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ARTHUR E. LUNDVALL, JR.
VICE PRESIDENT
SUPPLY

January 4, 1982

Mr. Darrell G. Eisenhut, Director
Division of Licensing
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Subject: Calvert Cliffs Nuclear Power Plant
Units Nos. 1 & 2; Dockets Nos. 50-317 & 50-318
Control of Heavy Loads

Dear Mr. Eisenhut:

Enclosed are forty copies of our phase one report providing you with the information requested in paragraph 2.1 of your December 22, 1980 letter except as specifically modified in the report. Please note that Exhibit C is missing electrical drawing SK-ME-103. Copies will be forwarded as soon as completed.

We are taking the necessary steps to complete the phase two segment of the study prior to our Spring outage.

Very truly yours,

A. E. Lundvall, Jr.

cc: J. A. Biddison, Esquire
G. F. Trowbridge, Esquire
Messrs. D. K. Jaffe
R. E. Architzel

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I. Summary

This report constitutes our initial response to your letter of December 22, 1980 on NUREG-0612. The following is a summary of our results to date. We have provided the information requested in a question/response format in Section III of this document.

All information required to meet the intent of NUREG-0612 for the spring outage will be completed prior to that time.

We have reviewed areas in the vicinity of plant overhead handling systems with respect to identifying possible load drops on safe shutdown/decay heat removal systems. Where this possibility exists we are reviewing the associated handling systems to referenced and other codes and standards stated herein. The aspects of major plant cranes reviewed to date have identified only minor differences with those standards. We feel at this time that these deviations can be accepted as is.

Procedures for specific heavy load lifts and crane operation, testing, and maintenance have been reviewed where handling systems operate above irradiated fuel and safe shutdown/decay heat removal systems. These procedures have been evaluated against the referenced ANSI standards and the requirements of NUREG-0612 and, as a result, some minor modifications to documents will be made.

Non-special lifting devices (e.g., slings) are being maintained and inspected in compliance with the ANSI standard however verification of initial design is not possible in most cases. New procedural requirements will correct this as inventory is replaced.

Special lifting devices were not designed in accordance with ANSI N14.6. We conclude from our evaluation to date that continued use of the special lifting devices meets the intent of the guidance in NUREG-0612.

Structural and electrical designs of major plant cranes have been completed and are in general compliance with referenced standards stated herein. Mechanical aspects reviewed to date are also in compliance.

No exceptions to ANSI standards for operator training have been identified. Procedures verifying training program requirements are in effect.

II. Definitions

1.0 Safe Shutdown/Decay Heat Removal Systems:

Safe Shutdown/Decay Heat Removal Systems are identified in Regulatory Guide 1.29, Position C.1 as modified by Section 1.3 of the December 22, 1980 NRC letter. BG&E has identified these systems in the Alternate Safe Shutdown Analysis and Interactive Cable Analysis sent to the NRC on September 30, 1981, as well as in the FSAR Section 10 Appendix 10.A. Systems or components identified as being part of the alternate safe shut down path were not included in this review.

2.0 Heavy Load

A heavy load is any load which is approximately equal to or greater than the weight of on fuel assembly and its associated lifting device. For Calvert Cliffs this weight is 1600 pounds.

III. Responses to December 22, 1980 Letter

A. Phase I

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).

Response:

The cranes, hoists, and monorails listed as part of Exhibit A are capable of handling heavy loads which, if dropped, may result in damage to safe shutdown or decay heat removal systems regardless of interlocks, technical specifications, operating procedures, or detailed structural analysis. The handling systems listed and considered in this evaluation are permanently installed plant equipment.

Determination of Safe Shutdown/Decay Heat Removal systems used in this review was performed using the Alternate Safe Shutdown analysis generated and submitted to meet Appendix R requirements (S.E.R. Item 3.2.1). Only the normal shutdown systems were identified and are reflected in the drawings attached for our response to item 3.a.

Where preliminary structural review for an area indicates that floor penetration of a dropped load may occur or analysis is not complete and safe shutdown items are in the area below, the handling system is included in Exhibit A. Should a more detailed analysis later conclude that both penetration and spalling that could cause damage are not possible, that system will be considered to be excluded from this section (assuming no other hazard exists).

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.

Response:

The lifting devices excluded from analysis under this review are listed in Exhibit B. Our inspection has indicated that either sufficient separation exists between the lift point and any safe shutdown/decay heat removal equipment; and/or the overhead handling system capacity is less than that of a heavy load.

3. With respect to the design and operation of heavy-loads-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:

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

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

Response:

Exhibit C represents load paths for heavy load movements regularly performed at Calvert Cliffs Units 1 and 2 as referenced in BG&E's interim response dated June 25, 1981. During the course of Phase II, these load paths will be re-reviewed and the results of our analyses will be used to modify those paths in order to minimize the potential for damage from an accidental load drop while maintaining flexibility for load movements. Exhibit C also includes drawings indicating the locations of spent fuel and safe shutdown piping, instrumentation and cable in areas beneath load handling systems.

The implementation methods necessary for enforcement of a particular load path will also be determined during completion of Phase II as the configuration and extent of allowable load paths are finalized. We intend to review (as part of Phase II) the entire area in the path of a handling system in order to maximize the acceptable movement area under that system. (The existence of complete exclusion areas is also anticipated). These paths would be simplified to the maximum extent possible in order to facilitate load handling path decisions in the event that the normal path is not available. Those load paths would be attached to applicable load movement procedures. If a deviation from the defined load path is necessary, our current procedure is to have an engineering review. The results of this engineering evaluation are then forwarded to our Plant Operations and Safety Review Committee for review before allowing the deviation.

We feel that the use of equipment landmarks as indicated on load path drawings would be preferable to load paths marked on floors

as referenced in the NUREG. Training of handling system operators will also be an important factor in assuring adherance to safe load paths.

3.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).

Response:

Exhibit A lists by load handling system, the heavy loads, and their associated weights, lift devices and an indication of whether or not the load movement is presently governed by procedure(s).

Calvert Cliffs Instruction (CCI) 201A provides guidelines for crane operations and inspection reports. Review of our current procedures identified several minor deviations from the referenced standard and the guidance of NUREG-0612. These procedures are being revised and scheduled to be completed prior to our next scheduled outage next April. Where loads have no procedure governing their movement, lift procedures will be established in accordance with our interim response, Measure 2. No procedures will be written for load handling systems eliminated from Phase 1 consideration.

3.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.

Response:

Lifting devices were not designated in accordance with either ANSI N14.6 or ANSI B30.9. Special lifting devices were designed using accepted engineering practices. Evaluation of the design of special devices reviewed to date indicates that in some cases the ANSI stress design factor for structural items is not satisfied. However, these items are considered satisfactory for continued use.

A program for material handling equipment maintenance, inspection, and testing (CCI-219A) was instituted in early 1980 for Calvert Cliffs Units 1 and 2. Under this new program, we are in compliance with the ANSI B30.9 standard.

Verification of factors of safety of non-special slings currently in inventory is not possible, although we feel that based on our inspection program and training of riggers, continued use of these devices is justified. As inventory is replaced, manufacturer certified factors of safety will be obtained as a matter of policy and in accordance with the plant procedures.

At present, newly purchased non-special lifting devices are required by procedure to be complete with a certificate of compliance of design load to the specified requirements.

3.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 of proposed alternatives.

Response:

As indicated in our Interim Measure 4 Status statement, we are committed to implementing ANSI B30.2 and a review of existing overhead handling system inspection, testing, and maintenance procedures to the standard has been performed.

As previously discussed, our procedure CCI-219A has been established (superceding our previously existing program) which outlines inspection, testing and maintenance requirements intervals for all handling systems. This procedure is being revised to more closely reflect the requirements of the ANSI standards.

Our review of existing procedures to both ANSI B30.2 and ANSI B30.16 has identified some minor deviations and revisions to our procedures will be incorporated to meet the appropriate code.

In addition, some overhead handling systems have been identified, as a result of review to NUREG-0612, which will require specific inspection, testing and/or maintenance procedures to be developed. However, these devices are now included in the scope of CCI-219A which requires such procedures.

3.f. Verification that crane design complies with the guidelines of CMAA Specification 70 and Chapter 2-1 of ANSI B30.2-1076 including the demonstration of equivalency of actual design requirements for instances where specific compliance with these standards not provided.

Response:

The overhead cranes (polar crane, spent fuel cask crane, intake structure crane, turbine building main, and auxiliary cranes) were purchased using the Electric Overhead Crane Institute's Specification Number 61 (EOCI-61), American Institute of Steel Construction (AISC), American Welding Society's (AWS) design codes, and American Society for Testing and Materials (ASTM) specifications. As minimum requirement structural design was in accordance with EOCI-61 except where more strict requirements governed. All structural members not covered by EOCI-61 were designed and fabricated with standard specifications and codes of the American Institute of Steel Construction except that the unit stresses shall not exceed ninety percent of the values stated in the code. Please note that CMAA-70 is a revision of EOCI-61. The most significant difference between EOCI and CMAA-70 relates to an increase in impact factor.

We have completed structural and electrical analysis and partially completed the mechanical analysis of the above cranes. No significant deviations were revealed by this review and evaluation that would necessitate further action to ensure adherance to the NUREG guidance.

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

Response:

Calvert Cliffs has instituted procedure CCI-210A to set guidelines for crane operator training prior to the issuance of NUREG-0612. This procedure assures all crane operators will be trained in accordance with ANSI B30.2-1976 Section 2.3.1.

No exceptions to that standard have been identified.

Exhibits

Exhibit A -- NUREG-0612 Overhead Handling Systems

Exhibit B -- NUREG-0612 Excluded Overhead Handling Systems

Exhibit C -- Requested Drawings

SK-ME-101 Load Paths (5 Sheets)

SK-ME-102 Safe Shutdown Piping (3 Sheets)

SK-ME-103 Safe Shutdown Instrumentation and Cable

Exhibit D -- Safe Shutdown Equipment Basis from Alternate Safe Shutdown Analysis (10 Sheets)

Overhead Handling Systems

Crane	Load	Weight**(lb.)	Lift Device	Procedure
Polar 180 T/25 T	Neutron Shield Framework 4 pieces	10,000 total	Sling Assembly	RV-54
	PaR Device for RV Head, Hoist Only	2,000	Polar Crane	None - Use is Indicated in RV-7 and RV-8
	PaR Device	4,000	PaR Hoist Device	None - Use is Indicated in RV-7 and RV-8
	Polar Crane Main Hoist Load Block	9,000	Polar Crane	None
	Reactor Cavity Seal Ring	12,000	Reactor Cavity Seal Ring Lift Rig	RV-9 RV-10
	Reactor Coolant Pump Motor	90,400	R.C. Pump Motor Sling Assembly	RCS-1 RCS-2
	Reactor Vessel Head/Shroud	180,000	R.V. Head Lift Rig	RV-7 RV-8
	Reactor Vessel Head Lift Rig	18,220	Polar Crane	HE-3 HE-16
	Reactor Vessel Stud Tensioners	2,250	Hoists on Reactor Head Lift Rig Support Frame	None
	ICI Removal Tool	7,500	Polar Crane	None - Use is Indicated in RV-17, RV-18

* Where no designated device is indicated lift is accomplished with slings identified as necessary and proper by a qualified rigger.

** Weights are approximate and except where indicated do not include lift device or load block.

Exhibit A

Overhead Handling Systems

Crane	Load	Weight**(lb.)	Lift Device	Procedure
Polar 180 T/ 25 T	Refueling Pool Stairs	8,000	No Designated Service**	None
	Upper Guide Structure Lift Rig Assembly Incl. Tripod	14,000	Polar Crane Load Cell	RV-17 RV-18
	Upper Guide Structure	96,000	UGS Lift Rig	RV-17 RV-18
	Tripod Assembly	2,000	Polar Crane Load Cell	HE-1 HE-2/0
	Combined UGS/ICI Assembly	116,500	Polar Crane	RV-17 RV-18
	Core Support Barrel Lift Rig	14,000	Polar Crane	None
	Core Support Barrel	250,000	CSB Lift Rig	None
Spent Fuel Cask Crane 150 T/15 T	Load Block	8,250	Cask Crane	None
	Irradiated Specimen Cask	10,000 max.	Cask Yoke	None
	Spent Fuel Shipping Cask	10,000 max.	SF Cask Yoke	FH-33
	Spent Fuel Cask Yoke	2,000	Cask Crane	FH-33
	New Fuel Shipping Container	25,000	No Designated Device**	FH-1
	Spent Fuel Divider Gate	3,300	No Designated Device**	HE-27 HE-28
	CE Superstand (Upper)	8,000	Lift Bar w/Slings	FH-9
	CE Superstand (Lower)	13,000	Lift Bar w/Slings	FH-9

Exhibit A

Overhead Handling System

Crane	Load	Weight**(lb.)	Lift Device	Procedure
Turbine Bldg. Main Crane 200/25 T	Generator Rotor	351,300	No Designated Device**	None
	HP Turbine Rotor	113,200	No Designated Device**	None
	LP Turbine Rotor	260,000	No Designated Device**	None
Turbine Bldg. Aux. Crane 40 T/10 T	Miscellaneous	80,000 (Max.)	No Designated Device**	None
Intake Structure Semi-Gantry Crane 35 T/10 T	Load Block	1,800	Crane	None
	Roof Hatch Covers	9,000 max.	No Designated Device	HE-32
	Circulating Water Pump: Motor	46,660	No Designated Device**	HE-32
	Filler Piece Assembly	14,175	No Designated Device**	HE-32
	Shaft/Impeller Assembly	10,195	No Designated Device**	HE-32
	Salt Water Pump	8,000	No Designated Device**	HE-32
Transfer Machine Jib Crane 6T	Spent Fuel Transfer Carriage	12,000	Lifting Beam/Slings	FHE-1 FHE-2
Filter Cask Monorail(s) 7.5 T	Filter Cask	10,000	Cask Lift Rig	RCP 3-512
	Resin Cask	40,000	Cask Lift Rig	RCP 3-512
	Filter Hatch Floor Plugs	12,000 max.	No Designated Device	None
Solid Waste Disposal Trolley Hoist 40T	Filter Cask	10,000	Cask Lift Rig	RCP 3-512
	Resin Cask	40,000	Cask Lift Rig	RCP 3-512

Overhead Handling Systems

Crane	Load	Weight**(lb.)	Lift Device	Procedure
Diesel Generator Room Monorail 5 T (1 per D.G. Room)	Engine Head	10,000 (Max.)	No Designated Device	None
	Upper Crankshaft		No Designated Device	None
Main Steam Room Monorails (4-3 T)(2-1 T)	MSIV Cylinder Module	14,000	No Designated Device	None
	MSIV Yoke	2,500	No Designated Device	None
	Salt Water Pump Motor	8,400	No Designated Device	HE-32
Machine Shop# Monorail 5 T	Miscellaneous	10,000 (Max.)	No Designated Device	None
Ctmt. Equip. Hatch Hoist 15 T	Equipment Hatch	30,000	No Designated Device	HE-13 HE-15
Ctmt. Equip. Bay Jib Crane (Not Yet Installed)	Miscellaneous	10,000 (Max.)	No Designated Device	None
Ctmt. Equip. Bay Beam Crane (Not Yet Installed)	Miscellaneous	6,000 (Max.)	No Designated Device	None
Component Cooling Room Hoist	Component Cooling Piping	2,000	No Designated Device	None
Switchgear Room# Monorail Hoist (10T)(1 per unit)	Miscellaneous	20,000 max.	No Designated Device	None

#May be excluded based on drop analysis of floor -- no SSD/DHR in room.

Exhibit B

Overhead Handling Systems Excluded
From Review

Chlorine House Monorails

-- Sufficient Separation

Condensate Demineralizer Area Monorail

-- Sufficient Separation

Condenser Water Box Removal Monorail

-- Sufficient Separation

Reactor Head Stud Handling Jib Crane (not yet installed)

-- Capacity Less Than Heavy Load (in Ctmt.)

Spent Fuel Pool Jib Crane

-- Capacity Less Than Heavy Load (Over S.F.P.)

Vertical Lifting Rail

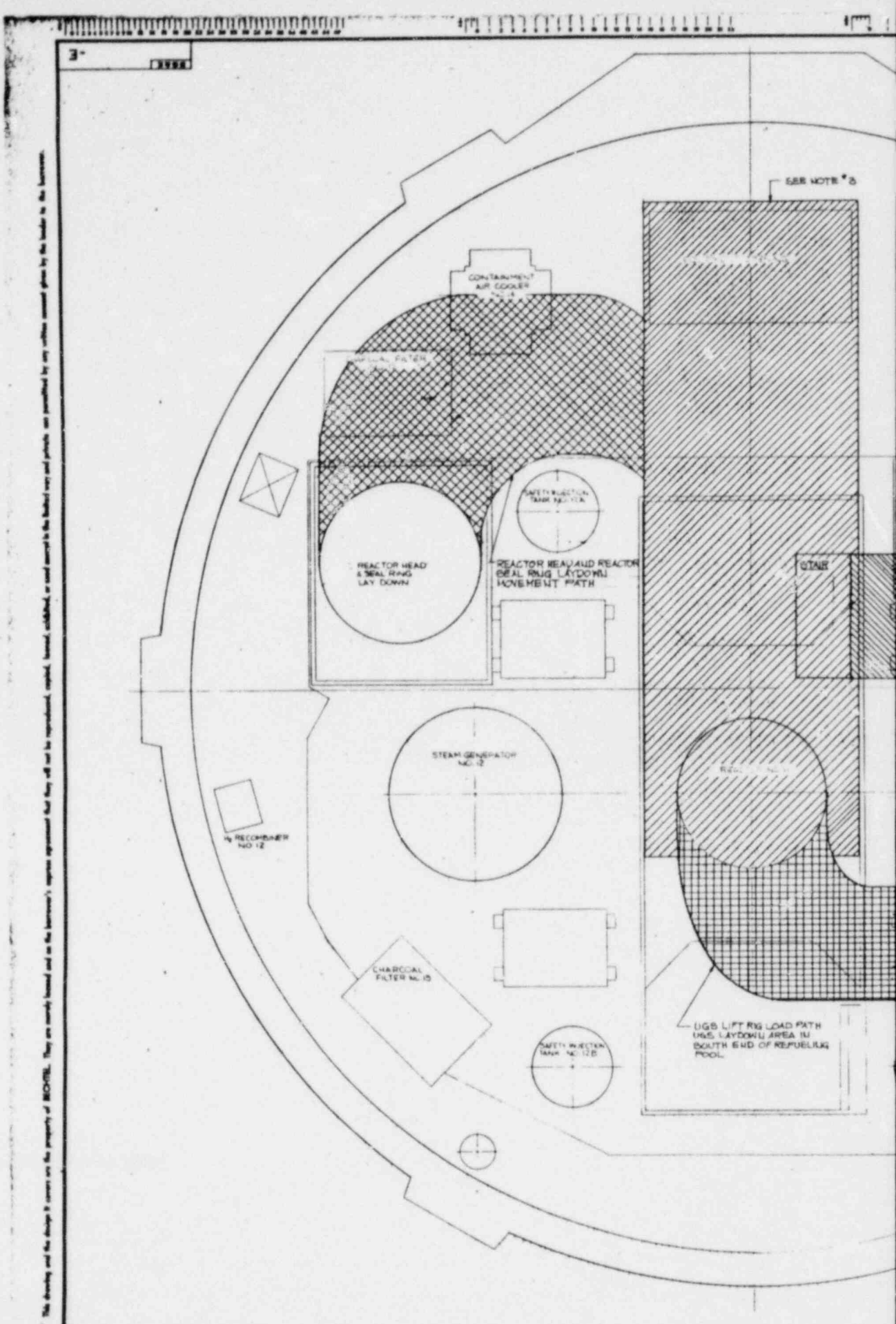
-- Sufficient Separation

Hot Machine Shop Crane

-- Sufficient Separation

Decontamination Room Hoist

-- Sufficient Separation



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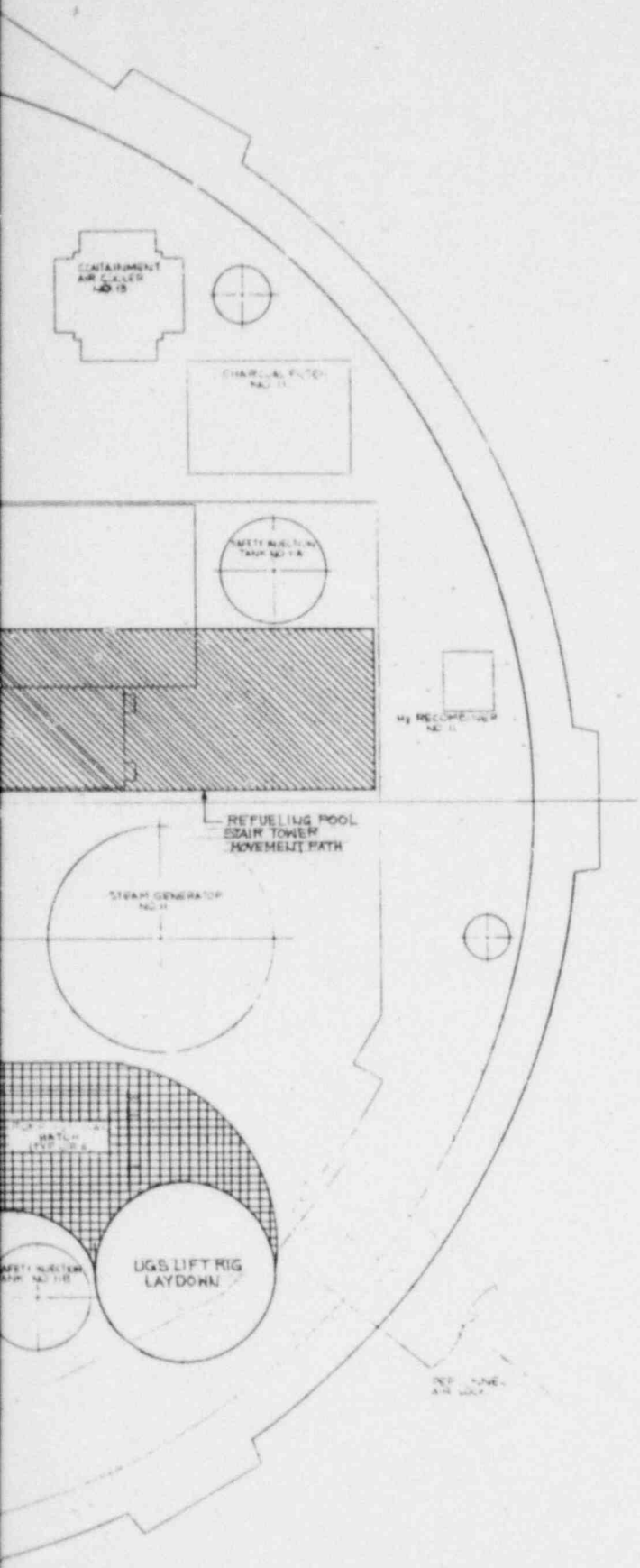

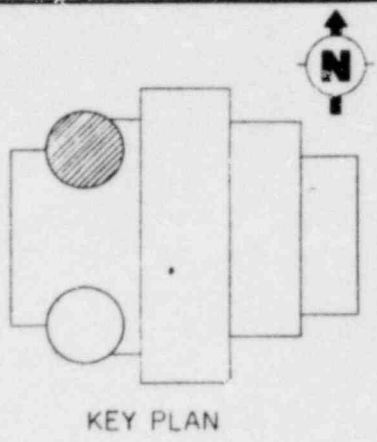

KEY PLAN

NOTES:

1. LOAD PATH SHOWN ARE THOSE IN USE IN THE PLANT.
2. THIS DRAWING IS NOT FOR PLANT USE - DIAGRAMATIC ONLY.
3. THIS LOAD PATH IS ALSO USED FOR MOVEMENT OF THE FOLLOWING (OTHER THAN SHOWN).
   R.V. HEAD STUD TENSIONERS
   I.C.I. REMOVAL BRIDGE
   NEUTRON SHIELD FRAME WORK
4. LOAD PATHS FOR ITEMS OTHER THAN SHOWN WILL BE DEVELOPED DURING PHASE II OF NUREG-0612 EVALUATION.

NO.	DATE	REVISIONS	BY	DATE	CHK'D	APP'D
SCALE: NONE	DESIGNED	DRAWN	CHK'D	APP'D		

BALTIMORE GAS & ELECTRIC CO.
CALVERT CLIFFS

BECHTEL POWER CORPORATION

LOAD PATHS
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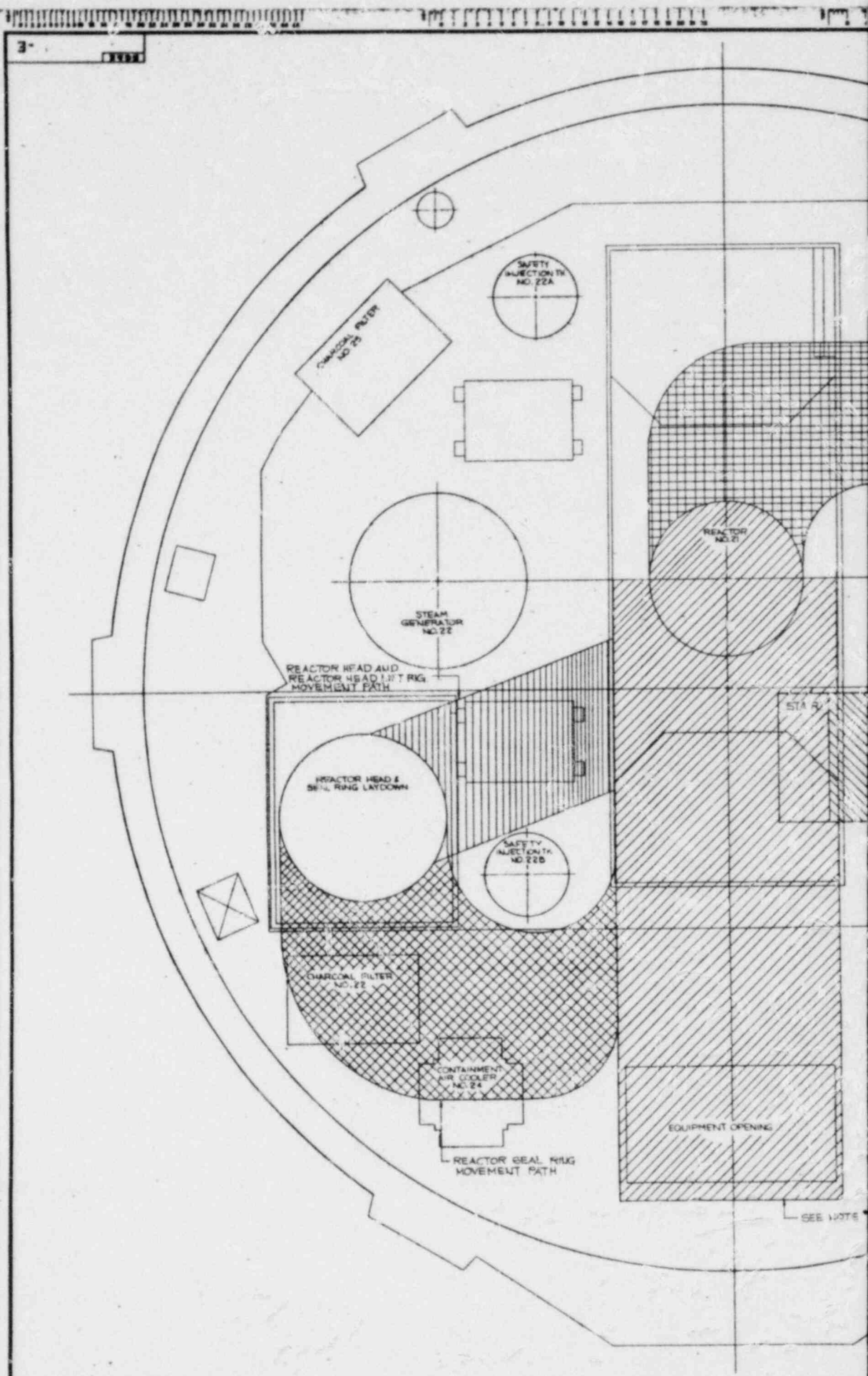
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CHARCOAL FILTER NO. 23
REACTOR NO. 21
STEAM GENERATOR NO. 22
REACTOR HEAD AND REACTOR HEAD LIFT RIG MOVEMENT PATH
REACTOR HEAD & SEAL RING LAYDOWN
SAFETY INJECTION TK NO. 22B
CHARCOAL FILTER NO. 22
CONTAINMENT AIR COOLER NO. 24
REACTOR SEAL RING MOVEMENT PATH
EQUIPMENT OPENING
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UNIT NO 2 PLAN AT EL 6
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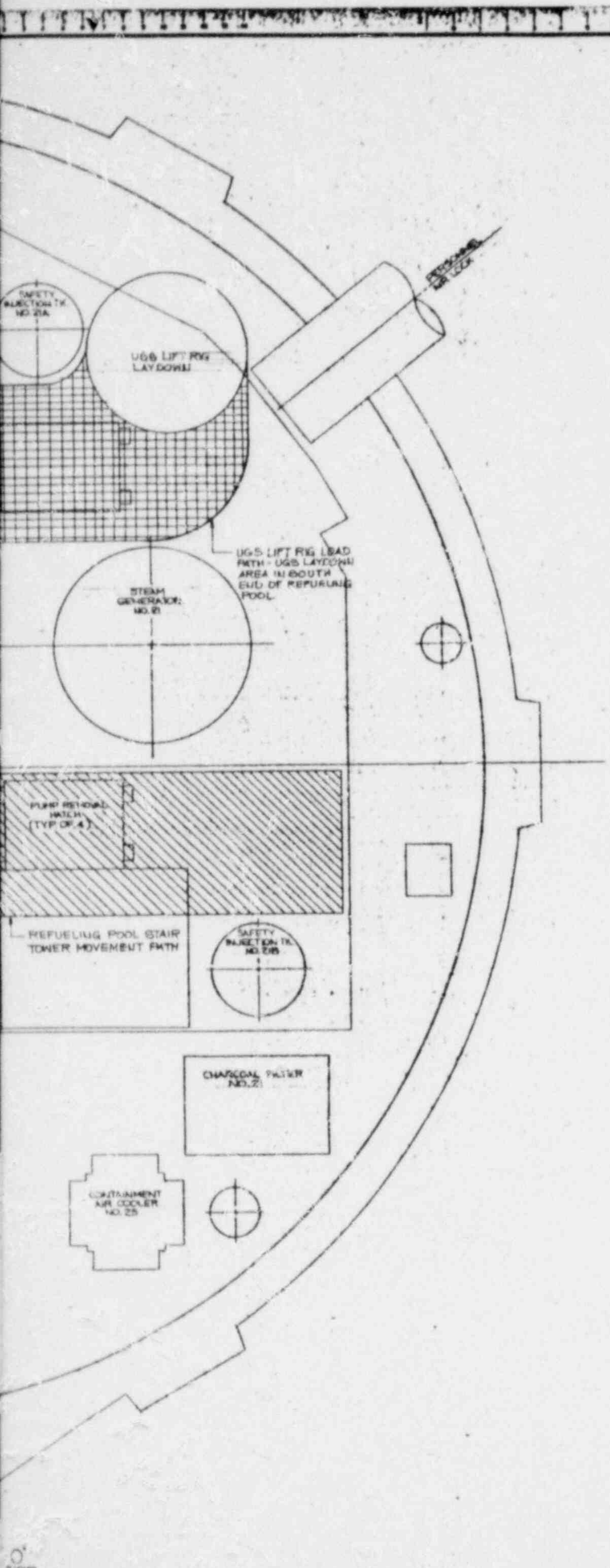

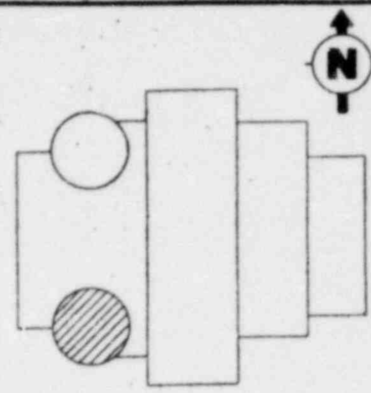

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   RV HEAD STUD TENSIONERS
   ICI REMOVAL BRIDGE
   NEUTRON SHIELD FRAMEWORK
4. LOAD PATHS FOR ITEMS OTHER THAN SHOWN WILL BE DEVELOPED DURING PHASE II OF NUREG - 0612 EVALUATION.

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SCALE 3/16" = 1'-0" DRAWN J.C.H. DAW

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BECHTEL POWER CORPORATION

LOAD PATHS

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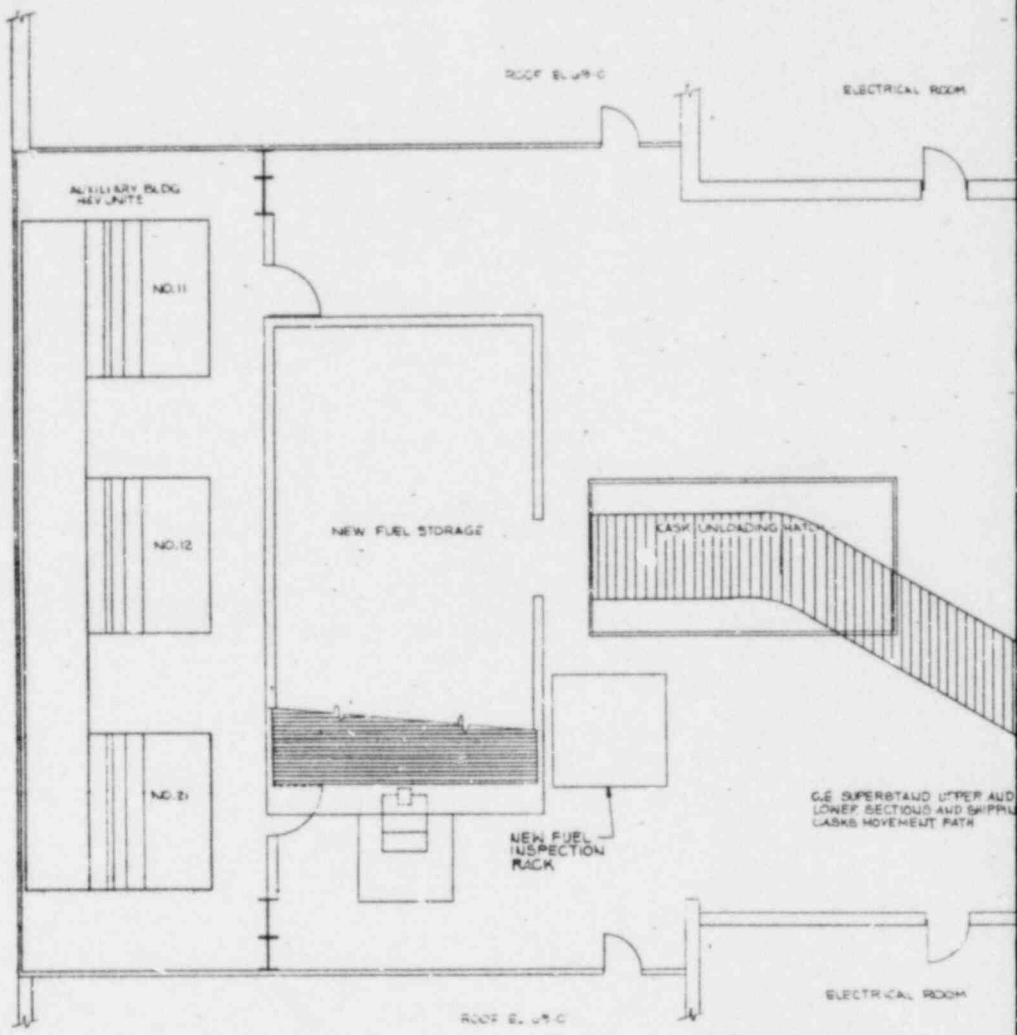

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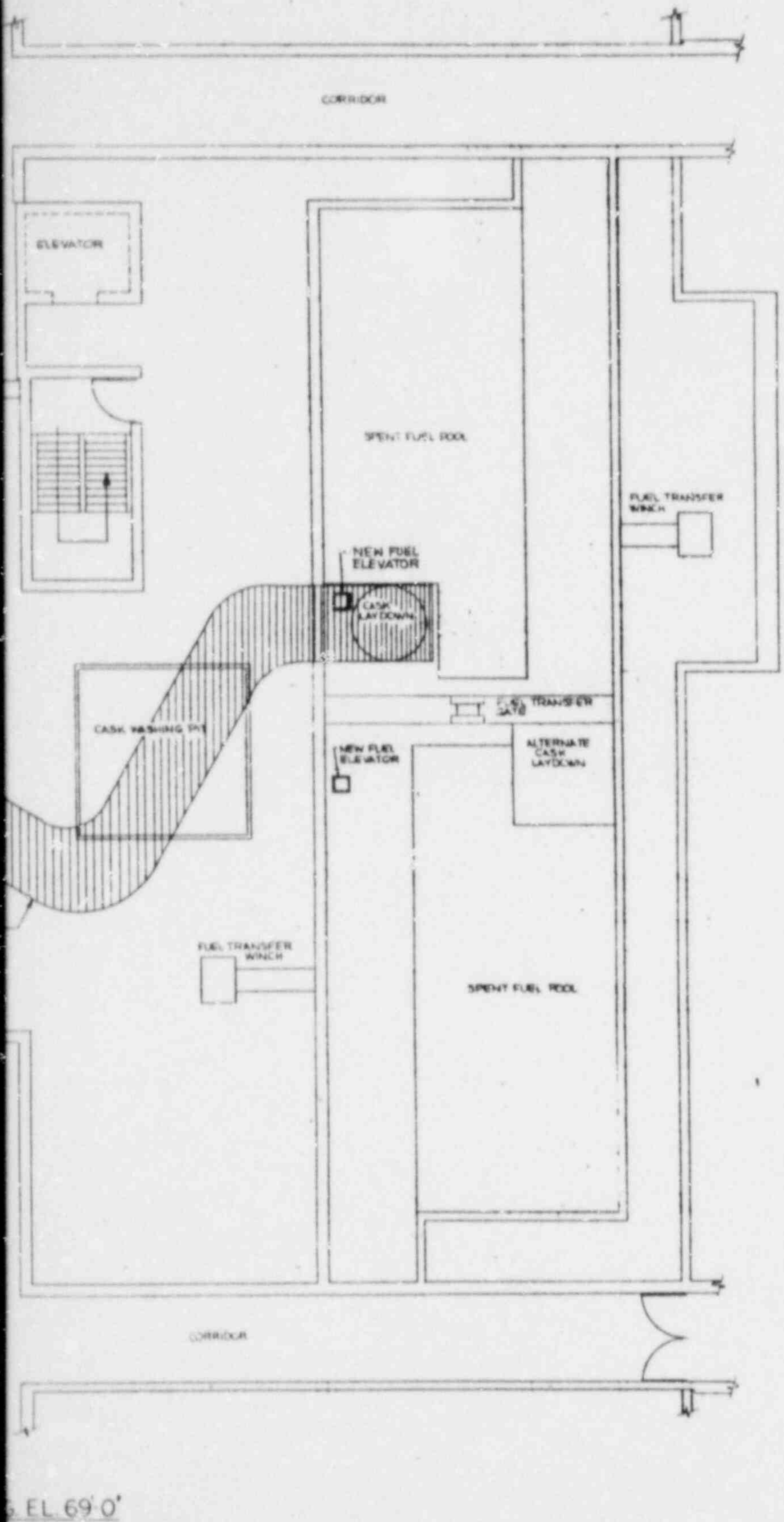

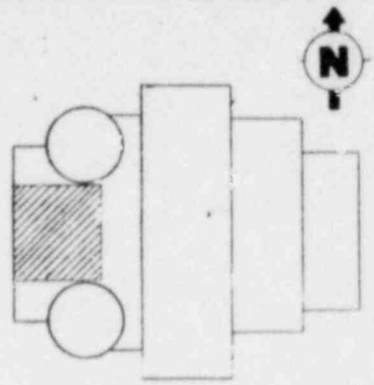

KEY PLAN

NOTES:

1. LOAD PATHS ARE THOSE CURRENTLY IN USE IN THE PLANT.
2. THIS DRAWING IS NOT FOR IN PLANT USE - DIAGRAMATIC ONLY.
3. PATHS SHOWN ARE USED BY SPENT FUEL CASK CRANE

[redacted]

SCALE 1/16" = 1'-0" DRAWN K.M. DAW

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BECHTEL POWER CORPORATION

LOAD PATHS

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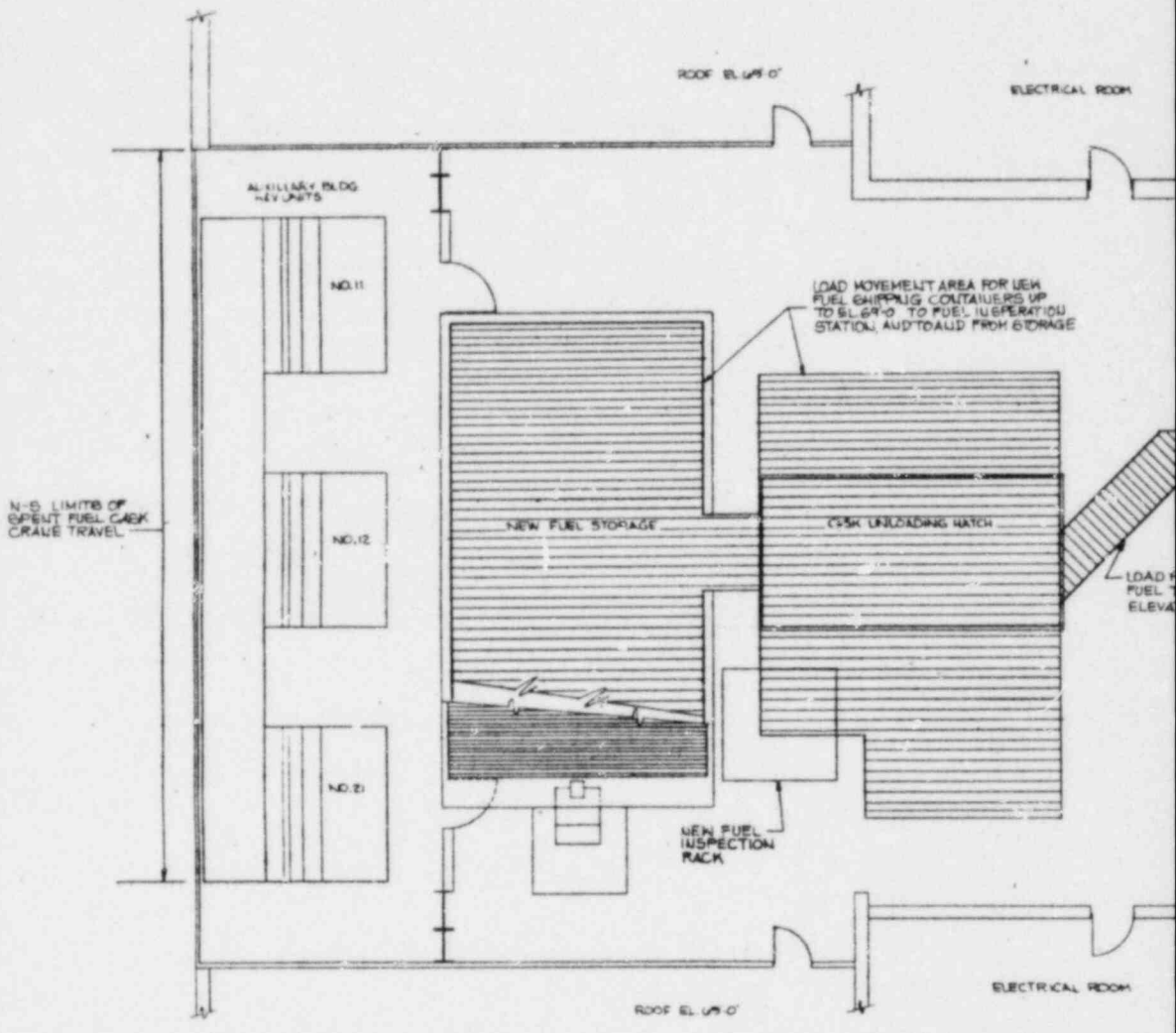

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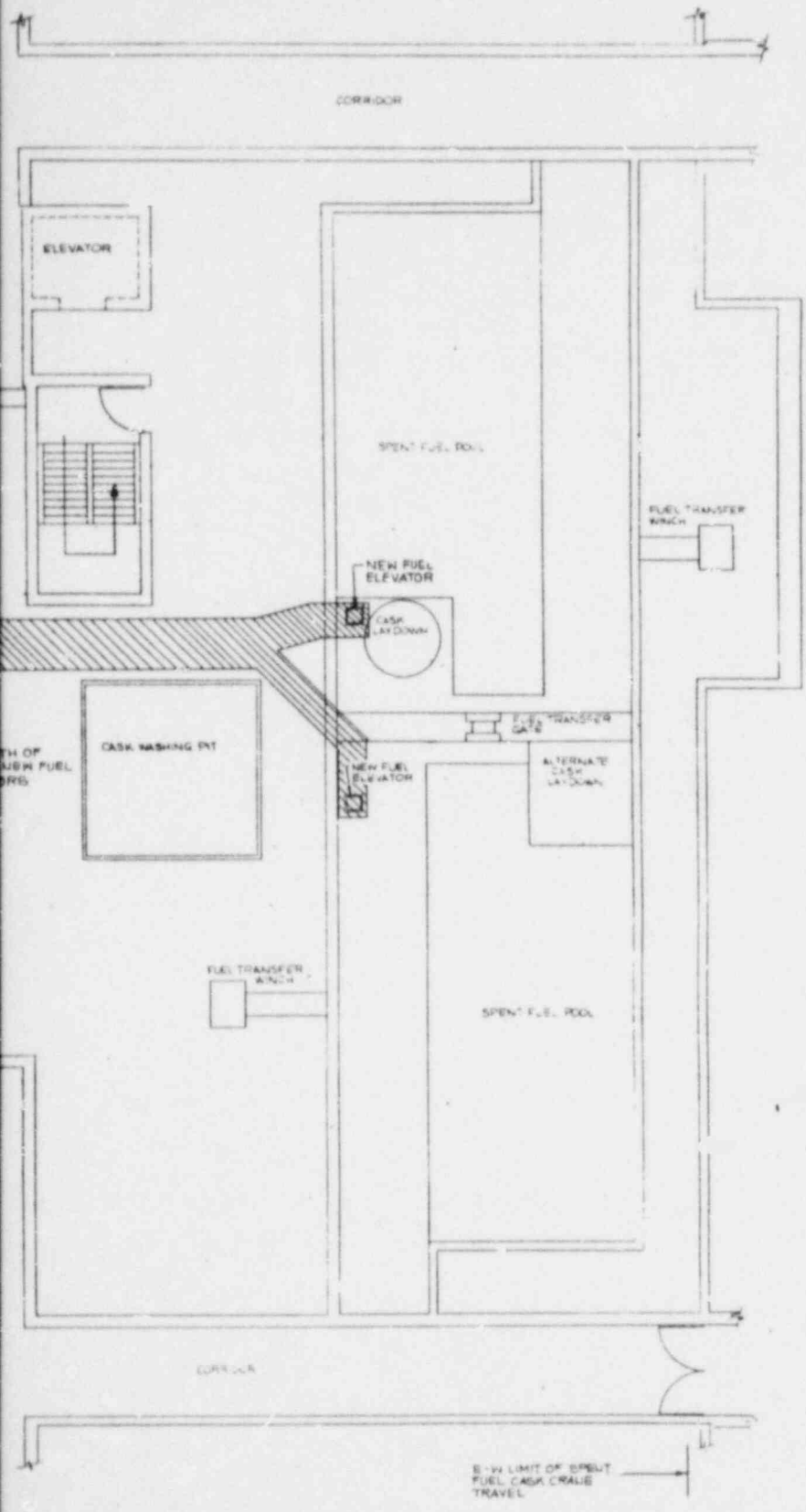

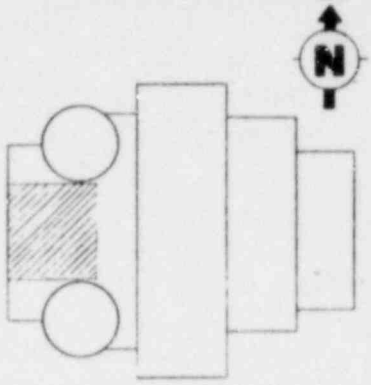

KEY PLAN

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3. PATH SHOWN ARE USE BY SPENT FUEL CASK CRANE.

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BALTIMORE GAS & ELECTRIC CO.
CALVERT CLIFFS

BECHTEL POWER CORPORATION

LOAD PATHS
EXHIBIT-C

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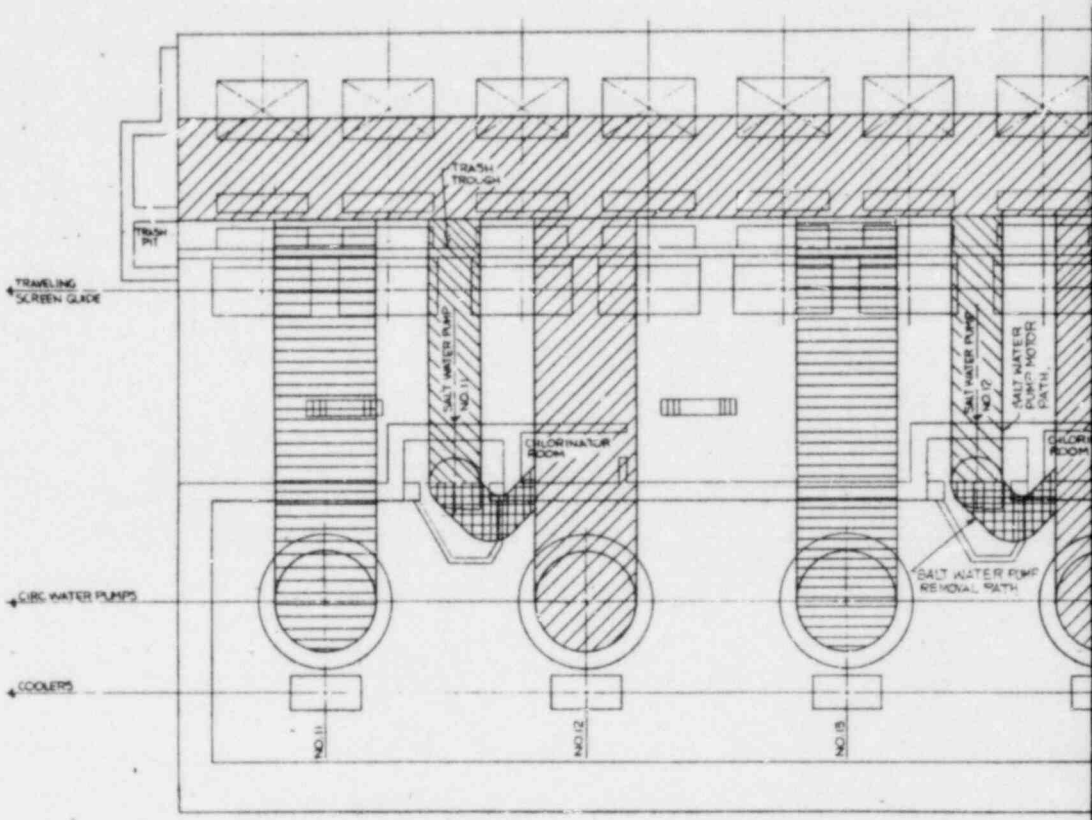

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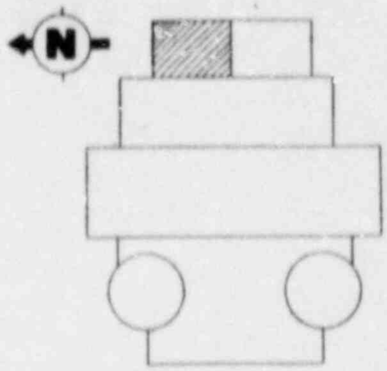
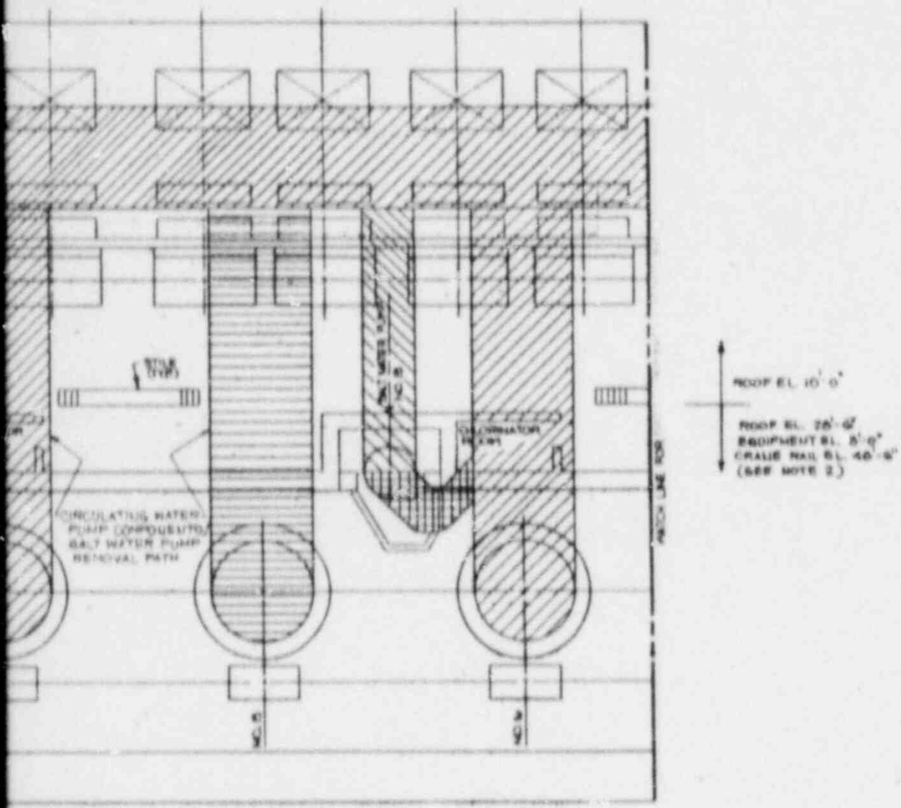


KEY PLAN



NOTES:

1. HATCHES LOCATED ABOVE CIRC. WATER PUMPS.
2. LOAD MOVEMENTS PERFORMED WITH INTAKE STRUCTURE GANTRY CRANE LOCATED ABOVE ROOF-LINE OF THIS AREA. MAJORITY OF THE PATHS SHOWN ARE FOLLOWED ABOVE ROOF LINE.
3. PATHS SHOWN ARE THOSE CURRENTLY USED IN PLANT.
4. PATHS ARE NOT FOR PLANT USE - DIAGRAMMATIC ONLY.

[redacted]

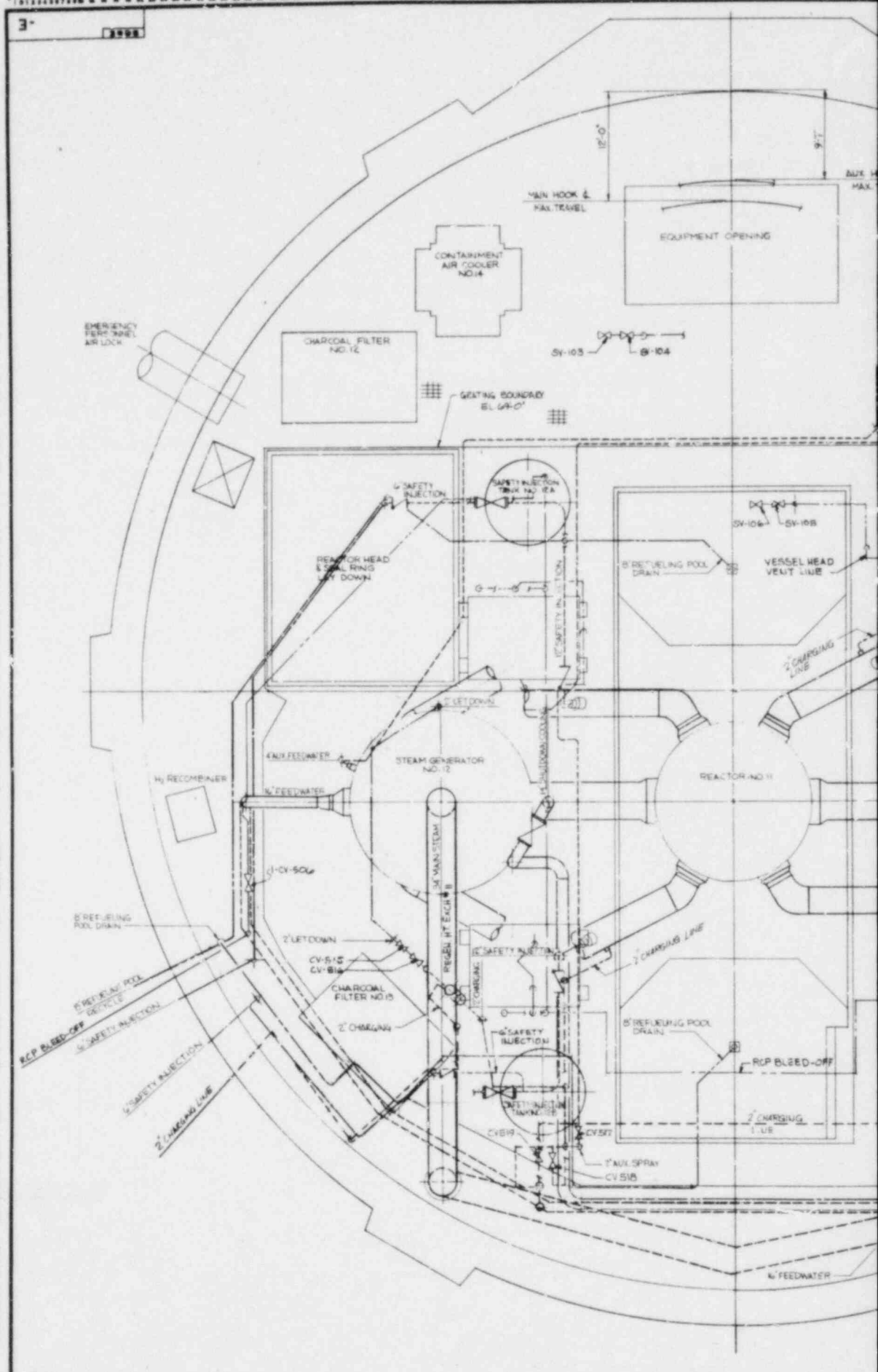
BALTIMORE GAS & ELECTRIC CO.
CALVERT CLIFFS

BECHTEL POWER CORPORATION

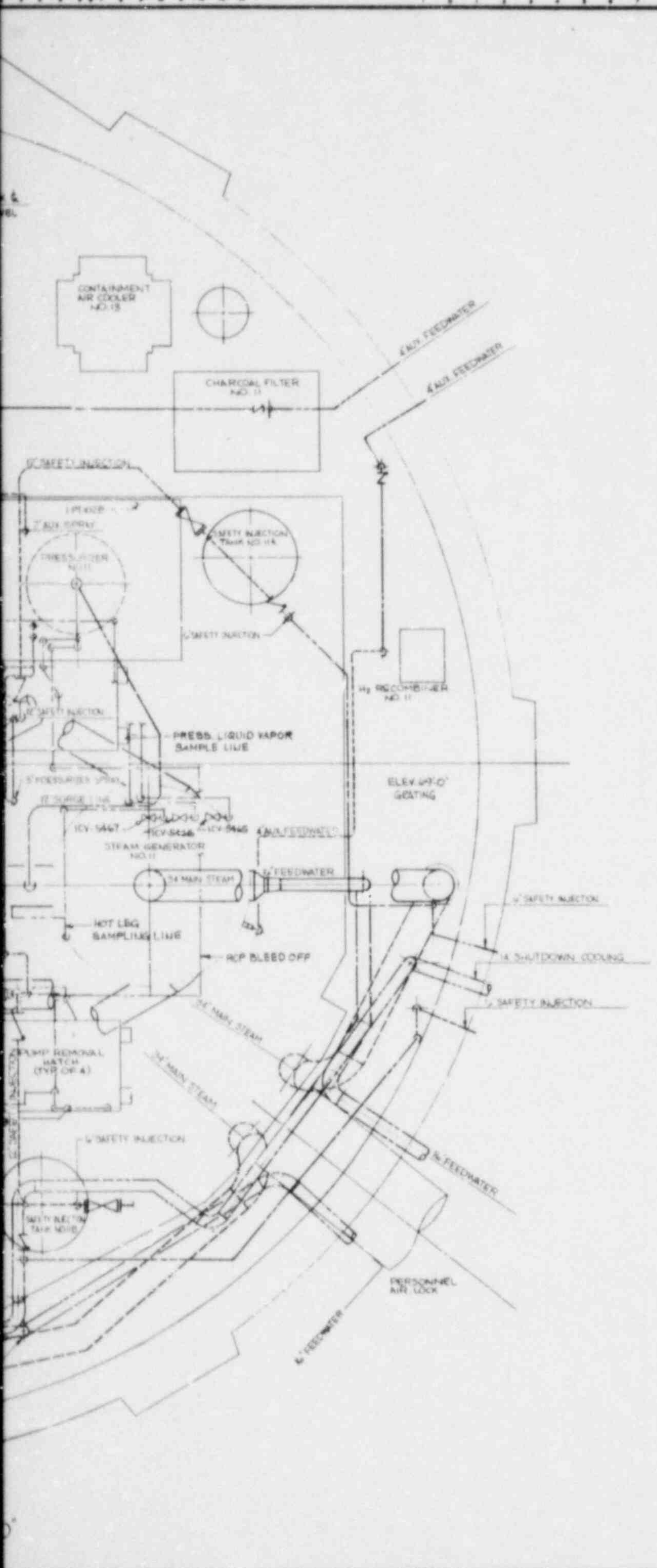
LOAD PATHS

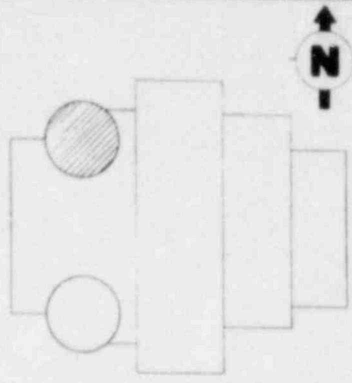
EXHIBIT - C

11865	—	SK-ME-101	0



UNIT NO. 1 PLAN AT EL. 69





KEY PLAN

NOTES:-

1. PIPING LOCATIONS ARE APPROXIMATE
2. R.C. LOOP AT EL. 37'-0"
3. ONLY SAFE SHUTDOWN/DECAY HEAT REMOVEL PORTIONS OF PIPING SHOWN.
4. INSTRUMENT TUBING NOT SHOWN
5. ALL PRESSURIZER PIPING ABOVE EL. 46'-0" LOCATED IN PRESSURIZER BLDG.

REFERENCE DRAWINGS

M-351	AREA NO. 22 PIPING PLAN EL. 69'-0"
M-361	AREA NO. 23 PIPING PLAN EL. 69'-0"
M-350	AREA NO. 22 PIPING PLAN EL. 45'-0"
M-360	AREA NO. 23 PIPING PLAN EL. 45'-0"
M-349	AREA NO. 22 PIPING PLAN EL. 27'-0"
M-359	AREA NO. 23 PIPING PLAN EL. 27'-0"
M-348	AREA NO. 22 PIPING PLAN EL. 10'-0"
M-358	AREA NO. 23 PIPING PLAN EL. 10'-0"
SK-M-614-SK1	CHARGING LINE REGEN. HT. EXCH. TO COOLANT LOOP
SK-M-614-SK2	AUXILIARY SPRAY LINE
FSK-MP-491	REGEN. HT. EXCH. #11 TO CHARGING LINE LOOP 12B
FSK-MP-492-SK1	REGEN. HT. EXCH. #11 TO CHARGING LINE LOOP 11A

LEGEND

- ———————— PIPING AT EL. 69'-0" AND UP
- - - - - - - - - PIPING BETWEEN EL. 45'-0" AND 69'-0"
- —-—-—— PIPING BELOW EL. 45'-0"

[redacted]

NO.	DATE	REVISIONS	BY	CH'K	GROUP SUPV	ENGR'G	PROJ. ENGR.	APPR.

SCALE 3/16" = 1'-0" | DESIGNED | DRAWN K.M. CHKD | CHIEF ENGR.

BALTIMORE GAS & ELECTRIC CO.
CALVERT CLIFFS

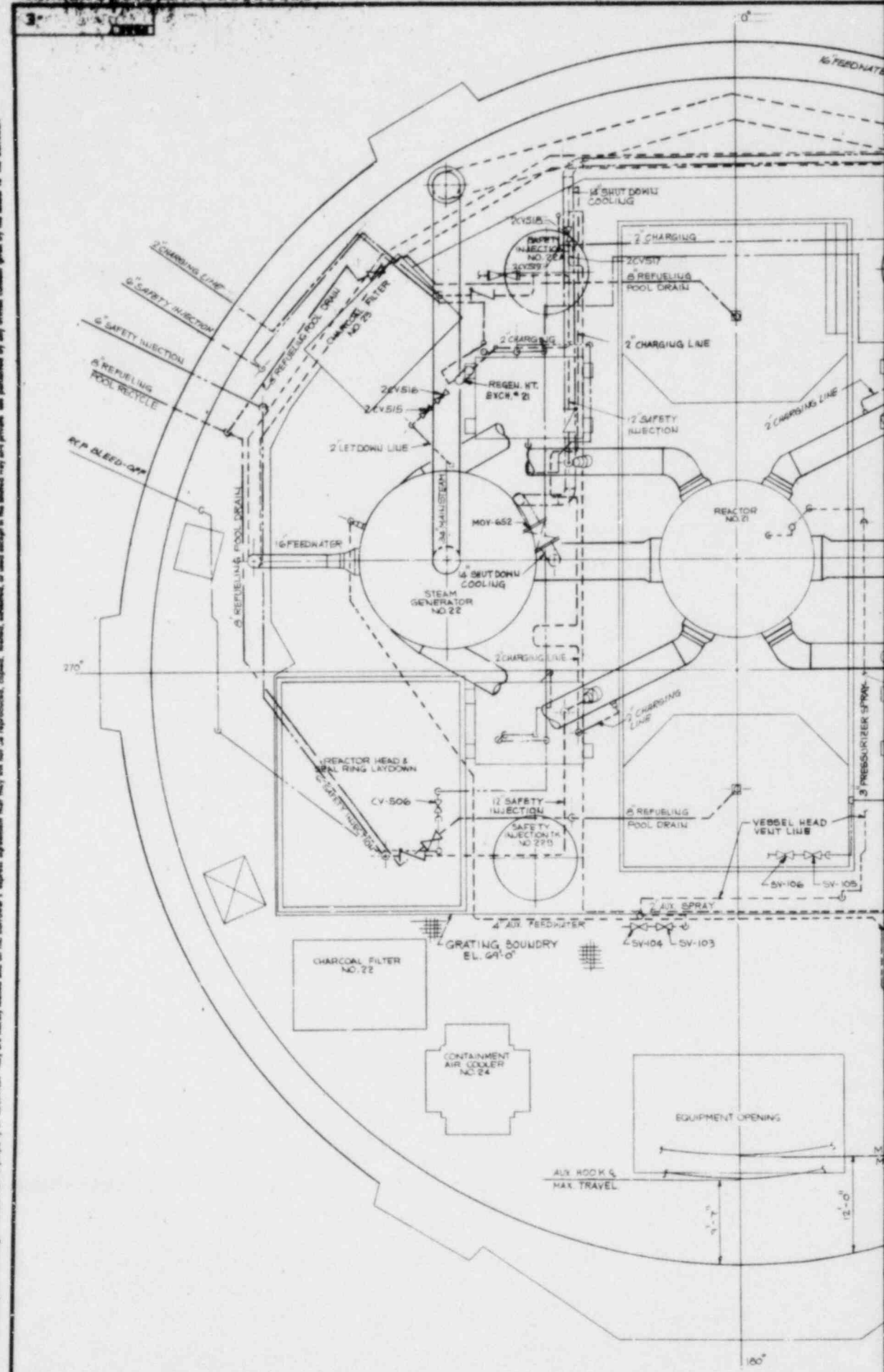
BECHTEL POWER CORPORATION

SAFE SHUTDOWN PIPING

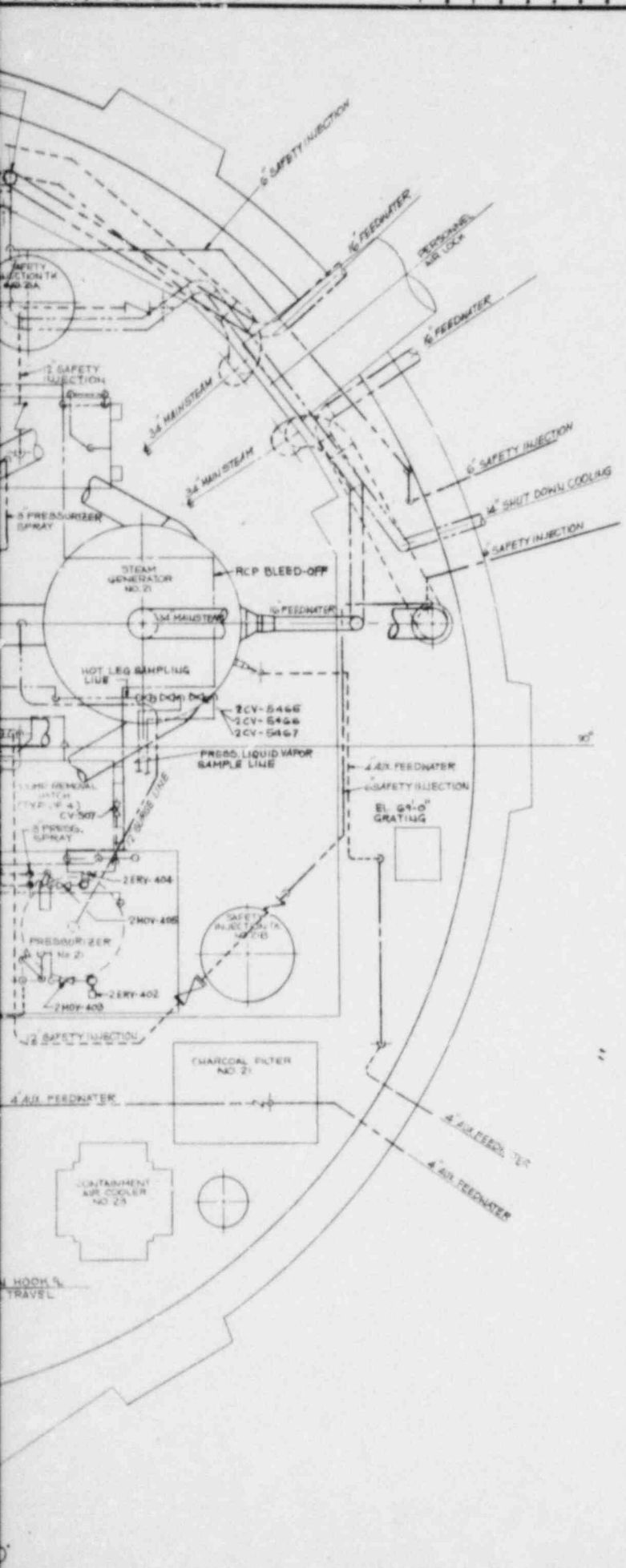
EXHIBIT—C

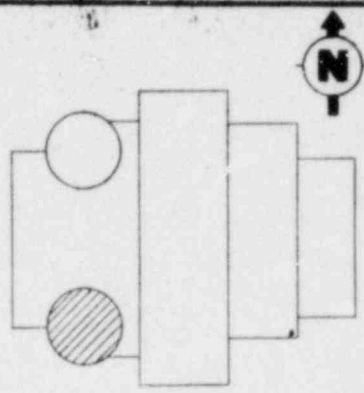
JOB NO.	B.G.&E. DRAWING NO.	BECHTEL DRAWING NO.	REV.
11865	——	SK-ME-102 SH. 1 OF 5	0

12 13



UNIT NO. 2 PLAN AT EL. 69





KEY PLAN

NOTES:-

1. PIPING LOCATIONS ARE APPROXIMATE.
2. R.C. LOOP AT EL. 37'-0"
3. ONLY SAFE SHUTDOWN/DECAY HEAT REMOVAL PORTIONS OF PIPING SHOWN.
4. INSTRUMENT TUBING NOT SHOWN.
5. ALL PRESSURIZER PIPING ABOVE EL 45'-0 LOCATED IN PRESSURIZER BLDG. EXCEPT PRESS. SPRAY VALVES ON ROOF AT EL. 93'-6"

REFERENCE DRAWING

M-371 AREA No. 24 PIPING PLAN EL 69'-0"
M-381 AREA No. 25 PIPING PLAN EL. 69'-0"
M-370 AREA No. 24 PIPING PLAN EL. 45'-0"
M-380 AREA No. 25 PIPING PLAN EL. 45'-0"
M-369 AREA No. 24 PIPING PLAN EL. 27'-0"
M-379 AREA No. 25 PIPING PLAN EL. 27'-0"
M-368 AREA NO. 24 PIPING PLAN EL. 10'-0"
M-378 AREA NO. 25 PIPING PLAN EL. 10'-0"
BK-M-0614 SHT 1 CHARGING LINE-REGEN. HT. EXCH. TO COOLANT LOOP
BK-M-0614 SHT 2 AUXILARY SPRAY LINE
FSK-MP-3107 REGEN. HT. EXCH. # 21 TO CHARGING LINE LOOP 22B.
FSK-MP-3108 REGEN. HT. EXCH. # 21 TO CHARGING LINE LOOP 22B.

LEGEND

——— PIPING AT EL. 69'-0" AND UP
- - - - - - PIPING BETWEEN EL 45'-0 AND EL 69'-0"
——— PIPING BELOW EL. 45'-0"

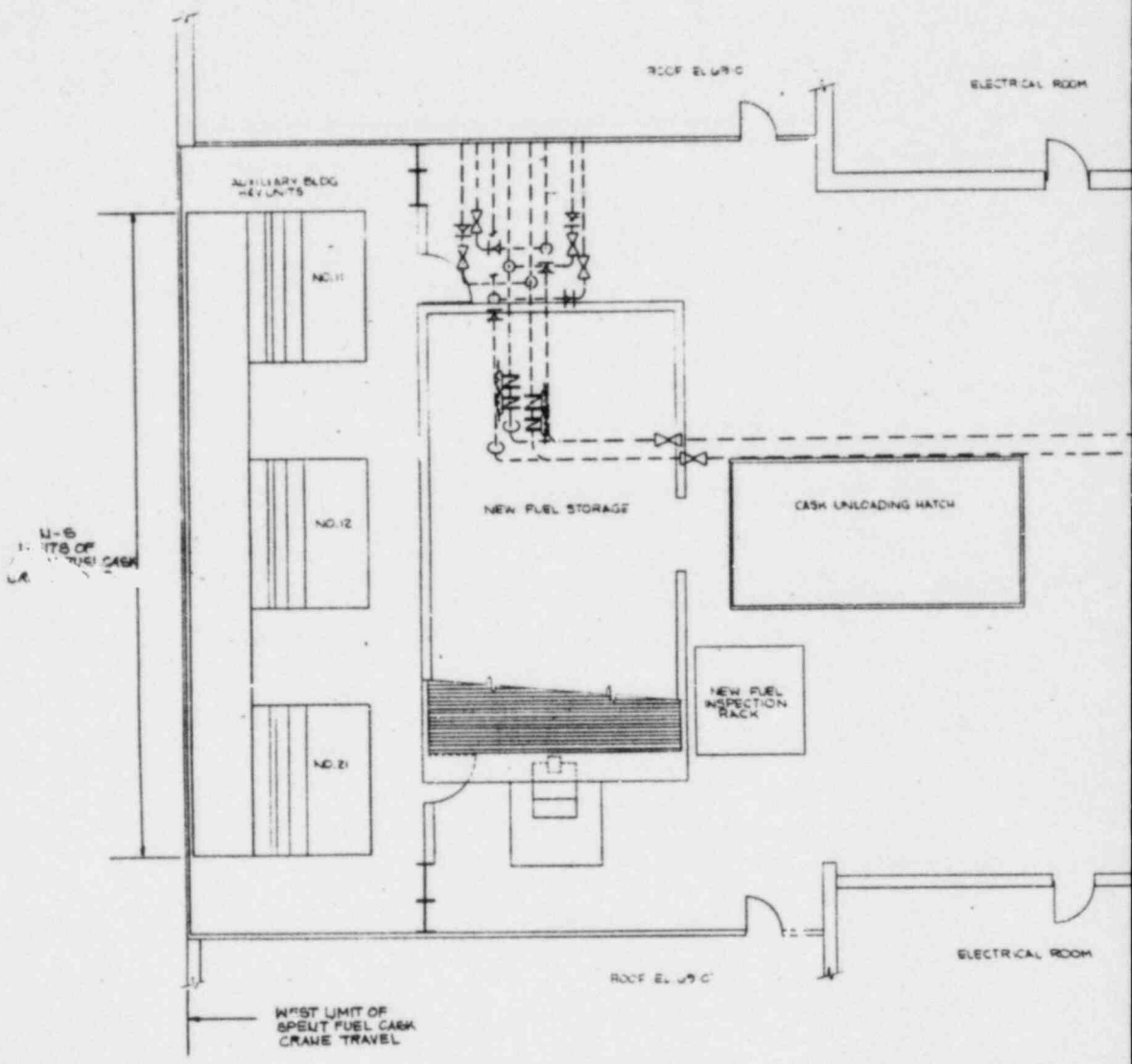
NO.	DATE	REVISIONS	BY	CHK'D	ENGR'G APPR.	PROJ. ENGR.	CHK
SCALE 3/16" = 1'-0"		DESIGNED		DRAWN K.M.DAW			

BALTIMORE GAS & ELECTRIC CO.
CALVERT CLIFFS

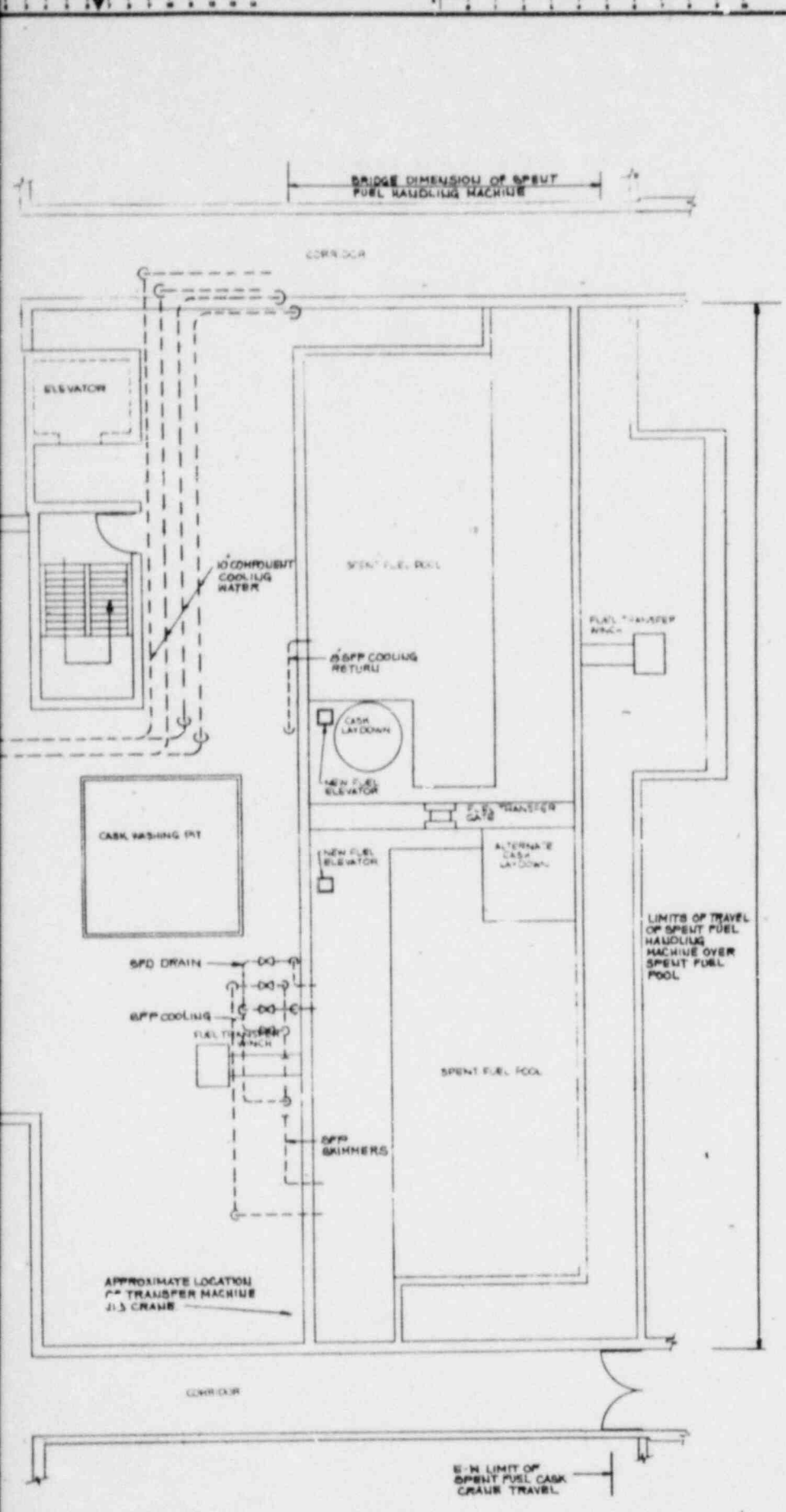
BECHTEL POWER CORPORATION

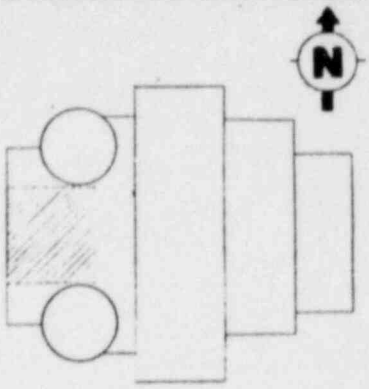
SAFE SHUTDOWN PIPING EXHIBIT-C

JOB NO.	SERVICE UNIT NO.	DRAWING NO.	REV.
11865	—	SK-ME-102 SH. 2 OF 8	0



AUXILIARY BU





KEY PLAN

NOTES:

1. PIPING SHOWN IS LOCATED ON ELEVATION BELOW (EL 46') AND ABOVE HANDRAIL ON THAT ELEVATION. FOR OTHER PIPING IN CRANE PATH SEE ELEVATION 45' DRAWING (SK-ME-102 SH 4)

REFERENCES:

M-300 AREA NO 16 PIPING PLAN EL. 45'-0"
M-306 AREA NO 17 PIPING PLAN EL. 45'-0"

DG. EL. 69'-0"

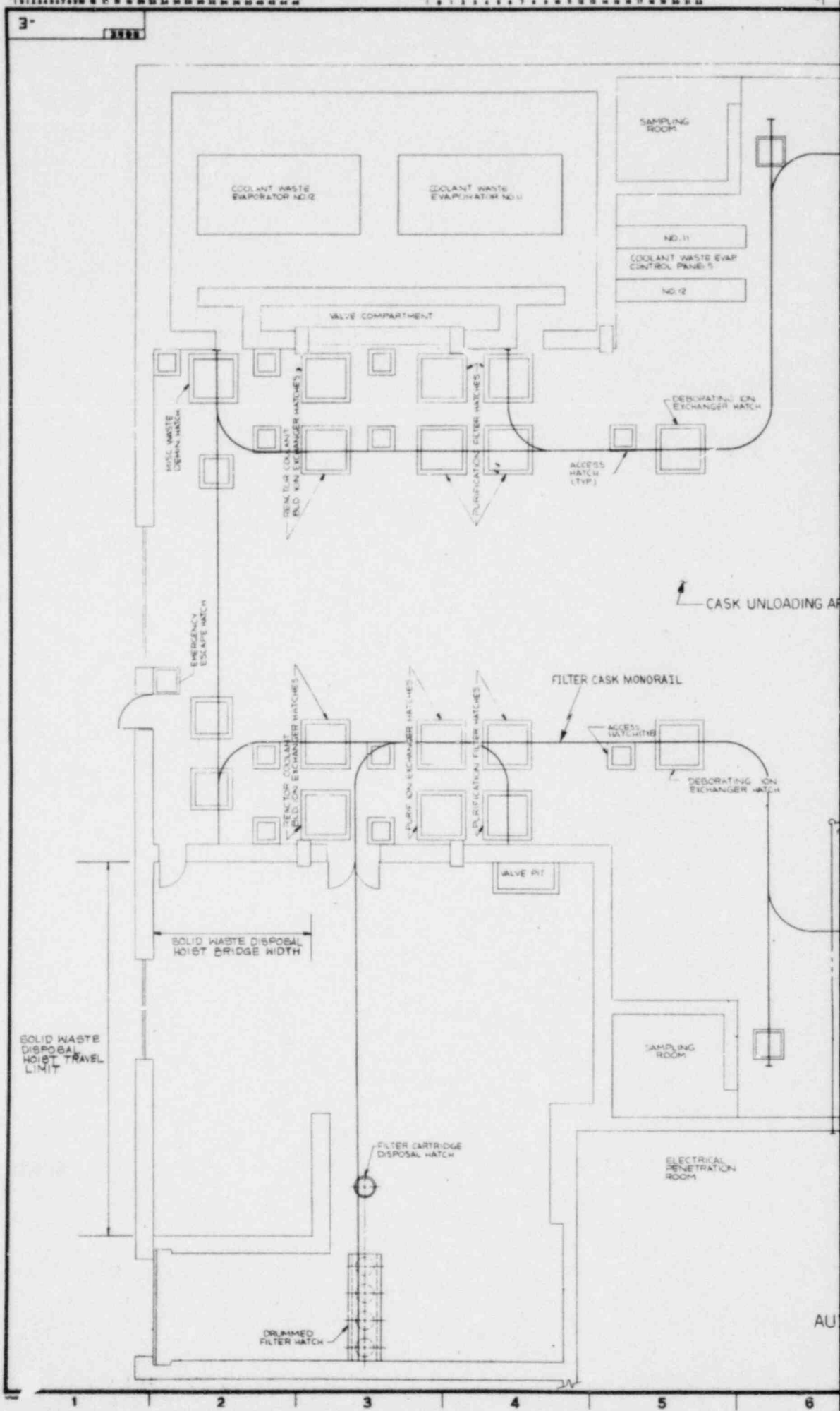
NO	DATE	REVISIONS	BY	CHK	APP'D	DRAWN DATE	APP'D
SCALE 1/4" = 1'-0"		DESIGNED		DRAWN K.M. DAW		CHK'D DATE	

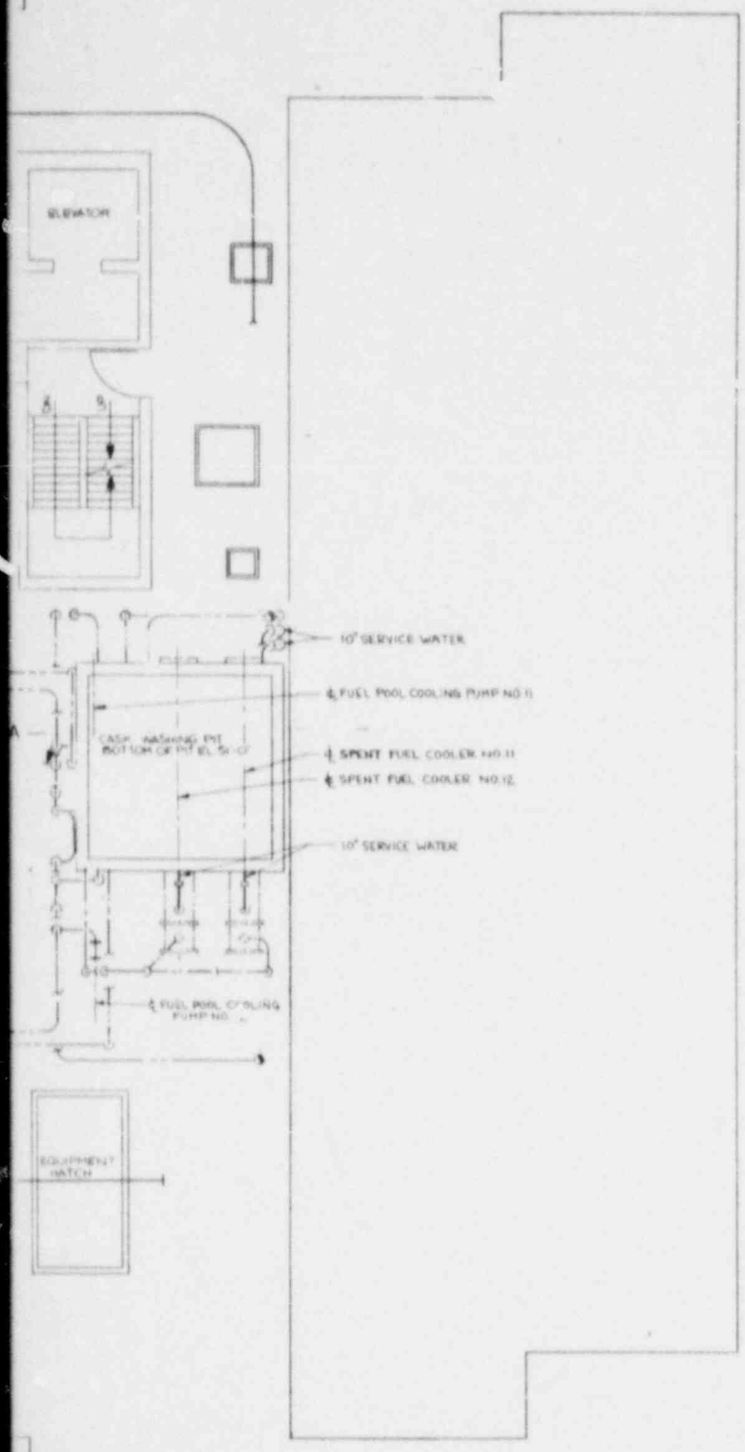
BALTIMORE GAS & ELECTRIC CO.
CALVERT CLIFFS

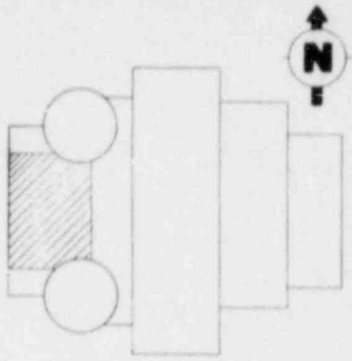
BECHTEL POWER CORPORATION

SAFE SHUTDOWN PIPING
EXHIBIT-C

JOB	BECHTEL DRAWING NO.	CONTR. DRAWING NO.	REV.
11865	—	SK-ME 102 SHT. 3 OF 8	0







KEY PLAN

NOTE:

1. PIPING SHOWN IS LOCATED ON LOWER ELEVATION (EL 27'-0") AND IS SPENT FUEL POOL COOLING SYSTEM RELATED.
2. ALL PIPING IS 6" ℄ EXCEPT AS NOTED.

REFERENCE DRAWING

M-300 AREA 16 PIPING PLAN EL. 45'-0"
M-308 AREA 17 PIPING PLAN EL. 45'-0"
M-307 AREA 17 PIPING PLAN EL. 27'-0"
M-309 AREA 17 PIPING - PARTIAL PLAN & SECTION EL. 27'-0"
M-299 AREA 16 PIPING PLAN EL. 27'-0"

LARY BLDG. EL. 45'-0"

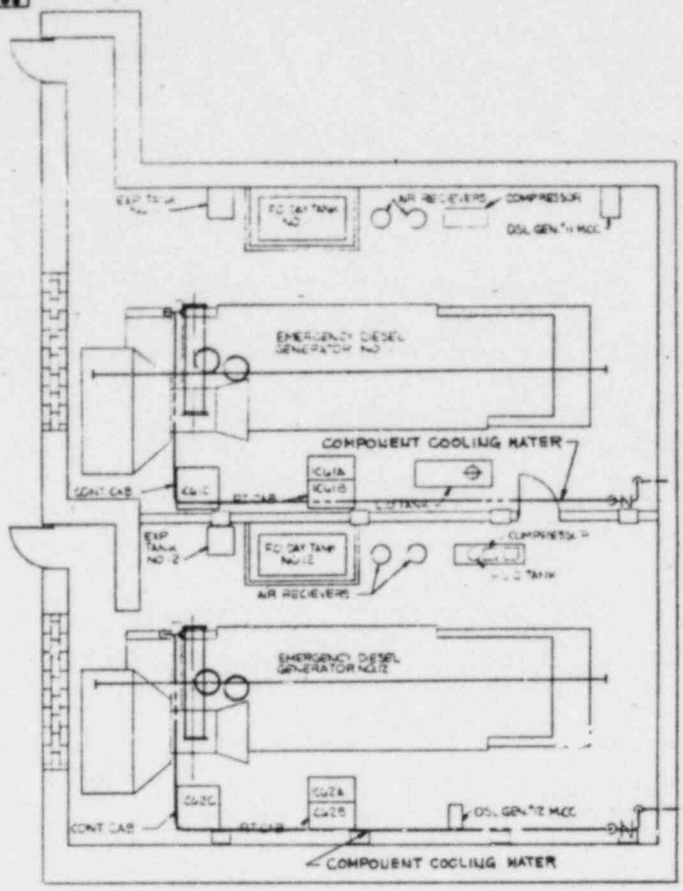
[redacted]

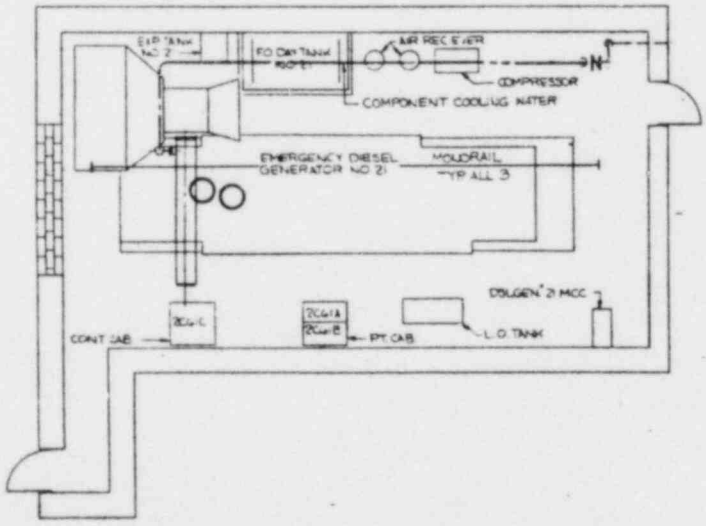
BALTIMORE GAS & ELECTRIC CO.
CALVERT CLIFFS

BECHTEL POWER CORPORATION

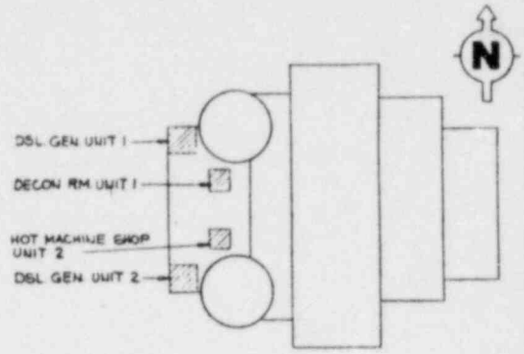
SAFE SHUTDOWN
PIPING
EXHIBIT-C

11985	—	SK-ME-102	0

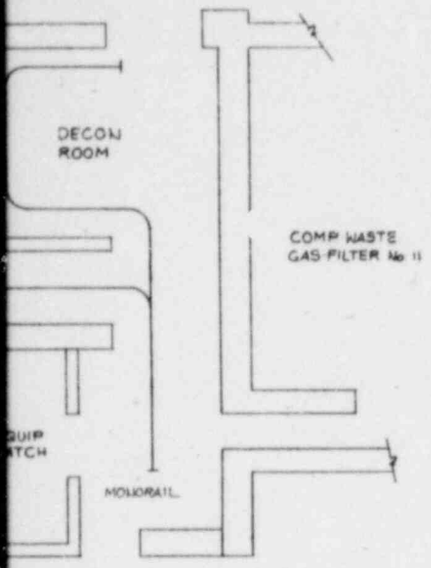




DIESEL GENERATOR ROOMS EL 45'-0"



KEY PLAN

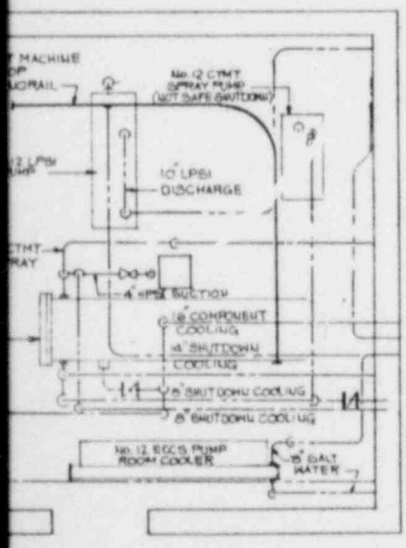


NOTES:

1. THESE ROOM WERE EXCLUDED FROM PHASE I CONSIDERATION JUST PRIOR TO REPORT SUBMITTAL AND ARE SHOWN FOR INFORMATION ONLY. EXCLUSION IS BASED ON COMPLETION OF DROP ANALYSIS ON EL 45' FLOOR.

NTAMINATION ROOM EL 5'-0" (SEE NOTE 1)

PIPING AT THIS OR LOWER ELEVATION



CORRIDOR

ACHINE SHOP EL 5'-0" (SEE NOTE 1)

PING SHOWN LOCATED ON ELEVATION

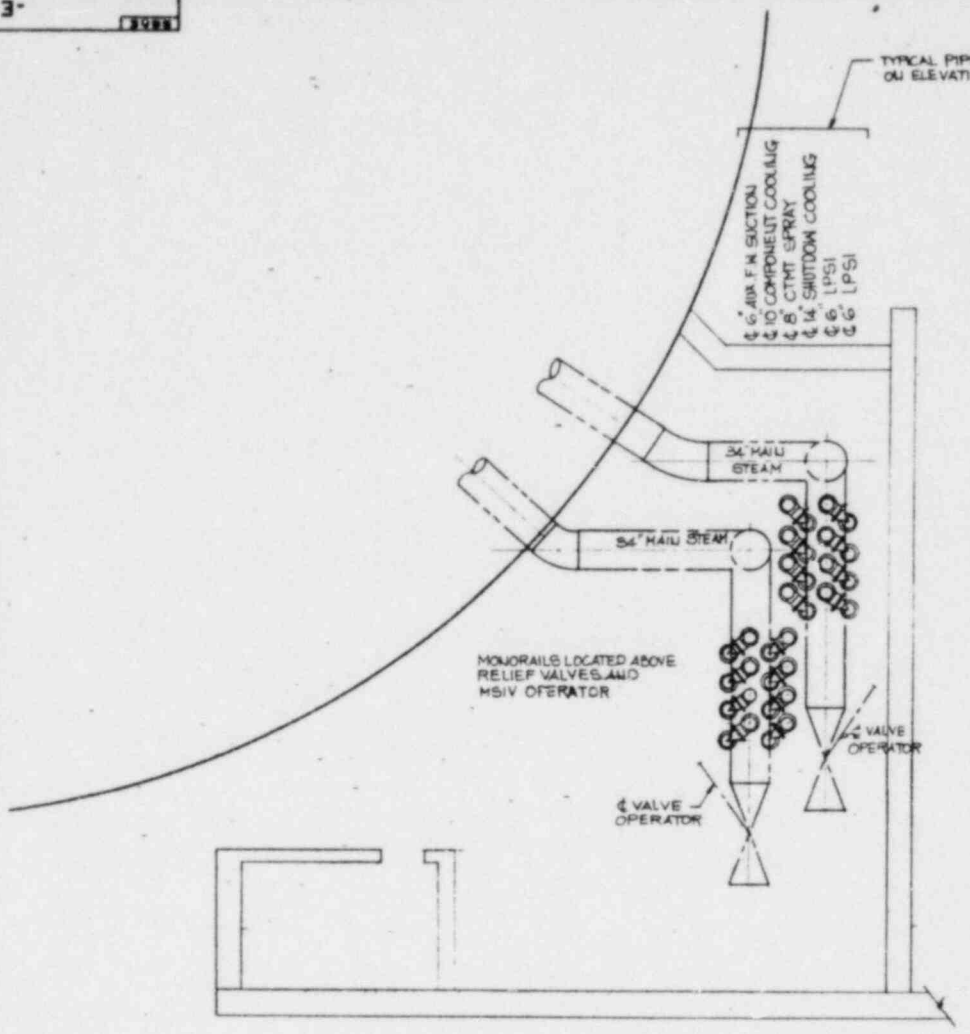
[redacted]								
NO.	DATE	REVISIONS	BY	DATE	APPD.	CHK'D.	PROJ. ENGR.	QPAS
SCALE: 1/8"=1'-0"		DESIGNED		DRAWN KH DAW		CHIEF ENGR.		

BALTIMORE GAS & ELECTRIC CO.
CALVERT CLIFFS

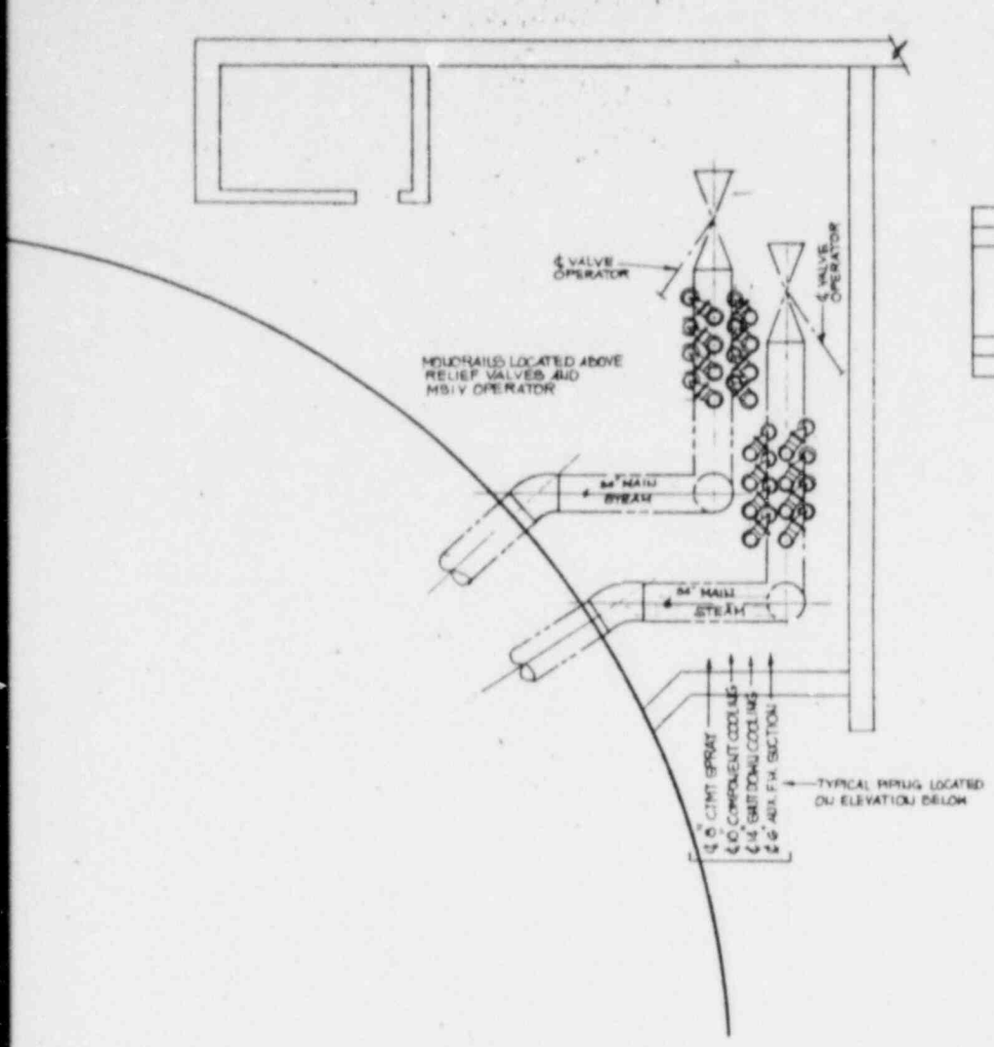
BECHTEL POWER CORPORATION

SAFE SHUTDOWN PIPING EXHIBIT-C

JOB NO.	BECHTEL DRAWING NO.	BG&E DRAWING NO.	REV.
11865	———	SK-ME-102 SHT. 5 OF 6	0



MAIN STEAM ROOM EL 27'-0"
UNIT - 1



MAIN STEAM ROOM EL 27'-0"
UNIT-2

NOTES:

1 DUTY SAFE SHUTDOWN/DECAY HEAT REMOVAL PORTIONS OF SYSTEMS SHOWN.
2 MOUDRAILS ARE APPROXIMATELY 20' LONG IN LOCATIONS INDICATED.

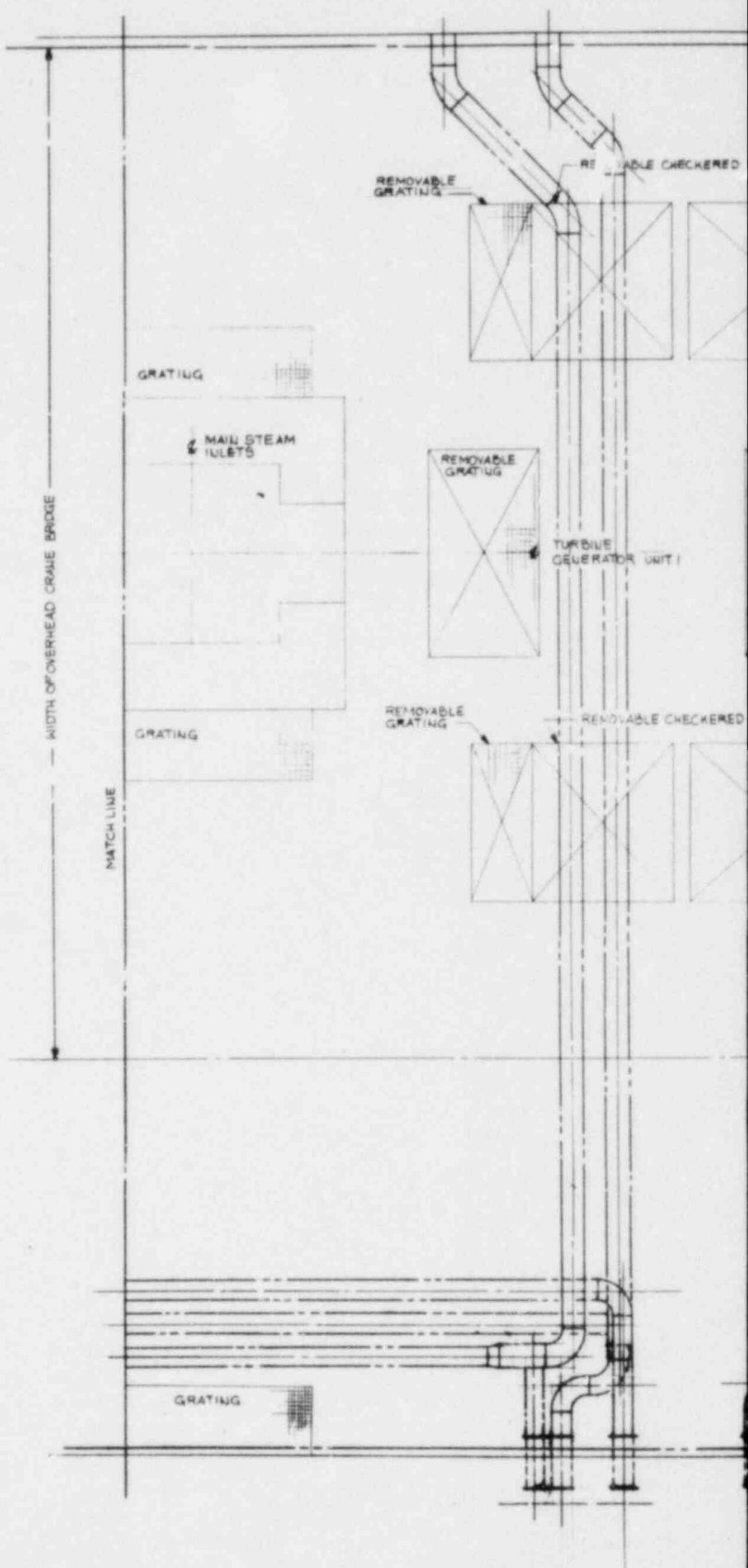
NO	DATE	REVISIONS	BY	CHK	PROJ ENGR	PROJ SUPT	DATE

BALTIMORE GAS & ELECTRIC CO.
CALVERT CLIFFS

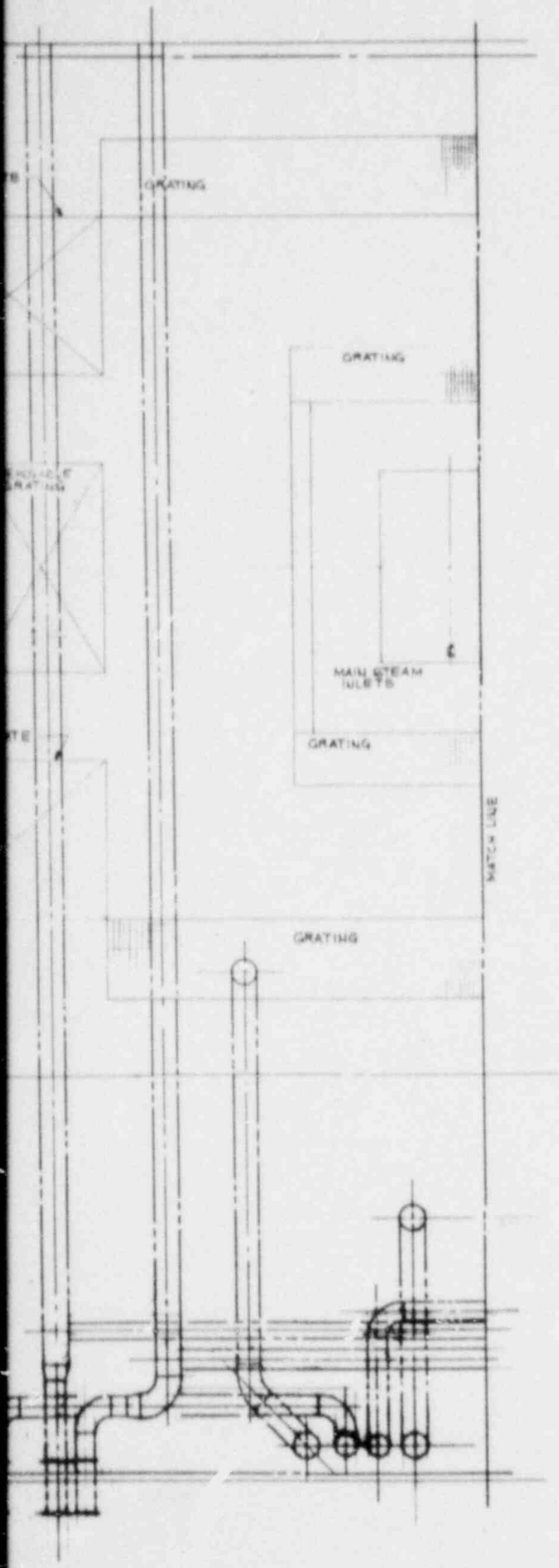
BECHTEL POWER CORPORATION

SAFE SHUTDOWN
PIPING EXHIBIT-C

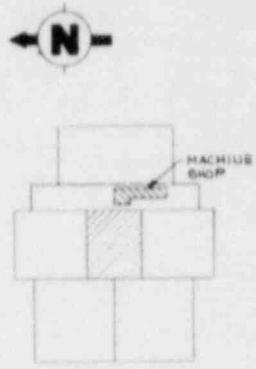
JOB NO.	BECHTEL DRAWING NO.	GIBBS DRAWING NO.	REV.
11865	—	SK-ME-102 SHT 6 OF 8	C



TURBINE BUILDING PL



EL. 45'-0" & 12'-0"



KEY PLAN

NOTES

1. TURBINE CENTERLINE AT EL 45'-0"
2. TURBINE BLDG GROUND FLOOR AT EL 12'-0"
3. SALT WATER SYSTEM PIPING EMBEDDED IN FLOOR BETWEEN EL 8'-2" AND EL (-) 1'-4"
4. CRANE BRIDGE TRAVEL - NORTH / SOUTH
5. MACHINE SHOP (EL 45'-0") LOCATED EAST OF AREA SHOWN. PIPING BELOW SHOP IS SAME AS INDICATED ON THIS DRAWING

[redacted]

DRAWN S.C.S.

BALTIMORE GAS & ELECTRIC CO.
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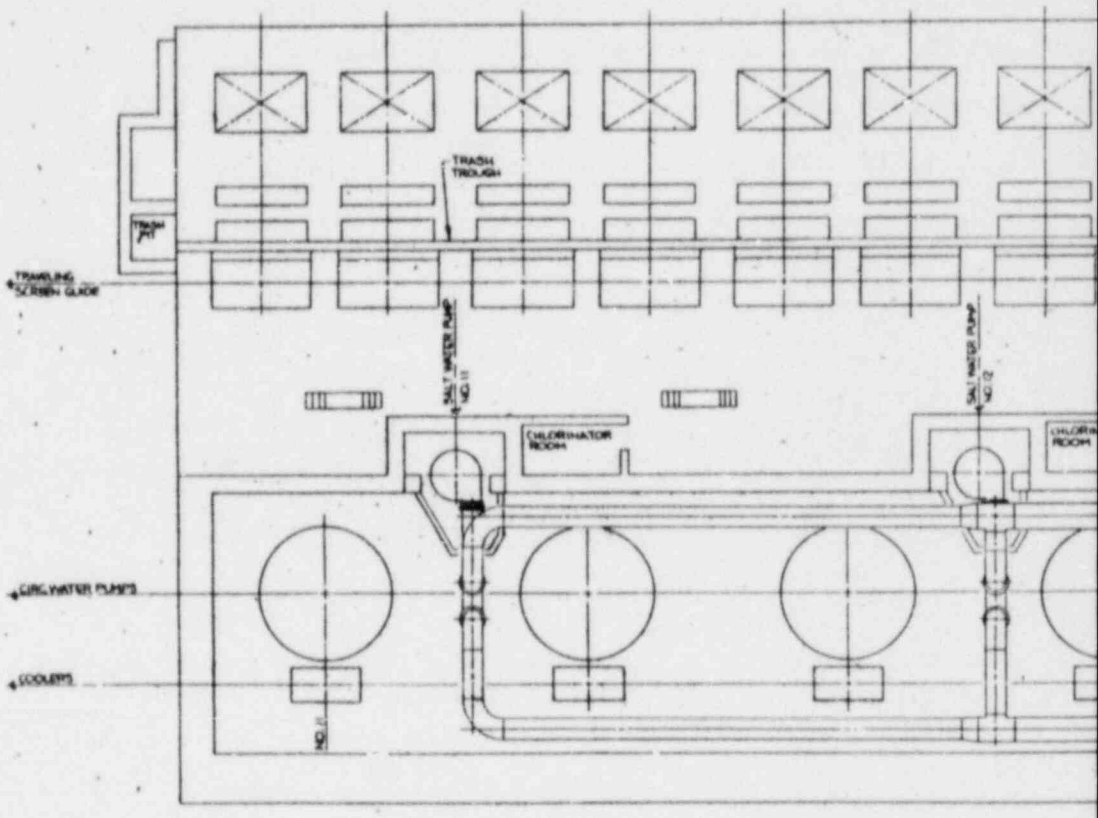
BECHTEL POWER CORPORATION

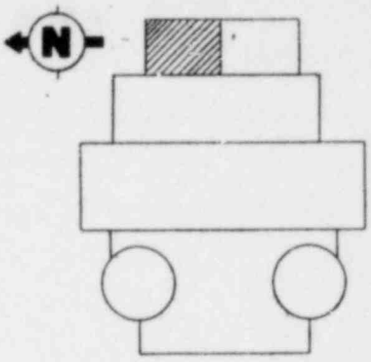
SAFE SHUTDOWN
PIPING

EXHIBIT - C

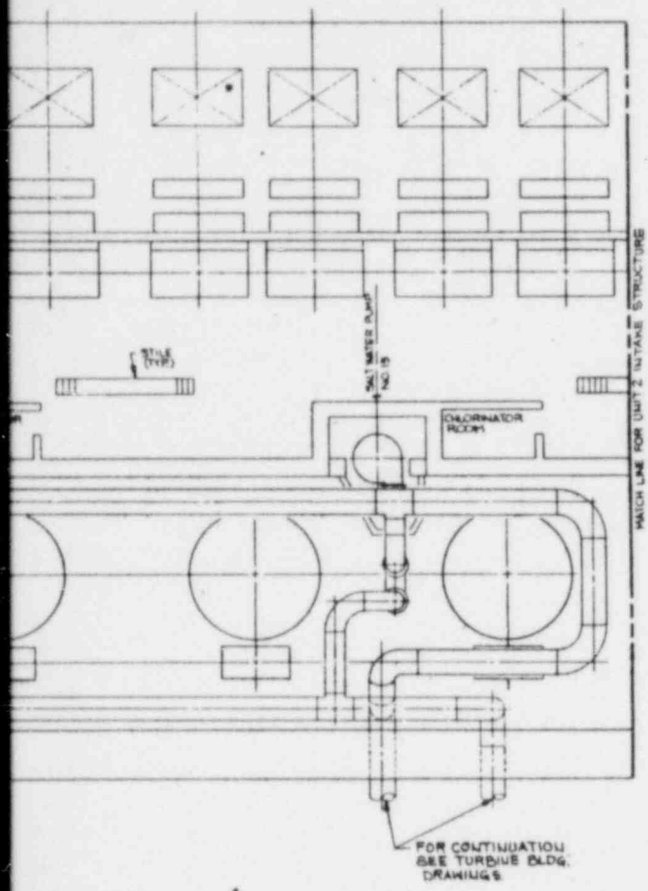
JOB NO.		DRAWING NO.	REV
11865	——	SK-ME-102	0



UNIT NO. 1
INTAKE STRUCTUR
(TYP. ARRANGEMENT FOR UNIT 2)



KEY PLAN



NOTES:

1. ALL PIPING SHOWN IS SALT WATER SYSTEM PIPING.

NO.	DATE	REVISIONS	BY	CHK'D	PROJ. ENGR.	DRAWN	PROJ. ENGR.	APPD.
SCALE 1/8"-1'-0"		DESIGNED		DRAWN C.H. DAN		CHIEF ENGR.		

BALTIMORE GAS & ELECTRIC CO.
CALVERT CLIFFS

BECHTEL POWER CORPORATION

SAFE SHUTDOWN
PIPING
EXHIBIT – C

JOB NO.	E.E. DRAWING NO.	MECH. DRAWING NO.	REV.
11865	—	SK-ME-102 SH. 6 OF 6	0

A B C D E F G H J

7 8 9 10 11 12 13