LICENSE APPLICATION FOR STORAGE ONLY OF
UNIRRADIATED REACTOR FUEL AND ASSOCIATED
RADIOACTIVE MATERIAL

March 8, 1978

WM. H. ZIMMER NUCLEAR POWER STATION - UNIT 1

1. NAME OF APPLICANT

The Cincinnati Gas & Electric Company
Columbus and Southern Ohio Electric Company
The Dayton Power and Light Company

2. DESCRIPTION OF APPLICANT

Information concerning Applicant's officers and ownership are set forth on pages 1-9 of the September 10, 1975 Amendment and Supplement to Application, Amendment No. 22, as revised on December 14, 1977, (Docket No. 50-358, Construction Permit No. CPPR-88).

3. REACTOR FACILITY LOCATION

The Wm. H. Zimmer Nuclear Power Station - Unit 1, a boiling water nuclear reactor, is located on a site consisting of about 635 acres on the Ohio River approximately 24 miles southeast of the City of Cincinnati in Clermont County, Ohio.

4. THE INTENDED USE OF SPECIAL NUCLEAR MATERIAL

The activity for which the Special Nuclear Material License is requested is to receive, possess and store Special Nuclear Material in the form of unirradiated fuel assemblies and in-core monitoring system detectors for eventual use in Unit 1 of the Wm. H. Zimmer Nuclear Power Station, located in Moscow, Ohio. The general plan for carrying out the intended activity is as described in Chapter 9 of the Final Safety Analysis Report (hereinafter called the FSAR) under Docket No. 50-358 and CPPR No. 88.

5. DURATION OF LICENSE

The applicant requests a license pursuant to 10 CFR Part 70, effective June 1, 1978, to receive, possess and store fuel assemblies and in-core monitoring system detectors at the Wm. H. Zimmer Nuclear Power Station. The license is to remain effective until the issuance of an operating license for Unit 1.

6. REACTOR AND FUEL

6.1 Description of the Reactor

Unit 1 of the Wm. H. Zimmer Nuclear Power Station is a General Electric Boiling Water Reactor with 8 x 8 fuel assemblies. This reactor is designed to operate at a rated core thermal power of 2436 MWt with a corresponding gross electrical output of 839 MWe and net electrical output of 797 MWe.

6.2 Description of the Fuel Bundles

The fuel bundle structure and materials of construction are described in Chapter 4 of the FSAR for Unit 1. Specific characteristics of fuel bundles, fuel rods and fuel pellets are presented below:

Fuel Bundles

Number	560
Rod Array	8 x 8
Fuel Rods per Bundle	63
Rod Pitch, Inches	0.64
Overall Dimensions, Inches	175.98 x 5.248 x 5.248

6. REACTOR AND FUEL (Cont'd)

6.2 Description of the Fuel Bundles (Cont'd)

Fuel Bundles (Cont'd)

Bundle Average Enrichment, Wt. % U-235	1.90
Maximum Rod Enrichment, Wt. % U-235	1.95
Maximum (Type II) Bundle Weight, Kg U	186.214
Maximum (Type II) Bundle Weight, Kg U-235	3.537
Total Fuel Weight in Core, Kg U	104,179
Total Fuel Weight in Core, Kg U-235	1,979
Number of Fuel Rod Spacers per Bundle	7
Fuel Rod Spacer Material	Zr-4 with Inconel Springs
Upper and Lower Tie Plate Material	304SS

Fuel Rods

Number	35,280
Cladding Material	Zr-2
Outside Diameter, Inches	0.425
Diametrical Gap, Inches	0.009
Cladding Thickness, Inches	0.034
Cladding Tube Length, Inches	160.25
Active Fuel Length, Inches	146.00

Fuel Pellets

Material	UO_2 Sintered
Density (% of Theoretical)	95
Pellet O.D., Inches	0.416
Pellet Length, Inches	0.42
Burnable Poison	Gd_2O_3

7. STORAGE CONDITIONS

7.1 Shipping

The General Electric Company, fabricator of nuclear fuel bundles, is responsible for shipment of the fuel bundles from Wilmington, North Carolina or from its storage facility at Greenville, South Carolina, to the reactor site. All fuel bundles are to be delivered to the site in accordance with shipping procedures and arrangements of General Electric Company, utilizing Model RA-2/RA-3 containers authorized for use by that company under U.S. Nuclear Regulatory Commission Certificate of Compliance No. 4986, Package Identification No. USA/4986/B( )F, dated December 20, 1976. Fuel will be shipped by truck trailers in quantities not exceeding 17 shipping containers, each containing two fuel bundles, thereby providing a maximum of thirty-four fuel bundles per truck shipment.

Motor carrier(s) will be selected by General Electric Company and will have had experience transporting fuel in the containers identified above, and will hold appropriate authority from the Interstate Commerce Commission. Such carriers will be subject to the Department of Transportation's Hazardous Materials Regulations and Motor Safety Carrier Regulations.

7.2 Receiving

Upon arrival of fuel at the site, the truck trailers are directed to the equipment access building carport (Figs.

7. STORAGE CONDITIONS (Cont'd)

7.2 Receiving (Cont'd)

M4, Sheet 1 and 2). Here the shipment is initially inspected, the inventory checked against the receiving documents and receipt of clearance for unloading obtained. Each container is unloaded from the truck trailer using a fork lift truck or crane sling in combination with the overhead crane. The outer shipping containers will be removed and the fuel bundles, still within their metal containers, will be lifted using the reactor building crane to the refueling floor for removal from their containers, inspection, channeling and final storage prior to fuel loading. Elevations and plan views of the reactor building showing the fuel storage areas are shown on Figure M-8.

7.3 Storage

As described in Section 7.2, the metal fuel containers are lifted to the refueling floor, elevation 627' 9" of the reactor building utilizing the reactor building crane auxiliary hook. Temporary storage space for the fuel containers is provided on the north and west portions of the refueling floor.

From the temporary storage location, each metal container is positioned horizontally on the operating (refueling)

7. STORAGE CONDITIONS (Cont'd)

7.3 Storage (Cont'd)

floor, the cover removed, the contents visually inspected to verify that no damage during shipping has occurred, and radiation control measures as described in Section 11 are implemented. After installation of special fuel bundle holddown bars and removal of the end cover, the container is pivoted to the vertical position and secured to a vertical support adjacent to the fuel inspection stand. Each fuel bundle is removed in turn from the container and is transferred to the new fuel inspection stand.

The fuel inspection station is a "clean" area where the assemblies are checked for damage, cleanliness, and specified clearances. Following inspection, the fuel assemblies are channeled and placed in the spent fuel storage racks, located in the spent fuel storage pool, Figure M-8.

Movements of fuel containers are accomplished using the auxiliary hook of the reactor building crane and/or the 5 ton new fuel handling jib crane. Fuel assemblies will be moved using the reactor building crane auxiliary hook, and/or the refueling platform fuel grapple. Further discussion on the receipt and handling of new fuel is also provided in FSAR Section 9.1.4.3.1. Drawings of the temporary new fuel storage area and the spent fuel storage

7. STORAGE CONDITIONS (Cont'd)

7.3 Storage (Cont'd)

pool are provided in Figure M-8.

7.3.1 Temporary Storage Area

The temporary storage area for the new fuel containers is located on the reactor building refueling floor, elevation 627' 9". Here the metal shipping containers are stored horizontally and may be stacked to a minimum of three containers high. Access to the reactor building refueling floor is controlled during new fuel storage.

7.3.2 Spent Fuel Pool

The spent fuel pool is used for storage of new, channeled fuel assemblies and is located on the reactor building refueling floor, elevation 627' 9". The details of the storage area and spent fuel storage racks are given in Figure M-8, and FSAR Figure 9.1-2 respectively. Thirty-seven fuel racks, each rack storing 20 assemblies, provide space to accommodate 740 fuel assemblies. To prevent the extremely remote possibility of inadvertant, accidental, criticality, possibly induced by the presence of a water mist, the following additional administrative controls will be instituted:

7.3.2.1 Water hoses provided for fire protection on the reactor building refueling floor

7. STORAGE CONDITIONS (Cont'd)

7.3 Storage (Cont'd)

7.3.2 Spent Fuel Pool (Cont'd)

will be valved off and safety tagged under the administrative control of the shift supervisor. To provide fire protection capability, a 150 lb. wheeled portable, ABC type, dry chemical fire extinguisher will be placed in the immediate area. Signs will be posted in this area to reflect the precautionary fire protections measures to be taken in the unlikely event of a fire.

7.3.2.2 The new fuel assemblies will be protected with a waterproof and fire resistant cover.

7.3.2.3 Storage of combustible materials on the refueling floor will be strictly controlled by administrative procedure and no such material will be permitted in the immediate vicinity of the temporary fuel storage area or the spent fuel pool.

7.4 Activities on the Refueling Floor

Personnel access to the refueling floor and to the fuel handling equipment, as well as approval and control of all refueling floor activities, are controlled through approved administrative procedures. Fuel bundle handling operations are performed by CG&E personnel in accordance with approved procedures.

7. STORAGE CONDITIONS (Cont'd)

7.5 New Fuel Handling Cranes

The approximate weight of a new 8 x 8 fuel assembly is 685 pounds. The cranes listed below, and further described in FSAR Section 9.1.4, will be used for handling the new assemblies.

7.5.1 The reactor building overhead crane with a 110 ton main hoist and a 10 ton auxiliary hoist.

7.5.2 The refueling platform with a 1200 pound fuel grapple.

7.5.3 The 1000 pound jib crane used in conjunction with the fuel preparation machine.

7.5.4 The 5 ton new fuel handling jib crane.

7.6 Fire Protection

The temporary new fuel storage area and the spent fuel pool are located on the reactor building refueling floor, elevation 627' 9". The details for the fire protection systems provided are presented in the "Fire Protection Evaluation Report" for Unit 1, issued February 4, 1977.

The refueling floor consists of structural concrete and the walls and roof are constructed of steel framing with corrugated metal siding. There are no combustibles normally located in the area, thus the fire loading is negligible. Any possible fire in the area would involve transient materials possibly present during fuel transfer. No accumulation of flammable material is permitted.

8. PHYSICAL PROTECTION

As specified in Section 7.4, administrative controls will be utilized to control access to the new fuel storage areas. These controls include a list of personnel who are authorized access to the new fuel storage areas, signed by the Station Superintendent or his designee. In addition to administrative controls, barriers will be erected around the access points to the new fuel storage areas on the refueling floor as shown on Figure M-8. Entry to the area will be provided through a normally locked gate. Keys will be maintained by the on duty shift supervisor in a controlled key cabinet, and a procedure will be written to provide for administrative key control.

9. TRANSFER OF SPECIAL NUCLEAR MATERIAL

The fuel vendor, the General Electric Company, is responsible for shipment of fuel to the Wm. H. Zimmer Nuclear Power Station site. The protection of this Special Nuclear Material in transit will be provided by the fuel fabricator. (See also Section 7.1 of this application.)

10. FINANCIAL PROTECTION AND INDEMNITY

Proof of financial protection, as required by 10 CFR 140.15 in the amount specified in 10 CFR 140.13, is provided by the attached certified declarations page of the nuclear energy liability policy.

11. RADIATION SAFETY MEASURES

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11.1 Technical Qualifications

Mr. D. L. Erickson, Rad-Chem Engineer, is responsible for radiation safety at the Zimmer Station. Mr. Erickson's

11. RADIATION SAFETY MEASURES (Cont'd)

11.1 Technical Qualifications (Cont'd)

resumé detailing his training and experience is provided as Attachment 13.A-8 to Chapter 13.0 of the FSAR. A trained staff of rad-chem technicians, described in Section 13.1.2.2.3 of the FSAR, will implement radiation protection measures as required.

11.2 Contamination Surveys and Decontamination Procedures

Smear tests as well as direct measurements are used to detect contamination in the temporary new fuel storage area. Smears are counted in the laboratory counting room with instrumentation specified in FSAR Section 12.3.2.2.3. Direct radiation measurements are performed using instrumentation specified in FSAR Section 12.3.2.3.4. If contamination is detected, the boundaries of the affected area are established, and the area is barricaded and posted until decontamination procedures are implemented. All equipment leaving a contaminated area will be surveyed by a GM instrument. If contamination is detected, appropriate procedures will be implemented for decontamination and/or transport of affected equipment.

Personnel leaving a contaminated area will be checked at a control point for contamination prior to the removal of protective clothing. Personnel survey instruments (friskers)

11. RADIATION SAFETY MEASURES (Cont'd)

11.2 Contamination Surveys and Decontamination Procedures (Cont'd)

used for detection of contamination are specified in FSAR Section 12.3.2.3.4(f). If the protective clothing is damaged or shows a radiation level of 1.0 mr/hr at one inch, the clothing is removed and replaced. After removal of protective clothing, personnel are again surveyed for possible contamination. If contamination is detected, appropriate decontamination procedures will be implemented. As new fuel is received and uncrated, the exterior of each metal shipping container will be surveyed for beta and gamma radiation. A smear test will also be performed. As fuel is removed from the metal shipping container, the container interior, polyethylene covers and the new fuel assemblies will be surveyed for contamination.

All radiation surveys performed as specified above will be documented by recording survey results on appropriate radiation survey data sheets.

11.3 Calibration and Testing of Instruments

All instruments used in the performance of contamination surveys, described in Section 11.2 above, will be calibrated using approved calibration procedures. Calibrated instruments are tagged with a calibration sticker indicating the date of the last calibration. All instrument calibrations will be traceable to an approved NBS standard. The results

11. RADIATION SAFETY MEASURES (Cont'd)

11.3 Calibration and Testing of Instruments (Cont'd)

of instrument calibrations including a determination of instrument efficiency, are recorded and maintained on file as specified in FSAR Section 12.3.2.2.4.

11.4 Safety Related Equipment and Procedures

The description of equipment, facilities and procedures used at the Wm. H. Zimmer Nuclear Power Station which are designed to prevent or mitigate the consequences of postulated accidents that could cause undue risk to the health and safety of the public are given in the following sections of the FSAR:

a.	Section 4.0	Reactor Components
b.	Section 9.1	Fuel Handling System
c.	Section 9.5.1	Fire Protection Systems
d.	Section 11.0	Waste Disposal Systems
e.	Section 12.1	Station Shielding and Shielding for Fuel Handling
f.	Sections 12.1 & 12.3	Radiation Monitoring System
g.	Section 12.3	Health Physics Program
h.	Appendix F	Emergency Plans

12. NUCLEAR CRITICALITY ANALYSIS

Nuclear criticality analysis for the new fuel assemblies stored in the spent fuel pool is merely a more conservative special case of the results reported in FSAR Section 9.1.2.3 for a flooded pool with 25 feet of water covering the fuel. These

12. NUCLEAR CRITICALITY ANALYSIS (Cont'd)

results indicate that K_{eff} is equal to or less than 0.90 under normal conditions and equal to or less than 0.95 under abnormal conditions. Mist criticality is prevented by covering the fuel with a waterproof cover. Both dry storage and storage of initial core fuel instead of reload fuel represent more conservative (less reactive) conditions than were assumed in the results reported in FSAR Section 9.1.2.3.

13. ACCIDENT ANALYSIS

Analysis of abnormal fuel storage conditions and accidents are considered in FSAR Section 9.1.2.3.

14. OTHER SPECIAL NUCLEAR MATERIAL

14.1 In-Core Monitoring System Detectors

Applicant seeks authorization to receive, possess, and store up to 5 grams of U-235 incorporated in nuclear detection instruments for purposes of installation, response testing, calibration, and related functions not involving destruction of encapsulated material.

15. EXEMPTION FROM MONITORING REQUIREMENTS

Applicant requests exemption from the monitoring requirements of 10CFR70.24 in that the physical facilities described in the foregoing sections and procedural controls which it proposes to employ preclude any possibility of accidental criticality during receipt, unloading, inspection and storage of the new fuel bundles. In addition to the procedural controls described

15. EXEMPTION FROM MONITORING REQUIREMENTS (Cont'd)

in the foregoing sections, personnel authorized to enter the fuel storage areas shall carry personnel monitoring devices, radiation and visual surveys of the storage areas shall be conducted on a routine basis, and temporary portable monitors shall be used during all fuel handling operations.

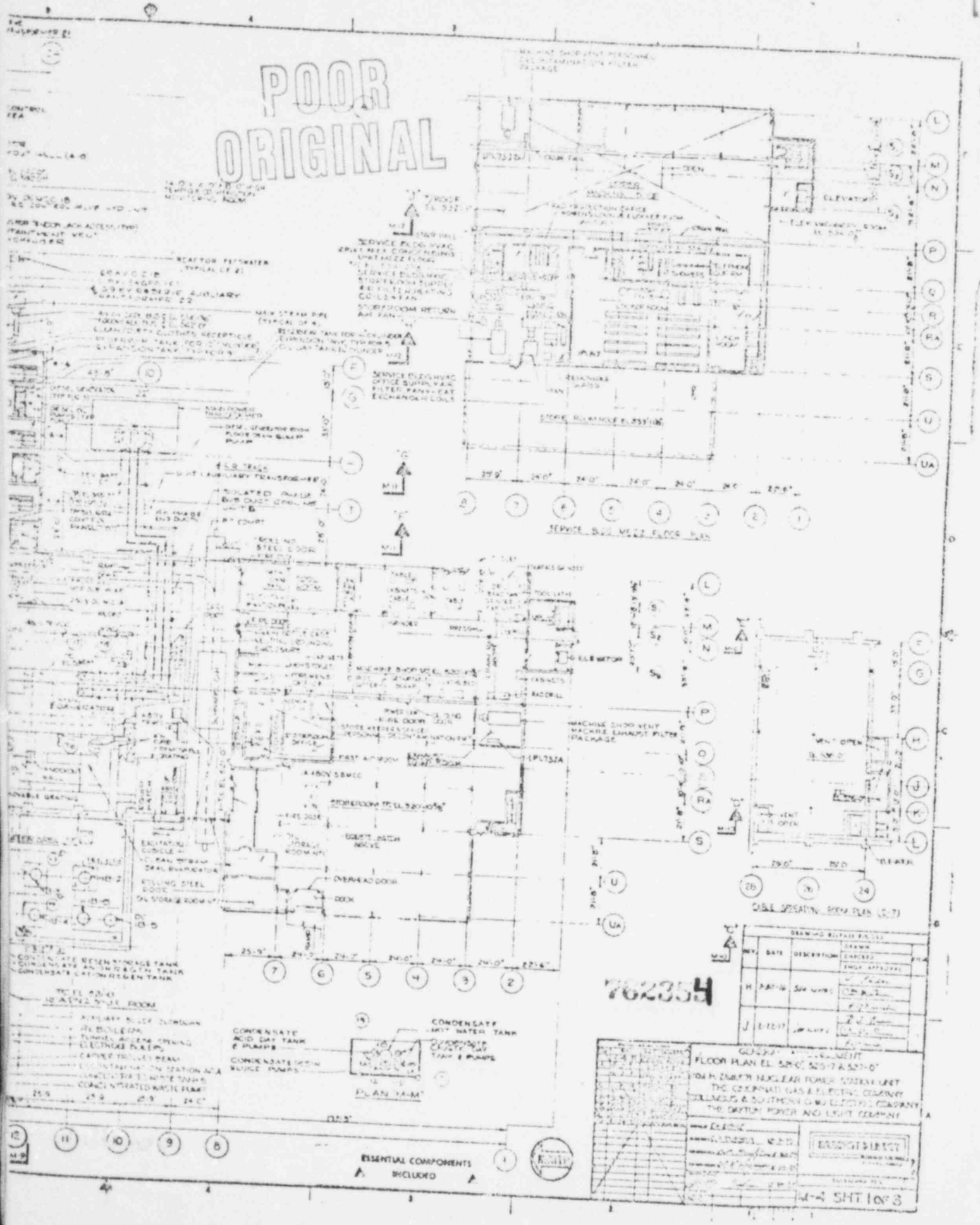
16. COMMUNICATIONS

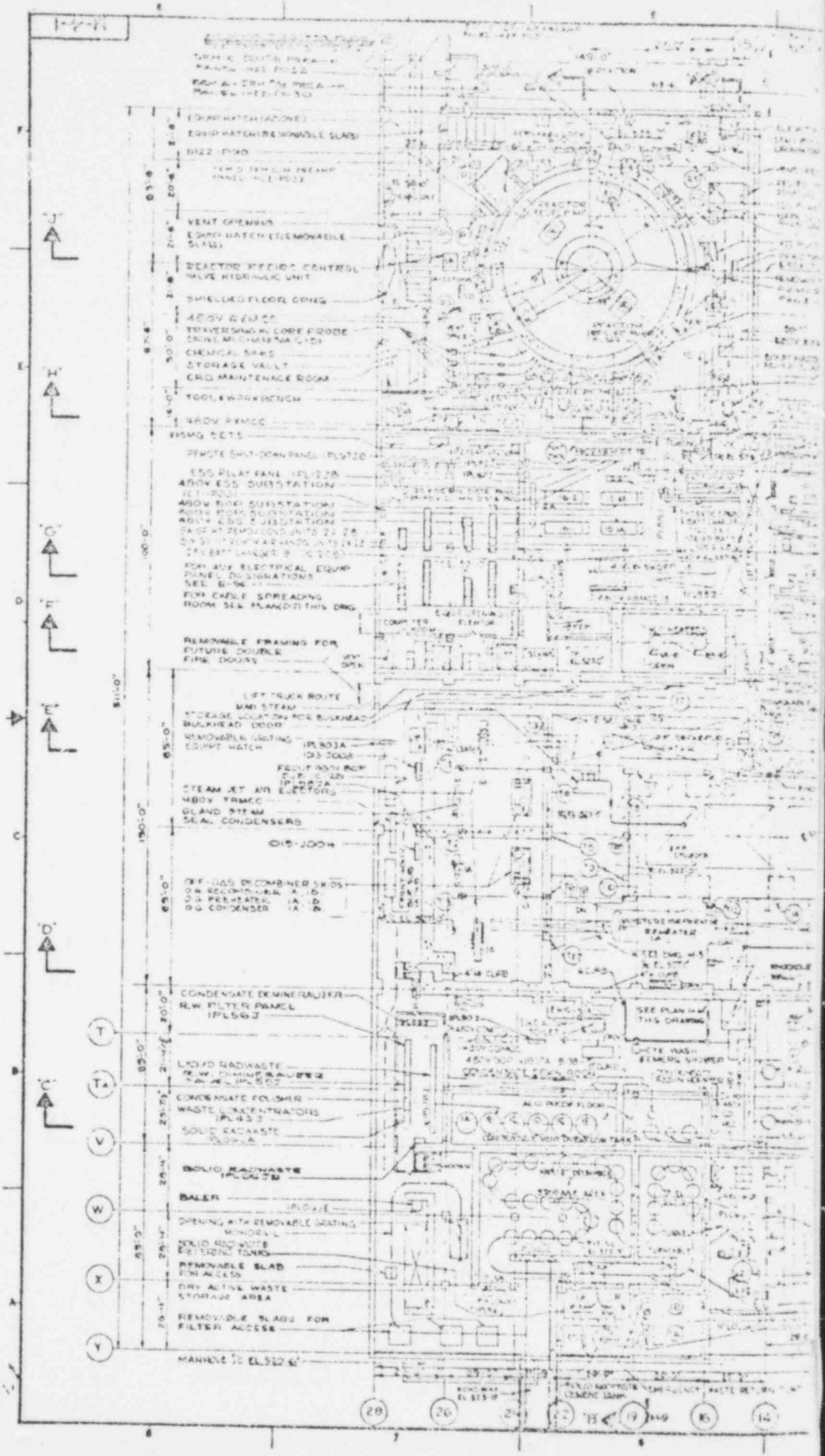
All communications pertaining to this Application should be sent to:

Mr. E. A. Borgmann
Vice President - Engineering
The Cincinnati Gas & Electric Company
P.O. Box 960
Cincinnati, Ohio 45201

THE CINCINNATI GAS & ELECTRIC COMPANY

By E. A. Borgmann
E. A. Borgmann





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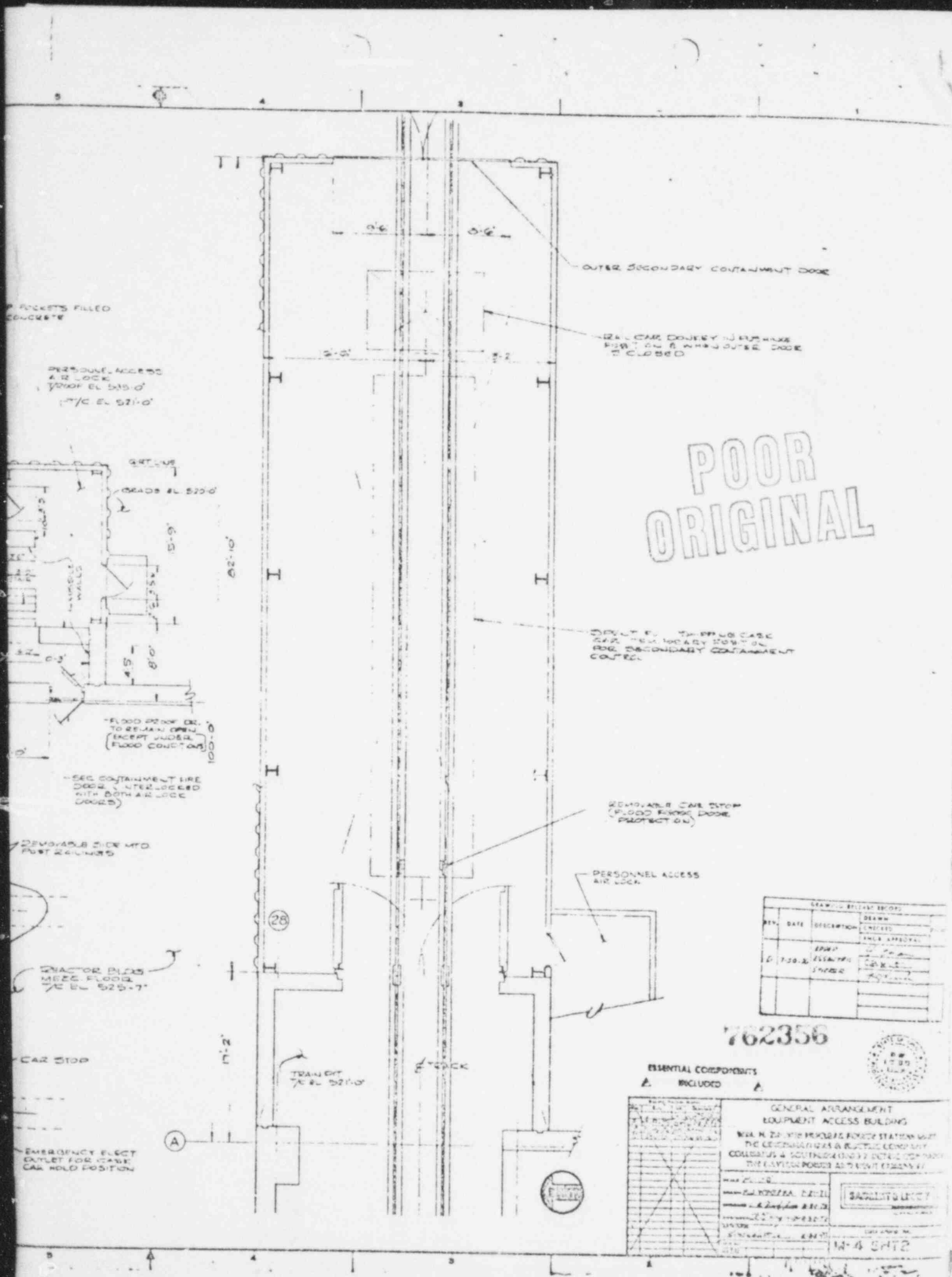

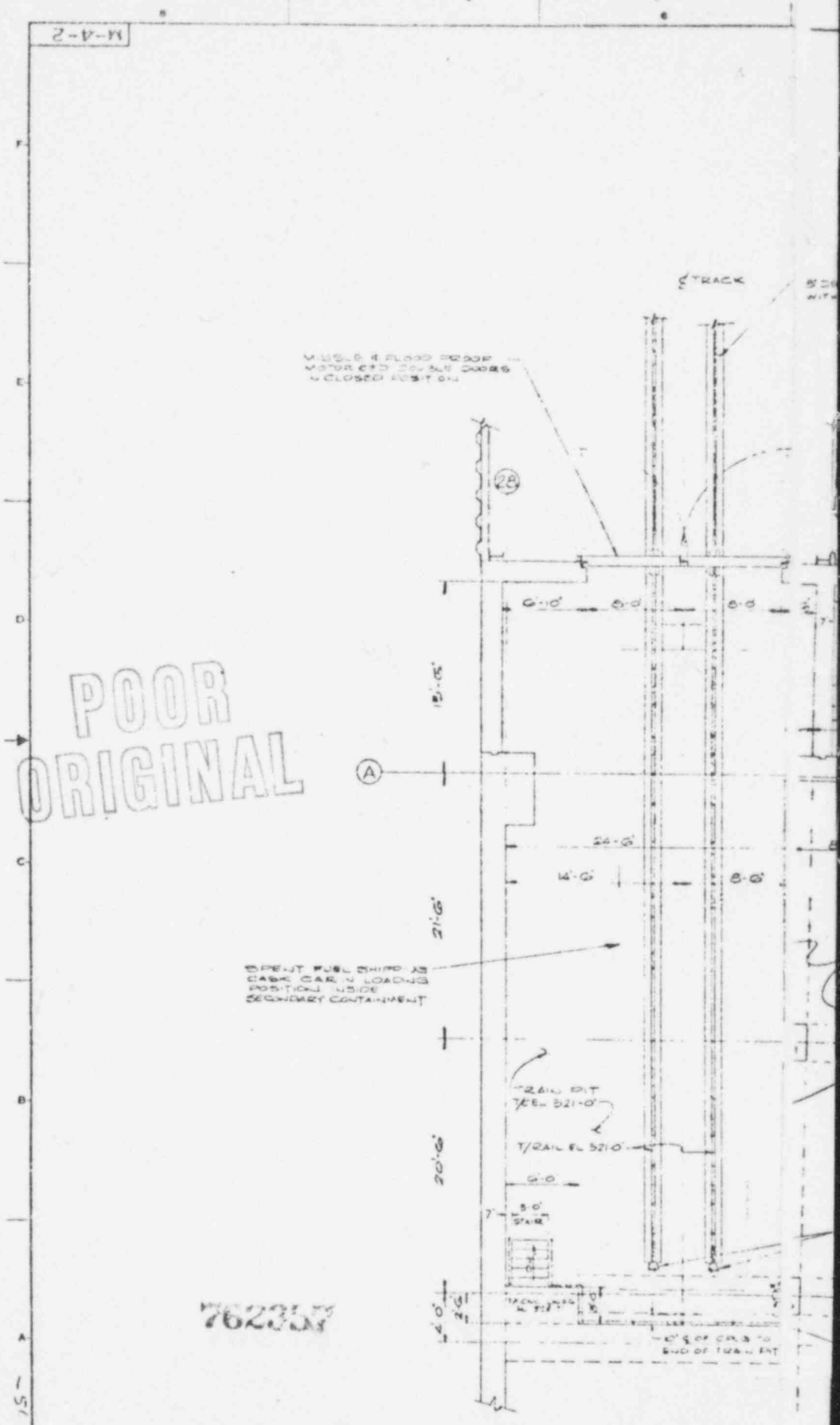

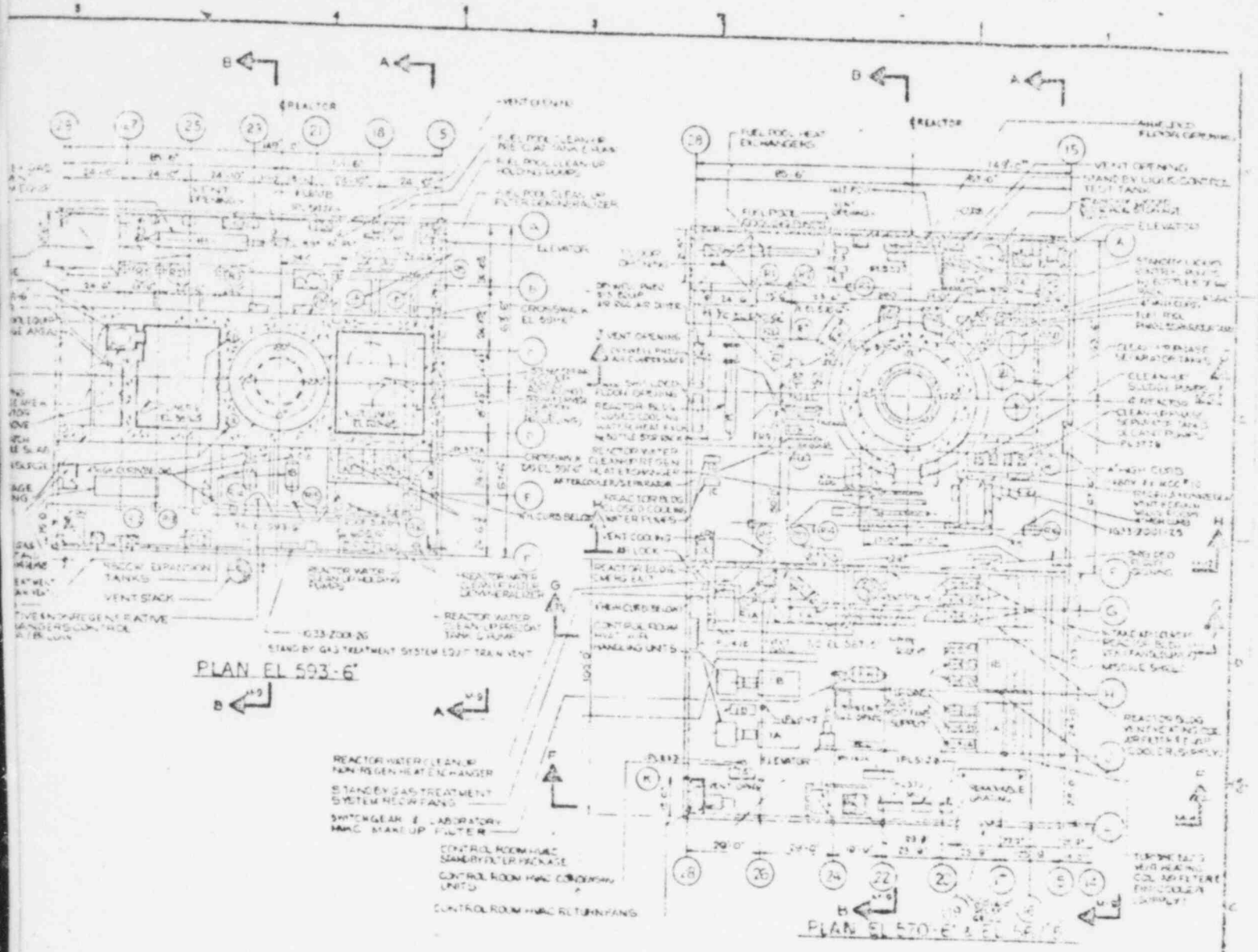

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ESSENTIAL COMPONENTS

A INCLUDED Δ

DRAWING RELEASE RECORD			
REV.	DATE	DESCRIPTION	DRAWN / CHECKED / ENGR APPROVAL
H	7-10-76	SEE NOTES	
J	2-22-77	SEE NOTES	

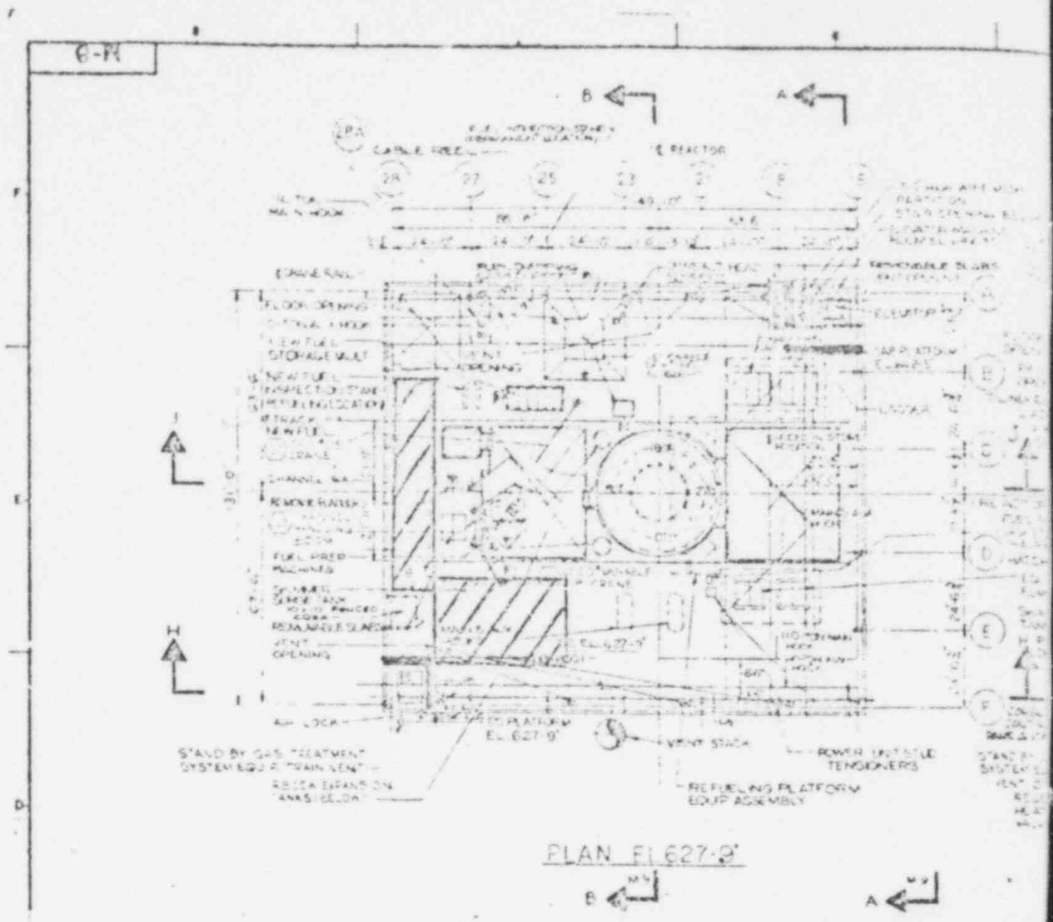
GENERAL ARRANGEMENT
UPPER REACTOR FLOOR PLANS

PEACH BOTTOM ATOMIC POWER STATION UNIT 3
THE CONSOLIDATED GAS & ELECTRIC COMPANY
COLUMBIA GAS & SOUTH EN GAS ELECTRIC COMPANY
THE EASTERN POWER AND LIGHT COMPANY

ARCHITECT & ENGINEER

DRAWING NO.

M-10-4



PLAN EL 627-9"

Temporary New Fuel Storag

Physical Barriers