AUG 1 1974

DOCKET NOS.: 50-438 AND 50-439

APPLICANT : TENNESSEE VALLEY AUTHORITY (TVA)

FACILITY : BELLEFONTE NUCLEAR PLANT, UNITS 1 AND 2

SUMMARY OF MEETING WITH THE ADVISORY COMMITTEE ON REACTOR SAFEGUARDS (ACRS)

The application of the Tennessee Valley Authority for licenses to construct the two-unit Bellefonte Nuclear Plant was considered by the ACRS during its 171st Meeting on July 11, 1974. The meeting was open to the public and a transcript of the meeting is available. A copy of slides used in the presentation is attached for the file copies. At the conclusion of the meeting, the ACRS advised the applicant that they could write a favorable letter for construction of the two Bellefonte units. A summary of the more significant subjects described during the meeting is presented below.

1. Introduction

TVA discussed their organizational structure and the division of responsibility within this organization. Mr. J. Gilleland represented TVA's management and presented the status of their activities on Bellefonte Nuclear Plant, Units 1 and 2.

2. Site Description

A brief description of the demography and land use around the site was given. A summary of the hydrology and meteorology of the site was presented. After TVA presented a geologic and seismologic description of the site, the staff and a USGS representative responded to questions clarifying certain comments in the USGS letter on Bellefonte Nuclear Plant, dated July 9, 1974.

3. Plant Description

A brief description of the proposed Bellefonte Nuclear Plant was given. This presentation included a comparison of this facility with Rancho Seco and Oconee 2 and 3.

LB

OFFICE ➤						
SURNAME ➤						
DATE ➤						

4. Containment Design

The design of the containment structure was described with some discussion of the treatment of shear in the containment walls. The containment rock anchors were described with emphasis on the grouting procedures. A question arose as the extent of the staff's review of guard pipes for process lines.

5. Containment Sumps

TVA briefly described the design of the containment sumps for the Bellefonte Nuclear Plant, Units 1 and 2.

6. Design Commitment

TVA indicated that the design of Bellefonte was consistent with the presentations earlier in the day by B&W.

7. Generic Items

The ACRS questioned the applicant and the staff on the status of the reactor coolant pump overspeed concern and the status of the ATWS evaluation for Bellefonte Nuclear Plant, Units 1 and 2.

Original Signed by

Don K. Davis, Project Manager
Light Water Reactors Branch 2-3
Directorate of Licensing

Enclosure:
Slides (f/file cys)

DISTRIBUTION:

Docket Files	AKenneke
AEC PDR	TR ADs
LPDR	TR BCs
L Reading	DKDavis
LWR 2-3 Reading	EGoulbourne
RP ADs	OGC
RP BCs	WPaton
SVarga	RO (3)
[redacted]	RS (3)
DEisenhut	ACRS (16)
JHendrie	

OFFICE ➤	x7686/LWR 2-3					
SURNAME ➤	DKDavis:cjb					
DATE ➤	8/2/74					

Form AEC-318 (Rev. 9-53) AECM 0240 ☆ U. S. GOVERNMENT PRINTING OFFICE: 1974-526-166

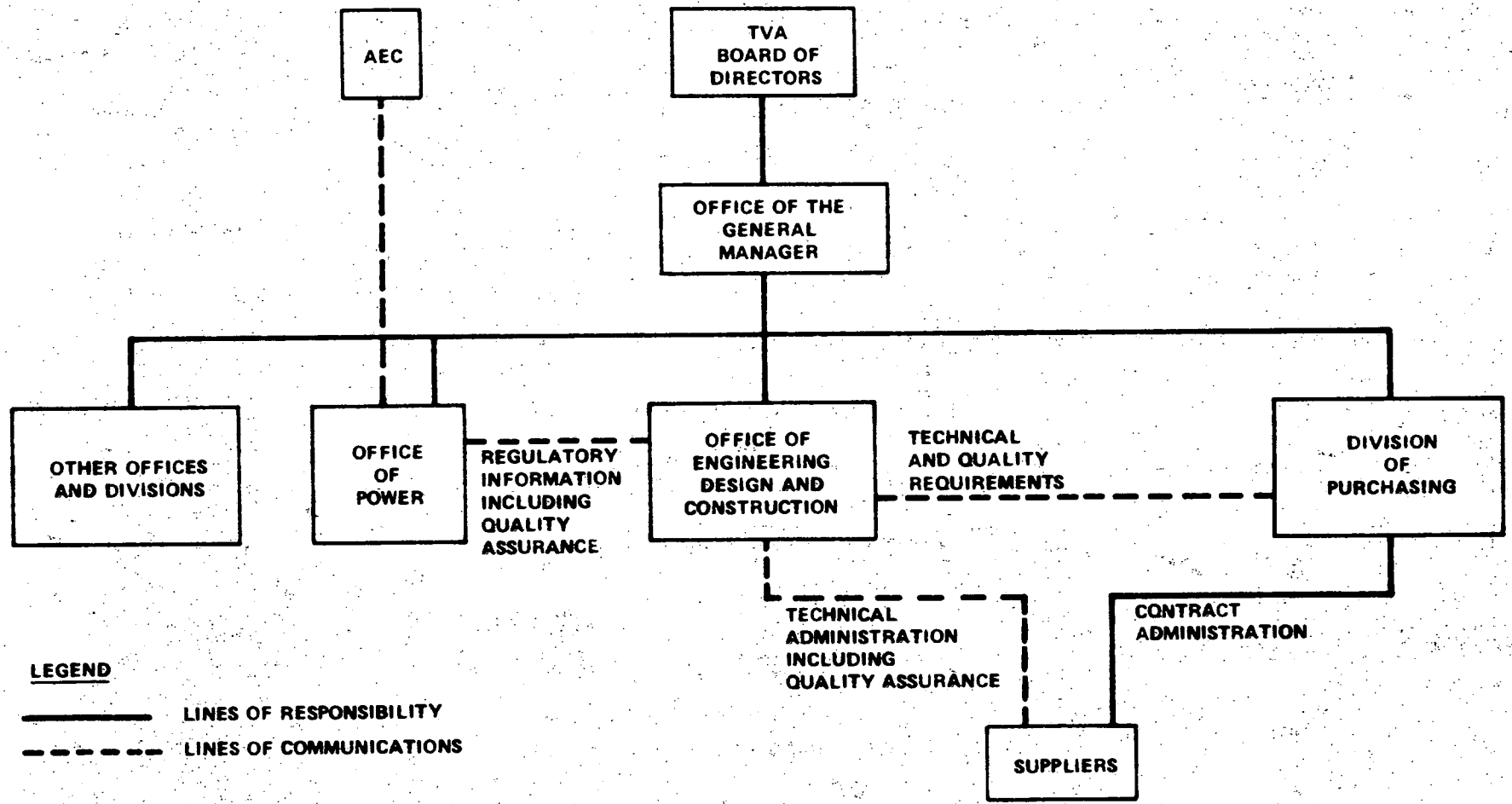
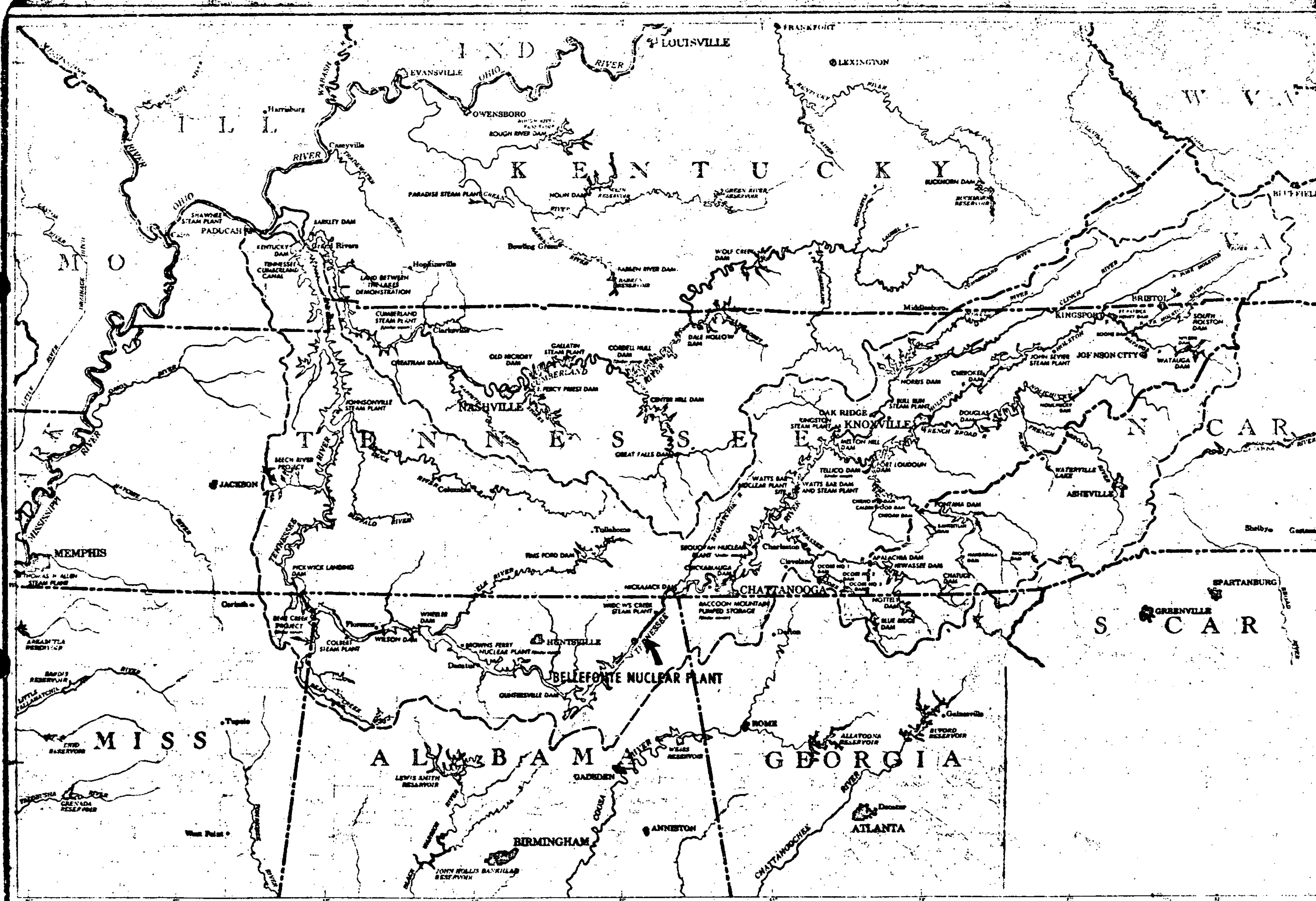


FIGURE 17.1A-1 TVA ORGANIZATION



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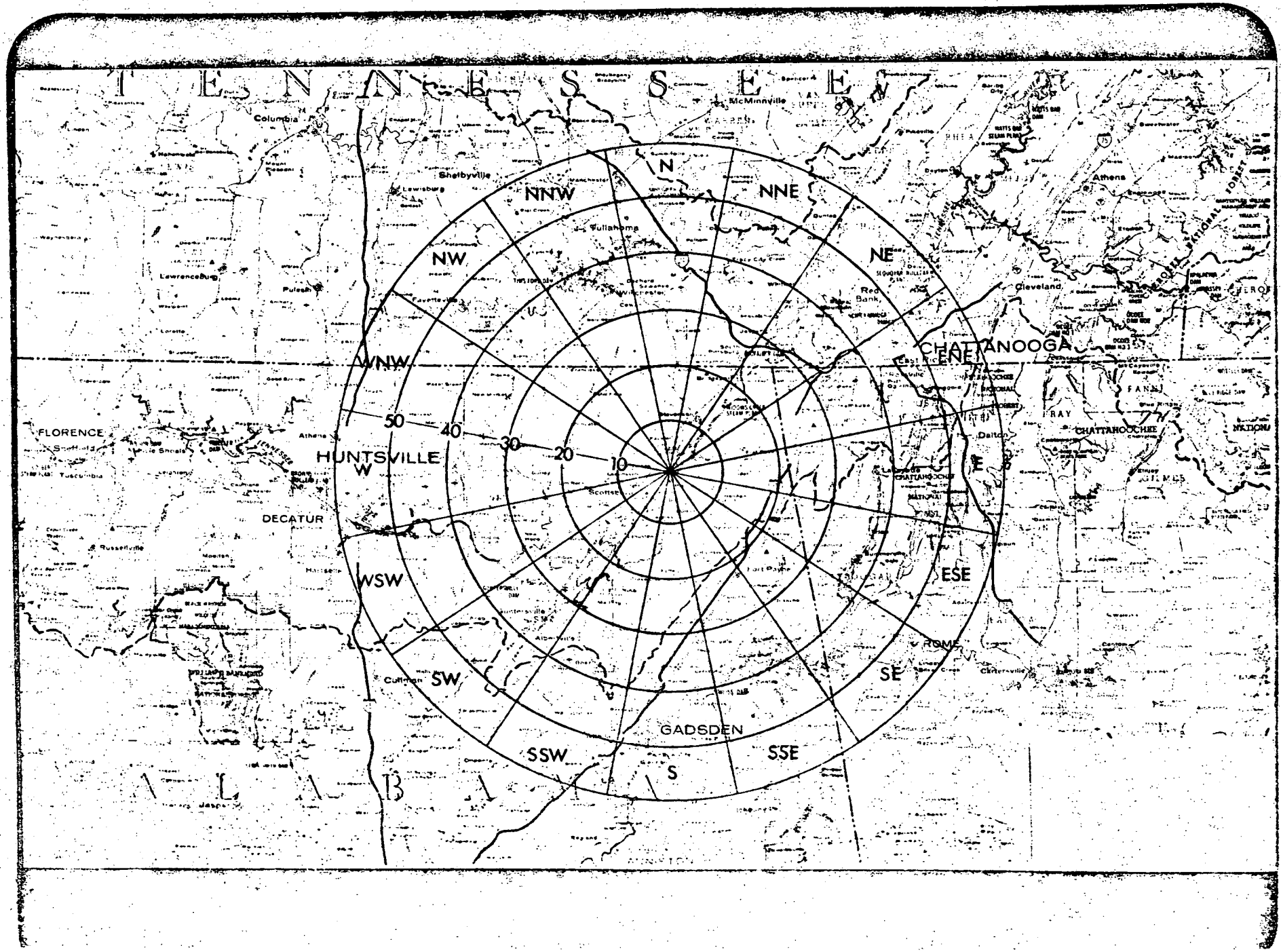
LOUISVILLE
FRANKFORT
LEXINGTON
EVANSVILLE
OWENSBORO
OHIO
RIVER
ILL
Harrisburg
Caseyville
KENTUCKY
PARADISE STEAM PLANT
ROUGH RIVER DAM
BUCKHORN DAM
SHAWNEE STEAM PLANT
PADUCAH
BARKLEY DAM
KENTUCKY DAM
Grand Rivers
TENNESSEE CUMBERLAND CANAL
LAND BETWEEN THE LAKES DEMONSTRATION
Hopkinsville
Bowling Green
BARREN RIVER DAM
WOLF CREEK DAM
Middlesboro
W VA
BLUEFIELD
VA
BRISTOL
KINGSPORT
SOUTH HOLSTON DAM
WATAUGA DAM
JOHNSON CITY
JOHN SEVIER STEAM PLANT
MO
CUMBERLAND STEAM PLANT
Clarksville
CHEATHAM DAM
OLD HICKORY DAM
GALLATIN STEAM PLANT
CORDELL HULL DAM
DALE HOLLOW DAM
CENTER HILL DAM
NASHVILLE
PERCY PRIEST DAM
NORRIS DAM
CHEROKEE DAM
BULL RUN STEAM PLANT
DOUGLAS DAM
OAK RIDGE
KINGSTON STEAM PLANT
KNOXVILLE
MELTON HILL DAM
FORT LOUDOUN
TELLICO DAM
WATTS BAR NUCLEAR PLANT SITE
WATTS BAR DAM AND STEAM PLANT
JOHNSONVILLE STEAM PLANT
TENNESSEE
GREAT FALLS DAM
N CAR
ASHEVILLE
WATERVILLE LAKE
FONTANA DAM
BEECH RIVER PROJECT
JACKSON
Columbia
MISSISSIPPI
MEMPHIS
THOMAS H. ALLEN STEAM PLANT
Tullahoma
TIMS FORD DAM
SEQUOYAH NUCLEAR PLANT
Charleston
Cleveland
CHICKAMAUGA DAM
APALACHIA DAM
HIWASSEE DAM
CHATUGE DAM
NICKAJACK DAM
CHATTANOOGA
RACCOON MOUNTAIN PUMPED STORAGE
NOTTELY DAM
BLUE RIDGE DAM
Shelby
SPARTANBURG
GREENVILLE
S CAR
PICKWICK LANDING DAM
Corinth
BEAR CREEK PROJECT
Florence
WHEELER DAM
WILSON DAM
COLBERT STEAM PLANT
BROWNS FERRY NUCLEAR PLANT
HUNTSVILLE
WIDOWS CREEK STEAM PLANT
Decatur
GUNTERSVILLE DAM
BELLEFONTE NUCLEAR PLANT
Dalton
ROME
ALLATOONA RESERVOIR
Gainesville
BUFORD RESERVOIR
Tupelo
MISS
ENID RESERVOIR
GRENADA RESERVOIR
West Point
ALABAMA
LEWIS SMITH RESERVOIR
GADSDEN
WEISS RESERVOIR
GEORGIA
ANNISTON
BIRMINGHAM
JOHN HOLLIS BANKHEAD RESERVOIR
ATLANTA
CHATTAHOOCHEE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McMinnville
Shelbyville
Lewisburg
Fullahoma
Athens
Lawrenceburg
Pulaski
Red Bank
Cleveland
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FLORENCE
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HUNTSVILLE
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Russellville
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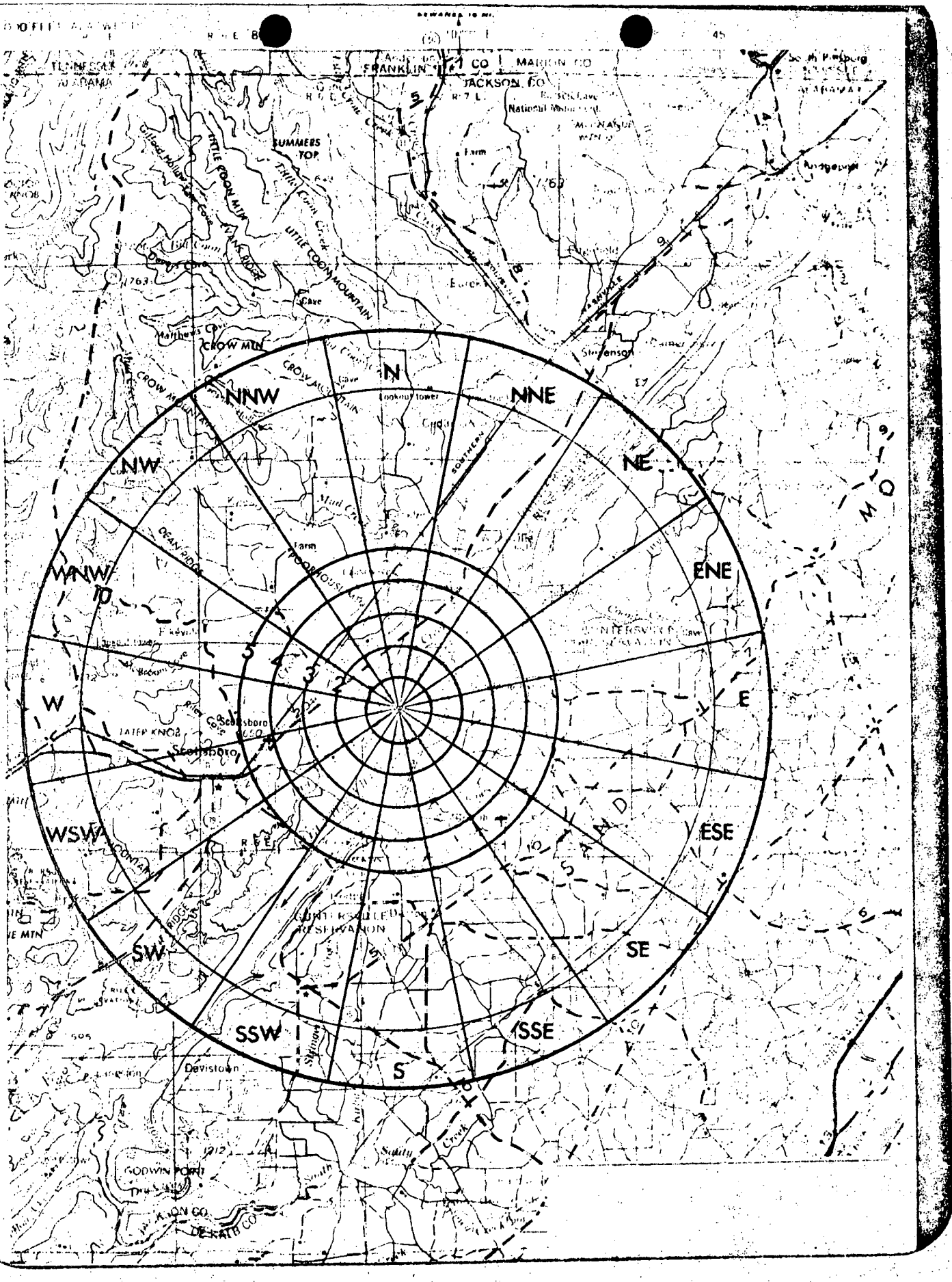
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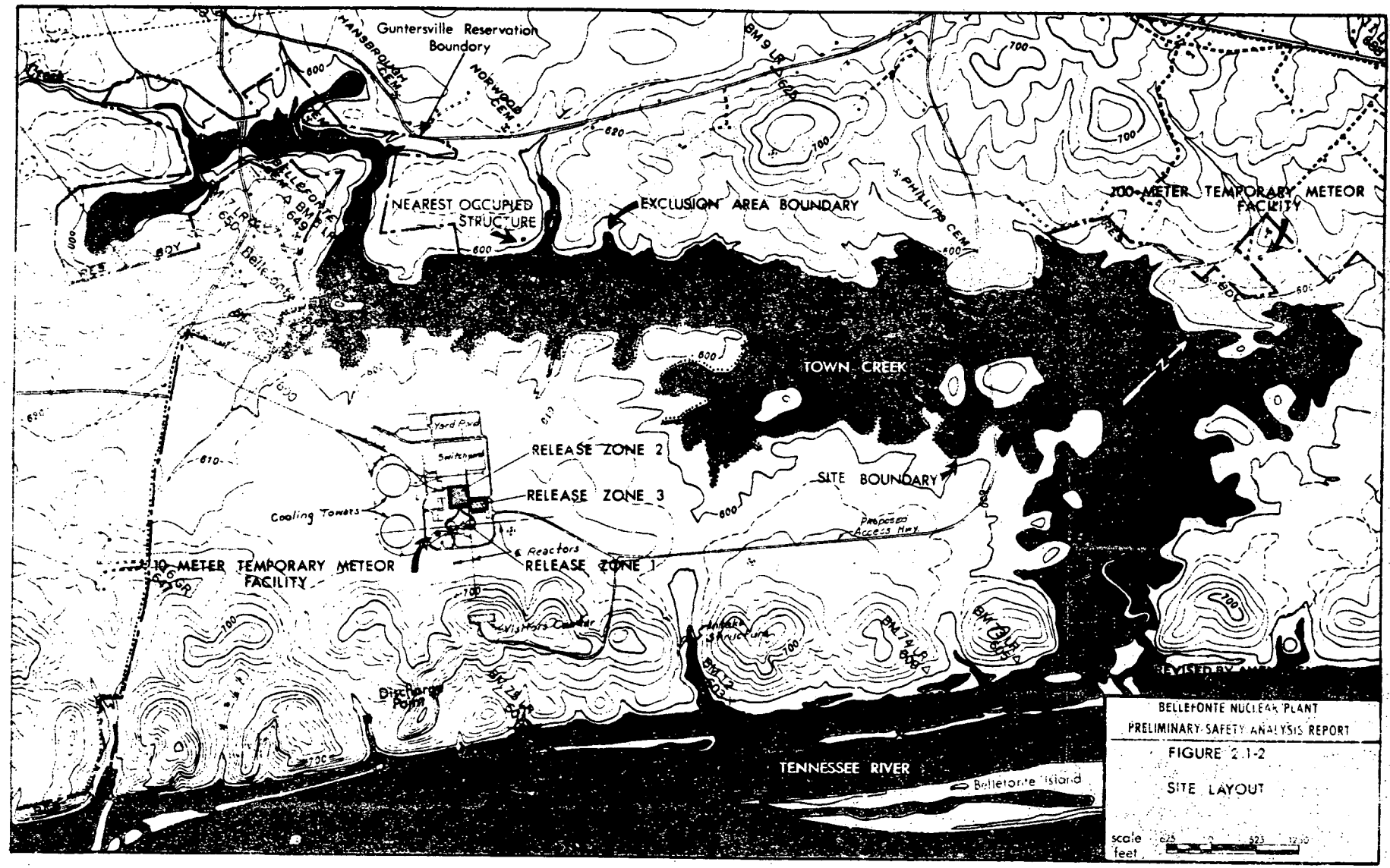
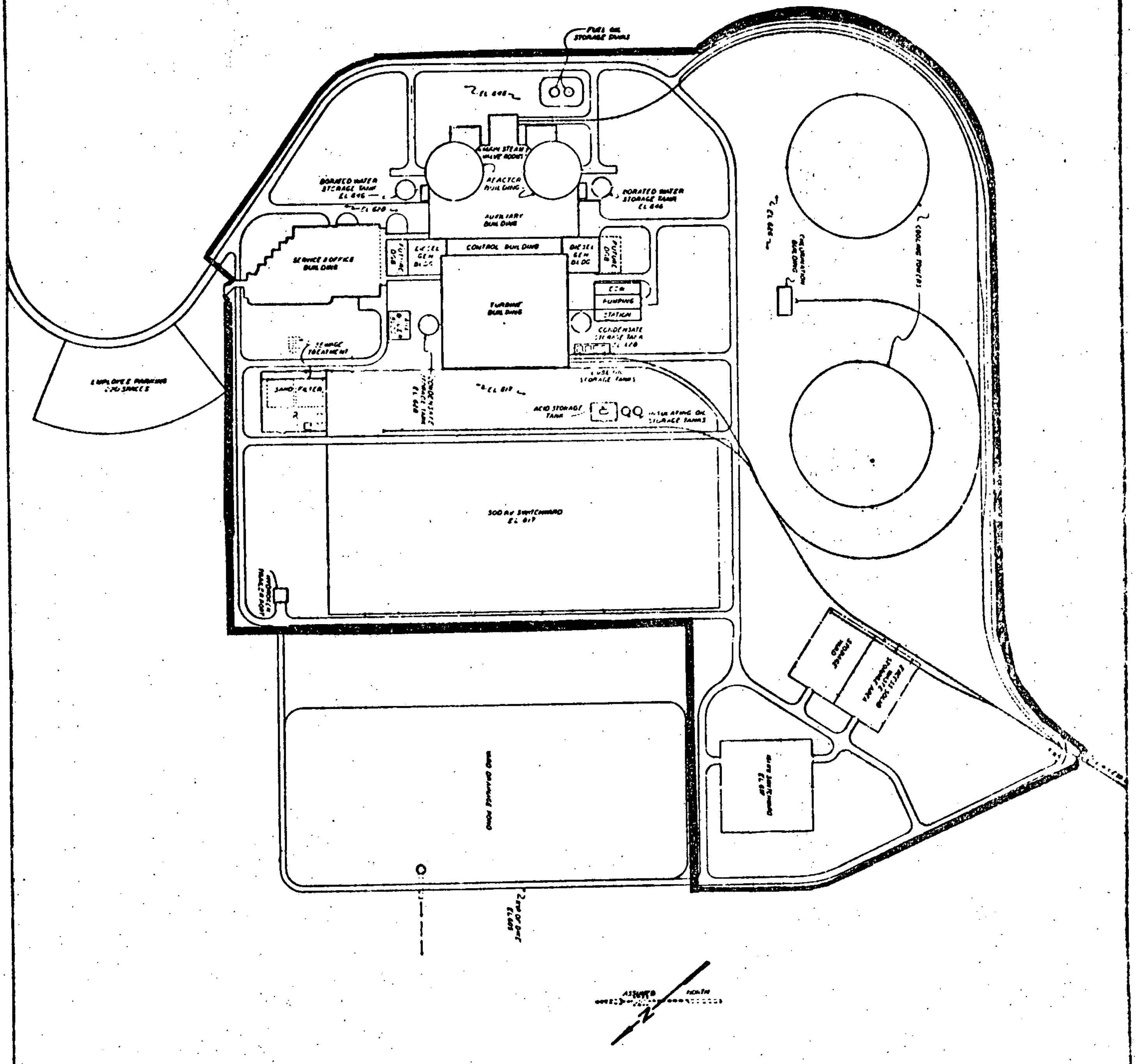
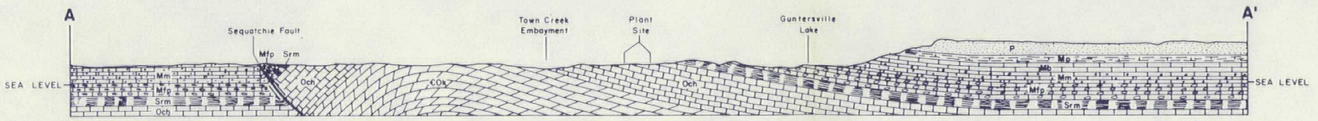
JACKSON CO
MARION CO
SUMMERS TOP
LITTLE COON MTN
CROW MTN
Scottsboro
Stevenson
Bridgeport
Jasper
Davistown
GODWIN POINT
JACKSON CO
DE KALB CO


Guntersville Reservation Boundary
NEAREST OCCUPIED STRUCTURE
EXCLUSION AREA BOUNDARY
100-METER TEMPORARY METEOR FACILITY
TOWN CREEK
RELEASE ZONE 2
RELEASE ZONE 3
SITE BOUNDARY
Cooling Towers
Reactors
RELEASE ZONE 1
10-METER TEMPORARY METEOR FACILITY
Proposed Access Hwy
Visitors Center
Discharge Pond
TENNESSEE RIVER
Bellefonte Island
BELLEFONTE NUCLEAR PLANT
PRELIMINARY SAFETY ANALYSIS REPORT
FIGURE 2.1-2
SITE LAYOUT
scale feet

	Bellefonte 1&2	Rancho Seco	Oconee 2&3
Power Level, MWt	3600	2772	2568
Feed & Bleed vs. Rodded Core	Feed & Bleed	Feed & Bleed	Rodded
Fuel Density	94.0	95.0	unit 2 92.5 unit 3 96.0
Flow Rate lb/hr	150.5×10^6	137.9×10^6	131.32×10^6
Core Ave. Temp.	600.5°F	582°F	579°F
Containment	Post Ten. 4-180° 3-way Dome Tend.-135'ID 269'H-3.4×10^6 ft^3 1/4" Plate-50 psig	Post Ten. 3-240° Cyl. Tend.-3 way Dome Tend.-130'ID 185'H-198×10^6 ft^3 1/4" Plate-59 psig	Post Ten. 6-120° Cyl. Tend.-3 way Dome Tend.-116'ID 208.5'H-1.91×10^6 ft^3 1/4" Plate-59 psig
R. B. Spray Additive	sodium hydroxide	sodium hydroxide	sodium thiosulphate
Feed Water Pump	2-70% tur. driven w/F. W. Valves	2-60% tur. driven W/ F. W. Valves	2-half cap. tur. driven W/ F. W. Valves
Aux. F. W. System	1 tur. driven full cap., 2-half cap - motor driven pumps independent from other unit	1 tur. & motor driven 1 motor driven - independent W/X-tie	1 tur. driven system shared w/normal F. W. system. -X-tie with other units
Ultimate Heat Sink	Tenenssee River	Spray Ponds 165×10^6 BTU/HR cap. 2.73×10^6 gal.	Lake-shared system for 3 units
Radwaste	Evaporators w/dump to blowdown discharge solidification .	dry site-evaporators, solidification & trucking capability	evaporators w/dump hydro discharge
Emergency Power Source	2 - 6 to 7 MW diesels	2 - 2750 KW diesels	2 on-site hydro units 87.5 MW
Switchyard	4 - 500 KV 2 - 161 KV	5 offsite lines 2 su trans.	8 offsite lines, 5 su trans. shared by 3 units
Main Turbine	Tandem Compound 1 HP-2 LP-4 flow 7 stage F. W. Htg.	Tandem Compound 1 HP-2 LP-4 flow 6 Stage F. W. Htg.	Tandem Compound 1 HP-3 LP-6 flow 6 Stage F. W. Htg.
Main Condenser Cooling	Hyperbolic Natural Draft	Hyperbolic Natural Draft	Lake


FUEL OIL STORAGE TANKS
EL 646
REACTOR BUILDING
AUXILIARY BUILDING
BORATED WATER STORAGE TANK EL 646
EL 620
SERVICE & OFFICE BUILDING
CONTROL BUILDING
TURBINE BUILDING
PUMPING
STATION
CONDENSATE STORAGE TANK
SEWAGE TREATMENT
SAND FILTER
STORAGE TANKS
ACID STORAGE TANK
INSULATING OIL STORAGE TANKS
500 kV SWITCHYARD
COOLING TOWERS
NORTH



DIAGRAMATIC SECTION A-A'

LEGEND:

Qal — Alluvium	Mm — Monteagle Limestone	*Silurian* Srm — Red Mountain Formation Shale and siltstone with thin Chattanooga Shale at top.	*Cambro - Ordovician* COk — Knox Dolomite and Limestone		
Pennsylvanian P — Sandstone and Shale	Mb — Bangor Limestone	*Ordovician* Och — Chickamauga Formation	— Major thrust fault		
Mississippian Mp — Pennington Shale and Limestone	Mfp — Fort Payne Cherty Limestone		— Approximate formation contact.		

DATA SOURCES:

1. Approximate northwest half, from Knox/Chickamauga contact: Based on 1:24,000 manuscript map by Dr. R. L. Wilson for Alabama Geological Survey, 1973.
2. In immediate vicinity of plant: by TVA staff - See Figure 2.5-3.
3. Area southeast of river and strike belts northeast and southwest of plant site based on:
   (a) Silurian Red Iron Ores in Georgia and Northeastern Alabama, J. W. Whitlow, USGS, 1959.
   (b) Geologic Atlas of the United States, Stevenson Folio, USGS, 1895.
   (c) Geologic Map of Alabama, Alabama Geological Survey, 1926.
   (d) Topographic expression

Scale 1:24,000

10 0.5 0.0 10 Miles

Contour Interval - 20 Feet

REVISED GEOLOGY					
2 1-14-74 RWA					
REV NO.	DATE	MADE	CHKD	SUPV	INSP
DRWN		COMPUTED			
TRCD		ENGINEER			
CHKD					

GEOLOGIC INVESTIGATIONS

GEOLOGIC AND TECTONIC MAP OF PLANT AREA

BELLEFONTE NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF WATER CONTROL PLANNING

SUBMITTED	RECOMMENDED	APPROVED
Hunter C. Darnell	R. W. Allen	John M. Ralkey

KNOXVILLE	7-1-71	88	GE	1	822N1836 R2

LEGEND

- Mfp = Fort Payne Limestone
- MDc = Chattanooga Shale
- Srm = Red Mountain Formation
- Och = Chickamauga Group
- €Ok = Knox Group
- ——— = Contact established
- – – – = Assumed contact
- ⊤ = Dip-Strike Symbol
- ⊤ = Joint Symbol
- ● = Permanent ground water station
- = Isolated exposures

SCALE:

400 0 400 800 feet

NOTES:
1. CONTOUR INTERVAL = 2 FEET; DASHED LINES = 1 FOOT.
2. TOP OF ROCK CONTOURS ARE NOT SHOWN.
3. PATTERNS DESIGNATE AREAS OF NUMEROUS ROCK EXPOSURES.
4. FIELD GEOLOGY IN IMMEDIATE VICINITY OF PLANT BY TVA STAFF.

REV NO	DATE	MADE	CHKD	SUPV	INSP
4	6-6-74	WMS	WMS	RWA	
REV. GEOL. NORTH OF INTAKE & NOTE					
3	4-4-74	PCIII	RWA	RWA	
ADD NOTES & DIP-STRIKE READING					
2	10-19-73	RWA			
REVISED GEOLOGY					
1	11-22-72	PCIII			
ADD GROUND WATER STATIONS					

DRWN ..... COMPUTED
TRCD ..... ENGINEER
CHKD .....

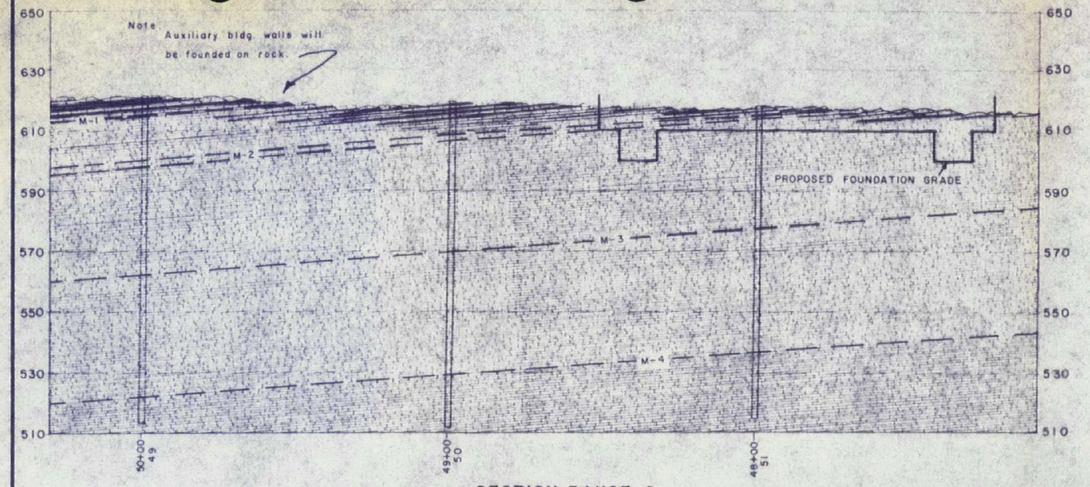
FOUNDATION INVESTIGATIONS

GEOLOGIC MAP OF PLANT SITE

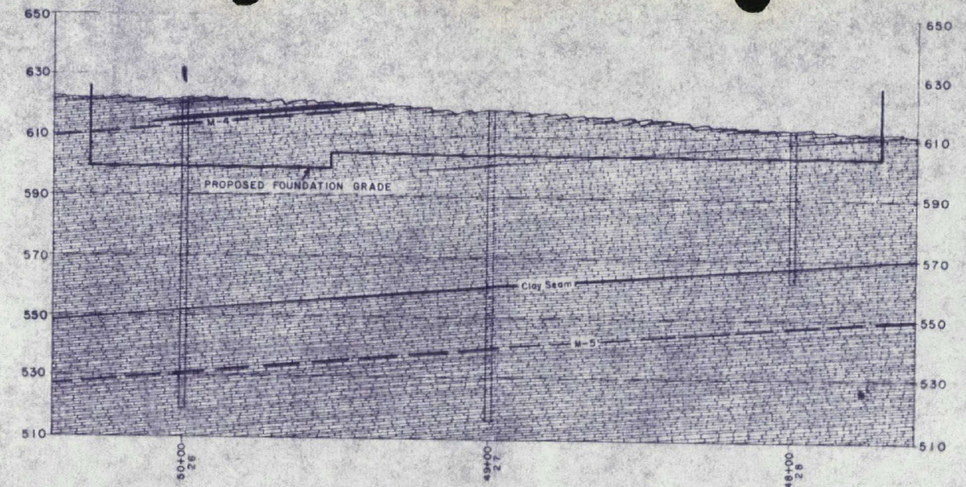
BELLEFONTE NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF WATER CONTROL PLANNING

SUBMITTED	RECOMMENDED	APPROVED
Forrest L. Orr	R.W. Allen	John M. Kelley

KNOXVILLE	4-7-72	W	GE	I	822K1929R4



SECTION RANGE Q



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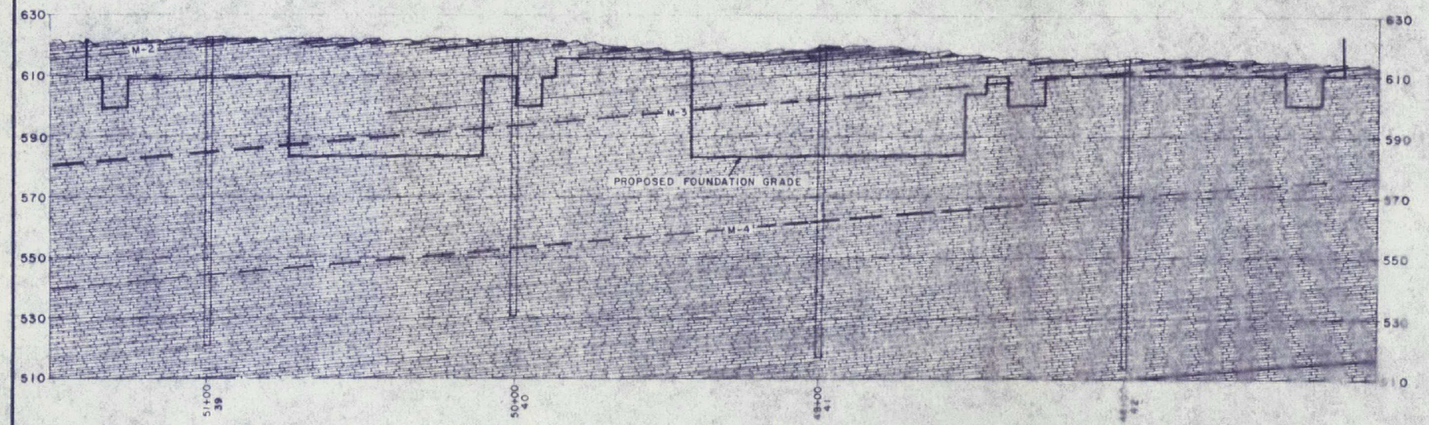

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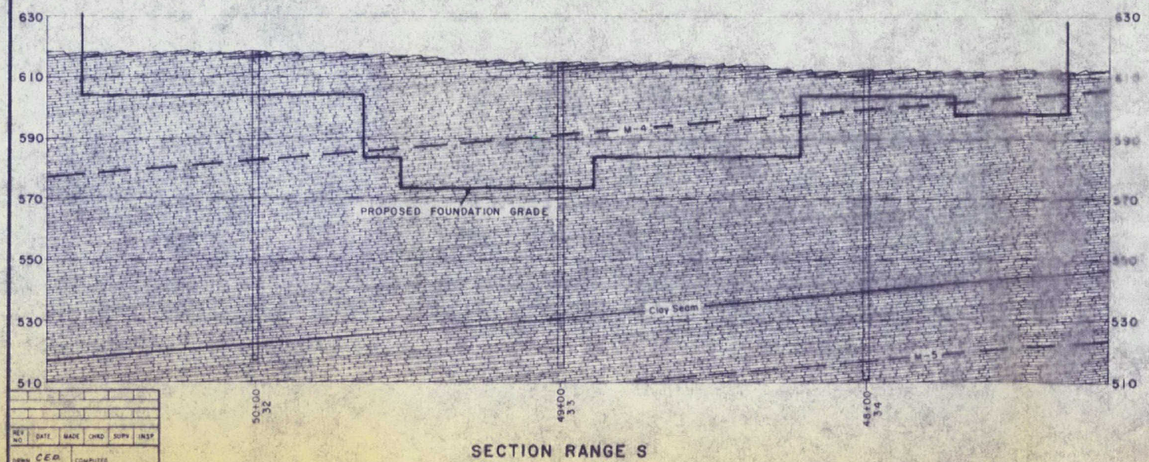
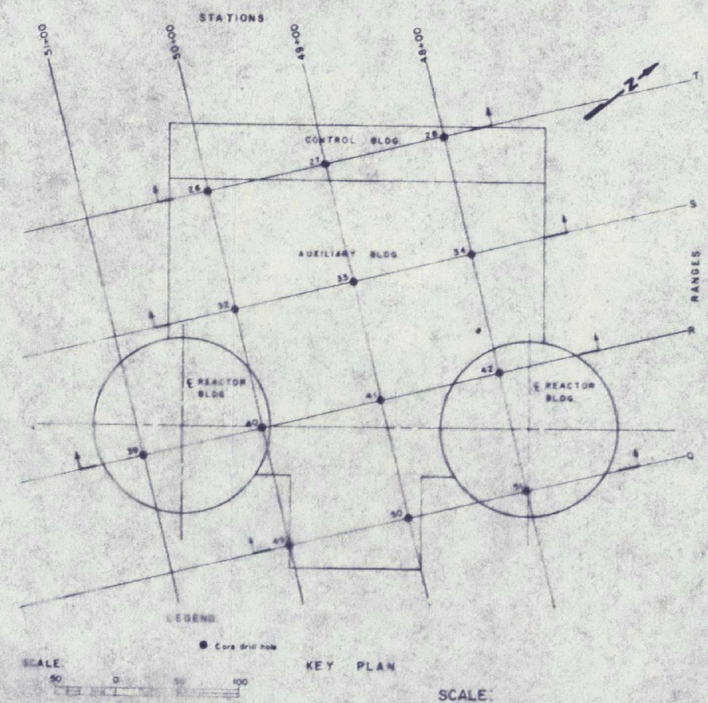


SECTION RANGE S



SCALE: 20 0 20 40 Feet

LEGEND

UNIT 2 LIMESTONE

KEY HORIZONS: M-1 THROUGH M-5

NOTE

FOR DETAILS IN BOREHOLES, SEE GRAPHIC LOGS.

REV NO.	DATE	BASE	CHKD	SUPV	INSP
DRWN CEB	COMPUTED				
TRCD	ENGINEER				
CHKD					

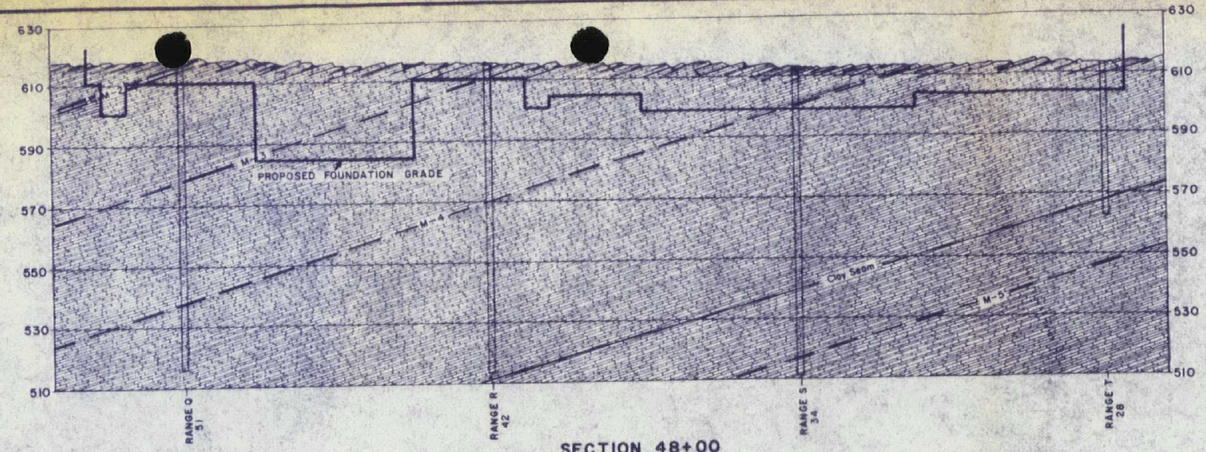
FOUNDATION INVESTIGATIONS

GEOLOGIC SECTIONS REACTOR & AUXILIARY BLDG AREA

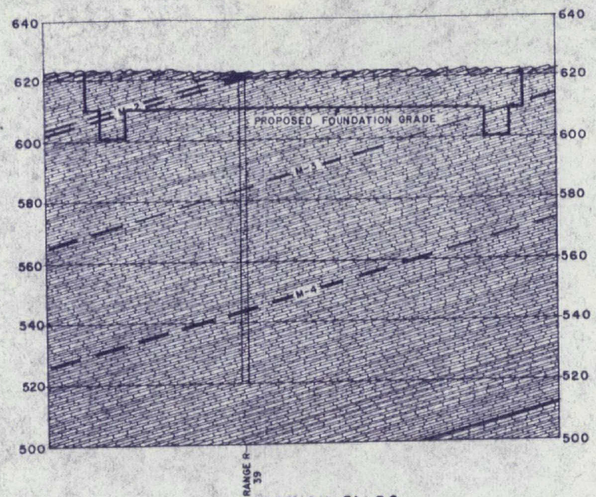
BELLEFONTE NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF WATER CONTROL PLANNING

SUBMITTED	RECOMMENDED	APPROVED
C.C.D.		

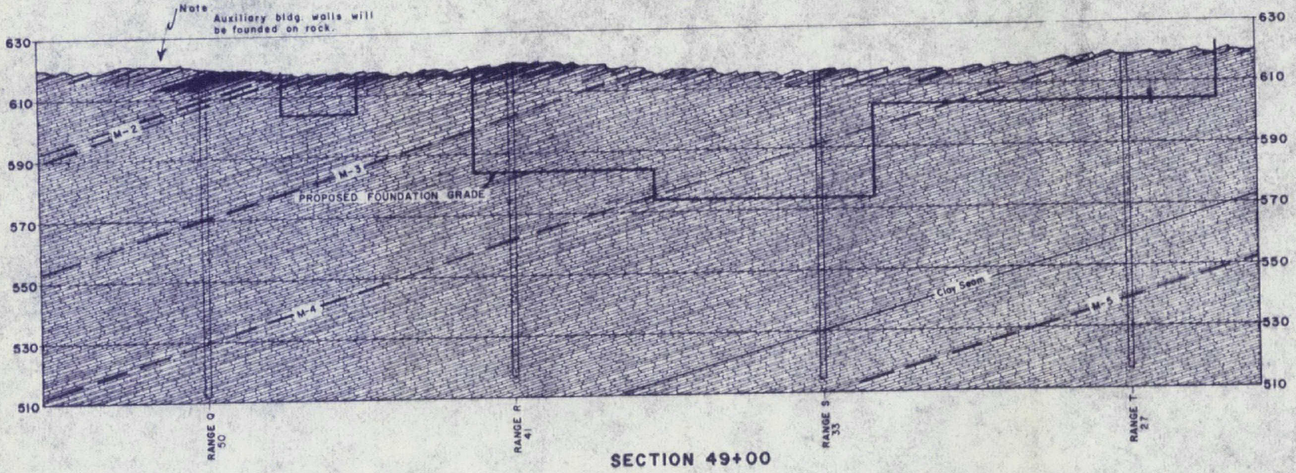
KNOXVILLE	7-16-71	W	GE	822N1846-1



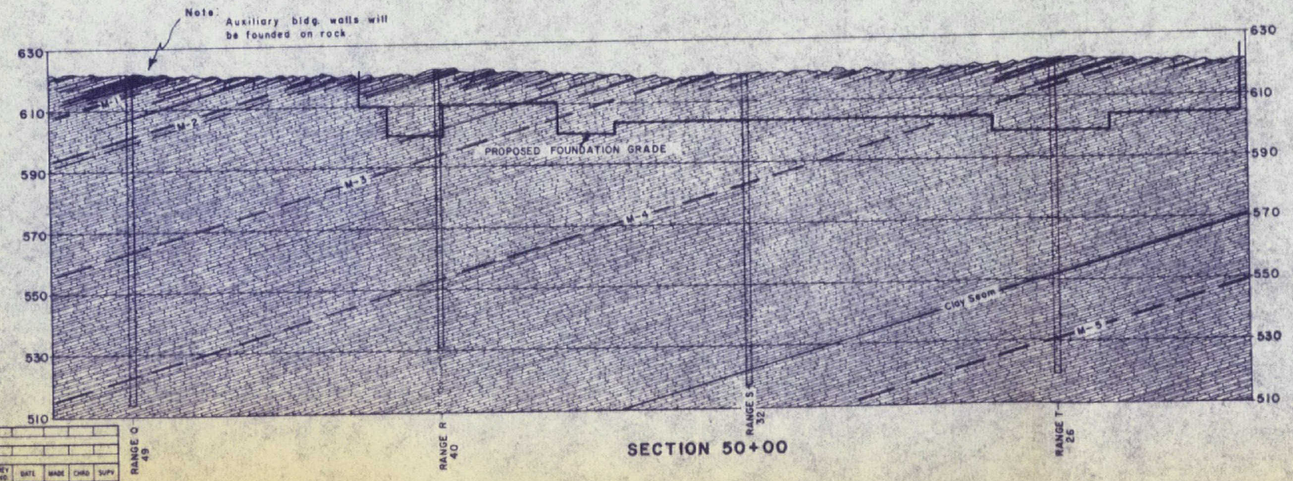
SECTION 48+00



SECTION 51+00



SECTION 49+00



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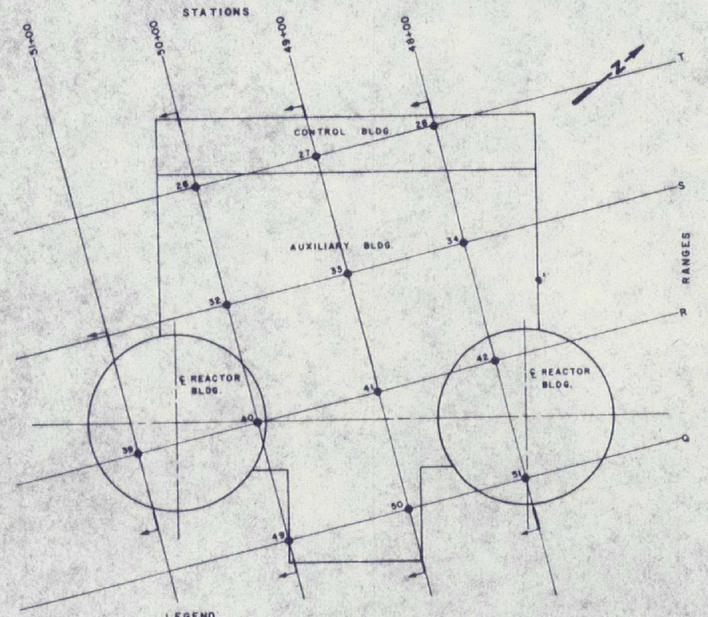

LEGEND:

UNIT 2
LIMESTONE

KEY HORIZONS:
M-1 THROUGH M-6

NOTE:
FOR DETAILS ON BOREHOLES, SEE GRAPHIC LOGS.

FOUNDATION INVESTIGATIONS

GEOLOGIC SECTIONS REACTOR & AUXILIARY BLDG AREA

BELLEFONTE NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF WATER CONTROL PLANNING

SUBMITTED	RECOMMENDED	APPROVED
C.E.D.	K.W. Wilson	S.M. Cauley

KNOXVILLE	7-16-71	W	GE	1	822N1846-2

REV. NO.	DATE	MADE	CHKD	SUPV.
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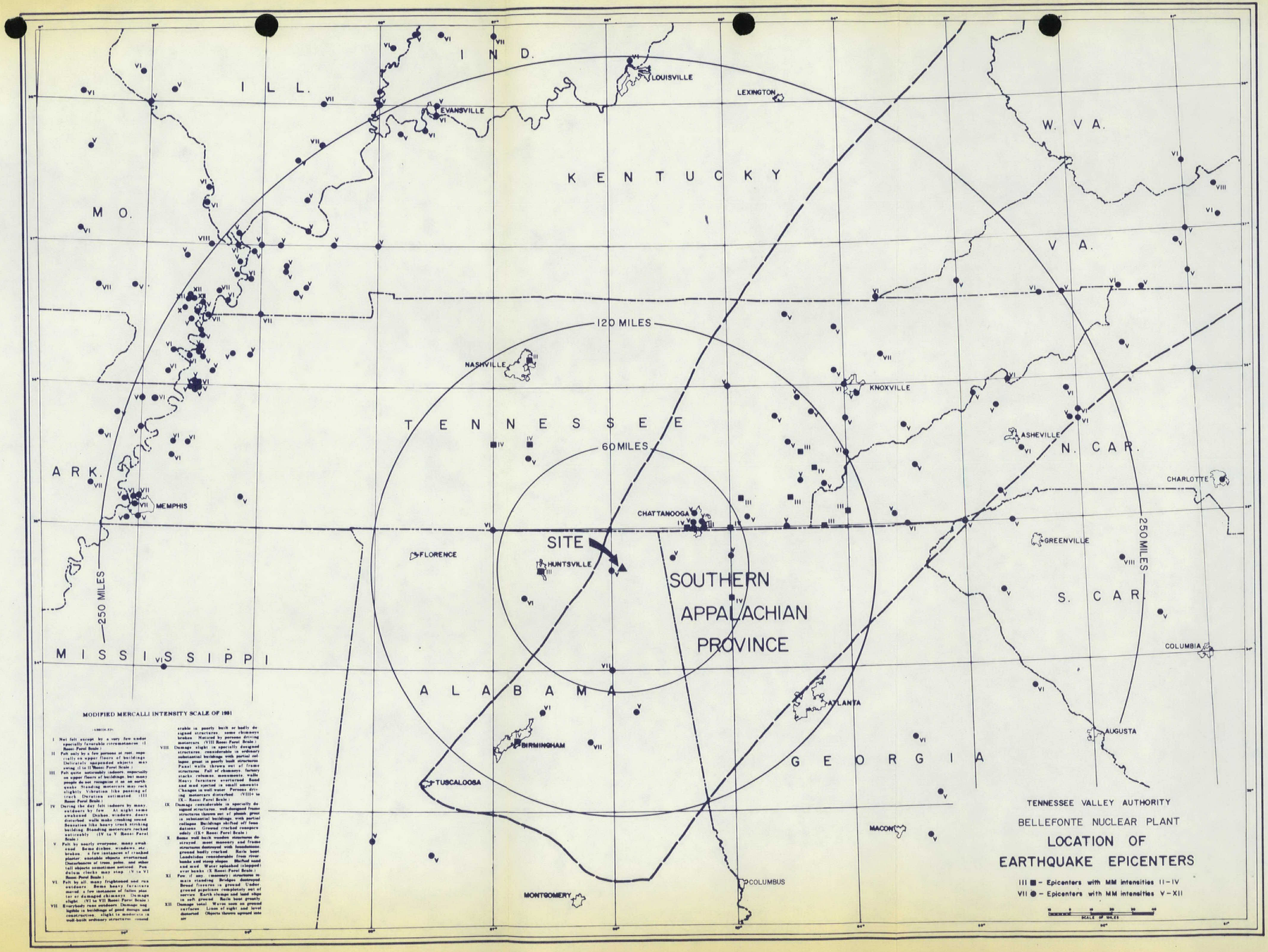
TRCD				ENGINEER
CHKD				



MODIFIED MERCALLI INTENSITY SCALE OF 1931

I Not felt except by a very few under specially favorable circumstances (I Rossi-Forel Scale)

II Felt only by a few persons at rest, especially on upper floors of buildings. Delicately suspended objects may swing (I to II Rossi-Forel Scale)

III Felt quite noticeably indoors, especially on upper floors of buildings, but many people do not recognize it as an earthquake. Standing motorcars may rock slightly. Vibration like passing of truck. Duration estimated. (III Rossi-Forel Scale)

IV During the day felt indoors by many, outdoors by few. At night some awakened. Dishes, windows, doors disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motorcars rocked noticeably. (IV to V Rossi-Forel Scale)

V Felt by nearly everyone, many awakened. Some dishes, windows, etc. broken; a few instances of cracked plaster; unstable objects overturned. Disturbances of trees, poles, and other tall objects sometimes noticed. Pendulum clocks may stop. (V to VI Rossi-Forel Scale)

VI Felt by all, many frightened and run outdoors. Some heavy furniture moved; a few instances of fallen plaster or damaged chimneys. Damage slight. (VI to VII Rossi-Forel Scale)

VII Everybody runs outdoors. Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable in poorly built or badly designed structures; some chimneys broken. Noticed by persons driving motorcars. (VII Rossi-Forel Scale)

VIII Damage slight in specially designed structures; considerable in ordinary substantial buildings with partial collapse; great in poorly built structures. Panel walls thrown out of frame structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned. Sand and mud ejected in small amounts. Changes in well water. Persons driving motorcars disturbed. (VIII+ to IX- Rossi-Forel Scale)

IX Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb; great in substantial buildings, with partial collapse. Buildings shifted off foundations. Ground cracked conspicuously. (IX+ Rossi-Forel Scale)

X Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations; ground badly cracked. Rails bent. Landslides considerable from river banks and steep slopes. Shifted sand and mud. Water splashed (slopped) over banks. (X Rossi-Forel Scale)

XI Few, if any, (masonry) structures remain standing. Bridges destroyed. Broad fissures in ground. Underground pipelines completely out of service. Earth slumps and land slips in soft ground. Rails bent greatly.

XII Damage total. Waves seen on ground surfaces. Lines of sight and level disturbed. Objects thrown upward into the air.

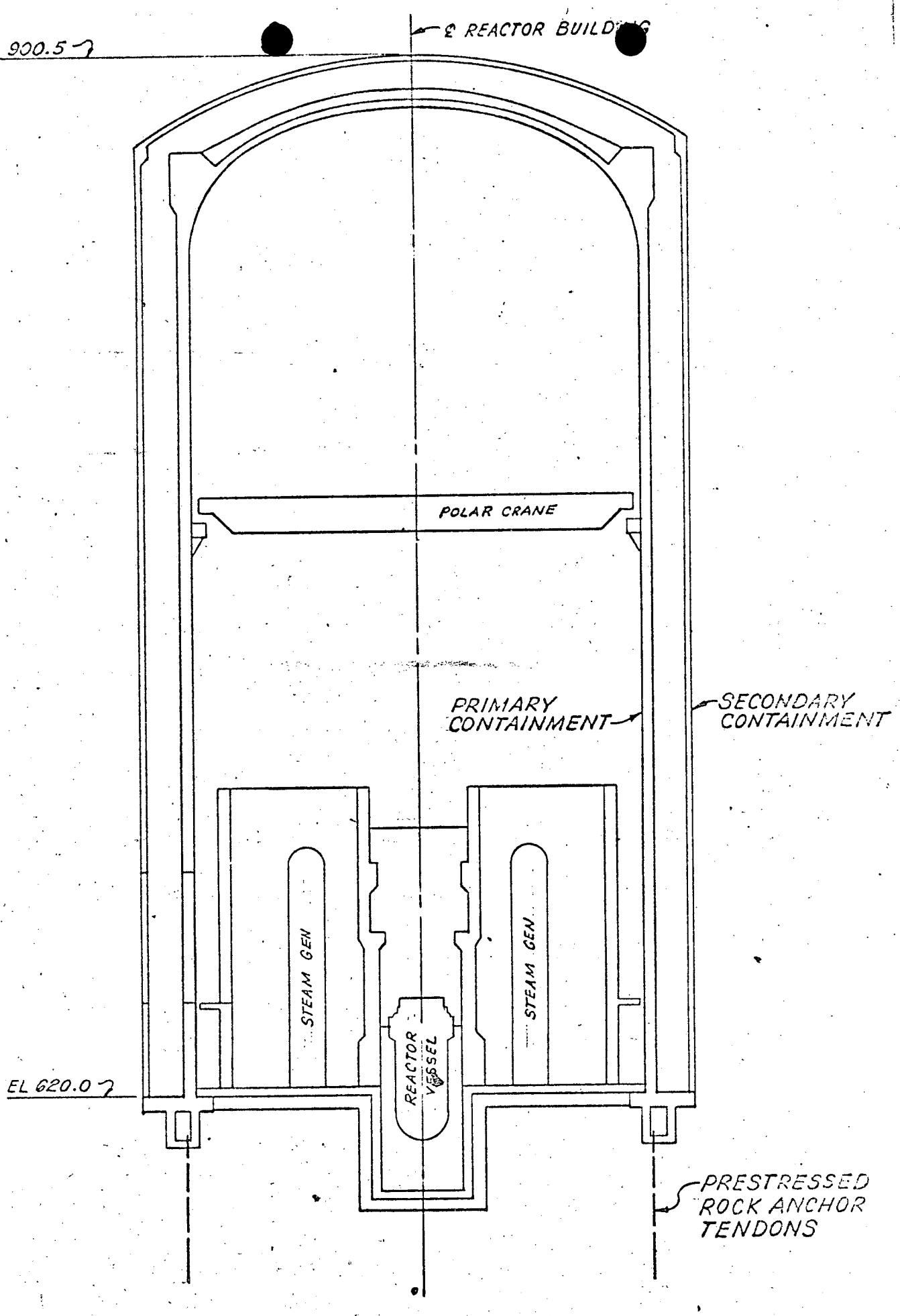
TENNESSEE VALLEY AUTHORITY

BELLEFONTE NUCLEAR PLANT

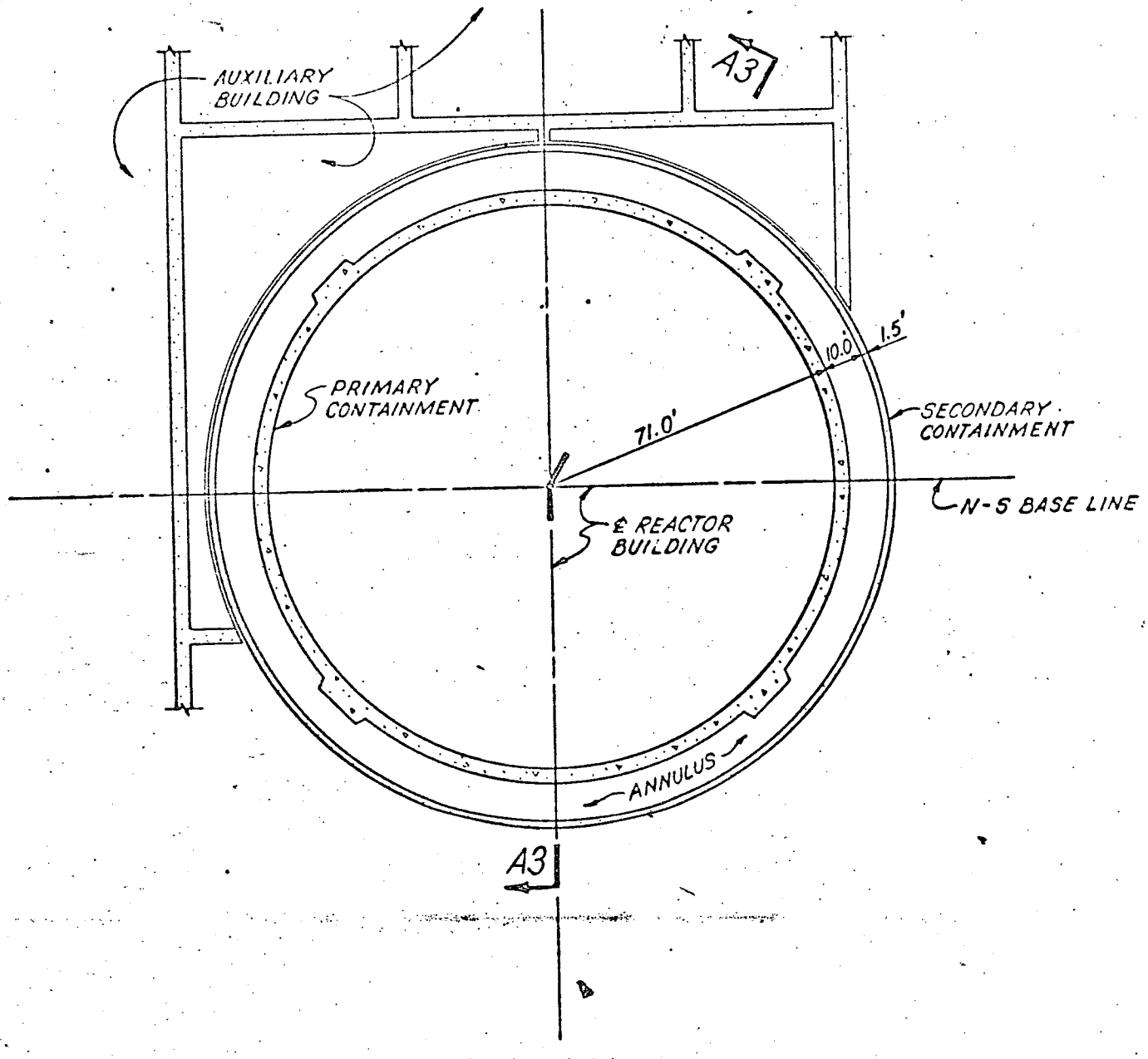
LOCATION OF EARTHQUAKE EPICENTERS

III ■ – Epicenters with MM intensities II–IV

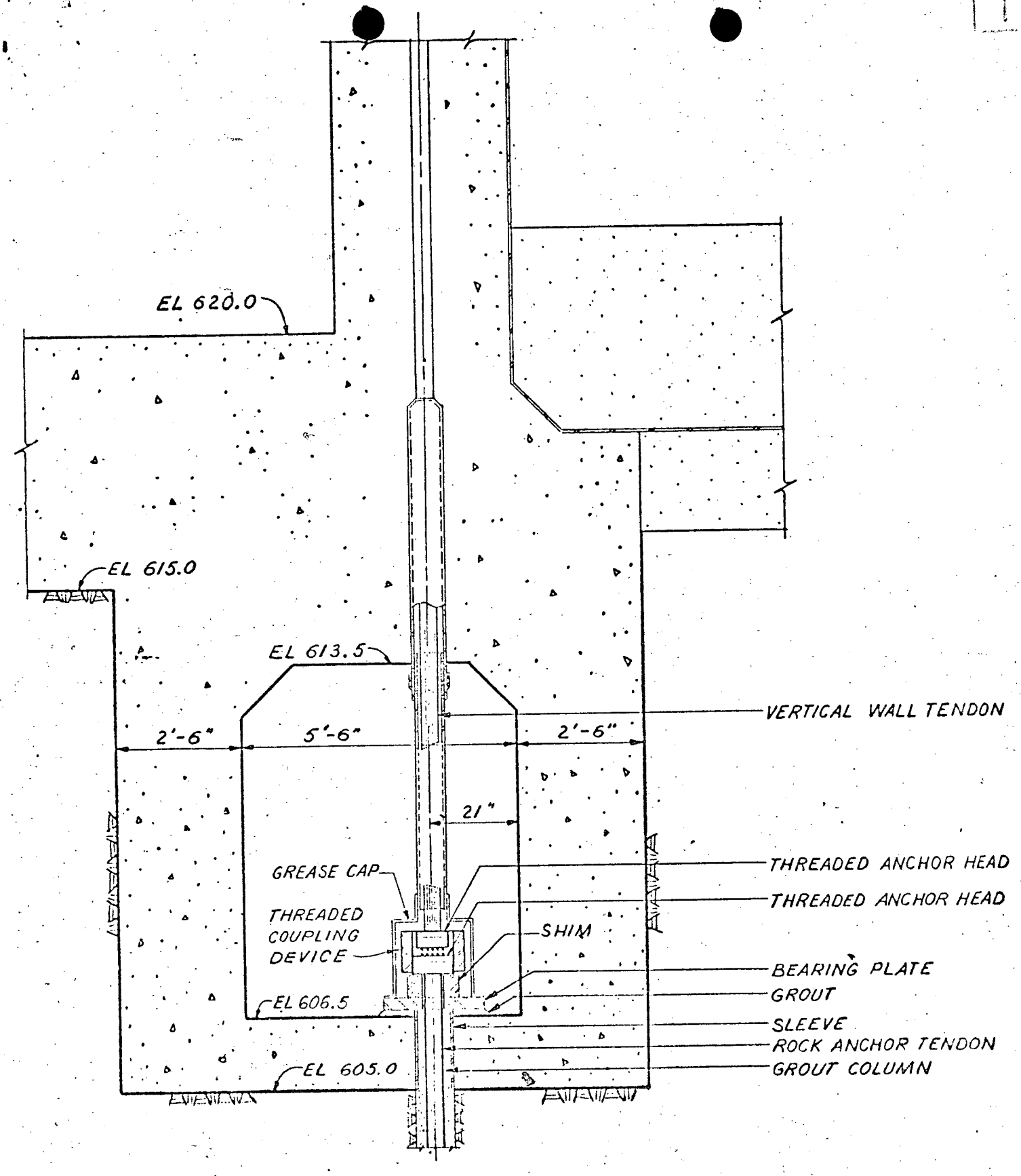
VII ● – Epicenters with MM intensities V–XII



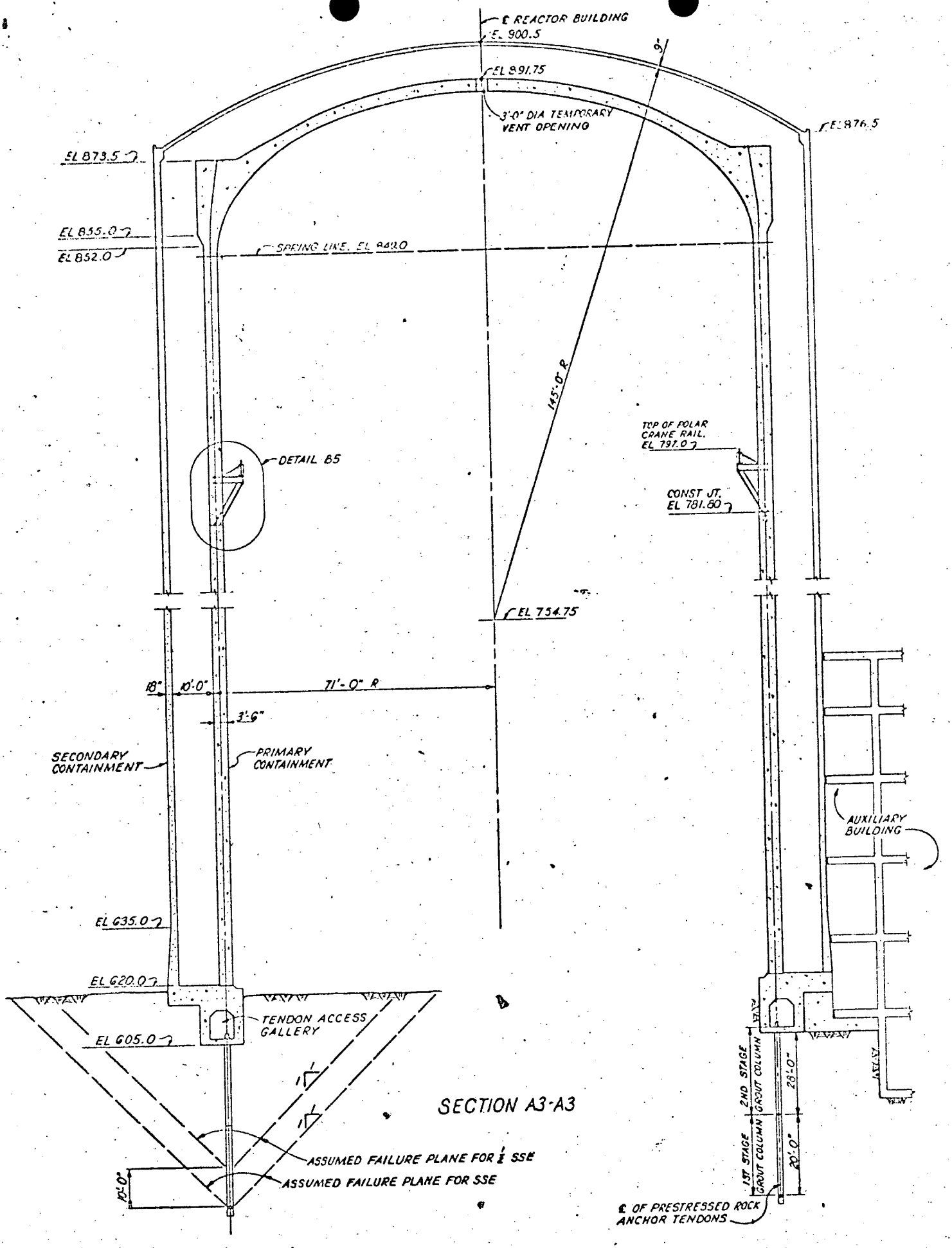
TYPICAL SECTION - REACTOR BUILDING
BELLEFONTE NUCLEAR PLANT


AUXILIARY BUILDING
A3
PRIMARY CONTAINMENT
10.0'
1.5'
71.0'
SECONDARY CONTAINMENT
℄ REACTOR BUILDING
N-S BASE LINE
ANNULUS
A3

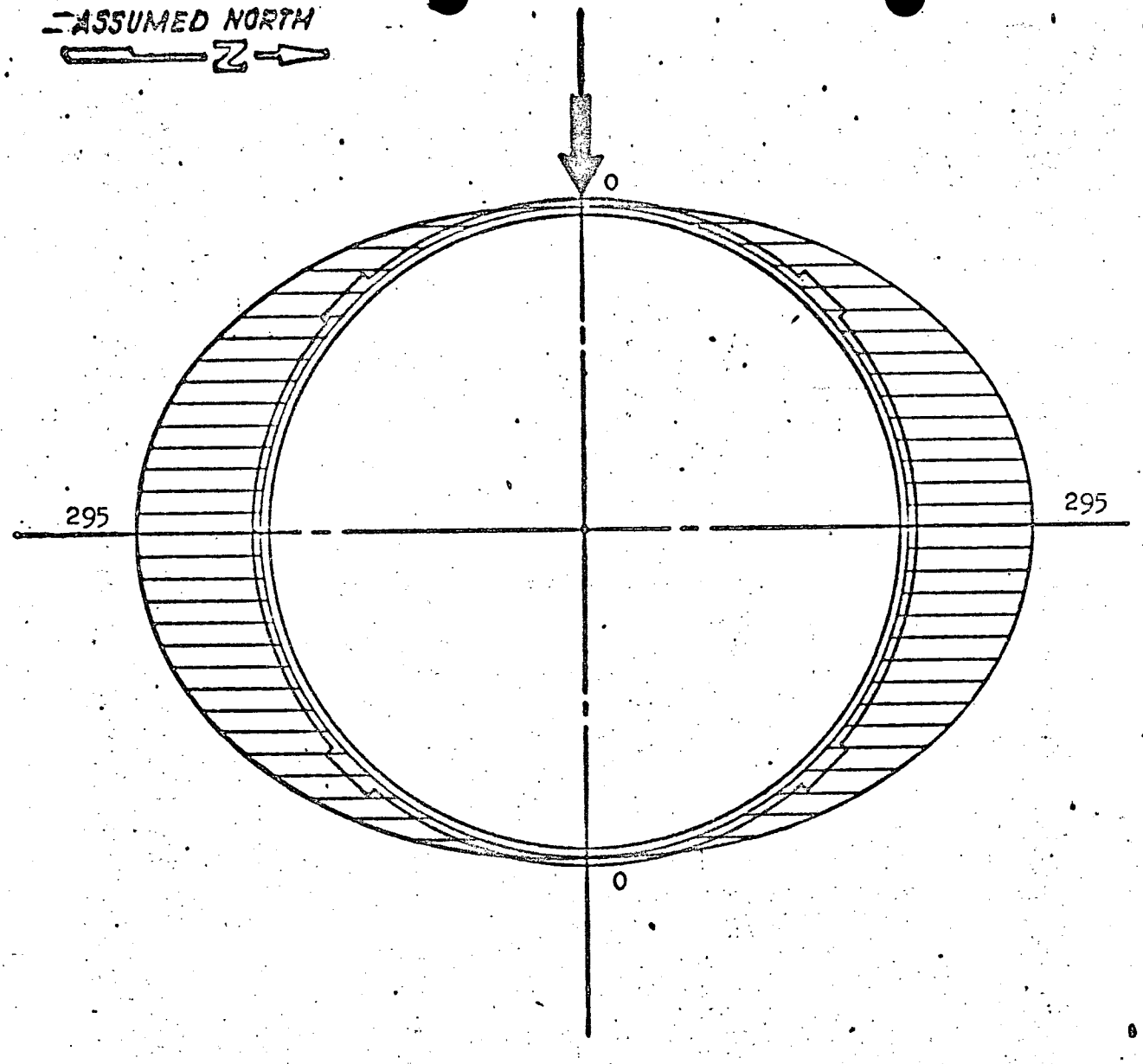
PLAN



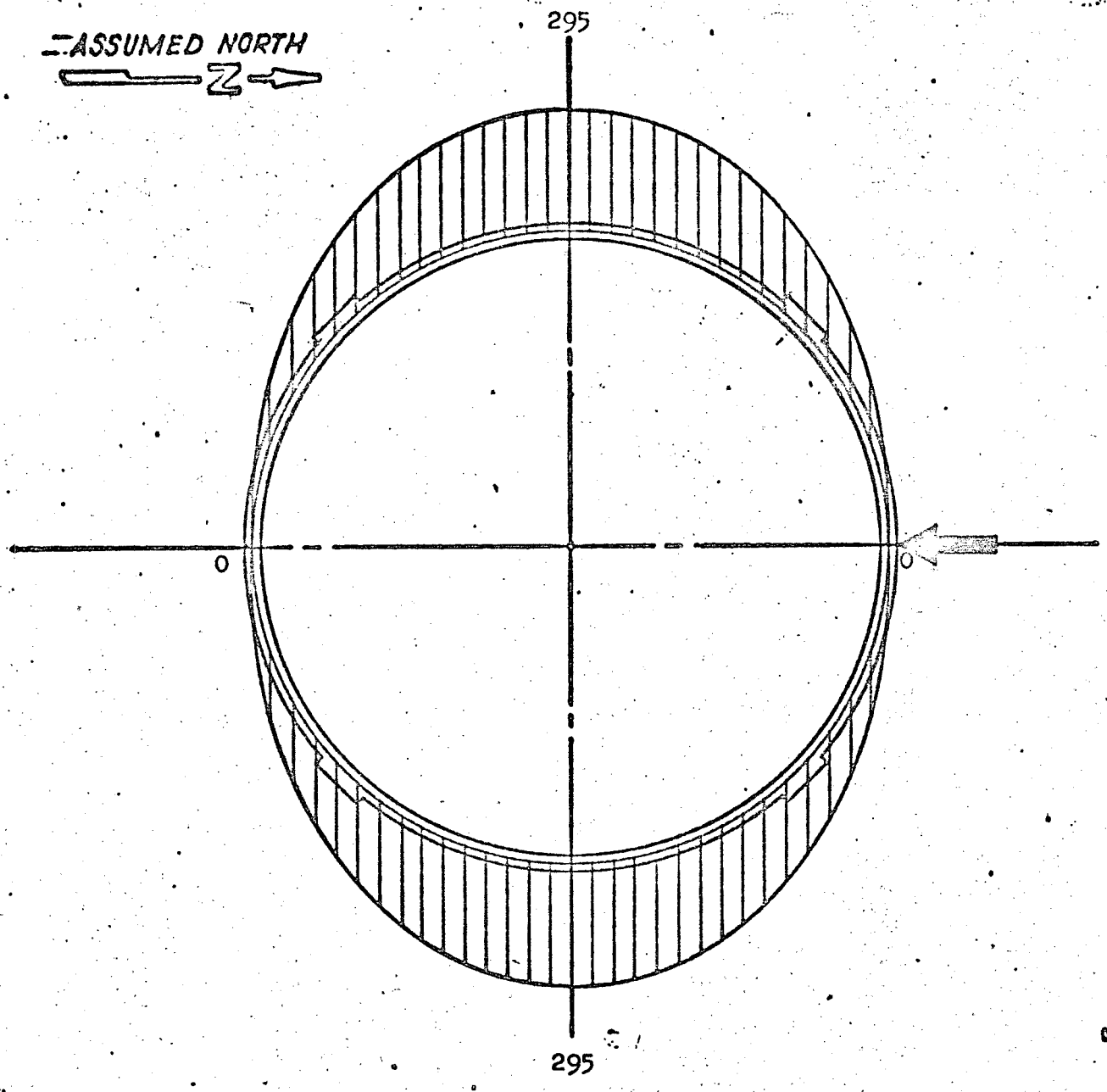
TENDON COUPLING DEVICE



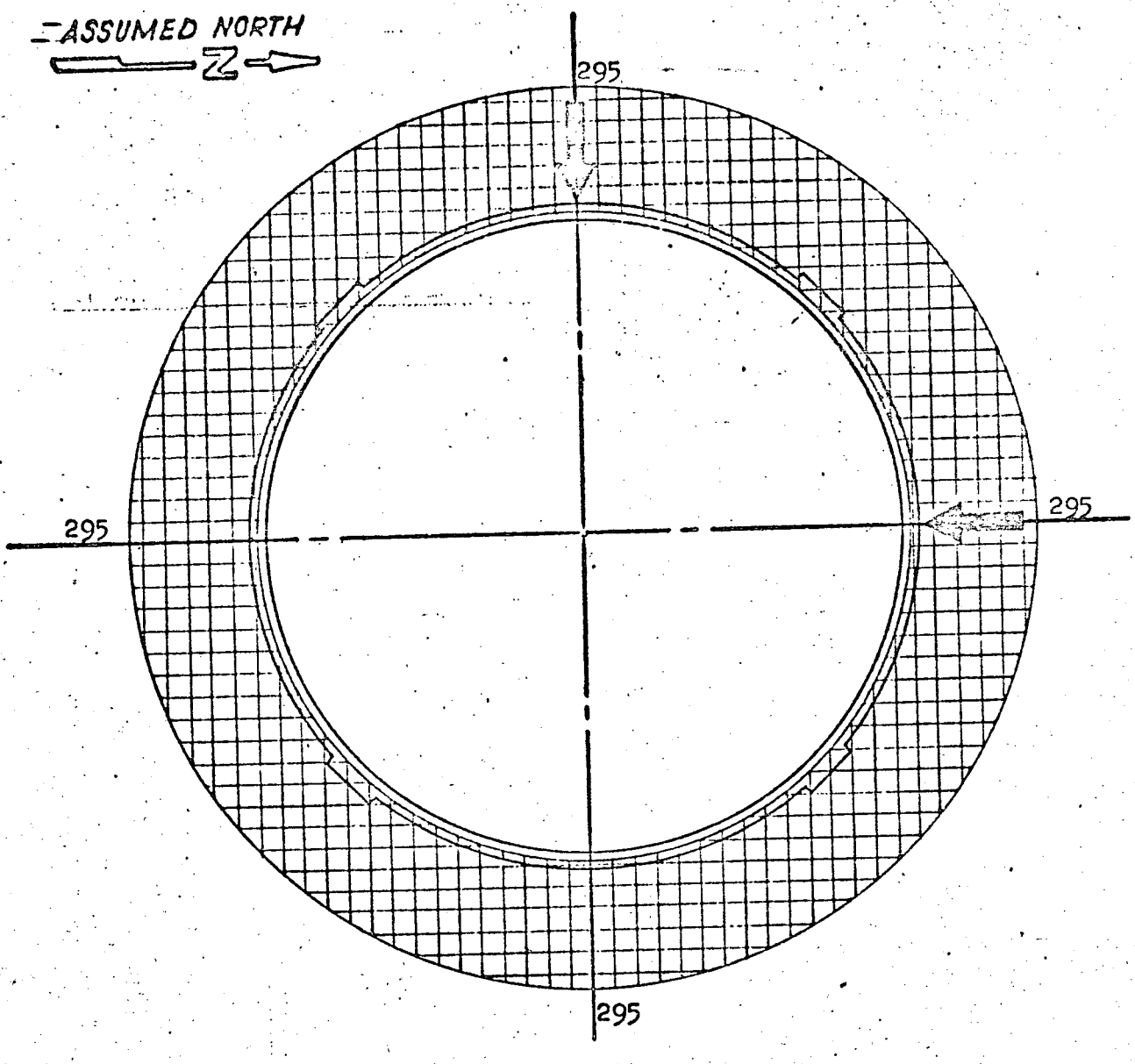
SECTION A3-A3



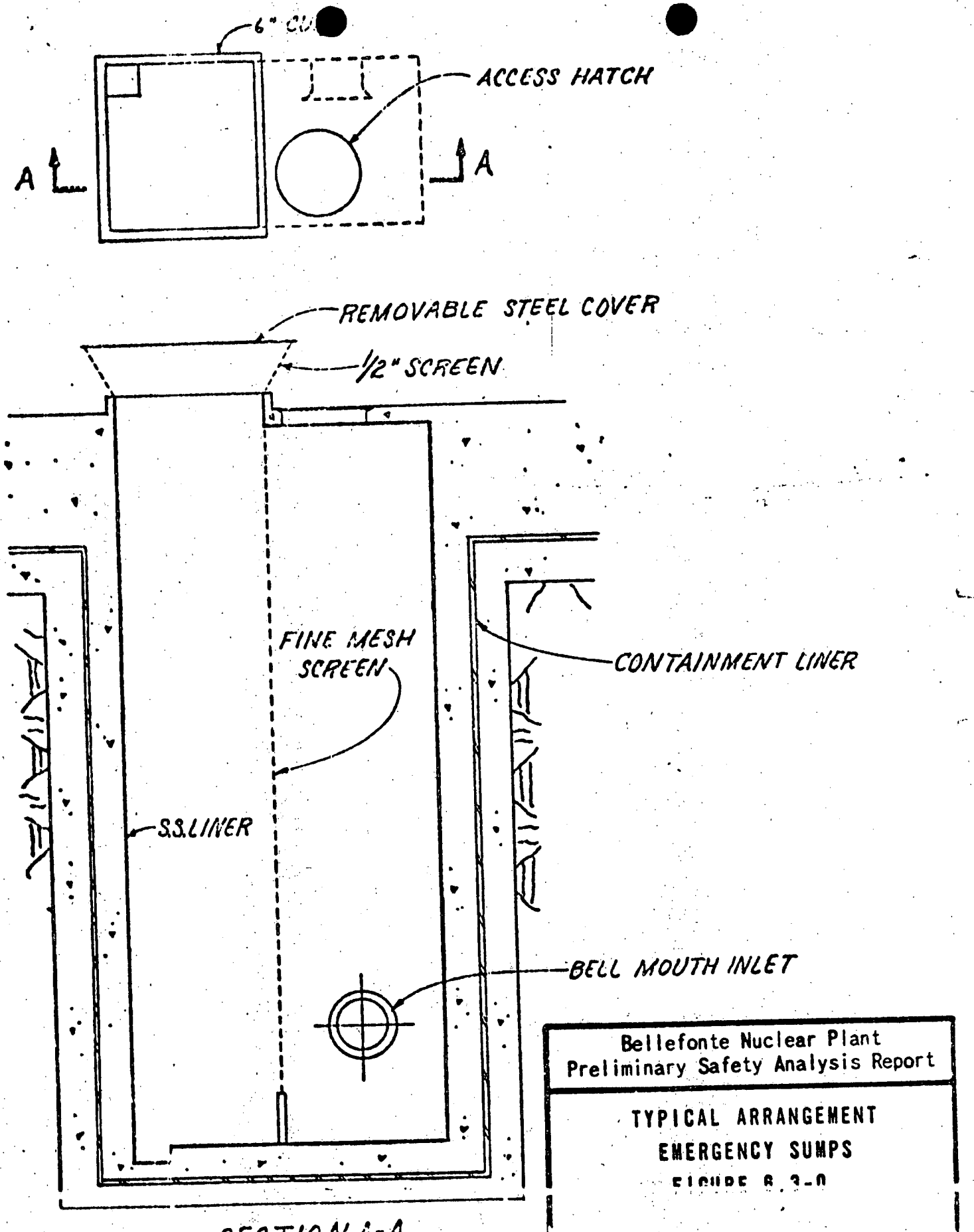
TANGENTIAL SHEAR DISTRIBUTION
FOR EAST-WEST EARTHQUAKE
(psi)



TANGENTIAL SHEAR DISTRIBUTION
FOR NORTH-SOUTH EARTHQUAKE
(psi)



NET TANGENTIAL SHEAR
DISTRIBUTION FOR THREE
COMPONENT EARTHQUAKE
(psi)

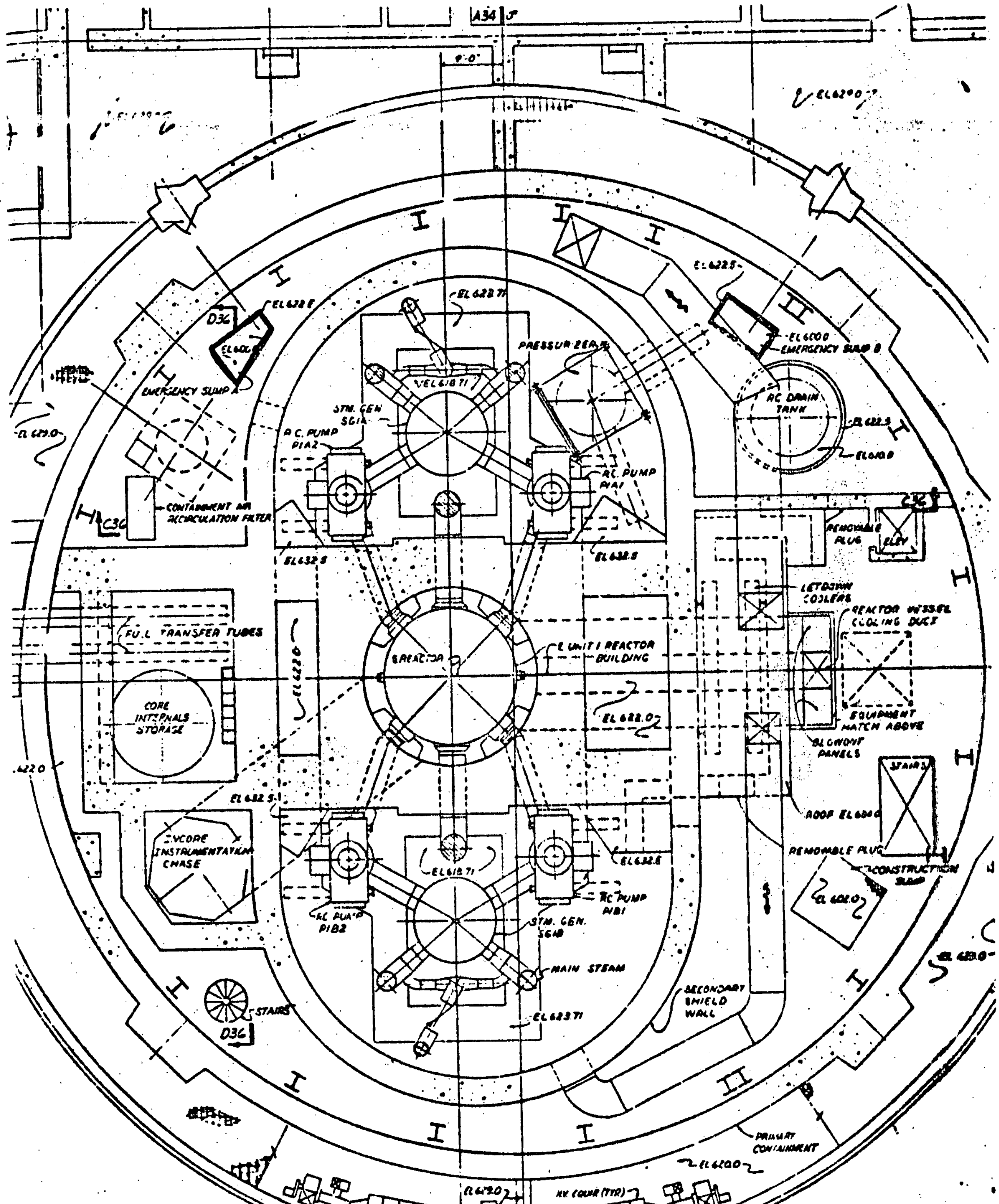


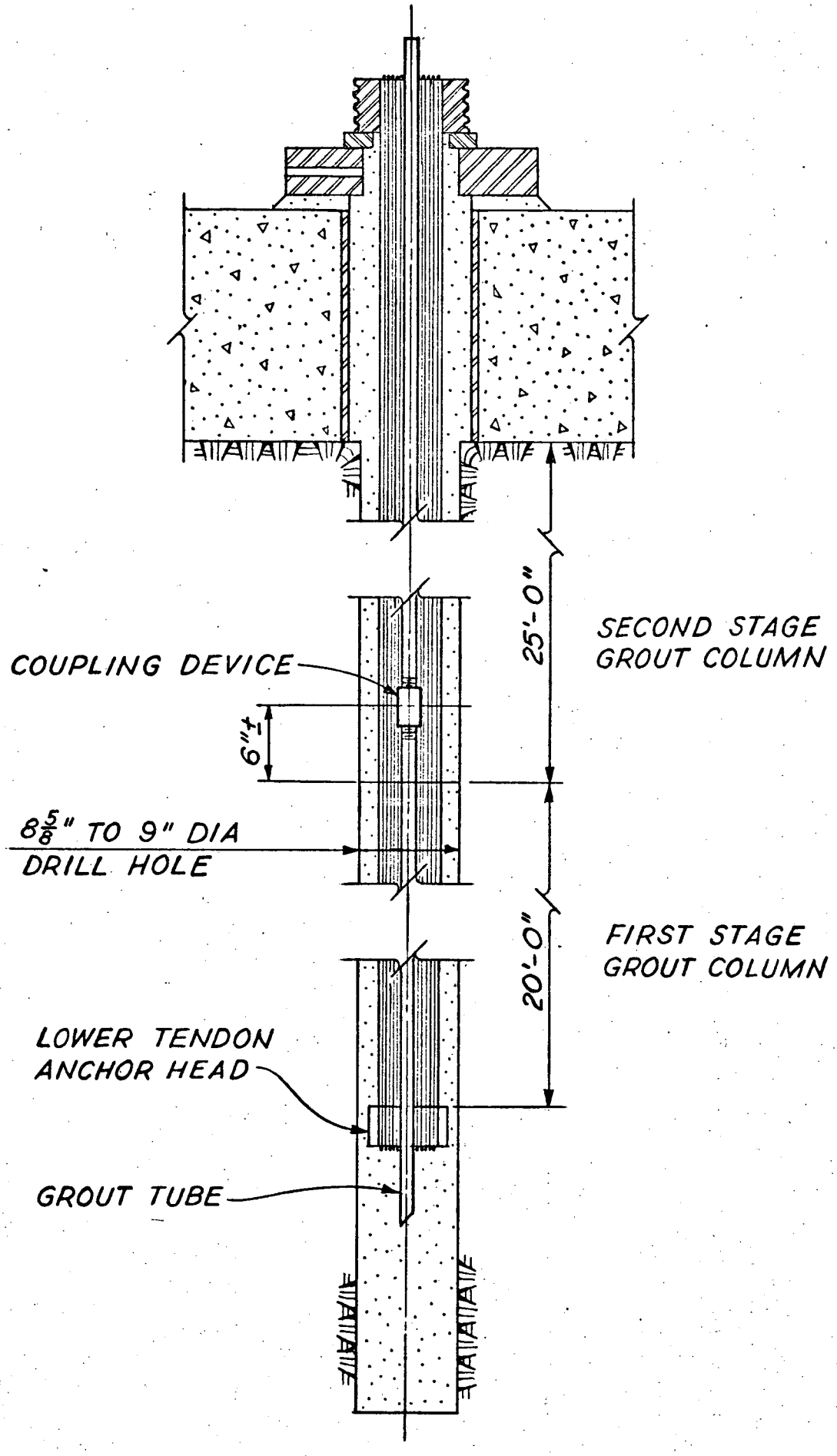
Bellefonte Nuclear Plant
Preliminary Safety Analysis Report

TYPICAL ARRANGEMENT
EMERGENCY SUMPS
FIGURE 6.3-9

TVA DWG. NO. RRH62976

ADDED BY AMENDMENT 1,
JULY 16, 1973

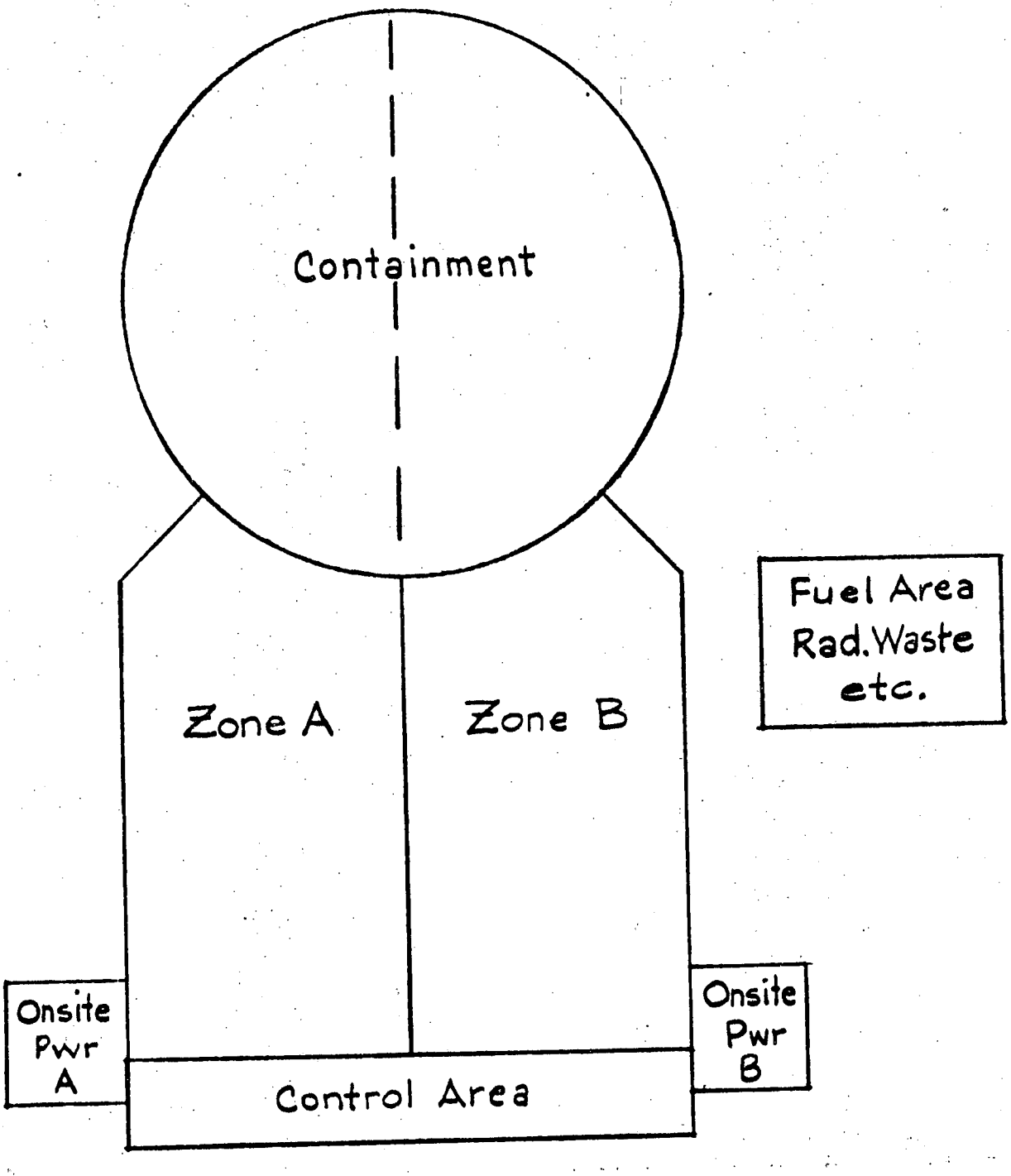

A34
9'-0"
EL 628 E
D36
EL 600
EMERGENCY SUMP A
EL 629.0
CONTAINMENT AIR RECIRCULATION FILTER
C36
EL 623.71
VEL 618.71
STM. GEN. SG1A
R.C. PUMP P1A2
PRESSURIZER
RC. PUMP P1A1
EL 622.5
EL 600.0
EMERGENCY SUMP B
RC DRAIN TANK
EL 622.5
EL 610.0
EL 632.5
EL 632.5
REMOVABLE PLUG
ELEV
LETDOWN COOLERS
REACTOR VESSEL COOLING DUCT
FUEL TRANSFER TUBES
REACTOR
UNIT I REACTOR BUILDING
EL 622.0
EQUIPMENT HATCH ABOVE
BLOWOUT PANELS
CORE INTERNALS STORAGE
EL 622.0
EL 632.5
STAIRS
ROOF EL 684.0
INCORE INSTRUMENTATION CHASE
EL 618.71
EL 632.5
REMOVABLE PLUG
CONSTRUCTION SUMP
EL 602.0
RC PUMP P1B2
RC PUMP P1B1
STM. GEN. SG1B
MAIN STEAM
EL 629.0
STAIRS
D36
EL 623.71
SECONDARY SHIELD WALL
PRIMARY CONTAINMENT
EL 620.0
EL 629.0
HX COUR (TYP)


COUPLING DEVICE
6"±
8 5/8" TO 9" DIA
DRILL HOLE
LOWER TENDON
ANCHOR HEAD
GROUT TUBE
25'-0"
SECOND STAGE
GROUT COLUMN
20'-0"
FIRST STAGE
GROUT COLUMN

TVA 489G (DES-1-63) TENNESSEE VALLEY AUTHORITY SHEET OF

SUBJECT Plant Physical Separations PROJECT Bellefonte

COMPUTED BY DATE CHECKED BY DATE



NECESSARY POST ACCIDENT INSTRUMENTATION

FOR LOCA

Manual Action	Indication
1. Monitor reactor conditions	1. Pressurizer pressure
2. Monitor and control HPI flow, if necessary	2. RC temperature
3. Monitor and control LPI flow, if necessary	3. Pressurizer level
4. Shift LPI pump suction from BWST to reactor building sump	4. HPI flow
5. Monitor component cooling water flow to LPI pump and decay heat coolers	5. BWST level
6. Monitor and control reactor building spray flow, as necessary	6. LPI flow
7. Monitor and control ERCW flow, as necessary	7. Component cooling water flow to decay heat coolers
8. Shift SFC to other unit component cooling system	8. Reactor building spray flow
	9. ERCW flow indication

NECESSARY POST ACCIDENT INSTRUMENTATION

FOR STEAM LINE BREAK

Manual Action	Indication
1. Monitor steam generator pressure to enable regulation of cooldown	1. Pressurizer pressure
2. Control makeup to RC system (if the normal makeup system is unavailable, high pressure injection is used)	2. Pressurizer level
3. Initiate decay heat removal for cooldown using unaffected steam generation; switch to decay heat system when RC temperature and pressure are reduced	3. RC temperature
4. Control component cooling water flow to decay heat coolers	4. Steam generator level
	5. Main steam pressure
	6. Component cooling water flow to decay heat coolers
	7. Decay heat cooler flow