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PALO VERDE NUCLEAR GENERATING STATION

NUREG-0612 section 2.1 general requirements for overhead handling systems

ARIZONA PUBLIC SERVICE COMPANY
PROJECT MANAGER AND OPERATING AGENT

Docket # 50-528
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INTRODUCTION

The Palo Verde Nuclear Generating Station NUREG-0612 evaluation and report addresses the United States Nuclear Regulatory Commission's letters of December 22, 1980 (1) and February 3, 1981 (2); and NUREG-0612 (3) dated July, 1980 all concerning control of heavy loads at nuclear power plants. A heavy load is defined per NUREG-0612, page 1-2 as, "Any load carried in a given area after a plant becomes operational, that weighs more than the combined weight of a single spent fuel assembly and its associated handling tool for the specific plant in question." That heavy load at PVNGS is 1480 pounds for the spent fuel assembly and 760 pounds for the handling tool, for a combined weight of 2240 pounds.

Each general guideline is addressed, as it applies to the Palo Verde Nuclear Generating Station (PVNGS) design and operation in the following manner:

1. Description of requested information per Enclosure 3 of Nuclear Regulatory Commission's December 22, 1980 letter is provided.

2. APS' evaluation and report per each item requested in Nuclear Regulatory Commission's, December 22, 1980 letter and per NUREG-0612 guidelines is provided.

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2.1 GENERAL REQUIREMENTS FOR OVERHEAD HANDLING SYSTEMS

NUREG-0612, Section 5.1.1, identifies several general guidelines related to the design and operation of overhead load-handling systems in the areas where spent fuel is stored, in the vicinity of the reactor core, and in other areas of the plant where a load drop could result in damage to equipment required for safe shutdown or decay heat removal. Information provided in response to this section should identify the extent of potentially hazardous load-handling operations at a site and the extent of conformance to appropriate load-handling guidance.

2.1.1 NRC Position

Report the results of your review of plant arrangements to identify all overhead handling systems from which a load drop may result in damage to any system required for plant shutdown or decay heat removal (taking no credit for any interlocks, technical specifications, operating procedures, or detailed structural analysis).

PVNGS Evaluation: APS has conducted a detailed review of plant arrangements to identify all overhead handling systems from which a load drop may result in damage to any system required for plant shutdown or decay heat removal. A list of the overhead handling systems that fall into the category of 2.1.1 are identified in Exhibit A-1.

EXHIBIT A-1

BUILDING	HEAVY-LOAD HANDLING SYSTEM EQUIPMENT DESIGNATOR	SAFETY RELATED EQUIPMENT & COMPONENTS SERVICED	TYPE SYSTEM	CAPACITY	LOCATION DRAWINGS	COLUMN LOCATOR
Auxiliary						
1	Trolley- M-ZAN-G01 M-ZAN-G06 Hoist- M-ZAN-G12	LPSI Pumps & Motors	Fixed Monorail with Trolly and Hoist.Trolley-Hoist/Manual. Hoist G12 used for both Trolleys	4 Ton	13-P-ZAL-202 13-P-ZAL-209	G01 - A8/A9 AD/AE G06 - A8/A9 AG/AH
2	Trolley M-ZAN-G03 M-ZAN-G04 Hoist- M-ZAN-G12	HPSI Pumps & Motors	Fixed Monorail with Trolly and Hoist.Trolley-Hoist/Manual. Hoist G12 used for both Trolleys	4 Ton	13-P-ZAL-202 13-P-ZAL-210	G03 - A6/A7 AE/AF G04 - A6/A7 AF/AG
3	Trolley M-ZAN-G02 M-ZAN-G05 Hoist- M-ZAN-G12	Containment Spray Pumps and Motors	Fixed Monorail with Trolly and Hoist.Trolley-Hoist/Manual. Hoist G12 used for both Trolleys	4 Ton	13-P-ZAL-202 13-P-ZAL-210	G02 - A7/A8 AD/AE G05 - A7/A8 AG/AH
4	Trolley M-ZAN-G07 M-ZAN-G08 Hoist- M-ZAN-G15	Essential Cooling Water Pumps and Motors	Fixed Monorail with Trolly and Hoist.Trolley-Hoist/Manual. Hoist G15 used for both Trolleys	4 Ton	13-P-ZAL-203 13-P-ZAL-210	G07 - A7/A8 AB/AC G08 - A8/A9 AJ/AK
5	Trolley M-ZAN-G09 M-ZAN-G10 M-ZAN-G11 Hoist-M-ZAN-G15	Charging Pumps and Motors	Fixed Monorail with Trolly and Hoist.Trolley-Hoist/Manual. Hoist G15 used for both Trolleys	4 Ton	13-P-ZAL-205 13-P-ZAL-209	G09 - A8/A9 AG/AH G10 - A8/A9 AH/AJ G11 - A8/A9 AJ/AK

BUILDING	HEAVY-LOAD HANDLING SYSTEM EQUIPMENT DESIGNATOR	SAFETY RELATED EQUIPMENT & COMPONENTS SERVICED	TYPE SYSTEM	CAPACITY	LOCATION DRAWINGS	COLUMN LOCATOR
6	Monorail Hoist M-ZAN-G13	Equipment from 51'6" Level and 40' Level	Fixed Monorail with Trolley & Hoist. Trolley-Manual Hoist-Electrical	4 Ton	13-P-ZAL-203 13-P-ZAL-210	G13 - A9/A10 AB/AE
7	Monorail Hoist M-ZAN-G14	Equipment from 51'6" Level and 40' Level	Fixed Monorail with Trolley & Hoist. Trolley-Manual Hoist-Electrical	4 Ton	13-P-ZAL-203 13-P-ZAL-209	G14 - A9/A10 AG/AJ
8	Monorail Hoist M-ZAN-G16	Equipment Between 100' & 88' elevation	Fixed Monorail with Trolley & Hoist. Trolley-Manual Hoist-Electrical	4 Ton	13-P-ZAL-205 13-P-ZAL-210	G16 - A9/A10 AB/AE
9	Monorail Hoist M-ZAN-G17	Equipment Between 100' & 88' elevation	Fixed Monorail with Trolley & Hoist. Trolley-Manual Hoist-Electrical	4 Ton	13-P-ZAL-205 13-P-ZAL-210	G17 - A9/A10 AG/AK
10	Monorail Hoist M-ZAN-G20	Equipment From Lower Levels	Fixed Monorail with Trolley & Hoist. Trolley-Manual Hoist-Electrical	5 Ton	13-P-ZAL-207	G20 - A3/A6 AK/AL

EXHIBIT A-1

BUILDING	HEAVY-LOAD HANDLING SYSTEM EQUIPMENT DESIGNATOR	SAFETY RELATED EQUIPMENT & COMPONENTS SERVICED	TYPE SYSTEM	CAPACITY	LOCATION DRAWINGS	COLUMN LOCATOR
11	Monorail Hoist M-ZAN-G21	Equipment Between Levels	Fixed Monorail with Trolley & Hoist. Trolley-Manual Hoist-Electrical	5 Ton	13-P-ZAL-208 13-P-ZAL-209 13-P-ZAL-210	G21 - A6/A7 AE/AG
Containment						
1	Bridge Crane Polar Crane M-ZCN-G01	Containment Building Maintenance Activities	Bridge Crane Electrical	225 Ton 35 Ton	13-P-ZCL-105 13-P-ZCL-106	N/A Containment Building
2	Jib Cranes M-ZCN-G04A M-ZCN-G04B	Reactor Coolant Pump Maint.	Jib Cranes Electrical	5 Ton	13-P-ZCG-110	N/A - 5 positions in Containment Building
Fuel Building						
1	Monorail Hoist M-ZFN-G03	Spent Fuel Pool Cooling Pumps & Heat Exch.	Fixed Monorail with Trolley & Hoist Electrical	5 Ton	13-P-ZFL-501 13-P-ZFL-502	F2/F3 FD/FE
Main Steam Support Structure						
1	MSSS-Auxiliary Feedwater Pumps & Motors. No Equipment Designator	AFP & Motors or Turbine Q Class Only	Gantry Portable Not Permanent	5 Ton	13-P-ZCL-106 13-P-ZCL-105	N/A

EXHIBIT A-1

BUILDING	HEAVY-LOAD HANDLING SYSTEM EQUIPMENT DESIGNATOR	SAFETY RELATED EQUIPMENT & COMPONENTS SERVICED	TYPE SYSTEM	CAPACITY	LOCATION DRAWINGS	COLUMN LOCATOR
Diesel Generator 1	Diesel Generator Bridge Crane M-ZGN-G01A M-ZGN-G01B	Diesel Engine	Bridge Crane	5 Ton	13-P-ZGL-701 13-P-ZGL-702	G2/G3 GA/GC
2	Trolley M-ZGN-G02A M-ZGN-G02B Hoist-M-ZGN-G03	Generator	Fixed Monorail Mounted with Trolley & Hoist	25 Ton	13-P-ZGL-701 13-P-ZGL-702	G2/G3 GA/GC

2.1.2 NRC Position

Justify the exclusion of any overhead handling systems from the above category (categorized in 2.1.1) by verifying that there is sufficient physical separation from any load-impact point and any safety-related components to permit a determination by inspection that no heavy load drop can result in damage to any system or component required for plant shutdown or decay heat removal.

PVNGS Evaluation: The following overhead handling systems identified in section 2.1.1 have been excluded from the category requirements of section 2.1.1.

A. Auxiliary Building

1. LPSI Pump Maintenance
2. HPSI Pump Maintenance
3. Containment Spray Pump Maintenance
4. Essential Cooling Water Pumps Maintenance
5. Charging Pump Maintenance
6. Equipment from Levels 51'6" and 40'
7. Equipment from Levels 51'6" and 40'
8. Equipment between 88' and 100'
9. Equipment between 88' and 100'
10. Equipment from Lower Levels
11. Equipment between Levels

B. Diesel Generator Building crane and monorail trolley hoist.

C. Main Steam Support Structure Auxiliary Feedwater Pump Maintenance Portable Gantry Cranes.

Justification

1. Auxiliary Building - The Auxiliary Building overhead handling systems, items 1 through 5 under 2.1.1, Exhibit A-1 service redundant plant safety related equipment. They are located in separate areas of the Auxiliary Building and are enclosed in their own concrete reinforced structure. Load paths are designed unique to that load handling system. No load drop can result in damage to any other system or component required for plant shutdown or decay heat removal.

   The Auxiliary Building overhead handling systems items 6 through 11 under 2.1.1, Exhibit A-1 do not service specific safety related equipment. These overhead handling systems service any piece of equipment that will be transported out of the Auxiliary Building or to a higher level of the building for maintenance. Load paths do not cross safety related systems and they are physically separate from safety related systems.

2. Diesel Generator Building - The overhead heavy load handling systems used for maintenance of the diesels and generators are unique to each diesel/generator and are located in separate concrete reinforced structures.

3. Main Steam Support Structure (MSSS) - The overhead handling system used for auxiliary feedwater pump maintenance are portable gantry hoists and are not designated as permanent plant equipment. The Auxiliary Feedwater System is a redundant system and all components are physically located in a separate concrete reinforced room within the MSSS. Load paths are designed unique to each pump.

2.1.3 NRC Position

With respect to the design and operation of heavy-load-handling systems in the containment and the spent-fuel-pool area and those load-handling systems identified in 2.1.1 above, provide your evaluation concerning compliance with the guidelines of NUREG-0612, section 5.1.1. The following specific information should be included in your reply:

2.1.3a NRC Position

Drawings or sketches sufficient to clearly identify the location of safe load paths, spent fuel, and safety-related equipment.

PVNGS Evaluation: The systems identified per section 2.1.1 and 2.1.2 and found to be reportable under 2.1.3 are:

1. Containment Building Bridge Crane
2. Containment Building RCP Maintenance Jib Crane
3. Fuel Building Cask Handling Crane
4. Fuel Building New Fuel Handling Crane
5. Fuel Building Spent Fuel Pool Cooling Pumps and Heat Exchangers Monorail Hoist

Each overhead heavy load handling system identified under 2.1.3a are tabulated in Exhibit A-2 and will be addressed individually in regards to compliance with the guidelines of NUREG-0612, section 5.1.1. The information given on each heavy load handling system will include:

1. Name:
2. Type:
3. Capacity:
4. Equipment Designator:
5. Location Drawings:
6. Components and Equipment Serviced:
7. Load Paths:

EXHIBIT A-2

NAME	TYPE	CAPACITY (TONS)	EQUIPMENT DESIGNATOR	LOCATION DRAWINGS	COMPONENTS & EQUIPMENT SERVICED	LOAD PATHS (See Footnotes)
CONTAINMENT BLDG.						
Containment Bldg. Bridge Crane	Bridge Crane	225/35	1-M-ZCN-G01-Unit 1 2-M-ZCN-G01-Unit 2 3-M-ZCN-G01-Unit 3	13-P-ZCL-105 13-P-ZCL-106 13-P-ZCL-107 13-P-ZCG-110 13-P-ZCG-111	1. Incore Inst. Holddown Frame 2. RCP Seal Crane 3. RV Head Assembly 4. RV MST & Control Console 5. Hydroset 6. ICI Support Frane Assembly 7. Upper Collecting Ring 8. RC Head Cooling Ring (lower) 9. CEDM Cable Support Structure 10. RV Missile Shield & CEDM Air Cooling Unit 11. Removable Slabs on Top of Pressurizer (3 sections) 12. RCP (Motor) 13. RCP (Pump) 14. RCP (Tools) 15. Steam Generator Manway MST 16. Calibration Blocks 17. Jib Cranes (Containment Maint.) 18. CEA Change Platform 19. Refueling Machine Components (Maintenance) 20. 1 & 2 Ton Monorails (Fuel Pool Maintenance) 21. Fuel Pool Removable Stairway 22. RV Head Stud Rack 23. Refueling Pool Seal Ring 24. Core Support Barrel Assembly 25. Spreader Assembly 26. RV Head Insulation 27. Upper Guide Structure Assembly 28. Closure Head Lift Rig 29. Reactor Cooling Fans 30. Fuel Carriage Winch 31. Regenerative Heat Exchanger 32. Pre-Access Normal AFU's 33. Internals Lift Rig	"A"

EXHIBIT A-2

NAME	TYPE	CAPACITY (TONS)	EQUIPMENT DESIGNATOR	LOCATION DRAWINGS	COMPONENTS & EQUIPMENT SERVICED	LOAD PATHS (See Footnotes)
Containment Bldg. RCP Maintenance Jib Cranes	Jib Cranes	5	1-M-ZCN-G04A-Unit 1 1-M-ZCN-G04B-Unit 1 2-M-ZCN-G04A-Unit 2 2-M-ZCN-G04B-Unit 2 3-M-ZCN-G04A-Unit 3 3-M-ZCN-G04B-Unit 3	13-P-ZCG-110 13-P-ZCL-107	Reactor Coolant Pump & Motor Maintenance.	"B" "E"
FUEL BUILDING						
Fuel Bldg. Cask Handling Crane	Bridge Crane	150/15	1-M-ZFN-G01 2-M-ZFN-G01 3-M-ZFN-G01	13-P-ZFL-501 13-P-ZFL-502 13-P-ZFL-503	This crane handles spent fuel casks.	"C"
Fuel Bldg. New Fuel Handling Crane	Bridge Crane	10	1-M-ZFN-G02 2-M-ZFN-G02 3-M-ZFN-G02	13-P-ZFL-501 13-P-ZFL-502 13-P-ZFL-503	This crane only handles new fuel assemblies.	"D"
Fuel Bldg. Spent Fuel Pool Cooling Pumps & Heat Exchangers	Monorail Hoist	5	1-M-ZFN-G03	13-P-ZFL-501 13-P-ZFL-502	Spent Fuel Pool Cooling Pumps and Heat Exchangers.	"B"

EXHIBIT A-2

FOOTNOTES:

A Load paths have been established for the Reactor Cavity Cooling Fans, Reactor Coolant Pump (Motor and Pump), Reactor Coolant Pump Seals, Regenerative Heat Exchanger, Pre-Access normal AFU's, and the CEDM Normal ACU Units and Fans. These load paths are not designated as safe load paths but they will be reviewed and designated as safe load paths. If the existing path is not the safest path a new safe load path will be designated. The safe load paths will be incorporated into the PVNGS Equipment Maintainability Data Manual and will be shown on equipment location drawings. Other equipment serviced by this crane do not have designated safe load paths but load paths will be developed per section 5.1.1g, NUREG-0612 before fuel load, November, 1982, and they will be incorporated into the PVNGS Equipment Maintainability Data Manual and shown on equipment location drawings as safe load paths.

Miscellaneous small equipment not listed herein and not having specific safe load paths will be administered and controlled by operating and maintenance procedures developed specifically for the Containment Building.

B No safe load paths have been established for components associated with RCP maintenance but safe load paths will be developed per section 5.1.1 of NUREG-0612 before fuel load, November, 1982, for each component serviced by these Jib Cranes. The information will be incorporated into the PVNGS Equipment Maintainability Data Manual and will be shown on equipment location drawings as safe load paths.

C A safe load path has been established and is incorporated in our design specification. Refer to Exhibit F-1 and F-2.

D Refer to Exhibit F-1. Safe load paths have not been established but will be developed per section 5.1.1 NUREG-0612 before fuel load, November, 1982. They will be incorporated into the PVNGS Equipment Maintainability Data Manual and they will be shown on equipment location drawings as safe load paths.

E Miscellaneous components not listed and not having specific safe load paths will be administered and controlled by operating and maintenance procedures developed specifically for the Containment Building.

2.1.3b NRC Position

A discussion of measures taken to ensure that load-handling operations remain within safe load paths, including procedures, if any, for deviation from these paths.

PVNGS Evaluation: Except for the cask handling crane (Exhibit F-1 AND F-2), safe load paths have not been developed for overhead heavy-load handling systems listed under 2.1.3a herein. Safe load paths will be established per the guidelines of NUREG-0612 section 5.1.1(1) and incorporated into our procedures per the guidelines of NUREG-0612 section 5.1.1(2) prior to the handling of heavy loads.

2.1.3c NRC Position

A tabulation of heavy loads to be handled by each crane which includes the load identification, load weight, its designated lifting device, and verification that the handling of such load is governed by a written procedure containing, as a minimum, the information identified in NUREG-0612, section 5.1.1(2).

PVNGS Evaluation: A tabulation of heavy loads to be handled by each crane listed in section 2.1.3a has been tabulated in Table B-1. The table lists the cranes by load identification, load weight, its designated lifting device, if applicable. No procedures have been written at this time, but procedures will be written and approved prior to the handling of these loads per the guidelines of NUREG-0612, section 5.1.1(2).

2.1.3d NRC Position

Verification that lifting devices identified in 2.1.3c, above, comply with the requirements of ANSI N14.6-1978, or ANSI B30.9-1971, as appropriate. For lifting devices where these standards, as supplemented by NUREG-0612, section 5.1.1(4) or 5.1.1(5), are not met, describe any proposed alternatives and demonstrate their equivalency in terms of load-handling reliability.

PVNGS Evaluation: The special designed lift rigs and slings listed in Table B-1 are provided as follows:

1. The upper collecting ring cable has been designed by the Bechtel Power Corporation and is compatible with the requirements of ANSI B30.9-1971.

2. The RV Missile Shield and CEDM Air Cooling Unit cables has been designed by the Bechtel Power Corporation and is compatible with the requirements of ANSI B30.9-1971.

3. The RV Missile Shield and CEDM Air Cooling Unit lift rig has been designed by the Bechtel Power Corporation per AISC 7th Edition - 1970.

4. The Closure Head Lift Rig has been designed by Combustion Engineering in accordance with AISC and AWS per Specification System 80 PE-113, Revision 01.

5. The Internals Lift Rig has been designed by Combustion Engineering in accordance with ASME Section III, Appendix 17.

2.1.3e NRC Position

Verification that ANSI B30.2-1976, Chapter 2-2, has been invoked with respect to crane inspection, testing, and maintenance. Where any exception is taken to this standard, sufficient information should be provided to demonstrate the equivalency of proposed alternatives.

PVNGS Evaluation: At the present time, APS has not established procedures for crane inspection, testing and maintenance. Prior to fuel load, November, 1982, APS will have written procedures for the overhead heavy load handling systems listed in section 2.1.3, of this report. The procedures will follow the requirements of ANSI B30.2-1976, Chapter 2-2 as discussed in NUREG-0612, section 5.1.1(6). Where any exception is taken to the standard, sufficient information will be provided to demonstrate the equivalency of proposed alternatives.

2.1.3f NRC Position

Verification that crane design complies with the guidelines of CMAA Specification 70 and Chapter 2-1 of ANSI B30.2-1976, including the demonstration of equivalency of actual design requirements for instances where specific compliance with these standards is not provided.

PVNGS Evaluation: Cranes and overhead heavy load handling systems listed in Exhibit A-2 comply with the guidelines of CMAA specification 70 and ANSI B30.2-1976, Chapter 2-1 and the verification of their design is shown in Exhibit F-4.

2.1.3g NRC Position

Exceptions, if any, taken to ANSI B30.2-1976 with respect to operator training, qualification, and conduct.

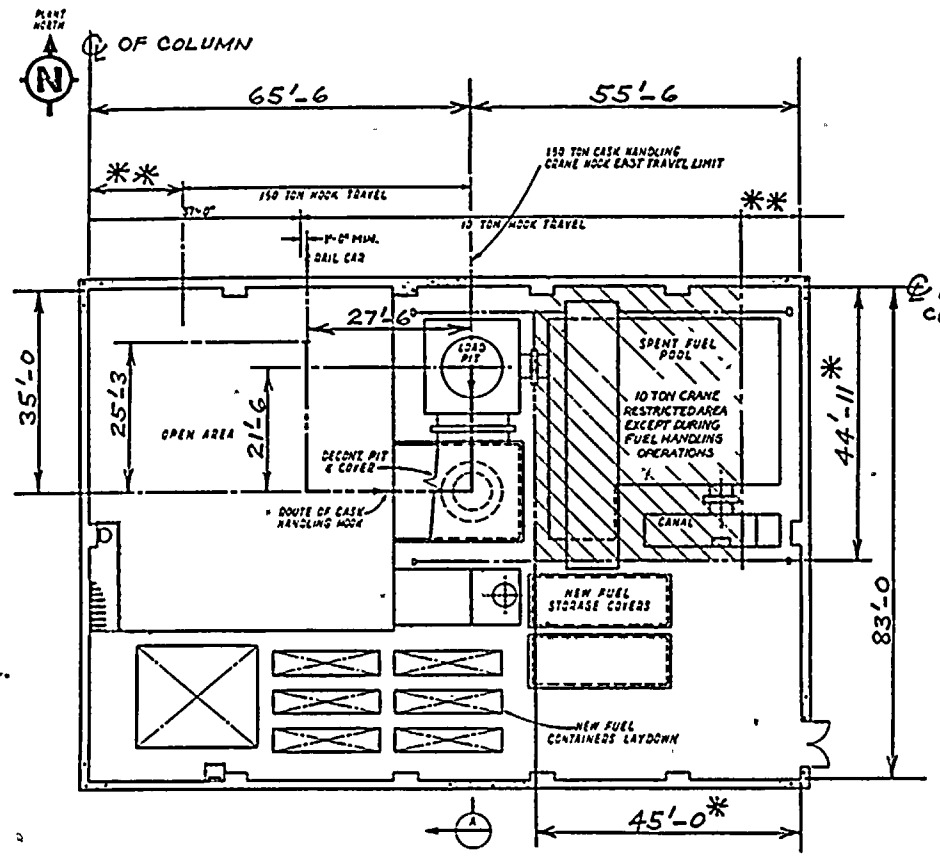
PVNGS Evaluation: Exceptions taken to ANSI B30.2-1976 with respect to operator training qualifications and conduct will be reported to the NRC prior to fuel load (November, 1982).

TABLE B-1

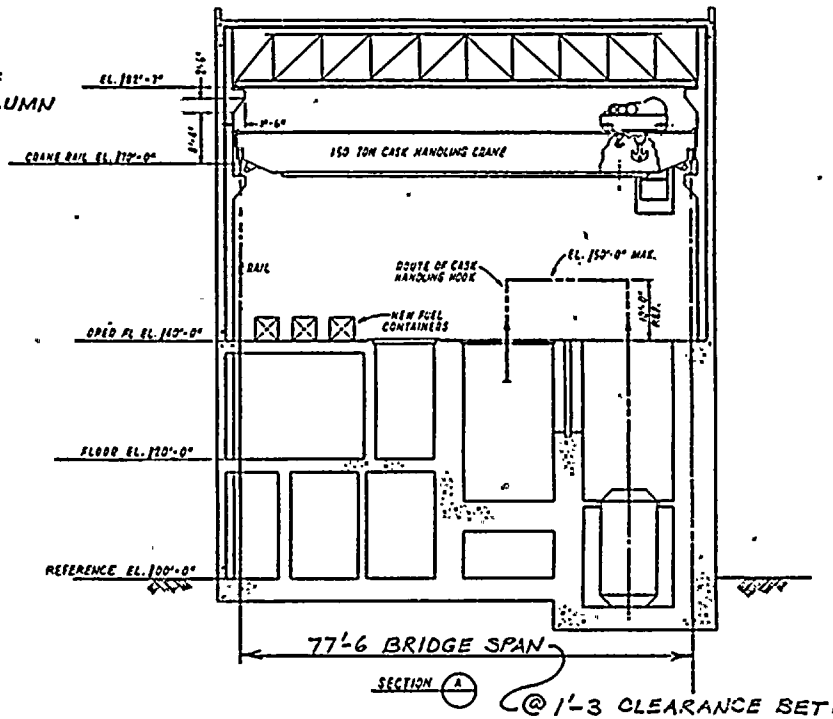
OVERHEAD HEAVY-LOAD HANDLING SYSTEM	LOAD IDENTIFICATION	LOAD WEIGHT	LIFTING DEVICE
1. Containment Bldg. Bridge Crane M-ZCN-G01	1. Incore Inst. Holddown Frame	2 Ton	
	2. RV Head Assembly	31,552 lbs.	Closure head lift Rig 47,675 lbs.
	3. RV MST & Control Console	6 Tons & 150 lbs.	Closure head lift Rig 47,675 lbs.
	4. Hydroset	5142 lbs.	
	5. Upper Collecting Ring	30,500 lbs.	Cables - 1700 lbs
	6. RC Head Cooling Ring (lower)	7,200 lbs.	
	7. CEDM Cable Support Structure	25 Ton	
	8. RV Missile Shield & CEDM Air Cooling Unit	170 Ton	Lift Rig & Cables 20,000 lbs
	9. Removable Slabs on Top of Pressurizer (3 sections)	27 Tons each section (Lift one section at a time)	
	10. RCP (Motor)	118,500 lbs.	
	11. RCP (Pump)	5,146 lbs. (Rotating parts)	
	12. Jib Cranes (Containment Maint.)	6 Ton	
	13. CEA Change Platform	16 Ton	
	14. Refueling Machine Components (Maintenance)	Bridge 19,800 lbs. Trolly 20,900 lbs.	
	15. RV Head Stud Rack	3520 lbs.	
	16. Refueling Pool Seal Ring	13 Ton	
	17. Core Support Barrel Assembly	320,000 lbs.	Internal Lift Rig 45,676 lbs
	18. Spreader Assembly	6 Ton	
	19. RV Head Insulation	105 Ton	
	20. Upper Guide Structure Assembly	206,000 lbs.	Internal Lift Rig 45,676 lbs
	21. Closure Head Lift Rig	47,675 lbs.	
	22. Regenerative Heat Exchanger	3400 lbs.	
	23. Pre-Access Normal AFU's	3937 lbs.	
	24. Internals Lift Rig	45,676 lbs.	
2. Containment Bldg. RCP Maintenance Jib Cranes M-ZCN-G04A M-ZCN-G04B	1. Reactor Coolant Pump (Pump) Maintenance	1.8 Tons Heaviest load	N/A
	2. Reactor Coolant Pump (Motor) Maintenance		

TABLE B-1

OVERHEAD HEAVY-LOAD HANDLING SYSTEM	LOAD IDENTIFICATION	LOAD WEIGHT	LIFTING DEVICE
3. Fuel Building Cask Handling Crane M-ZFN-G01	1. Fuel Cask	Not Determined at this time.	N/A
4. Fuel Building New Fuel Handling Crane M-ZFN-G02	1. New Fuel Assemblies	1480 lbs.	Fuel Assembly Handling Tool 750 lbs.
5. Fuel Building Spent Fuel Pool Cooling Pumps & Heat Exchangers Monorail - M-ZFN-G03	Spent Fuel Pool Cooling Pumps & Heat Exchangers	Pump 4690 lbs. Heat Exchangers 16,500 lbs.	N/A



PLAN VIEW AT EL. 140'-0"



SECTION A

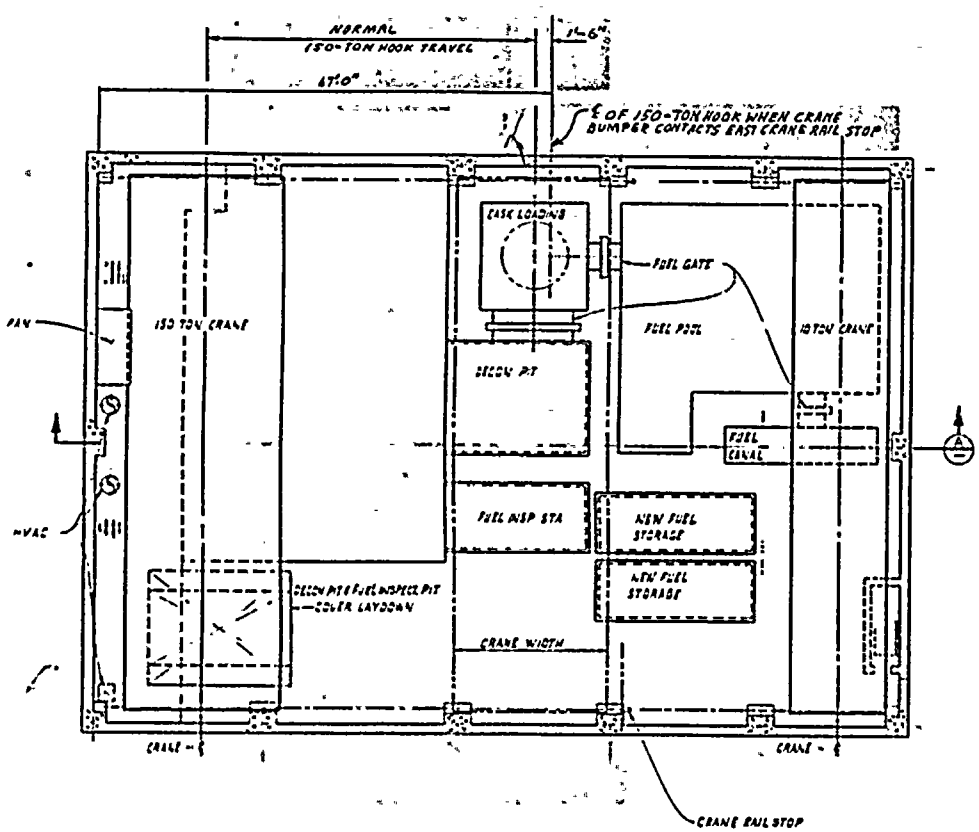
@ 1'-3 CLEARANCE BETWEEN RAIL ℄ & FACE OF COLUMN

* THESE TWO DIMENSIONS DEFINE THE AREA WHICH THE 10-TON NEW FUEL HANDLING CRANE HOOK IS RESTRICTED FROM, EXCEPT DURING FUEL HANDLING OPERATIONS.

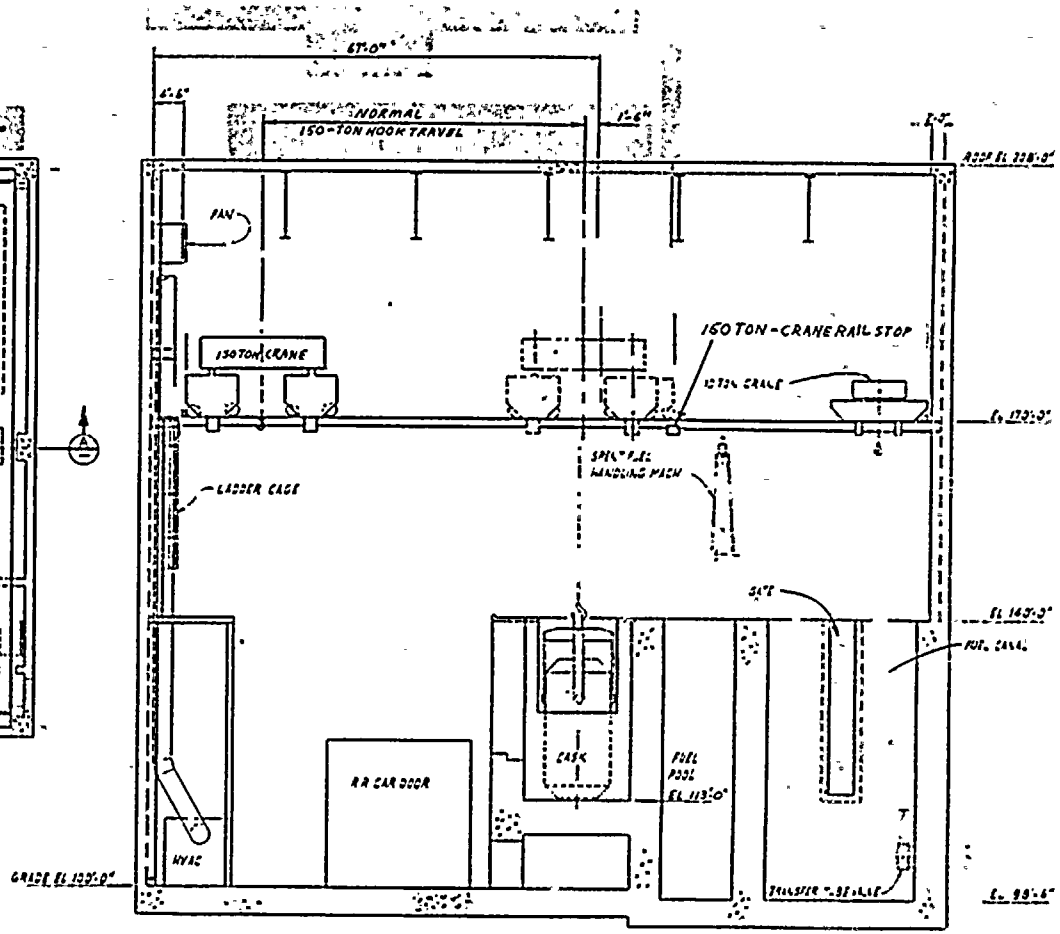
** TO BE DETERMINED. CLOSEST POSSIBLE APPROACH IS REQUIRED.

BECHTEL CORPORATION ENGINEERS & CONSTRUCTORS LOS ANGELES, CALIF.															
JOB NO. 10407	DATE	APPROVED	NO	REVISIONS	DATE	DR.	CHK.	E.E.	CHF. E.	P.E.	QA.C.	A.E. NO. FILE	CASK HANDLING & NEW FUEL HANDLING CRANE OPERATIONAL REQUIREMENTS SPECIFICATION NUMBER 13 MM-002 ATTACHMENT 4-6	SCALE 1"=10'	REV. 2

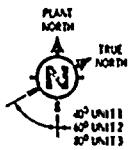
EXHIBIT F-1



PLAN



SECTION A



Palo Verde Nuclear Generating Station
FSAR

FUEL BUILDING CRANE
TRAVEL LIMITS
Figure 9.1-2

March 1980 Amendment 1

EXHIBIT F-2

CHANGE

EXHIBIT F-4

SECTION 4

TECHNICAL REQUIREMENTS

FOR

CONTAINMENT POLAR CRANE

FOR THE

ARIZONA PUBLIC SERVICE COMPANY

PALO VERDE NUCLEAR GENERATING STATION

UNITS 1, 2, AND 3

QUALITY CLASS Q

SPECIFICATION NUMBER 13-MM-063

JOB NUMBER 10407
BECHTEL POWER CORPORATION
NORWALK, CALIFORNIA

REV. NO.	DATE	REVISIONS
△		
△		
△		
2	1-3-77	Conformed for Purchase Order
1	8-2-76	Revised Seismic and Reissued for Bid
0	3-31-76	Released for Project Use

4.2 WORK NOT INCLUDED

a. Unloading, unpacking, inspection, and storage at the jobsite

b. Installation labor

c. Runway supporting structure, girders, and rails

d. Access ladders, stairs, and walkways other than those installed on the crane

e. Installation of runway conductor

f. Electric service connection

2 g. Field test weights and field testing labor.

4.3 CODES AND STANDARDS

4.3.1 Design, materials, manufacture, examination, testing, inspection, certification, and documentation shall conform to applicable portions of the latest edition and revisions of the following specifications, standards, codes, and addenda:

a. American Gear Manufacturers Association (AGMA)

b. American Institute of Steel Construction (AISC)

c. American National Standards Institute (ANSI)

- A12.1 Safety Requirements for Floor and Wall Openings, Railings, and Toeboards
- A14.3 Safety Code for Fixed Ladders
- B30.2.0 Overhead and Gantry Cranes
- C-1 National Electric Code (NEC)

d. American Society for Testing and Materials (ASTM)

e. American Welding Society (AWS)

2
- D1.1 Rev. - 73 Structural Welding Code, Sections 1 through 6 and Section 9.25

f. Anti-Friction Bearing Manufacturers Association (AFBMA)

g. Crane Manufacturers Association of America (CMAA)

- CMAA Specification No. 70 - Electric Overhead Traveling Cranes

h. Electronic Industry Association Standards (EIA)

i. Institute of Electrical and Electronics Engineers (IEEE)

j. Insulated Power Cable Engineers Association (IPCEA)

k. National Electrical Manufacturers Association (NEMA)

- MG1 Motors and Generators
- ICS Industrial Controls and Systems

l. National Fire Protection Association (NFPA)

- Volume 5, Article 610 - Cranes and Hoists

m. Occupational Safety and Health Administration (OSHA)

- Part 1910, Section 1910.179 Overhead and Gantry Cranes

n. Nuclear Regulatory Commission

- TID 25021 Nuclear Reactors and Earthquakes

o. Federal Specification RR-W-410 - Wire Rope and Strand

4.3.2 The latest issue of such specifications, standards, and codes is defined as the issue (including latest published case rulings, interpretation, and addenda) in force at date of award of the purchase order. Adoption of any subsequent issue or case ruling shall be subject to the Engineer's approval. For this purpose, the Supplier shall notify the Engineer of such official publications that would affect the material and test requirements.

4.3.3 The equipment specified herein is classified in accordance with the quality, seismic, and code classifications defined in appendix 4B.

Project Classification: Crane Q1K

The complete polar crane must retain structural integrity during and after a SSE, but need not retain operability: It shall remain fully operational during and after an OBE. See 4.5.2.

The corresponding quality assurance requirements shall be in conformance with appendix 4C.

4.4 RATING AND CONDITIONS OF SERVICE

4.4.1 General

4.4.1.1 During plant construction and operation the cranes will be required to meet three operational requirements. They are designated as

EXHIBIT P-4

SECTION 4

TECHNICAL REQUIREMENTS

FOR

FUEL BUILDING

BRIDGE CRANES

FOR THE

ARIZONA PUBLIC SERVICE COMPANY

PALO VERDE NUCLEAR GENERATING STATION

UNITS 1, 2, AND 3

QUALITY CLASS Q

SPECIFICATION NUMBER 13-MM-062

JOB NUMBER 10407
BECHTEL POWER CORPORATION
NORWALK, CALIFORNIA

REV. NO.	DATE	REVISIONS
2	2-25-77	Conformed for Purchase Order
1	8-20-76	Revised Sections 4.1, 4.3, 4.4, 4.7, 4.8 and Attachment 4-7
0	3-8-76	Released for Project Use

PF-875 (10407) 1/75

1 j. Services of an erection and test supervisor to provide guidance and inspect and approve erection and testing work

2 k. One lot of any special tools required for installation or maintenance, if necessary.

l. Touch-up paint for use after crane erection

2 m. Finish painting.

4.2 WORK NOT INCLUDED

a. Unloading, unpacking, inspection, and storage at the jobsite

b. Installation labor

c. Runway supporting structure, girders, and rails

d. Access ladders, stairs, and walkways other than those installed on the crane

e. Installation of runway conductor

f. Electric service connection

2 g. Field test weights and field testing labor.

4.3 CODES AND STANDARDS

4.3.1 Design, materials, manufacture, examination, testing, inspection, certification, and documentation shall conform to this specification and to the applicable portions of the latest edition and revision of the following specifications, standards, codes, and addenda: The code effective date shall be the date of purchase order issue.

- American Gear Manufacturers Association (AGMA)
- American Institute of Steel Construction (AISC)
- American National Standards Institute (ANSI)
  - A12.1 Safety Requirements for Floor and Wall Openings, Railings, and Toeboards
  - A14.3 Safety Code for Fixed Ladders
  - B30.2 Overhead and Gantry Cranes
  - C-1 National Electric Code (NEC)
- American Society for Testing and Materials (ASTM)

- American Welding Society (AWS)
  - D1.1 Structural Welding Code
    Rev.-74 Sections 1-6 and 9
- Anti-Friction Bearing Manufacturers Association (AFBMA)
- Crane Manufacturers Association of America (CMAA)
  - CMAA Specification No. 70 - Electric Overhead Traveling Cranes
- Electronic Industry Association Standards (EIA)
- Institute of Electrical and Electronics Engineers (IEEE)
- Insulated Power Cable Engineers Association (IPCEA)
- National Electrical Manufacturers Association (NEMA)
  - MG1 Motors and Generators
  - ICS Industrial Controls and Systems
- National Fire Protection Association (NFPA)
  - Volume 5, Article 610 - Cranes and Hoists
- Occupational Safety and Health Administration (OSHA)
  - Part 1910, Section 1910-179
- Nuclear Regulatory Commission
  - TID 25021 Nuclear Reactors and Earthquakes
- Federal Specification RR-W-410 - Wire Rope and Strand

4.3.2 The latest issue of codes and standards is defined as the issue (including latest published addenda, supplements, or cases) in force at date of purchase order. Adoption of any subsequent issues shall be subject to Engineer's approval prior to implementation. The use of any code case shall also be subject to Engineer's approval prior to implementation.

4.3.3 The equipment specified herein is classified in accordance with the quality, seismic, and code classifications defined in appendix 4B.

Project classification: Crane Q1K

4.3.4 The corresponding quality assurance requirements shall be in conformance with appendix 4C.

EXHIBIT F-4

SECTION 4

TECHNICAL REQUIREMENTS

FOR

MISCELLANEOUS BRIDGE CRANES AND HOISTS

FOR THE

ARIZONA PUBLIC SERVICE COMPANY

PALO VERDE NUCLEAR GENERATING STATION

UNITS 1, 2, AND 3

QUALITY CLASS R AND S

SPECIFICATION NUMBER 13-MM-066

SPECIFICATION FOR:
1. RCP MAINTENANCE JIB CRANES.
2. SPENT FUEL POOL COOLING PUMPS AND HEAT EXCHANGERS MAINTENANCE MONORAIL.

JOB NUMBER 10407
BECHTEL POWER CORPORATION
NORWALK, CALIFORNIA

REV. NO.	DATE	REVISIONS
△		
△		
△		
△		
△1	11-1-77	Conformed for Purchase Order
△0	1-28-77	Released for Project Use

PF-875 (10407) 1/75

4.3.5 Access ladders and walkways other than those installed on the bridge crane.

4.3.6 Electric service connections.

4.3.7 Field test weights.

4.3.8 Field touch-up painting.

4.4 CODES AND STANDARDS

4.4.1 All materials, design, and manufacture, examination, testing, inspection, certification, and documentation shall conform to applicable portions of the latest edition and revision of the following specifications, standards, codes, and addenda: The code effective date shall be the date of purchase order issue.

a. American Gear Manufacturers Association (AGMA)

- 210.02 Surface Durability - Spur Gears
- 211.02 Surface Durability - Helical and Herringbone Gears
- 220.02 Rating Strength of Spur Gears
- 221.02 Rating Strength of Helical and Herringbone Gears

b. American Institute of Steel Construction (AISC)

- Manual of Steel Construction

c. American National Standards Institute (ANSI)

- A10.5 Safety Requirements for Material Hoists
- A12.1 Safety Requirements for Floor and Wall Openings, Railings, and Toeboards
- A14.3 Safety Code for Fixed Ladders
- B30.2 Overhead and Gantry Cranes
- C-1 National Electric Code (NEC)
- B30.10 Hooks

d. American Welding Society (AWS)

- D1.1 Structural Welding Code
- AWS A 5.18 Gas Metal-Arc Welding Electrodes
- AWS A 5.20 Flux-Cored Arc Welding Electrodes

e. Anti-Friction Bearing Manufacturers Association (AFBMA)

- Sections 9 and 11, Method for Evaluating and Load Rating for Bearings.

f. Crane Manufacturers Association of America (CMAA)

- CMAA Specification No. 70 - Electric Overhead Traveling Cranes
- HM1 100-74 Electric Wire Rope Hoists

g. Electronic Industry Association (EIA) Standards

h. Institute of Electrical and Electronics Engineers (IEEE)

i. Insulated Power Cable Engineers Association (IPCEA)

- S-66-524 Standard for Cross Linked Thermosetting Polyethylene Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy.

j. National Electrical Manufacturers Association (NEMA)

- MG1 Motors and Generators
- ICS Industrial Controls and Systems

k. National Fire Protection Association (NFPA) No. 70

- NEC Article 610 - Cranes and Hoists
- NEC Article 430 - Motor and Branch-Circuit Running Overcurrent and Overload Protection

l. Occupational Safety and Health Administration (OSHA)

- Part 1910, Section 1910-179
- Arizona State and Local Codes

m. Underwriters' Laboratories (UL)

- UL 83 Thermoplastic - Insulated Wires

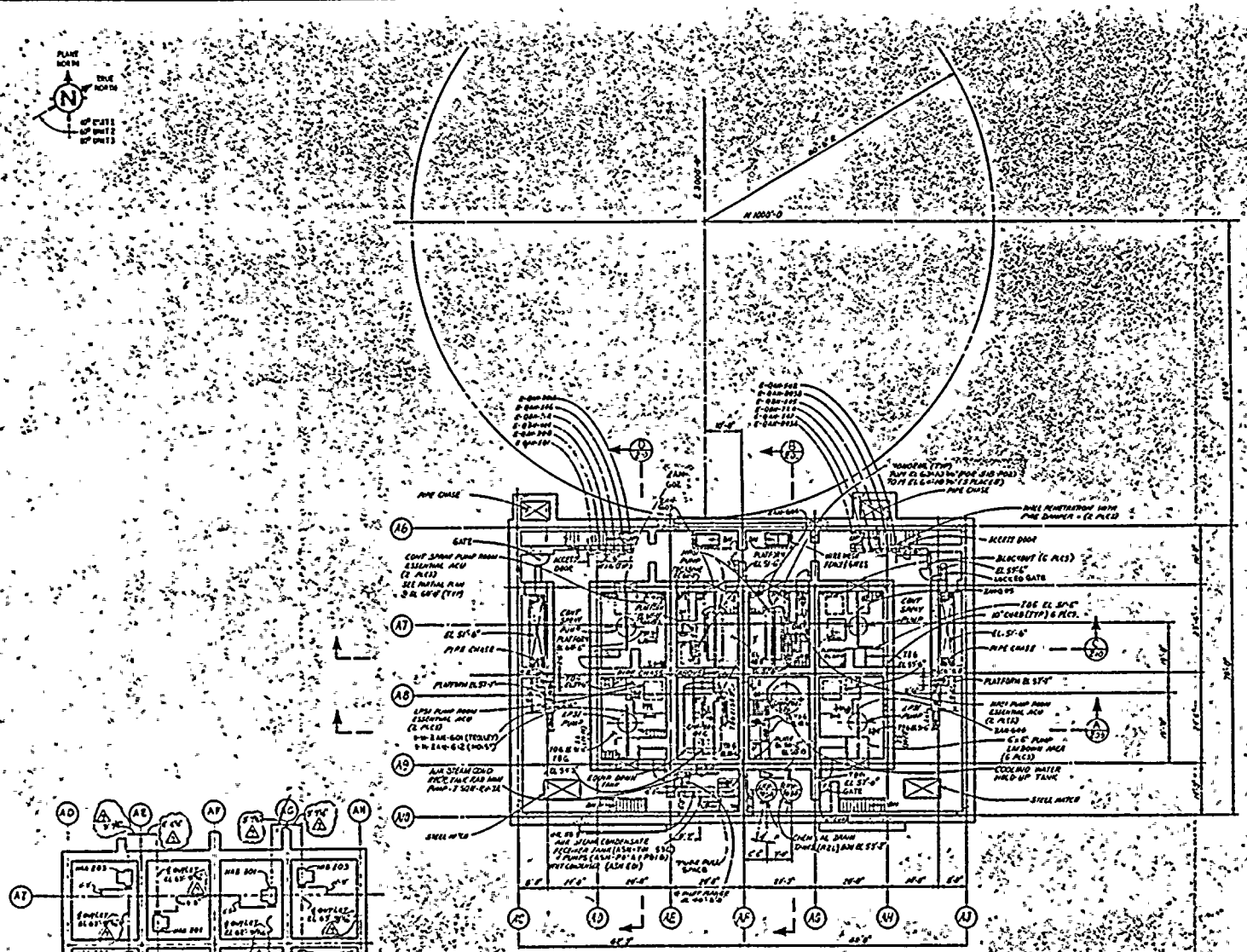
n. American Society for Testing and Materials (ASTM)

- ASTM E112 Estimating the Average Grain Size of Metals.
- ASTM A1 Specification for Carbon Steel Rails.

4.4.2 When specific requirements are stated in this specification and conflict with those required by documents and drawings listed herein, such discrepancies shall be brought to the immediate attention of the Engineer in writing, for resolution.

4.4.3 The equipment specified herein is classified in accordance with the quality, seismic, and code classifications defined in appendix 4B.

Project classification: As given in table 4-1.



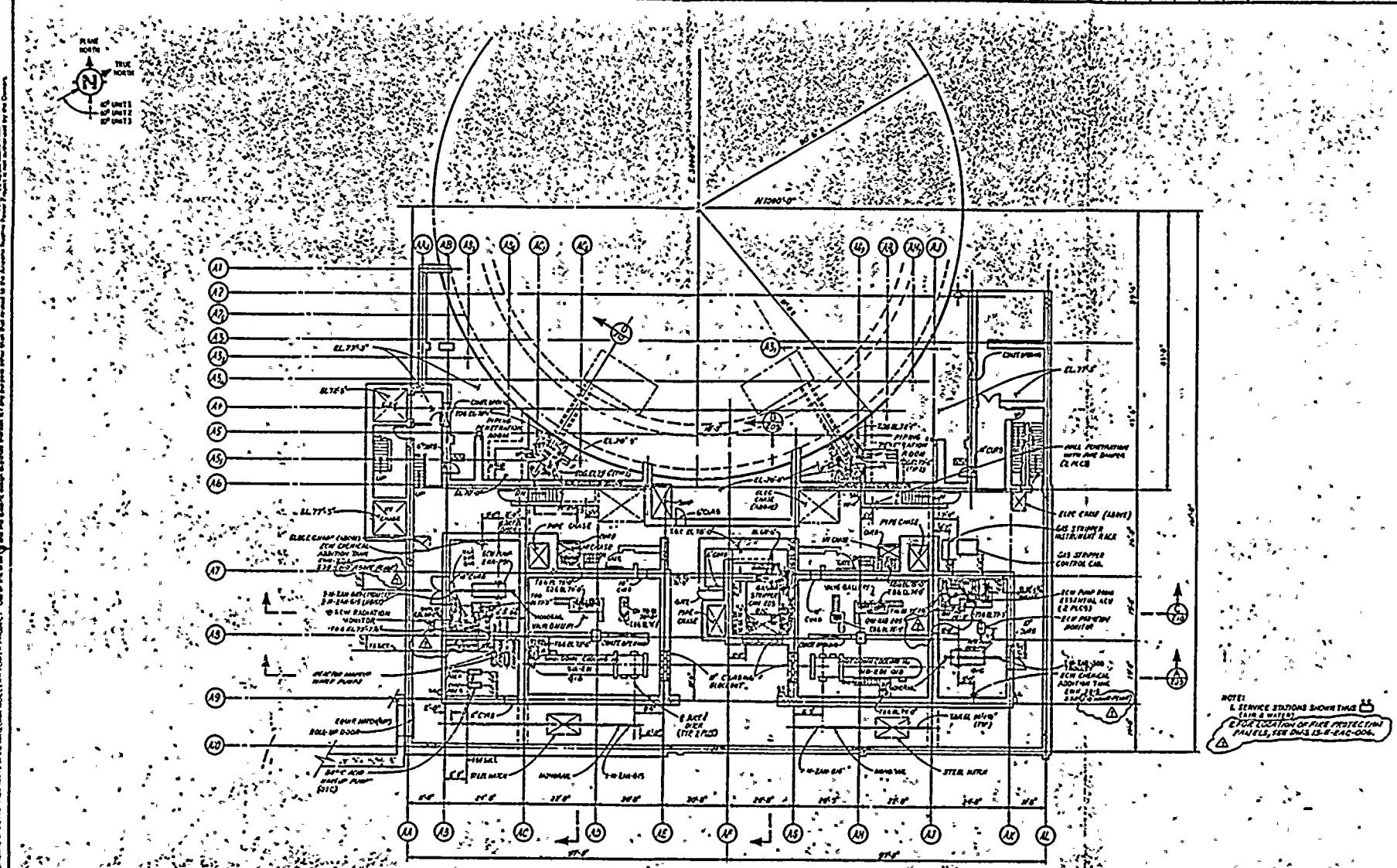
UNCONTROLLED DRAWING

BECHTEL
LOS ANGELES

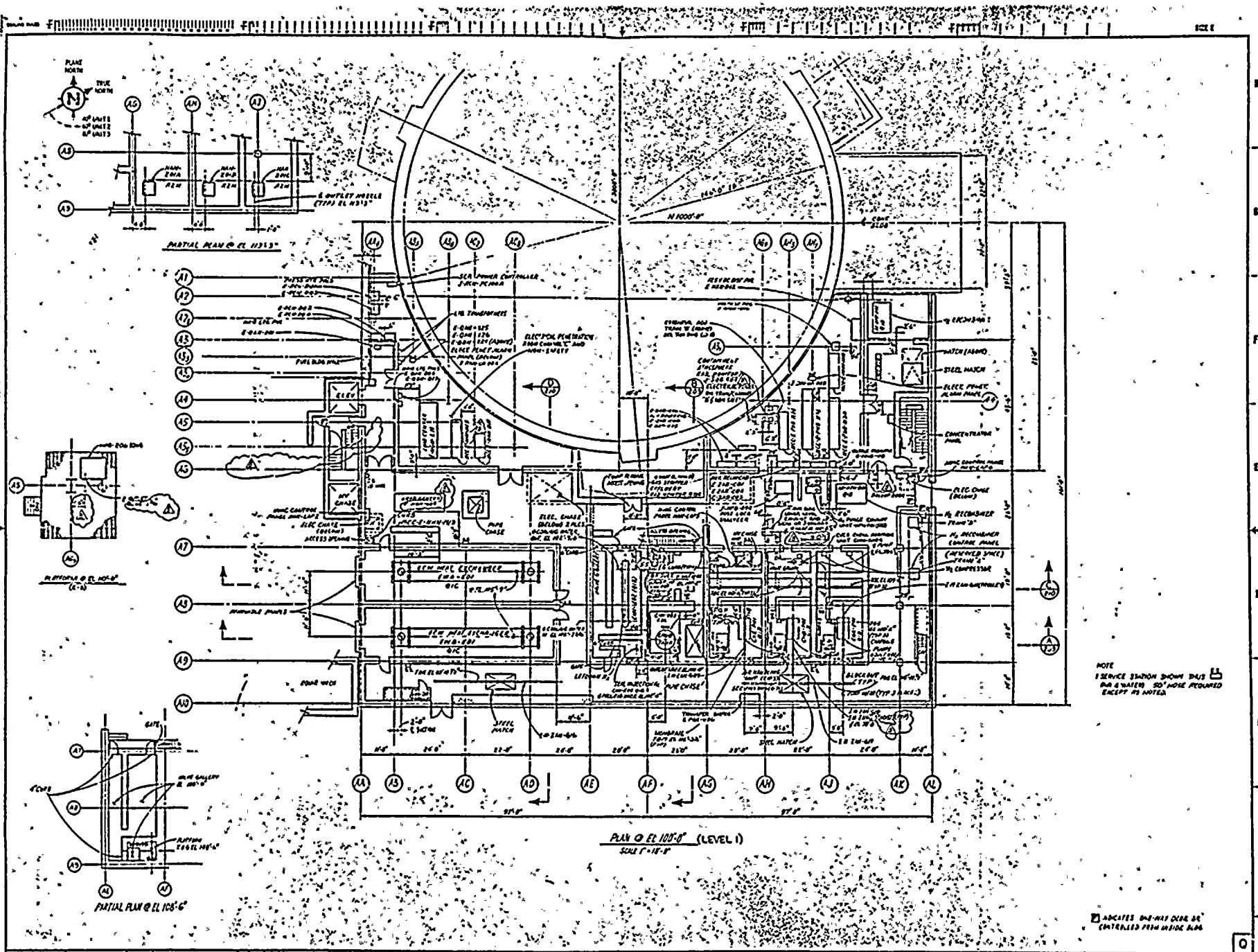
ARIZONA NUCLEAR POWER PROJECT
PALO VERDE NUCLEAR
GENERATING STATION

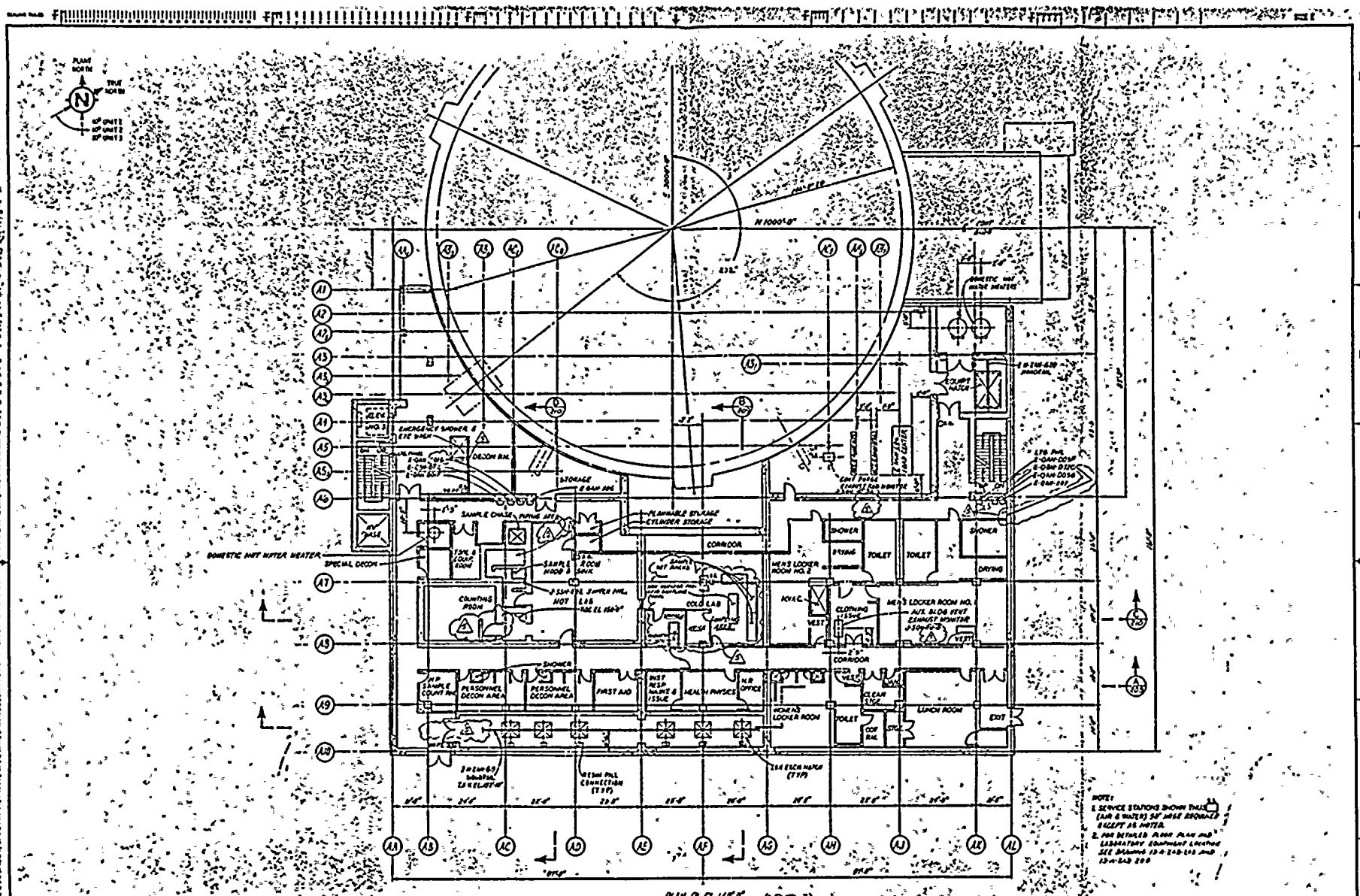
AUXILIARY BUILDING
EQUIPMENT LOCATIONS
PLAN AT EL 51'-6" - LEVEL C

13-P-ZAL-202 | 7



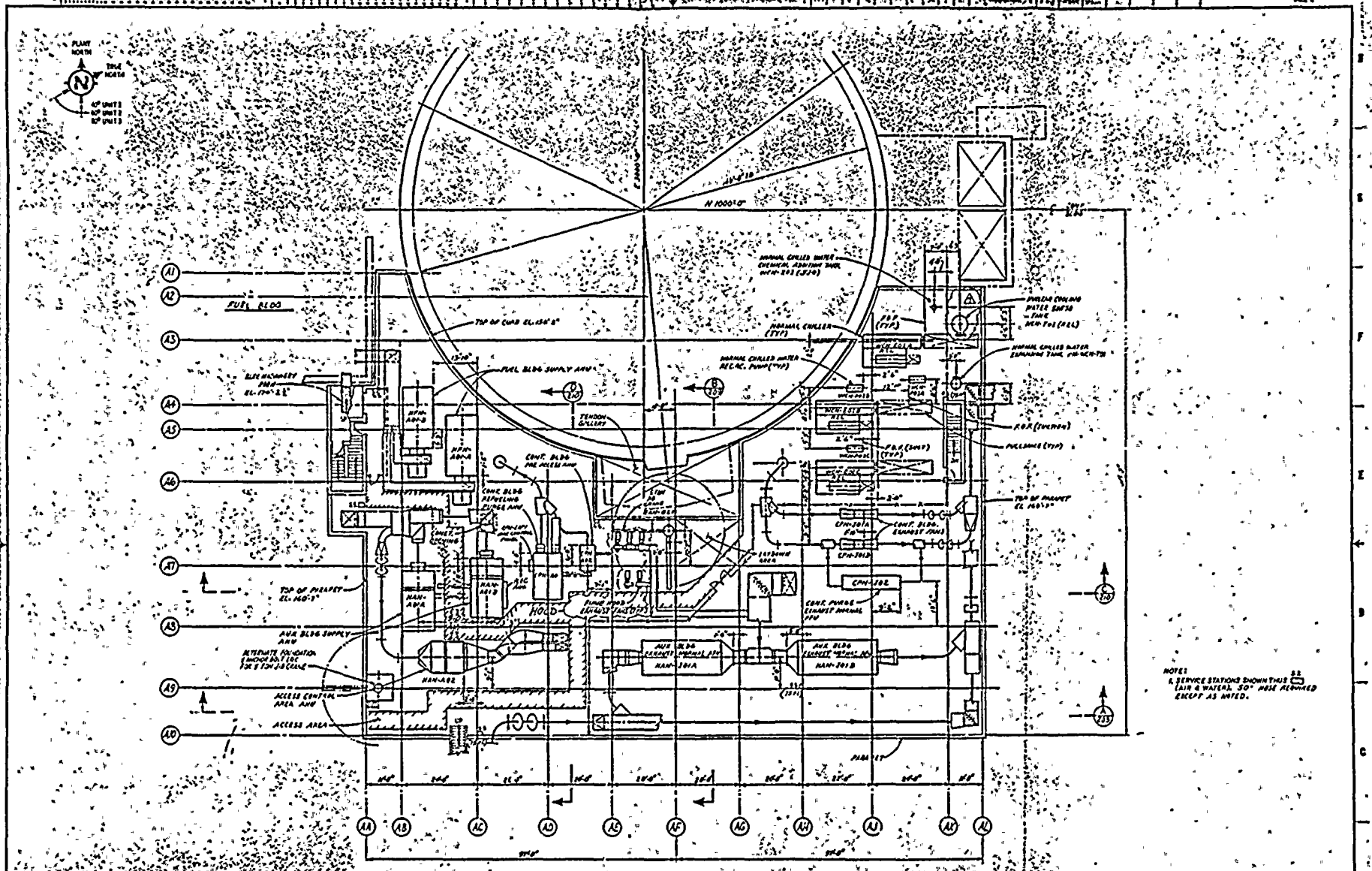
UNCONTROLLED DOCUMENT


PLAN @ EL 100'-0" (LEVEL 1)
PARTIAL PLAN @ EL 105'-6"
UNCONTROLLED DRAWING
BECHTEL
LOS ANGELES
ARIZONA NUCLEAR POWER PROJECT
PALO VERDE NUCLEAR
AUXILIARY BUILDING
EQUIPMENT LOCATIONS
PLAN AT EL 100'-0" – LEVEL 1



UNCONTROLLED DRAWING

BECHTEL LOS ANGELES	AUXILIARY BUILDING EQUIPMENT LOCATIONS PLAN AT EL 147'-8" - LEVEL 3		
ARIZONA NUCLEAR POWER PROJECT PALO VERDE NUCLEAR GENERATING STATION	SCALE 1/8"=1'-0"	JOB NO. 10407	DRAWING NO. 13-A-ZAL-287	REV. 5



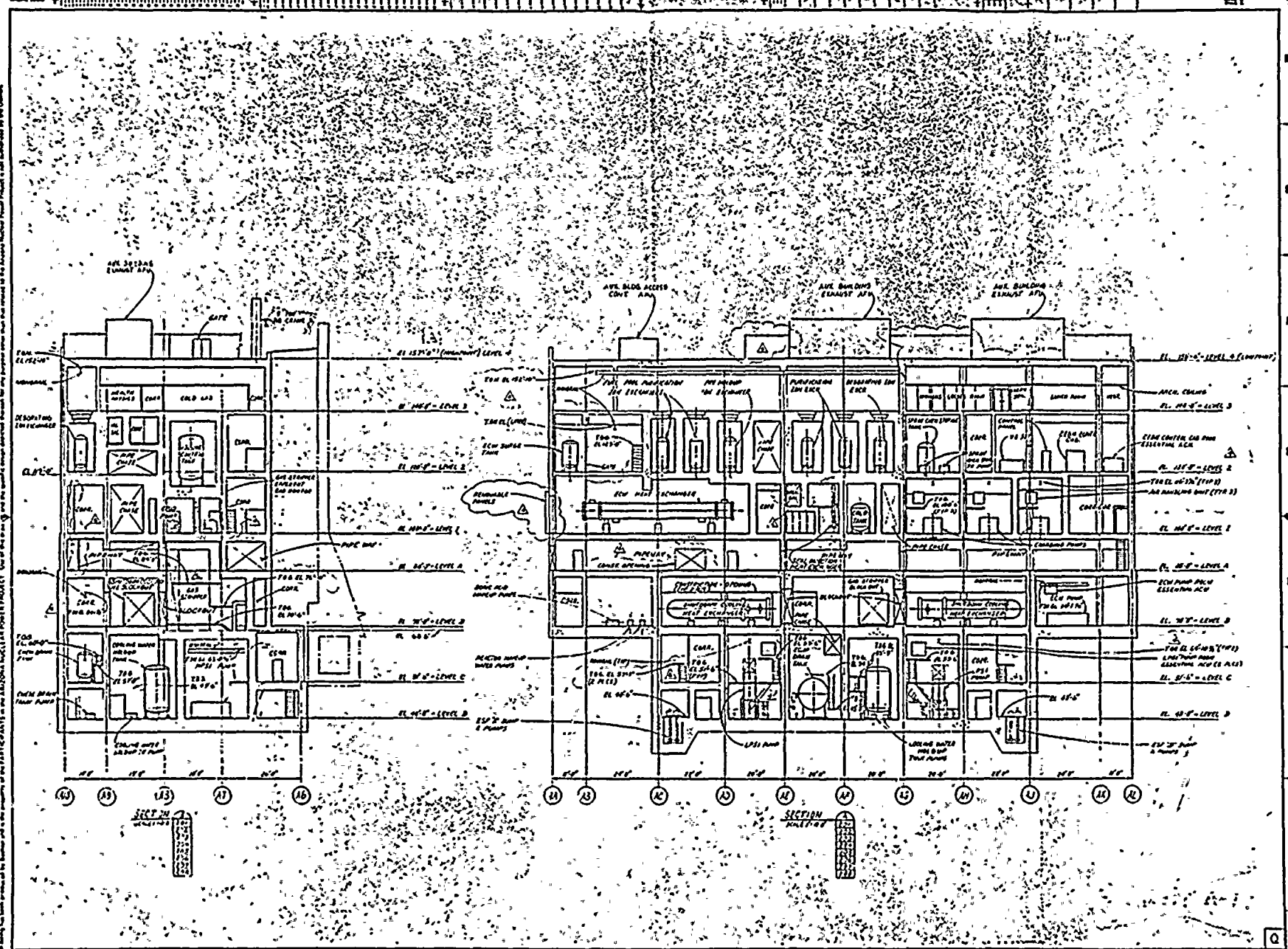
UNCONTROLLED DRAWING

BECHTEL
LOS ANGELES

ARIZONA NUCLEAR POWER PROJECT
PALO VERDE NUCLEAR
GENERATING STATION

AUXILIARY BUILDING
EQUIPMENT LOCATIONS,
PLAN AT EL 155'-6" - LEVEL 4

13-A-ZAL-208 7



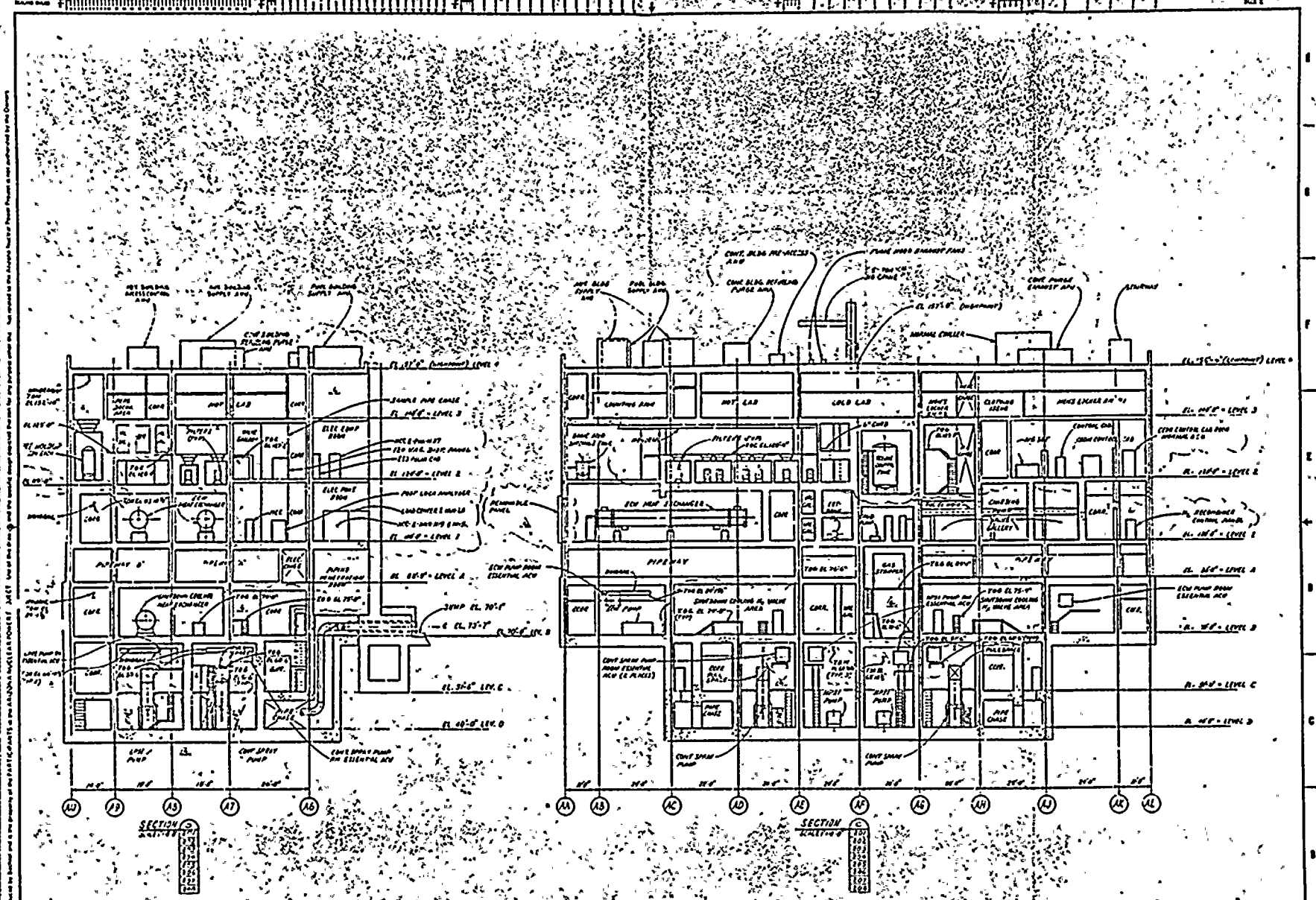
UNCONTROLLED DRAWING

BECHTEL
LOS ANGELES

ARIZONA NUCLEAR POWER PROJECT
PALO VERDE NUCLEAR
GENERATING STATION

AUXILIARY BUILDING
EQUIPMENT LOCATIONS
SECTIONS

13-P-ZAL-220



UNCONTROLLED DRAWING

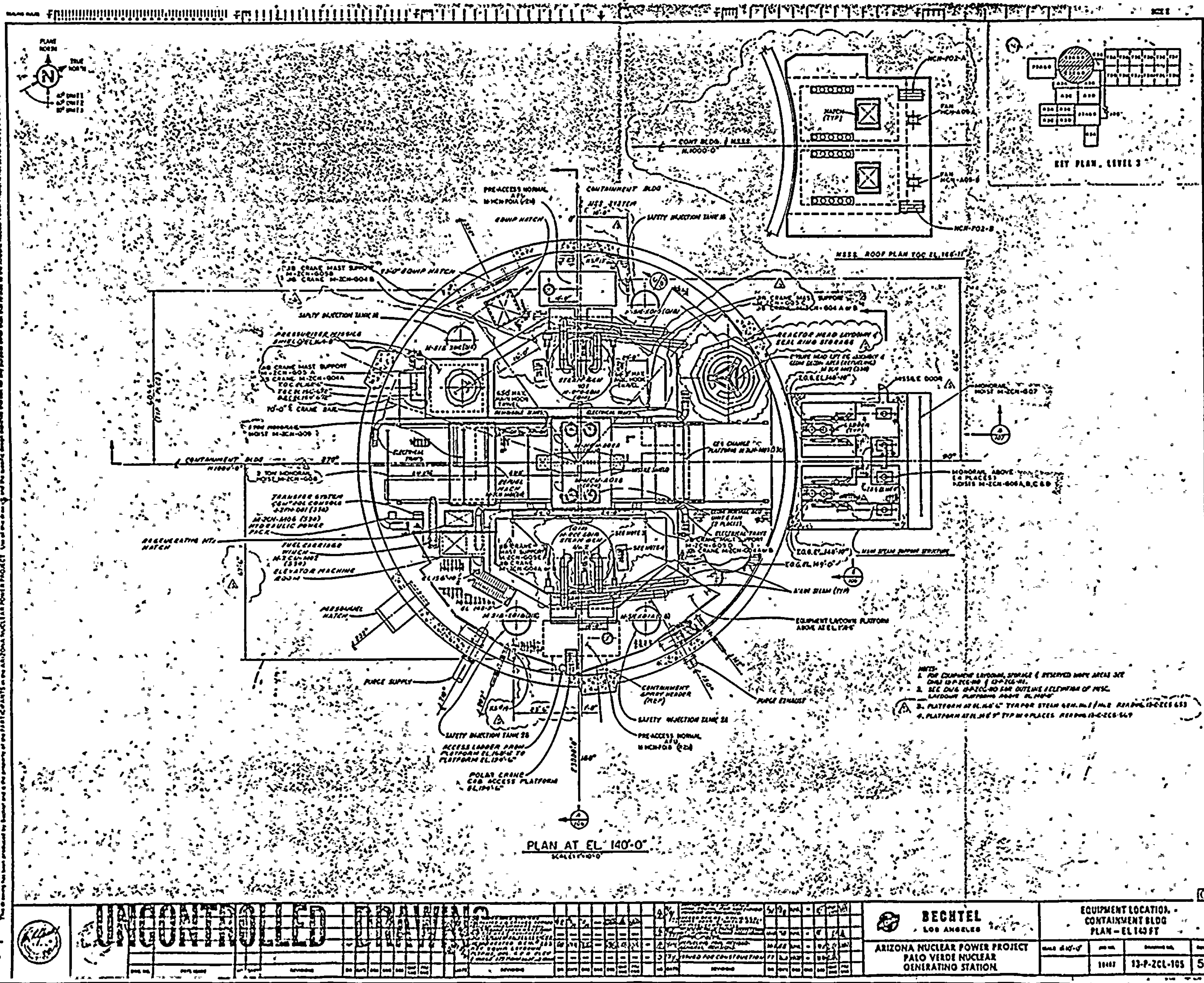
BECHTEL
LOS ANGELES

ARIZONA NUCLEAR POWER PROJECT
PALO VERDE NUCLEAR
GENERATING STATION

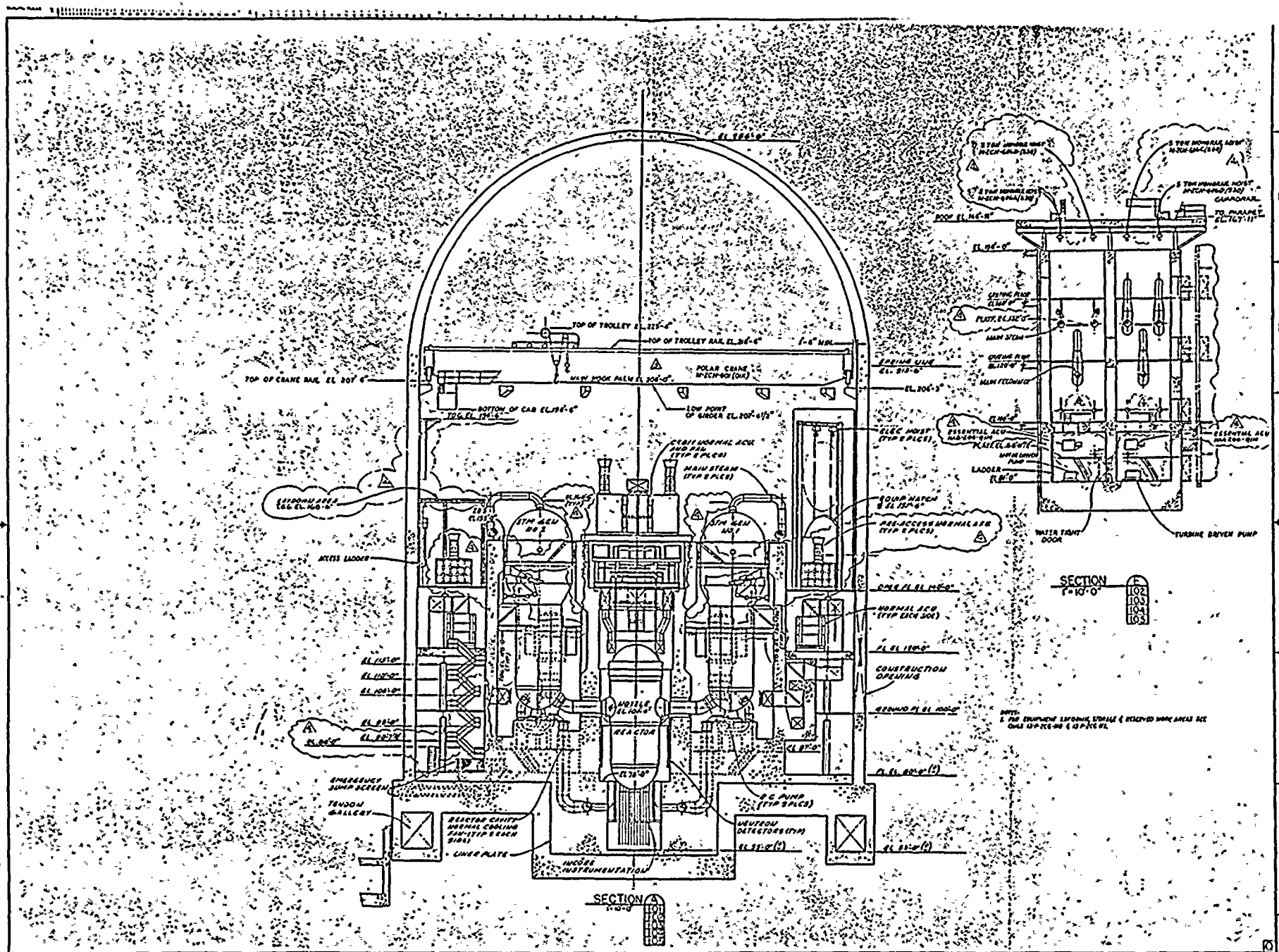
AUXILIARY BUILDING
EQUIPMENT LOCATIONS
SECTIONS

13-P-ZAL-210 4

1337-ZAL-210 10407



PLAN AT EL. 140'-0"
KEY PLAN, LEVEL 3
CONTAINMENT BLDG
SAFETY INJECTION TANK 1B
SAFETY INJECTION TANK 2A
SAFETY INJECTION TANK 2B
PRESSURIZER MISSILE SHIELD
REACTOR HEAD LAYDOWN & SEAL RING STORAGE
PERSONNEL HATCH
PURGE SUPPLY
PURGE EXHAUST
CONTAINMENT SPRAY HEADER
EQUIPMENT LAYDOWN PLATFORM ABOVE AT EL. 136'-6"
ELEVATOR MACHINE ROOM
REGENERATIVE HT. X HATCH
TRANSFER SYSTEM CONTROL CONSOLE
FUEL CARRIAGE WINCH
POLAR CRANE CAB ACCESS PLATFORM
ACCESS LADDER FROM PLATFORM
ELECTRICAL TRAYS
EQUIP HATCH
NSSS ROOF PLAN TOC EL. 146'-11"
UNCONTROLLED DRAWING
BECHTEL
LOS ANGELES
ARIZONA NUCLEAR POWER PROJECT
PALO VERDE NUCLEAR
GENERATING STATION
EQUIPMENT LOCATION - CONTAINMENT BLDG PLAN - EL 140 FT
13-P-ZCL-105
5



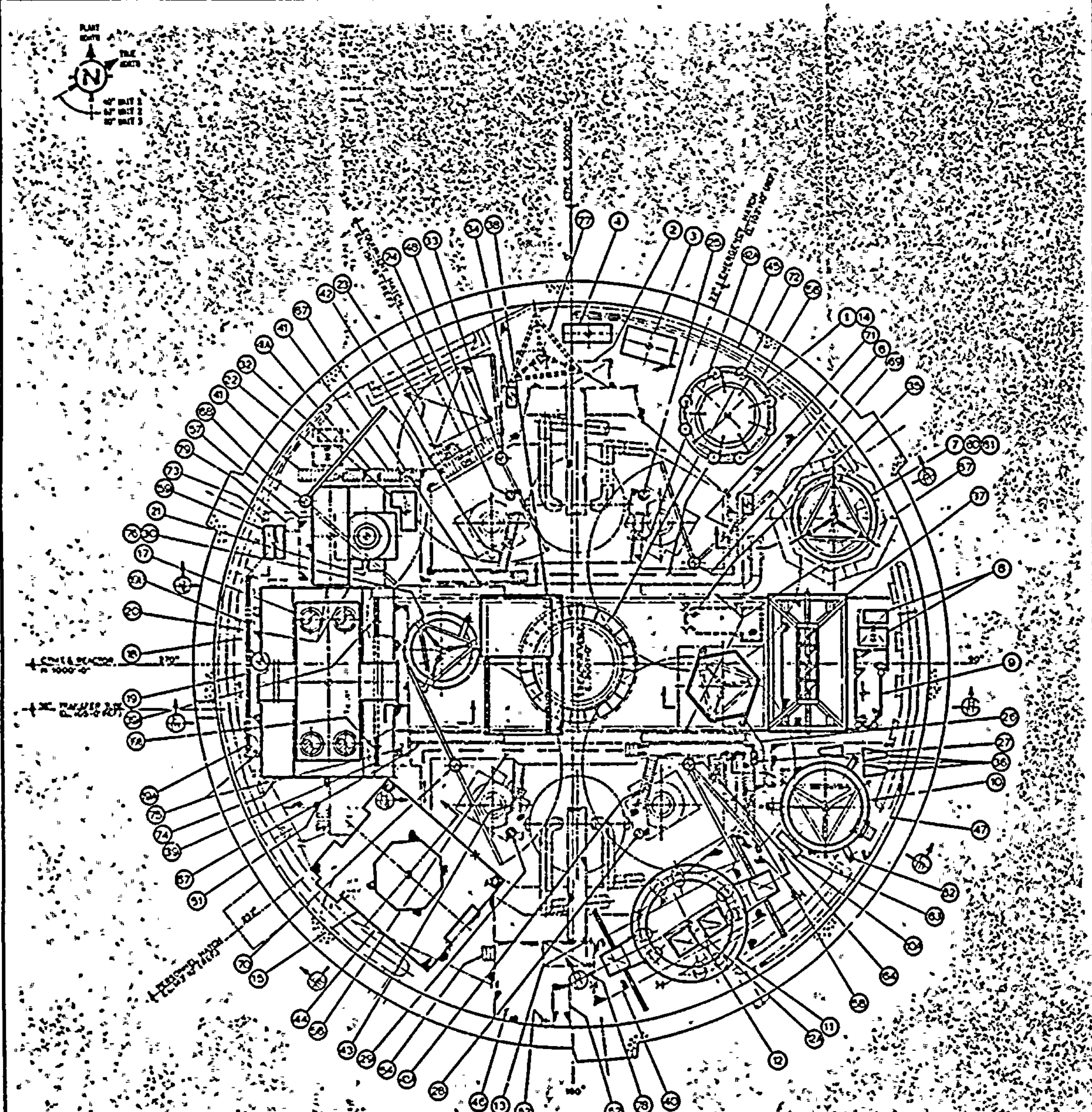
UNCONTROLLED DOCUMENT

BECHTEL
LOS ANGELES

ARIZONA NUCLEAR POWER PROJECT
PALO VERDE NUCLEAR GENERATING STATION

EQUIPMENT LOCATION CONTAINMENT BLDG SECTIONS A-A & E-E

SCALE	JOB NO.	DRAWING NO.	REV.
1"=10'-0"	10407	13-P-ZCL-106	4



ITEM NO.	NAME	DESCRIPTION	LOCATION NORTH	LOCATION EAST	ELEV	WEIGHT
1	RV HEAD INSULATION	REMOVABLE, ABOVE COOLING RING WITH SUPPORT STAND	[illegible]	[illegible]	140'-0"	[illegible]
2	HATCH	SIZE 7'-6" x 8'-0" FOR CTMT PREACCESS NORMAL AIR FILTRATION UNIT CARBON FILL HOPPER & FAN INSTALLATION	[illegible]	[illegible]	140'-0"	—
3	STORAGE RST HOLD FRAME		[illegible]	[illegible]	140'-0"	[illegible]
4	CRANE	REACTOR COOLANT PUMP SEAL REMOVAL	[illegible]	[illegible]	140'-0"	[illegible]
5						
6	GUIDE STUDS					[illegible]
7	RV HEAD ASSY		[illegible]	[illegible]	[illegible]	
8	HYDRA-SET	225 TON CAPACITY (STORAGE DURING REFUELING ONLY)	[illegible]	[illegible]	[illegible]	[illegible]
9	RC SUPPORTING FRAME ASSY	LAYDOWN AREA DURING REFUELING				[illegible]
10	MULTIPLE STUD TENSIONER	FOR RV HEAD STUDS	[illegible]	[illegible]	[illegible]	[illegible]
10A	SHIELD SECON AREA	FOR RV HEAD STUDS & TOOLS			[illegible]	—
11	UPPER COLLECTING RING	[illegible] CEDM COOLING DUCT	[illegible]	[illegible]	[illegible]	[illegible]
12	COOLING DUCT	[illegible] CEDM DUCT INLETS				—
12A	HATCH	SIZE [illegible] FOR STORAGE [illegible] CEDM DUCT INLETS	[illegible]	[illegible]	[illegible]	—
13	HATCH	SIZE [illegible] FOR CTMT PREACCESS NORMAL AIR FILTRATION UNIT CARBON FILL HOPPER & FAN INSTALLATION	[illegible]	[illegible]	[illegible]	—
14	COOLING RING	REACTOR HEAD COOLING RING				[illegible]
15	CEDM CABLE SUPPORT STRUCT		[illegible]	[illegible]	[illegible]	[illegible]
16						
17	RV MISSILE SHIELD & CEDM AIR COOLING UNIT	LAYDOWN PLATFORM EL. 140'-0"	[illegible]	[illegible]	[illegible]	[illegible]
18	BLIND FLANGE	36" DIA TRANSFER TUBE BLIND FLANGE	[illegible]	[illegible]	[illegible]	[illegible]
19	MONORAIL	36" DIA BLIND FLANGE REMOVAL	[illegible]	[illegible]	[illegible]	—
19A	[illegible] HOIST	TO SERVICE TRANSFER TUBE BLIND FLANGE		[illegible]	[illegible]	[illegible]
19B	[illegible]			[illegible]	[illegible]	
20	REMOVABLE SLABS	TOTAL OF THREE SLABS ON TOP OF PRESSURIZER	[illegible]	[illegible]	[illegible]	—
21	PUMP MOTOR	REACTOR COOLANT PUMP MOTOR	[illegible]	[illegible]	[illegible]	[illegible]
22	HYDRA-SET	225 TON CAPACITY (STORAGE DURING OPERATION)	[illegible]	[illegible]	[illegible]	[illegible]
23	HATCH	SIZE [illegible] EQUIPMENT REMOVING			[illegible]	—
24	SECONDARY MANWAY COVER	STEAM GEN COVER	[illegible]	[illegible]	[illegible]	[illegible]
25	SECONDARY MANWAY COVER	STEAM GEN COVER	[illegible]	[illegible]	[illegible]	[illegible]
26	UPPER GUIDE STRUCTURE	LAYDOWN AREA DURING REFUELING ONLY	[illegible]	[illegible]	[illegible]	[illegible]
27	CONTROL DESK	FOR MULTIPLE STUD TENSIONER	[illegible]	[illegible]	[illegible]	—
28	SECONDARY MANWAY COVER	STEAM GEN COVER	[illegible]	[illegible]	[illegible]	[illegible]
29	SECONDARY MANWAY COVER	STEAM GEN COVER	[illegible]	[illegible]	[illegible]	[illegible]
30	CORE SUPPORT BARREL	LAYDOWN AREA DURING VESSEL ISI	[illegible]	[illegible]	[illegible]	[illegible]
31						
32	MAINTENANCE TOOL	FOR REACTOR COOLANT PUMP MAINTENANCE	[illegible]	[illegible]	[illegible]	—
33	JIB CRANE	5 TON CAP. TO SERVICE EQUIP INSIDE SEC SHIELD WALL	[illegible]	[illegible]		[illegible]
34	MAINTENANCE TOOL	FOR REFUELING EQUIPMENT MAINTENANCE	[illegible]	[illegible]	[illegible]	—
35	RC SUPPORTING FRAME ASSY	LOCATION DURING OPERATION	[illegible]	[illegible]	[illegible]	[illegible]
36	[illegible]	MULTIPLE STUD TENSIONERS ACCESSORY			[illegible]	—
37	CEA CHANGE PLATFORM	LOCATION DURING REFUELING ONLY	[illegible]	[illegible]		[illegible]
38	REFUELING MACHINE					—
39	MONORAIL	TO SERVICE REFUELING POOL	[illegible]	[illegible]		—
39A	[illegible] TON CAP MONORAIL HOIST	TO SERVICE REFUELING CANAL EQUIPMENT		[illegible]		[illegible]
39B				[illegible]		
40	LAYDOWN PLATFORM	FOR UPPER COLLECTING RING			[illegible]	—
41	STAIRS	[illegible] WIDE STAIRS FROM PL. EL. [illegible]				—
41A	LANDING	[illegible] WIDE LANDING			[illegible]	—
42	STAIRS	2'-0" WIDE STAIRS FROM PL. EL. [illegible] TO PL. EL. [illegible]				—
42A	STAIRS	2'-0" WIDE STAIRS FROM PL. EL. [illegible] TO PL. EL. [illegible]				—
43	STAIRS	2'-0" WIDE STAIRS FROM PL. EL. [illegible] TO PL. EL. [illegible]				—
43A	STAIRS	2'-0" WIDE STAIRS FROM PL. EL. [illegible] TO PL. EL. [illegible]				—
44	LAYDOWN PLATFORM	FOR CEDM CABLE SUPPORT STRUCTURE			[illegible]	—
45	LAYDOWN PLATFORM				[illegible]	—
46	PLATFORM				[illegible]	—
47	LAYDOWN PLATFORM	FOR MULTIPLE STUD TENSIONER			[illegible]	—
48	STAIRS	[illegible] WIDE STAIRS FROM PL. EL. [illegible] TO PL. EL. [illegible]				—
49						
50						
51	LAYDOWN PLATFORM	FOR RV MISSILE SHIELD & CEDM AIR COOLING UNIT			[illegible]	—
52	PLATFORM	POLAR CRANE CAB ACCESS PLATFORM			[illegible]	—
53	LADDER	ACCESS LADDER FROM EL. [illegible] TO EL. [illegible]				—
54	STAIRS	2'-0" WIDE STAIRS FROM PL. EL. [illegible] TO PL. EL. [illegible]				—
55						
56	TOP OF SECON SHIELD WALL				[illegible]	—
57	PLATFORM	2'-?" WIDE PRESSURIZER MISSILE SHIELD PLATFORM			[illegible]	—
58	LADDER	EMERGENCY VERTICAL LADDER				—
59	REMOVABLE STAIRS	FOR ACCESS TO BOTTOM OF REFUELING POOL				—
60	RV HEAD ASSY		[illegible]	[illegible]	[illegible]	[illegible]
61	REFUELING POOL SEAL RING	LAYDOWN AREA DURING OPERATION			[illegible]	[illegible]
62	SUPPORTING COLUMNS	TOTAL OF THREE COLUMNS TO SUPPORT ITEM [illegible]				—
63	HYDRAULIC RESERVOIR	PERMANENTLY ATTACHED TO ITEM [illegible]				—
64	JIB CRANE	5 TON CAP. - TO SERVICE EQUIP INSIDE SEC SHIELD WALL	[illegible]	[illegible]		[illegible]
65						
66						
67	ELECTRICAL TRAYS					—
68	JIB CRANE	5 TON CAP. - TO SERVICE EQUIP INSIDE PRESSURIZER COMP	[illegible]	[illegible]		[illegible]
69	JIB CRANE	5 TON CAP. - TO SERVICE EQUIP INSIDE SEC SHIELD WALL	[illegible]	[illegible]		[illegible]
70	JIB CRANE	5 TON CAP. - TO SERVICE EQUIP INSIDE SEC SHIELD WALL	[illegible]	[illegible]		[illegible]
71	STAIRS	2'-?" WIDE STAIRS FROM PL. EL. [illegible] TO PL. EL. [illegible]				—
72	REFUELING POOL SEAL RING	DURING REFUELING ONLY (SEE CE LISTING)	[illegible]	[illegible]		—
73	LADDER	ACCESS LADDER FROM EL. [illegible] TO EL. [illegible]				—
74	LADDER	ACCESS LADDER FROM EL. [illegible] TO EL. [illegible] (2 PLACES)				—
75	PLATFORM	RV MISSILE SHIELD PLATFORM			[illegible]	—
76	INTERNALS LIFT AND SPREADER ASSY	FOR LIFTING UGS & CSB	997'-2"	2072'-3"		6.8 TON
77	REACTOR HEAD SPREADER ASSEMBLY	FOR LIFTING RV HEAD ASSY MULTIPLE STUD TENS. & REFUELING SEAL RING (STORAGE DURING OPERATION)	[illegible]	[illegible]	[illegible]	6 TON
78	LADDER	ACCESS LADDER FROM EL. [illegible] TO EL. [illegible]				—
79	LADDER	ACCESS LADDER FROM EL. [illegible] TO EL. [illegible]				—

GEN NOTES

1. FOR SECTIONS SEE DWG. 13-P-ZCG-111 & DWG. 13-P-ZCG-116.
2. FOR ADDITONAL STORAGE AREA SEE CTMT FLOOR EL 80'-0" EQUIPMENT CAN BE RELOCATED TO OPERATING AREA BY USING EQUIP HATCH (ITEM 23).
3. SPECIAL TOOL FOR CTMT PREACCESS NORMAL AIR FILTRATION UNIT CARBON FILL & DRAIN SYSTEM MAINTENANCE TO BE STORED OUTSIDE CTMT. (TYP. ALL UNITS).

LEGEND

- DESIGNATES WALKING AREAS ON TOP OF SECONDARY SHIELD WALL
- DESIGNATES EQUIPMENT LAYDOWN AREA DURING REFUELING
- DESIGNATES EQUIPMENT LAYDOWN AREA DURING OPERATION
- DESIGNATES PLATFORM OR GRATING
- DESIGNATES CENTER OF GRAVITY

REV	DATE	REVISIONS
2	[illegible]	REDRAWN & REVISED

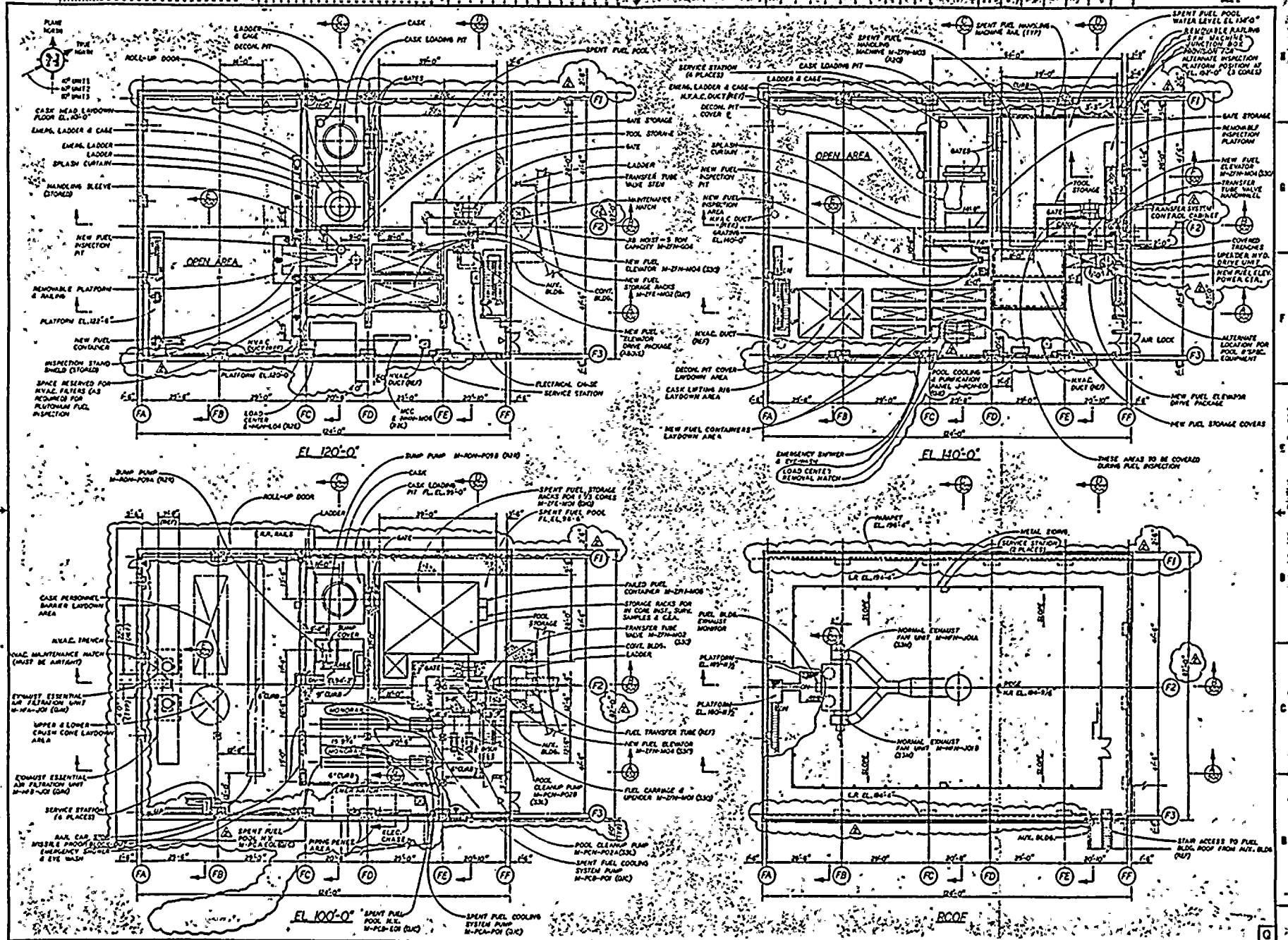
BECHTEL
LOS ANGELES

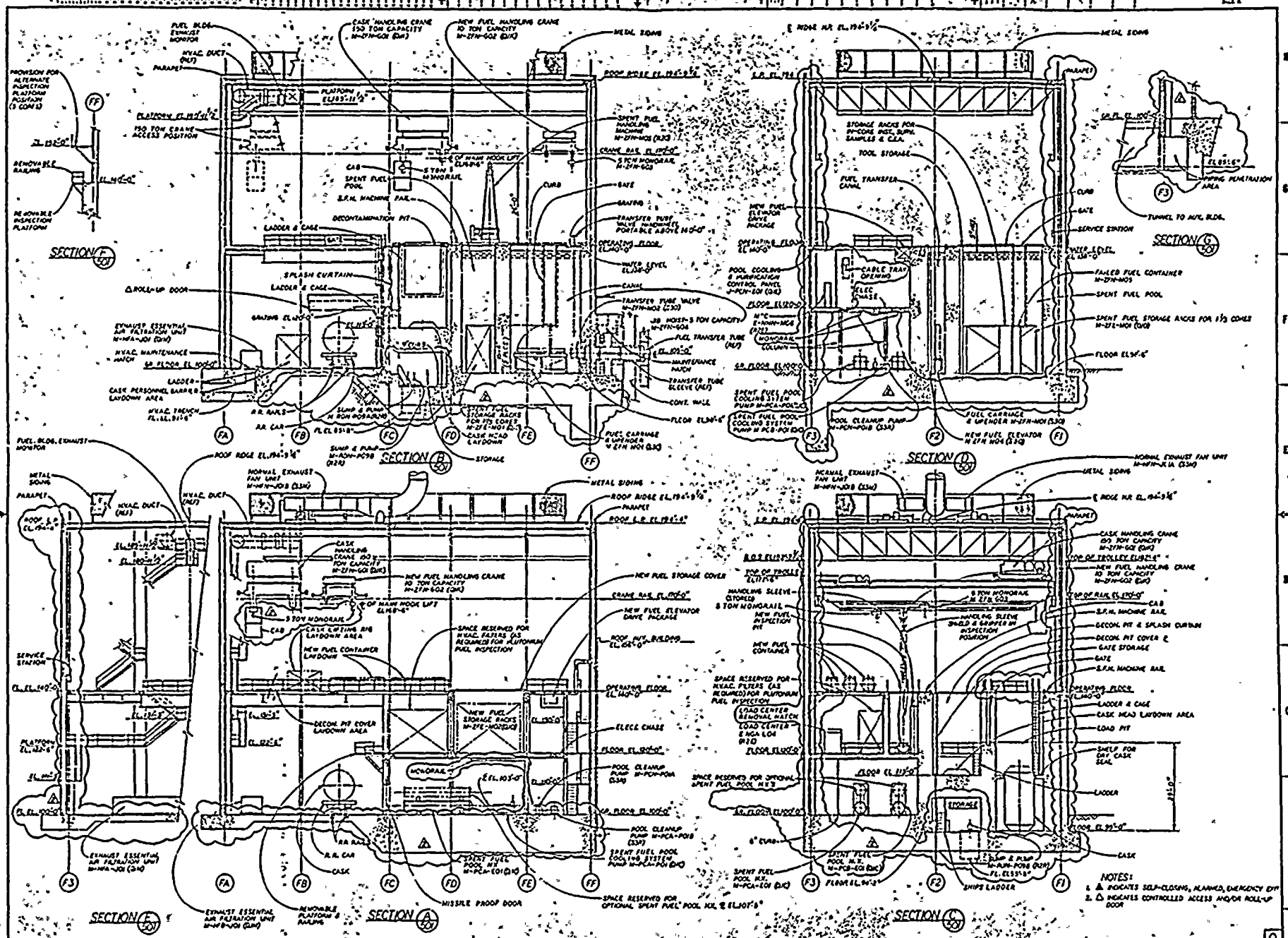
ARIZONA NUCLEAR POWER PROJECT
PALO VERDE NUCLEAR GENERATING STATION

CONTAINMENT BUILDING
EQUIPMENT LAYDOWN & STORAGE
PLAN ABOVE EL.140'-0"

SCALE	JOB NO.	DRAWING NO.	REV.
1/8"=1'-0"	10407	13-P-ZCG-110	2

CONTROLLED DRAWING

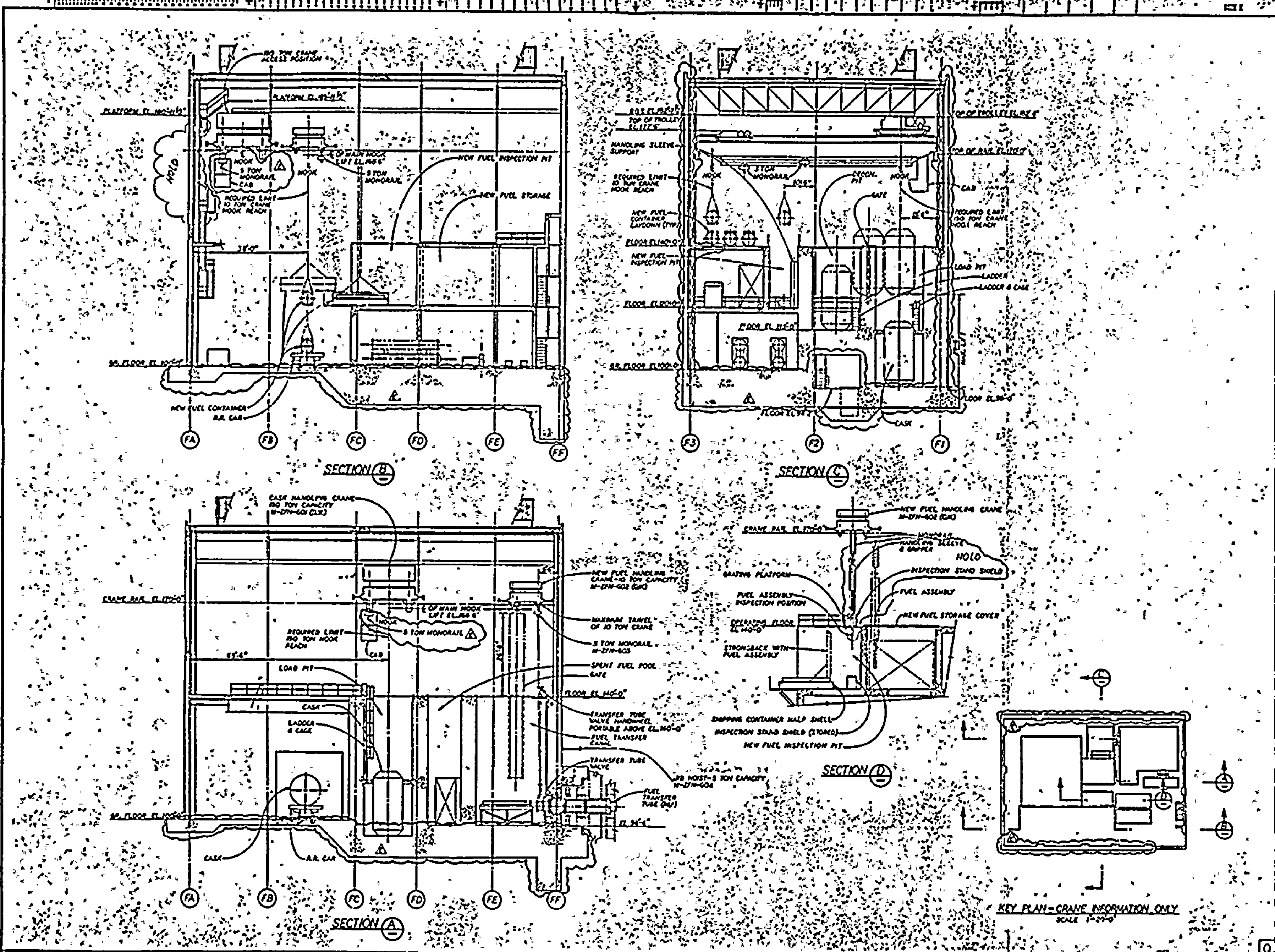

EL 120'-0"
EL 140'-0"
EL 100'-0"
ROOF
SPENT FUEL POOL
CASK LOADING PIT
OPEN AREA
NEW FUEL INSPECTION PIT
NEW FUEL ELEVATOR M-ZFH-MO4 (S3C)
SPENT FUEL HANDLING MACHINE M-ZFH-MO3 (S2C)
SPENT FUEL STORAGE RACKS FOR 193 CORES M-ZFE-MO2 (S2C)
FAILED FUEL CONTAINER M-ZFH-MO6
STORAGE RACKS FOR IN CORE INST. SUPT. SAMPLES & CEA
TRANSFER TUBE VALVE M-ZFH-MO3 (S3C)
FUEL TRANSFER TUBE (S4C)
FUEL CANISTER & UPENDER M-ZFH-MO1 (S3C)
SPENT FUEL COOLING SYSTEM PUMP M-PCH-P01 (S1C)
POOL CLEANUP PUMP M-PCH-P02A (S3C)
POOL CLEANUP PUMP M-PCH-P02B (S3C)
NORMAL EXHAUST FAN UNIT M-HFH-J01A (S3C)
NORMAL EXHAUST FAN UNIT M-HFH-J01B (S3C)
EXHAUST ESSENTIAL AIR FILTRATION UNIT M-HFA-J01 (S4C)
EXHAUST ESSENTIAL AIR FILTRATION UNIT M-HFB-J01 (S4C)
SERVICE STATION (6 PLACES)
EMERG. LADDER & CASE H.V.A.C. DUCT (R&T)
DECON. PIT COVER
SPLASH CURTAIN
NEW FUEL INSPECTION AREA
H.V.A.C. DUCT GRATING EL. 140'-0"
GATE STORAGE
TOOL STORAGE
GATE
LADDER
TRANSFER TUBE VALVE STEM
MAINTENANCE HATCH
20 TON CAPACITY M-ZFH-MO4
NEW FUEL ELEVATOR M-ZFH-MO4 (S3C)
NEW FUEL STORAGE RACKS M-ZFE-MO3 (S4C)
NEW FUEL ELEVATOR DRIVE PACKAGE (S3C)
AUX. BLDG.
CONT. BLDG.
H.V.A.C. DUCT (R&T)
CASK LIFTING RIG LAYDOWN AREA
NEW FUEL CONTAINERS LAYDOWN AREA
DECON. PIT COVER LAYDOWN AREA
POOL COOLING & PURIFICATION PANEL M-PCH-E01 (S2C)
AIR LOCK
NEW FUEL STORAGE COVERS
THESE AREAS TO BE COVERED DURING FUEL INSPECTION
EMERGENCY SHOWER & EYE WASH
LOAD CENTER REMOVAL HATCH
REMOVABLE INSPECTION PLATFORM
TRANSFER SYSTEM CONTROL CABINET
COVERED TRENCHES
UPENDER HYD. DRIVE UNIT
NEW FUEL ELEV. POWER CAB.
ALTERNATE LOCATION FOR POOL SPEC. EQUIPMENT
SPENT FUEL POOL WATER LEVEL EL 134'-0"
REMOVABLE PIPING & M MACHINE JUNCTION BOX PROVISION FOR ALTERNATE INSPECTION PLATFORM POSITION AT EL. 157'-0" (3 CORES)
SPENT FUEL HANDLING MACHINE RAIL (TYP)
ROLL-UP DOOR
CASK HEAD LAYDOWN FLOOR EL. 101'-0"
EMERG. LADDER & CASE
LADDER
SPLASH CURTAIN
HANDLING SLEEVE (STORED)
NEW FUEL INSPECTION PIT
OPEN AREA
REMOVABLE PLATFORM & RAILING
PLATFORM EL. 122'-6"
NEW FUEL CONTAINER
INSPECTION STAND SHIELD (STORED)
SPACE RESERVED FOR H.V.A.C. FILTERS CAS REQUIRED FOR PLUTONIUM FUEL INSPECTION
PLATFORM EL. 120'-0"
H.V.A.C. DUCTWORK
H.V.A.C. DUCT (R&T)
ELECTRICAL CHASE
SERVICE STATION
LOAD CENTER 8-MXM-L04 (S2C)
MCC 6 MXM-M06 (S4C)
SUMP PUMP M-RCH-P05A (S2C)
SUMP PUMP M-RCH-P05B (S2C)
CASK
CASK LOADING PIT EL. EL. 79'-0"
ROLL-UP DOOR
LADDER
RAILING
GATE
SPENT FUEL POOL EL. EL. 98'-0"
CASK PERSONNEL BARRIER LAYDOWN AREA
H.V.A.C. TRENCH
H.V.A.C. MAINTENANCE HATCH (MUST BE AIRTIGHT)
UPPER & LOWER CRUSH CONE LAYDOWN AREA
SERVICE STATION (6 PLACES)
AUX. CAB. EXIT
MISSILE PROOF BLOCK WALL
EMERGENCY SHOWER & EYE WASH
SPENT FUEL POOL H.X. M-PCB-E01 (S4C)
PIPING PENETRATION AREA
ELEC. CHASE
POOL COVER
POOL STORAGE
FUEL BLDG. EXHAUST MONITOR
PLATFORM EL. 109'-6 1/2"
PLATFORM EL. 160'-6 1/2"
AUX. BLDG.
FUEL BLDG.
PARAPET EL. 196'-6"
METAL SIDING
SERVICE STATION (2 PLACES)
LR EL. 184'-6"
LR EL. 196'-6"
STAIR ACCESS TO FUEL BLDG. ROOF FROM AUX. BLDG. (S4T)
UNCONTROLLED DRAWING
BECHTEL
LOS ANGELES
ARIZONA NUCLEAR POWER PROJECT
PALO VERDE NUCLEAR GENERATING STATION
FUEL BUILDING EQUIPMENT LOCATIONS PLANS
1"=10'-0"
13-P-ZFL-501
2



BECHTEL
LOS ANGELES

ARIZONA NUCLEAR POWER PROJECT
PALO VERDE NUCLEAR

FUEL BUILDING
EQUIPMENT LOCATIONS
SECTIONS



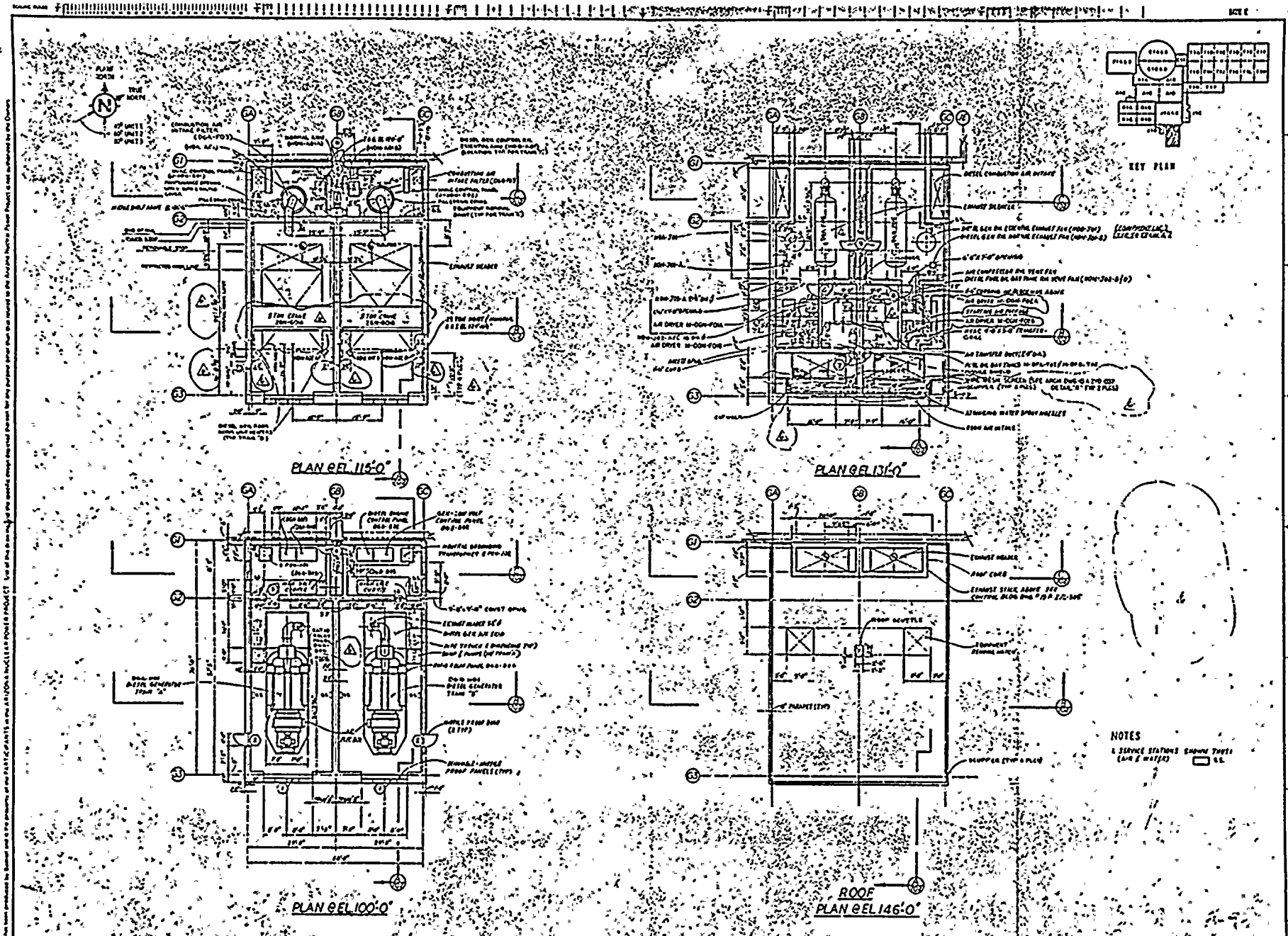
Rev	Date	Revision							
E		ISSUED FOR INFORMATION							
D		ISSUED FOR INFORMATION							
C		ISSUED FOR INFORMATION							
B		SUPSD'S 13-P-ZFL-003 (A)	—	—	—	—	—	—	—
—		ISSUED FOR INFORMATION							

BECHTEL
LOS ANGELES

ARIZONA NUCLEAR POWER PROJECT
PALO VERDE NUCLEAR GENERATING STATION

FUEL BUILDING CRANE HANDLING DETAILS

Scale 1"=10'-0" | 10407 | 13-P-ZFL-303 | E



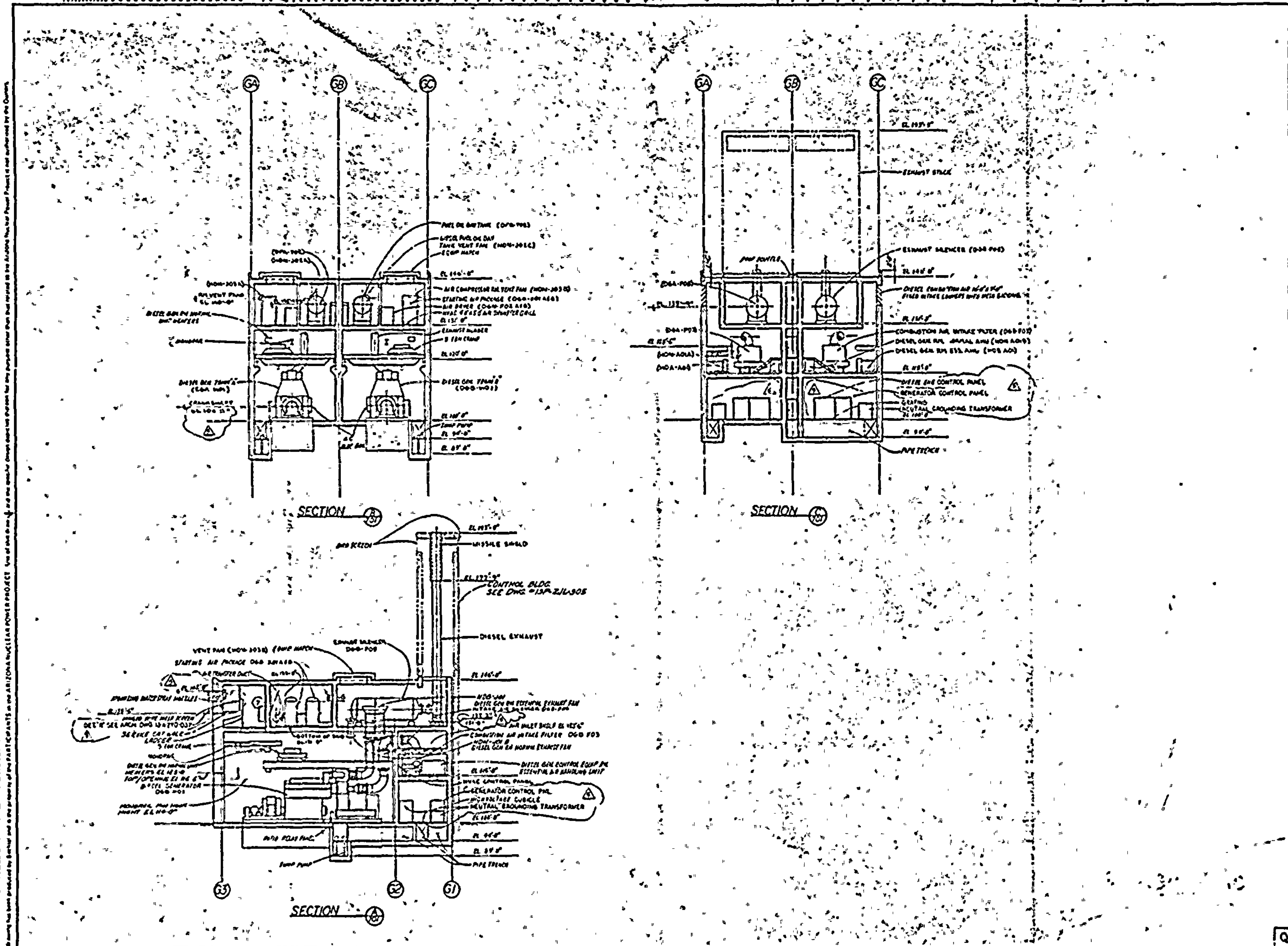
UNCONTROLLED DRAWING

BECHTEL LOS ANGELES

ARIZONA NUCLEAR POWER PROJECT
PALO VERDE NUCLEAR GENERATING STATION

DIESEL GENERATOR BUILDING
EQUIPMENT LOCATION – PLANS

SCALE	JOB NO.	DRAWING NO.	REV.
1/8"=1'-0"	10407	13-P-ZGL-701	6



UNCONTROLLED DRAWING

5		
4		
3		GENERAL REVISION
2		

BECHTEL
LOS ANGELES

ARIZONA NUCLEAR POWER PROJECT
PALO VERDE NUCLEAR
GENERATING STATION

DIESEL GENERATOR BUILDING
EQUIPMENT LOCATION – SECTIONS

SCALE 1"=10'-0"

10407 | 13-P-ZGL-302 | 5

Q

REFERENCES

(1) Letter from D. Eisenhut, NRC, to all Licenses of Operating Plants and Applicants for Operating Licenses and Holders of Construction Permits, dated December 22, 1980; Subject: Control of Heavy Loads

(2) Letter from D. Eisenhut, NRC, to all Licenses of Operating Plants and Applicants for Operating Licenses and Holders of Construction Permits, dated February 3, 1980; Subject: Control of Heavy Loads (Generic Letter 81-07)

(3) NUREG-0612, "Control of Heavy Loads at Nuclear Power Plants", U.S. Nuclear Regulatory Commission, July, 1980.

LIST OF ABBREVIATIONS APPLICABLE TO THIS REPORT

1.	ACU	-	Air Cooling Unit
2.	AFP	-	Auxiliary Feedwater Pump
3.	AFU	-	Air Filtration Unit
4.	AISC	-	American Institute of Steel Construction
5.	ANSI	-	American National Standards Institute
6.	ASME	-	American Society of Mechanical Engineer
7.	AWS	-	American Welding Society
8.	CEA	-	Control Element Assembly
9.	CEDM	-	Control Element Drive Mechanism
10.	CMAA	-	Crane Manufacturers Association of America
11.	HPSI	-	High Pressure Safety Injection
12.	ICI	-	Incore Instrumentation
13.	LPSI	-	Low Pressure Safety Injection
14.	MST	-	Multi-Stud Tensioner
15.	RCP	-	Reactor Coolant Pump
16.	RV	-	Reactor Vessel

LIST OF EXHIBITS, TABLES AND DRAWINGS
APPLICABLE TO THIS REPORT

EXHIBITS	TABLES	DRAWINGS
A-1	B-2	13-P-ZAL-202
A-2		13-P-ZAL-203
F-1		13-P-ZAL-205
F-2		13-P-ZAL-207
F-4		13-P-ZAL-208
		13-P-ZAL-209
		13-P-ZAL-210
		13-P-ZCL-105
		13-P-ZCL-106
		13-P-ZCG-110
		13-P-ZFL-501
		13-P-ZFL-502
		13-P-ZFL-503
		13-P-ZGL-701
		13-P-ZGL-702