Docket No. 50-358

WM. H. ZIMMER NUCLEAR POWER STATION - UNIT 1

HEAVY LOADS REPORT

June 1, 1983

HEAVY LOADS REPORT

On January 12, 1981, an NRC letter dated December 22, 1980, from Mr. Darrell G. Eisenhut was received. The purpose of that letter was to request that CG&E review its controls for the handling of heavy loads to determine the extent to which the guidelines of Enclosure 1 to that letter are presently satisfied at the Zimmer Plant, and to identify the changes in modifications that would be required in order to fully satisfy those guidelines.

In May, 1981, the Cincinnati Gas & Electric Company submitted a response concerning the implementation of the Interim Actions listed on Enclosure 2 to the December 22, 1980, Eisenhut letter. Since the Zimmer Nuclear Power Station was under construction at that time the May submittal committed to implementation of the Interim Actions by initial fuel loading of the plant.

In June, 1981 additional information concerning "General Requirements For Overhead Handling Systems" was submitted in response to Item 2.1 of Enclosure 3 to the December 22, 1980, Eisenhut letter.

In September, 1981 a third response was submitted covering the information requirements of Sections 2.2 and 2.3 of Enclosure 3 to the December 22, 1980, Eisenhut letter.

The following submittal provides the necessary descripton of plant hardware, administrative controls and general state of compliance with the requirements of NUREG 0612. This submittal is organized in accordance with the topical sections contained in the draft Technical Evaluation Report prepared by EG&G Idaho, Inc. dated January, 1982.

2.1 Overview

For the purpose of reviewing the applicability of NUREG 0612 to various load handling systems, the weight of a single spent fuel assembly and its handling tool was taken to be 1,000 lbs. Consequently those loads exceeding 1,000 lbs. were classified as heavy loads.

2.2 Heavy Load Overhead Handling Systems

As previously described, the June, 1981 submittal reported the results of our 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. The following information is a revision and update of the June 21, 1981, submittal.

Attachment 1 is a listing of every permanently installed or planned crane or overhead handling system incorporated into the design of the Wm. H. Zimmer Nuclear Power Station. Each crane or load handling device can be located on the equipment removal diagrams as referenced in

Attachment 1. Note the 100-Series cranes are those located in the reactor building.

Attachment 2 provides a listing of those load handling devices from which a load drop will not result in damage to any system required for plant shutdown or decay heat removal without taking credit for interlocks, technical specifications, operating procedures or detailed structural analysis. These cranes were excluded by verifying through visual observation that sufficient physical separation from any load-impact point to safety related equipment exists. The attached equipment removal drawings provide sufficient detail to establish a reasonable confidence level in this assessment.

Attachment 2 also lists those load handling devices which were excluded from further consideration since they are incapable of handling heavy loads. The consequences of a load drop from these load handling devices are bonded by the dropped fuel bundle accident as analyzed in the Zimmer Station FSAR.

Attachment 3 is a listing of those permanently installed overhead handling systems which because of their location make lifts in the vicinity of equipment required for safe shutdown or decay heat removal.

Attachment 4 provides justification for removing some overhead handling systems from fulfilling the General Requirements of NUREG 0612 Section 5.1.1 under specified conditions which would normally exist during its use. While being used under the plant conditions specified in Attachment 4 the overhead handling systems cannot degrade the shutdown or decay heat removal capabilities of the plant. Administrative controls will be established to ensure that crane use is restricted to the conditions specified in Attachment 4 or the General Requirements of NUREG 0612 Section 5.1.1 will be satisfied during use under other conditions. For those cranes listed in Attachment 3, Load/Impact area matrices are included in Attachment 5.

The overhead handling systems which are listed in Attachment 3 and no justification is given in Attachment 4 are those systems which shall meet the General Requirements of Section 5.1.1 of NUREG 0612. These cranes are listed in Attachment 6.

2.3 General Guidelines

The General Guidelines as presented in NUREG-0612 Section 5.1.1, shall be implemented at the time of fuel load or when required as discussed in the following sections:

Section 2.3.1

"Safe load paths should be defined per the guidelines of NUREG 0612, Section 5.1.1(1)".

As in accordance with Section 5.1.1 of NUREG 0612, those cranes defined to carry "heavy loads" with the potential of impacting equipment required and/or for safe shutdown or decay heat removal (see Section 2.2 of this document) will have defined for each, "safe load paths". The safe load path will "follow to the extent practicable structural floor members, beams, etc...." These safe load paths will be included in procedures, on equipment layout drawings. On the plant refueling floor safe load paths will be clearly marked (via paint or safety roping) where the load shall be handled.

As is the case with all procedures at the Wm. H. Zimmer Nuclear Power Station temporary changes to approved written procedures must be approved before implementing any work action deviating from a written procedure. The procedures regarding movement of "heavy loads" are no different. The normal approval cycle of any procedure includes review by the Station Review Board.

Section 2.3.2

"Procedures should be developed and implemented per the guidelines of Section 5.1.1(2)".

Also in accordance with Section 5.1.1 of NUREG 0612, for applicable cranes defined by Section 2.2, detailed procedures shall be written governing the load handling operations of heavy loads over spent fuel or safe shutdown equipment. Such procedures shall be written and approved prior to performing applicable load handling operations following initial fuel loading. Procedures shall contain detailed rigging instructions including sling lengths, rope diameters, shackle diameters and minimum ratings. The procedure shall contain an isometric pictorial diagram of the required rigging. Multi-use rope slings used at ZPS-1 are labeled with tags to indicate their rated capacity. Some heavy loads located on the plant refueling floor are handled with dedicated sling arrangements. These slings will be labeled for their particular use(s). The following applicable before use rigging inspections shall be contained in the procedure:

a) Latches, fastenings and attachments for proper operation.

b) Excessive wear and/or distortion or deformation.

c) Chemical or heat damage to materials.

d) Cracking, fraying or parting of equipment.

e) All end connections for damage.

f) Slings and ropes for cuts, crushing, kinks, broken wires, unstranding or corrosion (no more than six randomly distributed broken wires in one rope lay, or three broken wires in one strand in one rope lay).

g) Hooks and U-bolts for deformation or cracks (shall not exceed more than 15% in excess of normal throat opening or more than 10 deg. twist).

h) Chains for wear, twists, broken, cracked or otherwise damaged links.

i) Examine sling or rope width or diameter for indications of wear or faulty core support.

The procedure shall contain step-by-step load movement instructions and shall define the equipment removal path as previously discussed.

Section 2.3.3

"Crane operators should be trained, qualified and conduct themselves per the guidelines of Section 5.1.1 (3)".

All personnel who operate cranes or hoists at ZPS-1 shall be trained, qualified and conduct themselves per the guidelines of Chapter 2-3 of ANSI B30.2-1976.

Section 2.3.4

"Special lifting devices should satisfy the guidelines of ANSI-N14.6-1978".

In the June, 1981 and September, 1981 responses concerning the state of compliance with the guidelines of NUREG 0612 at the Wm. H. Zimmer Nuclear Power Station, two special lifting devices were identified. These special lifting devices are identified as the reactor vessel head strongback and

the steam dryer/moisture separator strongback. At the time of previous NUREG 0612 submittals the Cincinnati Gas and Electric Co. was in the process of obtaining detailed design and fabrication documentation to establish the status of compliance with the requirements of ANSI 14.6 as required by item 4 of NUREG 0612 Section 5.1.1.

The subject special lifting devices were designed and supplied by the General Electric Co. The following information details the design, fabrication and acceptance testing methods and controls which were employed to ensure the load handling reliability of the special lifting devices.

The subject special lifting devices were designed by the General Electric Co. The design of each device is presented on detailed engineering drawings. The drawings indicate the specified materials and any required heat treatment. Commercially procured items are specified by manufacturer and catalog numbers. The material is specified as per the referenced catalog. The design drawings require welders and procedures be qualified in accordance with ASME Boiler and Pressure Vessel Code Section IX. Other fabrication practices are specified on the design drawings.

Quality Assurance requirements, required documentation and control of fabrication records were specified by General Electric Company QC Plans and associated supplements which are available for review. No limiting conditions for use of either device were specified. The reactor head strongback will be operated and stored in an environment which is suited for human beings and such an environment has no detrimental effects on the equipment as designed. The steam dryer/moisture separator lifting device was designed for the existing environment during use. It can be immersed in water and will operate reliably and safely at temperatures that exist when the RPV head is removed.

The reactor head strongback was designed by General Electric to lift the reactor vessel head. However, since the reactor vessel head and the drywell head were both manufactured by Chicago Bridge and Iron, allowance has been made to lift both items with the same strongback. The weight of the containment head is less than or equal to the reactor vessel head. The attachment points are also located in the same dimensional relationship. Consequently, although not specifically designed for this purpose by General

Electric, the reactor vessel head strongback may be used for both purposes. The design documents require the attachment of nameplates to each device. The nameplates indicate the design drawing number and the rated capacity of the device.

The design documents for the special lifting devices do not contain a critical items list. As previously described the design drawings and other referenced documents indicate any required material traceability or special fabrication practices. In-process testing was specified on the component design drawings. The specified in process testing involved magnetic particle inspection, per GE specifications, of structural welds prior to and following the proof load test. The crane hook engagement pins were magnetic particle and ultrasonic tested, per GE specifications, following the performance of the proof load test. Final product testing was specified on the design drawings. This testing involved, for the reactor head strongback, a proof load test of 100 tons with 25 tons applied simultaneously to the four lift points and for the steam dryer/moisture separator strongback a proof load test of 104 tons with 26 tons applied simultaneously to each leg on a 194.25 inch spacing. As discussed above, for both devices, magnetic particle inspection of structural welds was performed following the proof load test.

Stress analyses which demonstrate margins of safety are contained in the GE Design Record File DRF #F13-00011. These files are open for audit at the General Electric Company offices.

The designer has not specified permissible repair procedures. Under the GE QA program any deviation from design drawings or specifications during fabrication are reported to the design individual. The design engineer approves the disposition of the equipment which includes repair procedures or retesting requirements as applicable.

Documentation received from General Electric lists the safety factor of the head strongback with respect to yield as 4.1. Similarly the steam dryer/moisture separator strongback safety factor is stated to be greater than 3.33 with respect to yield. For both devices the safety factor with respect to ultimate material strength is stated to be greater than 5.0. All intervening hardware between the strongback proper and the lifted load are part of the strongback design. These loads are very small in relation to the design capacity. The reactor building bridge

crane 110 ton hook hoisting speed is 5.5 ft/min. Based on this slow hook speed the subject special lifting devices are adequate with respect to yield point when dynamic loads are considered. The load bearing pins, turnbuckles and cables are designed as part of the special lifting devices. The stated safety factors apply to all load bearing components. The steam dryer/moisture separator lifting device employs a four legged sling in its design. Each leg has a documented 40,000 lb. working load rating and was proof tested by the manufacturer to 80,000 lbs. The four legged sling arrangement exhibits an approximate 24 degrees to the vertical angle. Including a conservative estimate for the strongback weight of 20 tons the slings are determined to meet requirements of ANSI B30.9 while lifting the 51 ton moisture separator.

Hardness tests were performed only on parts which were heat treated for the required material condition. The particular requirements were specified on the parts drawing. This requirement applied to the crane hook adaptor pins.

Lamellar tearing was considered in the design of the devices. No laminations were observed in manufacturing when cutting plates or during magnetic particle testing of the hook adaptor pins which are of tubular configuration.

The design of each lifting device includes turnbuckles at each of the four lift points to accomplish even load distributions.

The load carrying components that may become inadvertantly disengaged are fitted with locking devices. The steam dryer/moisture separator strongback requires remote engagement with the load attachment points. The design provides for sufficient clearance to allow simple motion engagement. Remote indication is supplied to confirm engagement.

As previously described, fabrication of the special lifting devices was accomplished under the requirements of the General Electric Quality Control Plan. Product Quality Certifications are on file from General Electric which supply evidence that the subject devices are in conformance with the requirements of GE design drawings, referenced specifications and purchase order requirements. Deviations from original design documents were approved by design engineers.

device, presently under fabrication, will be installed using a special lifting device. Prior to its initial use the shield strongback will be evaluated to ensure compliance with the design and fabrication requirements of ANSI 14.6 The owners responsibilities for acceptance testing, maintenance and assurance of continued compliance will be addressed as provided in this submittal.

The reactor vessel stud tensioning strongback was not evaluated as a special lifting device. The stud tensioners are used to tension and detension the reactor head nuts and studs. The vessel head is installed during these operations. Consequently the stud tensioners and strongback cannot impact fuel in the reactor vessel. The strongback will not be moved in close proximity to the spent fuel pool.

Section 2.3.5 "Lifting Devices not Specially Designed"

The rigging used with all plant load handling systems meets the requirements of ANSI B30.9. For those load handling systems listed in Attachment 6 additional allowance for dynamic loading will be included as follows. The capacity of the rigging will be specified as the static load plus 1/2% of the static load for each foot/minute of hoist hook speed.

Table 1 is a revision of previous submittals which details the load handling combinations employed on the plant refueling floor. These load handling combinations are composed of rigging rated by the manufacturer at 200% of the static load.

These ratings take into consideration sling construction, sling leg angles and other considerations. All load handling combinations, therefore, meet or exceed the requirements of ANSI B30.9.

Section 2.3.6

"Cranes should be inspected, tested, and maintained in accordance with the guidelines of Section 5.1.1(6)."

All cranes and hoists at ZPS-1 shall be subjected to frequent and periodic inspections as described in Chapter 2-2 of ANSI B30.2-1976. All plant cranes are designated as either regular or standby service based upon a twice/week usage criterion.

Periodic testing, maintenance and actions to ensure reliable and safe operation of the special lifting devices used at the Wm. H. Zimmer Nuclear Power Station shall be implemented as follows.

In accordance with the requirements of NUREG 0612 use of the special lifting devices will be controlled through detailed procedures. The special lifting devices will only be used for their intended functions as described by procedure. The procedure will contain required precise visual inspections. Subparts or assemblies will not be exchanged from one special lifting device to another. Each special lifting device is marked with its rated capacity on its nameplate. Historical records of the special lifting devices will be maintained as described in ANSI 14.6. Special lifting devices will be removed from service as required by ANSI 14.6 Section 5.1.7 until special testing is completed to ensure continuing compliance as described in ANSI 14.6 Section 5.3.3.

The proof load test performed as required by General Electric design requirements satisfies the intent of an initial acceptance test. Periodic testing required by ANSI 14.6 Section 5.3.1 will be performed. It is our interpretation that "If the device has not been used for a period exceeding one year, this testing shall not be required. However, in this event, the test shall be applied before returning the device to service" applies to both testing options.

The special load testing prescribed in ANSI 14.6 Section 5.2.1 shall be performed following major maintenance or overstressing events as described in ANSI 14.6 Sections 5.3.2 and 5.3.3. The reactor head strongback has no non-load-bearing functional parts. The remote engagement system and the engagement display system of the steam dryer/moisture separator strongback will be functionally tested by procedure as described in Sections 5.3 4 and 5.3.5 of ANSI 14.6.

All special lifting devices will be visually inspected by staff engineering personnel before use; for intervals less than 3 months between use, inspection is not required.

In addition to the steam dryer/moisture separator strongback and the reactor head strongback, a fuel transfer canal shield has been purchased. This

All cranes undergo an undocumented before use inspection encompassing those items listed under Section 2-2.1.2 of ANSI B30.2. All regular use cranes, or standby use cranes being operated regularly for more then a month, undergo a documented monthly inspection of these same characteristics. All cranes undergo a documented yearly inspection encompassing those items listed under Section 2-2.1.3 of ANSI B30.2.

All new, altered, extensively repaired, or modified cranes will be tested as required by Section 2-2.2.1 and rated load tests will be performed per Section 2-2.2.2 of ANSI B30.2 with the following exceptions. We believe that the requirement of Sections 2-2.2.2.b.2&3 requiring full length travel of the crane trolley and bridge while handling a 125% test load is inappropriate and unnecessary. The load test as described in ANSI B30.2 may necessarily be performed in the vicinity of safe shutdown or decay heat removal equipment, thus placing the plant in an unsafe situation. We feel that this exception should be taken and is justifiable in certain situations where an inadvertant drop of the test load could impact safe shutdown or decay heat removal equipment.

Preventative maintenance, equipment safety tagging, adjustments and lubrication will be performed as described in Section 2-2.3 of ANSI B30.2.0. Wire rope inspection, replacement and maintenance will be conducted as described in Section 2-2.4 of ANSI B30.2.

Section 2.3.7

"The crane should be designed to meet applicable criteria and guidelines of ANSI B30.2-1976, "Overhead and Gantry Cranes", and of CMAA-70, "Specifications for Electric Overhead Traveling Cranes". An alternative to a specification in ANSI B30.2 of CMAA-70 may be accepted in lieu of specific compliance if the intent of the specification is satisfied."

The miscellaneous hoist and trolleys located in the general areas of the plant are designed and constructed in accordance with ANSI B30.16-1973. They are described by the architect engineer and manufacturer as "electric overhead hoists". The refueling floor cranes include three jib cranes and the Reactor Building Crane. The three jib cranes on the refueling floor were designed and constructed in accordance with ANSI B30.11. The Turbine Building

crane meets EOCI specifications. The Service Water Maintenance Bridge Crane complies with ANSI B30.2.

The Reactor Building bridge crane design is described in detail in Section 9.1.4.2.2 of the Wm. H. Zimmer Nuclear Power Station FSAR which is included with this submittal (Attachment 7). In particular the FSAR states:

> "The cask crane will be designed, fabricated, installed, and tested in accordance with ANSI B30.2.0, Overhead and Gantry Cranes CMAA Specification, AISC, AISE, and other applicable manufacturers' association and engineering society codes."

The reactor building crane main hook is believed to have sufficient design features to make the likelihood of a load drop extremely small as described in the September, 1981 submittal.

The lifting point safety factors for shield plugs & pool gates on the refueling floor are listed in Table 2. These lift points were designed to AISC codes requiring a safety factor of approximately 1.67. Design modifications will be completed to upgrade the spent fuel pool plug attachment points. This modification provides for the use of rigging rated at twice the lifted static load.

The state of compliance to NUREG 0612 requirements for other overhead load handling systems which may impact safe shutdown or decay heat removal systems is as described in the September, 1981 submittal.

2.4 Interim Guidelines

Enclosure 2 of the NRC letter lists a series of Interim Actions to be applied for the control of heavy loads. In May 1981 the Cincinnati Gas & Electric Company submitted a response which described planned Interim Actions to be implemented before initial fuel loading. In October 1982 additional information was supplied to clarify and update our commitments with respect to the Interim Actions. The Interim Actions will be met at the time of initial core loading as follows:

(1) Licenses for all operating reactors not having a single-failure-proof overhead crane in the fuel storage pool area should be revised to include a specification comparable to Standard Technical Specification 3.9.7, "Crane Travel - Spent Fuel Storage Pool Building" for PWR's and Standard

Technical Specification 3.9.6.2, "Crane Travel," for BWR's, to prohibit handling of heavy loads over fuel in the storage pool until implementation of measures which satisfy the guidelines of Section 5.1.

The main reactor building crane is used for handling heavy loads in the fuel storage pool area at the Wm. H. Zimmer Nuclear Power Station. The 110 ton hook of the main reactor building crane is designed with the following single failure proof features described in the FSAR:

a) A redundant idler gear train, which is a duplicate of the driving side gear reduction system (without drive motor). Each gear reduction train has a 150% of rated torque braking system.

b) Structural steel support upon which the drum barrel will rest following gross failure of drum bearings, shaft, or bearing support.

c) Redundant full capacity wire rope system.

d) Redundant designed hook within a hook load handling system.

In addition to the single failure proof design features of the reactor building crane, the Wm. H. Zimmer Nuclear Power Station Technical Specifications contain a LCO for movement of equipment over fuel assemblies in the spent fuel pool. The technical specifications also contain surveillance requirements to assure operability of the crane interlocks which prevent travel over the spent fuel pool.

(2) Safe load paths should be defined per the guidelines of Section 5.1.1(1).

Per the requirements of Section 5.1.1(1) of NUREG-0612, equipment removal paths have been defined for all load handling devices. Equipment removal paths traverse structural members as much as is practical. For those heavy loads which are determined to potentially impact irradiated fuel in the reactor vessel or spent fuel pool or safe shutdown equipment, the following additional controls shall apply:

a) Heavy load movements shall be accomplished through detailed implementing procedures. The procedures shall contain an equipment layout drawing which indicates the equipment removal path.

b) The equipment removal path shall be physically indicated by marks on the floor or a series of stands connected with safety ribbon.

c) Temporary changes and revisions to such implementing procedures shall be accomplished in accordance with existing administative controls which apply to all plant implementing procedures.

(3) Procedures should be developed and implemented per the guidelines of Section 5.1.1(2).

Per the requirements of Section 5.1.1(2) of NUREG-0612, procedures shall be develcped to detail load handling operations for hoists determined to be operating over or in proximity to irradiated fuel or safe shutdown equipment. Such procedures shall be written and approved prior to performing applicable load handling operations following initial fuel loading. Procedures shall contain detailed rigging instructions including sling lengths, rope diameters, shackle diameters and minimum ratings. The procedure shall contain an isometic pictorial diagram of the required rigging. Multi-use rope slings used at ZPS-1 are labeled with tags to indicate their rated capacity. Some heavy loads located on the plant refueling floor are handled with dedicated sling arrangements. These slings will be labeled for their particular use(s). The following applicable before use rigging inspections shall be contained in the procedure:

a) Latches, fastenings and attachments for proper operation.

b) Excessive wear and/or distortion and deformation.

c) Chemical or heat damage to materials.

d) Cracking, fraying or parting of equipment.

e) All end connections for damage.

f) Slings and ropes for cuts, crushing, kinks, broken wires, unstranding or corrosion (no more than six randomly distributed broken wires in one rope lay, or three broken wires in one strand in one rope lay).

g) Hooks and U-bolts for deformation or cracks (shall not exceed more than 15% in excess of normal throat opening or more than 10 deg. twist).

h) Chains for wear, twists, broken, cracked or otherwise damaged links.

i) Examine sling or rope width or diameter for indications of wear or faulty core support.

The preocedure shall contain step-by-step load movement instructions and shall define the equipment removal path as previously discussed.

(4) Crane operators should be trained, qualified and conduct themselves per the guidelines of Section 5.1.1(3);

All personnel who operate cranes or hoists at ZPS-1 shall be trained, qualified and conduct themselves per the guidelines of Chapter 2-3 of ANSI B30.2-1976.

(5) Cranes should be inspected, tested, and maintained in accordance with the guidelines of Section 5.1.1(6).

See Section 2.3.6 for response.

(6) In addition to the above, special attention should be given to procedures, equipment, and personnel for the handling of heavy loads over the core, such as vessel internals or vessel inspection tools. This special review should include the following for these loads: (1) review of procedures for installation of rigging or lifting devices and movement of the load to assure that sufficient detail is provided and that instruction are clear and concise; (2) visual inspections of load bearing components of cranes, slings, and special lifting devices to identify flaws or deficiencies that could lead to failure of the component; (3) appropriate repair and replacement of defective components; and (4) verify that the crane operators have been properly trained and are familiar with specific procedures used in handling these loads, e.g., hand signals, conduct of operations, and content of procedures.

The special review described in Item (6) will be performed.

ITEM NO.	PURPOSE OR EQUIPMENT TO BE LIFTED	(NO.) & CAPACITY OF BEAMS OR HOISTS (TONS)	LOCATION						HOIST TYPE	TROLLEY MODE OF TRAVEL
			ELEVATION OF			COLUMN	ROWS	M-19		
			TOP OF STL.	HOIST FLR.	OPER. FLR.	N-S	E-W	SHEET NO.		
101	Main Reactor Bldg. Crane-Aux. Hook	110-10	654'-3"	521'-0"	627'-9"	15-28	A-F	6,8	Bridge Cr.	PWR
102	Fuel Handling Jib Crane	1/2	-	627'-9"	627'-9"	25-27	B-D	6,8	Electric	PWR
103	Channel Handling Boom Jib Crane	100 lbs.	-	627'-9"	627'-9"	25-27	D-C	6,8	Chain	Manual
104	Fuel Handling Jib Crane	1/2	-	627'-9"	627'-9"	23-25	B-C	6,8	Electric	PWR
105	Relief & Safety Valve Maint. VP Cooler Units	2	582'-10"	520'-10"	-	18-25	B-D	6,8,11	Electric	PWR
106	CRD Maintenance Bridge Crane	1/2	537'-9"	525'-7"	525'-7"	27-20	D-F	2,11	Electric	PWR
107	RHR & RBCCW (1B) Heat Exchanger	20	565'-6"	503'-6"	546'-0"	27-28	B-E	1,11	Electric	PWR
108	Main Steam Hatch Slabs & Isolation Valves	18	564'-6"	532'-0"	546'-0"	21-25	E-F	1,8,11	Electric	PWR
109	Recirculating Pump Motors VP Cooler Units	24.45	552'-8 5/8"	525'-7"	525'-7"	18-25	B-E	2,8,11	None	PWR
110	R.R. Pumpmotor Cart	25	-	-	-	-	-	-	-	Manual
111	Hatch Slabs & RCIC Maintenance	15	543'-0"	503'-6"	525'-7"	15-18	E-F	2,8,11	Electric	PWR
112	RBCCW (1B) Heater Exchanger	20	542'-0"	503'-6"	525'-7"	23-28	A-B	2,8,11	Electric	PWR
113	Refueling Platform	1/2	625'-7"	625'-7"	625'-7"	21-23	C-D	6,8	Electric	PWR
114	Valve Maintenance	2 1/2	553'-10 1/4"	525'-7"	525'-7"	21-25	B-E	2,8,11	Chain	PWR
115	Service Platform Jib Crane	1/2	625'-7"	625'-7"	625'-7"	21-23	C-D	6	Electric	PWR
116	Drywell Access Hatch Cover	6	540'-4"	525'-7"	525'-7"	18-21	B-D	2,11	Chain	Chain H.G.T.
117	Undervessel Service	-	531'-11"	525'-7"	525'-7"	21-20	C-D	2	-	-
118	Low Pressure Core Spray	-	518'-0"	475'-6"	503'-6"	25-28	B-C	4	Electric	PWR
119	RHR Pumps	4	520'-6 7/8"	475'-6"	503'-6"	27-23	D-E	4,11	Electric	PWR
119	RHR Pumps	4	520'-7"	475'-6"	503'-6"	27-28	D-E	4,11	Electric	PWR
119	RHR Pumps	4	520'-7"	475'-6"	503'-6"	27-28	D-E	4,11	Electric	PWR
120	High Pressure Core Spray Pump	15	522'-7"	475'-6"	503'-6"	15-18	A-B	4,8	Electric	Chain H.G.T.
121	RCIC Turbine Pump & Condenser	4	521'-7 7/8"	475'-6"	503'-6"	15-18	D-F	4,8,11	Electric	PWR
122	Suppression Pool Service	2	519'-1/4"	475'-6"	-	18-27	B-E	4,8,11	Electric	PWR
123	Standby Gas Filters	2	624'-9"	593'-6"	593'-6"	23-27	A-B	6,8	Electric	Chain H.G.T.
124	Standby Gas Filters	2	566'-6"	546'-0"	546'-0"	23-27	A-B	1,8	Electric	Chain H.G.T.
125	Winch - R.R. Cart Removal	1 1/2	-	-	525'-7"	15-19	A-B	1,8	Electric	-
126	MSIV (Outboard) Clearance Pull	(1) 1 1/2	541'-6"	532'-0"	532'-0"	21-25	E-F	2,8,11	Manual	None
127	New Fuel Handling - Jib Crane	(1) 2	-	521'-0"	546'-0"	27-28	A-B	1	Electric	PWR
128	MSIV (Inboard) Maintenance	(4) 5	544'-6 3/8"	-	-	22-19	D	2,13	None	Chain H.G.T.
129	CRD Maintenance Rail & Cart	By RCI	-	-	-	-	-	-	-	Manual
201	H.P. Heaters & Slabs	(2) 65	604'-0"	496'-0"	546'-0"	16-19	J-L	1,8,10	-	-
202	Miscellaneous Equipment & Slabs	7 1/2	564'-2"	496'-0"	546'-0"	16-24	J-L	1,10	Electric	PWR
203	Diesel Generator Engine	(6) 1	544'-0"	525'-7"	525'-7"	12-14	F-L	2,8	-	Manual
204	Diesel Generator Engine	(3) 5	544'-0"	525'-7"	525'-7"	13-14	F-L	2,8	-	Manual

ITEM NO.	PURPOSE OR EQUIPMENT TO BE LIFTED	(NO.) & CAPACITY OF BEAMS OR HOISTS (TONS)	LOCATION						HOIST TYPE	TROLLEY MODE OF TRAVEL
			ELEVATION OF			COLUMN	ROWS	M-19 SHEET NO.		
			TOP OF STL.	HOIST FLR.	OPER. FLR.	N-S	E-W			
205	Miscellaneous Equipment & Slabs	7 1/2	507'-3"	473'-5"	496'-0"	19-24	J-L	4,10	Electric	PWR
206	Guard Bed 1A and 1B	(2) 2	1A-480'-0"	473'-5"	473'-5"	26-28	H-J	5,10	Electric	Manual
207	Guard Bed 1A and 1B	(2) 2	1B-490'-10½"	473'-5"	473'-5"	26-28	H-J	5,10	Electric	Manual
208	HVAC Fan Removal	2	565'-7"	567'-5"	567'-5"	17-19	F-J	6	Electric	Manual
301	Main Turbine Bldg. Cranes-Lifting Beam	(2) 110-25	596'-9"	473'-5"	546'-0"	8-28	L-S	1,8	Bridge Crane	PWR
302	Condenser Water Box Lay Down	13	531'-9"	473'-5"	473'-5"	11-12	N-R	2,9	Electric	PWR
303	Condenser Water Box	(4) 13	527'-8½"	482'-0"	482'-0"	12-13	N-R	2,8,1	Electric	Chain H.G.T.
304	Turbine Driven Reactor Feed Pumps	(2) 10	522'-2"	496'-0"	496'-0"	22-26	N-R	4,8	Electric	PWR
305	Reactor Feed Pump Turbines	(4) 2	523'-0"	496'-0"	496'-0"	22-26	N-R	4,8	Electric	PWR
306	Oil Reservoir Cooler & Slabs	(2) 5	525'-0"	496'-0"	496'-0"	11-13	L-N	3,8,9	Electric	PWR
307	Condensate Pumps & Boosters	6	492'-0"	471'-2"	471'-2"	13-19	R-S	5,8,9	Electric	PWR
308	Emergency Water Drain Pump	12	492'-0"	473'-5"	473'-5"	12-13	R-S	5,8,9	Electric	Chain H.G.T.
309	L.P. HTRS 1A & 1B Drain Coolers 1A & 1B	(2) 25	539'-0"	510'-3"	527'-0"	13-16	R-S	2,8,9	Electric	PWR
309	L.P. HTRS 1A & 1B Drain Coolers 1A & 1B	(2) 25	542'-0"	510'-3"	527'-0"	13-16	R-S	2,8,9	Electric	PWR
401	Solid Radwaste Bridge Crane	7 1/2	550'-1"	523'-0"	527'-0"	22-24	W-Y	2,8	None	PWR
402	Solid Radwaste Crane Hoist & Trolley "A"	7 1/2	549'-0"	496'-0"	527'-0"	25-28	V-Y	1,8	Electric	PWR
403	Solid Radwaste Crane Hoist & Trolley "B"	7 1/2	549'-0"	527'-0"	527'-0"	16-28	V-Y	2,8	Electric	PWR
404	Machine Shop Bridge Crane	10	-	-	-	2-8	M-P	2	Bridge Crane	-
405	Decontamination Room	5	530'-$\frac{5}{8}$"	520'-10$\frac{5}{8}$"	520'-10$\frac{5}{8}$"	7-8	L-M	2	Electric	PWR
406	Traveling Screen & S.W.P.S. Bridge Crane	30	565'-$\frac{3}{8}$"	521'-0"	521'-0"	1-4	B-D	16,17	Electric	PWR
407	Circ Water Pumps	27	547'-4$\frac{5}{8}$"	510'-0"	521'-0"	101-104	AA-BB	15	Electric	PWR
408	Circ Water Stop Logs	1	547'-8½"	498'-4"	521'-0"	101-104	BB-CC	15	Electric	PWR
409	Circ Water CL^2 Storage Tanks	2	547'-3$\frac{3}{8}$"	521'-0"	521'-0"	101-104	BB-CC	15	Electric	PWR
410	Fire Water Pumps	(2) 1	537'-9½"	521'-0"	521'-0"	101-104	CC-DD	15	Electric	PWR
411	Cooling Tower Make-up Water Pumps	(2) 5	486'-5½"	435'-0"	466'-5½"	3-4	A-B	16,1&2	Electric	PWR
412	Service Water Pumps	(2) 8	486'-5½"	435'-0"	466'-5½"	2-5	A-C	16,1	Electric	PWR
413	Service Water Strainers	5	517'-0"	491'-5½"	491'-5½"	3-4	A-B	16,1&2	Electric	PWR
414	Service Water General Service	8	543'-10"	466'-5½"	521'-0"	2-3	A-B	16,1&2	Electric	PWR
415	Slab Removal Radwaste RLDS	5	567'-4½"	546'-0"	527'-0"	28	W	1	Chain	HGT
416	Radwaste Racility Vent Fan Removal	1 1/2	567'-4½"	546'-0"	546'-0"	36	W	1	Chain	HGT
417	Service Water Pump Motors 1A & 1B Maintenance	3	450'-1$\frac{3}{4}$"	435'-0"	435'-0"	2	B	16	None	By CG&E
418	Service Water Pump Motors 1A & 1B Maintenance	3	450'-1$\frac{3}{4}$"	435'-0"	435'-0"	3	B	16	None	By CG&E
419	Cooling Tower Make-up Water Pump Motor Maintenance	3	449'-4½"	435'-0"	435'-0"	2-3	A	16	None	By CG&E

ATTACHMENT 2
OVERHEAD HANDLING DEVICES EXCLUDED
FROM THE REQUIREMENTS OF NUREG 0612

102---incapable of handling a heavy load

103---incapable of handling a heavy load

104---incapable of handling a heavy load

106---incapable of handling a heavy load. In addition the load impact point only effects the drywell floor drain and equipment drain sumps and sump pumps. The device is used for control rod drive removal which is only performed in cold shutdown.

110---Item 110 is a 25-ton cart to be used for transporting a Reactor Recirculation pump motor through the drywell hatch. Since the load is not lifted, this is not an overhead handling system and is therefore removed from further review.

113---incapable of handling a heavy load

115---incapable of handling a heavy load

117---Item 117 is an overhead handling system which is indicated on the equipment removal plans as an undervessel service crane. Purchase and installation of this crane has not taken place. When installed a detailed review will be performed at that time to ensure the requirements of NUREG 0612 are satisfied.

123---Item 123 is a two-ton overhead handling system which is used to manipulate standby gas treatment train components. When in use the Standby Gas Treatment train is moperable and no other decay heat removal or Safe shutdown equipment can be impacted.

124---Item 124 is a two-ton overhead handling system which is over the second standby gas treatment filter train. Again, the impact area contains no safe shutdown or decay heat removal equipment.

125---Item 125 is a 1.5-ton capacity winch used for pulling the reactor recirculation pump motor cart through the drywell equipment access hatch. This winch is not an overhead handling system. Furthermore this device would only be used with the drywell open, requiring the unit to be in cold shutdown. Therefore this system has been deleted from further review.

127---Item 127 is a two-ton wall mounted jib crane which is used in the secondary containment equipment access building to off load equipment from trucks in the equipment access building. The impact area contains no safe shutdown or decay heat removal equipment.

129---Item 129 is a cart mounted winch used for removing control rod drives from the primary containment. This device is not an overhead handling system and control rod drives can only be removed with the unit in cold shutdown. Therefore this device has been removed from further consideration.

201---Item 201 is a 65 ton overhead handling system which would be used to remove the high pressure feedwater heaters from their cubicles if tube bundle replacement was ever necessary. This lifting device is indicated on plant equipment removal drawings but has not been purchased at this time. The load impact point for this device, involves numerous prices of equipment required for safe shutdown or decay heat removal located in the plant auxiliary building. Purchase and installation of this device will not proceed until the need for removing the high pressure feedwater heaters exists. If this is ever necessary a detailed review will be performed at that time to ensure that the requirements of NUREG 0612 are satisfied.

205---Item 205 is a 7.5-ton overhead handling system used for transporting various pieces of equipment located in the plant auxiliary building. The load impact area contains no equipment required for safe shutdown or decay heat removal.

207---Item 207 is composed of two 2-ton overhead handling system which are used to remove the offgas system prefiltering guard bed covers and adsorption media. The load impact area for this device contains no safe shutdown or decay heat removal equipment.

208---Item 208 is a 2 ton overhead handling system used to transport plant ventilation fans and motors during maintenance. The load impact area contains no safe shutdown or decay heat removal equipment.

302---Item 302 consists of a 13-ton overhead load handling system used for removal of the mani condenser circulating water system water boxes. The load impact area contains no safe shutdown or decay heat removal equipment.

303---Item 303 consists of 4 overhead handling hoists which are used for removing the circulating water system water boxes from the main condenser. The load impact area contains no safe shutdown or decay heat removal systems.

304---Item 304 consists of two 10-ton overhead handling systems which handle the turbine driven reactor feed pumps when being serviced. There is a four-inch Main Steam line in each of the Feedwater pump rooms. However the main steam lines are isolated outside of the Feedwater pump rooms.

Furthermore the pumps are in separate rooms and a load drop in one room cannot impact the other. Therefore a load drop will not impact any safe shutdown or decay heat removal systems.

305---Item 305 consists of four 2-ton overhead cranes w tich handle the reactor feed pump turbines and miscellaneous equipment. The same situation as item 304 exists. If the turbine and/ or pump for the feedwater pumps were being serviced the steam lines would be isolated external to the feedwater pump room. The load impact area contains no safe shutdown or decay removal systems.

306---Item 306 consists of two 5-ton overhead cranes which handle miscellaneous equipment when servicing the main turbine oil cooler. These cranes are presently not installed. However the load impact area contains no safe shutdown or decay heat removal systems.

307---This is a 6-ton overhead handling system for manipulating the condensate and condensate booster pumps during maintenance. The load impact area contains no safe shutdown or decay heat removal systems.

308---This crane is a 12-ton crane over the emergency heater drain pump for maintenance of that pump and/or motor. A load drop would impact no safe shutdown equipment or decay heat removal systems.

309---Item 309 consists of two 25-ton overhead handling systems of which only one trolley beam is installed. These cranes will handle the Low Pressure Feedwater. Heaters 1A & B Drain Coolers which are located horizontally in the west side of the condensor. There is a 6-inch main steam line approximately 5-feet below the east end of this crane. However the Drain Coolers are approximately 20-feet below the trolley beam of this crane. The Drain Coolers will not be brought up to the same level as the crane because it is only a grating level (there is no laydown area for the coolers on the 527' level). Furthermore, in order to remove the Drain Coolers the unit must be in cold shutdown. Therefore this crane will not be used unless in cold shutdown and has a very low probability of impacting the main steam line.

401---This crane is a 7.5-ton bridge crane which is used to load solid radwaste drums onto a truck for transport off-site. The impact area contains no safe shutdown or decay heat removal systems.

402---Item 402 is a 7.5 ton overhead handling system which is used to manipulate solid radwaste drums in the radwaste storage area. The impact area contains no safe shutdown or decay

heat removal systems.

403---Item 403 is a 7.5-ton overhead crane which is used to handle solid radwaste drums when moving them from the storage area to the budge crane for truck loading. The impact area contains no safe shutdown or decay heat removal systems.

404---This crane is a 10-ton bridge crane located in the machine or maintenance shop for lifting miscellaneous equipment in the maintenance shop. A load drop would not impact any safe shutdown or decay heat removal systems.

405---Item 405 is a 5-ton overhead crane which is in a room next to the maintenance shop. This crane is used for lifting miscellaneous equipment for decontamination. The load impact area contains no safe shutdown or decay heat removal systems.

407---Item 407 is a 27-ton overhead crane which is used to lift the circulating water pumps and/or motors. The impact area contains no safe shutdown equipment or decay heat removal systems.

408---This crane is a 1-ton overhead crane used to install the circulating water pump stop logs when servicing a pump. The impact area contains no safe shutdown or decay heat removal systems.

409---Item 409 is a 2-ton crane used to manipulated Chlorine storage tanks at the circulating water structure. The impact area contains no safe shutdown or decay heat removal systems.

410---This crane consists of two one-ton overhead systems in the circulating water structure for handling the diesel driven and motor driven fire protection pumps and/or motors. The load impact areas contain no safe shutdown or decay heat removal systems.

413---Item 413 is a 5-ton overhead handling crane used to manipulate the service water strainers during maintenance. These will be by passed during maintenance and a load drop will not impact safe shutdown or decay heat removal equipment.

414---This is an 8-ton general service overhead crane used for miscellaneous equipment. The impact area contains no safe shutdown or decay heat removal systems.

415---Item 415 is a 5-ton overhead crane which is used to handle shielding slabs and miscellaneous equipment. The impact area contains no safe shutdown or decay heat removal systems.

416---Item 416 is a 1.5-ton overhead crane used for servicing the Radwaste building ventilation fan's. A load drop would not impact safe shutdown or decay heat removal systems.

419---Item 419 is a 3-ton overhead crane which is used to manipulate the circulating water make-up pumps and/or motors within the pump cubicle. The load impact area contains no safe shutdown or decay heat removal systems.

ATTACHMENT 3

OVERHEAD HANDLING SYSTEM WHICH INTERFACE SAFE SHUTDOWN OR DECAY HEAT REMOVAL SYSTEMS

ITEM NO.	PURPOSE OF EQUIPMENT TO BE LIFTED	(NO.) & CAPACITY OF BEAMS OR HOISTS (TONS)	LOCATION					M-19 SHEET NO.	HOIST TYPE	TROLLEY MODE OF TRAVEL
			ELEVATION OF			COLUMN	ROWS			
			TOP OF STL.	HOIST FLR.	OPER. FLR.	N-S	E-W			
101	Main Reactor Bldg. Crane-Aux. Hook	110-10	654'-3"	512'-0"	627'-9"	15-28	A-F	6,8	Bridge Cr.	PWR
102	Fuel Handling Jib Crane	1/2	-	627'-9"	627'-9"	25-27	B-D	6,8	Electric	PWR
103	Channel Handling Boom Jib Crane	100 lbs.	-	627'-9"	627'-9"	25-27	D-C	6,8	Chain	Manual
104	Fuel Handling Jib Crane	1/2	-	627'-9"	627'-9"	23-25	B-C	6,8	Electric	PWR
105	Relief & Safety Valve Maintenance	2	582'-10"	520'-10"	-	18-25	B-D	6,8,11	Electric	PWR
107	RHR & RBCCW (1B) Heat Exchanger	20	565'-6"	503'-6"	546'-0"	27-28	B-E	1,11	Electric	PWR
108	Main Steam Hatch Slabs & Isolation Valve	18	564'-6"	532'-0"	546'-0"	21-25	E-F	1,8,11	Electric	PWR
109	Recirculating Pump Motors	24.45	552'-8 5/8"	525'-7"	525'-7"	18-25	B-E	2,8,11	None	PWR
111	Hatch Slabs & RCIC Maintenance	15	543'-0"	503'-6"	525'-7"	15-18	E-F	2,8,11	Electric	PWR
112	RBCCW (1A) Heat Exchanger	20	542'-0"	503'-6"	525'-7"	23-28	A-B	2,8,11	Electric	PWR
114	Valve Maintenance	2 1/2	533'-10 1/4"	525'-7"	525'-7"	21-25	B-E	2,8,11	Chain	PWR
116	Drywell Access Hatch Cover	6	540'-4"	525'-7"	525'-7"	18-21	B-D	2,11	Chain	Chain H.G.T.
118	Low Pressure Core Spray	-	518'-0"	475'-6"	503'-6"	25-28	B-C	4	Electric	PWR
119	RHR Pumps	4	520'-6 7/8"	475'-6"	503'-6"	27-28	D-E	4,11	Electric	PWR
119	RHR Pumps	4	520'-7"	475'-6"	503'-6"	27-28	D-E	4,11	Electric	PWR
119	RHR Pumps	4	520'-7"	475'-6"	503'06"	27-23	D-E	4,11	Electric	PWR
120	High Pressure Core Spray Pump	15	522'-7"	475'-6"	503'-6"	15-18	A-B	4,8	Electric	Chain H.G.T.
121	RCIC Turbine Pump & Condenser	4	521'-7/8"	475'-6"	503'-6"	15-18	D-F	4,8,11	Electric	PWR
122	Suppression Pool Service	2	519'-1/4"	475'-6"	-	18-27	B-E	4,8,11	Electric	PWR
126	MSIV (Outboard) Clearance Pull	1 1/2	541'-6"	532'-0"	532'-0"	21-25	E-F	2,8,11	Manual	None
128	MSIV (Inboard) Maintenance	(4) 5	544'-6 3/8"	-	-	22-19	D	2,13	None	Chain H.G.T.
202	Miscellaneous Equipment & Slabs	7 1/2	564'-2"	496'-0"	546'-0"	16-24	J-L	1,10	Electric	PWR
203	Diesel Generator Engine	(6) 1	544'-0"	525'-7"	525'-7"	12-14	F-L	2,8	-	Manual
204	Diesel Generator Engine	(3) 5	544'-0"	525'-7"	525'-7"	13-14	F-L	2,8	-	Manual
301	Main Turbine Bldg. Cranes-Lifting Beam	(2) 110-25	596'-9"	473'-5"	546'-0"	8-28	L-S	1,8	Bridge Cr.	PWR
406	Traveling Screen & S.W.P.S. Bridge Crane	30	565'-6 1/4"	521'-0"	521'-0"	1-4	B-D	16,17	Electric	PWR
411	Cooling Tower Make-up Water Pumps	(2) 8	486'-5 1/2"	435'-0"	466'-5 1/2"	3-4	A-B	16,1&2	Electric	PWR
412	Service Water Pumps	(2) 8	486'-5 1/2"	435'-0"	466'-5 1/2"	2-5	A-C	16,1	None	PWR
417	Service Water Pump Motors 1A & 1B Maintenance	3	450'-1 3/8"	435'-0"	435'-0"	2	B	16	None	By CG&E
418	Service Water Pump Motors 1C & 1D Maintenance	3	450'-1 3/8"	435'-0"	435'-0"	3	B	16	None	By CG&E

ATTACHMENT 4

JUSTIFICATION FOR EXCLUSION OF OVERHEAD
HANDLING SYSTEMS (FROM TABLE 3)
FROM REQUIREMENTS OF NUREG 0612

Item 107 RHR & RBCCW (1B) Heat Exchanger

Item 107, is a 20-ton monorail overhead hoist to be used for tube bundle removal and overhaul of the 1B RBCCW Heat Exchanger and RHR Heat Exchanger 1A and 1B. Sufficient separation exists insuring that inadvertant drop of any components would not degrade safe shutdown or decay heat removal capacity. The 1B RBCCW Heat Exchanger is separated by 12 ft. from the north bank hydraulic control units and by two floors from the RHR Heat Exchangers. The RHR Heat Exchangers are located in separate cubicles and are located 2 floors below the 1B RBCCW Heat Exchanger. Therefore, this crane need not meet the general requirements of Section 5.1.1/NUREG 0612.

Item 108 Main Steam Hatch Slabs and Isolation Valves

Item 108 is a 20-ton overhead handling system used to do maintenance on the outboard MSIV's, outboard feedwater check valves, and lift the associated equipment access slabs.

Administrative controls shall be applied to assure that the main steam hatch slabs are not removed wher the MSIV's are open. Inadvertent dropping of the main steam hatch slabs after isolation will not effect plant safety. Similarly, inadvertant dropping of any of the main steam isolation valve components of feedwater valve components, after they have been released for maintenance, will not have any effect on plant safety or decay heat removal.

Item 111 Hatch Slabs and RCIC Maintenance

Item 111 is a 15-ton overhead handling system which could impact panel H22-P022 and some Reactor Building closed cooling water piping. Panel H22-P022 contains one steam line flow switch for each main steam line and the recirculation loop flow transmitters feeding the B rlow unit for APRM flow biased scrams. Based upon single failure proof criteria employed in the design of these systems their failure can neither cause nor prevent the completion of a safety function. Therefore, this crane need not meet the general guidelines of Section 5.1.1 of NUREG 0612.

Item 112 RBCCW 1B Heat Exchanger

Item 112 is a 20-ton monorail overhead hoist to be used for tube bundle removal and overhaul of the 1A RBCCW Heat Exchanger. Sufficient separation exists to ensure inadvertant drop of any component would not cause damage to any other system required for safe shutdown or decay heat removal.

Item 120 High Pressure Core Spray Pump

Item 120 is a 15-ton overhead handling system. Sufficient physical separation exists insuring that inadvertent drop of the high pressure core spray pump components would not cause damage to any other system required for safe shutdown or decay heat removal.

Item 121 RCIC Turbine Pump and Condenser

Item 121 is a 4-ton overhead handling system which could impact panel H22-P022 and some Reactor Building closed cooling water piping. Panel H22-P022 contains one steam line flow switch for each main steam line and recirculation loop flow transmitters feeding the B flow unit for APRM flow biased scrams. Based upon single failure proof criteria employed in the design of these systems their failure can neither cause nor prevent the completion of a safety function. Therefore this crane need not meet the general guidelines of section 5.1.1 of NUREG 0612.

Item 122 Suppression Pool Service

Item 122 is a 2-ton overhead handling system. The trolley and hoist is used for performance of any corrective or preventative maintenance required in the suppression pool. Any such activities performed with the unit is during cold shutdown and would not cause damage to any component for decay heat removal.

Item 126 Main Steam Isolation Valve (Outboard) Clearance Pull

Item 126 is a 1.5-ton hoist which is movable to one of 4 locations within the MSIV cubicle. This hoist is furnished to assist Item 108 for MSIV valve actuator removal. Use of this hoist requires isolation of the steam lines.

Item 128 Main Steam Isolation Valve (Inboard)

Item 128 consists of four 5-ton overhead handling systems over the inboard MSIV's. Maintenance performed on inboard main steam isolation valves or feedwater check valves can only be performed in cold shutdown. Inadvertant dropping of any main steam isolation valve components or feedwater valve components, after they have been released for maintenance, will have no effect on plant decay heat removal.

Item 202 Miscellaneous Equipment & Slabs

Item 202 is a 7.5-ton overhead load handling system designed for transport of various equipment located in the plant Auxiliary Building. The load impact point has potential for effecting the main steam lines in the main steam tunnel. Analysis by the architect engineer indicates the main steamlines would not be effected by a load drop. Therefore this crane need not meet the general requirements of section 5.1.1 of NUREG 0612.

Item 203 & 204 Diesel Generators

Planned future hoists for use in the diesel generator rooms. Each of the three diesels will be served by two 1-ton and one 5-ton hoists. The accidental dropping of the diesel engine component will have no effect upon any other system required for safe shutdown or decay heat removal.

Item 301 Turbine Building Crane

Item 301 consists of two turbine building overhead traveling bridge cranes. Both cranes consists of a 110-ton hook and a 25-ton hook. The impact area of these cranes contains the main steam tunnel, turbine stop valves, associated turbine trip reactor protection instruments and low condenser vacuum MSIV closure instruments.

Unless the main steam lines are isolated, the turbine building bridge cranes shall be administratively restricted to handling less than 24 tons in the area defined by rows L and R and columns 16 and 24. This shall preclude a load drop on the main steam lines and turbine stop valves. Furthermore, a load drop impacting the Reactor Protection Instrumentation will not effect safe shutdown or decay heat removal capacity due to the single-failure-proof criterion design basis for those instruments.

Item 406 Traveling Screen & Service Water Pump Structure Bridge Cranes

Item 406 is a 30-ton bridge crane for lifting the traveling screens from the service water structure intake area for maintenance. Since the entire traveling screen assembly is about 85 feet high and the maximum height of the crane is about 50 feet, the entire assembly cannot be lifted and moved in one piece. The assembly will be removed in several pieces. Each piece weighing no more than approximately 15 tons. A blockage of the intake is not possible. A wall establishes two redundant flow paths to the service water pump suction area, as shown on equipment removal diagram M-19 sheet 16. Therefore a load impact will not reduce the safe shutdown or decay heat removal capacity of the system. This crane need not meet the general guidelines of section 5.1.1 of NUREG 0612.

Item 411 Cooling Tower Make-up Water Pumps

Item 411 consists of two 5-ton overhead WSMCC handling systems which are used to move the circulating water make-up pumps and/or motors in and out of the pump cubicle.

This crane can impact Service Water Motor Control Center 1A which contains service water pump 1A cooling fan breaker.

However, due to physical separation, a failure of this system cannot degrade the safe shutdown or decay heat removal capacity of the plant.

Item 412 Service Water Pumps

Item 412 consists of two 8-ton overhead handling systems. These hoists are shown on M-19 sheet 16 of the Equipment Removal Plan and are used for corrective maintenance activities on the service water pumps. A failure of these cranes could impact Service Water Motor Control Center 1B and 1C. The 1B motor control center contains breakers for service water pump 1B&C ventilation cooling fans and the pump discharge isolation valves for those same pumps. The 1C motor control center contains a breaker for the service water pump 1D ventilation cooling fan. Physical separation from separate pairs of service water pumps and single failure proof criteria employed in the design of this system preclude degradation of plant safe shutdown or decay heat removal capability.

Item 417 & 418 Service Water Pump Motors Maintenance

Items 417 & 418 are each 3-ton overhead handling systems. These hoists are used for maintenance of the service water pumps. Maintenance work can only be performed on pumps of the same cubicle. Sufficient separation occurs between the service water pumps and preclude effecting plant safety.

LOAD/IMPACT AREA MATRIX

CRANE: REACTOR BUILDING BRIDGE CRANE (MAIN HOOK 110T) 1HC01G

LOCATION	REACTOR BUILDING - REFUELING FLOOR					
IMPACT AREA / LOADS	SEE M-17, IMPACT AREA BELOW SAFE MOVEMENT LOAD PATHS. M-19 SHT. 6,8 COORDINATES 15-27: A-F					
	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY
REACTOR CAVITY SHIELD PLUGS (90T)	627'-9"	REACTOR VESSEL	d			
DRYWELL HEAD (65T)	627'-9"	REACTOR VESSEL	d			
REACTOR HEAD (65T)	627'-9"	REACTOR VESSEL	d			
STEAM DRYER (38T)	627'-9"	REACTOR VESSEL	d			
STEAM SEPERATOR (51T)	627'-9"	REACTOR VESSEL	d			
RRV HEAD INSULATION (6T)	627'-9"	REACTOR VESSEL	d			

LOAD/IMPACT AREA MATRIX

CRANE: REACTOR BUILDING BRIDGE CRANE (MAIN HOOK 110T) 1HC01G

LOCATION	REACTOR BUILDING-REFUELING FLOOR					
IMPACT AREA / LOADS	SEE M-17, IMPACT AREA BELOW SAFE MOVEMENT LOAD PATHS M-19 SHTS. 6, 8 COORDINATES 15-27: A-F					
	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY
DRYER/SEPERATOR PIT PLUGS (3-40T, 1-44T)	627'-9"	N/A	d			
DRYER/SEPERATOR POOL GATE (23.5T)	627'-9"	N/A	d			
FUEL POOL SHIELD PLUGS (12T)	627'-9"	CLOSE PROX-IMITY TO FUEL POOL	d			
FUEL POOL GATES (1-5.5T, 1-3.5T)	627'-9"	FUEL POOL	d			
RX HEAD STUD TENSIONER (4T)	627'-9"	REACTOR VESSEL	d			
SHIPPING CAST STORAGE PIT GATE	627'-9"	FUEL POOL	d			

LOAD/IMPACT AREA MATRIX

CRANE: REACTOR BUILDING BRIDGE CRANE (MAIN HOOK 110T) 1HC01G

LOCATION	REACTOR BUILDING - REFUELING FLOOR					
IMPACT AREA / LOADS	SEE M-17, IMPACT AREA BELOW SAFE MOVEMENT LOAD PATHS M-19 SHTS. 6, 8 COORDINATES 15-27; A-F					
	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY
REACTOR SERVICE PLATFORM (6T)	627'-9"	REACTOR VESSEL	d			
REMOVEABLE ½ TON JIB CRANES (4-4T)	627'-9"	N/A	d			
REFUELING CANAL SHIELD (20T)	627'-9"	CLOSE PROXIMITY TO FUEL POOL & REACTOR VESSEL	d			
SPENT FUEL SHIPPING CASK (?T)	627'-9"	N/A	d			

LOAD/IMPACT AREA MATRIX

CRANE: REACTOR BUILDING BRIDGE CRANE (AUXILIARY HOOK 10T)

LOCATION	REACTOR BUILDING - REFUELING FLOOR					
IMPACT AREA / LOADS	AUXILIARY HOOK RESTRICTED TO ITEMS WHERE MAIN HOOK CANNOT REACH (WEST SIDE OF REACTOR BUILDING) M-19 SHTS. 6, 8; COORDINATES 15-27: E-F					
	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY
RPV SERVICE PLATFORM (6T)	627' - 9"	N/A	a (procedural control)			
STUD TENSIONER (10T)	627' - 9"	N/A	A (procedural control)			

CRANE: REACTOR BUILDING BRIDGE CRANE (AUXILIARY HOOK 10T)

LOCATION	REACTOR BUILDING - REFUELING FLOOR					
IMPACT AREA / LOADS	SEE M-17 AUXILIARY HOOK RESTRICTED FROM FUEL POOL INTERLOCKED AREA M-19 SHTS. 6,8; COORDINATES 15-28: A-F					
	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY
NEW FUEL SHIPPING CRATE (1 TON)	627' 9" 521' 0"	N/A	a			
FUEL CHANNEL SHIPPING CRATE (1 TON)	627' 9" 521' 0"	N/A	a			
CONTROL ROD SHIPPING CRATE (1 TON)	627' 9" 521' 0"	N/A	a			
INCORE DETECTOR SHIPPING CRATE (1 TON)	627" 9" 521' 0"	N/A	a			

ITEM 105 CRANE: RELIFE VALVE AND SRV MAINT. & VP COOLER UNITS (2 TON)

LOCATION	RX BLDG (IN CONTAINMENT) 582'					
IMPACT AREA / LOADS	M-19 SHT. 6, 8, 11 COORDINATES 19-24, B-D					
SRV (<2T)	525'	RH LINE SHUTDOWN COOLING	b			
VP COOLER COMPONENTS (<2T)	"	"	"			

LOAD/IMPACT AREA MATRIX

ITEM 107 CRANE: RHR & RBCCW (1B) HEAT EXCHANGER (20T) 1HC07RB

LOCATION	REACTOR BUILDING El 546'					
IMPACT AREA / LOADS	27-28: B - E M-19 SHTS. 1, 11					
	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY
RBCCW HX1B (7T BUNDLE) (15T TOTAL)	546'	NORTH BANK HCU'S RHR HX'S	b			
	546'	PIPING WR07A14	b			
RHR (7T BUNDLE) (15T TOTAL)	475'-9"	REDUNDANT RHR. HX	b			
FLOOR PLUGS (2T)	525'	RPS CABLE TRAY NCKR	b			
FLOOR PLUGS (9.5T)	475'-9"	ASSOCIATED RHR HX	b			

LOAD/IMPACT AREA MATRIX

ITEMS 108 CRANE: MAIN STEAM HATCH SLABS & ISOLATION VALVES (20T) 1HC08RB

LOCATION	REACTOR BUILDING 546'					
IMPACT AREA / LOADS	M-19 SHT 1, 8, 11 COORDINATES: 19-24, E-F					
ACCESS HATCH SLAB (18.5T)	520'	MAIN STEAM, FW OUTBOARD ISOL. VLVS	b			
ACCESS HATCH SLAB (18.5T)	520'	RPS INST. H-22-P004	b			
	520'	DIV 1 CABLE TRAY (YELLOW) 1210 K	b			
MSIV AIR PISTON (1T)	520'	MAIN STEAM, FW OUTBOARD ISOL. VLVS	b			

LOAD/IMPACT AREA MATRIX

ITEM 109 CRANE: RECIRCULATING PUMP MOTORS (24.45T; 1HC09RB

LOCATION	REACTOR BUILDING - CONTAINMENT					
IMPACT AREA / LOADS	18-25: B - E M-19 SHTS. 2, 8, 11					
	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY
PUMP MOTOR (23.8T)	525'-7"	RECIRCULATION LOOP PIPING	REVIEW REQUIRED			

LOAD/IMPACT AREA MATRIX

ITEMS 111 CRANE: HATCH SLABS AND RCIC MAINTENANCE (15T) 1HC11RB

LOCATION	REACTOR BUILDING					
IMPACT AREA / LOADS	Coordinates: 15-18: E - F M-19 SHTS. 2, 8, 11					
	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY
HATCH SLABS (1T)	503' 6"	PANEL H22-PO22	b			
RCIC PUMP OR TURBINE (2T) (1.5T)	503' 6"	PANEL H22-PO22 YES	b			
ROD DRIVE PUMP OR MOTOR (1.75T) (1.5T)	503' 6"	PANEL H22-PO22	b			
	503	PIPING WR08A8	b			

LOAD/IMPACT AREA MATRIX

ITEM 112 CRANE: RBCCW (1A) HEAT EXCHANGER (20T) 1HC12RB

LOCATION / IMPACT AREA / LOADS	23-28: A - B M-19 SHTS. 2,4,8,11					
	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY
RBCCW HX 1A (7T BUNDLE) (15T TOTAL)	503' 6"	NO	b			
FLOOR PLUGS (4.5T)	503' 6"	NO	b			

LOAD/IMPACT AREA MATRIX

ITEM 114 CRANE: VALVE MAINTENANCE (2.5T) 1HC14RB

LOCATION	REACTOR BUILDING - CONTAINMENT					
IMPACT AREA / LOADS	21-25: B-E M-19 SHTS. 2,8,11					
	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY
SHUTDOWN COOLING SYSTEM - VALVE BONNET (1T)	533'	YES	NOT A HEAVY LOAD			
RECIRCULATION FLOW CONTROL VALVE ACTUATOR (0.5T)	533'	YES	NOT A HEAVY LOAD			

LOAD/IMPACT AREA MATRIX

ITEM 116 CRANE: DRYWELL ACCESS HATCH COVER (6T) 1HC16RB

LOCATION	REACTOR BUILDING - CONTAINMENT					
IMPACT AREA / LOADS	13-21: B-D M-19 SHTS. 2,11					
	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY
DRYWELL ACCESS HATCH (6T)	525'-7"	NO				

ITEM 118 CRANE: LOW PRESSURE CORE SPRAY (4T) 1HC18RB

LOCATION	REACTOR BUILDING					
IMPACT AREA / LOADS	25-28: B-C M-19 SHT. 4 5					
	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY
PUMP MOTOR (3.5T)	475'-6"	RHR PUMPA	b			
PUMP IMPELLER (3.0T)	475'-6"	RHR PUMPA	b			
FLOOR SLABS (3.0T)	475'-6"	RHR PUMPA	b			

ITEM 119 CRANE: RHR PUMPS (4T) 1CH19RBA
1HC19RBB
1HC10RBC

LOCATION	REACTOR BUILDING					
IMPACT AREA / LOADS	27-28: D-E M-19 SHTS. 4, 5, 11 27-28: A-C M-19 SHTS. 4, 5, 11					
	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY
FLOOR SLAB (3T)	503'-7"	LPCS PUMP OR OTHER RHR PUMP	b			
PUMP MOTOR (2.T)	475'-6"	LPCS PUMP OR OTHER RHR PUMP	b			
PUMP IMPELLER (2.5T)	475'-6"	LPCS PUMP OR OTHER RHR PUMP	b			

LOAD/IMPACT AREA MATRIX

ITEM 120 CRANE: HIGH PRESSURE CORE SPRAY PUMP (15T) 1HC20RB

LOCATION	REACTOR BUILDING					
IMPACT AREA / LOADS	15-18: A-B M-19 SHTS. 4,5,8					
	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY
PUMP AND MOTOR (13T)	475'-6"	HPCS PUMP	b			
MOTOR (6T)	475'-6"	HPCS PUMP	b			
FLOOR SLABS (3T)	503' 7"	HPCS PUMP	b			

LOAD/IMPACT AREA MATRIX

ITEM 121 CRANE: RCIC TURBINE PUMP & CONDENSOR (4T) 1HC21RB

LOCATION	REACTOR BUILDING					
IMPACT AREA / LOADS	15-18: D-F M-19 SHTS. 4,5,8,11					
	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY
RCIC PUMP (2T)	475'-6"	RCIC PUMP	b			
RCIC TURBINE (1.5T)	475'-6"	RCIC PUMP	b			
FLOOR SLABS (3.5T)	503' 6"	RCIC PUMP	b			

LOAD/IMPACT AREA MATRIX

ITEM 122 CRANE: SUSPENSION POOL SERVICE (2T) 1CH22RB

LOCATION	REACTOR BUILDING (WETWELL)					
IMPACT AREA / LOADS	18-27: B-E M-19 SHTS. 4,8,11					
	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY
GONDOLA	474' 10"	NO	b			

LOAD/IMPACT AREA MATRIX

ITEM 126 CRANE: MSIV (OUTBOARD) CLEARANCE POOL (1.5T) 1HC26RB

LOCATION	REACTOR BUILDING					
IMPACT AREA / LOADS	21-25: E-F M-19 SHTS. 2,8,11					
	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY
MSIV'S (CLEARANCE PULL ONLY)	532'-0"	OUTBOARD MSIV'S AND FW ISOLATION	b			

LOAD/IMPACT AREA MATRIX

ITEM 128 CRANE: MSIV (INBOARD) - MAINTENANCE (5T)

1HC28RBA
1HC28RBB
1HC28RBC
1HC28RBD

LOCATION	REACTOR BUILDING - CONTAINMENT					
IMPACT AREA / LOADS	19-22: D M-19 SHTS. 2,13					
	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY
MSIV AIR CYLINDER (1T)	525'	INBOARD MSIV AND FW ISOLATION	b			
VALVE (4T)	525'	INBOARD MSIV AND FW ISOLATION	b			

LOAD/IMPACT AREA MATRIX

ITEM 202 CRANE: MISC. EQUIP. & SLABS (7.5T)

LOCATION	AUX. BLDG. 546					
IMPACT AREA / LOADS	M-19 SHT. 1, 10 COORDINATES 16-24, J-L					
	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY			
SWGR EQUIP AND MISC EQUIP (≤ 7.5T)	503	MS LINES (TUNNEL)	b			
SLABS (5T)						

LOAD/IMPACT AREA MATRIX

ITEMS 203 & 204 CRANE: DIESEL GENERATOR (1T AND 5T)

LOCATION	DIESEL GENERATOR ROOMS					
IMPACT AREA / LOADS	12-14: F-L M-19 SHTS. 2,8					
	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY
DIESEL GENERATOR COMPONENTS	525'-7"	DIESEL GENERATOR	b			

LOAD/IMPACT AREA MATRIX

ITEM 301 CRANE: TURB. BLDG. CRANE

LOCATION	TURBINE BUILDING 546'					
IMPACT AREA / LOADS	M-19 SHEETS 1, 8 COORDINATES 8-28, L-S					
	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY			
TURBINE SHELL (71 TONS)	546	RPS INST.	b			
TURBINE ROTOR (100 TONS)	546	RPS INST.	b			

LOAD/IMPACT AREA MATRIX

ITEM 406 CRANE: TRAVELING SCREEN & SERVICE WATER PUMP STRUCTURE BRIDGE CRANE (30 T)

LOCATION	SERVICE WATER STRUCTURE 521'					
IMPACT AREA / LOADS	M-19 SHT.: 16, 17 COORDINATES 1-4, B-D					
	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY			
TRAVELING SCREENS (< 30 T)	521'	SERVICE WATER INTAKE	b			

LOAD/IMPACT AREA MATRIX

ITEM 411 CRANE: CW MAKE-UP PUMPS (5 T)

LOCATION	SERV. WTR. STRUCTURE 466'					
IMPACT AREA / LOADS	M-19 SHT. 16, 17 COORDINATES 3-4; A					
	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY			
CW M/V PUMP (<2T) MTR (2.25T) MISC (<2T)						
	451	WSMCC 1A	b			

LOAD/IMPACT AREA MATRIX

ITEM 412 **CRANE: SERVICE WATER PUMPS (8T)** 1HC65WBA
1HC65WBB

LOCATION	SERVICE WATER PUMP STRUCTURE					
IMPACT AREA / LOADS	2-3; A-C M-19 SHTS. 16,17 COORDINATES 1-2, 3-4, A-C					
	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY
SERVICE WATER PUMPS PUMP UPPER CASING (< 2T)	435'-0"	SERVICE WATER PUMPS	b			
OTHER PUMP COMPONENTS (< 2T)	435'-0"	SERVICE WATER PUMPS	b			
PUMP MOTOR (4.257)	435'-0"	SERVICE WATER PUMPS	b			
SERVICE WATER PUMPS PUMP UPPER CASING (2T)	451'	WS MCC B&C	b			
OTHER PUMP COMPONENTS (2T)	451'	WS MCC B&C	b			
PUMP MOTOR (4.257)	451'	WS MCC B&C	b			

LOAD/IMPACT AREA MATRIX

CRANE: SW PUMP MOTORS MAINT. (3T) 1HC72WB
1HC73WB

LOCATION	SERVICE WATER PUMP STRUCTURE					
IMPACT AREA / LOADS	2-3: B M-19 SHTS. 16,17					
	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY	ELEVATION	SAFETY-RELATED EQUIPMENT	HAZARD ELIMINATION CATEGORY
PUMP UPPER SHEL (<2T)	435'	SERVICE WATER PUMPS	b			
OTHER PUMP COMPONENTS (< 2T)	435'	SERVICE WATER PUMPS	b			
PUMP MOTOR (2.25T)	435'	SERVICE WATER PUMPS	b			

Attachment 6

CRANES WHICH WILL MEET REQUIREMENTS OF NUREG 0612

101 - Main Reactor Building Crane

105 - Relief and Safety Valve Maintenance and VP Cooler Unit Crane

109 - Recirculating Pump Motors Crane

114 - Valve Maintenance Crane

116 - Drywell Access Hatch Cover Crane

118 - Low Pressure Core Spray Crane

119 - RHR Pump Crane

MAIN REACTOR BUILDING CRANE - 110 TON HOOK

LOAD IDENTIFICATION	LOAD WGT (TONS)	DESIGNATED LIFTING DEVICE	CONTROLLING DOCUMENT
Reactor Cavity Shield Plugs (6)	90	(3) legged bridle sling rated at 180 tons Max angle from vertical plane 44°	ME.RFP.402
Dryer Separator Pit Plugs	(3) 40 (1) 44	(2) 2 1/2" shackles 2 legged bridle sling, 88 ton rating Max angle from vertical plane 25°	ME.RFP.402
Fuel Pool Shield Plugs	(4) 12	( ) 1 3/8" shackle, (1) 24 ton rated sling Vertical lift	ME.RFP.402
Drywell Head	65	RPV head strong back, (4) 2.75" turnbuckle, (4) 2.5" shackles	ME.RFP.401
RPV Head Insulation	7.5	Required rigging rated for 15 tons Max angle from vertical plane 35°	ME.RFP.403
RX Head Stud Tensioner	4	Stud Tensioner Strongback	ME.RFP.404
Reactor Head	65	RPV head strongback, (4) 2.75" turnbuckles, (4) 2.5" shackles	ME.RFP.404
Steam Dryer	38	Dryer/Separator Strongback, 1 1/2" IWRC legged bridle sling (4) 2.5" turnbuckles Max angle from vertical plane 25°	ME.RFP.303
Steam Separator	51	Dryer/Separator Strongback, 1 1/2" IWRC 4 legged bridle sling, (4) 2.5" trunbuckles Max angle from vertical plane 25°	ME.RFP.304
Fuel Pool Gates	(1) 5.5 (1) 3.5	(2) 1 1/2" shackles, 11 ton rated 2 legged bridle sling Max angle from vertical plane 10°	ME.RFP.405
Dryer/Separator Pool Gate	23.5	(2) 2" shackle 47 ton rated 2 legged bridle sling Max angle from vertical plane 30°	ME.RFP.406

MAIN REACTOR BUILDING CRANE - 110 TON HOOK

LOAD IDENTIFICATION	LOAD WGT (TONS)	DESIGNATED LIFTING DEVICE	CONTROLLING DOCUMENT
Shipping Cask Storage	4.0	(2) 1.5" shackles 8 ton rated 2 legged bridle sling Max angle from vertical 10°	ME.RFP.407
Reactor Service Platform	6.0	1" 3 legged bridle sling Max angle from vertical 35°	ME.RFP.408
Removable 1/2 Ton Jib Crane	4.0	1 3/8" shackle, 1 3/8" sling Vertical lift	ME.RFP.409
Channel Handling Boom	2.0	1 3/8" shackle, 1 3/8" sling Vertical lift	ME.RFP.409
Equipment Hatch Cover	( )	Rigging rated greater than double static load	
Refueling Canal Shield	30	Strongback, 60 ton rated rigging	ME.RFP.410

NOTE: Shackles were selected assuming a minimum breaking strength of six times safe working loads to yield a safety factor of ten between minimum breaking strength and the selected usage. (does not apply to fuel pool shield plugs as previously described)

Attachment 7
FSAR Section 9.1.4.2.2

9.1.4.2.2 Reactor Building Crane

9.1.4.2.2.1 Description

The main purpose of the reactor building crane is to handle the spent fuel cask between the cask transport vehicle, the cask pool, and the cask decontamination pit in the reactor building. Secondary purposes of the reactor building crane include handling loads related to maintenance and replacement of equipment from the reactor building received or shipped through the railcar loading facility.

The reactor building crane is a single-trolley top-running electric overhead traveling crane with a 110-ton capacity main hoist, a 10-ton capacity auxiliary hoist and a span of 126 feet 3 inches. The general arrangement of the crane in the reactor building is shown in Figure 1.2-15. 3

The operating environment was specified in the purchase specification for the reactor crane. These included the following as a minimum.

Ambient Temperature

105° F maximum
65° F minimum

Ambient Pressure (tornado)

300 mph (tangential)
60 mph (translational)
3 psi change in 3 seconds
Box girder to be provided with vent and drain holes for above pressure change.

Earthquake

Floor response spectra furnished for the OBE and SSE.

Corrosion

Immersion of auxiliary and main hook and block into demineralized water.

Impact

Minimum temperature to be considered in selection of materials and the need for impact tests. 14

The humidity was not specified in the original specifications. The humidity requirements were reviewed with the vendor and confirmed to be within the capability of the crane design.

The reactor crane is located indoors in a controlled environment. The low building temperature and the material selected for the crane preclude the need for performing fracture toughness tests. Upon completion of erection of the crane, the crane will be proof tested to 125% of the design rated load of 110 tons. The test will be performed at the minimum temperature of 65° F or lower unless not practical, at which time the test will be duplicated prior to fuel load at the minimum ambient temperature. The critical areas will be visually examined for cracks following the minimum temperature test load lift.

Postweld heat treatment was not required due to the material thickness used. Preheat temperatures for weldments were specified in the weld procedures. All welding was performed in accordance with AWS D1.1.

The cask crane will be designed, fabricated, installed, and tested in accordance with ANSI B30.2.0, Overhead and Gantry Cranes CMAA Specification, AISC, AISE, and other applicable manufacturers' association and engineering society codes.

Operation of the crane will be from the cab or floor by pendant control for all motions. Control at any one time will be from one point only.

The structure of the crane bridge consists of welded box-type girders with truck saddle and truck frames of welded-steel construction. The trolley side frames, sheave frames, and truck frames are of structural steel welded construction. High strength friction-type bolts are used for major field connections for bridge and trolley assembly. Spring bumpers are provided at each end of crane travel to limit travel movement. | 3

The rated full-load capacities, lifts, and full-load speeds are as follows:

Main Hook		
Rated full-load capacity, tons (2000 lb)	110	
Hook travel, ft	133	
Hoisting speed, ft/min at full-load	5.5	| 14
Auxiliary Hook		
Rated full-load capacity, tons (2000 lb)	10	
Hook travel, ft	150	
Hoisting speed, ft/min at full-load	21	
Travel Speeds		
Trolley travel speed, ft/min at full load	33	
Bridge travel speed, ft/min at full load	75	| 14

The reactor crane runway runs in the north-south direction. When the reactor crane is not in use, it will be parked on the south end of the reactor building over the dryer-separator storage pool. This location is as far as possible from the spent fuel storage pool. Access into the crane cab is provided from the elevator machine room roof in the southeast corner of the reactor building. Figure 1.2-15 shows the travel limits of the crane and the stored position. Tornado and earthquake lugs are provided on the trolley and bridge to prevent the crane from being dislodged from the bridge or crane rail. | 14

The structural portion of the crane and trolley are designed for: (1) dead load plus rated lift load plus impact load not to exceed code allowable stress, (2) dead load plus 1/2 SSE not to exceed code allowable stress, (3) dead load plus 275% main hoist motor stall torque load not to exceed a factor of 1.6 times code allowable stress, and (4) dead load plus SSE load not to exceed a factor of 1.6 times code allowable stress. | 3

The lateral loads on the crane runway in the normal operating condition were 20% of the sum of the weights of the lifted load and of the crane trolley only, and seismic load of the dead load of the crane in the event of earthquake, applied at the top of the rail, one-half on each side of the runway rail and shall be considered as acting in either direction normal to the runway rail. | 14 | 3

9.1.4.2.2.2 Safety Features

Single failure protection will be designed into the cask crane components in order to assure safe handling of the spent fuel cask and other heavy plant equipment. This protection is provided by the following features.

9.1.4.2.2.2.1 Mechanical

Power from a single hoist motor is transmitted through a multireduction gearing system to the drum gear mounted on the barrel of the hoisting drum. This reduction is defined as the driving reduction. On the opposite end of the drum barrel is another drum gear, again coupled to an exact duplicate gear reduction system which has a spring-set electric shoe brake mounted on the high speed low-torque pinion shaft extension (Figure 9.1-4.) This second gear train is termed the idler gear case, since in the normal function of the crane the only torque transmitted backwards through the gear train from the drum gear is that force required to accelerate the inertia of the gearing and brake wheel. Each gear case is designed to handle 100% motor torque.

On the driving side of the system, the spring set 150% torque motor brake is mounted on the motor pinion shaft extension. In order to give redundancy to the gears, shafting, keys, and couplings used, the idler gear case is applied and the spring-set shoe brake on the idler gear case is also rated at 150% torque. This brake will be used along with the other motor brake on the driving side to share the deceleration of the hoist machinery and to hold a suspended load. The idler gear case brake mounted on the high-speed low-torque pinion shaft extension is also the brake to set and hold the load if a failure were to occur in the driving gear case system. The brake would set through the use of an overspeed device actuated by the speed of the revolving drum. To prevent load drop due to drum bearing, shaft, or bearing support failure, the lower periphery of the drum barrel at each end is encompassed by a close-fitting (but not touching) structural support upon which the barrel will rest if any of the failures mentioned previously should occur. The length of the drum system and the amount of drop are such that the mismatching of the faces of the drum pinion and drum gear under such a condition is still within the allowable alignment tolerances of AGMA recommendations. Also, single failure impact will not exceed permissible stresses in the crane.

The redundant full-capacity wire rope system consists of two balanced reeving systems utilizing two individual wire ropes reeved side by side from the double-scored drum grooving through the upper and lower block sheaves and to the double sheave-type equalizer. (See Figure 9.1-5).

The main hoist cable is a 1-inch diameter, 6 x 46 IWRC with a 7 x 7 IWRC cable center. The load is supported by 8 parts of rope (reeving) for each cable system (16 parts total). Pitch diameter of the lead sheaves is 33 3/4-inches. Pitch diameter of the running sheaves is 30 inches. Pitch diameter of the equalizer sheaves is 18.75 inches. The maximum fleet angle of the main hoist cable is 1° 52'. Breakage of one cable system will, of course, reduce the factor of safety in half but not the capacity. | 3 | 14

The stress in the lead line in the hoisting system at maximum design speed with the design rated load does not exceed 20% of the published breaking strength of the cable. The static stress in the rope with the design load stationary is 14% of the published rated strength. Lead line speed during hoisting or lowering with the design load is 19.2 fpm. | 3

Since each system is reeved to both sides of the bottom block and upper block systems, there will be no swinging or pendulum action of the block upon failure of one system. Since failure of one hoist cable system would transfer the load on the equalizer entirely to the other equalizer, there would tend to be a rapid displacement during this transition. (See Figure 9.1-6.) Maximum vertical travel is 1/2 inch should one rope of the dual reeving system fail. This could result in a high dynamic shock to the crane system and is prevented from doing so by providing a two shock absorber arrangement for each of the equalizers. This permits readjustment to be made slowly and smoothly, thus preventing any appreciable load shock. Each of the equalizers is hung from a main pivot mechanism, this support mechanism being redundant within itself. The support system consists of a through shaft which in turn is encompassed by a hollow shaft, each of which is capable of handling the equalizer load forces. The ends of the internal shaft are supported on a structural system which is part of the trolley frame. The hollow shaft itself is several inches shorter than the through shaft and this hollow shaft would be supported by safety lugs should be internal shaft break at its ends or in any part of its length. Should the internal shaft break in the middle, the hollow shaft will in turn take over and take full load responsibility. Vertical travel of the main hoist will be approximately 1/2 inch should one rope of the redundant reeving system fail. | 14 | 3

In both the lower block and the upper block, the sheaves are mounted in a structural cage system having supporting plates on each side of each sheave. (See Figure 9.1-7.) Thus, the load being carried by the sheave pin is shared by each of these diaphragm plates, and should a pin fail on any particular one sheave, the sheave adjacent to it will still maintain its integrity allowing system 1 or system 2 of the reeving to take over the entire load. The bottom block hook suspension system consists of a double main hook arrangement fitted one inside the other. This arrangement provides redundancy without requiring special slinging or hook box designs in lifting devices.

The hook system consists of what appears to be a conventional bottom block utilizing a "hook within a hook." In effect, there is a sister

hook suspended from a hollow hook shaft and within this outer sister hook a section is milled out and an inner sister hook is inserted supported from an internal shaft. (See Figure 9.1-8). Both inside and outside sister hooks have the same contour and look to be one and the same. In supporting the hook shank of the bottom block, each one of these shanks is supported from its own crosshead and antifriction bearing. Failure in any one portion of the system will result in the other's taking over its full load duties. The design of the crane permits repair, adjustment, or replacement of failed active components or subsystems. The crane will maintain a load in a safe temporary position should a failure occur with a lifted load to allow for crane repair or adjustment. 75

The ZPS-1 reactor building crane system is provided with spring bumpers on the bridge to limit trolley travel and on the crane runway to limit bridge travel in the event of failure of the limit switches. Limit switches are provided to sense overtravel. The control system incorporates an overspeed control which sets the idler gear brake upon overspeeds. Speed is sensed from the main hoist drum shaft. Circuit breakers and thermal overloads are provided for the crane motors to limit excess current and high temperature which may result due to maloperation or component failure. 14

In addition to the manufacturer's normal quality control inspection for ensuring high quality, the main hook was ultrasonically tested and magnetic particle inspected before and after a load test of 200% of the design rated load at the manufacturer's shop. Certified test results have been furnished to document the results. 3

9.1.4.2.2.2.2 Electrical 89

The reactor building crane is furnished by the Harnischfeger Corporation and utilizes and Electrotorque 300 control system for main and auxiliary hoist control and a static stepless a-c reverse plugging control for bridge and trolley motion.

Electrotorque is the registered trade name of the hoist control system. It converts three-phase a-c power to d-c power by means of thyristor bridges. A shunt wound d-c motor serves as the electromechanical output element. The d-c motor on the ZPS-1 crane is controlled in either the constant torque mode or the constant horsepower mode. The control provides infinite speed control within its operating range.

A tachometer is used to obtain a signal proportional to speed when operating in the constant horsepower range. High speed at light loads (3 times rated speed at no load) is obtained by field weakening. The maximum developed torque of the hoist system is 140% of the required torque rating of the d-c hoist motor and less than the load-carrying capability of the hoist system. 14 75

The bridge and trolley control provides infinite variable speed control between the minimum and maximum travel speeds and has no floating point. The control portion of the crane instruction manual is provided by Reference 1. Figure 9.1-9 shows the pendant control for the crane. The same functions are provided in the crane cab for crane control.

The hoist is furnished with a geared upper and lower limit switch. The lower limit has a two-contact system switch connected in series and operated from a single mechanical drive. The purpose of this is to protect against a frozen set of contacts. The upper geared limit switch operates a control circuit limit switch by opening a reversing switch control circuit, stopping the hoist motion, and setting the brakes. A separate block-type limit switch is provided to operate a power circuit limit switch to positively interrupt the motor-raising circuit and to set the brakes. | 75 | 14

The control system also incorporates the use of an overspeed switch driven from the idler gear train or the idler side of the drum. The purpose of this switch is to "defeat" certain brake circuits that can be established by the crane operator should a hoisting motor or control system fail. This overspeed switch is adjusted to open the circuit of both the spring-set motor brakes and the hoist control circuit so that a load would immediately be held in suspension should the drive motor overpseed 40% in the lowering direction. | 3

The control system also incorporates means of safely lowering a load should there by a failure either mechanically or electrically in the drive system.

The main and auxiliary hoists are each provided with a d-c variable voltage control system equipped with regenerative braking and two d-c magnetic holding brakes. The d-c hoists motors are shunt wound and rated for 230-Vdc service. The motors are rated at 40 hp and 15 hp respectively with a 1.20 service factor. The calculated maximum continuous bhp required is 40 hp and 15 hp respectively for the main and auxiliary hoists. | 3

A full-capacity load can be lowered in a controlled mode at approximately 120% speed using the dynamic braking circuit in the system.

Under the worst conditions, which would include loss of power, defective gear train, defective motor, etc., the load can still be lowered by using the brake release lever to open the holding brakes and lower the load to the floor in a series of controlled steps. | 75

Electrical track limit switches are provided for the bridge and trolley to prevent travel of the crane over the spent fuel pool. The crane interlocked area is shown in Figure 1.2-15. Thus, the spent fuel shipping cask or any other heavy object is never moved into a position where an accidental drop could damage the spent fuel in the spent fuel storage pool.

9.1.4.2.2.3 Safety Evaluation

The ambient temperature under which the crane is to operate does not exceed 40° C. Stresses in all structural and mechanical parts will be far below the endurance limits for infinite life of the various materials for both the rated crane capacity and the test load of 125% capacity.

In addition to the regenerative braking system for the main and auxiliary hoists, two d-c magnetic holding brakes are provided. The trolley is provided with one d-c magnetic holding brake, and the bridge is provided with two electric-hydraulic brakes. | 3

Loads on the structural parts will vary but will not reverse. The only critical parts with stress reversals will be the rotating parts, and these are provided with single failure protection. Since the crane is to operate under normal temperature conditions and since the stress levels are below the endurance limits for infinite life, testing of the crane to 125% of rated capacity provides reasonable assurance that the crane will not fail while handling a spent fuel cask.

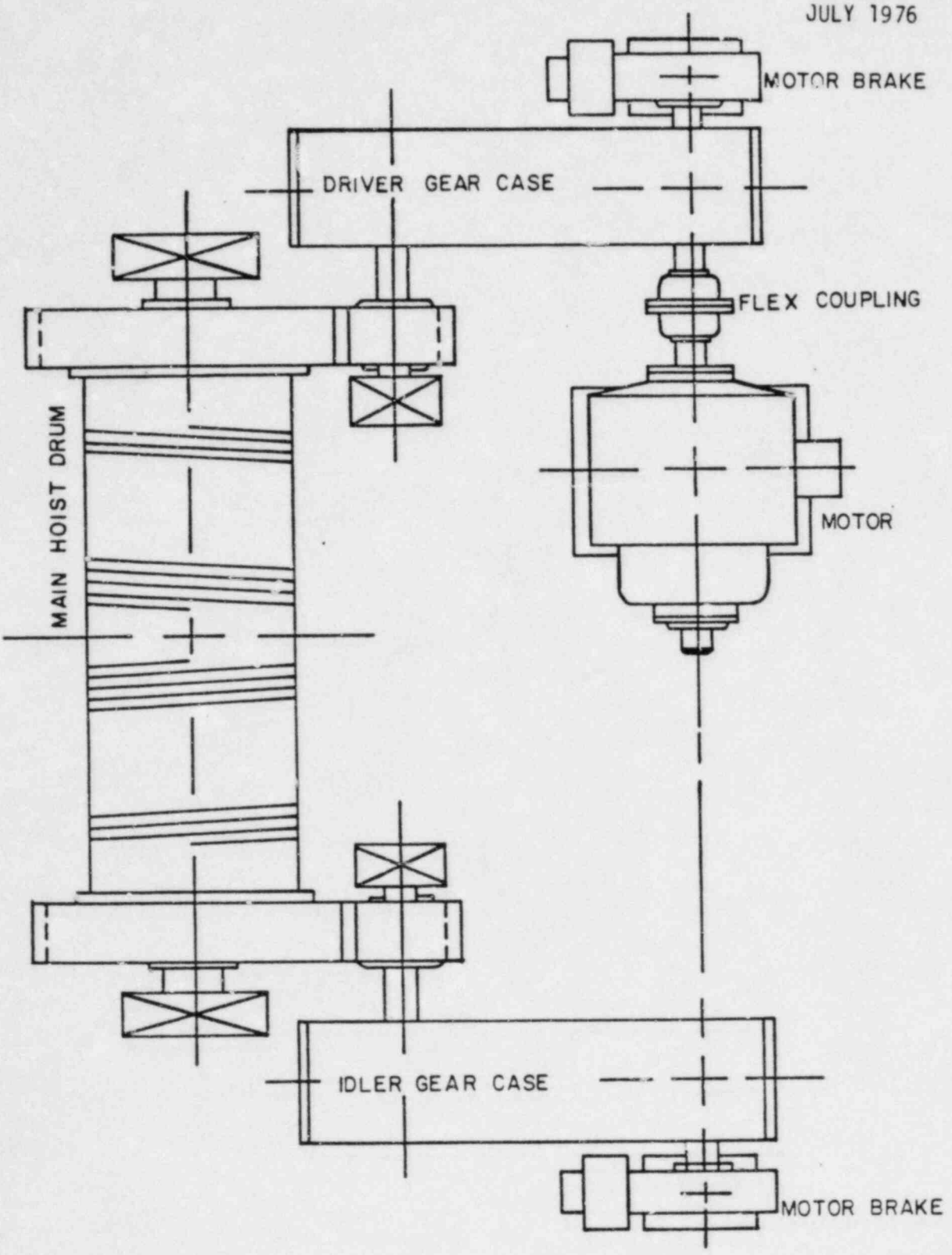
During an earthquake, the crane bridge and the trolley could be displaced but they will not leave the rails. The bridge rails are firmly attached to the supporting concrete and steel superstructure, and the trolley rails are firmly attached to the bridge girders. Locking pins are provided for the bridge and uplifts are provided for the trolley to prevent the crane from being dislodged during a tornado.

The cask crane will be tested to 125% of rated capacity at the low building temperature (137.5 tons for the main hoist and 12.5 tons for the auxiliary hoist). The ability of the crane to perform all its intended functions will be demonstrated during these tests and critical areas visually examined. | 14

Operational tests and visual inspections are to be made at periodic intervals during the life of the crane to demonstrate its ability to safely perform its functions. The crane hooks have been inspected by the magnetic particle method and UT examined after the manufacturer's 200% full load proof test.

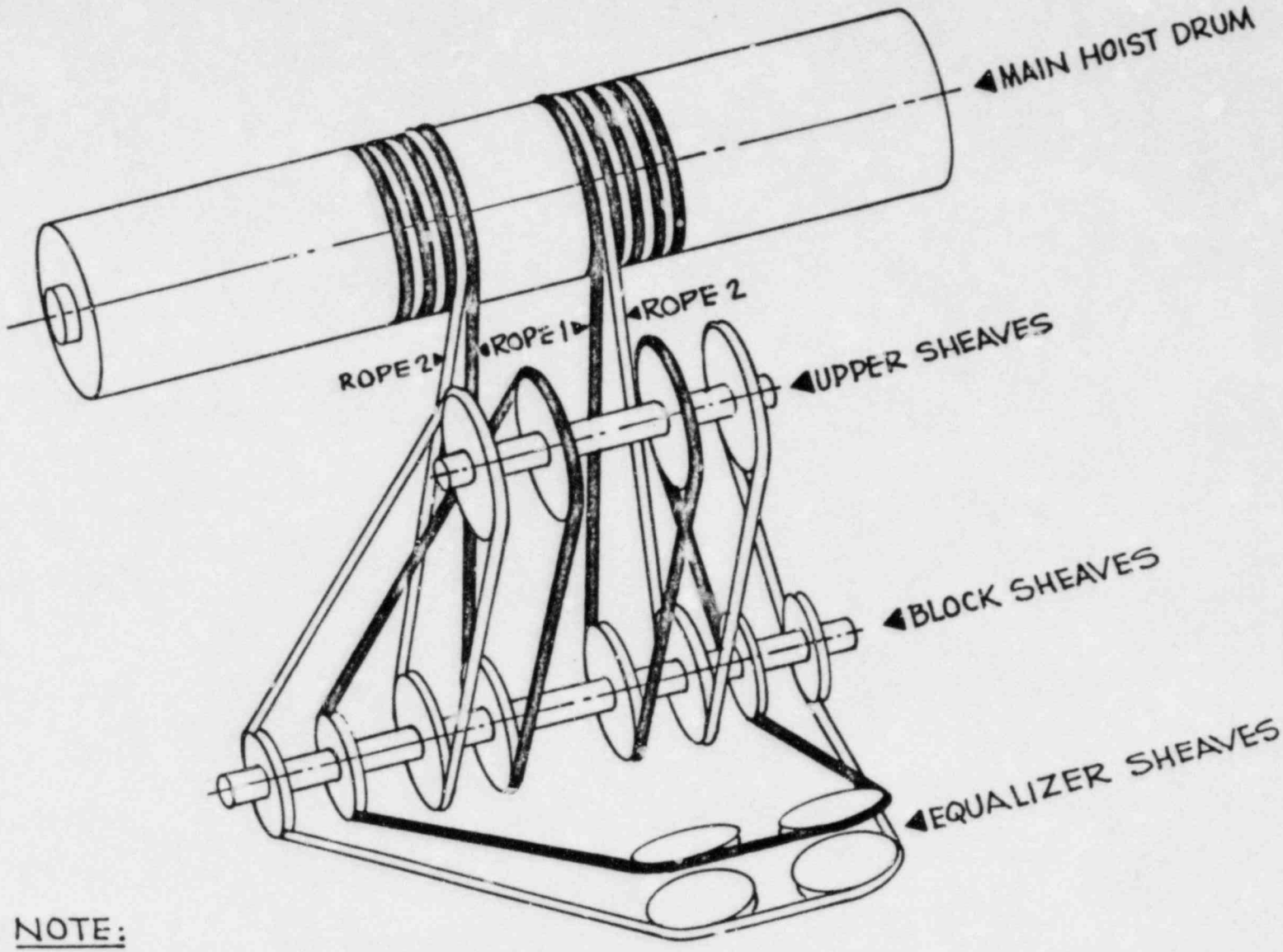
Bridge speed will be administratively controlled to limit the maximum speed to 40 fpm when lifting heavy loads with the main hoist. Full rated bridge speed will be permitted when using the auxiliary hoist. | 14

REVISION 14
JULY 1976



WM. H. ZIMMER NUCLEAR POWER STATION, UNIT 1
FINAL SAFETY ANALYSIS REPORT

FIGURE 9.1-4
HOIST GEAR TRAIN

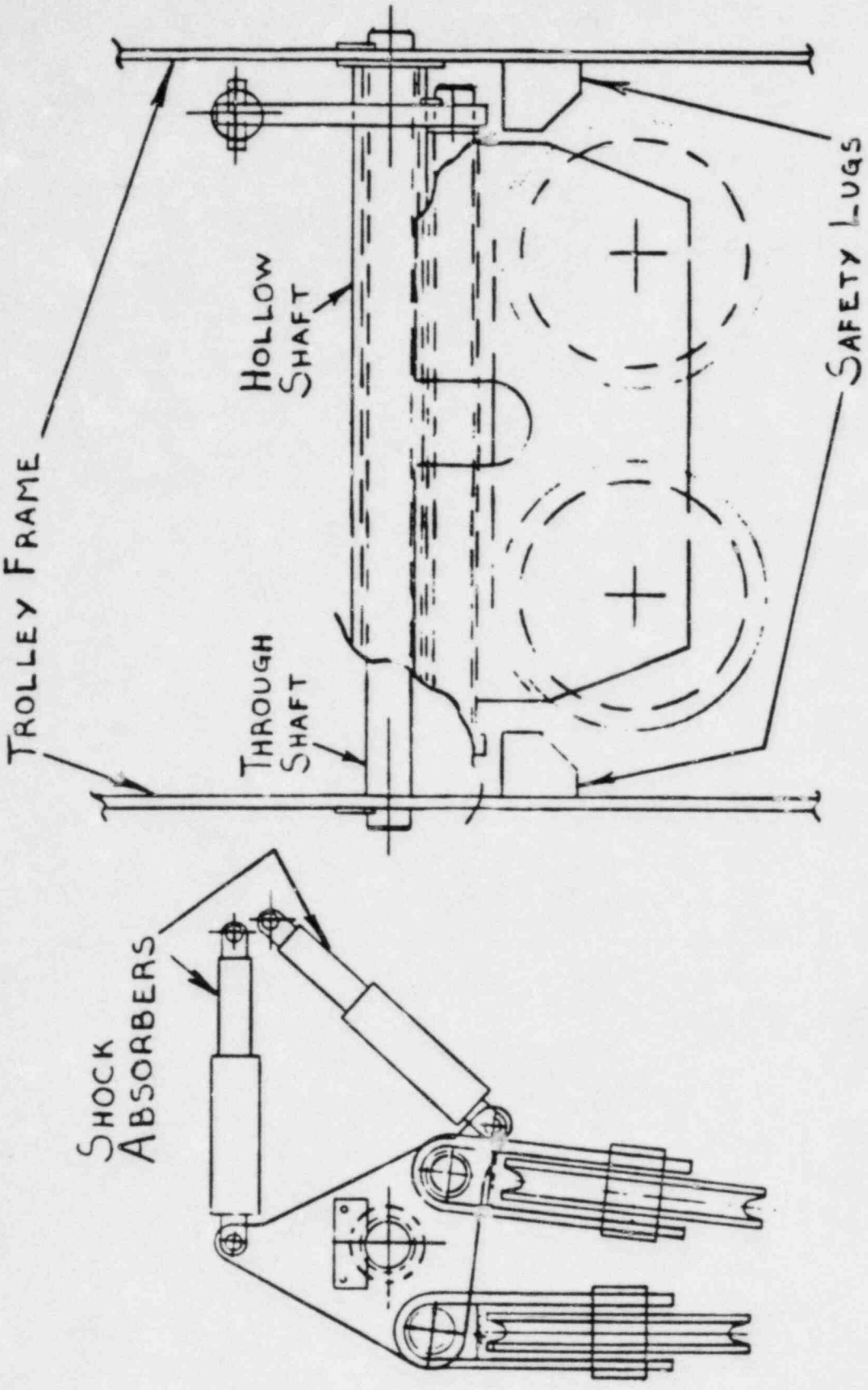


NOTE:

RELATIVE POSITION OF SHEAVES IS EXTENDED AND ANGLE OF VIEW IS DISTORTED TO CLARIFY REEVING PATHS.

WM. H. ZIMMER NUCLEAR POWER STATION, UNIT 1
FINAL SAFETY ANALYSIS REPORT

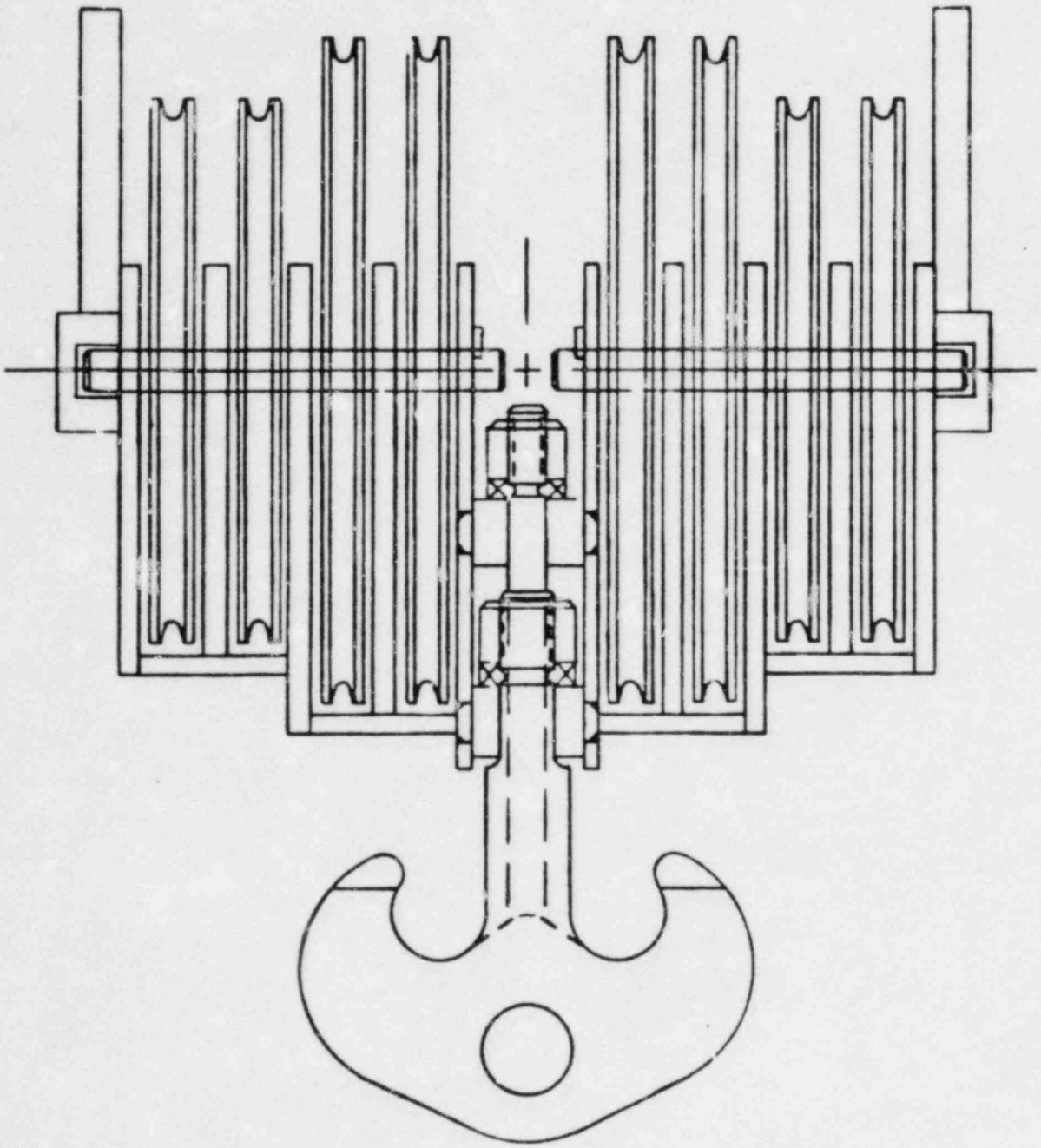
FIGURE 9.1-5
WIRE ROPE SYSTEM



WM. H. ZIMMER NUCLEAR POWER STATION, UNIT 1
FINAL SAFETY ANALYSIS REPORT

FIGURE 9.1-6

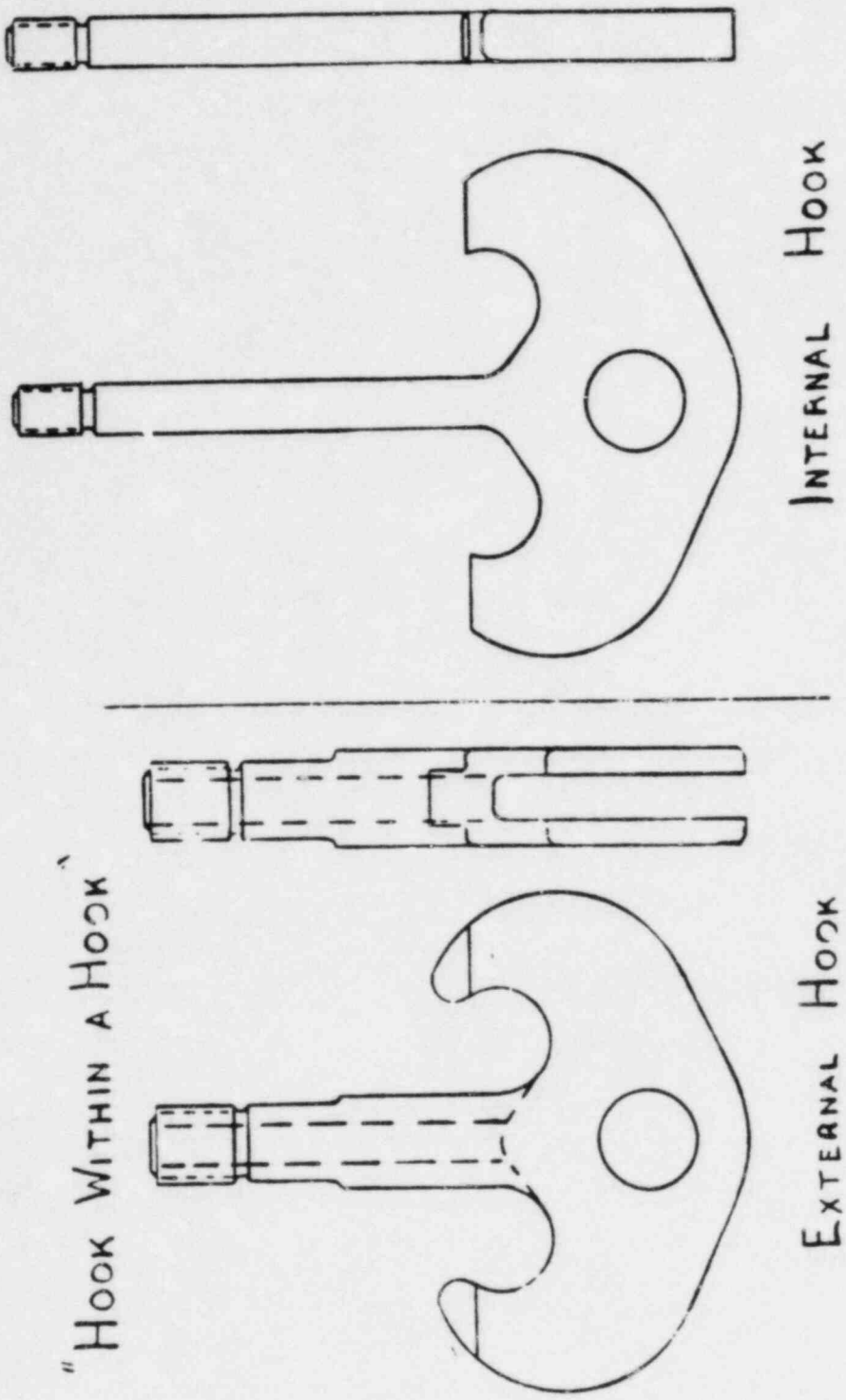
EQUALIZER ASSEMBLY



WM. H. ZIMMER NUCLEAR POWER STATION, UNIT 1
FINAL SAFETY ANALYSIS REPORT

FIGURE 9.1-7

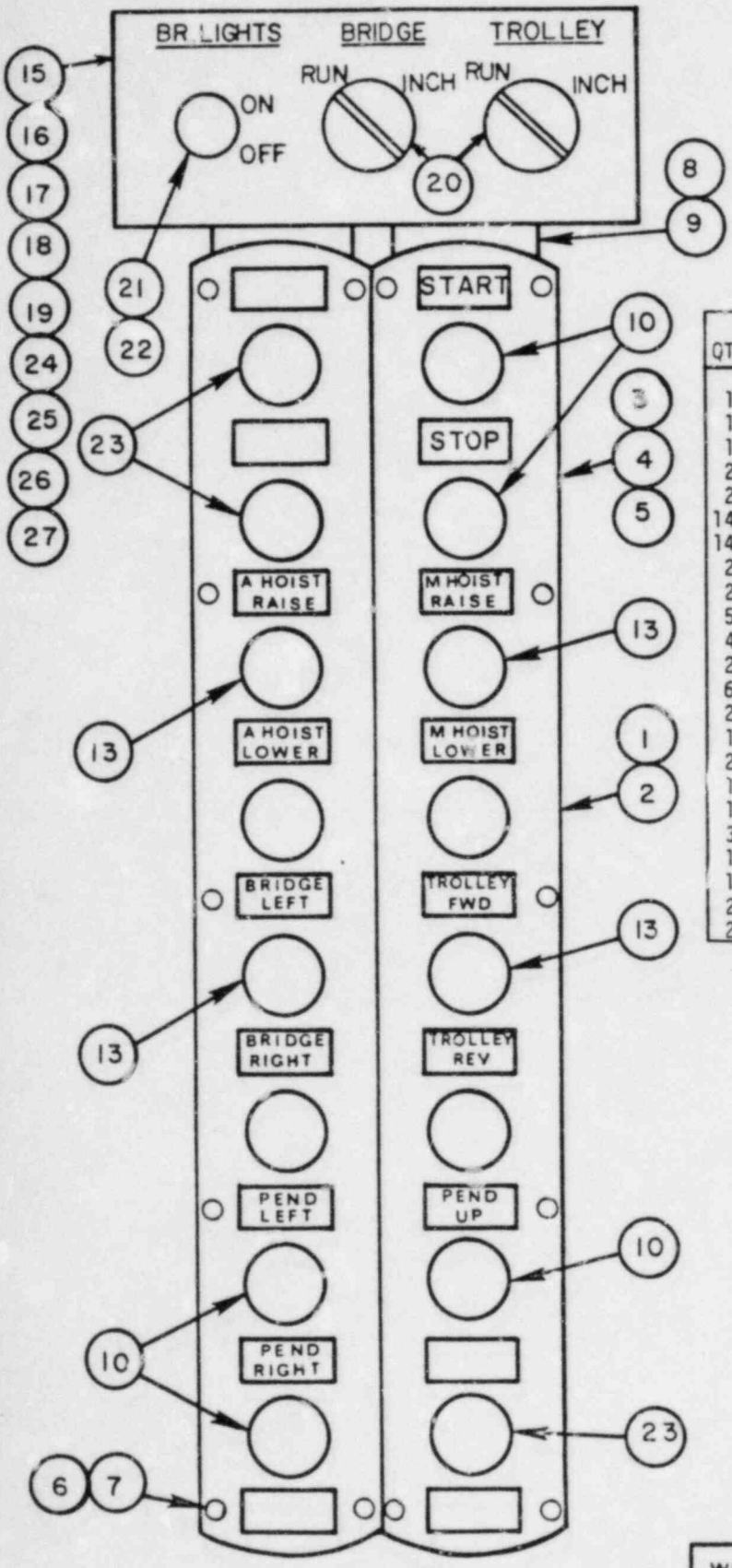
HOOK BLOCK ASSEMBLY



WM. H. ZIMMER NUCLEAR POWER STATION, UNIT 1
FINAL SAFETY ANALYSIS REPORT

FIGURE 9.1-8

HOOK ARRANGEMENTS

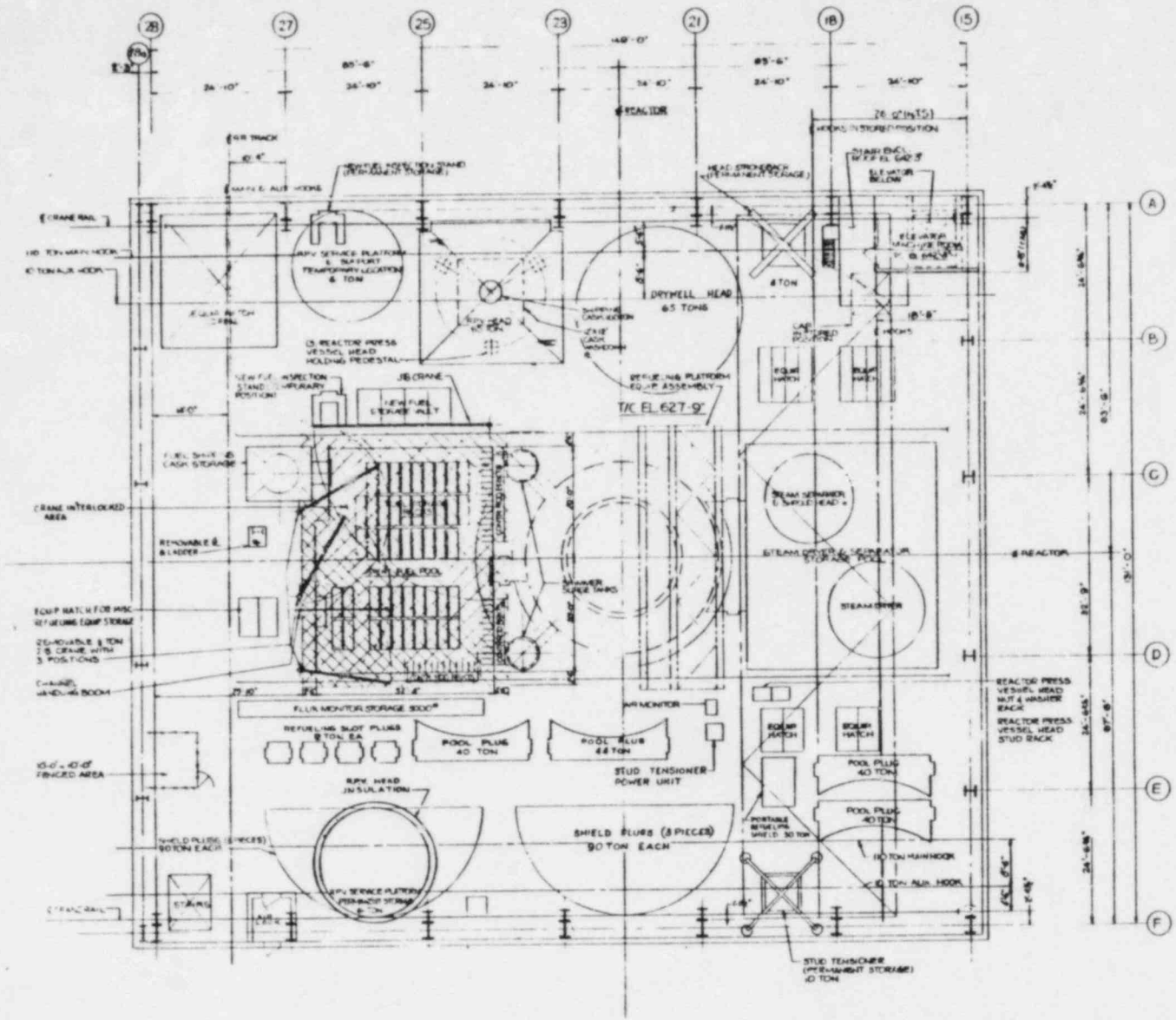


QTY.	DESCRIPTION	PART NO.	IT. NO.
1	CASE	314E761-1	1
1	NAMEPLATE	32Z395	2
1	COVER	314E762	3
2	GASKET	20H855	4
2	INSULATOR	20F12	5
14	1/4"- 20 x 1/2" R.H.M.S.	0860V109	6
14	1/4" HELICAL L.W.	3616V007	7
2	1 1/4" BUSHED NIPPLE	0948V007	8
2	1 1/4" GALV. COND. L'NUT	0944V004	9
5	SINGLE SPEED P.B.	979H164-1	10
4	IND. MASTER-TRAVERSE	979H165-1	13
2	CORD GRIP	79Z1560D12	15
6	TY-RAP TIES	32Z890-D3	16
2	#14 - 22 CABLE 24 FT. LG.	P&H 2009	18
1	JUNCTION BOX	14F3901	19
2	SEL. SWITCH (RUN-INCH)	79Z1773D38	20
1	TOGGLE SWITCH	79Z894	21
1	T. SW. N. P. (ON-OFF)	79Z805	22
3	BLANK	979H166-3	23
1	PLUG-CABLE #1	79Z1558D16	24
1	PLUG-CABLE #2	79Z1558D31	25
2	COUPLING FOR ITEMS 24 & 25	18H3009C1	26
2	CORD GRIP FOR ITEMS 24 & 25	85Z24D10	27

WM. H. ZIMMER NUCLEAR POWER STATION, UNIT 1
FINAL SAFETY ANALYSIS REPORT

FIGURE 9.1-9

CRANE PENDANT CONTROL



NOTE
ITEMS NOTED FOR PERMANENT STORAGE MUST
BE ANCHORED FOR SEISMIC CONDITION.

ESSENTIAL COMPONENTS
▲ INCLUDED ▲

NORTH

WM. H. ZIMMER NUCLEAR POWER STATION, UNIT 1
FINAL SAFETY ANALYSIS REPORT

FIGURE 1.2-15

GENERAL ARRANGEMENT
REACTOR OPERATING FLOOR LAYDOWN

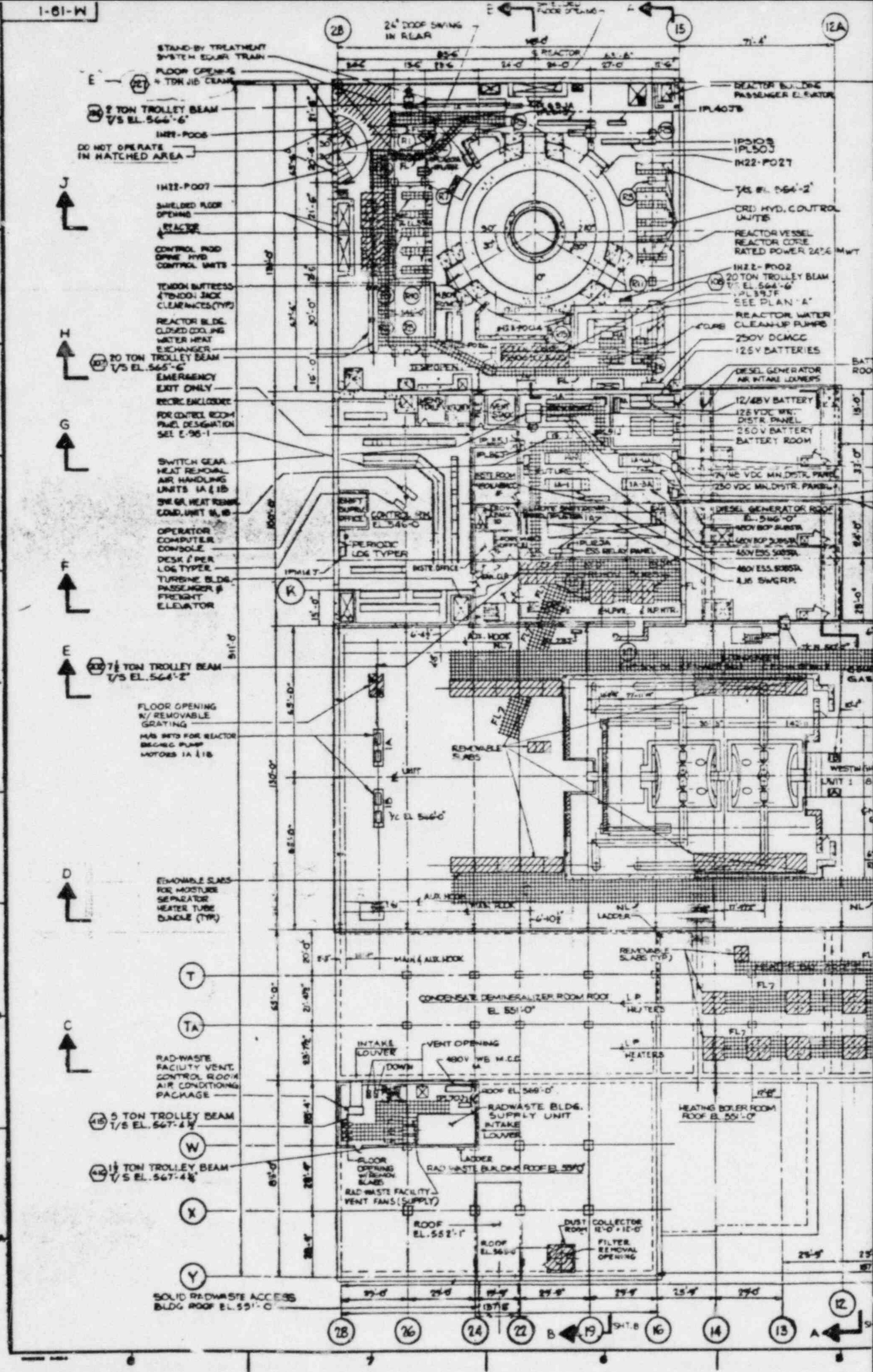
Table 2

Lifting Point Safety Factors

Location	Quantity	WT	Safety Factor
Reactor Shield Plug	18	90 tons	2.1
Pool Plug	8	44 tons	1.7
Refueling Slot Plug	4	8.1 tons	10
Equip. Hatch (el. 627'-9" East)	16	9 tons	3.7
Equip. Hatch (el. 627'-9" West)	8	14.4 tons	2.3
New Fuel Storage Vault Plug	8	4.4 tons	2.0
Pool Gate No. 1	2	5.5 tons	2.2
Pool Gate No. 2A	2	5 tons	2.5
Pool Gate No. 2B	2	7.5 tons	2.2
Pool Gate No. 3	2	26 tons	2.3
Skimmer Surge Tank Cover	3	2.2 tons	10.1

Note: Actual weights may differ from the rated weights used for laydown area purposes.

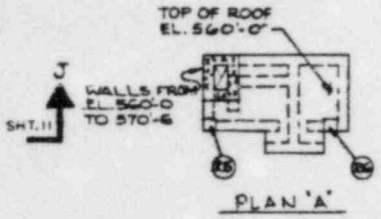
1-61-W



STAND-BY TREATMENT SYSTEM EQUIP. TRAIN
FLOOR OPENING
4 TON JIB CRANE
2 TON TROLLEY BEAM T/S EL. 566'-6"
DO NOT OPERATE IN HATCHED AREA
REACTOR BUILDING PASSENGER ELEVATOR
1PL407B
1PS10B
1PL50J
1H22-P027
T/S EL. 564'-2"
CRD HYD. CONTROL UNITS
REACTOR VESSEL REACTOR CORE RATED POWER 2436 MWT
1H22-P002
20 TON TROLLEY BEAM T/S EL. 564'-6"
SEE PLAN "A"
REACTOR WATER CLEAN-UP PUMPS
250V DCMCC
125V BATTERIES
DIESEL GENERATOR AIR INTAKE LOUVERS
12/48V BATTERY
125 VDC MISC. DISTR. PANEL
250V BATTERY
BATTERY ROOM
250 VDC MN. DISTR. PANEL
DIESEL GENERATOR ROOF EL. 546'-0"
4.16 SWGRR
1H22-P007
SHIELDED FLOOR OPENING
REACTOR
CONTROL ROD DRIVE HYD CONTROL UNITS
TENDON BUTTRESS 4'TENDON JACK CLEARANCES (TYP)
REACTOR BLDG. CLOSED COOLING WATER HEAT EXCHANGER
20 TON TROLLEY BEAM T/S EL. 565'-6"
EMERGENCY EXIT ONLY
FOR CONTROL ROOM PANEL DESIGNATION SEE E-96-1
SWITCH GEAR HEAT REMOVAL AIR HANDLING UNITS 1A & 1B
OPERATOR COMPUTER CONSOLE
DESK & PER LOG TYPER
TURBINE BLDG. PASSENGER & FREIGHT ELEVATOR
CONTROL RM EL. 546'-0"
PERIODIC LOG TYPER
7½ TON TROLLEY BEAM T/S EL. 564'-2"
FLOOR OPENING W/ REMOVABLE GRATING
REMOVABLE SLABS
REMOVABLE SLABS FOR MOISTURE SEPARATOR HEATER TUBE BUNDLE (TYP)
MAIN & AUX. HOOK
CONDENSATE DEMINERALIZER ROOM ROOF EL. 551'-0"
LP HEATERS
LADDER
INTAKE LOUVER
VENT OPENING
480V WB M.C.C.
RAD-WASTE FACILITY VENT. CONTROL ROOM AIR CONDITIONING PACKAGE
5 TON TROLLEY BEAM T/S EL. 567'-4½"
1½ TON TROLLEY BEAM T/S EL. 567'-4½"
ROOF EL. 569'-0"
RADWASTE BLDG. SUPPLY UNIT INTAKE LOUVER
FLOOR OPENING W/REMOV. SLABS
RAD WASTE BUILDING ROOF EL. 590'
RAD WASTE FACILITY VENT FANS (SUPPLY)
HEATING BOILER ROOM ROOF EL. 551'-0"
ROOF EL. 552'-1"
ROOF EL. 560'-0"
DUST COLLECTOR ROOM 12'-0" x 12'-0"
FILTER REMOVAL OPENING
SOLID RADWASTE ACCESS BLDG ROOF EL. 551'-0"
28
26
24
22
19
16
14
13
12
15
12A
T
TA
W
X
Y
K
J
H
G
F
E
D
C
B
A

GENERAL NOTES:

1. ▦ DENOTES 7'-0" HIGH MIN. EQUIPMENT REMOVAL AISLE.
2. ▦ DENOTES 8'-0" HIGH MIN. LIFT TRUCK ROUTE WITH MAX. FLOOR LOAD OF 18,000# SHOWN ON M-19 SHT. 2 ONLY.
3. ▨ DENOTES EQUIPMENT REMOVAL HATCH.
4. LTL DENOTES LIFT TRUCK LOAD.
   TL DENOTES TRACK LOAD.
   FL DENOTES AISLE FLOOR LOAD.
   NL DENOTES EQUIPMENT HANDLE FROM OVERHEAD WITH NO FLOOR LOAD.
5. ——— DENOTES FLOOR DOLLY AISLE OF JACKING DEVICE TO BUTTRESS.
6. USE OF EQUIPMENT REMOVAL DWGS. M-19 SHEET 1 THRU 14. MUST BE RESTRICTED TO EQUIPMENT REMOVAL ARRANGEMENT ONLY AND FOR NO OTHER PURPOSE. THIS IS NOT AN ERECTION DRAWING.
7. ⬡ NUMBERS INDICATE ITEM NUMBERS ON M-19 SHT. 12:
   100-199 REACTOR BUILDING.
   200-299 AUXILIARY BUILDING.
   300-399 TURBINE BUILDING
   400- RADWASTE & OTHERS.
8. ▩ DENOTES REMOVABLE FLOOR OR WALL OR KNOCK OUT WALL.



PLAN 'A'

REVISED (17) PER UNSOLICITED COMMENTS MT-468. FOR DISTR. PER MT-2119

EQUIPMENT REMOVAL
MAIN FLOOR EL. 546'-0"
WM. H. ZIMMER NUCLEAR POWER STATION UNIT-1
THE CINCINNATI GAS & ELECTRIC COMPANY
COLUMBUS & SOUTHERN OHIO ELECTRIC COMPANY
THE DAYTON POWER AND LIGHT COMPANY

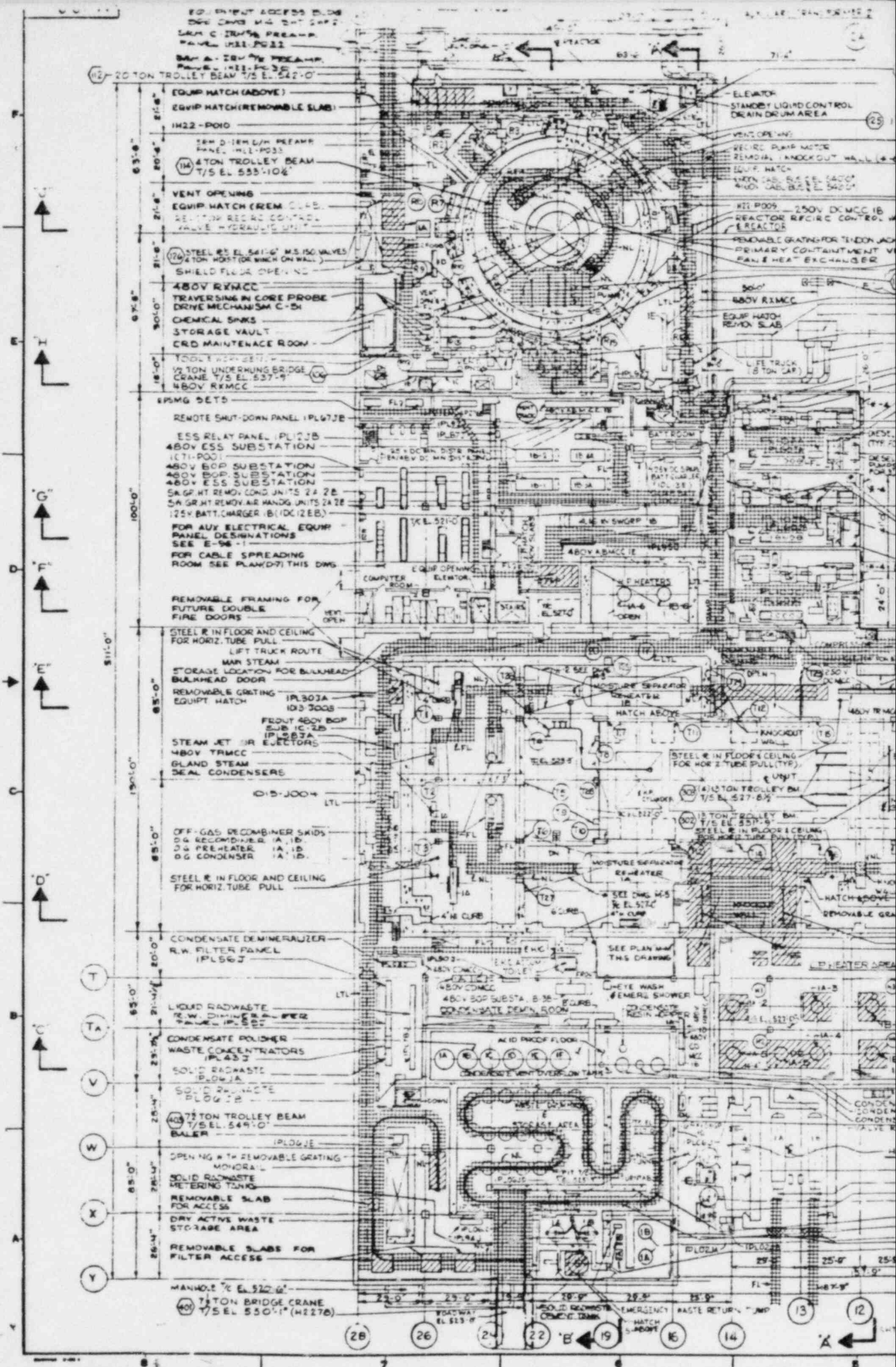
1" = 20'-0"

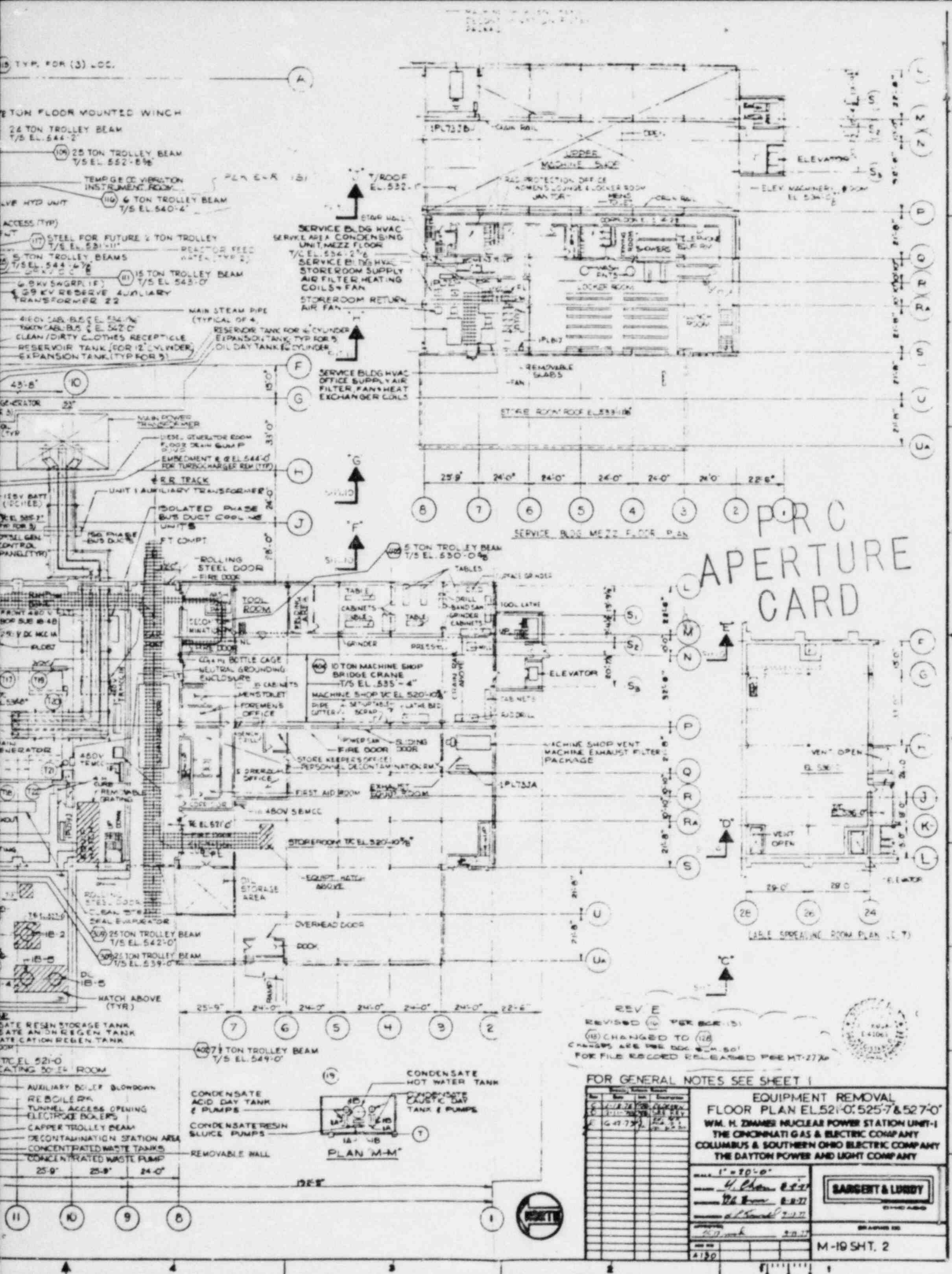
BARGERT & LUKEY

M-19 SHT. 1 OF 17

8306080140-01

Also Available On
Aperture Card





TYP. FOR (3) LOC.
TON FLOOR MOUNTED WINCH
24 TON TROLLEY BEAM T/S EL. 544-2"
25 TON TROLLEY BEAM T/S EL. 552-8 3/8"
TEMP. G.E. CO. VIBRATION INSTRUMENT ROOM
6 TON TROLLEY BEAM T/S EL. 540-4"
STEEL FOR FUTURE 1/2 TON TROLLEY T/S EL. 531-11"
5 TON TROLLEY BEAMS
15 TON TROLLEY BEAM T/S EL. 543-0"
RESERVE AUXILIARY TRANSFORMER 22
MAIN STEAM PIPE (TYPICAL OF 4)
CLEAN/DIRTY CLOTHES RECEPTICLE
RESERVOIR TANK (FOR 12" CYLINDER) EXPANSION TANK (TYP FOR 5)
SERVICE BLDG HVAC SERVICE AREA CONDENSING UNIT, MEZZ FLOOR
SERVICE BLDG HVAC STOREROOM SUPPLY AIR FILTER HEATING COILS & FAN
STOREROOM RETURN AIR FAN
SERVICE BLDG HVAC OFFICE SUPPLY AIR FILTER, FANS, HEAT EXCHANGER COILS
UPPER MACHINE SHOP
LOCKER ROOM
SHOWERS
LUNCH ROOM
REMOVABLE SLABS
ELEVATOR
ELEV MACHINERY ROOM
STORE ROOM ROOF
SERVICE BLDG MEZZ FLOOR PLAN
MAIN POWER TRANSFORMER
R.R. TRACK
UNIT 1 AUXILIARY TRANSFORMER
ISOLATED PHASE BUS DUCT COOLING UNITS
ROLLING STEEL DOOR
5 TON TROLLEY BEAM T/S EL. 530-0 3/8"
TOOL ROOM
DECONTAMINATION
10 TON MACHINE SHOP BRIDGE CRANE T/S EL. 535'-4"
MACHINE SHOP
MENS TOILET
FOREMENS OFFICE
FIRE DOOR
SLIDING DOOR
STORE KEEPERS OFFICE
PERSONNEL DECONTAMINATION RM.
FIRST AID ROOM
EXHAUST EQUIP. ROOM
MACHINE SHOP VENT MACHINE EXHAUST FILTER PACKAGE
STOREROOM
OIL STORAGE AREA
EQUIPT. HATCH ABOVE
OVERHEAD DOOR
DOCK
25 TON TROLLEY BEAM T/S EL. 542-0"
25 TON TROLLEY BEAM T/S EL. 539-0"
HATCH ABOVE (TYP.)
7 1/2 TON TROLLEY BEAM T/S EL. 549-0"
VENT OPEN
CABLE SPREADING ROOM PLAN
CONDENSATE HOT WATER TANK
CONDENSATE ACID DAY TANK & PUMPS
CONDENSATE CAUSTIC DAY TANK & PUMPS
CONDENSATE RESIN SLUICE PUMPS
PLAN "M-M"
AUXILIARY BOILER BLOWDOWN
REBOILERS
TUNNEL ACCESS OPENING
ELECTRODE BOILERS
DECONTAMINATION STATION AREA
CONCENTRATED WASTE TANKS
CONCENTRATED WASTE PUMP
REMOVABLE WALL
REV. E
PRC APERTURE CARD

FOR GENERAL NOTES SEE SHEET 1

EQUIPMENT REMOVAL
FLOOR PLAN EL.521'-0", 525'-7" & 527'-0"

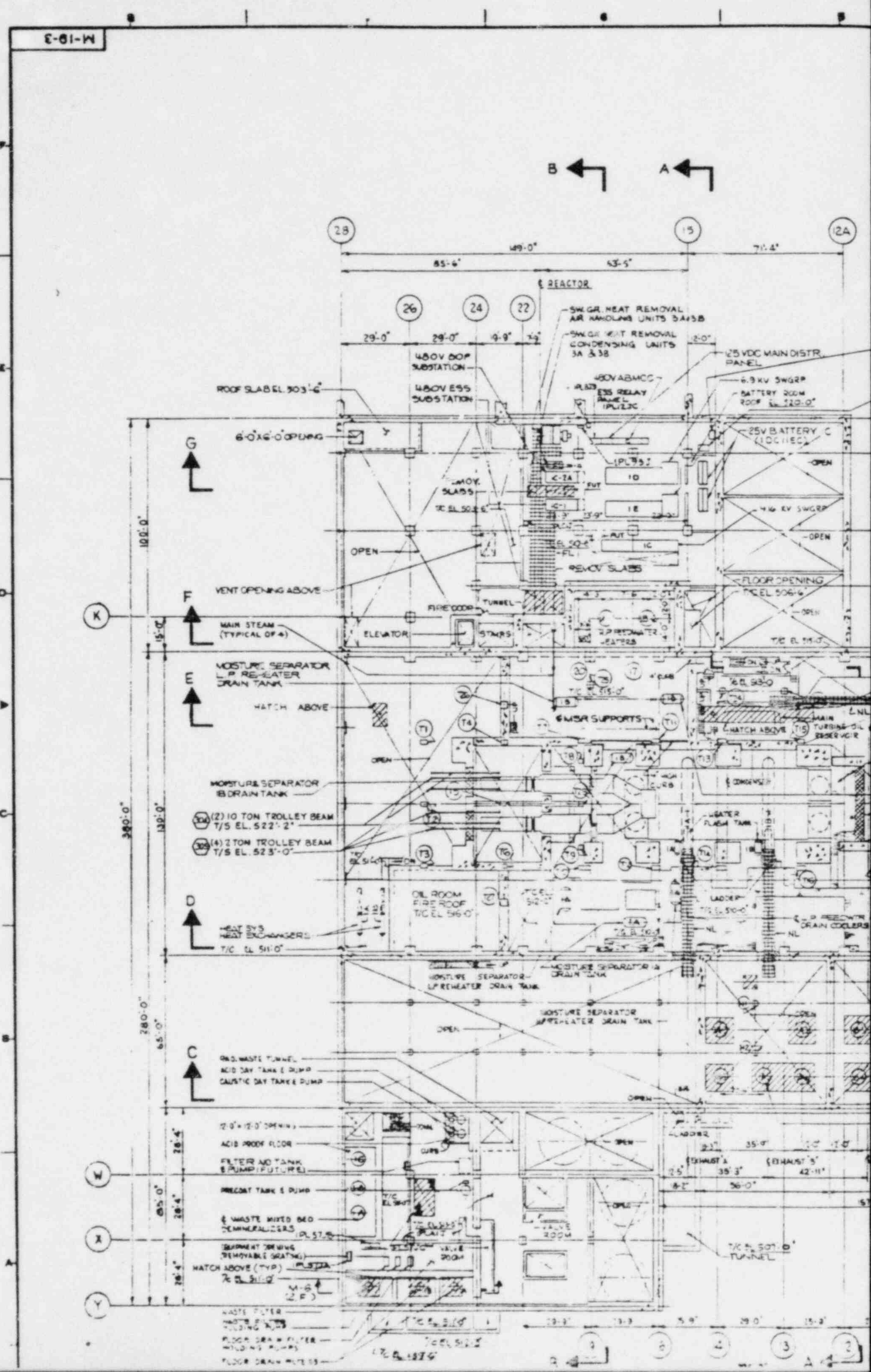
WM. H. ZIMMER NUCLEAR POWER STATION UNIT-1
THE CINCINNATI GAS & ELECTRIC COMPANY
COLUMBUS & SOUTHERN OHIO ELECTRIC COMPANY
THE DAYTON POWER AND LIGHT COMPANY

1" = 20'-0"

SARGENT & LUNDY
CHICAGO

M-19 SHT. 2

8306080140-02

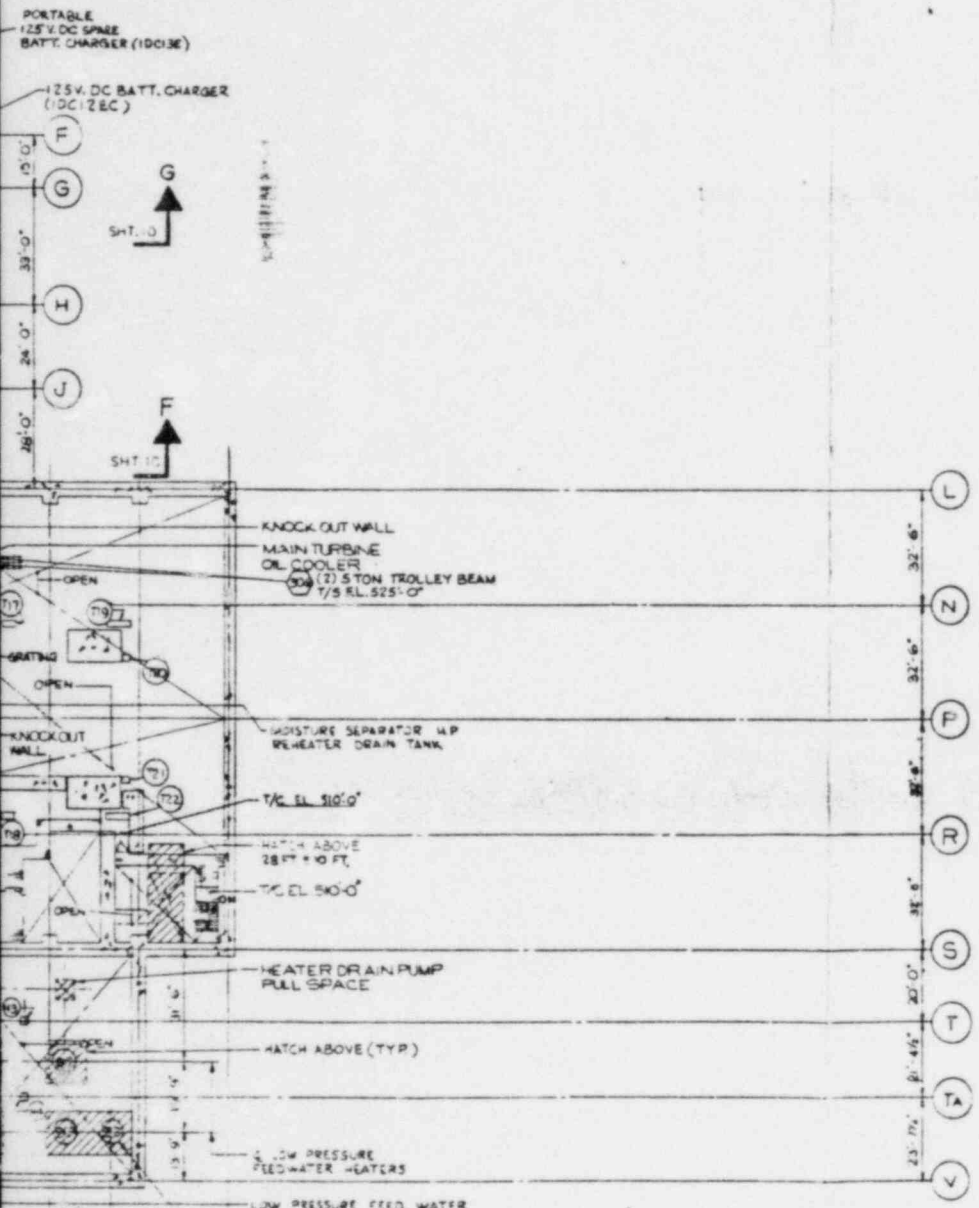


REACTOR
SW. GR. HEAT REMOVAL AIR HANDLING UNITS 3A & 3B
SW. GR. HEAT REMOVAL CONDENSING UNITS 3A & 3B
480V BOP SUBSTATION
480V ESS SUBSTATION
480V AB MCC
ESS RELAY PANEL
125 VDC MAIN DISTR. PANEL
6.9 KV SWGRP
BATTERY ROOM
125V BATTERY
4.16 KV SWGRP
ROOF SLAB EL. 503'-6"
6'-0" X 6'-0" OPENING
OPEN
REMOV. SLABS
VENT OPENING ABOVE
FLOOR OPENING
FIRE DOOR
TUNNEL
ELEVATOR
STAIRS
MAIN STEAM (TYPICAL OF 4)
MOISTURE SEPARATOR L.P. REHEATER DRAIN TANK
HATCH ABOVE
MSR SUPPORTS
MAIN TURBINE OIL RESERVOIR
MOISTURE SEPARATOR 1B DRAIN TANK
(2) 10 TON TROLLEY BEAM T/S EL. 522'-2"
(4) 2 TON TROLLEY BEAM T/S EL. 523'-0"
HEATER FLASH TANK
OIL ROOM FIREPROOF T/C EL. 516'-0"
LADDER
HEAT SYS. HEAT EXCHANGERS
T/C EL. 511'-0"
DRAIN COOLERS
MOISTURE SEPARATOR 1A DRAIN TANK
MOISTURE SEPARATOR L.P. REHEATER DRAIN TANK
RAD. WASTE TUNNEL
ACID DAY TANK & PUMP
CAUSTIC DAY TANK & PUMP
12'-0" x 12'-0" OPENING
ACID PROOF FLOOR
FILTER AID TANK & PUMP (FUTURE)
PRECOAT TANK & PUMP
WASTE MIXED BED DEMINERALIZERS
EQUIPMENT OPENING (REMOVABLE GRATING)
HATCH ABOVE (TYP.)
VALVE ROOM
T/C EL. 507'-0" TUNNEL
WASTE FILTER
WASTE FILTER HOLDING PUMP
FLOOR DRAIN FILTER HOLDING PUMPS
FLOOR DRAIN FILTERS

M-19-3

8306080140-03

Also Available On
Aperture Card



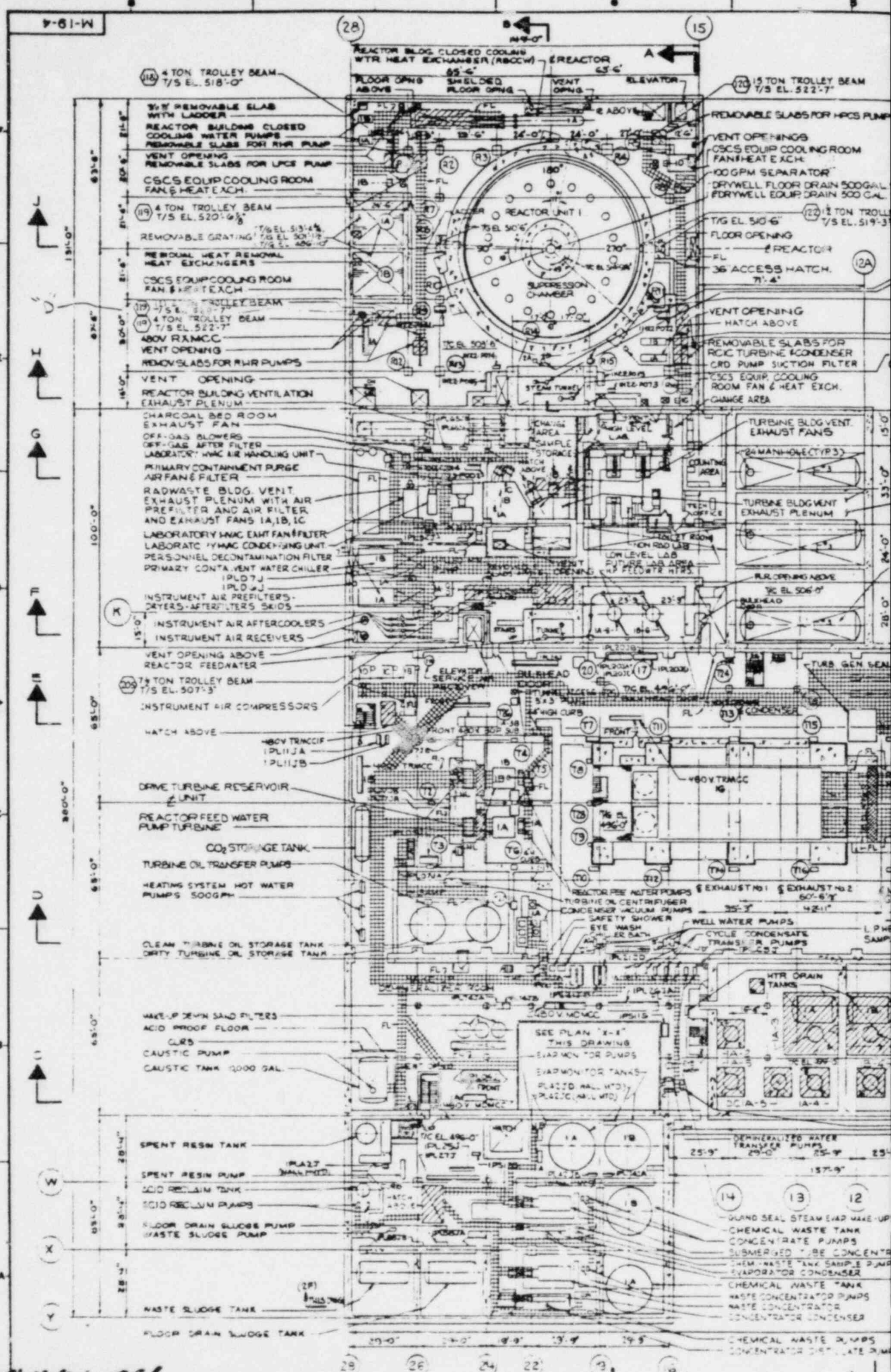
FOR GENERAL NOTES SEE SHEET 1

C { REV. C
RELEASED FOR COMMENTS MT-589
RELEASE FOR FILE RECORD MT-919

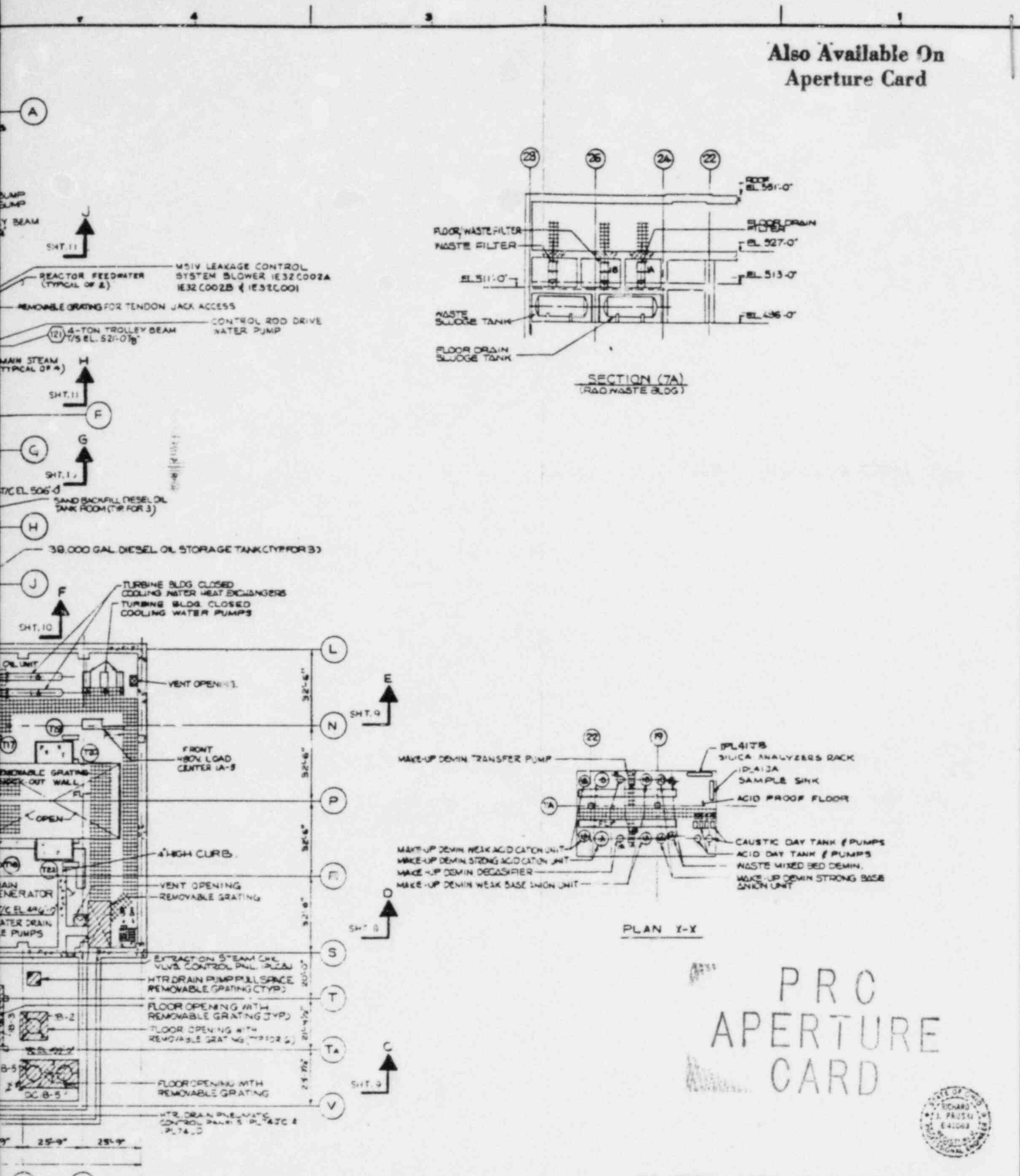
EQUIPMENT REMOVAL
FLOOR PLAN EL 510'-6", 513'-0" & 515'-0"
WM. H. ZIMMER NUCLEAR POWER STATION UNIT-1
THE CINCINNATI GAS & ELECTRIC COMPANY
COLUMBUS & SOUTHERN OHIO ELECTRIC COMPANY
THE DAYTON POWER AND LIGHT COMPANY

1" = 10'-0"

SARGENT & LUNDY



8306080140-04

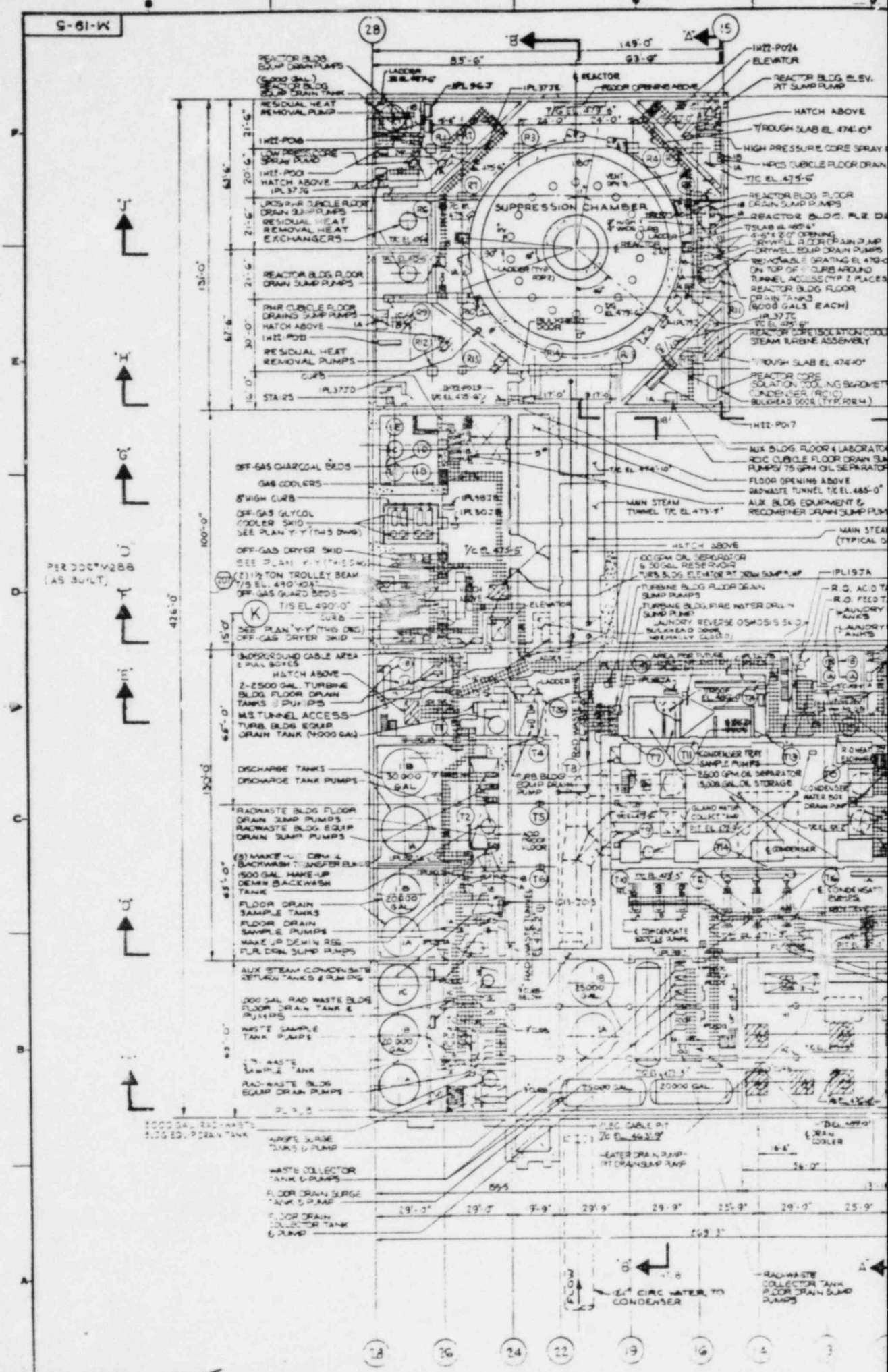


FOR GENERAL NOTES SEE SHEET 1

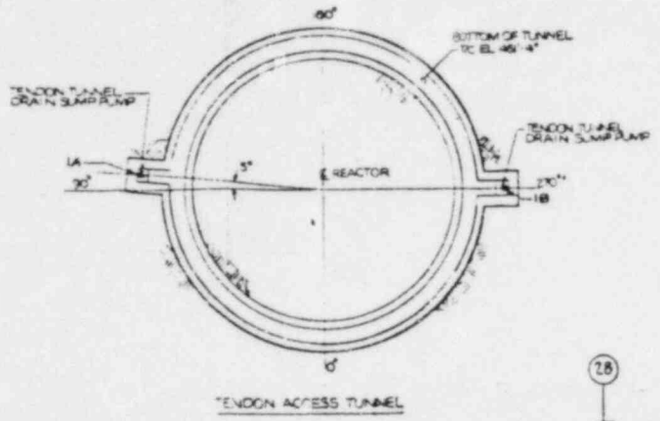
EQUIPMENT REMOVAL
FLOOR PLAN EL. 496'-0" & 503'-6"
WM. H. ZIMMER NUCLEAR POWER STATION UNIT-1
THE CINCINNATI GAS & ELECTRIC COMPANY
COLUMBUS & SOUTHERN OHIO ELECTRIC COMPANY
THE DAYTON POWER AND LIGHT COMPANY

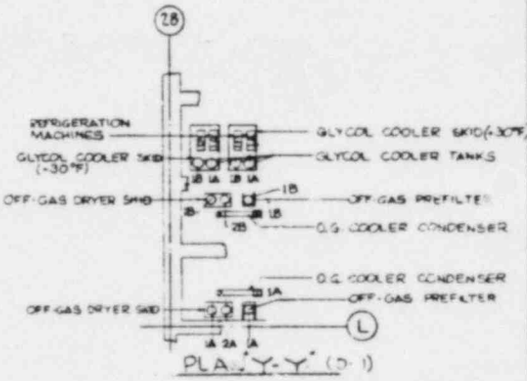
SCALE 1" = 20'-0"

SARGENT & LUNDY
CHICAGO



8306080140-05





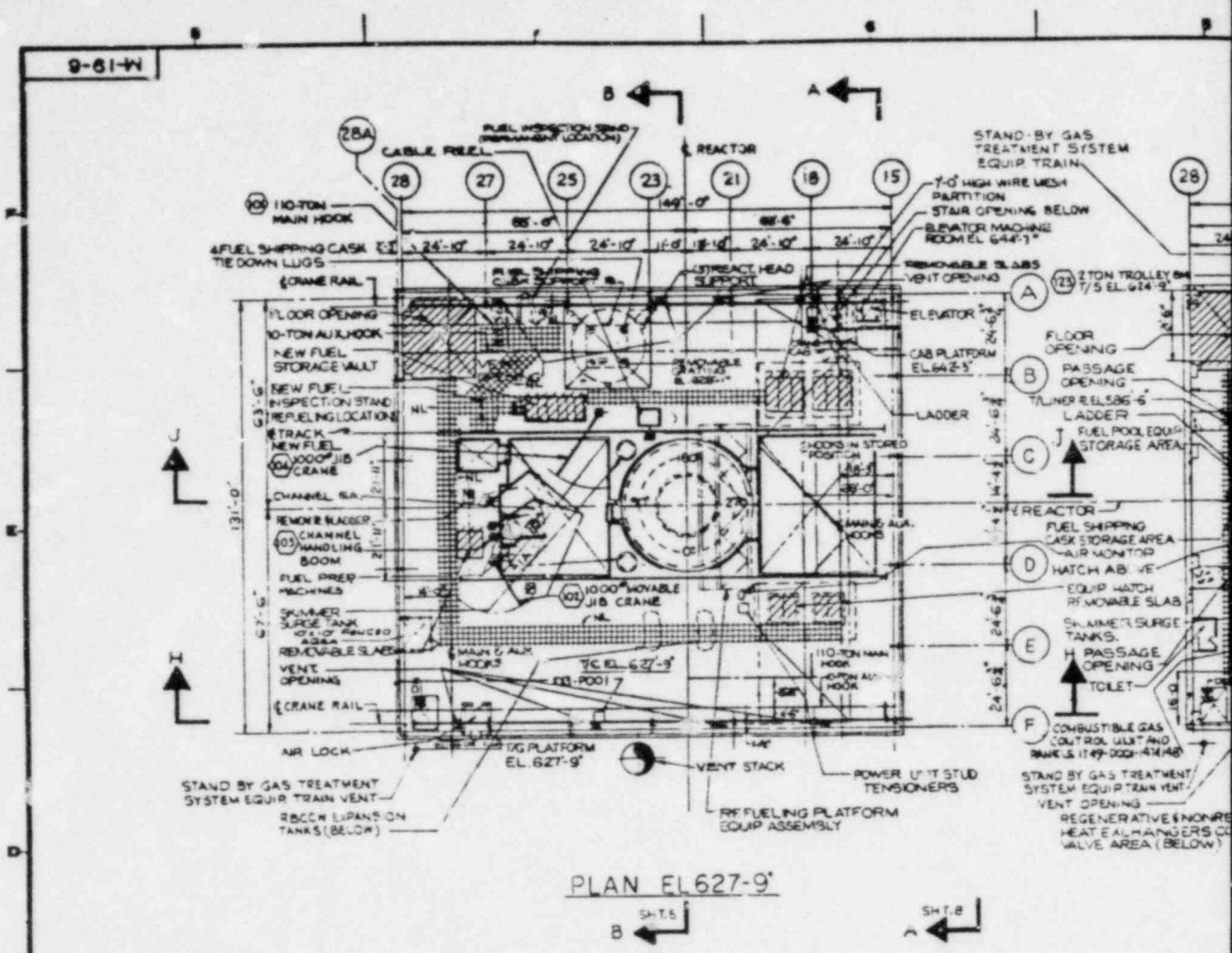
FOR GENERAL NOTES SEE SHEET 1

REV 'D'
REVISED T/S ELEVATION
PER ITEM 207 PER C.M. 288
FOR FILE RECORD 25-EA-560
PER MT-5455

EQUIPMENT REMOVAL
FLOOR PLAN EL. 473'-5" & 475'-6"
WM. H. ZIMMER NUCLEAR POWER STATION UNIT-1
THE CINCINNATI GAS & ELECTRIC COMPANY
COLUMBUS & SOUTHERN OHIO ELECTRIC COMPANY
THE DAYTON POWER AND LIGHT COMPANY

1" = 20'-0"

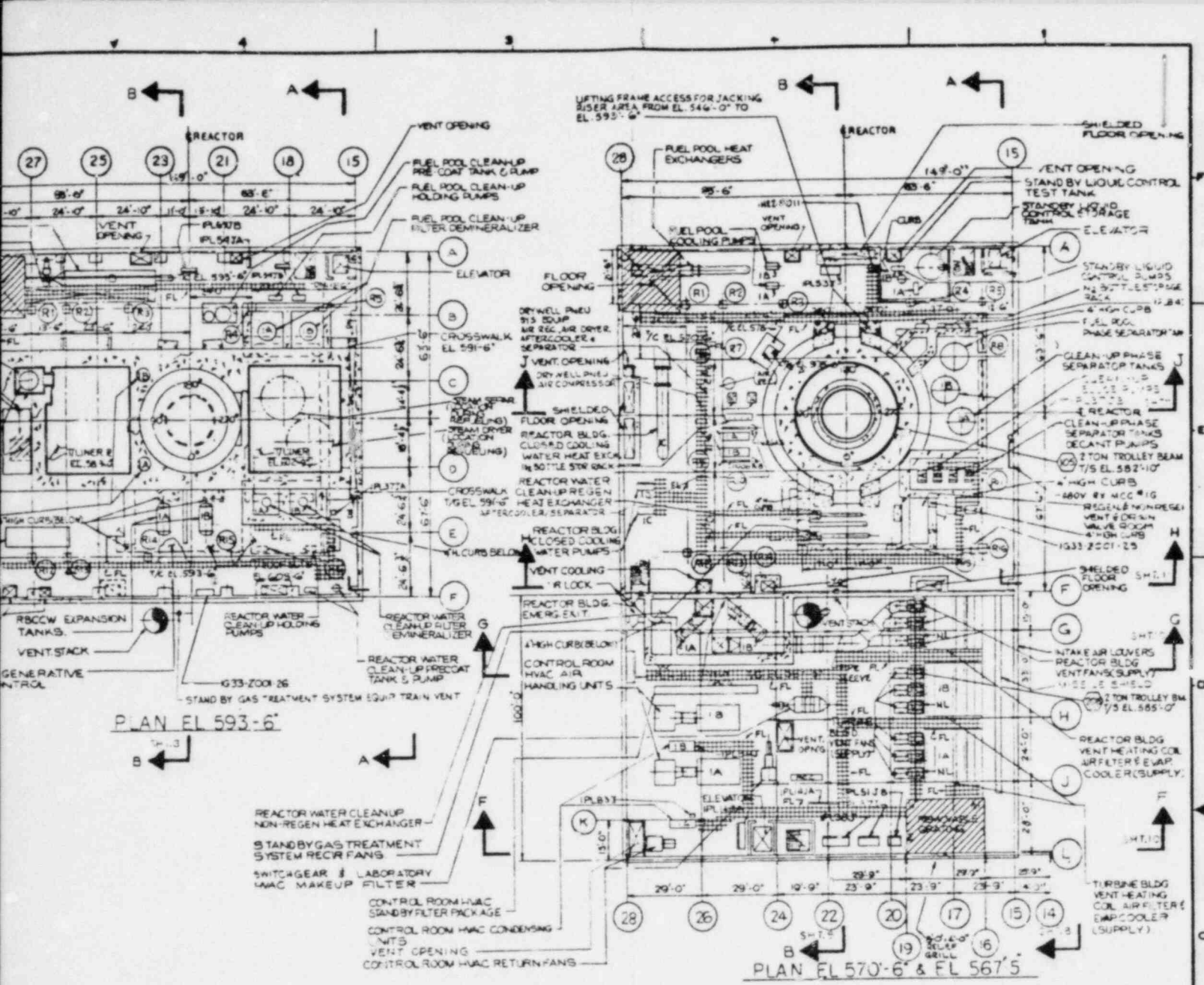
SARGENT & LUNDY



PLAN EL 627-9"

Also Available On Aperture Card

8306080 140- 06



C { REV. C
RELEASED FOR COMMENTS MT-583
RELEASE FOR FILE RECORD M1 9/9

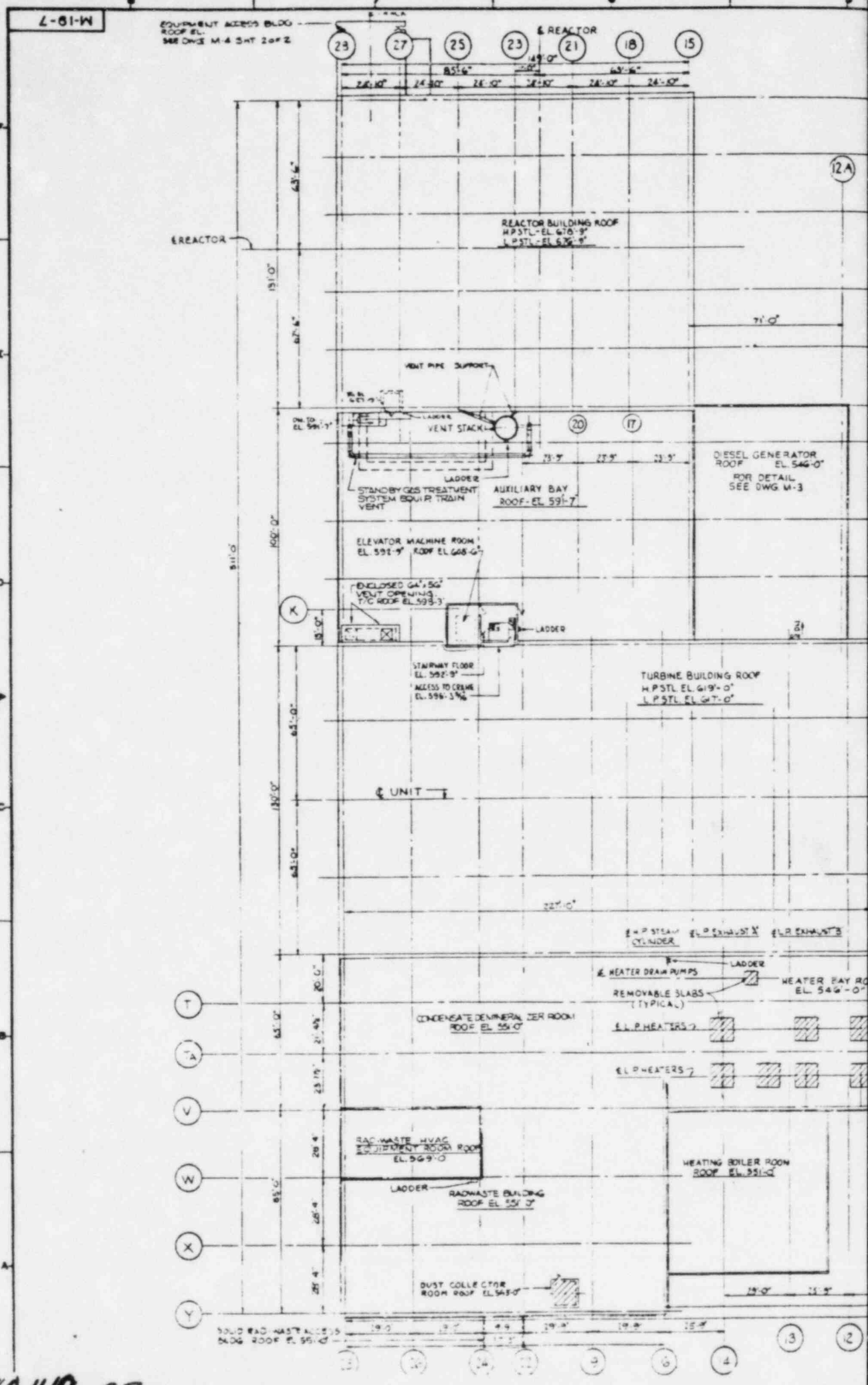
FOR GENERAL NOTES SEE SHEET 1

EQUIPMENT REMOVAL
UPPER REACTOR FLOOR PLANS
WM. H. ZIMMER NUCLEAR POWER STATION UNIT-1
THE CINCINNATI GAS & ELECTRIC COMPANY
COLUMBUS & SOUTHERN OHIO ELECTRIC COMPANY
THE DAYTON POWER AND LIGHT COMPANY

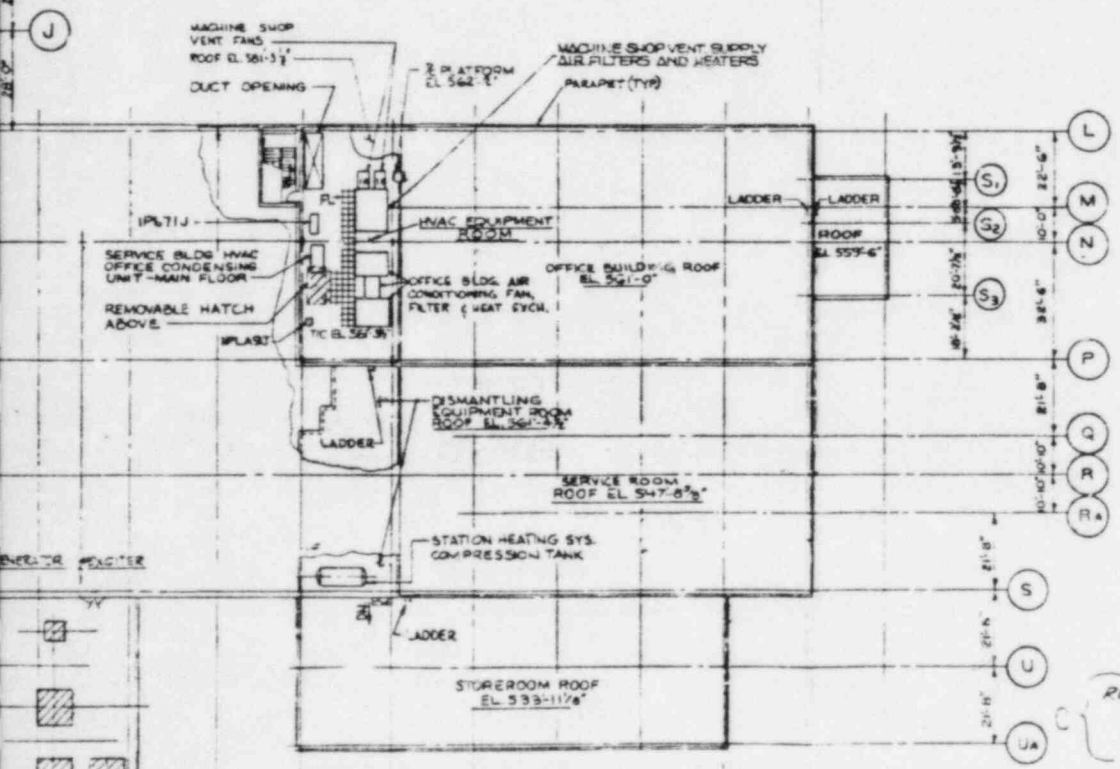
1" = 20'-0"

SARGENT & LUNDY
CHICAGO

M-2 SHT. A



8306080140-07



REV. C
RELEASED FOR COMMENTS MT-589
RELEASE FOR FILE RECORD MT-919

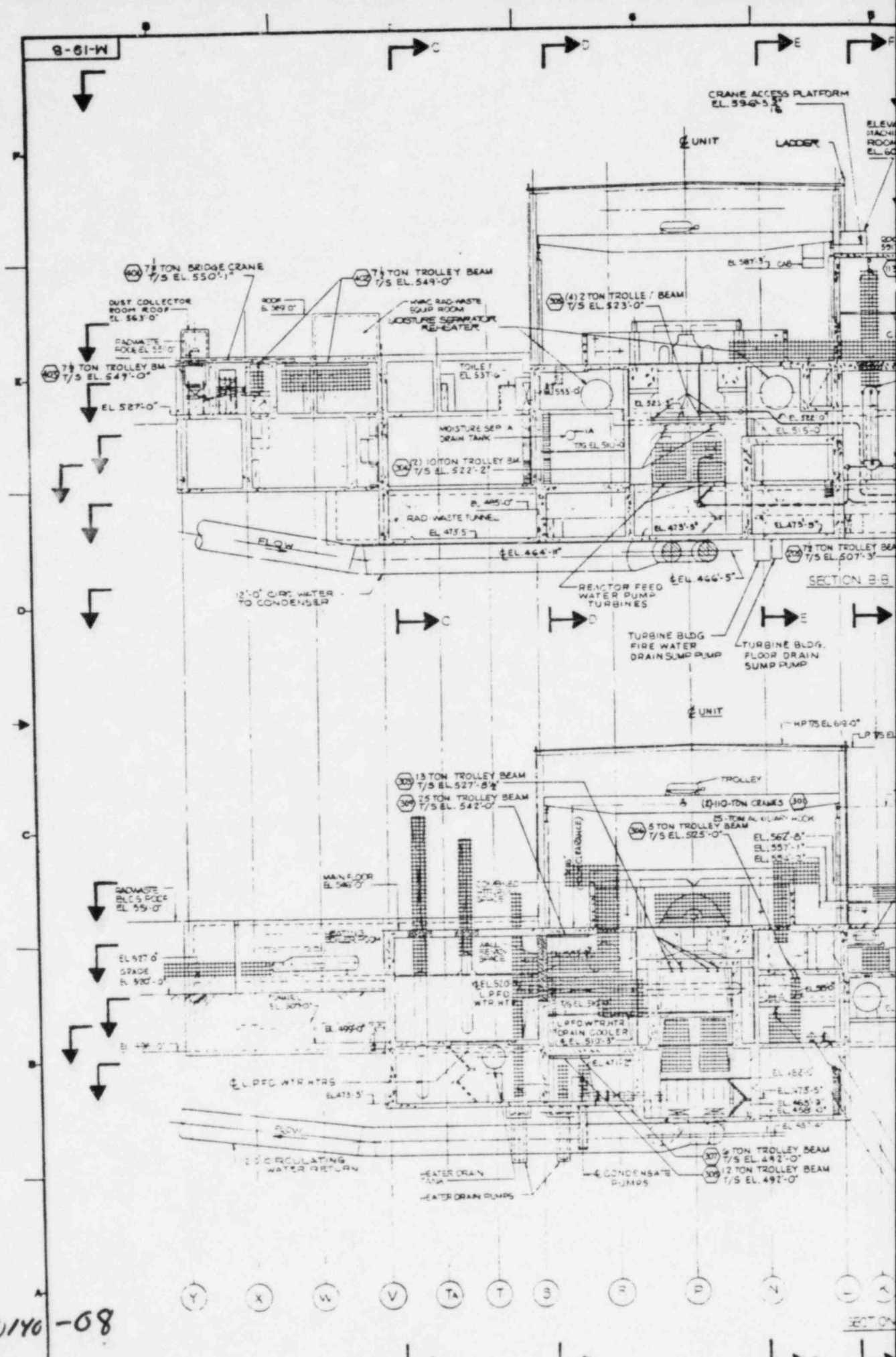
FOR GENERAL NOTES SEE SHEET 1

EQUIPMENT REMOVAL
ROOF PLAN
WM. H. ZIMMER NUCLEAR POWER STATION UNIT-1
THE CINCINNATI GAS & ELECTRIC COMPANY
COLUMBUS & SOUTHERN OHIO ELECTRIC COMPANY
THE DAYTON POWER AND LIGHT COMPANY

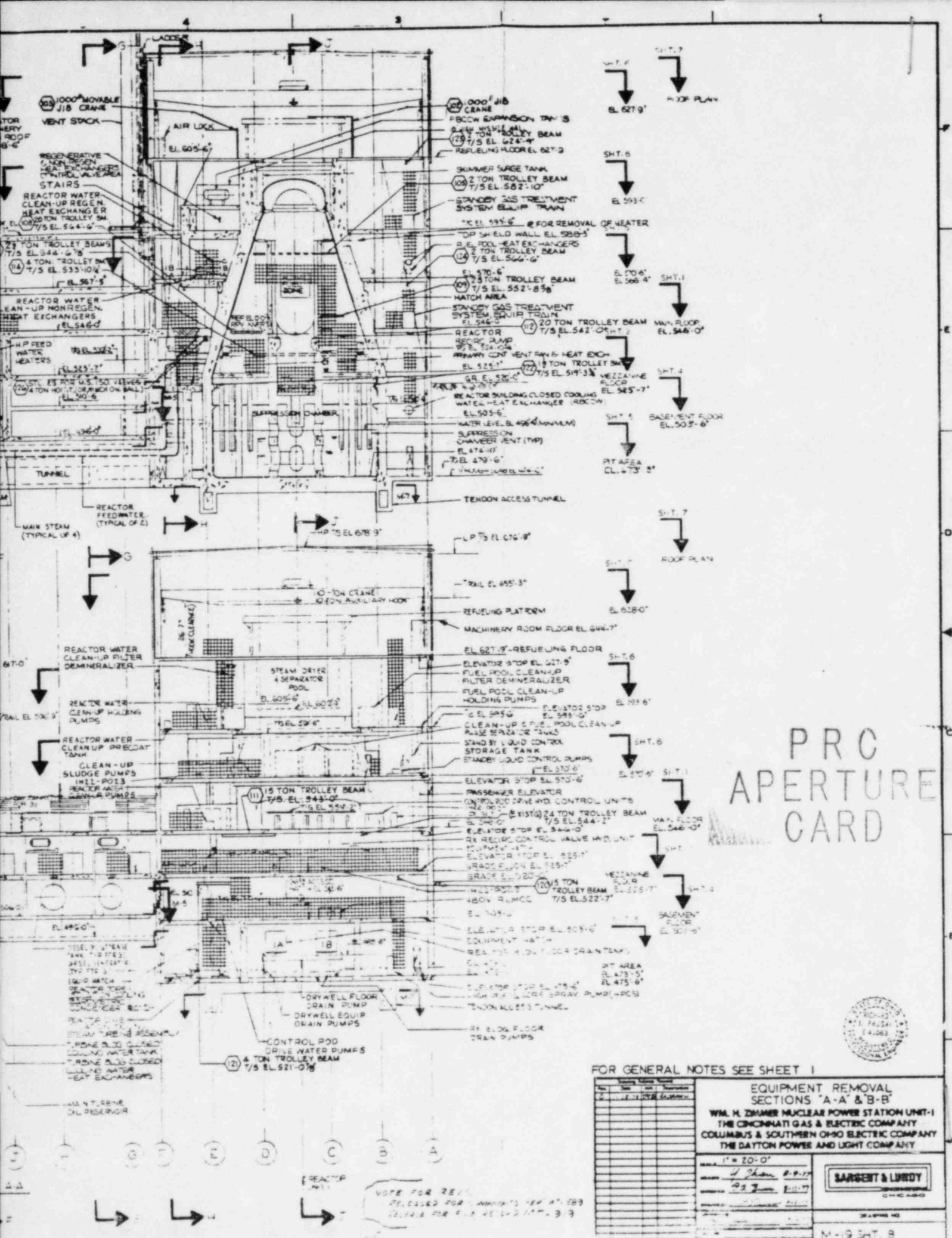
SCALE 1" = 20'-0"

SARGENT & LUNDY

11-13 SHT. 7



8306080140-08



FOR GENERAL NOTES SEE SHEET 1

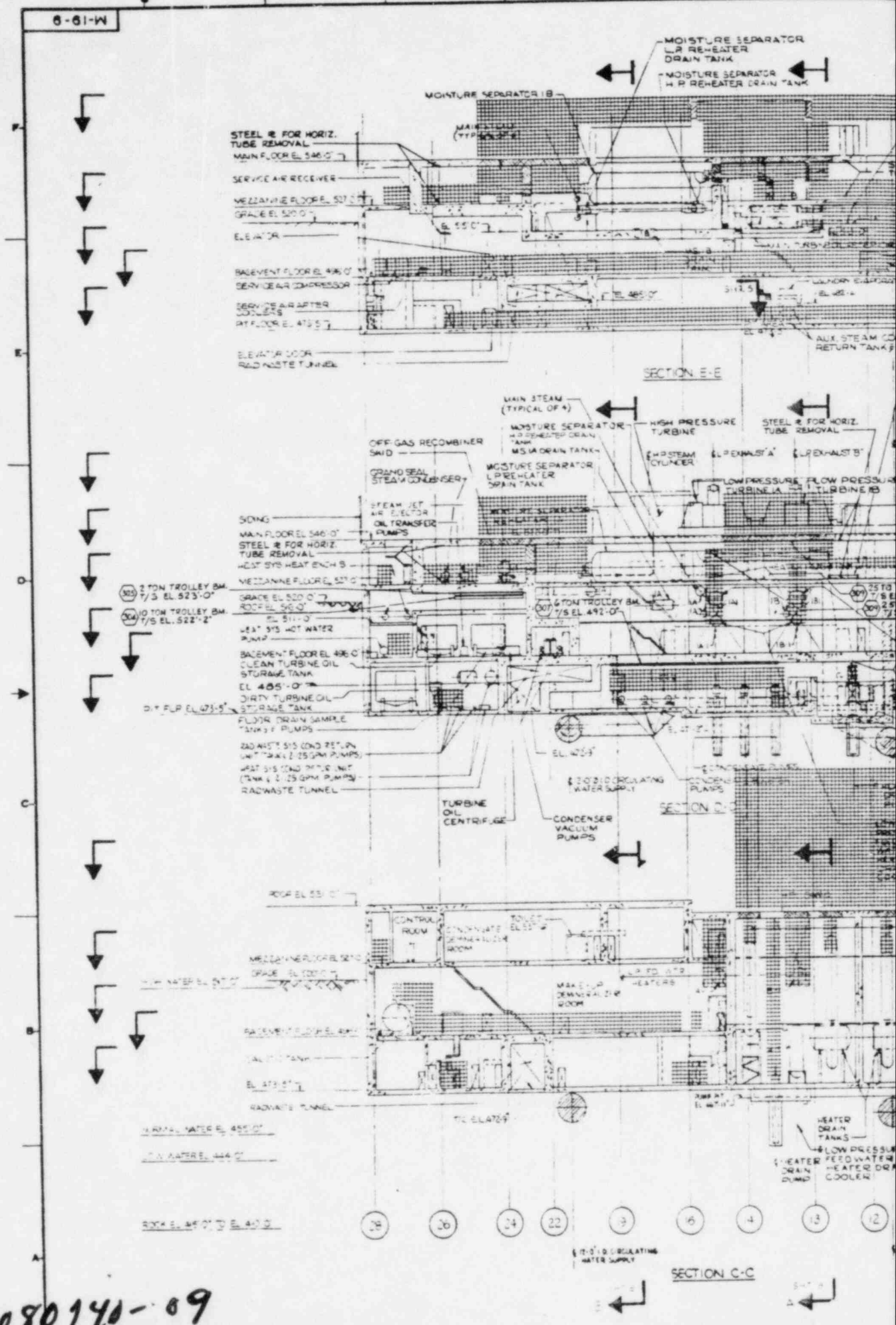
EQUIPMENT REMOVAL SECTIONS "A-A" & "B-B"

WM. H. ZIMMER NUCLEAR POWER STATION UNIT-1
THE CINCINNATI GAS & ELECTRIC COMPANY
COLUMBUS & SOUTHERN OHIO ELECTRIC COMPANY
THE DAYTON POWER AND LIGHT COMPANY

1" = 20'-0"

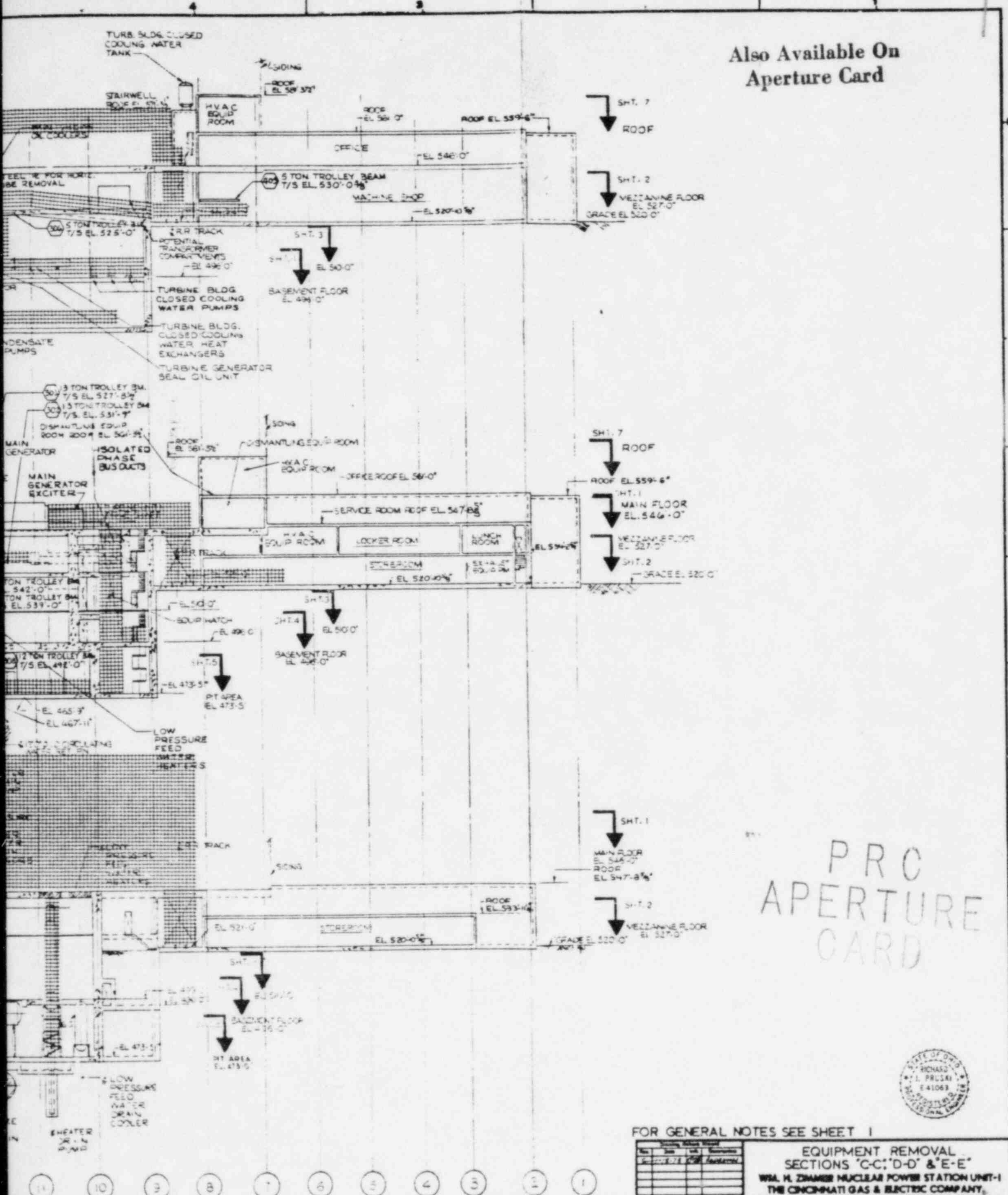
SARGENT & LUNDY CHICAGO

M-19 SHT. 8



8306080140-09

Also Available On Aperture Card



PRC APERTURE CARD

FOR GENERAL NOTES SEE SHEET 1

REV. C
RELEASED FOR COMMENTS PER M-589
RELEASE FOR FILE RECORD M-919

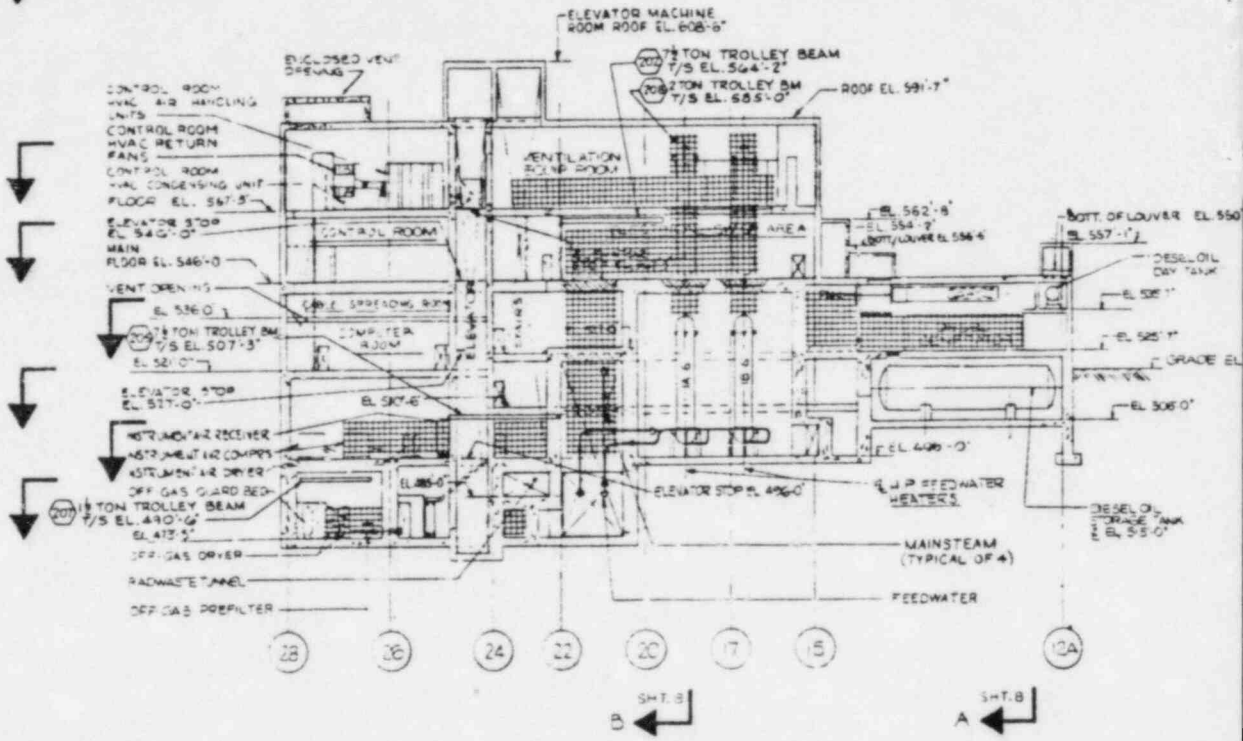
EQUIPMENT REMOVAL
SECTIONS "C-C", "D-D" & "E-E"
WM. H. ZIMMER NUCLEAR POWER STATION UNIT-1
THE CINCINNATI GAS & ELECTRIC COMPANY
COLUMBUS & SOUTHERN OHIO ELECTRIC COMPANY
THE DAYTON POWER AND LIGHT COMPANY

1" = 20'-0"

SARGENT & LUNDY
CHICAGO

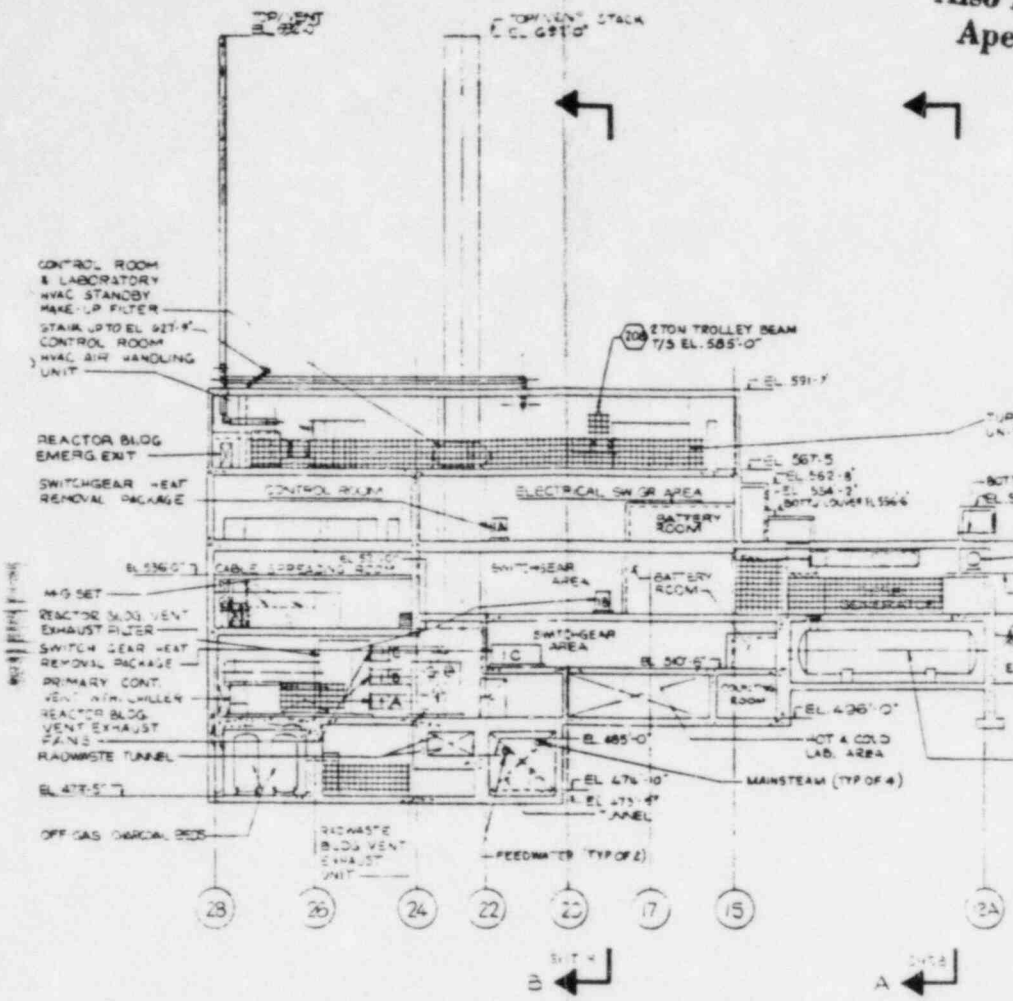
M-10 SHT. 3

01-61-W



SECTION F-F

8306080140-10



SECTION G-G

FOR GENERAL NOTES SEE SHEET 1

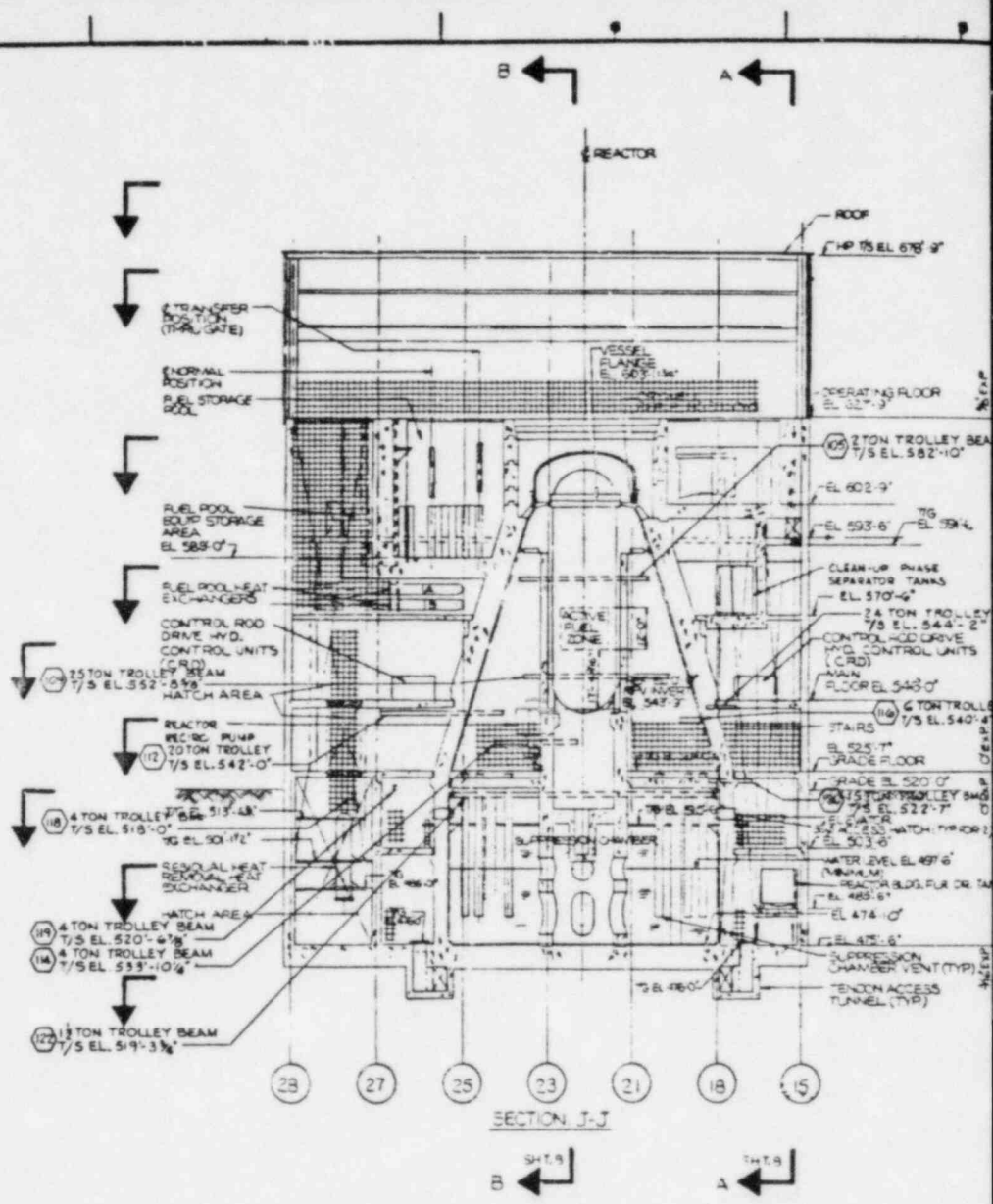
C { REV. C
RELEASED FOR COMMENTS MT- 589
RELEASE FOR FILE RECORD MT-919

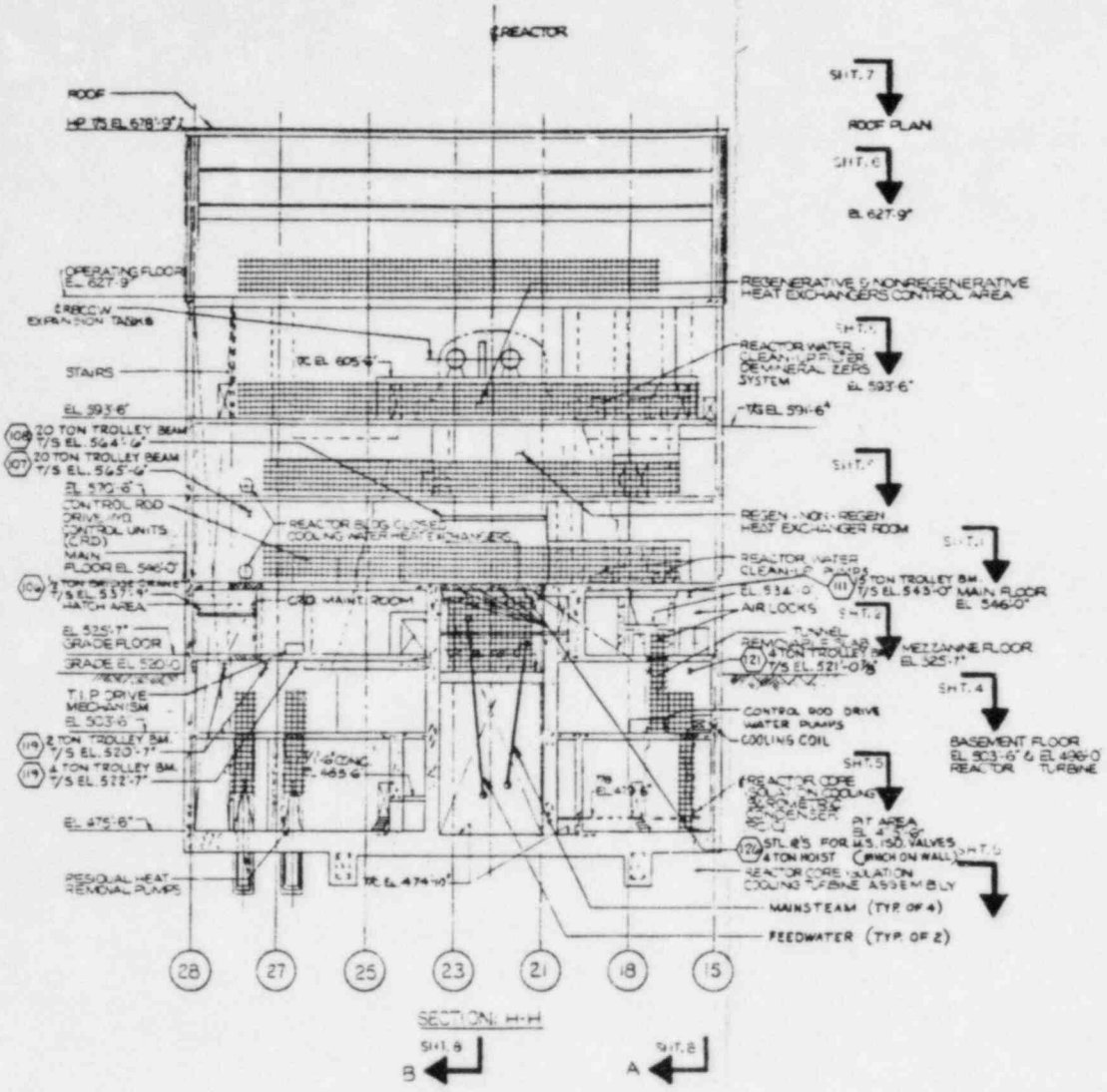
EQUIPMENT REMOVAL
SECTIONS "F-F" & "G-G"
WM. H. ZIMMER NUCLEAR POWER STATION UNIT-1
THE CINCINNATI GAS & ELECTRIC COMPANY
COLUMBUS & SOUTHERN OHIO ELECTRIC COMPANY
THE DAYTON POWER AND LIGHT COMPANY

1" = 20'-0"

SARGENT & LUNDY
CHICAGO

11-61-W





SECTION H-H

PRC
APERTURE
CARD

FOR GENERAL NOTES SEE SHEET 1

C { REV. C
RELEASED FOR COMMENTS PER MT-589
RELEASE FOR FILE RECORD MT-919

EQUIPMENT REMOVAL
SECTIONS "J-J" & "H-H"
WM. H. ZIMMER NUCLEAR POWER STATION UNIT-1
THE CINCINNATI GAS & ELECTRIC COMPANY
COLUMBUS & SOUTHERN OHIO ELECTRIC COMPANY
THE DAYTON POWER AND LIGHT COMPANY

1" = 20'-0"

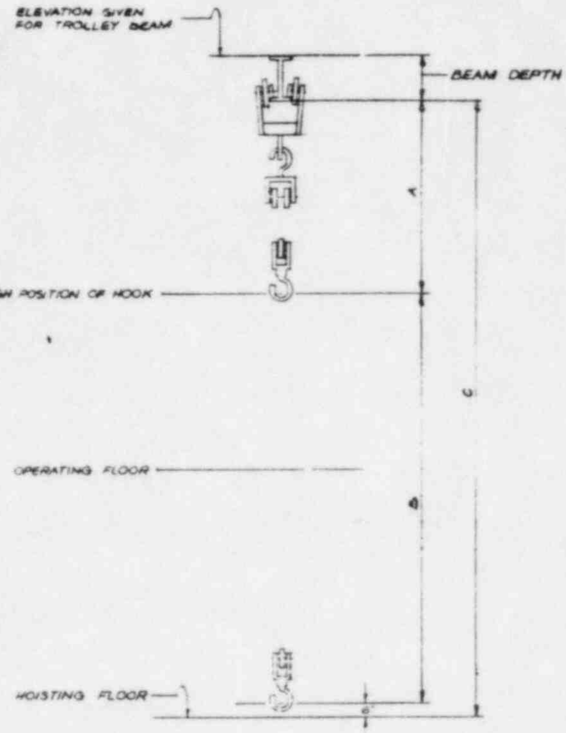
SARGENT & LUNDY

M-10 SHT. 11

M19-12

ITEM NO.	PURPOSE OR EQUIPMENT TO BE LIFTED	(NO.) & CAPACITY OF BEAMS OR HOISTS (TONS)	LOCATION: ELEVATION OF: TOP OF STL.	HOIST. FLR.	OPER. FLR.	COLUMN ROWS: N-S	E-W	M-19 SHEET NO.	HOIST TYPE	TROLLEY MODE OF TRAVEL
101	MAIN REACTOR BLDG. CRANE - AUX. HOOK	110-10	654'-3"	521'-0"	627'-9"	15-28	A-F	2,8	BRIDGE CRANE	PWR.
102	FUEL HANDLING JIB CRANE	½	-	627'-9"	627'-9"	25-27	B-D	6,8	ELECTRIC	PWR.
103	CHANNEL HANDLING BOOM JIB CRANE	200 LBS		627'-9"	627'-9"	25-27	D-C	6,8	CHAIN	MANUAL
104	FUEL HANDLING JIB CRANE	½		627'-9"	627'-9"	23-25	B-C	6,8	ELECTRIC	PWR.
105	RELIEF & SAFETY VALVE MAINT.	2	562'-10"	520'-0"	-	18-25	B-D	6,8,11	ELECTRIC	PWR.
106	CRD MAINTENANCE BRIDGE CRANE	½	557'-9	525'-7	525'-7	27-28	D-F	2,11	ELECTRIC	PWR.
107	RHR & RBCCW (1A) HEAT EXCHANGER	20	565'-6"	503'-6"	546'-0"	27-28	B-E	1,11	ELECTRIC	PWR.
108	MAIN STM. HATCH SLABS & ISOLATION VALVES	18	564'-6"	532'-0	546'-0"	21-25	E-F	1,8,11	ELECTRIC	PWR.
109	RECIRCULATING PUMP MOTORS	24.45	552'-0⅝"	525'-7"	525'-7"	18-25	B-E	2,8,11	NONE	PWR.
110	RR PUMPMOTOR CART	25	—	—	—	—	—	—	—	MANUAL
111	HATCH SLABS & RCIC MAINTENANCE	15	543'-0	503'-6"	525'-7"	15-18	E-F	2,8,11	ELECTRIC	PWR.
112	RBCCW (1B) HEAT EXCHANGER	20	542'-0"	503'-6"	525'-7"	23-28	A-B	2,8,11	ELECTRIC	PWR.
113	DELETED									
114	VALVE MAINTENANCE	2½	533'-10¼"	525'-7"	525'-7"	21-25	B-E	2,8,11	CHAIN	PWR.
115	DELETED									
116	DRYWELL ACCESS HATCH COVER	6	540'-4"	525'-7"	525'-7"	18-21	B-D	2,11	CHAIN	CHAIN H.G.T.
117	UNDERVESSEL SERVICE		531'-11"	525'-7"	525'-7"	21-20	C-D	2		
118	LOW PRESSURE CORE SPRAY		518'-0"	475'-6"	503'-6"	25-28	B-C	4	ELECTRIC	PWR.
119	RHR PUMPS	[illegible]	[illegible]	475'-6"	503'-6"	27-28	D-E	4,11	ELECTRIC	PWR.
120	HIGH PRESSURE CORE SPRAY PUMP	15	522'-7"	475'-6"	503'-6"	15-18	A-B	4,8	ELECTRIC	CHAIN H.G.T.
121	RCIC TURBINE PUMP & CONDENSER	4	521'-0⅞"	475'-6"	503'-6"	15-18	D-F	4,8,11	ELECTRIC	PWR.
122	SUPPRESSION POOL SERVICE	2	519'-0½"	475'-6"	-	18-27	B-E	4,8,11	ELECTRIC	PWR.
123	STANDBY GAS FILTERS	2	624'-9"	593'-6"	593'-6"	23-27	A-B	6,8	ELECTRIC	CHAIN H.G.T.
124	STANDBY GAS FILTERS	2	566'-2"	546'-0"	546'-0"	23-27	A-B	1,8	ELECTRIC	CHAIN H.G.T.
125	WINCH - RR CART REMOVAL	1½			525'-7"	15-19	A-C	2,11	ELECTRIC	
126	MSIV (OUTBOARD) CLEARANCE PULL	(SEE NOTE 1) 1½	541'-6"	532'-0"	532'-0"	21-25	E-F	2,8,11	MANUAL	NONE
127	NEW FUEL HANDLING JIB CRANE	(1) 2	—	521'-0"	546'-0	27-28	A-B	1	ELECTRIC	PWR.
128	MSIV (INBOARD) - MAINTENANCE	(4) 5	544'-6⅜"	—	—	22-15	D	2,13	NONE	CHAIN H.G.T.
129	CRD MAINTENANCE RAIL & CART	BY RCI								MANUAL
201	H.P. HEATERS & SLABS	(2) 65	604'-0"	498'-0"	548'-0"	18-19	J-L	1,8,10		
202	MISCELLANEOUS EQUIPMENT & SLABS	7½	564'-2"	498'-0"	548'-0"	16-24	J-L	1,10	ELECTRIC	PWR.
203	DIESEL GENERATOR ENGINE	(8) 1	544'-0"	525'-7"	525'-7"	12-14	F-L	2,8		MANUAL
204	DIESEL GENERATOR ENGINE	(3) 5	544'-0"	525'-7"	525'-7"	13-14	F-L	2,8		MANUAL
205	MISCELLANEOUS EQUIPMENT & SLABS	7½	507'-5"	473'-5"	498'-0"	18-14	J-L	4,10	ELECTRIC	PWR.
		"F"								
207	GUARD BED 1A AND 1B	(2) 2	1A-+30'-0" 1B-+30'-0"	473'-5"	473'-5"	28-28	H-J	5,10	ELECTRIC	MANUAL
208	HVAC FAN REMOVAL	2	585'-7"	567'-5"	567'-5"	17-19	F-J	6	ELECTRIC	MANUAL
301	MAIN TURBINE BLDG. CRANES-LIFT'G BM.	(2) 110-25	598'-9"	473'-5"	548'-0"	8-28	L-9	1,8	BRIDGE CRANE	PWR.
302	CONDENSER WATER BOX LAYDOWN	13	531'-9"	473'-5"	473'-5"	11-12	N-R	2,9	ELECTRIC	PWR.
303	CONDENSER WATER BOX	(4) 13	527'-6½"	482'-0"	482'-0"	12-13	N-R	2,8,9	ELECTRIC	CHAIN H.G.T.
304	TURBINE DRIVEN REACTOR FEED PUMPS	(2) 10	522'-2"	498'-0"	498'-0"	22-28	N-R	4,8	ELECTRIC	PWR.
305	REACTOR FEED PUMP TURBINES	(4) 2	523'-0"	498'-0"	498'-0"	22-26	N-R	4,8	ELECTRIC	PWR.
306	OIL RESERVOIR COOLER & SLABS	(2) 5	525'-0"	498'-0"	498'-0"	11-13	L-N	3,8,9	ELECTRIC	PWR.
307	CONDENSATE PUMPS & BOOSTERS	8	492'-0"	471'-2"	471'-2"	13-19	R-S	5,8,9	ELECTRIC	PWR.
308	EMERGENCY HEATER DRAIN PUMP	12	492'-0"	473'-5"	473'-5"	12-13	R-S	5,8,9	ELECTRIC	CHAIN H.G.T.
309	LP HTRS. (A & B) DRAIN COOLERS 4 & B	(2) 15	[illegible]	510'-5"	527'-0"	5-16	R-S	1,8,9	ELECTRIC	PWR.
401	SOLID RADWASTE BRIDGE CRANE	7½	550'-[illegible]	523'-0"	527'-0"	22-24	W-Y	2,8	NONE	PWR
402	SOLID RADWASTE CRANE HOIST & TROLLEY 'A'	7½	547'-0"	496'-0"	527'-0"	25-28	V-Y	1,8	ELECTRIC	PWR
403	SOLID RADWASTE CRANE HOIST & TROLLEY 'B'	7½	547'-0"	527'-0"	527'-0"	18-28	V-Y	2,8	ELECTRIC	PWR
404	MACHINE SHOP BRIDGE CRANE	10	—	—	—	2-8	M-P	2	BRIDGE CRANE	
405	DECONTAMINATION ROOM	5	530'-0⅝"	520'-10⅝"	520'-10⅝"	7-8	L-M	2	ELECTRIC	PWR
406	TRAVELING SCREENS S.W.P.S. BRIDGE CRANE	30	565'-6½"	521'-0"	521'-0"	1-4	B-D	6,7	ELECTRIC	PWR
407	CIRC. WATER PUMPS	27	547'-4⅝"	510'-0"	521'-0"	101-104	AA-BB	15	ELECTRIC	PWR
408	" " STOP LOGS	1	547'-8½"	498'-4"	521'-0"	101-104	BB-CC	15	ELECTRIC	PWR
409	" CL₂ STOR TANKS	2	547'-3⅝"	521'-0"	521'-0"	101-104	BB-CC	15	ELECTRIC	PWR
410	FIRE WATER PUMPS	(2)	537'-9½"	521'-0"	521'-0"	101-104	CC-DD	15	ELECTRIC	PWR
411	COOLING TOWER MAKE UP WATER PUMPS	(2) 5	486'-5½"	435'-0"	466'-5½"	3-4	A-B	6,12	ELECTRIC	PWR
412	SERVICE WATER PUMPS	(2) 3	486'-5½"	435'-0"	466'-5½"	2-5	A-C	6,1	ELECTRIC	PWR
413	" " STRAINERS	5	517'-0"	491'-5½"	491'-5½"	3-4	A-B	6,12	ELECTRIC	PWR
414	" " GENERAL SERVICE	8	593'-10"	466'-5½"	521'-0"	2-3	A-B	6,12	ELECTRIC	PWR
415	SLAB REMOVAL RADWASTE BLDG	5	567'-4½"	546'-0"	527'-0"	28	W	1	CHAIN	HGT
416	RADWASTE FACILITY VENT FAN REMOVAL	1½	567'-4½"	546'-0"	546'-0"	16	W	1	CHAIN	HGT
417	SW PUMP MOTORS A & B [illegible]	3	480'-5½"	435'-0"	435'-0"	2	3	6	NONE	[illegible]
418	SW PUMP MOTORS C & D [illegible]	3	[illegible]	435'-0"	435'-0"	3	3	[illegible]	NONE	[illegible]
419	[illegible]	[illegible]	[illegible]	435'-0"	435'-0"	2 3	[illegible]	[illegible]	[illegible]	[illegible]

SIZE & TYPE OF TROLLEY BEAM OR CRANE RAIL	DIMENSIONS A BY MANUFACTURER	[illegible]	C	EQUIPMENT NO.	SPEC. OR BILL OF MAT'L NO.	TROLLEY TRAVEL DISTANCE APPROX.	REMARKS
				1HC01G	H-2217 P.O. 2046		
		56'-0"		1HC02RB	H-2884 P.O. 2859		DETAILS ON M-19 SHT. 14
	34"	7'-0"	8'-0"	1HC03RB	H-2241 P.O. 2515		DETAILS ON M-19 SHT. 14
	34"	56'-0"		1HC04RB	H-2884 P.O. 2859		DETAILS ON M-19, SHT. 14
S12×40.8	36½"	58'-9"	61'-10"	1HC05RB	H-2884 P.O. 2514	120'-0" R	CIRCULAR BEAM 35'-0" DIA.
S8×18.4	12¾"	15'-0"	12'-2"	1HC06RB	H-2241 P.O. 2515	33'-0"	[illegible] HEAD ROOM HOIST, FOR REF SEE [illegible]
S24×105.9	96"	52'-0"	60'-0"	1HC07RB		35'-0"	
S24×105.9	78"	24'-0"	30'-6"	1HC08RB		30'-0"	SLAB LIFT, 16-18 TON
S24×120	19"	25'-5"	25'-1⅝"	1HC09RB	H-2884 P.O. 2514	60'-0" R	CIRCULAR BEAM 35'-0" DIA. TROLLEY BEAM ONLY
—	—	—	—	1HC10RB	BY KEI	—	CART USED TO TRANSPORT RR PUMP MOTORS THRU HATCH
S24×79.9	53⅛"	45'-0"	37'-6"	1HC11RB	H-2241 P.O. 2515	20'-0"	
S24×79.9	70¾"	38'-0"	36'-6"	1HC12RB		40'-0"	
							SEE ITEM 126
S12×40.8	2	9'-8"	8'-8½"	1HC14RB	HOLD	63'-0"	CG&E REVIEWING USE OF HOIST
S15×50	0'-8⅛"	8'-0"	12'-9"	1HC16RB	H-2241	15'-0"	HATCH COVER TO CLEAR DOWN COMERS
					HOLD		
S12×31.8	29⅛"	44'-0"	41'-6"	1HC18RB	H-2241 P.O. 2515	20'-0"	
S12×40.8 S12×31.8 S12×31.8	19⅛"	44'-0"	45'-0⅝" [illegible]	1HC19RBA 1HC19RBB 1HC19RBC		15'-10" 12'-2" 12'-2"	[illegible]
S24×79.9	53⅛"	45'-0"	45'-1"	1HC20RB		10'-0"	
S12×40.8	32⅞"	57'-0"	44'-6⅞"	1HC21RB		20'-0"	
S7×15.3	14⅛"	13'-8"	8'-10"	1HC22RB	H-2884 P.O. 2514	210'-0" R	MIN HEAD CLEARANCE CIRCULAR BEAM) 2 TON HOIST IS SPARE
S8×18.4	28"	32'-2"	30'-7"	1HC23RB		45'-0"	SPARE
S8×18.4	28"	32'-2"	19'-10"	1HC24RB		45'-0"	SPARE
FLOOR MOUNTED				1HC25RB			UTILIZED TO MOVE 1HC10RB
			5'-6"	1HC26RB	HOLD		STEEL ℄ ONLY MAX. LOAD 1 TON 5'-6" DIAGONAL PULL
	32 15/16"	37'-0"		1HC27RB	H-2241 P.O. 2515		DETAILS ON M-19 SHT. 14
S12×50	-	-	-	1HC28RBA, RBB, RBC, RBD	H-2241	15'-0"	TROLLEY CAPACITY 15 2/3 T WITH 20° SIDE PULL
				1HC29RB	RCI		BY RCI
					LATER		DO NOT BID THIS HOIST LATER
S18×54.7	43 13/16"	62'-0"	66'-8"	1HC31AB	H-2241 P.O. 2515	20'-0"	
					HOLD		WILL BE BOUGHT IN FUTURE
					HOLD		PLATES IN CEILING NO BEAM
S24×105.9	43 9/16"	35'-0"	31'-10"	1HC34AB	H-2241 P.O. 2515	33'-0"	
		"F"					
S8×18.4	28"	16'-7"	A: 5'-11" B: 16'-3⅛"	1HC36ABA, ABB	H-2884 P.O. 2514	20'-0"	SEE PLAN (S-282) SPARES
S18×35			17'-8"	1HC37AB	HOLD	76'-0"	
				1HC02GA, GB & GC	H-2217 P.O. 2046		1HC02GC = AUXIL. HOOK EQPT NO.
S24×79.9	54⅛"	60'-0"	56'-4"	1HC43TB	H-2241 P.O. 2515	30'-0"	
S[illegible]×54.7	53 9/16"	45'-0"	44'-5⅛"	1HC44TBA, TBB, TBC & TBD		10'-0"	
S15×42.9	43 13/16"	24'-0"	24'-11"	1HC45TBA & 1HC45TBB		35'-0"	
S8×18.4	28¼"	32'-2"	26'-4"	1HC46TBA, TBB, TBC & TBD	H-2884 P.O. 2514	30'-0"	
S15×50	32⅞"	27'-0"	27'-9"	1HC47TBA & 1HC47TBB	H-2241 P.O. 2515	25'-0"	SPARES
S12×35	36"	17'-4"	19'-10"	1HC48TB	H-2884 P.O. 2514	80'-0"	MIN. HEAD CLEARANCE [illegible]
S15×42.9	53 1/16"	20'-0"	17'-4"	1HC49TB	H-2241 P.O. 2515	15'-0"	
S24×105.9 S24×105.9	53"	26'-11"	31'-9"	1HC50TBA & 1HC50TBB	H-2883 P.O. 2513	14'-0"	NOT INSTALLED
NO 5000 AREA 12½ - 31"				1HC125	H-2278	11'-5"	TRANSFER BRIDGE ONLY
NO. 5000 AREA 12½ - 31"		35'-0"		1HC33A 1HC43A	H-2278		SOLID RADWASTE DRUMMING
NO. 5000 AREA 12½ - 31"		35'-0"		1HC33B 1HC43B	H-2278	—	SOLID RADWASTE EQUIPMENT
				1HC583B	PO 2357		
S12×50			3'-2"	1HC695B	HOLD	63'-0"	
85 LBS ASCE	29"	59'-0"		1HC11G	H-2176 PO. 2319	72'-0"	
S20×85	56"	30'-6⅝"	35'-4"	1HC60WB	H-2885 PO. [illegible]	77'-0"	
S12×31.8	30½"	45'-8"	48'-4"	1HC61WB	H-2884 PO. 2514	77'-0"	
S12×40.8	28¼"	32'-2"	25'-4"	1HC62WB		50'-0"	
S8×18.4	26"	16'-6"	16'-1"	1HC63WBA WBB		29'-0"	
S12×40.8	32⅞"	67'-0"	50'-5"	1HC64WBA 1HC64WBB	H-2241 PO 2515	45'-0"	
S12×40.8	43 9/16"	49'-0"	50'-5"	1HC65WBA 1HC65WBB		45'-0"	
S12×40.8	32⅞"	27'-0"	25'-7"	1HC66WB		30'-0"	
S12×40.8	71¾"	79'-0"	76'-5"	1HC67WB		30'-0"	
			40'-4½"	1HC70WB		14'-0"	
			21'-4½"	1HC71WB	—	19'-0"	
S8×18.4	—	—	—	1HC72WB	BY [illegible]	[illegible]	SEE NOTES [illegible]
[illegible]	—	—	—	1HC73WB	[illegible]	[illegible]	SEE NOTES 2 & 3
[illegible]	—	—	—	1HC74WB	[illegible]	[illegible]	SEE NOTES [illegible]



DETAIL 1

NOTES

1. ITEM NO. 126: ONE HOIST PROVIDED WITH (4) MOUNTING BRACKETS FOR PERMANENT ATTACHMENT. HOIST WILL BE MOVED AS REQUIRED.
2. 3 TON CAPACITY IS BASED ON NO LIVE LOAD ON THE FLOOR TO WHICH THE TROLLEY IS ATTACHED
3. CG&E IS RESPONSIBLE FOR INSTALLING INTERMEDIATE TRAVEL STOPS FOR CONDUIT, PIPING AND ANY OTHER OBSTRUCTING ITEMS.

REV "F"
REVISED ITEM 207
T/S ELEVATION PER DOC M-288
FOR [illegible] RELEASED [illegible]

8306080140-12

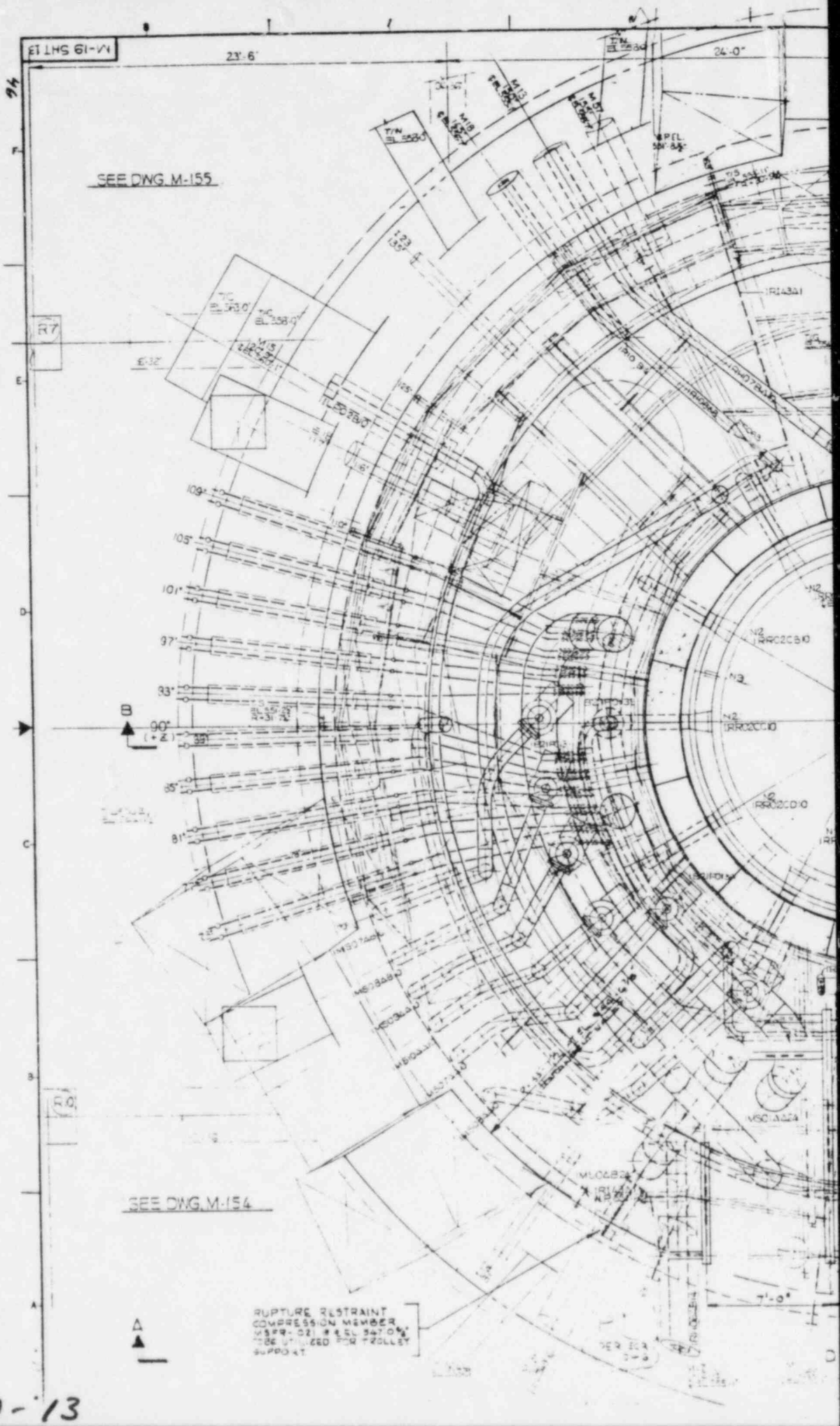
EQUIPMENT REMOVAL
CRANE HOIST & TROLLEY

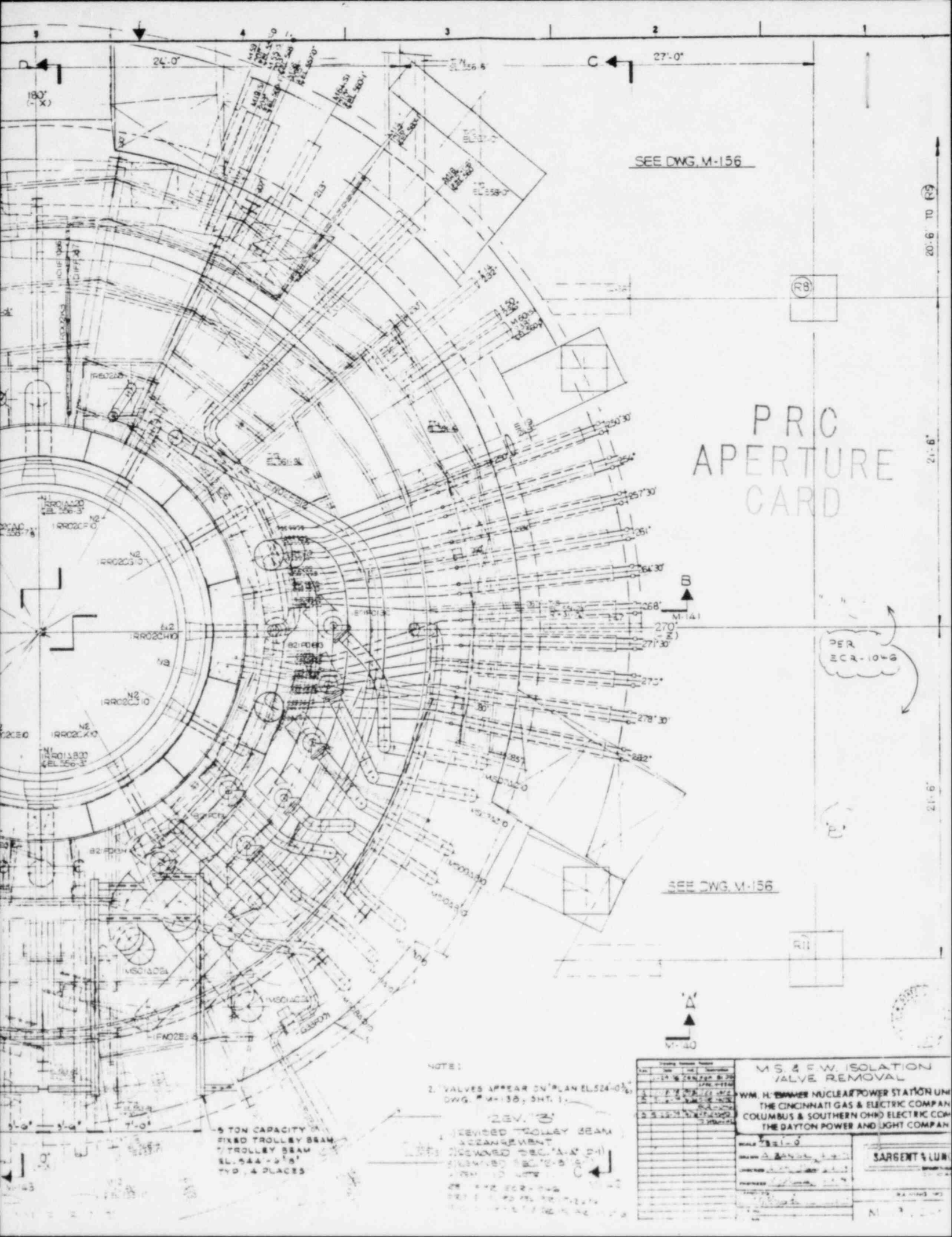
WM. H. ZIMMER NUCLEAR POWER STATION UNIT
THE CINCINNATI GAS & ELECTRIC COMPANY
COLUMBUS & SOUTHERN OHIO ELECTRIC COMPANY
THE DAYTON POWER AND LIGHT COMPANY

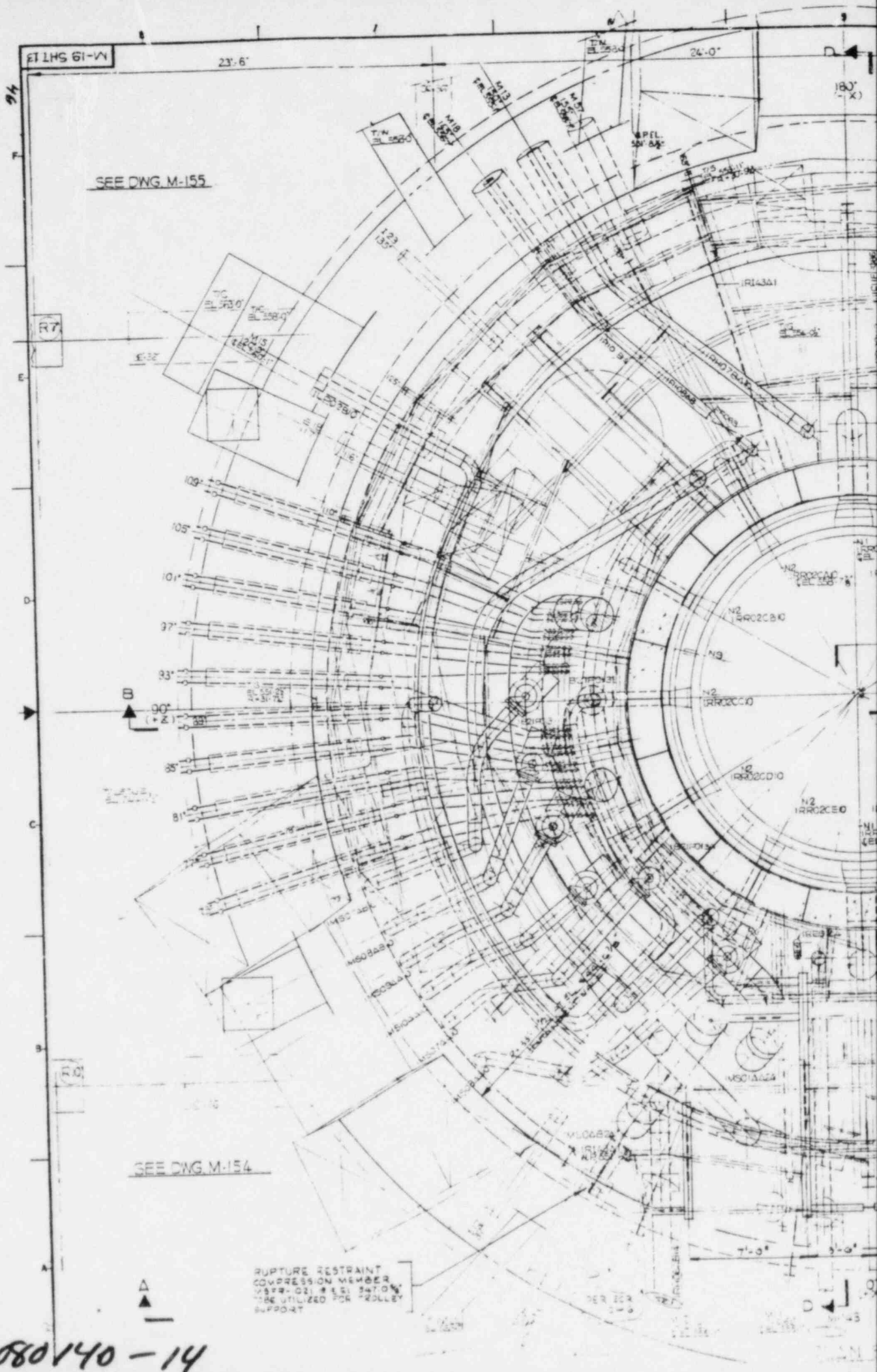
SCALE NONE
DRAWN E. D. GONZALEZ [illegible]

SARGENT & LUNDY
CHICAGO

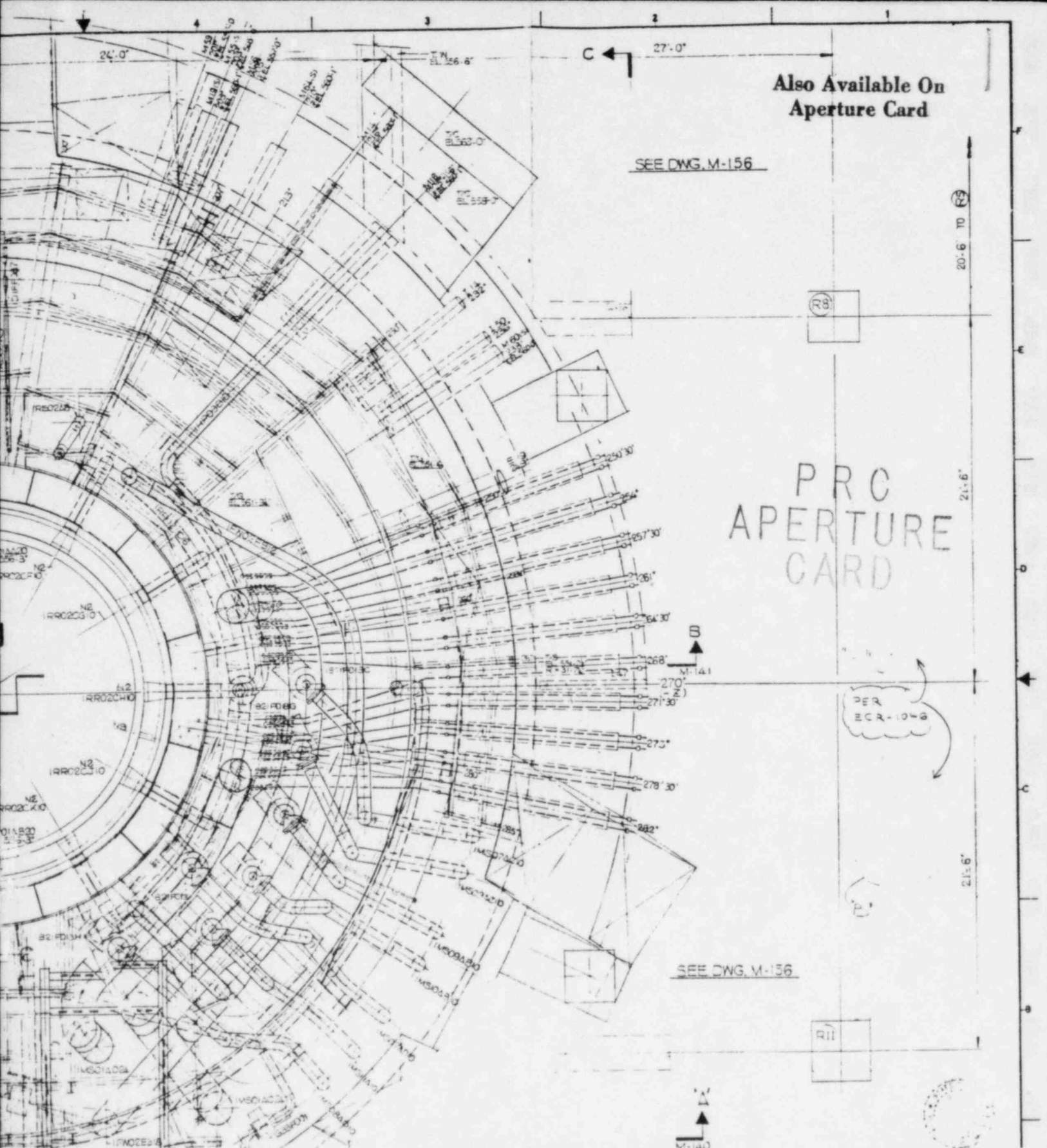
M-[illegible] SH. T 2




SEE DWG. M-156
PRC APERTURE CARD
PER ECR-104-G
SEE DWG. M-156
5 TON CAPACITY FIXED TROLLEY BEAM
TROLLEY BEAM EL. 544'-0" TYP. 4 PLACES
NOTE:
2. VALVES APPEAR ON PLAN EL 524'-0 1/2" DWG. M-38, SHT. 1.
REVISED TROLLEY BEAM ARRANGEMENT
M.S. & F.W. ISOLATION VALVE REMOVAL
WM. H. ZIMMER NUCLEAR POWER STATION UNIT
THE CINCINNATI GAS & ELECTRIC COMPANY
COLUMBUS & SOUTHERN OHIO ELECTRIC COMPANY
THE DAYTON POWER AND LIGHT COMPANY
SARGENT & LUNDY



8306080140 – 14



NOTE:

2. VALVES APPEAR ON PLAN EL 524'-10 1/4" DWG. # M-138, SHT. 1.

REV. 'B'

1) REVISED TROLLEY BEAM ARRANGEMENT
2) REMOVED SEC. 'A-A' (P-1)
3) REMOVED SEC. 'B-B' (P-1)

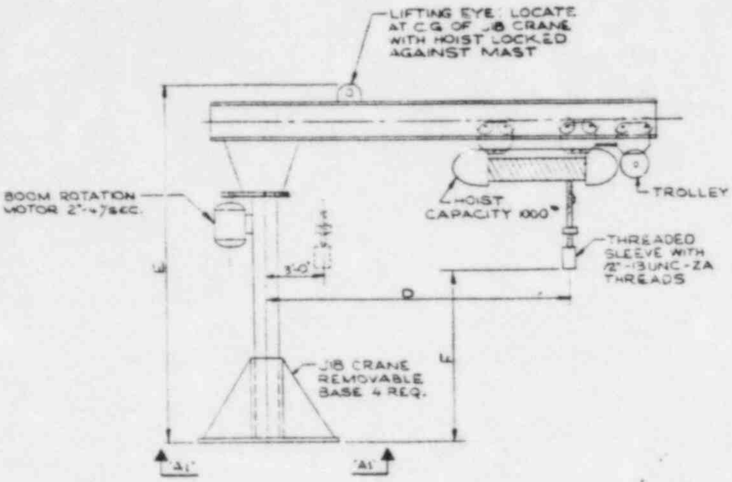
REV. PER ECR-104-G

M.S. & F.W. SOLATION VALVE REMOVAL

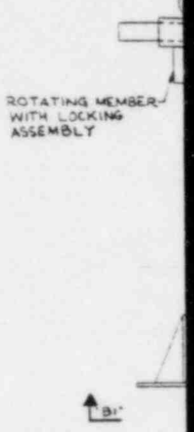
WM. H. ZIMMER NUCLEAR POWER STATION UNIT 1
THE CINCINNATI GAS & ELECTRIC COMPANY
COLUMBUS & SOUTHERN OHIO ELECTRIC COMPANY
THE DAYTON POWER AND LIGHT COMPANY

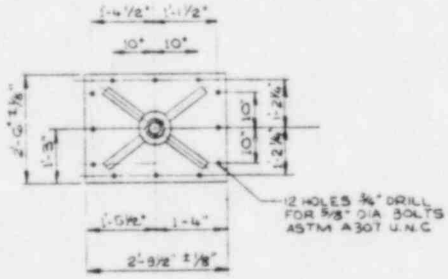
SARGENT & LUNDY

M-19, S-

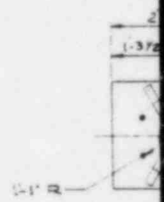


PLAN 'A'
1HC02RB & 1HC04RB





SECTION 'A1-A1'



SECTIO

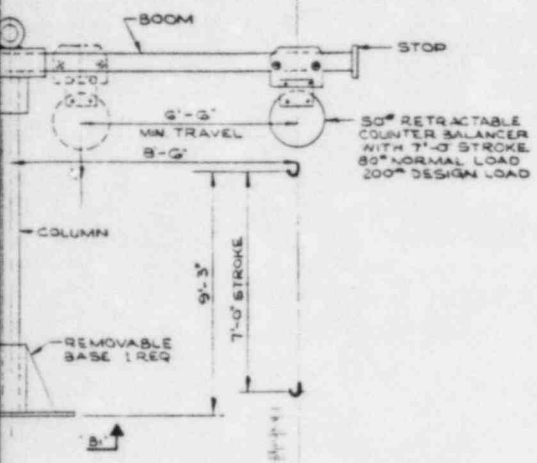
	1HC02RB	1HC04RB
D	17'-0"	24'-0"
E	21'-6"	21'-8"
F	17'-9"	17'-9"

LIFT 58'-0"
HOIST SPEED 9 & 28 F/M
TROLLY SPEED 13 F/M
480 V - 60CY - 3Φ

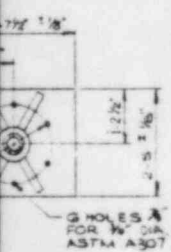
DRAWING RELEASE RECORD

REV	SPEC. NO.	DATE	DRAWN	CHECKED	ENGR. APPROVAL	DESCRIPTION	FILM
	H-2741	1-29-76	[illegible]	[illegible]	[illegible]	FOR BIDS	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	SEE NOTE FOR REV	
[illegible]	[illegible]	12-1-78	[illegible]	[illegible]	[illegible]	SEE REV NOTE	
C	H-2741	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	

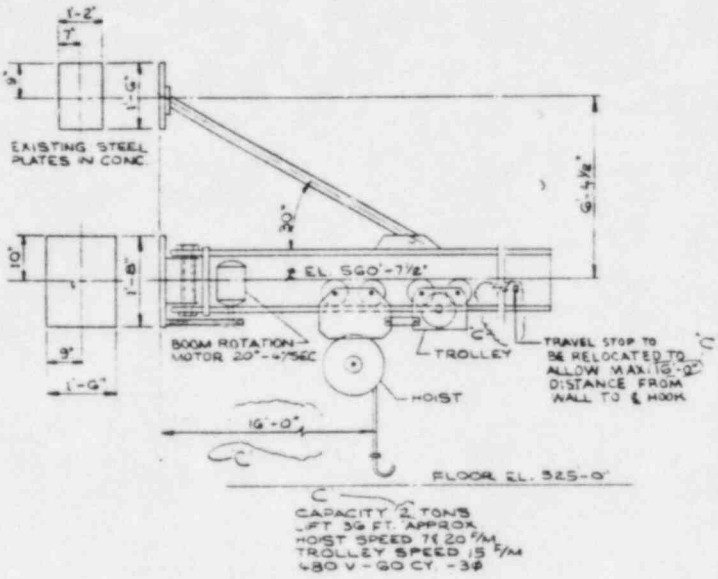
REV	SPEC. NO.	DATE	DRAWN	CH



PLAN B
HC 03RB



N "B1-B1"



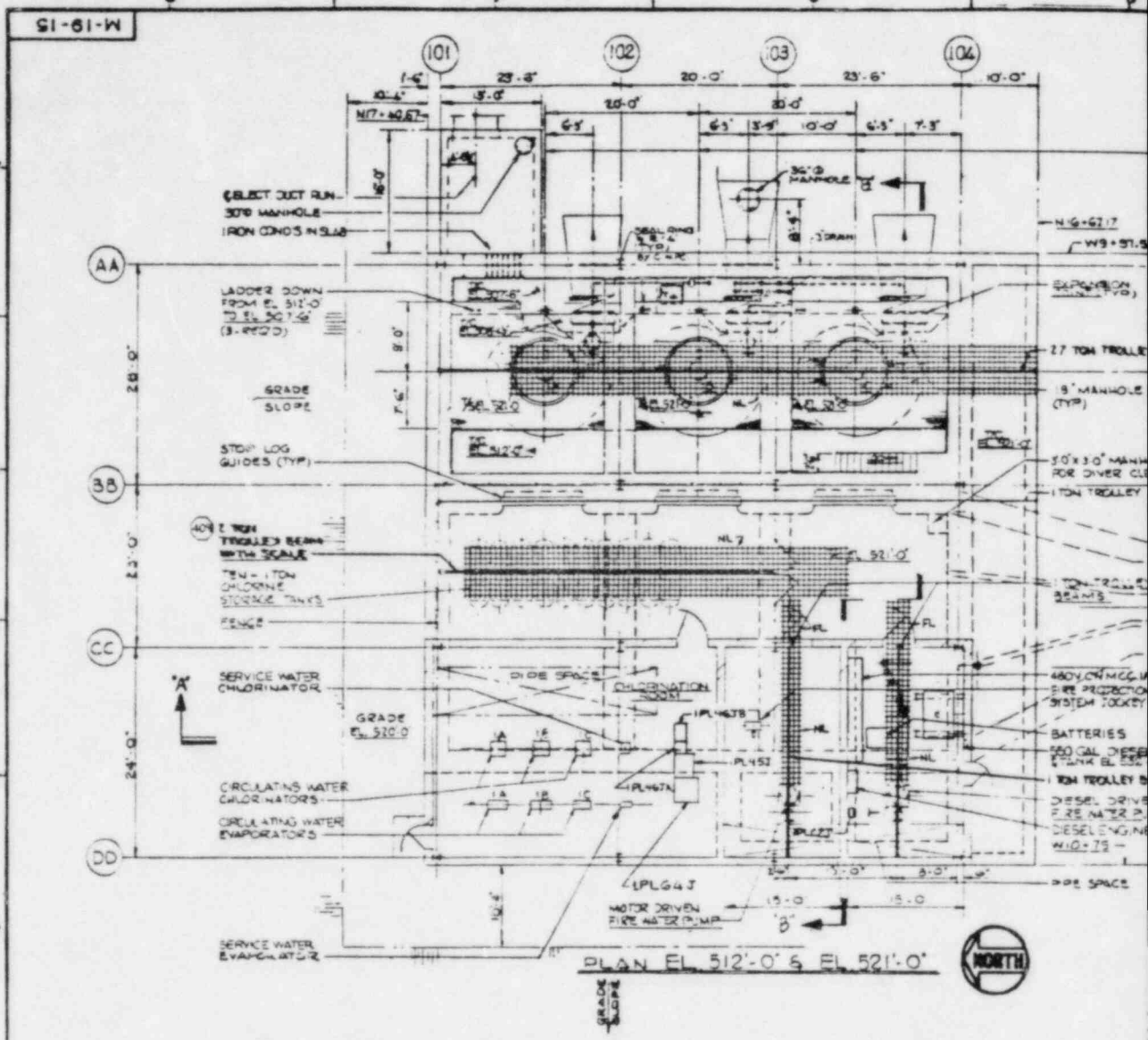
PLAN "C"
HC 27RB

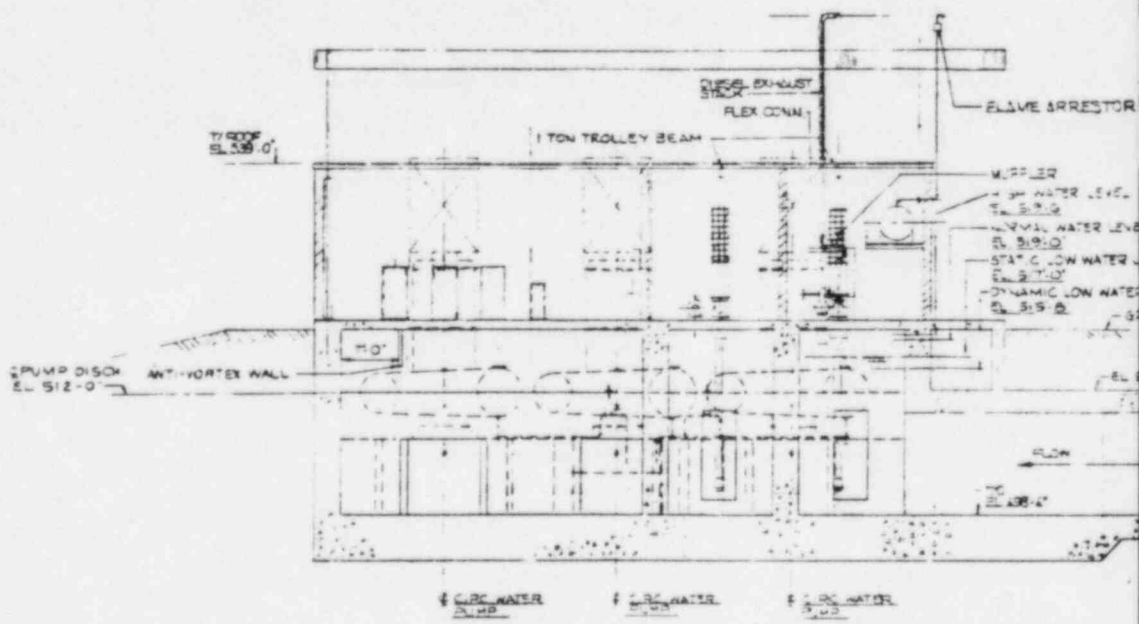
REV. "C"
CHANGED MEASUREMENTS FROM 13'-0 TO 16'-0" AND CHANGED CAPACITY FROM 4 TO 2 TONS @ PLAN "C"
REVISED PER DRC NO. SU-501 &
JUSOL KITED COMMENT MT-553
COMMENT INCLUDED PER MT-1834
FOR F.I.S RECORD RELEASED PER MT-2776

DRAWING RELEASE RECORD
CKED | ENGR APPROVAL | DESCRIPTION | FILM

SARGENT & LUNDY

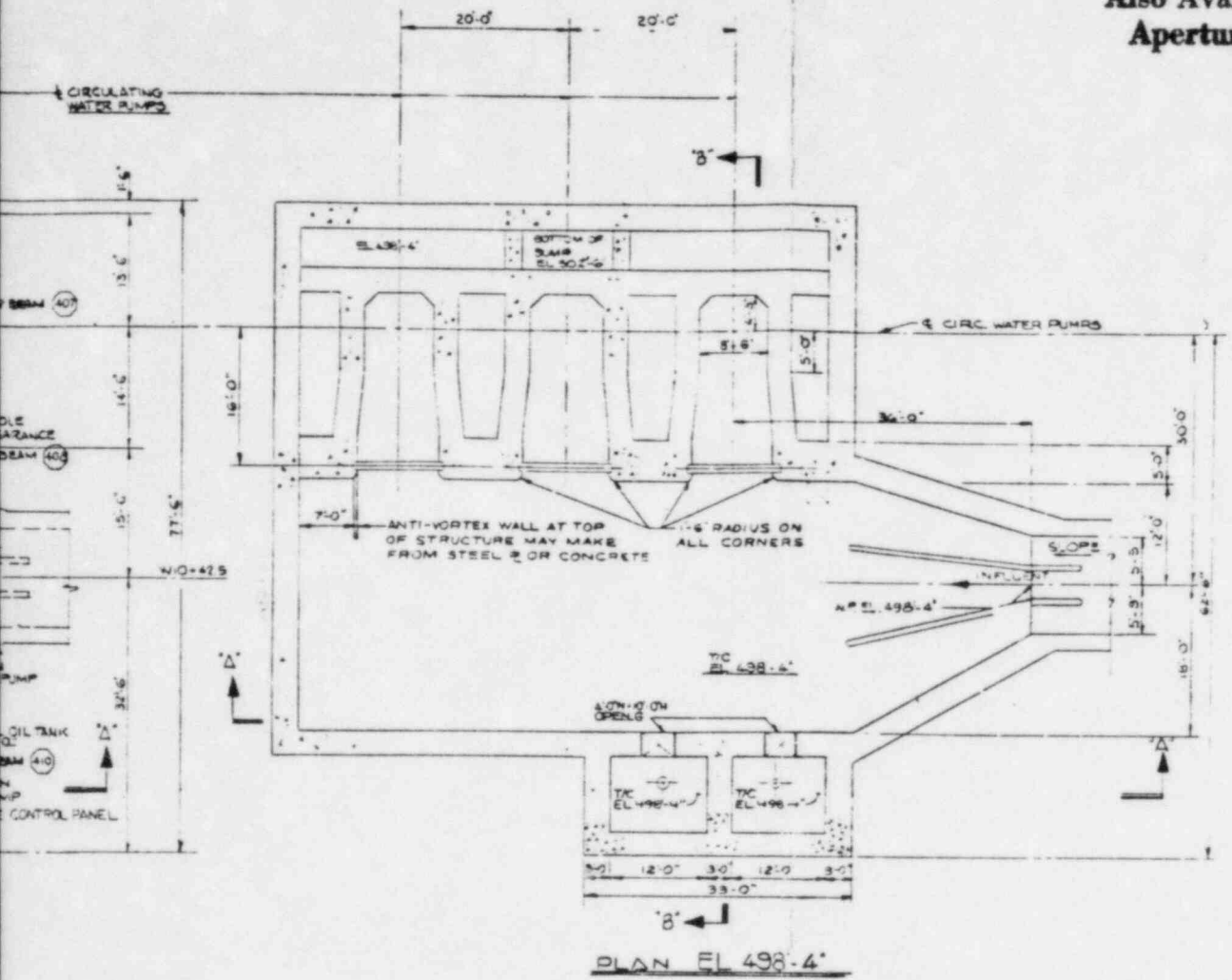
M-19-15



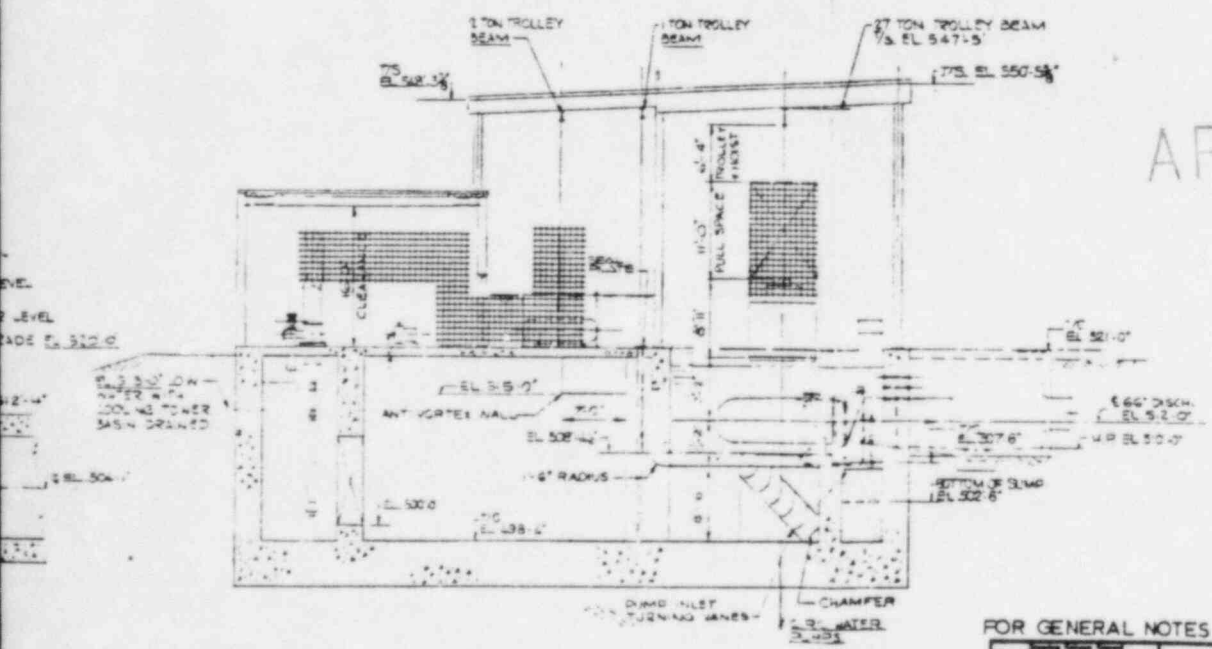


SECTION 'A-A'

8306080140 - 16



PLAN EL 498'-4"



SECTION "B-B"

REV. C
RELEASED FOR COMMENTS PER WT-589
RELEASE FOR FILE RECORD WT-3 3

FOR GENERAL NOTES SEE SHEET 1

EQUIPMENT REMOVAL
CIRCULATING WATER PUMP STRUCTURE
WM. H. ZIMMER NUCLEAR POWER STATION UNIT-1
THE CINCINNATI GAS & ELECTRIC COMPANY
COLUMBUS & SOUTHERN OHIO ELECTRIC COMPANY
THE DAYTON POWER AND LIGHT COMPANY

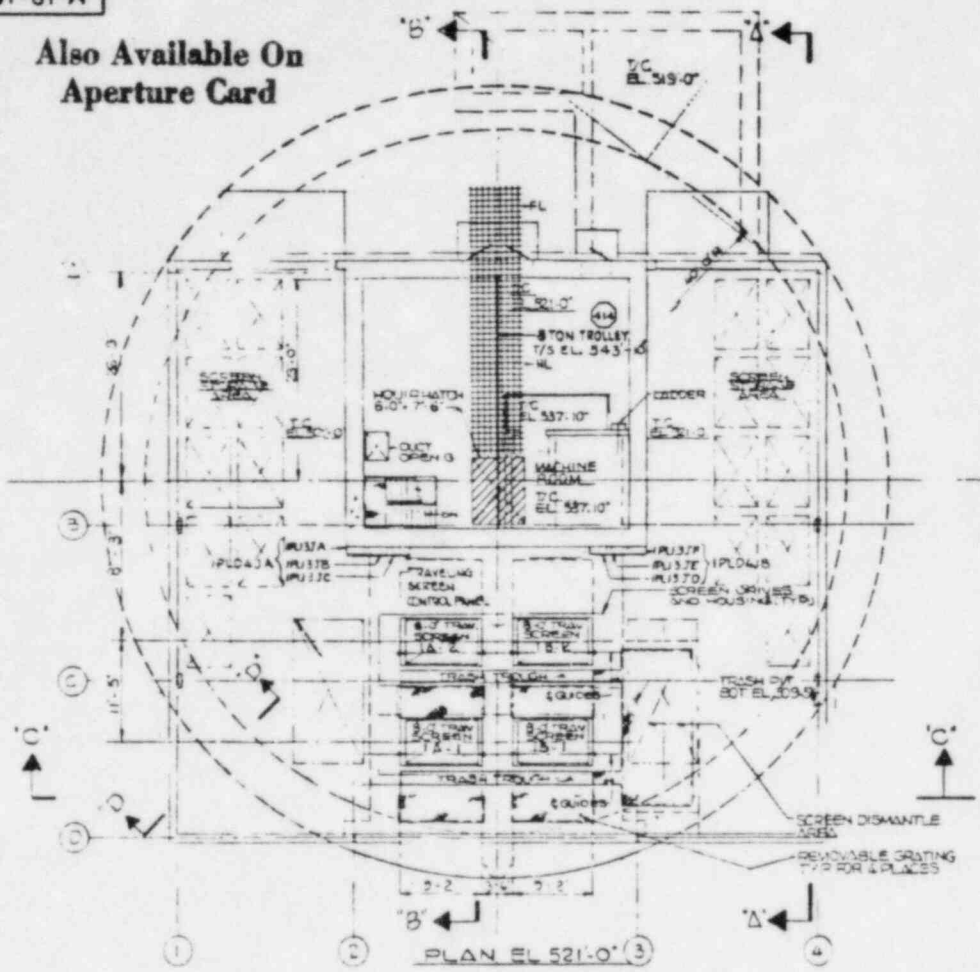
1" = 10'-0"

SARGENT & LUNDY
CHICAGO

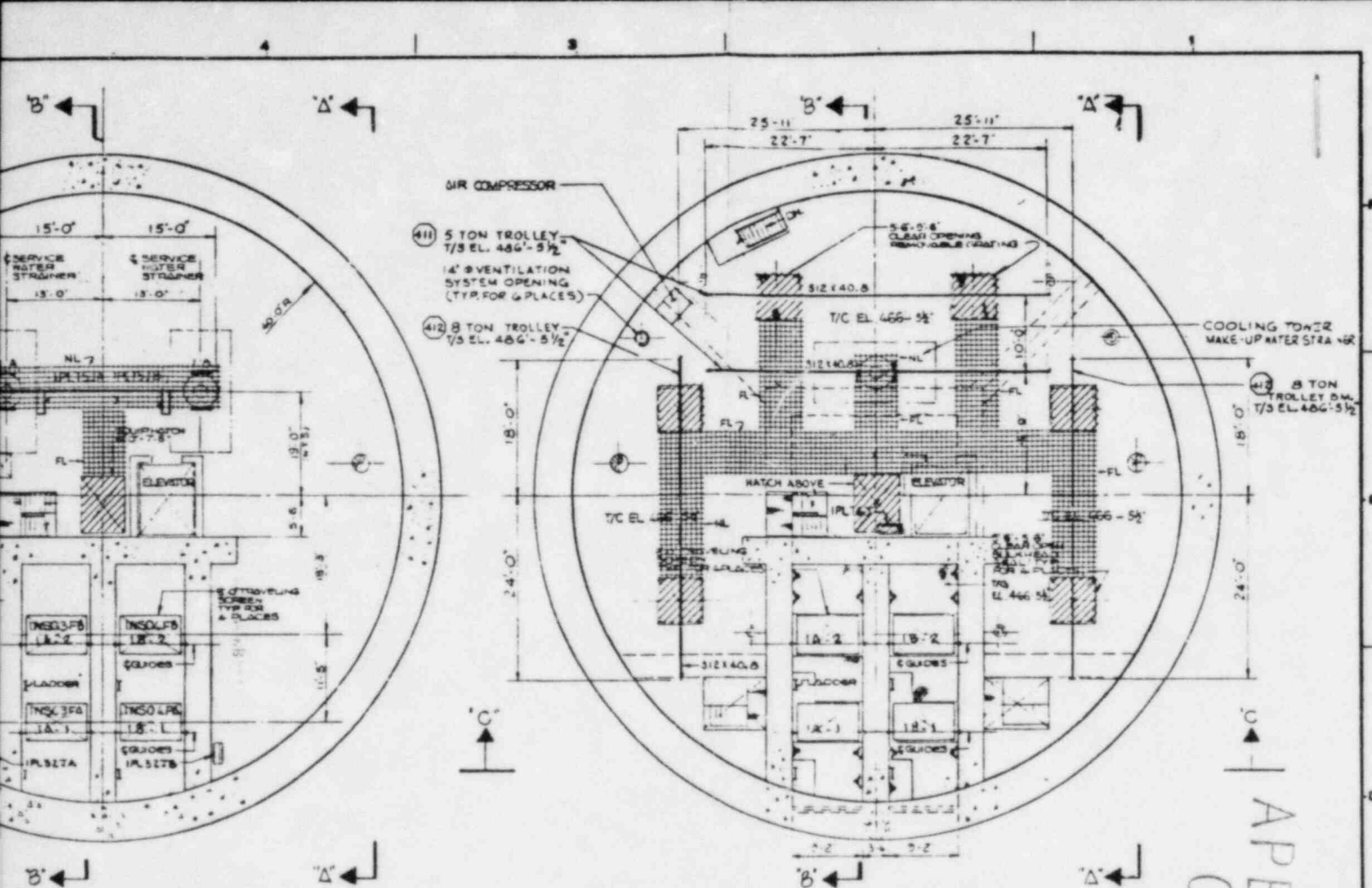
M-GCT-15

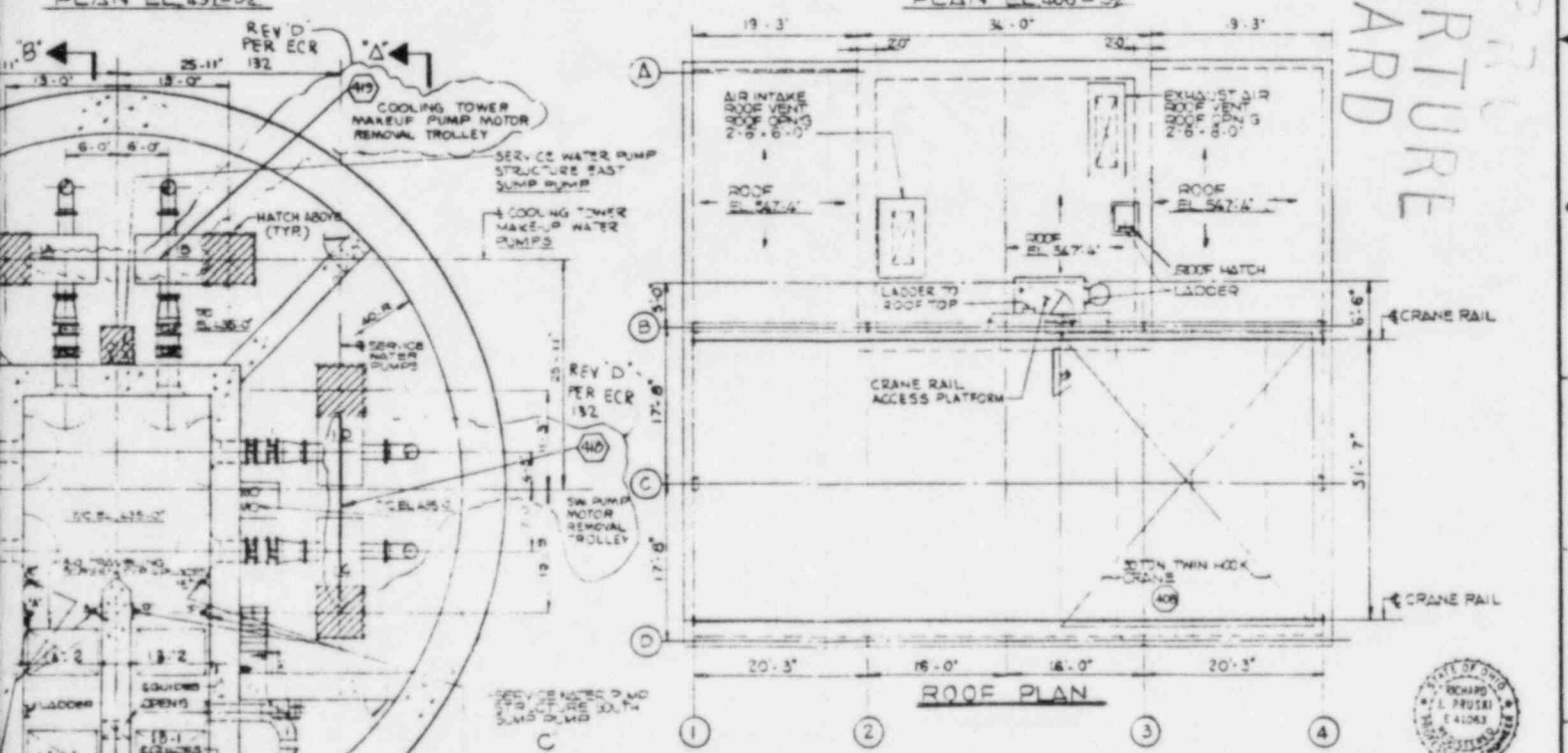
M-18-16

Also Available On Aperture Card



8306080 140- 17





FOR GENERAL NOTES SEE SHEET 1

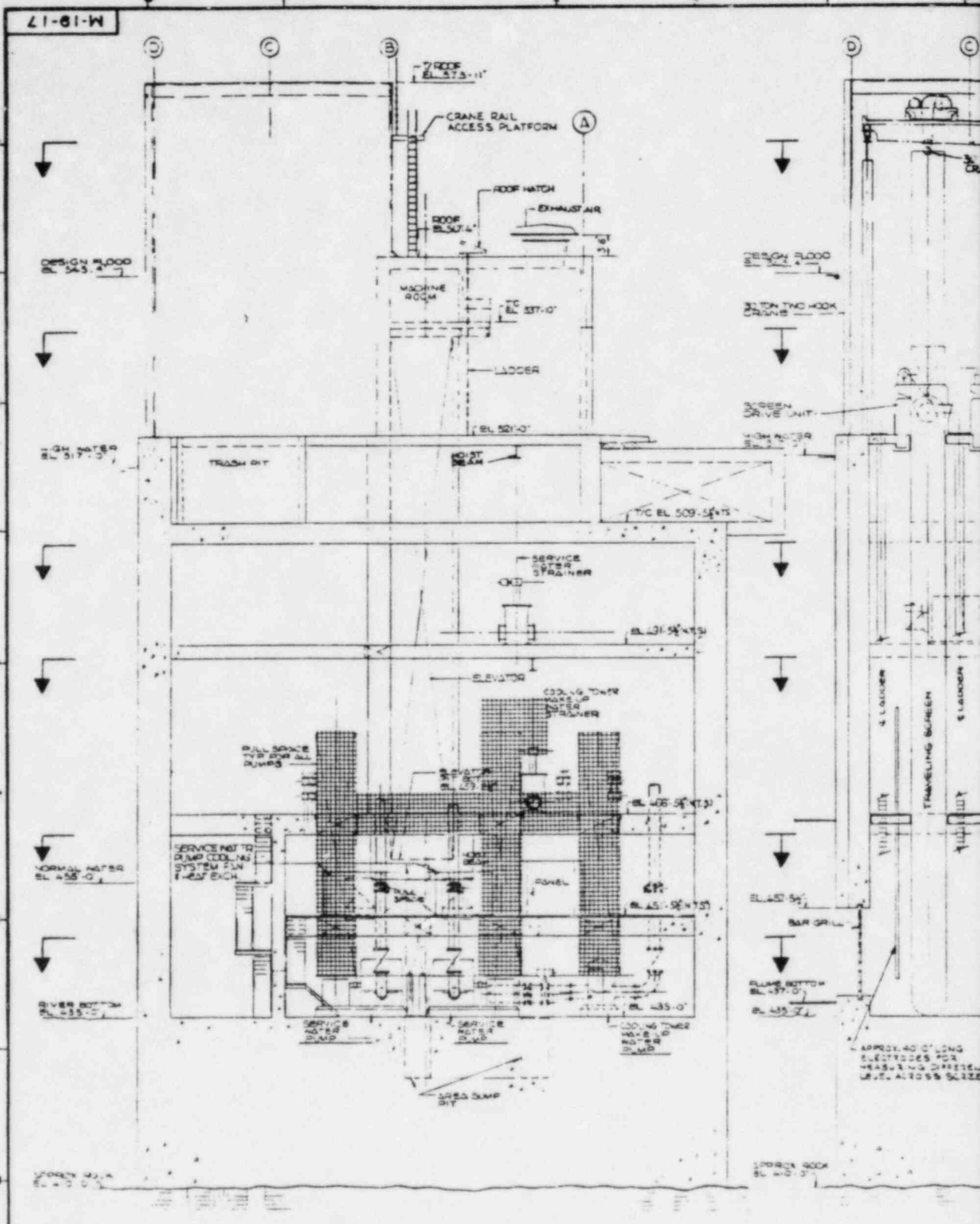
REV'D
ADDED ITEM 409 + 410 PER ECR 132

EQUIPMENT REMOVAL
SERVICE WATER PUMP STRUCTURE
WM. H. ZIMMER NUCLEAR POWER STATION UNIT-1
THE CINCINNATI GAS & ELECTRIC COMPANY
COLUMBUS & SOUTHERN OHIO ELECTRIC COMPANY
THE DAYTON POWER AND LIGHT COMPANY

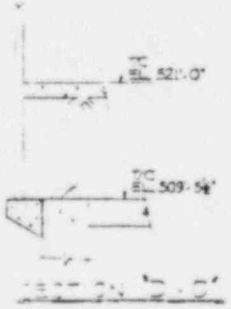
1" = 20'-0"

BARGENT & LUKOV

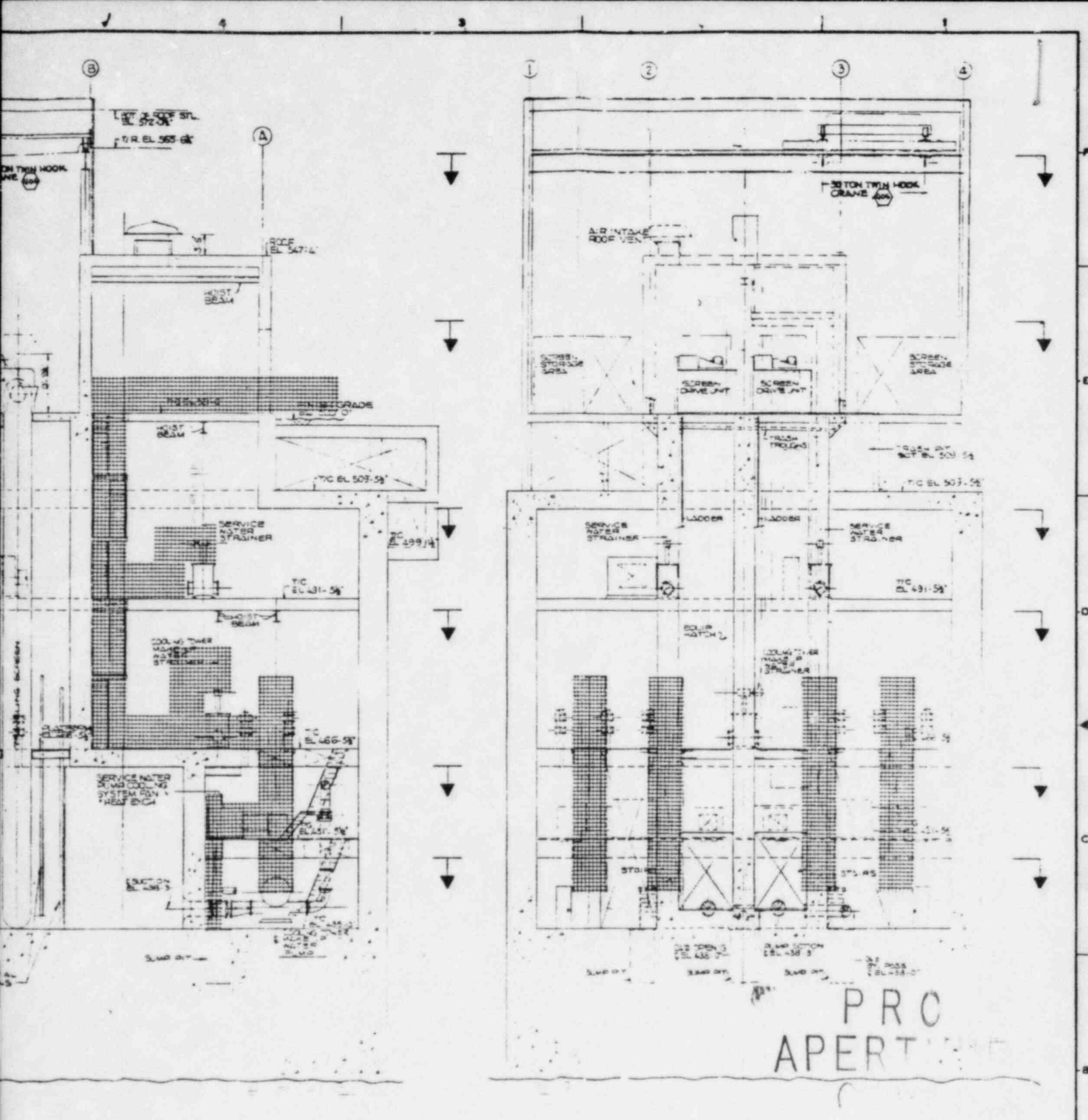
APERTURE CARD



SECTION 'A-A'



8306080 140 - 18



SECTION 'B-B'

SECTION 'C-C'

FOR GENERAL NOTES SEE SHEET 1

REV C
RELEASED FOR COMMENTS WT-889
RELEASE FOR FILE RECORD WT-919

EQUIPMENT REMOVAL
SERVICE WATER PUMP STRUCTURE
WM. H. ZIMMER NUCLEAR POWER STATION UNIT-1
THE CINCINNATI GAS & ELECTRIC COMPANY
COLUMBUS & SOUTHERN OHIO ELECTRIC COMPANY
THE DAYTON POWER AND LIGHT COMPANY

1" = 20'-0"

SARGENT & LUNDY

PRC
APER