REGULATORY [redacted]FORMATION DISTRIBUTION SY[redacted]M (RIDS)

ACCESSION NBR:8206290388 DOC.DATE: 82/06/18 NOTARIZED: NO DOCKET #
FACIL:50-315 Donald C. Cook Nuclear Power Plant, Unit 1, Indiana & 05000315
50-316 Donald C. Cook Nuclear Power Plant, Unit 2, Indiana & 05000316
AUTH.NAME AUTHOR AFFILIATION
HUNTER,R.S. Indiana & Michigan Electric Co.
RECIP.NAME RECIPIENT AFFILIATION
DENTON,H.R. Office of Nuclear Reactor Regulation, Director

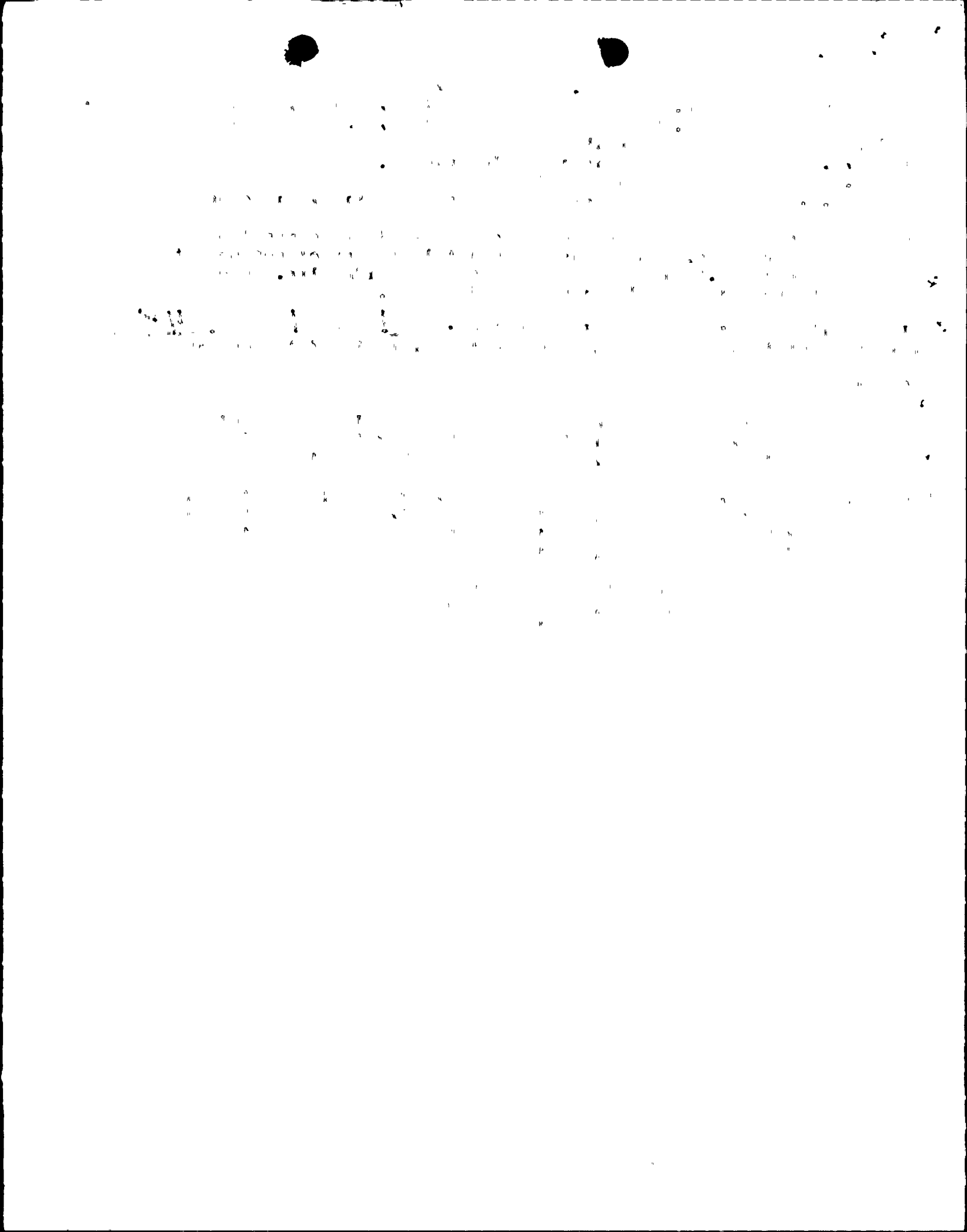
SUBJECT: Forwards Phase Ia response to NUREG-0612 re control of heavy loads.Phase 1a is resubmittal of part of response to Section 2.1 of Encl 3 of DG Eisenhut 801222 ltr.Response to technical evaluation rept also encl.

DISTRIBUTION CODE: A033S COPIES RECEIVED:LTR 1 ENCL 1 SIZE: 44
TITLE: Conrtol of Heavy Loads Near Spent Fuel (USI A-36) Operating Reactor

NOTES:

	RECIPIENT ID CODE/NAME		COPIES LTTR	COPIES ENCL	RECIPIENT ID CODE/NAME		COPIES LTTR	COPIES ENCL
	ORB #1 BC		7	7	NRR CLEMENSON01		4	4
INTERNAL:	NRR REQUA,G	09	1	1	NRR/DL/ORAB	12	1	1
	NRR/DSI/ADCCS	11	1	1	NRR/DSI/AEB		1	1
	NRR/DSI/RAB	10	1	1	REG FILE	04	1	1
	RGN3		1	1				
EXTERNAL:	ACRS	13	10	10	LPDR	03	2	2
	NRC PDR	02	1	1	NSIC	06	1	1
	NTIS		1	1				

TOTAL NUMBER OF COPIES REQUIRED: LTTR 33 ENCL 33



INDIANA & MICHIGAN ELECTRIC COMPANY

P. O. BOX 18
BOWLING GREEN STATION
NEW YORK, N. Y. 10004

June 18, 1982
AEP:NRC:0514C

Donald C. Cook Nuclear Plant Unit Nos. 1 and 2
Docket Nos. 50-315 and 50-316
License Nos. DPR-58 and DPR-74
CONTROL OF HEAVY LOADS

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Mr. Denton:

Our response to NUREG-0612 is being submitted in two phases as suggested by your staff.

This letter and its attachments are Phase Ia. Phase Ia is a resubmittal of part of our response to the "Control of Heavy Loads", Section 2.1 of Enclosure No. 3 to Mr. D. G. Eisenhut's letter dated December 22, 1980. This letter also includes our response to the draft Technical Evaluation Report (TER) which we discussed with your staff and your consultant in a telephone conversation on December 17, 1981. Therefore, in the interest of clarity, we are hereby superseding AEP:NRC:00514 in its entirety by this letter.

Phase Ia is a partial response to "Control of Heavy Loads" Section 2.1, and provides a detailed review with respect to cranes that operate over the reactor, in the vicinity of the spent fuel pit, and the major Turbine Building Cranes. Phase Ib will respond to all other cranes and hoists encompassed by Section 2.1. This Phase Ib detailed review will be presented at a later date.

Phase II of our response will address Sections 2.2, 2.3, and 2.4 of Enclosure No. 3 to Mr. D. G. Eisenhut's December 22, 1980 letter.

A033

This document has been prepared following Corporate procedures which incorporate a reasonable set of controls to insure its accuracy and completeness prior to signature by the undersigned.

Very truly yours,

R. S. Hunter
Vice President

RSH/sag
Attachments

cc: John E. Dolan - Columbus
R. W. Jurgensen
W. G. Smith, Jr. - Bridgman
R. C. Callen
G. Charnoff
Joe Williams, Jr.
Resident Inspector at Cook Plant - Bridgman

ATTACHMENT TO AEP:NRC:0514C
DONALD C. COOK NUCLEAR PLANT
CONTROL OF HEAVY LOADS, NUREG-0612

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 "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)."

Our review has identified the following overhead handling systems at the Donald C. Cook Plant which fall under the scope of this section:

(a) Auxiliary Building Crane, located in the Auxiliary Building at elevation 683'.

(b) Polar Crane, one located in each Containment Building at elevation 715' - 7½".

(c) 30 Ton Bridge Crane, located in the Circulating Water Pump and Screen House at elevation 621'. The detailed review of this crane will be presented at a later date.

For excluded systems, see our response to Section 2.1.2.

2.1.2 "Justify the exclusion of any overhead handling system from the above category by verifying that there is sufficient physical separation from any load-impact point and any safety-related component 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."

Our review has identified the following overhead handling systems at the Donald C. Cook Plant which fall under the scope of this exclusion section:

(a) The turbine room is equipped with one 240/50T main overhead crane at elevation 685' - 8", and two 10/4T auxiliary cranes at elevation 670' - 11". None of these cranes pass over equipment required for plant shutdown or decay heat removal as can be seen on color coded General Arrangement Drawing numbers 12-5161, 12-5164, 12-5165 and 12-5170 submitted in response to item 2.1.3a.

(b) Manipulator Crane, one located in each Containment Building at elevation 652'-7½". Each manipulator crane is designed for the shuffling, removal and replacement of new, partially spent, and spent fuel assemblies, one at a time; therefore by definition, these cranes do not handle heavy loads.

(c) New and Spent Fuel Handling Crane, located in the Auxiliary Building at elevation 650'. Similarly to the manipulator crane, item (c) above, the New and Spent Fuel Handling Crane is designed to handle single fuel assemblies and therefore does not handle heavy loads.

2.1.3 "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:

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

The attached General Arrangement Drawing numbers; 12-5161, 12-5162, 12-5163, 12-5164, 12-5165, 12-5166, 12-5167, 12-5168, 12-5169, and 12-5170 have been color coded to identify load handling areas, and equipment required for safe reactor shutdown and decay heat removal. Equipment required for safe reactor shutdown, as defined in FSAR Appendix O, and decay heat removal is shown in red. The load handling areas are shown in yellow. The hatched yellow areas indicate the projected load handling area below separating floors or ceilings; spent fuel is stored in the spent fuel pit after discharging from the Reactor Vessel through the Fuel Transfer System.

Safe load paths are being developed for the heavy loads indicated on Tables 2.1.3.C.1 and 2.1.3.C.2, found in the response to item 2.1.3c below, and will be incorporated into the appropriate procedure as soon as possible. These component specific safe load paths remain within the indicated load handling areas and are based on the general concept of handling heavy loads as close to the operating floor as is feasible, in order to minimize the potential load drop impact energy, and with the maximum possible horizontal separation from spent fuel. Many of the tabulated heavy loads handled in the Reactor Containment Building must pass over the Reactor Vessel. In these cases, the safe load path is established by considering the minimum time spent over the reactor vessel, the minimum height required for obstacle clearance, and the minimum number of crane operations which require load direction changes. All safe load paths for the heavy loads identified remain within the load handling areas indicated on the attached General Arrangement Drawings.

This approach of utilizing individual component safe load paths contained within the component's specific handling or maintenance procedure was developed in lieu of providing fixed load paths on facility structures such as markings on floors, walls and crane rails or supports. The limited space available for handling loads in an ice condenser containment, the tight configuration of the Auxiliary Building and the lack of prominent structural members over which to handle heavy loads, would require the application of many multi-color safe load paths that overlap and would most likely lead to crane operator confusion.

Markings on crane rail support structures and/or walls would require the crane operator to divert his/her attention from the load and obstacles near its load path for observation of such markings, since crane operation is radio or pendant controlled from the operating floor.

Therefore, we have concluded that the safe load paths contained within specific handling procedures is the correct method to pursue.

b. "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."

The maintenance supervisor or leadman directs the crane operator and is responsible for ensuring that heavy load handling remains within the established safe load paths. Anyone observing load handling operations which depart from the safe load path can signal for the crane operator to stop all crane motion. When circumstances require deviations from established safe load handling paths an alternate safe load path will be formulated and incorporated into the handling procedure by temporary sheets as provided for in Plant Manager's Instruction PMI-2010.

Miscellaneous loads within the Reactor Containment Building will normally be handled only when the missile shields are in place over the Reactor Vessel and will follow the general safe load path practice stated in response to 2.1.3a above. Should the need arise to handle a heavy load when a specific procedure is not available and the missile shields are not in place, a safe load path will be prepared and incorporated into a special procedure. In the Auxiliary Building, miscellaneous loads will be handled as prescribed for in procedure 12 MHP 5021.001.036 "Control of Heavy loads in Auxiliary Building". For inclusion of heavy load paths into specific procedures, see our response to Item 2.1.3.a.

c. "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)."

Attached Tables 2.1.3.C.1 and 2.1.3.C.2 indicate the heavy loads handled in the Auxiliary Building and Containment Building respectively. These tables identify the loads handled, the load weights, lifting devices utilized, the appropriate handling procedure and the crane used for the lift. Table 2.1.3.C.3 is a partial index of plant procedures which are used to control the handling of heavy loads.

A review of the procedures listed in tables 2.1.3.C.1 and 2.1.3.C.2 indicates partial compliance with the recommendations of NUREG 0612, Section 5.1.1 (2). As the component specific safe load paths are being incorporated into these procedures, additional updating will be performed to assure the adequate inclusion of: required equipment identification, prerequisite inspection and acceptance criteria, step by step sequences, and special precautions.

The D. C. Cook Plant does not currently ship spent fuel and therefore does not have a specific spent fuel cask handling procedure. Prior to spent fuel cask handling a procedure will be prepared which will be both consistent with FSAR commitments and responsive to the intent of NUREG-0612.

d. "Verification that lifting devices identified in 2.1. 3-c, 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."

Arrangements are currently in progress to provide for verification of lifting devices identified in Tables 2.1.3.C.1 and 2.1.3.C.2. Design criteria for the reactor vessel head and internals lifting rigs have been requested from Westinghouse Electric Corporation. The remaining lifting devices indicated on Tables 2.1.3.C.1 and 2.1.3.C.2 are being evaluated as to compliance with ANSI N 14.6-1978 or ANSI B30.9-1971. This response to 2.1.3d supersedes our response given in AEP:NRC:0514 which incorrectly referenced ANSI N14.6-1978.

e. "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 proposed alternatives."

Cranes and hoists at the D. C. Cook Plant are classified into the following two groups:

Regular Service, which corresponds to "Normal Service" stated in ANSI B30.2, include:

Auxiliary Building Crane
Turbine Building Main crane
Two Turbine Building Auxiliary cranes

Standby Service or storage, corresponding to "special or infrequent service" as stated in ANSI B30.2 include:

Two Polar Cranes
Two Manipulator Cranes
New and Spent Fuel Handling Crane
Circulating Water Pump and Screen House Crane.

Crane inspection, testing and maintenance at the D. C. Cook Plant is primarily controlled by Maintenance Head Instruction - MHI 5030 and

attachments thereto, the AEP safety manual, maintenance procedures, preoperational test procedures, quality control inspection procedures and the crane manufacturer's parts list, operation and maintenance instructions. These documents were reviewed against the item by item criteria set forth in chapter 2-2 of ANSI B30.2.0-1976. The results of this review are presented on Tables 2.1.3.E-1 through-4, and are structured to the format of the ANSI standard.

Crane inspection and testing direction is in close agreement with the ANSI B30.2 criteria with the single exception indicated on Table 2.1.3.E-1. As can be seen on Tables 2.1.3.E-3, and -4, prescribed crane maintenance is not in conflict with the ANSI B30.2 criteria; however, there are several B30.2 maintenance items which have not been specifically addressed as indicated on Table 2.1.3.E-4.

f. "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."

The Auxiliary Building Crane and the two Polar Cranes were designed and manufactured in 1969-1970 by the Whiting Corporation according to the guidelines of E.O.C.I Specification 61 and ANSI B30.2-1967. These two standards were the predecessors of CMAA Specification 70 and ANSI B30.2-1976, respectively. In order to determine compliance, studies were made comparing the specifications item by item, under which the cranes were designed and manufactured, against the more recent versions of the specifications. The cranes were then analyzed in those areas where a change in the specifications occurred.

The study comparing the ANSI standard and the resulting analysis of the cranes in the areas of difference, indicated that the cranes were in compliance. The study comparing CMAA Specification 70 with E.O.C.I. Specification 61 was performed by the Whiting Corp. and indicated several areas where detailed calculations were required to verify compliance. These calculations showed that there were eight areas in which the cranes did not meet CMAA Specification 70 - Revision 75 design standards. These eight areas are discussed below:

<u>150/20 Ton Auxiliary Building Crane</u>

1. The drum pinion strength of the main hoist extra reduction gearing is exceeded by 8% and the gear durability is exceeded by 45%.

   Disposition - Load lifting will be limited to 75 Tons Maximum until this item is resolved.

2. The main block bronze sheave bushing is overstressed by 28%.

Disposition - Whiting states that the 1,000 psi working pressure stated in CMAA #70 - Rev. 75, is not related to any specific type of bearing material supplied. The existing bushings in the block sheaves are #79 bronzoid, which has an ultimate compressive stress rating of 10,000 psi, and, Whiting further states, at a safety factor of 5 as specified by CMAA #70, the bushing should be adequate for working loads up to compressive stresses of 2,000 psi. Therefore, the bushing is satisfactory.

3. The auxiliary hoist sheave material is Class 35 cast iron with an ultimate tensile strength of 35,000 psi, instead of the Class 40 cast iron with an ultimate tensile strength of 40,000 psi as specified in CMAA-70.

   Disposition - Whiting states that sheaves are generally stressed in compression between their rope contact area and hub. Tensile stresses are usually of minor consequence at bearing hubs and at rope entry points in their flanges. We concur that the sheave material is satisfactory.

4. The horsepower and torque rating of the auxiliary hoist motor is exceeded by 1.5% when handling a rated load of 20 tons.

   Disposition - The horsepower and torque rating of the auxiliary hoist motor is exceeded because the weight of the load block was added to the 20 - ton capacity of the hoist. The gears, bearings, and brake are all adequate for the additional load. Therefore, no modification is necessary since at worst the motor would stall when attempting to lift a full-capacity load.

5. The longitudinal stiffeners are not located properly and do not meet moment of inertia requirements.

   Disposition - A design change will be initiated to add longitudinal stiffeners to the outside face of each main girder web plate.

6. In the event of an axle failure, the bridge end truck may drop 1 7/8", instead of the allowed 1".

   Disposition- A design change will be initiated to weld bars to the truck plates across the runway rail head near each bridge wheel.

<u>250/35 Ton Containment Polar Cranes</u>

7. The auxiliary hoist sheave material is Class 35 cast iron with an ultimate tensile strength of 35,000 psi, instead of the class 40 cast iron with an ultimate tensile strenght of 40,000 psi as specified in CMAA-70.

Disposition - Same as Item 3 above; no modification is necessary.

8. The girder longitudinal stiffener is not located properly.

Disposition - According to the evaluation by Whiting, the location of the longitudinal stiffeners was determined by the weld length required to transfer bridge rail loadings through the intermediate short depth stiffeners to both webs of each girder, as well as the overall depth required in these short depth stiffeners to transfer the rail load moment across the span between girder webs. Whiting believes that the longitudinal stiffener location specified in CMAA-70 has been established based on the extreme case where only full depth internal stiffeners may be used and that it neglects the reduction in effective unsupported web panel lengths provided by the short depth internal stiffeners. We concur with Whiting's conclusion that the probability of web buckling in this critical web compression area is reduced to an extent equal to or exceeding the reinforcement required by the present specification. Therefore, girder stiffener modification is not needed.

The above review indicates that the containment polar cranes are entirely adequate. Two modifications will be made for the auxiliary building crane - installation of additional longitudinal stiffeners and the installation of bars to reduce end truck drop.

Table 2.1.3.F.1 has been included to help identify where concerns expressed in the December 17, 1981 telephone conference among NRC, Franklin Research Center and AEP have been addressed. The two (2) "No" entries in the compliance column for the Auxiliary Building crane have been addressed in the preceding item descriptions.

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

A review of crane operator skill Training lessons, QC inspection procedures and the safety manual utilized at the D. C. Cook Nuclear Plant for operator training, qualification and conduct, was made against the provisions of chapter 2-3 of ANSI B30.2. The verification tables 2.1.3.G-1,2,3, & 4 indicate the comparison of ANSI B30.2 - 1976 with D. C. Cook Plant procedures and programs. In some instances ANSI standard items are not specifically addressed but no stated exceptions are taken. A Maintenance Head Instruction (MHI) will be prepared to address this ANSI Standard on Operator Training.

TABLE 2.1.3.C.1

SURVEY OF HEAVY LOADS*

AEP:NCR:0514C

Area	Crane (A = Aux. Bldg. Crane; FHC = New & Spent Fuel Handling Crane)		Loads Handled	Over (O) or only Proximity (P) to Spent Fuel	Approximate Weight	Frequency Handled	Lifting Device	Handling Procedure
Auxiliary Building	A	1.	Spent Fuel Shipping Cask	(P)	110 Tons	(Future)	(Future)	(Future)
	A	2.	Radiation Protection Shields	(P)	55 Tons	As required during refueling outages	Slings	12 MHP 5021.001.036
	A	3.	Irradiated Specimen Shipping Cask	(P)	1-2 Tons	8 times in 20 yrs.(2 Units)	Slings	12 MHP-SP-006
	A	4.	Plant Equipment (e.g. pumps, motors, valves, heat exchangers)	(P)	Max 4 Tons	As required for modification or replacement	Slings	12 MHP 5021.001.036
	A	5.	New Fuel Shipping Containers with Assembly	(P)	1-1/2 Tons	50/year	Slings	12 MHP 4050 FDF .001 12 MHP 4050 FDF .002
	FHC	6.	Spent Fuel Assembly	(O)	1850#/1890#**	100-150 per refueling	Handling Tool	12 MHP 4050 FDF .008
	A	7.	Crane Load Block	(P)	4.25 T	Integral to Crane	Crane Ropes	12 MHP 4050 FDF .011
	A & FHC	8.	New Fuel Assembly	(P)	1850#/1890#**	100-150 per refueling	Handling Tool	12 MHP 4050 FDF .008
	A	9	Superstructure New & Spent Fuel Handling Crane	(P)	25 Tons	Approx. every 18 months.	Slings	Instruction Book #105571 Dwight Foote, Inc.
	A	10.	Equipment Hatch	(P)	45 Tons	As required during refueling	Slings	12 MHP 5021.001.032
	A	11.	Reactor Coolant Pump Rotating Assembly	(P)	28 Tons	As required during maintenance	Slings	12 MHP 5021.001.036
	A	12.	Reactor Coolant Pump Motor	(P)	38 Tons	As required during maintenance	Slings	12 MHP 5021.001.036
	A	13.	LSA Waste Boxes	(P)	2 Tons	52/year	Slings	12 MHP 5021.001.036
	A	14.	Waste Container Metal Bin	(P)	2 Tons	52/year	Slings	12 MHP 5021.001.036
	A	15.	Glycol Tank	(P)	5 Tons	12/year	Slings	12 MHP 5021.001.036
	A	16.	Reactor Stud Rack (12 Studs/rack)	(P)	4-5 Tons	4/year	Slings	12 MHP 5021.001.036

* Heavy Loads are defined 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."

** Unit No. 1 1850#, Unit No. 2 1890#

TABLE 2.1.3.C.2

SURVEY OF HEAVY LOADS*

AEP:NRC:0514C

Area	Crane (P = Polar, M = Manipulator)	Loads Handled	Over (O) or only Proximity (P) to Spent Fuel	Approximate Weight	Frequency Handled	Lifting Device	Handling Procedure
Containment Building	P	1. Reactor Vessel Head	(P)	148.5 Tons	2 times (per refueling)	Head Lifting Rig W Spin FHSTIR	12 MHP 5021.001.002
	P	2. Upper Internals	(O)	58 Tons	2 times (per refueling)	Internals Lifting Rig W Spin FHSTIR	MHP 5021.001.003A
	P	3. Lower Internals	(1)	80 Tons	Once every 10 years	Internals Lifting Rig W Spin FHSTIR	MHP 5021.001.003B
	M/P	4. In-Service Inspection Tool	(O)	1.5 Tons	Used at least once every 3 yrs.		12 QHP 5070 ISI .007
	P	5. Missile Shields	(P)		2 times (per refueling)	Missile Shield Lifting Rig	12 MHP 4050 FDF .026
		a Beams 1 & 4		39 Tons			
		b Beams 2 & 3		87 Tons			
	P	6. Cavity Bulkhead Sections	(P)		2 times (per refueling)	Lifting Beams MK-31864 LB1 and LB 2	12 MHP 4050 FDF .026
		a BH 1 & 2		28 Tons			
		b BH 3		30 Tons			
	P	7. Crane Load Block	(P)	6.25 Tons	Integral to Polar Crane	Crane Ropes	12 MHP 4050 FDF .025
	P	8. In-Containment Equipment (Including reactor coolant pump internal assembly & motor)	(P)	38 Tons	Administrative control of all equipment brought into containment during refueling outage	Slings	MHP 5021.002.002
	M	9. New and Spent Fuel Assembly	(O)	1850#/1890#**	260 times/Refueling	Integral to M	12 MHP 4050 FDF .015

(1) All fuel is removed from containment when lower internals are handled.

* Heavy loads are defined 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."

** Unit No. 1 - 1850#, Unit No. 2 1890#

Table 2.1.3.C.3
Load handling Procedure Index

Identification Number	Title	Revision No. and Date
12 MHP 5021.002.001	Maintenance Repair Procedure for Reactor Coolant Pump	Revision 2 6-17-78
MHP 5021.002.002	Maintenance Repair Procedure for Reactor Coolant Pump Motor	Revision 1 4-29-75
12 MHP 5021.001.036	Control of Heavy Loads in Auxiliary Building	Revision #1 11/24/81
12 MHP 5021.001.032	Containment Airlock and Equipment Hatch Removal and Replacement.	Revision 0 5-17-79
MHP 5021.001.002	Reactor Vessel Head Removal and Replace ment.	Revision 0 10-16-74
MHP 5021.001.003A	Reactor Vessel Upper Internals Removal and Replacement	Revision 0 9-12-74
MHP 5021.001.003B	Reactor Vessel Lower Internals Removals and Replacement	Revision 0 9-12-74
12 MHP 4050 FDF.025	Containment Building Polar Crane Operating Instructions	Revision #1 10-20-81
12 MHP 4050 FDF.026	Removal and Reinstalla- tion of Reactor Vessel Missile Blocks and Vertical Wall Sections	Revision 1 12-8-81
12 MHP 4030 STP.015	Auxiliary Building Crane Interlock Verification- Fuel Handling	Revision 1 11-21-78
12 MHP 4050 FDF.041	Inspection of Irradiated Fuel Assemblies (Using the Auxiliary Building Crane)	Revision #0 4-19-79

TABLE 2.1.3.C.3-1

12 MHP 4050 FDF.042	Load Monitoring Device Verification Instructions	Revision #0 10-16-80
12 MHP 4050 FDF.011	Auxiliary Building Crane Operating Instructions	Revision 1 11-21-78
12 MHP-SP-006	Shipment of Reactor Vessel Materials Surveillance Capsule Using SWRI Cask and Equipment	Revision 0 1-24-80

Table 2.1.3.E - 1
Verification of ANSI B30.2 - 1976 Application

B30.2.0 Section	D. C. Cook confirmed Application	Comments
2-2.1 - Inspection		
2-2.1.1 - Inspection Classification		
A.	YES -	Not firmly stated.
B. 1	YES -	
2	YES	
2-2.1.2 - Frequent Inspection		
A. 1	YES	
2	Partial -	Limit switches tested prior to load movement.
3		Not specifically addressed.
4	YES	
5		Not normally used at D. C. Cook Plant.
6	YES	
7	YES	
8	YES	See exceptions below
9		Not specifically addressed.
2-2.1.3 - Periodic Inspection		
A-E and G-I	YES	
F	Partial	Load monitoring devices only
2-2.1.4 - cranes not in regular use	YES	

TABLE 2.1.3.E-1-2

B30.2.0 Section	D. C. Cook confirmed Application	Comments
2-2.1.5 - Inspection Records	YES	Report compiled for each PM Inspection.

Exceptions

1. Attachment No. 18 to MHI 5030 allows 4 broken strands per lay prior to sling replacement while ANSI B30.9-1971 allows only 3. Inspection for heat damage is not specifically addressed.

Table 2.1.3.E-2
Verification of ANSI B30.2.0-1976 Application

B30.2.0 Section	D. C. Cook confirmed Application	Comments
2-2.2 - Testing		
2-2.2.1 - Operational Tests		
1	YES	
2	YES	
3	YES	
4	YES	Includes all 5 speeds.
2-2.2.2 - Rated Load Test		
A	YES	Polar cranes Tested in excess of 125% rated load for special Lifts of Reactor Vessel and steam generator.
B 1	YES	
2	YES	
3	YES	
4	YES	

TABLE 2.1.3.E-2-2

B30.2.0 Section		D. C. Cook confirmed Application	Comments
	C 1		Not Specifically addressed
	2		Not Specifically addressed
	3		Not Specifically addressed
	4		Not Specifically addressed
	5		Not Specifically addressed
	D		Not Specifically addressed
2-2.3.4	Lubrication		Manufacturers Parts List, operating and maintenance Instruction
	A	YES	
	B		Not Specifically addressed

Table 2.1.3.E - 3
Verification of ANSI B30.2.0 - 1976 Application

B30.2.0 Section		D. C. Cook Confirmed Application	Comments
2-2.3	Maintenance		
2-2.3.1	Preventive Maintenance		
	A	Partial	Crane maintenance conducted in accordance with manufacturers Parts List, operating and maintenance Instructions.
	B		Not specifically addressed.
2-2.3.2	Maintenance procedure		Not specifically addressed
2-2.3.3	Adjustments and Repairs		Manufacturers Parts List, Operating and Maintenance Instructions
	A		
	B 1	YES	
	2	YES	
	3	YES	
	4	YES	

Table 2.1.3.E - 4
Verification of ANSI B30.2.0 - 1976 Application

B30.2.0 Section		D. C. Cook Confirmed Application	Comments
2-2.4	Rope Inspection, Replacement and maintenance		
2-2.4.1	Inspection		
	A	YES	
	B		Not Specifically addressed
2-2.4.2	Rope Replacement		Not Specifically addressed
2-2.4.3	Rope Maintenance		Not Specifically addressed

TABLE 2.1.3.F.1 - Item "f".

AREA OF CONCERN	REFERENCE IN CMAA-70	REVIEWED BY WHITING CORP.	IS COMPLIANCE INDICATED? AUX. BUILDING	POLAR
1. Impact Allowances	3.3.2.1.1.3	YES	YES	YES
2. Calculations - Torsion	3.3.2.1.3	YES	YES	YES
3. Longitudinal Stiffeners	3.3.3.1.2	YES	NO	YES
4. Allowable Compressive Stress	3.3.3.1.3 3.3.3.3 3.4.3	YES	YES	YES
5. Fatigue	3.10 3.3.3.1.3	YES	YES	YES
6. Hoist Rope	4.2	YES	YES	YES
7. Drum Design	4.4.1 4.4.3.1	YES	YES	YES
8. Drum Design- Groove Pitch	4.4.3.2	YES	YES	YES
9. Gear Design	4.5	YES	NO	YES
10. Bridge Brake Design	4.7.2	YES	YES	YES
11. Hoist Brake Design	4.7.4	YES	YES	YES
12. Bumper Stops	4.12	YES	YES	YES
13. Rules for Static Control System	5.4.6	YES	Not Applicable	Not Applicable
14. Restart Position	5.6.2	YES	YES	YES

Table 2.1.3 G - 1
Verification of ANSI B30.2.0 - 1976 Application

B30.2.0 Section		D. C. Cook confirmed Application	Comments
2-3.1	Qualifications for and conduct of operators		
2-3.1.1	Operators of cab-operated and Pulpit-operated	N.A.	Not used at D.C. Cook Plant.
2-3.1.2	Qualifications for operators of cab-operated and Pulpit-operated cranes cranes.	N.A.	Not use at D. C. Cook Plant.
2-3.1.3	Operators of Floor-operated cranes.		Not specifically addressed.
2-3.1.4	Qualifications for operators of Floor-operated cranes.	Partial	Not specific enough.
2-3.1.5	Operators of Remote-operated cranes.		Not specifically addressed.
2-3.1.6	Qualifications for operators of Remote-operated cranes		Not specifically addressed.

TABLE 2.1.3.G-1-2

B30.2.0 Section		D. C. Cook confirmed Application	Comments
2-3.1.7	Conduct of operators		
	A	YES	
	B	YES	
	C	YES	
	D	Partial	Not specific enough
	E	YES	
	F	YES	
	G	Partial	Not specific enough
	H	Partial	Not specific enough
	I	Partial	Not specific enough
	J	Partial	Not specific enough
	K		Not specifically addressed.
	L	NA	No outdoor cranes used.
	M	NA	No outdoor cranes used.
	N	Partial	Not specific enough
	O	Partial	Not specific enough
	P		Not specifically addressed.

Table 2.1.3. G - 2
Verification of ANSI B30.2.0 - 1976 Application

B30.2.0 Section		D. C. Cook confirmed Application	Comments
2-3.2	Handling the Load		
2-3.2.1	Load weight	YES	
2-3.2.1.1	Special Heavy Lifts	Partial	Needs updated prior to Lift.
	A		
	B		
	C		
	D		
	E		
	F	YES	
	G		Not specifically addressed.
	H	YES	
	I		
2-3.2.2	Attaching the Load	YES	
2-3.2.3	Moving the Load	YES	
2-3.2.4	Hoist Limit Device	YES	Prior to using crane.
	A		
	B		Not specifically addressed.

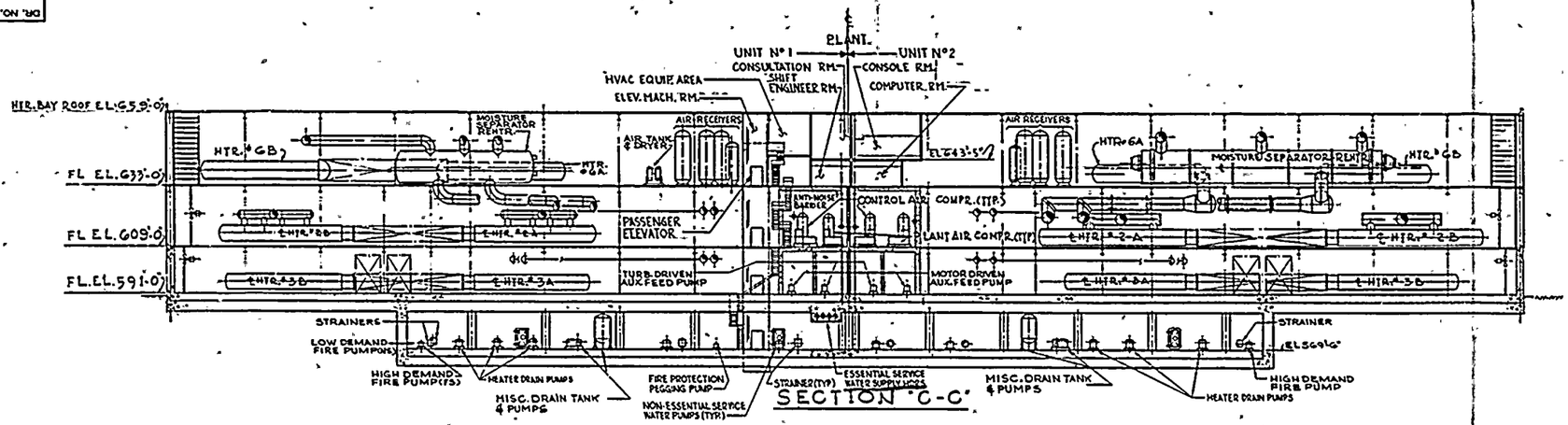
Table 2.1.3.G - 3
Verification of ANSI B30.2.0 - 1976 Application

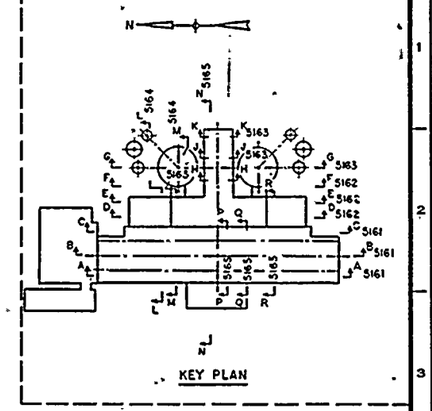
B30.2.0 Section		D. C. Cook confirmed Application	Comments
2-3.3	Signals		
2-3.3.1	Standard signals	YES	
2-3.3.2	Hand signals	YES	
	1 Multiple Trolley cranes	NA	Not used at D. C. Cook Plant.
	2	NA	
	A	NA	
	B	NA	
	C	NA	
	3	NA	

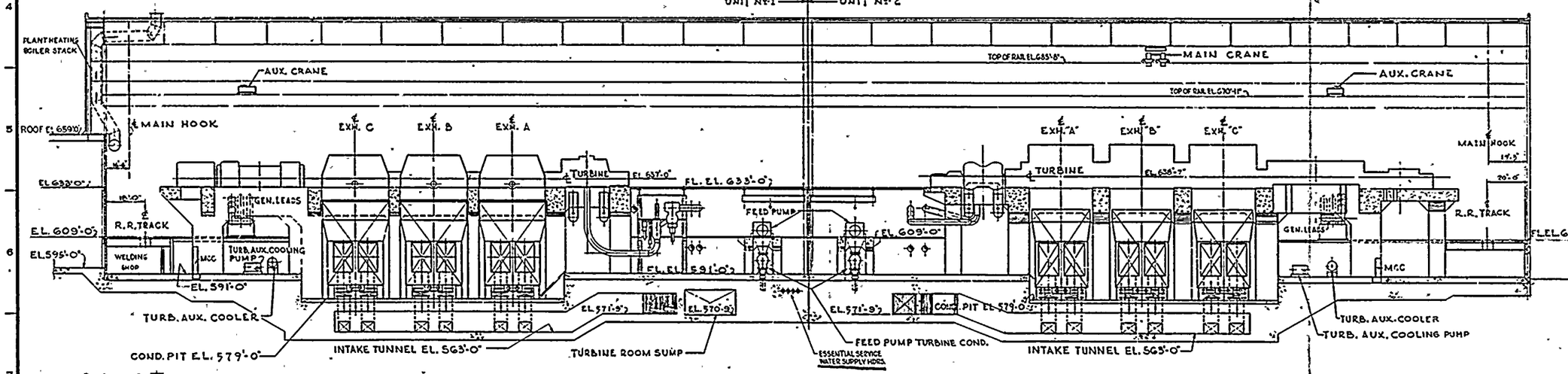
Table 2.1.3 G - 4
Verification of ANSI B30.2.0 - 1976 Application

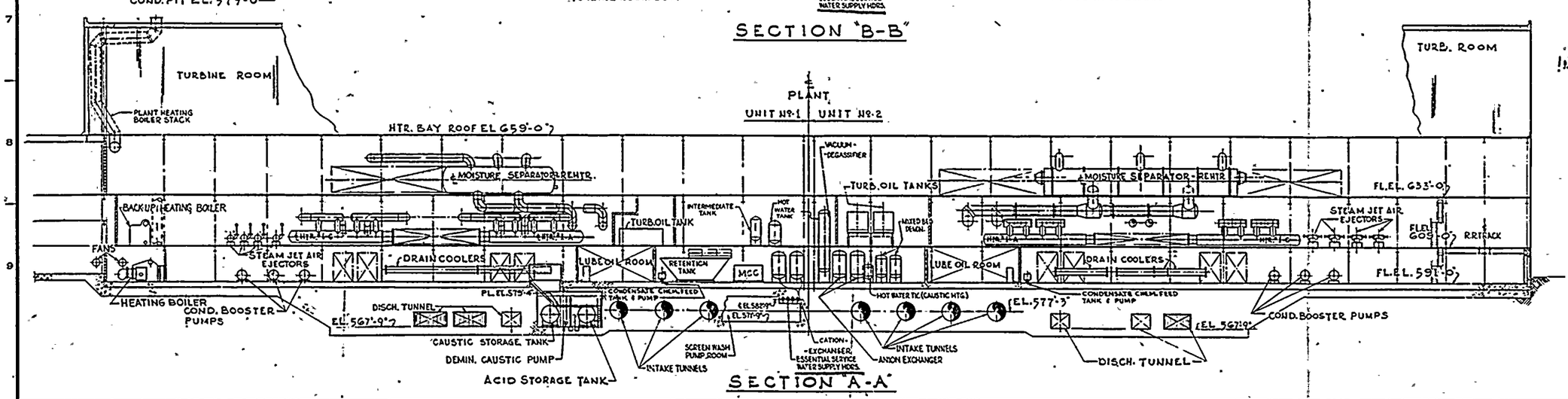
B30.2.0 Section		D. C. Cook confirmed Application	Comments
2-3.4	Miscellaneous		
2-3.4.1	Ladders		
	A	Partial	Not specific enough
	B		Not specifically addressed.
2-3.4.2	Cabs		
	A	NA	Not used at D. C. Cook Plant.
	B	NA	Not used at D. C. Cook Plant.
2-3.4.3	Fire Extinguishers	YES	

DR. NO.









MARK	NO.	DESCRIPTION	APPVD.
MF	3	GENERAL REVISION	
MF	2	GENERAL REVISION	
MF	1	GENERAL REVISION	

REVISIONS

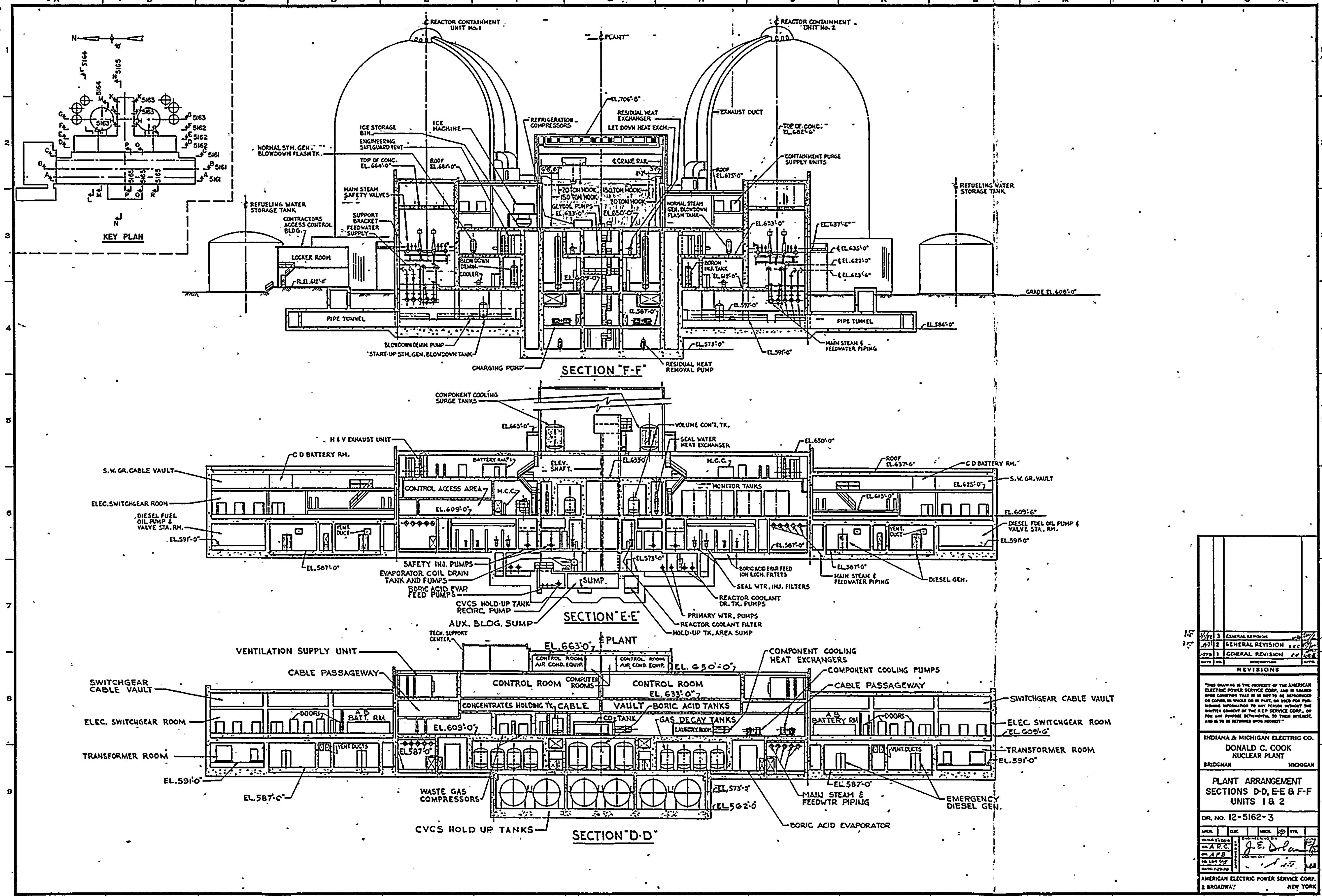
INDIANA & MICHIGAN ELECTRIC CO.
DONALD C. COOK NUCLEAR PLANT
BRIDGMAN MICHIGAN

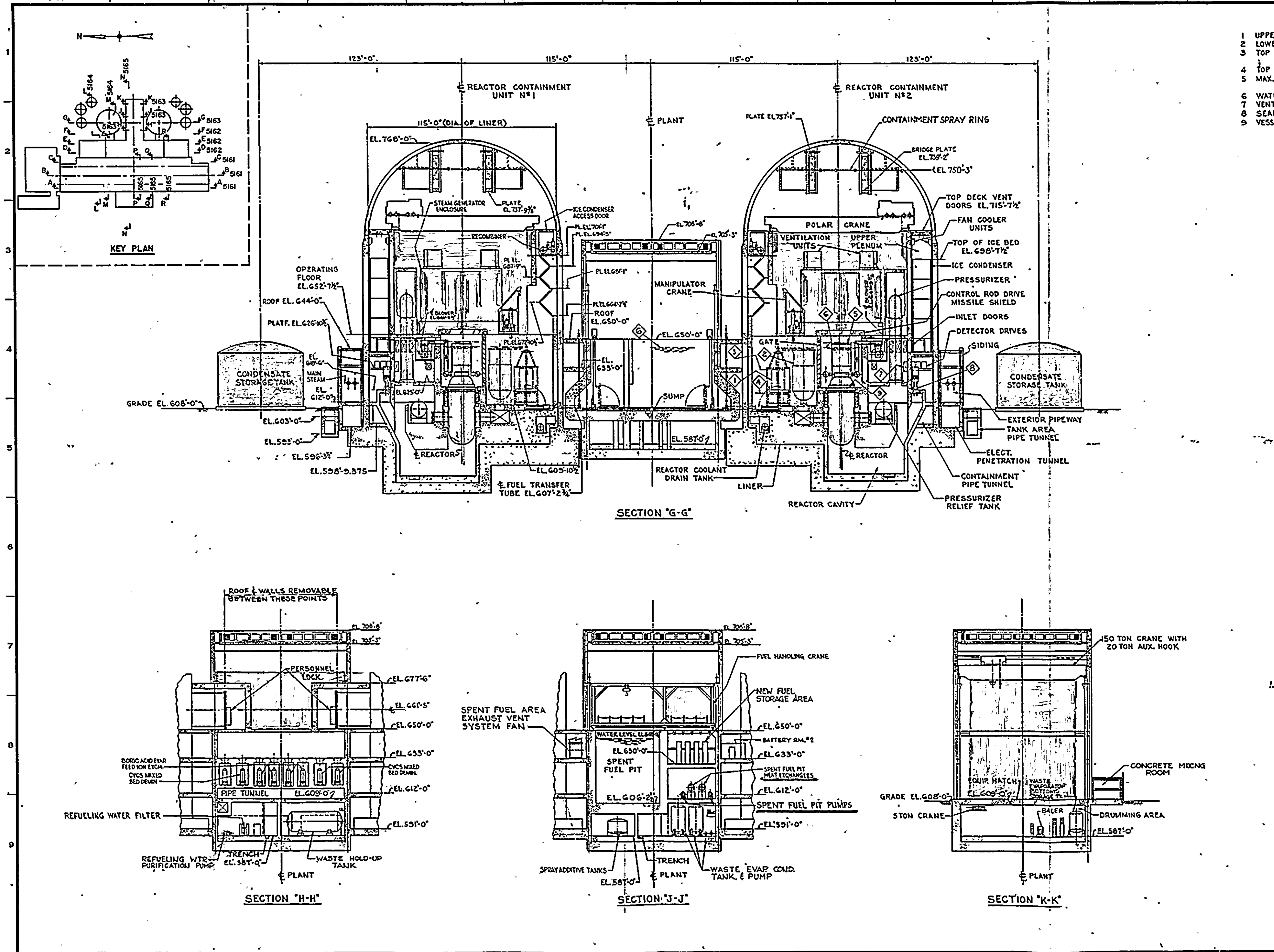
PLANT ARRANGEMENT SECTIONS A-A, B-B & C-C UNITS 1 & 2

DR. NO. 12-5161-3

ARCH.	ELEC.	MECH.	H&V	STR.
SCALE: 1/32-1				
DR. J.E.D.				
DES. A.F.B.				
SUPV.				
DATE: 2-29-70				

AMERICAN ELECTRIC POWER SERVICE CORP.
2 BROADWAY NEW YORK


KEY PLAN
SECTION "F-F"
REACTOR CONTAINMENT UNIT No. 1
REACTOR CONTAINMENT UNIT No. 2
PLANT
EL. 706'-8"
RESIDUAL HEAT EXCHANGER
LET DOWN HEAT EXCH.
REFRIGERATION COMPRESSORS
EXHAUST DUCT
TOP OF CONC. EL. 682'-6"
CONTAINMENT PURGE SUPPLY UNITS
ICE STORAGE BIN
ICE MACHINE
ENGINEERING SAFEGUARD VENT
NORMAL STM. GEN. BLOWDOWN FLASH TK.
TOP OF CONC. EL. 664'-0"
ROOF EL. 681'-0"
CRANE RAIL
MAIN STEAM SAFETY VALVES
SUPPORT BRACKET
FEEDWATER SUPPLY
REFUELING WATER STORAGE TANK
CONTRACTORS ACCESS CONTROL BLDG.
LOCKER ROOM
BLOWDOWN DEMIN. COOLER
20 TON HOOK
150 TON HOOK
GLYCOL PUMPS
EL. 650'-0"
EL. 633'-0"
EL. 609'-0"
EL. 587'-0"
EL. 573'-0"
EL. 591'-0"
EL. 586'-0"
ROOF EL. 615'-0"
NORMAL STEAM GEN. BLOWDOWN FLASH TANK
BORON INJ. TANK
PIPE TUNNEL
GRADE EL. 608'-0"
MAIN STEAM & FEEDWATER PIPING
BLOWDOWN DEMIN. PUMP
START-UP STM. GEN. BLOWDOWN TANK
CHARGING PUMP
RESIDUAL HEAT REMOVAL PUMP
SECTION "E-E"
COMPONENT COOLING SURGE TANKS
VOLUME CON'T. TK.
SEAL WATER HEAT EXCHANGER
H & V EXHAUST UNIT
C D BATTERY RM.
S.W. GR. CABLE VAULT
ELEC. SWITCHGEAR ROOM
DIESEL FUEL OIL PUMP & VALVE STA. RM.
ELEV. SHAFT
CONTROL ACCESS AREA
M.C.C.
MONITOR TANKS
ROOF EL. 637'-6"
S.W. GR. VAULT
EL. 625'-0"
EL. 613'-0"
EL. 609'-6"
SAFETY INJ. PUMPS
EVAPORATOR COIL DRAIN TANK AND PUMPS
BORIC ACID EVAP. FEED PUMPS
CVCS HOLD-UP TANK RECIRC. PUMP
AUX. BLDG. SUMP
SUMP
BORIC ACID EVAP. FEED ION EXCH. FILTERS
SEAL WTR. INJ. FILTERS
REACTOR COOLANT DR. TK. PUMPS
PRIMARY WTR. PUMPS
REACTOR COOLANT FILTER
HOLD-UP TK. AREA SUMP
DIESEL GEN.
SECTION "D-D"
TECH. SUPPORT CENTER
VENTILATION SUPPLY UNIT
CABLE PASSAGEWAY
EL. 663'-0"
EL. 650'-0"
CONTROL ROOM AIR COND. EQUIP.
CONTROL ROOM
COMPUTER ROOMS
EL. 633'-0"
COMPONENT COOLING HEAT EXCHANGERS
COMPONENT COOLING PUMPS
SWITCHGEAR CABLE VAULT
CONCENTRATES HOLDING TK.
CABLE VAULT
BORIC ACID TANKS
CO2 TANK
GAS DECAY TANKS
LAUNDRY ROOM
A B BATT. RM.
DOORS
VENT DUCTS
TRANSFORMER ROOM
EL. 575'-5"
EL. 562'-0"
WASTE GAS COMPRESSORS
CVCS HOLD UP TANKS
BORIC ACID EVAPORATOR
EMERGENCY DIESEL GEN.
REVISIONS
3 GENERAL REVISION
2 GENERAL REVISION
1 GENERAL REVISION
"THIS DRAWING IS THE PROPERTY OF THE AMERICAN ELECTRIC POWER SERVICE CORP. AND IS LOANED UPON CONDITION THAT IT IS NOT TO BE REPRODUCED OR COPIED, IN WHOLE OR IN PART, OR USED FOR FURNISHING INFORMATION TO ANY PERSON WITHOUT THE WRITTEN CONSENT OF THE A E P SERVICE CORP., OR FOR ANY PURPOSE DETRIMENTAL TO THEIR INTEREST, AND IS TO BE RETURNED UPON REQUEST."
INDIANA & MICHIGAN ELECTRIC CO.
DONALD C. COOK NUCLEAR PLANT
BRIDGMAN MICHIGAN
PLANT ARRANGEMENT SECTIONS D-D, E-E & F-F UNITS 1 & 2
DR. NO. 12-5162-3
AMERICAN ELECTRIC POWER SERVICE CORP.
2 BROADWAY NEW YORK



DATE	NO.	DESCRIPTION	APPD.
	2	GENERAL REVISION	
	1	GENERAL REVISION	

REVISIONS

"THIS DRAWING IS THE PROPERTY OF THE AMERICAN ELECTRIC POWER SERVICE CORP. AND IS LOANED UPON CONDITION THAT IT IS NOT TO BE REPRODUCED OR COPIED, IN WHOLE OR IN PART, OR USED FOR FURNISHING INFORMATION TO ANY PERSON WITHOUT THE WRITTEN CONSENT OF THE A.E.P. SERVICE CORP., OR FOR ANY PURPOSE DETRIMENTAL TO THEIR INTEREST, AND IS TO BE RETURNED UPON REQUEST."

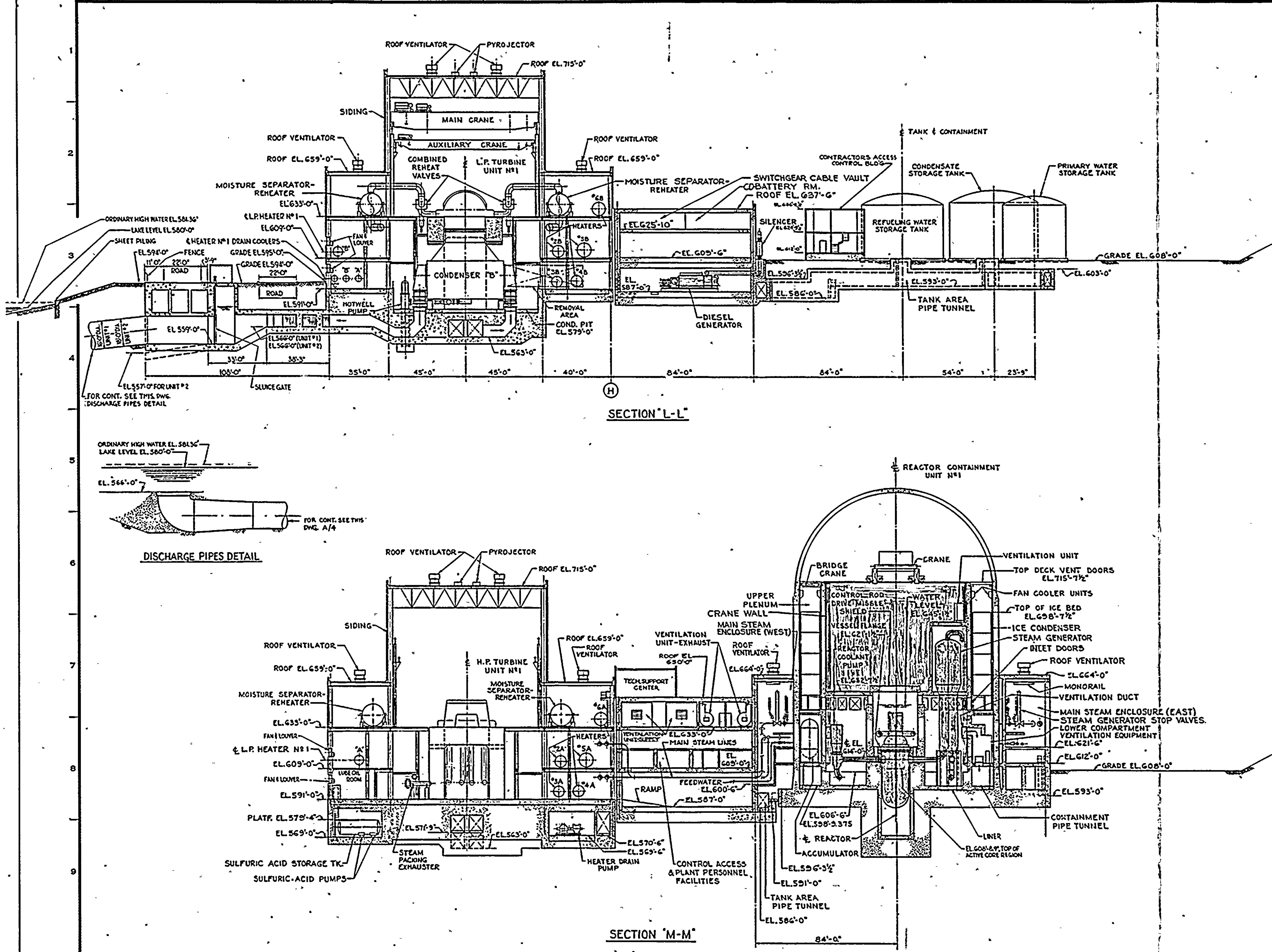
INDIANA & MICHIGAN ELECTRIC CO.
DONALD C. COOK NUCLEAR PLANT
BRIDGMAN MICHIGAN

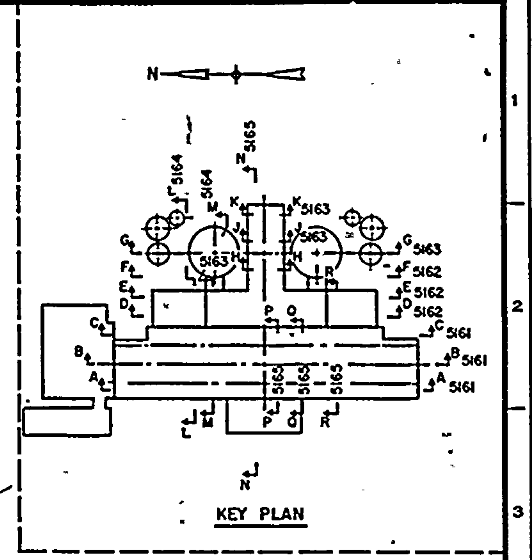
PLANT ARRANGEMENT SECTIONS "G-G", "H-H", "J-J" & "K-K" UNITS 1 & 2

DR. NO. 12-5163-2

J. E. Dolan

AMERICAN ELECTRIC POWER SERVICE CORP.
2 BROADWAY NEW YORK





DATE	NO.	DESCRIPTION	APPD.
3/82	2	GENERAL REVISION	
1277	1	GENERAL REVISION	

REVISIONS

INDIANA & MICHIGAN ELECTRIC CO.
DONALD C. COOK NUCLEAR PLANT
BRIDGMAN MICHIGAN

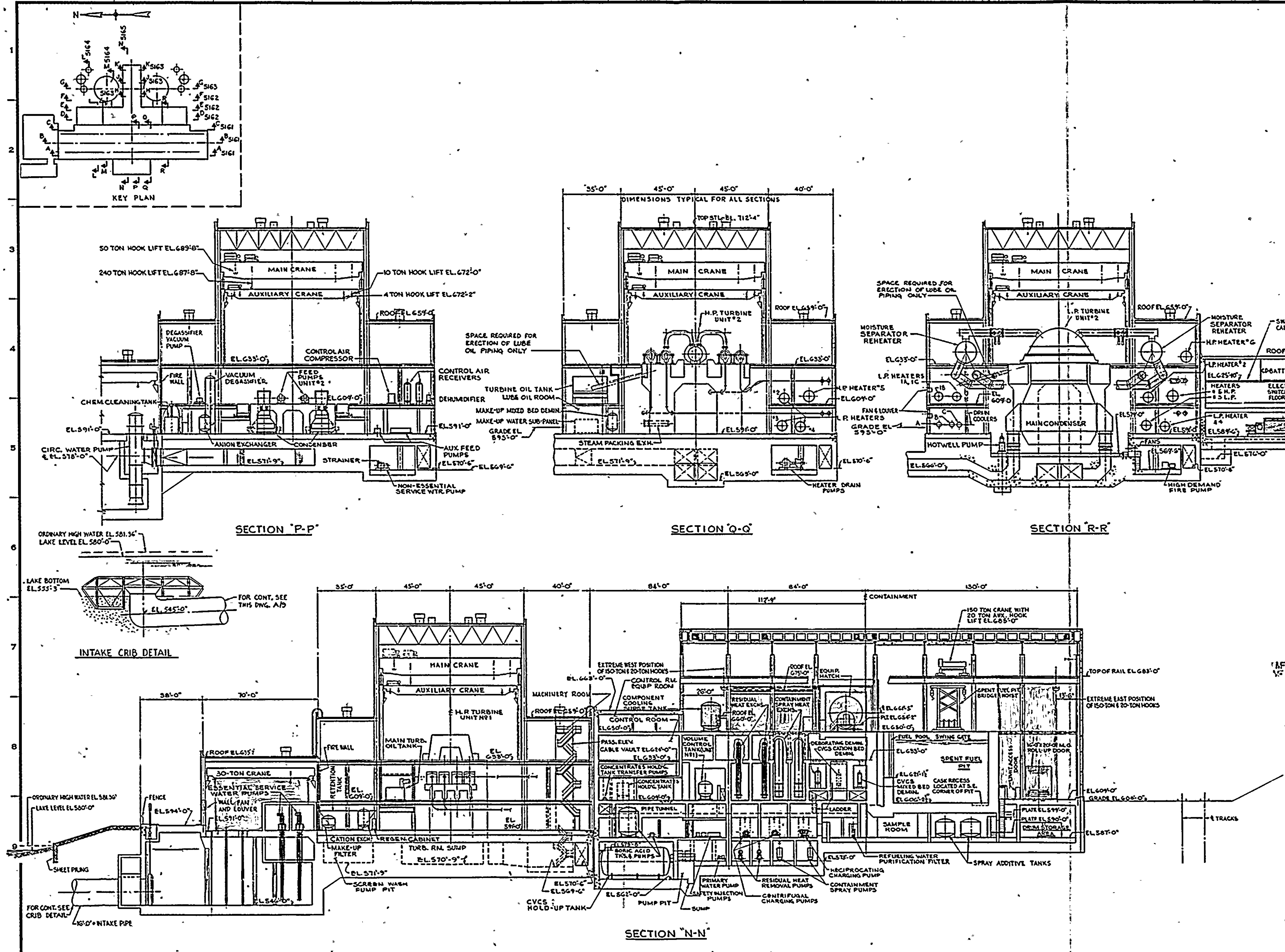
PLANT ARRANGEMENT SECTIONS L-L & M-M ·UNITS 1&2

DR. NO. 12-5164-2

DATE 1-29-70

J. E. Dolan

AMERICAN ELECTRIC POWER SERVICE CORP.
2 BROADWAY NEW YORK



Date	No.	Description	Appr.
	4	GENERAL REVISION	
	3	GENERAL REVISION	
	2	ADDED SPACE REQ'D FOR ERECTION OF LUBE OIL PIPING	
	1	GENERAL REVISION	

REVISIONS

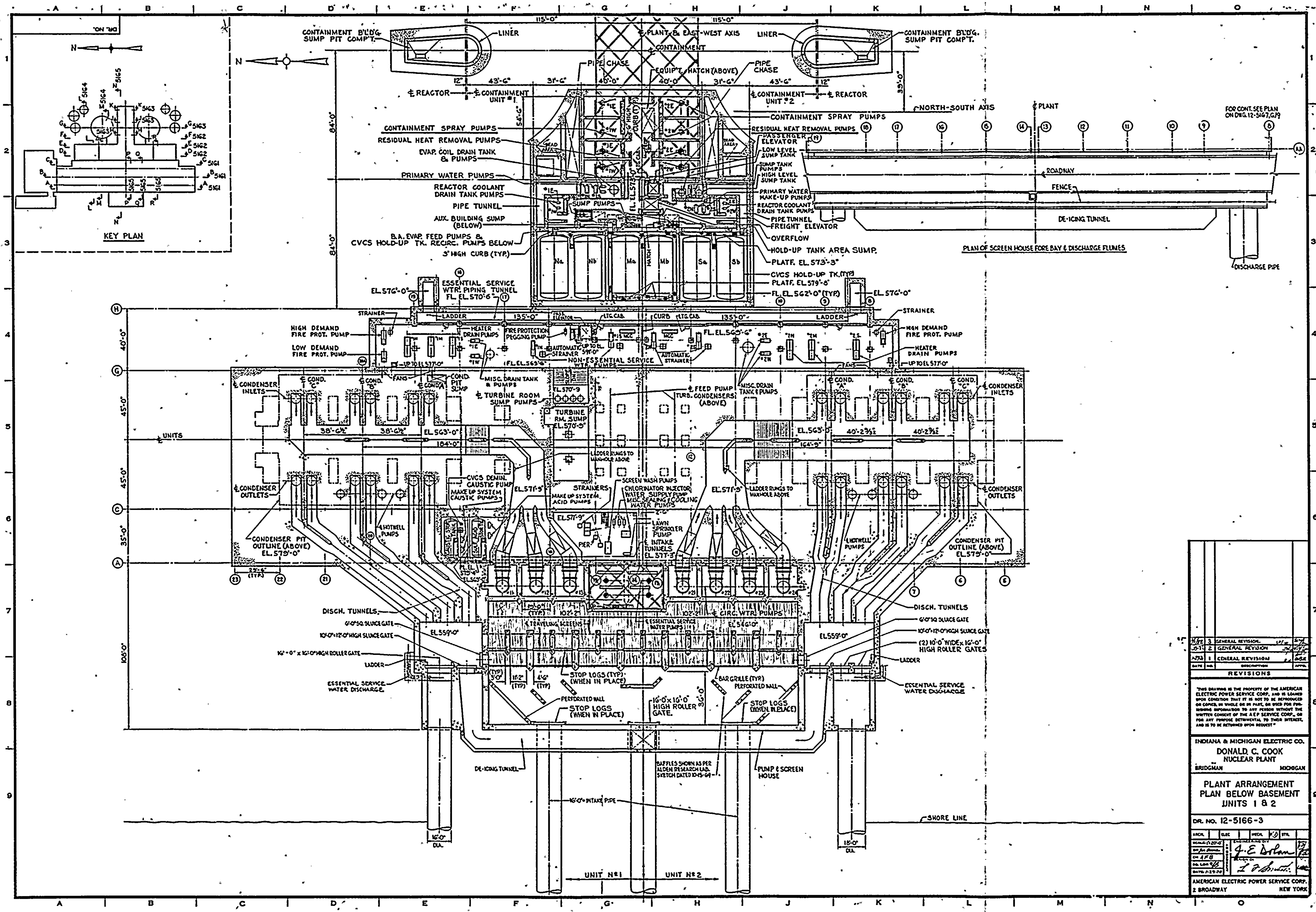
INDIANA & MICHIGAN ELECTRIC CO.
DONALD C. COOK NUCLEAR PLANT
BRIDGMAN MICHIGAN

PLANT ARRANGEMENT SECTIONS "N-N" "P-P" "Q-Q" & "R-R" UNITS 1 & 2

DR. NO. 12-5165-4

DATE: 1-29-70

AMERICAN ELECTRIC POWER SERVICE CORP.
2 BROADWAY NEW YORK


KEY PLAN
CONTAINMENT BLD'G. SUMP PIT COMPT.
LINER
PLANT & EAST-WEST AXIS
CONTAINMENT
PIPE CHASE
EQUIP'T. HATCH (ABOVE)
℄ REACTOR
℄ CONTAINMENT UNIT #1
℄ CONTAINMENT UNIT #2
NORTH-SOUTH AXIS
℄ PLANT
FOR CONT. SEE PLAN ON DWG. 12-5167, G/9
CONTAINMENT SPRAY PUMPS
RESIDUAL HEAT REMOVAL PUMPS
EVAP. COIL DRAIN TANK & PUMPS
PRIMARY WATER PUMPS
REACTOR COOLANT DRAIN TANK PUMPS
PIPE TUNNEL
AUX. BUILDING SUMP (BELOW)
B.A. EVAP. FEED PUMPS & CVCS HOLD-UP TK. RECIRC. PUMPS BELOW
3" HIGH CURB (TYP.)
PASSENGER ELEVATOR
LOW LEVEL SUMP TANK
SUMP TANK PUMPS
HIGH LEVEL SUMP TANK
PRIMARY WATER MAKE-UP PUMPS
REACTOR COOLANT DRAIN TANK PUMPS
FREIGHT ELEVATOR
OVERFLOW
HOLD-UP TANK AREA SUMP
PLATF. EL. 573'-3"
CVCS HOLD-UP TK. (TYP.)
PLATF. EL. 579'-8"
FL. EL. 562'-0" (TYP.)
ROADWAY
FENCE
DE-ICING TUNNEL
PLAN OF SCREEN HOUSE FORE BAY & DISCHARGE FLUMES
DISCHARGE PIPE
ESSENTIAL SERVICE WTR. PIPING TUNNEL FL. EL. 570'-6"
EL. 576'-0"
STRAINER
LADDER
HIGH DEMAND FIRE PROT. PUMP
LOW DEMAND FIRE PROT. PUMP
HEATER DRAIN PUMPS
FIRE PROTECTION PEGGING PUMP
AUTOMATIC STRAINER
NON-ESSENTIAL SERVICE WTR. PUMPS
FL. EL. 565'-6"
MISC. DRAIN TANK & PUMPS
TURBINE ROOM SUMP PUMPS
FEED PUMP TURB. CONDENSERS (ABOVE)
TURBINE RM. SUMP EL. 570'-9"
℄ CONDENSER INLETS
℄ COND. "A"
℄ COND. "B"
℄ COND. "C"
COND. PIT SUMP
℄ UNITS
EL. 563'-0"
LADDER RUNGS TO MANHOLE ABOVE
℄ CONDENSER OUTLETS
CVCS DEMIN. CAUSTIC PUMP
MAKE UP SYSTEM CAUSTIC PUMPS
MAKE UP SYSTEM ACID PUMPS
STRAINERS
SCREEN WASH PUMPS
CHLORINATOR INJECTOR WATER SUPPLY PUMP
MISC. SEALING & COOLING WATER PUMPS
EL. 571'-9"
LAWN SPRINKLER PUMP
INTAKE TUNNELS EL. 577'-3"
HOTWELL PUMPS
CONDENSER PIT OUTLINE (ABOVE) EL. 579'-0"
DISCH. TUNNELS
TRAVELING SCREENS
ESSENTIAL SERVICE WATER PUMPS
CIRC. WTR. PUMPS
EL. 559'-0"
6'-0" SQ. SLUICE GATE
10'-0" x 12'-0" HIGH SLUICE GATE
16'-0" x 16'-0" HIGH ROLLER GATE
(2) 10'-0" WIDE x 16'-0" HIGH ROLLER GATES
LADDER
ESSENTIAL SERVICE WATER DISCHARGE
STOP LOGS (TYP.) (WHEN IN PLACE)
BAR GRILLE (TYP.)
PERFORATED WALL
16'-0" x 16'-0" HIGH ROLLER GATE
DE-ICING TUNNEL
BAFFLES SHOWN AS PER ALDEN RESEARCH LAB. SKETCH DATED 10-15-69
PUMP & SCREEN HOUSE
16'-0" INTAKE PIPE
SHORE LINE
UNIT No 1
UNIT No 2
REVISIONS
3 GENERAL REVISION
2 GENERAL REVISION
1 GENERAL REVISION
"THIS DRAWING IS THE PROPERTY OF THE AMERICAN ELECTRIC POWER SERVICE CORP., AND IS LOANED UPON CONDITION THAT IT IS NOT TO BE REPRODUCED OR COPIED, IN WHOLE OR IN PART, OR USED FOR FURNISHING INFORMATION TO ANY PERSON WITHOUT THE WRITTEN CONSENT OF THE A E P SERVICE CORP., OR FOR ANY PURPOSE DETRIMENTAL TO THEIR INTEREST, AND IS TO BE RETURNED UPON REQUEST."
INDIANA & MICHIGAN ELECTRIC CO.
DONALD C. COOK NUCLEAR PLANT
BRIDGMAN MICHIGAN
PLANT ARRANGEMENT PLAN BELOW BASEMENT UNITS 1 & 2
DR. NO. 12-5166-3
AMERICAN ELECTRIC POWER SERVICE CORP.
2 BROADWAY NEW YORK

DR. NO.

KEY PLAN

69 AHR VALVES
90 EYEWASH & SHOWER
91 15GPM WASTE EVAPORATOR

1 SPENT RESIN STORAGE TANK
2 SPRAY ADDITIVE TANKS
3 WASTE HOLD-UP TANKS
4 WASTE EVAP. FEED PUMPS 1
5 WASTE EVAP. CONDENSATE TANKS
6 WASTE EVAP. CONDENSATE PUMPS
7 2 GPM WASTE EVAPORATOR
8 WASTE EVAP. FEED FILTERS
9 REFUELING WTR. PURIFICATION PUMP
10 BORIC ACID TANKS
11 BORIC ACID TRANSF. PUMP
12 REACTOR COOLANT FILTER
13 SEAL WATER FILTER
14 SAFETY INJECTION PUMPS
15 PRESSURIZER RELIEF TANK
16 REACTOR COOLANT DRAIN TANK
17 SEAL WATER INJECTION FILTERS
18 RECIRCULATION SUMP
19 EMERGENCY DIESEL GENERATOR
20 STARTING AIR COMPRESSOR
21 STARTING AIR RECEIVER
22 LAUNDRY & HOT SHOWER TANKS
23 LAUNDRY PUMP
24 CHEMICAL DRAIN PUMP
25 CHEMICAL DRAIN TANK
26 BORIC ACID EVAPORATOR
27 BORIC ACID FILTERS
28 GAS DECAY TANKS
29 MONITOR TANK PUMPS
30 CENTRIFUGAL CHARGING PUMPS
31 FUEL OIL DAY TANK
32 JACKET WATER CIRC. PUMPS
33 CONTROL PANEL
34 EQUIPMENT HATCH
35 ENGINE DRIVEN FIRE PUMP & STRAINER
36 ESSENTIAL SERVICE WATER PUMPS & STRAINERS
37 PLANT HTG. BLR. BURIED FUEL OIL STORAGE TANKS
38 FIRE WALL
39 FEED PUMP STRAINERS
40 TANK AREA PIPE TUNNEL
41 CONDENSATE PUMPS (PLANT HEATING BOILER)
42 CONDENSATE RECEIVER
43 FUEL OIL PUMPS
44 PLANT HEATING BOILER
45 H_2 SEAL OIL UNIT
46 STATOR COOLING UNIT
47 TURBINE AUX. COOLING PUMPS
48 TURBINE AUX. COOLER
49 CONDENSATE BOOSTER PUMP
50 DRAIN COOLERS
51 HOTWELL PUMPS
52 NO 4 L.P. HEATERS
53 NO 5 L.P. HEATER
54 BORIC ACID EVAP. FEED ION EXCH. FILTER
55 REFUELING WATER FILTER
56 STEAM PACKING EXHAUSTER
57 LOWER CONTAINMENT SUMP
58 EHC POWER UNIT
59 MOTOR DRIVEN AUX. FEED PUMP
60 TURB. DRIVEN AUX. FEED PUMP
61 FEEDPUMP TURBINE CONDENSER
62 RETENTION TANK
63 FILTER SUPPLY PUMPS
64 MAKE-UP WATER FILTERS
65 CHEMICAL CLEANING TANK
66 CHEMICAL CLEANING PUMP
67 CONTAINMENT PIPE TUNNEL SUMP
68 MAKE-UP WATER SUB-PANEL
69 MAKE-UP WATER MIXED BED DEMINS.
70 MAKE-UP WATER ANION EXCHANGERS
71 VACUUM DEGASSIFIER
72 DEGAS. WATER PUMPS
73 MAKE-UP WATER CATION EXCHANGERS
74 CONCENTRATES FILTERS
75 PASSENGER ELEVATOR
76 RECIPROCATING CHARGING PUMP
77 VALVE PIT
78 REGENERATION CABINET (MAKE UP WATER SYS)
79 HOT WATER TANK (CAUSTIC HEATING) (MAKE UP WATER SYS)
80 ELECT. PENETRATION AREA
81 PIPING PENETRATION AREA (VESTIBULE)
82 PASSENGER ELEVATOR
83 FREIGHT ELEVATOR
84 START-UP STEAM GEN. BLOWDOWN TANK
85 BLOWDOWN DEMIN. PUMP
86 LUBE OIL COOLER & JACKET WATER HEAT EXCH'GR.
87 PIPE CHASE
88 AIR-PARTICLE RADIO. GAS DETECTOR.

NOTE "A" AT E/6 & N/8"
BEFORE DOORS ARE INSTALLED, OPENING 14'-0" W. x 12'-0" H. TO BE LEFT IN THIS WALL TO PERMIT INSTALLATION OF STATOR COOLING UNIT.

NOTE "B" E/5 & J/5
15'-0" x 15'-0" OPENING TO REMAIN OPEN FOR CONSTRUCTION ACCESS.

NOTE "C" / /
10'-0" x 10'-0" OPENING TO REMAIN OPEN UNTIL EMERGENCY DIESEL GENERATORS AND STARTING AIR TANKS ARE INSTALLED.

MK	NO	DESCRIPTION	APPD
11-73	4	GENERAL REVISION	
1-8-73	3	GENERAL REVISION	
7-16-72	2	ADDED PHOSPHATE TANKS AND PUMPS REVISED [illegible]	
4-12-72	1	GENERAL REVISION	

REVISIONS

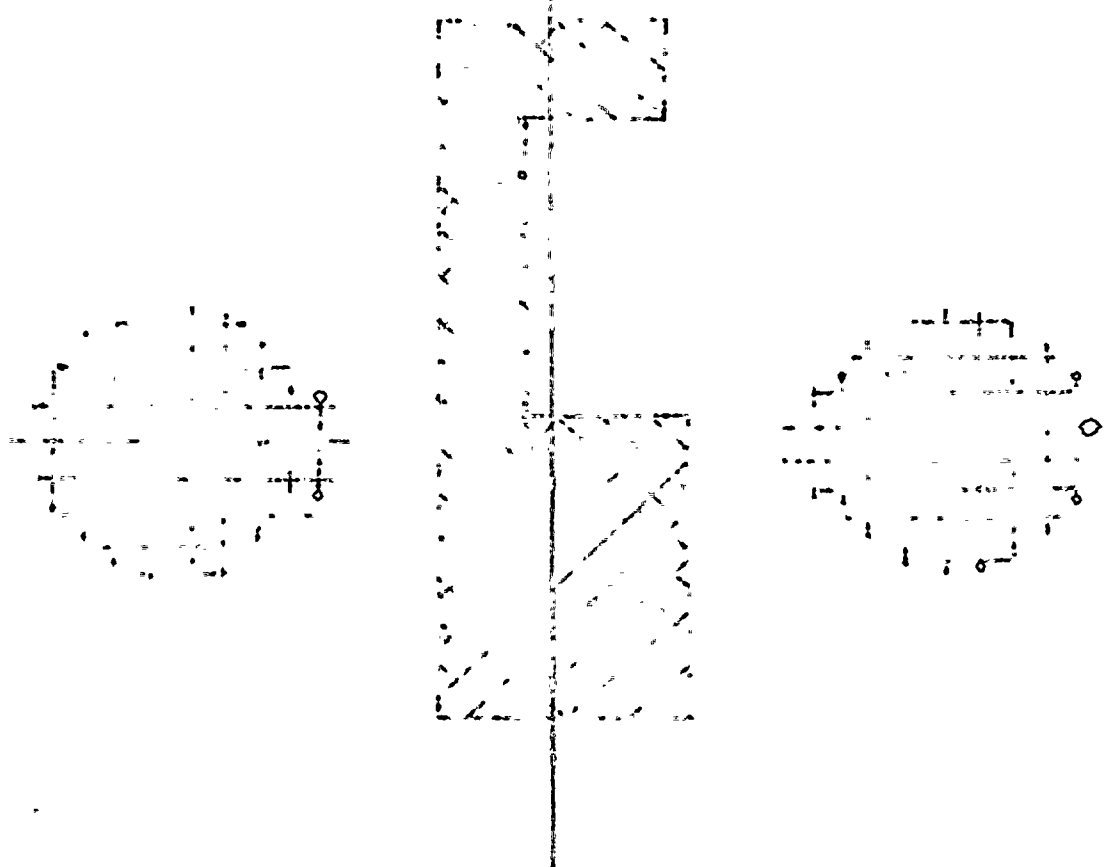
INDIANA & MICHIGAN ELECTRIC CO.
DONALD C. COOK NUCLEAR PLANT
BRIDGMAN MICHIGAN

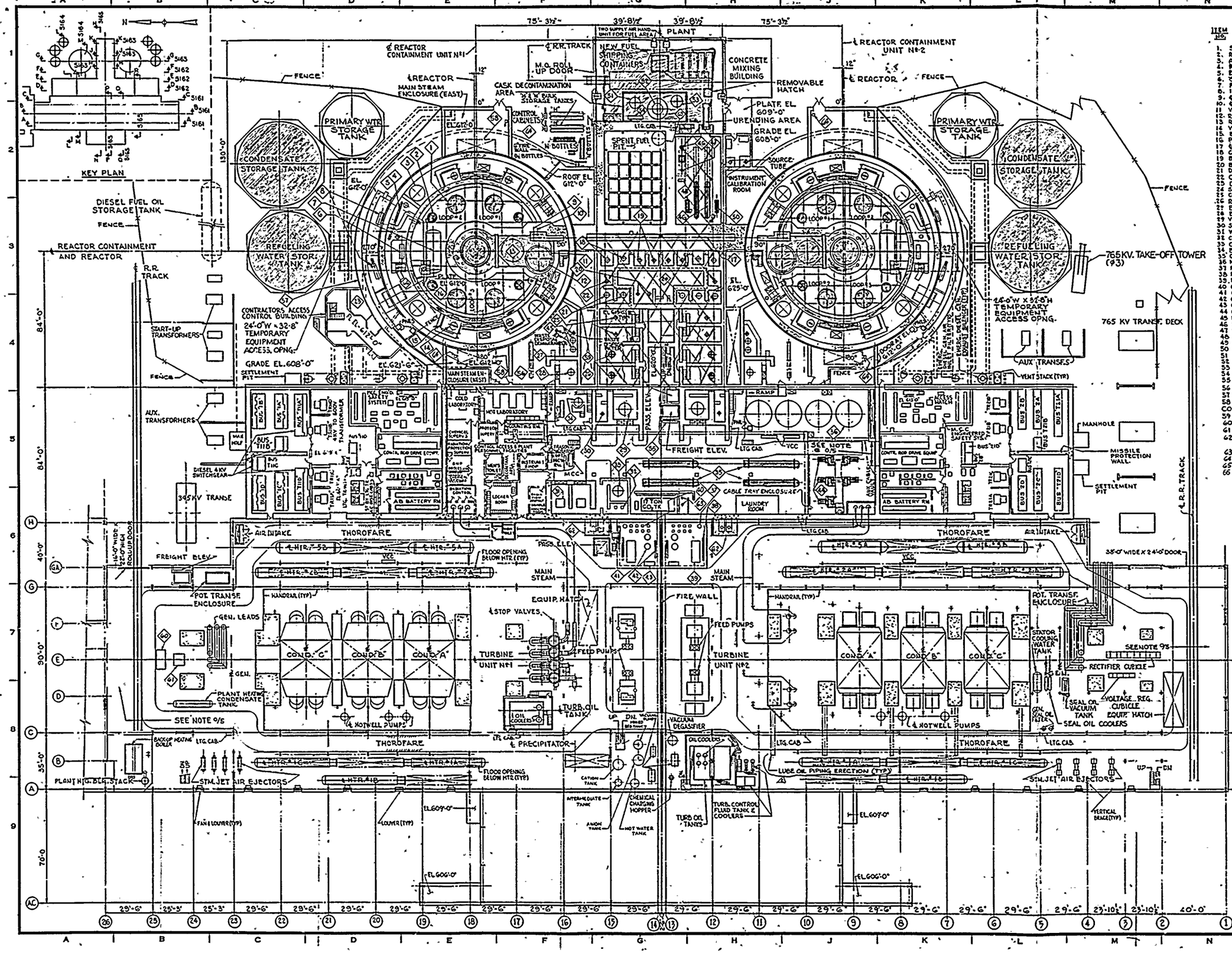
PLANT ARRANGEMENT BASEMENT PLAN EL. 591'-0" & 587'-0" UNITS 1 & 2

DR. NO. 12-5167-4

ARCH. | CLIC | MECH. | STR.
SCALE: 1"=20'
DR. L.B.
CH. A.F.B.
DES. SUPV.
DATE: 2-19-70

J.E. Dolan
AMERICAN ELECTRIC POWER SERVICE CORP.
2 BROADWAY NEW YORK





ITEM NO.	DESCRIPTION
1.	STEAM GENERATOR
2.	REACTOR COOLANT PUMP
3.	ACCUMULATOR
4.	REGENERATIVE HEAT EXCHANGER
5.	EXCESS LET-DOWN HEAT EXCHANGER
6.	SEAL TABLE
7.	PRESSURIZER RELIEF TANK
8.	INSTRUMENT SAMPLING ROOM PURGE SYS.
9.	℄ REFUELING EQUIPMENT
10.	℄ RCC CHANGE FIXTURE
11.	VESSEL FLG. PROTECTION RING IT FL.O.D. STGE.
12.	REACTOR UPPER INTERNALS STORAGE
13.	REACTOR LOWER INTERNALS STORAGE
14.	VENTILATING UNIT
15.	BLOWER
16.	PERSONNEL LOCK
17.	℄ FUEL TRANSFER SYSTEM
18.	CVCS MIXED BED DEMINERALIZER
19.	B.A. EVAPORATOR FEED HX EXCHANGER
20.	B.A. EVAPORATOR CONDENSATE DEMIN.
21.	DEBORATING DEMINERALIZER
22.	CVCS CATION BED DEMINERALIZER
23.	DRY CLEANER MACHINE ROOM
24.	SPENT FUEL PIT DEMINERALIZER
25.	CONTAINMENT SPRAY HEAT EXCHANGER
26.	RESIDUAL HEAT EXCHANGER
27.	BLOWDOWN HEATEXCHANGER
28.	BORON INJECTION TANK
29.	VOLUME CONTROL TANK
30.	SEAL WATER HEAT EXCHANGER
31.	WASTE GAS COMPRESSORS
32.	CONCENTRATE HOLDING TK. TRANSFER PUMPS
33.	CONCENTRATE HOLDING TANK
34.	BORIC ACID BATCHING TANK
35.	COMPONENT COOLING HEAT EXCHANGER
36.	MONITOR TANKS
37.	PLANT AIR RECEIVER
38.	PLANT AIR AFTERCOOLER
39.	PLANT AIR COMPRESSOR
40.	CONTROL AIR DEHUMIDIFIER
41.	CONTROL AIR RECEIVERS
42.	CONTROL AIR AFTERCOOLER
43.	CONTROL AIR COMPRESSOR
44.	COMPONENT COOLING PUMPS.
45.	BLOWDOWN PURIFICATION DEMIN.
46.	SPENT FUEL PIT FILTER
47.	SPENT FUEL PIT SKIMMER FILTER
48.	SPENT FUEL PIT SKIMMER PUMP
49.	SPENT FUEL PIT HEAT EXCHANGERS
50.	SPENT FUEL PIT PUMPS.
51.	HEAD LIFTING DEVICE STG. AREA
52.	CASK
53.	CASK HEAD
54.	CASK LIFTING DEVICE STG. AREA
55.	ELEC. PILASTERS
56.	VESTIBULE EL. 612'-0"
57.	EXTERIOR PIPEWAY
58.	NON-ESSENTIAL SERVICE WATER CONTROL & ISOLATION VALVE AREA
59.	PIPE CHASE
60.	ALTEREX CABINET
61.	RECTIFIER CUBICLE
62.	ESS. SERV. WTR. PIPE CHASE, WITH MISSILE PROTECTION BARRIER
63.	EVAP. CONDENSATE FILTER
64.	LOCAL SHUTDOWN INDICATING PANELS
65.	CASK DROP PROTECTION SYSTEM
66.	EQUIPMENT HATCH OPENING 26'-0"

MK	NO.	DESCRIPTION	APPD.
7/10	4	GENERAL REVISION	
1-6-71	3	GENERAL REVISION	
3-1-71	2	ADDED SERVICE PROVIDED FOR [illegible]	
1-27-70	1	GENERAL REVISION	

REVISIONS

INDIANA & MICHIGAN ELECTRIC CO.

DONALD C. COOK NUCLEAR PLANT

BRIDGMAN MICHIGAN

PLANT ARRANGEMENT MEZZANINE FLOOR EL.609'-0" UNITS 1 & 2

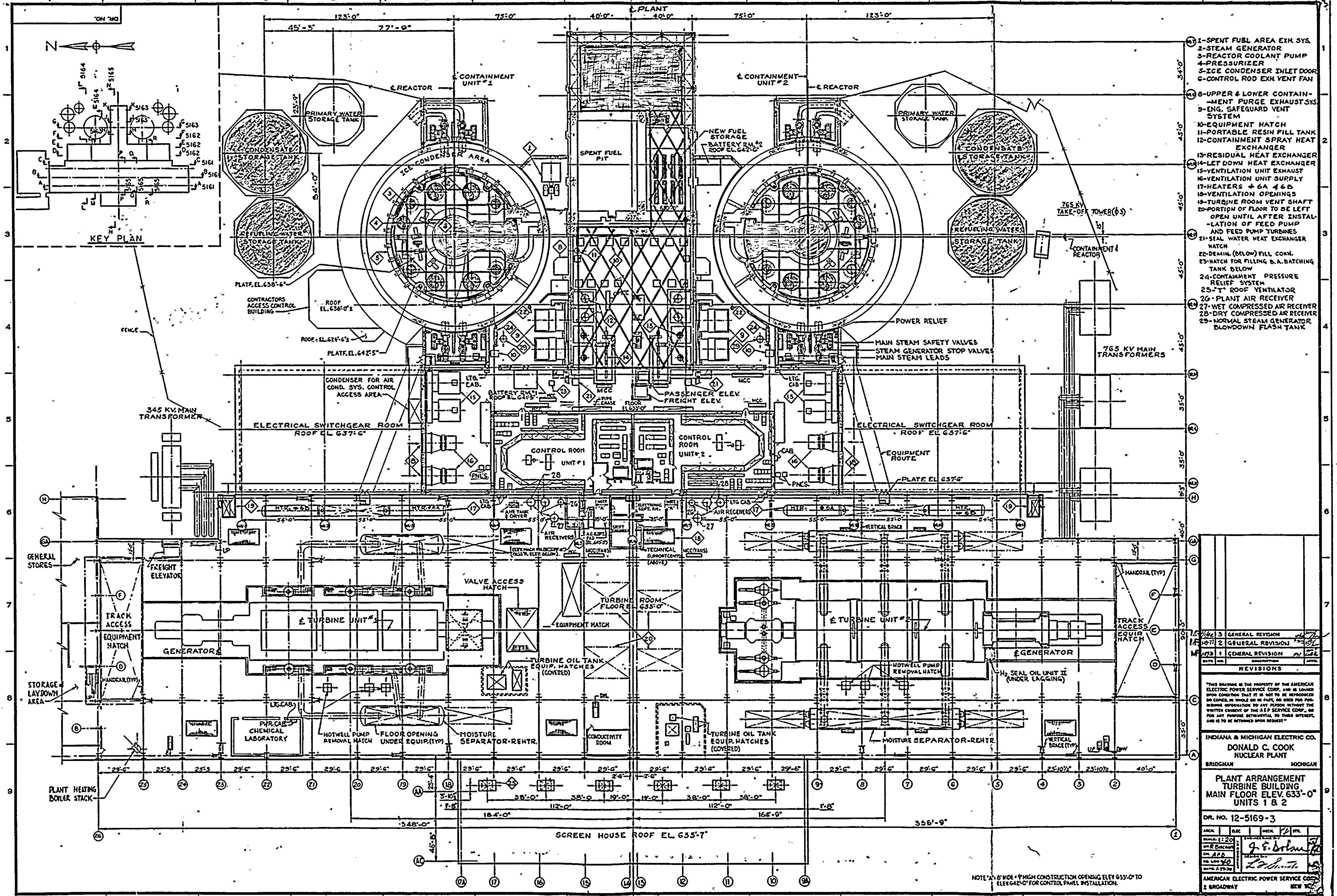
DR. NO. 12-5168-4

AREA	ELEC.	MECH.	K&S	ETC.
DESIGN & PROG.				
DR. JRE				
CH. ARA				
DATE 1-29-70				

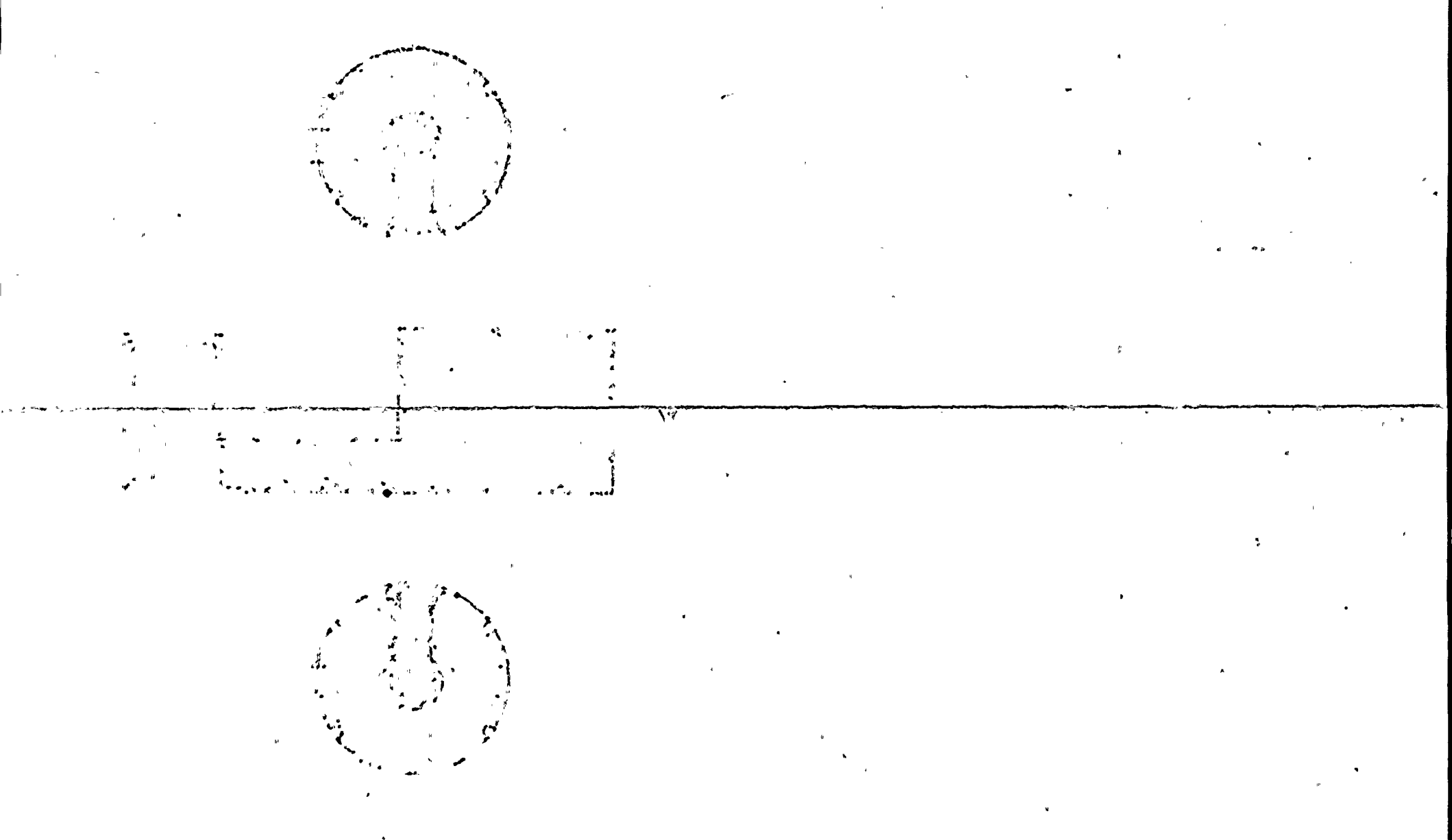
APPROVED FOR CONSTRUCTION

J. E. Dolan

AMERICAN ELECTRIC POWER SERVICE CORP.
2 BROADWAY NEW YORK



KEY PLAN
℄ PLANT
℄ REACTOR
℄ CONTAINMENT UNIT #1
℄ CONTAINMENT UNIT #2
PRIMARY WATER STORAGE TANK
CONDENSATE STORAGE TANK
REFUELING WATER STORAGE TANK
ICE CONDENSER AREA
SPENT FUEL PIT
NEW FUEL STORAGE
765 KV TAKE-OFF TOWER (Φ3)
765 KV MAIN TRANSFORMERS
345 KV. MAIN TRANSFORMER
POWER RELIEF
MAIN STEAM SAFETY VALVES
STEAM GENERATOR STOP VALVES
MAIN STEAM LEADS
ELECTRICAL SWITCHGEAR ROOM ROOF EL. 637'-6"
CONTROL ROOM UNIT #1
CONTROL ROOM UNIT #2
PASSENGER ELEV.
FREIGHT ELEV.
EQUIPMENT ROUTE
CONTRACTORS ACCESS CONTROL BUILDING
FENCE
GENERAL STORES
FREIGHT ELEVATOR
TRACK ACCESS EQUIPMENT HATCH
STORAGE & LAYDOWN AREA
GENERATOR
℄ TURBINE UNIT #1
℄ TURBINE UNIT #2
TURBINE ROOM FLOOR EL. 633'-0"
VALVE ACCESS HATCH
EQUIPMENT HATCH
TURBINE OIL TANK EQUIP. HATCHES (COVERED)
PWR. CAB. CHEMICAL LABORATORY
HOTWELL PUMP REMOVAL HATCH
FLOOR OPENINGS UNDER EQUIP. (TYP)
MOISTURE SEPARATOR-REHTR.
CONDUCTIVITY ROOM
H2 SEAL OIL UNIT II (UNDER LAGGING)
PLANT HEATING BOILER STACK
SCREEN HOUSE ROOF EL. 635'-7"
1-SPENT FUEL AREA EXH. SYS.
2-STEAM GENERATOR
3-REACTOR COOLANT PUMP
4-PRESSURIZER
5-ICE CONDENSER INLET DOOR
6-CONTROL ROD EXH. VENT FAN
8-UPPER & LOWER CONTAINMENT PURGE EXHAUST SYS.
9-ENG. SAFEGUARD VENT SYSTEM
10-EQUIPMENT HATCH
11-PORTABLE RESIN FILL TANK
12-CONTAINMENT SPRAY HEAT EXCHANGER
13-RESIDUAL HEAT EXCHANGER
14-LET DOWN HEAT EXCHANGER
15-VENTILATION UNIT EXHAUST
16-VENTILATION UNIT SUPPLY
17-HEATERS #6A & 6B
18-VENTILATION OPENINGS
19-TURBINE ROOM VENT SHAFT
20-PORTION OF FLOOR TO BE LEFT OPEN UNTIL AFTER INSTALLATION OF FEED PUMP AND FEED PUMP TURBINES
21-SEAL WATER HEAT EXCHANGER HATCH
22-DEMIN. (BELOW) FILL CONN.
23-HATCH FOR FILLING B.A. BATCHING TANK BELOW
24-CONTAINMENT PRESSURE RELIEF SYSTEM
25-"T" ROOF VENTILATOR
26-PLANT AIR RECEIVER
27-WET COMPRESSED AIR RECEIVER
28-DRY COMPRESSED AIR RECEIVER
29-NORMAL STEAM GENERATOR BLOWDOWN FLASH TANK
3 GENERAL REVISION
2 GENERAL REVISION
1 GENERAL REVISION
REVISIONS
"THIS DRAWING IS THE PROPERTY OF THE AMERICAN ELECTRIC POWER SERVICE CORP. AND IS LOANED UPON CONDITION THAT IT IS NOT TO BE REPRODUCED OR COPIED, IN WHOLE OR IN PART, OR USED FOR FURNISHING INFORMATION TO ANY PERSON WITHOUT THE WRITTEN CONSENT OF THE A.E.P. SERVICE CORP., OR FOR ANY PURPOSE DETRIMENTAL TO THEIR INTEREST, AND IS TO BE RETURNED UPON REQUEST."
INDIANA & MICHIGAN ELECTRIC CO.
DONALD C. COOK NUCLEAR PLANT
BRIDGMAN MICHIGAN
PLANT ARRANGEMENT TURBINE BUILDING MAIN FLOOR ELEV. 633'-0" UNITS 1 & 2
DR. NO. 12-5169-3
SCALE: 1:20
AMERICAN ELECTRIC POWER SERVICE CORP.
2 BROADWAY



KEY PLAN

REACTOR CONTAINMENT UNIT Nº 1

REACTOR CONTAINMENT UNIT Nº 2

LIMIT FOR 150 TON & 20 TON HOOKS

MAIN STEAM ENCLOSURE (WEST) ROOF ELEV. 664'-0"

PRIMARY WATER STORAGE TANK

CONDENSATE STORAGE TANK

REFUELING WATER STORAGE TANK

765 KV TAKE-OFF TOWER (Ø3)

MAIN STEAM

STEAM GENERATOR (4)

PUMP REMOVAL HATCH (4)

PRESSURIZER

ACCESS HATCH

REACTOR HEAD LAYDOWN SPACE

CONTROL ROD DRIVE MISSILE SHIELD

MANIPULATOR CRANE

CONTAINMENT PURGE SUPPLY UNITS

CASK DROP PROTECTION SYSTEM

SPENT FUEL PIT

SPENT FUEL/FUEL SERVICE BRIDGE & HOIST

FUEL TRANSFER SYSTEM

EQUIPMENT HATCH

REFRIG. COND. UNITS

ICE MACHINES

SPARE REACTOR COOL. PUMP

HOT MACHINE SHOP

TOP OF ICE BED

ELECTRICAL SWITHGEAR ROOF EL. 637'-6"

ROOF VENTILATOR (TYP.)

PENETRATION AIR RECEIVERS

COMPONENT COOLING SURGE TANK

FREIGHT ELEVATOR

ROOF ELEV. 663'-0"

CONTROL ROOM AIR CONDITIONING EQUIP.

TECH SUPPORT CENTER

HEATER BAY ROOF ELEV. 659'-0"

COMPUTER ROOMS

ROOF HATCH

MOISTURE SEPARATOR VENTS

ROOF VENTILATORS

SUPPLY AIR INTAKE LOUVER HOUSING

UPPER CRANE HOOKS (NORTH)

UPPER CRANE HOOKS (SOUTH)

LOWER CRANE HOOKS

ELEVATOR

PLANT HEATING BOILER STACK

LIMIT FOR 50 & 240 TON HOOKS

LIMIT FOR 10 & 4 TON HOOKS

TURBINE UNIT Nº 1

TURBINE UNIT Nº 2

NOTE "A" - PROVIDE CONSTRUCTION ACCESS AT END OF ICE CONDENSER.

3	GENERAL REVISION		
2	GENERAL REVISION		
1	GENERAL REVISION		
NO.	DESCRIPTION		

REVISIONS

INDIANA & MICHIGAN ELECTRIC CO.

DONALD C. COOK NUCLEAR PLANT

BRIDGMAN . MICHIGAN

PLANT ARRANGEMENT REACTOR BUILDING MAIN FLOOR ELEV. 650'-0"

DR. NO. 12-5170-3

AMERICAN ELECTRIC POWER SERVICE CORP. 2 BROADWAY