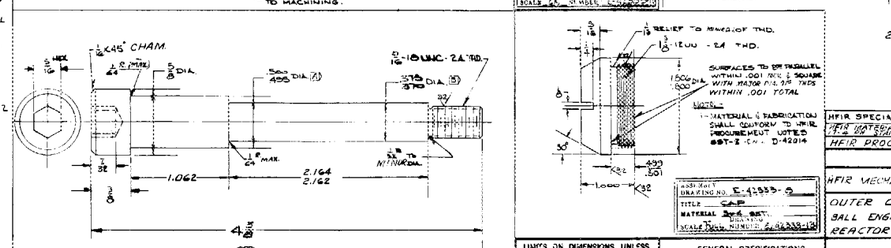
NOTES:
1- 63 FINISH UNLESS OTHERWISE SPECIFIED
2- 1/64 R. ALL SHARP EDGES
3- SURFACE "X" SHALL BE SQUARE WITH DIA. B WITHIN .0005 TOTAL
4. SST MATERIAL & FABRICATION SHALL CONFORM TO HFIR PROCUREMENT NOTES - SST-2 DWG D-42014
5- HARD FACING SHALL BE IN ACCORDANCE WITH D-42092
FINISHED OVERLAY SURFACES SHALL BE FREE OF VISIBLE CRACKS & OTHER DEFECTS. OVERLAY SURFACE TO BE ROCKWELL C54 MIN. HARDNESS.

ASSEMBLY DRAWING NO. E-42333-3
TITLE PLUNGER BOTTOM
MATERIAL 304L SST (STELLITE #1)
SCALE 2X



ASSEMBLY DRAWING NO. E-42333-6
TITLE CAGE
MATERIAL 304L SST
SCALE 2X

ASSEMBLY DRAWING NO. E-42333-5
TITLE PLUNGER-MIDDLE
MATERIAL 304L SST
SCALE 2X



ASSEMBLY DRAWING NO. E-42333-9
TITLE CAP
MATERIAL 304L SST
SCALE 2X

ASSEMBLY DRAWING NO. E-42333-12
TITLE BOLT
MATERIAL 17-4 PH - H1100
SCALE 2X

HFIR SPECIAL PROCUREMENT NOTES	D-42092
HFIR MATERIAL SPECIFICATION FOR HEAT TREATED 17-4 PH STAINLESS STEEL BAR	D-42013
HFIR PROCUREMENT NOTE "S ST-2"	D-42014
REFERENCE DRAWINGS	DWG. NO.

HFIR MECHANICAL CONTROLS — BLDG. 7900 NO.

OUTER CONTROL ROD DRIVE
BALL ENGAGEMENT MECHANISM ASSY. & DETAILS
REACTOR DIVISION

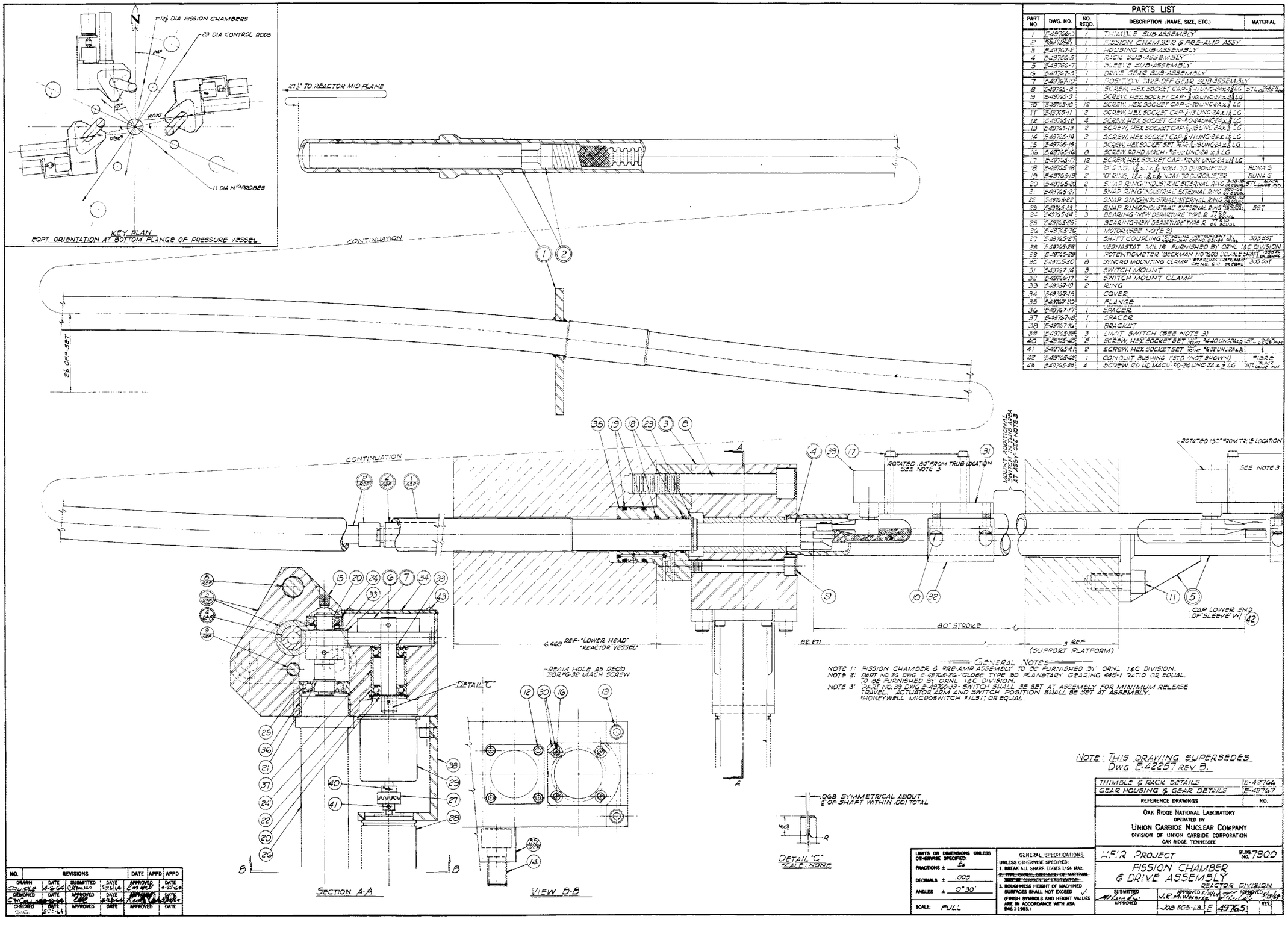
LIMITS ON DIMENSIONS UNLESS OTHERWISE SPECIFIED:	
FRACTIONS ±	1/64
DECIMALS ±	.005
ANGLES ±	0° 30'
SCALE: AS NOTED	

GENERAL SPECIFICATIONS
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES 1/64 MAX.
2. ~~FINISH MARKS ON SURFACES OF MACHINE MAY BE SURPASSED IN FABRICATION.~~
3. ROUGHNESS HEIGHT OF MACHINED SURFACES SHALL NOT EXCEED 63
(FINISH SYMBOLS AND HEIGHT VALUES ARE IN ACCORDANCE WITH ABA B46.1-1962.)

OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY
DIVISION OF UNION CARBIDE CORPORATION
OAK RIDGE, TENNESSEE

SUBMITTED	ACCEPTED		APPROVED
JOB 305-6.0			E-42333

A	UPGRADED FROM PROTOTYPE DWG.				
LTR.	REVISIONS		DATE	APPD.	APPD.
DRAWN	DATE	SUBMITTED	DATE	APPROVED	DATE
DESIGNED	DATE	APPROVED	DATE	APPROVED	DATE
CHECKED	DATE	APPROVED	DATE	APPROVED	DATE



PARTS LIST

PART NO.	DWG. NO.	NO. REQD.	DESCRIPTION (NAME, SIZE, ETC.)	MATERIAL
1	E-49766-3	1	THIMBLE SUB-ASSEMBLY	
2	~~E-49767-1~~ SEE NOTE 1	1	FISSION CHAMBER & PRE-AMP ASSY	
3	E-49767-2	1	HOUSING SUB-ASSEMBLY	
4	E-49766-5	1	RACK SUB-ASSEMBLY	
5	E-49766-7	1	SLEEVE SUB-ASSEMBLY	
6	E-49767-5	1	DRIVE GEAR SUB-ASSEMBLY	
7	E-49767-10	1	POSITION "TAKE-OFF" GEAR SUB-ASSEMBLY	
8	E-49765-8	1	SCREW, HEX SOCKET CAP-3/8-24 UNC-2A x 3/4 LG	STL BLACK OXIDE FIN
9	E-49765-9	1	SCREW, HEX SOCKET CAP-5/16 UNC-2A x 3/4 LG	
10	E-49765-10	12	SCREW, HEX SOCKET CAP-3/8 UNC-2A x 1 LG	
11	E-49765-11	2	SCREW, HEX SOCKET CAP-5/8 UNC-2A x 1 LG	
12	E-49765-12	4	SCREW, HEX SOCKET CAP-#10-24 UNC-2A x 1/2 LG	
13	E-49765-13	2	SCREW, HEX SOCKET CAP-5/16 UNC-2A x 1 LG	
14	E-49765-14	2	SCREW, HEX SOCKET CAP-3/4 UNC-2A x 1 LG	
15	E-49765-15	1	SCREW, HEX SOCKET SET 3/8 NC-2 BUNC-2A x 3/4 LG	
16	E-49765-16	8	SCREW, RD HD MACH-#6-32 UNC-2A x 3/8 LG	
17	E-49765-17	12	SCREW, HEX SOCKET CAP-#10-24 UNC-2A x 1/2 LG	
18	E-49765-18	2	"O" RING, 1 1/8 x 1/8 NOM TO DUROMETER	BUNA S
19	E-49765-19	2	"O" RING, 1 3/4 x 1/8 NOM TO DUROMETER	BUNA S
20	E-49765-20	2	SNAP RING "INDUSTRIAL" EXTERNAL RING 3/8 DIA	STL BLACK OXIDE FIN
21	E-49765-21	1	SNAP RING "INDUSTRIAL" EXTERNAL RING 2 1/8 DIA	
22	E-49765-22	1	SNAP RING "INDUSTRIAL" INTERNAL RING 2 1/8 DIA	
23	E-49765-23	1	SNAP RING "INDUSTRIAL" EXTERNAL RING 1 3/8 DIA	SST
24	E-49765-24	3	BEARING "NEW DEPARTURE" TYPE R OR EQUAL	
25	E-49765-25	1	BEARING "NEW DEPARTURE" TYPE R OR EQUAL	
26	E-49765-26	1	MOTOR (SEE NOTE 2)	
27	E-49765-27	1	SHAFT COUPLING "WOODWARD" TYPE "NEW" CAT NO. 681-14 OR EQUAL	303 SST
28	E-49765-28	1	THERMOSTAT "MILIB" FURNISHED BY ORNL I&C DIVISION	
29	E-49765-29	1	POTENTIOMETER "BECKMAN" 10 TURN DOUBLE SHAFT 3 SECTION OR EQUAL	
30	E-49765-30	8	SYNCRO MOUNTING CLAMP "BERLING" TYPE MR-1 ORNL I&C OR EQUAL	303 SST
31	E-49767-14	3	SWITCH MOUNT	
32	E-49766-17	3	SWITCH MOUNT CLAMP	
33	E-49767-19	2	RING	
34	E-49767-15	1	COVER	
35	E-49767-20	1	FLANGE	
36	E-49767-17	1	SPACER	
37	E-49767-18	1	SPACER	
38	E-49767-16	1	BRACKET	
39	E-49766-30	3	LIMIT SWITCH (SEE NOTE 3)	
40	E-49765-40	2	SCREW, HEX SOCKET SET 3/8" JOINT #4-40 UNC-2A x 3/8	STL BLACK OXIDE FIN
41	E-49765-41	2	SCREW, HEX SOCKET SET 3/8" JOINT #6-32 UNC-2A x 3/8	
42	E-49766-42	1	CONDUIT BUSHING 1 STD (NOT SHOWN)	FIBRE
43	E-49765-43	4	SCREW, RD HD MACH #0-24 UNC-2A x 3/8 LG	STL BLACK OXIDE FIN

NOTE 1: FISSION CHAMBER & PRE-AMP ASSEMBLY TO BE FURNISHED BY ORNL I&C DIVISION.
NOTE 2: PART NO. 26 DWG. E-49765-26 "GLOBE" TYPE 80 PLANETARY GEARING 445-1 RATIO OR EQUAL. TO BE FURNISHED BY ORNL I&C DIVISION.
NOTE 3: PART NO. 39 DWG. E-49765-39 - SWITCH SHALL BE SET AT ASSEMBLY FOR MINIMUM RELEASE TRAVEL. ACTUATOR ARM AND SWITCH POSITION SHALL BE SET AT ASSEMBLY. "HONEYWELL MICROSWITCH" #1LS1, OR EQUAL.

NOTE: THIS DRAWING SUPERSEDES DWG. E-42257 REV. B.

THIMBLE & RACK DETAILS	E-49766
GEAR HOUSING & GEAR DETAILS	E-49767
REFERENCE DRAWINGS	NO.

OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE NUCLEAR COMPANY
DIVISION OF UNION CARBIDE CORPORATION
OAK RIDGE, TENNESSEE

H.F.R. PROJECT — BLDG. NO. 7900

FISSION CHAMBER & DRIVE ASSEMBLY
REACTOR DIVISION

SUBMITTED: J. R. McWherter — APPROVED: J. R. McWherter — APPROVED: 3/15/64
APPROVED: DB 505-1-B — SIZE E — 49765 — REV.

LIMITS ON DIMENSIONS UNLESS OTHERWISE SPECIFIED:
FRACTIONS ± 1/64
DECIMALS ± .005
ANGLES ± 0°30'
SCALE: FULL

GENERAL SPECIFICATIONS
UNLESS OTHERWISE SPECIFIED:
1. BREAK ALL SHARP EDGES 1/64 MAX.
2. ~~TYPE, GRADE, OR FINISH OF MATERIAL DIRECTED CHANGES TO THIS DRAWING.~~
3. ROUGHNESS HEIGHT OF MACHINED SURFACES SHALL NOT EXCEED ✓
(FINISH SYMBOLS AND HEIGHT VALUES ARE IN ACCORDANCE WITH ASA B46.1-1955.)

NO.	REVISIONS	DATE	APPD	APPD
DRAWN	DATE	SUBMITTED	DATE	APPROVED
DESIGNED	DATE	APPROVED	DATE	APPROVED
CHECKED	DATE	APPROVED	DATE	APPROVED

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TID-4500 (27th ed.)

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