

UNITED STATES GOVERNMENT

Memorandum

TENNESSEE VALLEY AUTHORITY

CEB '83 0512 008

TO : G. Wadewitz, Project Manager, Watts Bar Nuclear Plant, CONST (3)

FROM : J. C. Standifer, Project Manager, Watts Bar Design Project, 204 GB-K

DATE : MAY 12 1983

SUBJECT: WATTS BAR NUCLEAR PLANT UNIT 1 - PROGRAM FOR NRC-OIE BULLETIN 79-14 PHASE 2 INSPECTIONS

CEB has overall responsibility to implement the subject inspections at WBN. EN DES-SEP 82-25 is being written to control this activity, and onsite inspections will occur between ~~July 5 and 16, 1983.~~

CEB will provide an independent inspection team of 4 to 6 persons not involved in the NRC-OIE Bulletin 79-14 phase 1 inspections currently in progress. In addition, a small onsite CEB and WBP engineer team will be provided. WBN CONST is requested by CEB to support this effort by providing the following services, facilities, and equipment during the above time period:

1. Field engineers to guide the team in locating the piping in the plant.
2. Measuring devices, flashlights, ladders, lighting, scaffolding, etc., as required to perform the inspections.
3. Onsite office space for approximately 12 people.
4. Onsite space for training (approximately 200 feet square).
5. Inspection package for each of the randomly selected problems.

All inspection packages must contain the following documents:

1. Prints (2) of the math model isometric drawing for rigorously analyzed piping.
2. Prints (2) of the applicable mechanical drawing for alternately supported piping.
3. Prints of the mechanical (physical) drawings which show the actual routing of the piping in the building.
4. Prints of the manufacturers' drawings of all valves inspected and/or special components within the piping system.

2

G. Wadewitz

WATTS BAR NUCLEAR PLANT UNIT 1 - PROGRAM FOR NRC-OIE BULLETIN 79-14 PHASE 2
INSPECTIONS

5. Copies of the inspection/recording forms.
6. Prints of pipe support design drawings as required to perform inspections.

Original Signed By
J.C. Standifer

J. C. Standifer

ROB:JDH:DCG

cc: R. O. Barnett, W9D224 C-K (2)
C. Bonine, E7B24 C-K
MEDS, W5B63 C-K
R. M. Pierce, 104 ESTA-K
M. N. Sprouse, W11A9 C-K

Principally Prepared By: J. D. Hansen, Extension 3702

NOT
SWP-88
PLEASE FORWARD

DE02;033129.10

UNITED STATES GOVERNMENT

Memorandum

TENNESSEE VALLEY AUTHORITY

TO : G. Wadewitz, Project Manager, Watts Bar Nuclear Plant, CONST (3)

FROM : J. C. Standifer, Project Manager, Watts Bar Design Project, 204 GB-K

DATE :

SUBJECT: WATTS BAR NUCLEAR PLANT UNIT 1 - PROGRAM FOR NCR-OIE BULLETIN 79-14 PHASE 2 INSPECTIONS

Reference: Your memorandum from J. C. Standifer dated May 12, 1983
(CEB 830512 008)

The 79-14 phase 2 inspections will occur between August 1 and 13, 1983 instead of between July 5 and 13, 1983 as specified in the referenced memorandum.

CEB has overall responsibility to implement the subject inspections at WBN. EN DES-SEP 82-25 is being written to control this activity, and onsite inspections will occur between July 5 and 16, 1983.

CEB will provide an independent inspection team of 4 to 6 persons not involved in the NCR-OIE Bulletin 79-14 phase 1 inspections currently in progress. In addition, a small onsite CEB and WBP engineer team will be provided. WBN CONST is requested by CEB to support this effort by providing the following services, facilities, and equipment during the above time period:

1. Field engineers to guide the team in locating the piping in the plant.
2. Measuring devices, flashlights, ladders, lighting, scaffolding, etc., as required to perform the inspections.
3. Onsite office space for approximately 12 people.
4. Onsite space for training (approximately 200 feet square).
5. Inspection package for each of the randomly selected problems.

All inspection packages must contain the following documents:

1. Prints (2) of the math model isometric drawing for rigorously analyzed piping.
2. Prints (2) of the applicable mechanical drawing for alternately supported piping.
3. Prints of the mechanical (physical) drawings which show the actual routing of the piping in the building.
4. Prints of the manufacturers' drawings of all valves inspected and/or special components within the piping system.

2

G. Wadewitz

WATTS BAR NUCLEAR PLANT UNIT 1 - PROGRAM FOR NRC-OIE BULLETIN 79-14 PHASE 2
INSPECTIONS

5. Copies of the inspection/recording forms.
6. Prints of pipe support design drawings as required to perform inspections.

J. C. Standiter

ROB:JDH:DCG

cc: R. O. Barnett, W9D224 C-K (2)
C. Bonine, E7B24 C-K
MEDS, W5B63 C-K
R. M. Pierce, 104 ESTA-K
M. N. Sprouse, w11A9 C-K

Principally Prepared By: J. D. Hansen, Extension 3702

083175.03

UNITED STATES GOVERNMENT

Memorandum

TENNESSEE VALLEY AUTHORITY

CEB '83 0802 002

TO : G. Wadewitz, Project Manager, Watts Bar Nuclear Plant, CONST (3)

FROM : J. C. Standifer, Project Manager, Watts Bar Design Project, 204 GB-K

DATE : AUG 2 1983

SUBJECT: WATTS BAR NUCLEAR PLANT UNIT 1 - PROGRAM FOR NCR-OIE BULLETIN 79-14 PHASE II INSPECTIONS

Reference: My memorandum to you dated May 12, 1983
(CEB 830512 008)

The 79-14 Phase II inspections will occur between August 18 and 31, 1983. CONST is responsible for preparing the inspection packages. A package must be prepared for each of the following analysis isometrics: 47W400-216, 47W401-208, 47W406-203, 47W427-200, 47W435-217, 47W437-201, 47W450-217, 47W454-242, and 47W465-206.

Original Signed By
J. C. Standifer
J. C. Standifer

*cc: Wadewitz
Standifer*

ROB

ROB:SKS:DCG
cc: R. O. Barnett, W9D224 C-K (2)
C. Bonine, E7B24 C-K
MEDS, W5B63 C-K
R. M. Pierce, 104 ESTA-K
M. N. Sprouse, W11A9 C-K

Principally Prepared By: S. K. Sherfey, Extension 4318



UNITED STATES GOVERNMENT

Memorandum

TENNESSEE VALLEY AUTHORITY

CEB '83 0902 004

TO : Those listed

FROM : M. N. Sprouse, Manager of Engineering Design, W11A9 C-K

DATE : SEP 2 1983

SUBJECT: EN DES SPECIAL ENGINEERING PROCEDURE (SEP) DISTRIBUTION - DIVISION LEVEL -
TRANSMITTAL MEMO NO. EN DES-SEP 82-25 RO

The following new EN DES-SEP is attached for your information and filing:

| <u>Item</u> | <u>Title</u> | <u>Affects</u> |
|------------------------|---|----------------|
| EN DES-SEP 82-25 RO | Program for NRC-OIE Bulletin 79-14 Phase II Inspections at Watts Bar Nuclear Plant Unit 1 | CEB WBP |

Also attached is a revised page of the EN DES-SEP Index.

Original Signed By
E. R. ARMSTRONG

M. N. Sprouse

R. O. Barnett, W9D224 C-K (2) _____
E. G. Beasley, W12B21 C-K (1) _____
ESB Procedures Control Section, S70 C-K (1) _____
R. M. Pierce, 104 ESTA-K (1) _____
J. C. Standifer, 204 GB-K (7) _____

ROB:SKS:BSH
Attachments
cc: MEDS, W5B63 C-K

----- FOLD HERE TO RETURN -----

NOTE TO THE ABOVE LISTED:

- For address changes to the above distribution please notify
S. K. Sherfey at 4318.
- To provide evidence of receipt of this transmittal, please initial and date the duplicate copy of this page in the space provided after your name and return the copy as follows:

RETURN TO:

R. R. DeVault, W9A2 C-K

UNITED STATES GOVERNMENT

Memorandum

TENNESSEE VALLEY AUTHORITY

CEB '83 0921 019

TO : Those listed

FROM : M. N. Sprouse, Manager of Engineering Design, W11A9 C-K

DATE : **SEP 21 1983**

SUBJECT: EN DES SPECIAL ENGINEERING PROCEDURE (SEP) DISTRIBUTION - DIVISION LEVEL - TRANSMITTAL MEMO NO. EN DES-SEP 82-25 R1

The following revised EN DES-SEP is attached for your information and filing:

| <u>Item</u> | <u>Title</u> | <u>Affects</u> |
|------------------|---|----------------|
| EN DES-SEP 82-25 | Program for NRC-OIE Bulletin 79-14 Phase II Inspections at Watts Bar Nuclear Plant Unit 1 | CEB WBP |

For a description of the changes to the revised SEP please refer to the revision log. Section supervisors should review and discuss applicable changes with their employees.

Also attached is a revised page of the EN DES-SEP Index.

M. N. Sprouse

M. N. Sprouse

- R. O. Barnett, W9D224 C-K (2) _____
- E. C. Beasley, W12421 C-K (1) _____
- CIVIL ENGINEERING BRANCH
- ESB Procedures Control Section, S70 C-K (1) _____
- OCT 4 1983 R. A. Pierce, 104 ETA-K (1) _____
- J. C. Standifer, 204 GB-K (7) _____

| IN | OUT | Date | Time | By | For |
|----|-----|------|------|-----|-------------------------|
| | | | | ROB | FOR [unclear] |
| | | | | JWB | FOR MEDS, W5B63 C-K |
| | | | | TCC | |
| | | | | WAE | |
| | | | | FUM | |
| | | | | WJA | |
| | | | | RJH | |
| | | | | ROH | |
| | | | | TWB | |
| | | | | | RETURN TO |
| | | | | | R. K. Devault, W9A2 C-K |

----- FOLD HERE TO RETURN -----

NOTE TO THE ABOVE LISTED:

1. Address changes to the above distribution please notify S. K. Sherfey at 4318.

2. To provide evidence of receipt of this transmittal, please initial and date the duplicate copy of this page in the space provided after your name and return the copy as follows:

R. K. Devault, W9A2 C-K



UNITED STATES GOVERNMENT

Memorandum

TENNESSEE VALLEY AUTHORITY
CEB '831101 900

: R. O. Barnett, Chief, Civil Engineering Support Branch, W9D224 C-K

FROM : J. C. Standifer, Project Manager, Watts Bar Design Project, 204 GB-K

DATE : 10/25/83

SUBJECT: TRANSMITTAL OF PIPING ANALYSIS/~~OR PIPE RUPTURE~~ INFORMATION FOR
Prob No: VARIOUS FILE (WBN 66D) - QUALITY INFORMATION,
 STANDALONE QUALITY INFORMATION, NOT QUALITY RELATED,
ECN 3100 OR DCR _____.Attached is the piping analysis/ pipe rupture information
for the VARIOUS system as requested by your
SEP 82-15-25 or provided without request.

This information is: (check one)

- A copy of controlled information.
 Advanced information that will be added to controlled documents.
 Other 79-14 PKG NO. FOR PHASE II

The information transmitted herein will be incorporated into: (check one)

- Piping Analysis Piping Isometric Pipe Rupture Report
 Calculations

B. G. Pratt
for J. C. Standifer

Attachments: (check one)

- TVA Drawing No.
 Vendor Drawing No.
 Sketch
 Piping Disc.
 VALVE
- Analysis Information Form
 Pipe Rupture Information
 Other 79-14 PKG. PHASE II
566 ATTACHED
T. J. Blane
Preparer

N/A
Independent Reviewer

To: J. C. Standifer, Project Manager, Watts Bar Design Projects, 204 GB-K
From: R. O. Barnett, Chief, Civil Engineering Support Branch, W9D224 C-K
Date: NOV 01 1983
Subject: TRANSMITTAL OF PIPING ANALYSIS/PIPE RUPTURE INFORMATION FOR

We acknowledge receipt of the above information. This information is: (check one)

- Satisfactory as received
 Insufficient
 Other

WIF 8/1/83 TO RETURN TO YOU BY NOV 1.

R. O. Barnett to OPM
+ C. KESNER

cc: MEDS, W5B63 C-K

TO: J. HANSEN / D. WILSON
FM: R.G. PRATT

SUBJECT: PHASE II 79-14 INSPECTION PACKAGES.

WBP HAS REVIEW THE 79-14 PHASE II
PACKAGES AS STATED PER SEP 82-25 RI.

PACKAGES REVIEWED ARE LISTED BELOW:

IT01-0600200-06-04

IT03-47W401-208

IT03-47W427-200 *

IT62-47W406-203

IT63-47W435-217

IT67-47W450-217 *

IT68-47W465-206

IT70-47W464-242

IT72-47W437-201

WE ARE RETURNING SAID PACKAGES FOR CEB'S
FINAL REVIEW AS PER SEP 82-25 RI.

WBP REQUEST THAT CEB MAKES COPIES OF
THE FINAL RESOLUTIONS OF THE DISCREPANCIES AND
FORWARD THEM TO R.G. PRATT, FOR DISTRIBUTION WITHIN
WBP. A COPY OF THE FINAL DISCREPANCY IS REQ'D
FOR DWG. REV.

* THERE ARE TWO DISCREPANCIES THAT REQ'D
REINSPECTION, IT67-47W450-217/04H &
IT03-47W427-200/OIP, A MEMO IS FORTH
COMING FROM BOB M. KAY.

UNITED STATES GOVERNMENT

Memorandum

TENNESSEE VALLEY AUTHORITY

TO : J. C. Standifer, Project Manager, Watts Bar Design Project, 204 GB-K

FROM : R. O. Barnett, Chief, Civil Engineering Support Branch, W9D224 C-K

DATE : NOV 14 1983

SUBJECT: WATTS BAR NUCLEAR PLANT UNIT(S) 1 - TRANSMITTAL OF
PIPING ANALYSIS/PIPE RUPTURE INFORMATION ASSOCIATED WITH SEP 82-25
- QUALITY INFORMATION, STANDALONE QUALITY
INFORMATION, NOT QUALITY RELATED, SYSTEM VARIOUS, ECN/DCR 4376

Attached are preliminary piping analysis results, final piping analysis results,
 pipe rupture information, request for information, other 7914
PHASE II INSPECTION & EVALUATION RESULTS, for CEB analysis No. _____,
isometric No. _____. This work was associated with ECN 4376,
other SEP 82-25. The attached information is to be
used for support design, protective device design, information only,
 documentation change (your design is not affected). Any questions concerning this
information should be addressed to S.K. SHERFEY W9C173 C-K at
extension 4318. Additional comments _____

Prepared by S.K. Sherfeey JPH

Independent Review Alan L. Edwards

William J. Kagay
for R. O. Barnett
WR

ROB:
Attachment(s): 9 INSPECTION PACKAGES ion

TO : R. O. Barnett, Chief, Civil Engineering Support Branch, W9D224 C-K

FROM : J. C. Standifer, Project Manager, Watts Bar Design Project, 204 GB-K

DATE :

SUBJECT: WATTS BAR NUCLEAR PLANT UNIT(S) _____ TRANSMITTAL OF
PIPING ANALYSIS/PIPE RUPTURE INFORMATION ASSOCIATED WITH _____

We acknowledge receipt of the above information. This information is: (check one)

- Satisfactory as received
- Insufficient
- Other _____

Prepared by _____ J. C. Standifer

JCS:
Attachment(s)
cc: MEDS, W5B63 C-K w/Attachment(s): _____

GH2.R2

79-14 PHASE II INSPECTION FORMS

DATA PACKAGE COVER SHEET
WATTS BAR NUCLEAR PLANT UNIT 1

Revision _____

Package No.: _____

1. The attached package contains _____ data sheet(s) 1
_____ data sheet(s) 2
_____ data sheet(s) 3
_____ data sheet(s) 4
_____ data sheet(s) 5
_____ data sheet(s) 6

2. No additional supports exist on piping other than those specified by the analysis isometric.

Remarks:

Inspector No. 1

Date

Inspector No. 2

Date

3. Reviewed by: _____
EN DES Site Representative

Date

79-14 PHASE II DATA SHEET 1

Revision _____

PIPE SUPPORT* CHECKLIST

Page ____ of ____

WATTS BAR NUCLEAR PLANT UNIT 1

Package No.: _____

1. Pipe Support Drawing No. _____

2. Is support installed per support drawing(s)? (Yes or No) _____

If no, indicate deviations on the support drawing and list them below.

NOTE: See Attachment 2, section 2.0, for items to be checked and instructions.

3. Is there load carrying attachment(s) welded to pipe? (Yes or No) _____

If yes, does the weld(s) conform to support drawing(s)? (Yes or No) _____

Inspector No. 1

Date

Inspector No. 2

Date

EN DES Site Representative Comments:

EN DES Site Representative

Date

*For springs use Data Sheet 5.

79-14 PHASE II DATA SHEET 2

Revision _____

VALVE CHECKLIST

Page ____ of ____

WATTS BAR NUCLEAR PLANT UNIT 1

Package No.: _____

- 1. Valve Tag No. _____
- TVA Valve Mark No. _____
- Valve Size and Type (e.g., 4" BW Globe) _____
- Valve Drawing No. _____
- Valve Manufacturer and Model No. _____

Note: See Attachment 2, section 3.0, for instructions.

- 2. Is valve location correct? (Yes or No) _____
(If no, show location on drawing)
- 3. If the valve has an extended operator, is the orientation of the operator correct? (Yes or No) _____
(If no, indicate orientation on drawing.)
- 4. Operator Manufacturer and Model No. _____

Inspector No. 1

Date

Inspector No. 2

Date

EN DES Site Representative Comments: _____

EN DES Site Representative

Date

79-14 PHASE II DATA SHEET 3

Revision _____

ISOMETRIC CHECKLIST

Page ____ of ____

WATTS BAR NUCLEAR PLANT UNIT 1

Package No.: _____

1. Does the general configuration of the piping system, including support location, match the isometric? (Yes or No) _____
2. List deviations below and submit marked drawings. See Attachment 2, section 4.0, for instructions.

Inspector No. 1

Date

Inspector No. 2

Date

EN DES Site Representative Comments:

EN DES Site Representative

Date

79-14 PHASE II DATA SHEET 4 Revision _____
PENETRATION CLEARANCE CHECKLIST Page ____ of ____
WATTS BAR NUCLEAR PLANT UNIT 1

Package No.: _____

1. Does the pipe have proper clearance through all penetrations (see Attachment 2, section 5.0, for instructions)? (Yes or No): _____
If no, indicate interferences below and mark them on the isometric.
Initial and date beside each penetration of the design drawing as it is checked.

Inspector No. 1 Date

Inspector No. 2 Date

EN DES Site Representative Comments:

EN DES Site Representative Date

79-14 PHASE II DATA SHEET 5 Revision _____

SPRING HANGER CHECKLIST Page ___ of ___

WATT BAR NUCLEAR PLANT UNIT 1

Package No.: _____

Hanger Dwg. No.: _____

Note: See Attachment 2, section 6.0, for instructions.

1. Vendor _____
2. Size and Type of Canister _____
3. Travel Limits (inches) _____
4. Load Setting and Condition (lb) _____
(i.e., hot or cold, full or empty)
5. Dynamic Travel Limit (inches) _____

_____ Inspector No. 1

_____ Date

_____ Inspector No. 2

_____ Date

EN DES Site Representative Comments:

EN DES Site Representative

Date

79-14 PHASE II DATA SHEET 6

Revision _____

GENERAL CLEARANCE CHECKLIST

Page ___ of ___

WATTS BAR NUCLEAR PLANT UNIT 1

Package No.: _____

Identify interferences below per Attachment 2, section 5.0.

INTERFERENCE IS _____ IN THE _____ DIRECTION FROM PIPE TO _____
_____, LOCATION: _____

INTERFERENCE IS _____ IN THE _____ DIRECTION FROM PIPE TO _____
_____, LOCATION: _____

INTERFERENCE IS _____ IN THE _____ DIRECTION FROM PIPE TO _____
_____, LOCATION: _____

INTERFERENCE IS _____ IN THE _____ DIRECTION FROM PIPE TO _____
_____, LOCATION: _____

INTERFERENCE IS _____ IN THE _____ DIRECTION FROM PIPE TO _____
_____, LOCATION: _____

INTERFERENCE IS _____ IN THE _____ DIRECTION FROM PIPE TO _____
_____, LOCATION: _____

INTERFERENCE IS _____ IN THE _____ DIRECTION FROM PIPE TO _____
_____, LOCATION: _____

Inspector No. 1

Date

Inspector No. 2

Date

EN DES Site Representative

Date

79-14 PHASE II
 DEVIATION EVALUATION FORM
 WATTS BAR NUCLEAR PLANT UNIT 1

Revision _____
 Page ____ of ____

Package No.: _____ Inspection Drawing: ⁽¹⁾ See Package No.

| (2) Devia- tion No. | (3) Phase I Discrepancy No. | (4) Acceptance Criteria | (5) Phase II Discrepancy No. | (6) Comments |
|------------------------------|--------------------------------------|-------------------------------|---------------------------------------|-----------------|
| | | | | |
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NOTES:

- (1) This is an analysis isometric drawing number.
- (2) All deviations are to be listed consecutively.
- (3) If this deviation was previously assigned a Phase I discrepancy number, identify the number and do not address columns (4) and (5).
- (4) If this deviation is acceptable per existing acceptance criteria, identify the acceptance criteria and page number and do not address column (5).
- (5) If this deviation was not assigned a Phase I discrepancy number or is not acceptable per existing acceptance criteria, then this deviation must be assigned a Phase II discrepancy number per EN DES-SEP 82-25, Attachment 4, page 4.
- (6) Any related comments of interest should be recorded.

Prepared by _____
 CONST/EN DES

_____ Date

Reviewed by _____
 EN DES

_____ Date

79-14 PHASE II
DEVIATION EVALUATION FORM
WATTS BAR NUCLEAR PLANT UNIT 1

Revision _____
Page ____ of ____

Package No.: _____ Inspection Drawing: ⁽¹⁾ See Package No. _____

| (2) Devia- tion No. | (3) Phase I Discrepancy No. | (4) Acceptance Criteria | (5) Phase II Discrepancy No. | (6) Comments |
|------------------------------|--------------------------------------|-------------------------------|---------------------------------------|-----------------|
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Prepared by _____ CONST/EN DES _____ Date _____

Reviewed by _____ EN DES _____ Date _____

Note: See first deviation evaluation form for notes. 033131.25

79-14 PHASE II
DISCREPANCY EVALUATION FORM
WATTS BAR NUCLEAR PLANT UNIT 1

Revision _____
Page ___ of ___

Discrepancy No.: _____

Support No.: _____

Description of Discrepancy: _____

Significant: _____ Nonsignificant: _____

Definite potential for loss of pressure boundary: _____

Basis for judgment: _____

Resolution: _____

Preparer Date Checker Date

Supervisor Date

Concurrer Date Reviewer Date

Supervisor Date

~~WATT BAR UNIT~~ ~~19~~ ~~PHASE II~~ ~~INSPECTION~~

SHT. 1 of 1

| DISCREPANCY No. | DEVIATION No. | DISCREPANCY DESCRIPTION | RESOLUTION |
|------------------------|---------------|--|------------|
| IT01-0600200-06-04/01C | 10C | POTENTIAL INTERFERENCE BETWEEN PIPE SPRT. HARDWARE AND MISC. STL. | CEB |
| IT01-0600200-06-04/02C | 12C | PIPE IN CONTACT WITH PIPE SPRT. (SPR. CAN ROD). | CEB |
| IT01-0600200-06-04/03C | 20C | PIPE IN CONTACT WITH STRUCT. STL. MEMBER. | CEB |
| IT01-0600200-06-04/01P | 41P | PIPE SPRT. LOCATION - OUT OF TOLERANCE | CEB & WBP |
| IT01-0600200-06-04/02P | 45P | FLOW INDKATOR CONN. LOCATION DOES NOT AGREE WITH ANAL. ISOMETRIC. | CEB |
| IT01-0600200-06-04/03P | 46P | INSULATION TH'KNSS. DOES NOT INCREASE W/ PIPE SIZE INCREASE. SAME TH'KNSS REQ'D. | CEB & WBP |
| IT01-0600200-06-04/04P | 48P | PIPE SPRT LOCATION - OUT OF TOLERANCE. | CEB & WBP |

~~WATT BAR UNIT~~ ~~1944~~ ~~PHASE~~ ~~INSPECTION~~

SHT. 29/11

| DISCREPANCY No. | DEVIATION No. | DISCREPANCY DESCRIPTION | RESOLUTION |
|--------------------------|---------------|--|------------|
| * IT01-0600200-06-04/01H | 09H | SPRING CAN SETTING (COLD LOAD) INCORRECT. | WBP |
| IT01-0600200-06-04/02H | 10H | PIPE SPRT. ATTACHM'TS DEVIATE FROM DESIGN DWG. | WBP |
| IT01-0600200-06-04/03H | 12H | PIPE SPRT. ATTACHM'TS DEVIATE FROM DESIGN DWG. | WBP |
| IT01-0600200-06-04/04H | 15H | PIPE SPRT. ATTACHM'TS DEVIATE FROM DESIGN DWG. | WBP |
| IT01-0600200-06-04/05H | 19H | PIPE SPRT. ATTACHM'T DEVIATES FROM DESIGN DWG. | WBP |
| IT01-0600200-06-04/06H | 23H | SPRING CAN SETTING (COLD LOAD) INCORRECT. | WBP |
| IT01-0600200-06-04/07H | 24H | EXIST. STR. STL. MEMB. AND ELEV. REFERENCE INCORRECT ON DES'N DWG. | WBP |

~~WATT BAR UNIT~~ ~~PHASE I~~ ~~INSPECTION~~

SHT. 3 of 11

| DISCREPANCY No. | DEVIATION No. | DISCREPANCY DESCRIPTION | RESOLUTION |
|------------------------|---------------|--|------------|
| IT01-0600200-06-04/08H | 25H | PIPE SPRT. DWG. DEVIATES FROM AS-INSTALLED CONFIGURATION. | WRP |
| IT01-0600200-06-04/09H | 27H | PIPE SPRT. STIFFENER POSITION DEVIATES FROM DES'N. DWG. | WRP |
| IT01-0600200-06-04/10H | 36H | PIPE SPRT. DWG. DET. DOES NOT AGREE W/ AS-INSTALLED CONFIGURATION. | WRP |
| IT01-0600200-06-04/11H | 38H | PIPE SPRT. SNUBBER ID TAG MISSING. | WRP |
| IT01-0600200-06-04/12H | 40H | PIPE SPRT. ATTACHMENT DIMS. DEVIATE FROM DES'N. DWG. | WRP |
| IT01-0600200-06-04/13H | 52H | PIPE SPRT. CLAMP GAPS DEVIATE FROM DES'N DWG. | WRP |
| IT01-0600200-06-04/14H | 53H | PIPE SPRT. DIMS. DEVIATE FROM AS-INSTALLED CONFIGURATION. | WRP |

~~WATER BAR UNIT~~ ~~PHASE I~~ ~~INSPECTION~~

SHT. 4 of 11

| DISCREPANCY No. | DEVIATION No. | DISCREPANCY DESCRIPTION | RESOLUTION |
|---------------------|---------------|--|------------|
| IT62-47W406-203/01P | P5 | INSTALLED PIPE LENGTH DOES NOT AGREE W/ ANALYSIS ISOMETRIC. | CEB & WBP |
| IT62-47W406-203/02V | V7 | VALVE ORIENTATION DOES NOT AGREE W/ ANALYSIS ISOMETRIC. | CEB & WBP |
| IT62-47W406-203/03V | V8 | VALVE ORIENTATION DOES NOT AGREE W/ ANALYSIS ISOMETRIC. | CEB & WBP |
| IT62-47W406-203/04C | C10 | POTENTIAL INTERFERENCE BETWEEN PIPE AND DUCT SUPPORT. | CEB |
| IT62-47W406-203/01H | 01H | PIPE SPRT. INSTALLED CONFIGURATION DIMS. DO NOT AGREE W/ DESIGN DRAWING. | WBP |
| IT62-47W406-203/02H | 02H | PIPE SPRT. INSTALLED CONFIGURATION DOES NOT AGREE W/ DESIGN DRAWING. | WBP |
| IT62-47W406-203/03H | 09H | PIPE SPRT. LOCATION - OUT OF TOLERANCE. | CEB & WBP |

~~WATER BAR UNIT~~ ~~19~~ ~~PHASE I~~ ~~INSPECTION~~

SHT. 5 of 11

| DISCREPANCY NO. | DEVIATION NO. | DISCREPANCY DESCRIPTION | RESOLUTION |
|-----------------------------|---------------|---|------------|
| IT62- 47W406- 203/04H | 15H | PIPE SPRT. LOCATION - OUT OF TOLERANCE. | CEB + WBP |
| IT62- 47W406- 203/05H | 18H | PIPE SPRT. LOCATION - OUT OF TOLERANCE. | CEB + WBP |
| IT62 47W406- 203/06H | 19H | PIPE SPRT. LOCATION - OUT OF TOLERANCE | CEB + WBP |
| IT62 47W406- 203/07H | 20H | PIPE SPRT. LOCATION - OUT OF TOLERANCE | CEB + WBP |
| | | | |
| IT03- 47W421- 200/01P | 9P | PIPE LENGTH (INSTALLED) DOES NOT AGREE W/ ANALYSIS ISOMETRIC. | CEB + WBP |
| | | | |

WATER BAR UNIT PHASE I INSPECTION

SHT. 69

| DISCREPANCY No. | DEVIATION No. | DISCREPANCY DESCRIPTION | RESOLUTION |
|-----------------------------|---------------|--|------------|
| 1T72- 47W437- 201/01V | 1V | VALVE OPERATOR (INSTALLED) IS NOT SHOWN ON ANALYSIS ISOMETRIC. | CEB |
| 1T72- 47W437- 201/02V | 2V | VALVE OPERATOR (INSTALLED) IS NOT SHOWN ON ANALYSIS ISOMETRIC. | CEB |
| 1T72- 47W437- 201/03V | 3V | VALVE OPERATOR (INSTALLED) IS NOT SHOWN ON ANALYSIS ISOMETRIC. | CEB |
| 1T72- 47W437- 201/04V | 4V | VALVE LOCATION NOT TIED DOWN. | CEB/WBP |
| 1T72- 47W437- 201/05V | 5V | VALVE OPERATOR (INSTALLED) IS NOT SHOWN ON ANALYSIS ISOMETRIC. | CEB |
| 1T72- 47W437- 201/01H | 2H | PIPE SPRT BOLT TO BOLT SPACING (INSTALLED) DOES NOT AGREE W/ DESIGN DWG. | WBP |
| 1T72- 47W437 201/02H | 11H | PIPE SPRT INSTALLED CONFIGURATION DOES NOT AGREE W/ DESIGN DWG. | WBP |

~~WATT BAR UNIT~~ ~~PHASE I~~ ~~INSPECTION~~

SHT. 7 of 11

| DISCREPANCY NO. | DEVIATION NO. | DISCREPANCY DESCRIPTION | RESOLUTION |
|-----------------------------|---------------|--|------------|
| IT72- 47W437- 201/03H | 12H | PIPE SPRT. INSTALLED CONFIGURATION DOES NOT AGREE W/ DESIGN DWG. | WBP |
| | | | |
| IT67- 47W450- 217/01V | 8V | VALVE OPERATOR ORIENTATION (INSTALLED) DOES NOT AGREE W/ ANALYSIS ISOMETRIC. | CEB & WBP |
| IT67- 47W450- 217/02V | 9V | VALVE OPERATOR ORIENTATION (INSTALLED) DOES NOT AGREE W/ ANALYSIS ISOMETRIC. | CEB & WBP |
| IT67- 47W450- 217/01H | 19H | PIPE SPRT. ATTACHMENT IS NOT IN ACCORDANCE W/ DESIGN DRAWING. | V13P |
| IT67- 47W450- 217/02H | 33H | PIPE SPRT. GAPS ARE NOT IN ACCORDANCE W/ DESIGN DWG. | CEB & WBP |
| IT67- 47W450- 217/03H | 37H | PIPE SPRT. GAPS ARE NOT IN ACCORDANCE W/ DESIGN DWG. | CEB & WBP |

WATER BAR UNIT PHASE II INSPECTION

SHT. 39

| DISCREPANCY No. | DEVIATION No. | DISCREPANCY DESCRIPTION | RESOLUTION |
|---------------------|---------------|--|------------|
| IT67-47W450-217/04H | 42H | PIPE SPRT. INSTALLED CONFIGURATION DOES NOT AGREE W/ DESIGN DRAWING. | WBP |
| | | | |
| IT70-47W464-242/01P | P1 | PIPE LENGTH (INSTALLED) DOES NOT AGREE W/ ANALYSIS ISOMETRIC. | CEB & WBP |
| IT70-47W464-242/01H | 08H | PIPE SUPPORT DESIGN DRAWING ERROR. | WBP |
| IT70-47W464-242/02H | 49H | PIPE SPRT. (INSTALLED) DIMENSION DOES NOT AGREE W/ DESIGN DRAWING. | WBP |
| | | | |
| IT68-47W465-206/01C | 1C | PIPE IN CONTACT W/ PIPE SPRT. | CEB |

~~WATT BAR UNIT~~ ~~49~~ ~~PHASE II INSPECTION~~

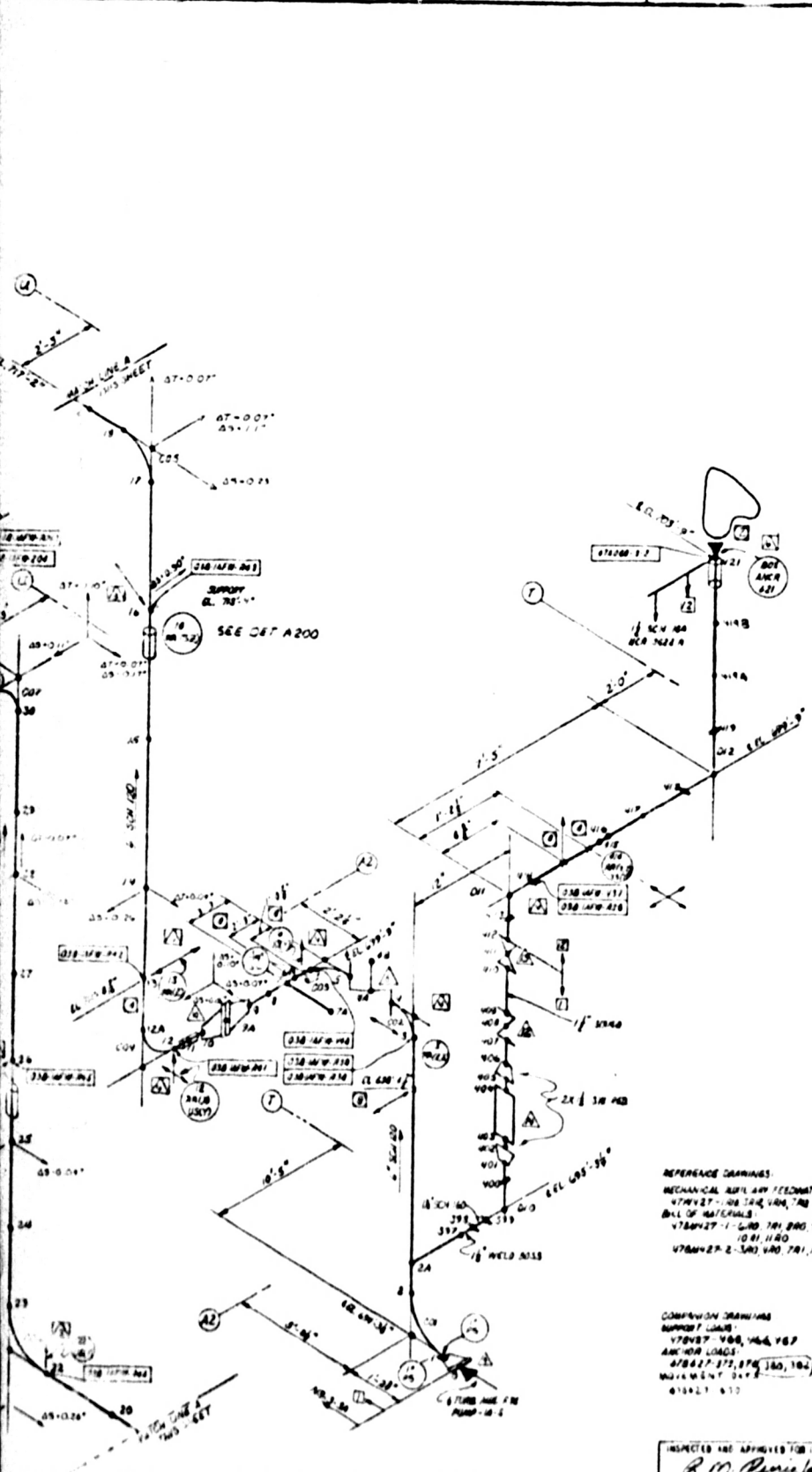
SHT. 99

| DISCREPANCY No. | DEVIATION No. | DISCREPANCY DESCRIPTION | RESOLUTION |
|-----------------------------|---------------|---|------------|
| IT68- 47W465- 206/02C | 2C | POTENTIAL INTERFERENCE W/ REACTOR COOLANT PUMP HOUSING. | CEB |
| IT68- 47W465- 206/03C | 14C | POTENTIAL INTERFERENCE W/ VALVE FLEX-HOSE | CEB |
| IT68- 47W465- 206/04P | 52P | INSTALLED PIPE ELEVATION DOES NOT AGRF. W/ ANALYSIS ISOMETRIC. | CEB + WBP |
| IT68- 47W465- 206/05C | 17C | POTENTIAL INTERFERENCE W/ PIPE. | CEB |
| IT68- 47W465- 206/06C | 24C | PIPE IN CONTACT W/ CONDUIT | CEB |
| IT68- 47W465- 206/07C | 26C | POTENTIAL INTERFERENCE W/ CONDUIT. | CEB |
| IT68- 47W465- 206/08C | 37C | CONTACT W/ PIPE SUPPORT COMPONENT. | CEB |

~~WATT BAR UNIT~~ - 1944 PHASE ~~INSPECTION~~

SHT. 109

| DISCREPANCY NO. | DEVIATION NO. | DISCREPANCY DESCRIPTION | RESOLUTION |
|-----------------------------|---------------|---|------------|
| IT68- 47W465- 206/09C | 38C | POTENTIAL INTERFERENCE W/ CONDUIT. | CEB |
| IT68- 47W465- 206/10C | 40C | POTENTIAL INTERFERENCE W/ CONCRETE WALL. | CEB |
| IT68- 47W465- 206/11C | 41C | VALVE OPERATOR IS IN CONTACT W/ CONDUIT. | CEB |
| IT68- 47W465- 206/12C | 42C | VALVE OPERATOR HAS A POTENTIAL INTERFERENCE W/ PIPE. | CEB |
| IT68- 47W465- 206/01H | 2H | PIPE SPRT LOCATION IS NOT IN ACCORDANCE W/ ANALYSIS ISO. | CEB & WBP |
| IT68- 47W465- 206/02H | 7H | INSTALLED PIPE SPRT MEMB. DOES NOT AGREE W/ DESIGN DWG. | WBP |
| IT68- 47W465- 206/03H | 22H | PIPE SPRT. ATTACHMENT DIMENSIONS DO NOT AGREE W/ DESIGN DWG. | WBP |



- NOTES
- ALL PIPE 2" OR SMALLER HAS SOCKET WELD TYPE FITTINGS
 - PIPE FROM THIS POINT ON IS SUPPORTED USING ALTERNATE PIPING ANALYSIS AND SUPPORT SPECIFICATIONS TO-B ALL PIPE 2" OR SMALLER IS SO NOT EXCEPT AS NOTED
 - WELD NUMBERS ARE TO BE IDENTIFIED
 - WELD NUMBERS SEE WELD ANCHOR IDENTIFICATION
 - ALL UNNOTED SAMPLING LINE
 - WELDS 3 AND WELDS 4 ARE HIGH ENERGY ALL OTHER WELDS 3 MODERATE ENERGY
 - CIRCUMFERENTIAL FRACTURES ARE POSTULATED AT WELDS 1, 2, 3, 4
 - SUPPORT LOCATION HAS DETERMINED UNDER PROGRAM IDENTIFIED BY THIS REPORT NO. 228-D-10
 - PIPE LOCATED IN 10' HAS ROTATED WEST 77° FROM VERTICAL, 45° FROM HORIZ.
 - DIMENSION CHANGE DETERMINED BY PROGRAM IDENTIFIED BY THIS REPORT OF 12.5" IN 30' BEING THIS IS NOT REQUIRED BY THIS ANALYSIS REVISION BUT CHANGE WILL BE INCORPORATED IN THE NEXT ANALYSIS REVISION
 - CLAMPABLE JOINTS ARE MAINTAINED TO ALLOW FOR THERMAL MOVEMENTS WITHIN ALLOWABLE LIMITS
 - AT MAXIMUM THERMAL MOVEMENTS (INCHES) AT MAXIMUM SEISMIC MOVEMENTS (DIRECTION IS UNKNOW) MOVEMENTS LESS THAN 1/4" ARE NOT SHOWN
 - PIPING ANALYSIS MODEL IS CURRENT TO DIVISION 3 OF THIS DRAWING CHANGES SHOWN ON AN PREVIOUS REVISION OF THIS DRAWING HAS NOT REQUIRED ANALYSIS BUT WILL BE INCORPORATED INTO THE NEXT REVISION OF THIS DRAWING

| | | | |
|----|-------------------|------|----|
| 1 | ISSUED FOR REVIEW | DATE | BY |
| 2 | ISSUED FOR REVIEW | DATE | BY |
| 3 | ISSUED FOR REVIEW | DATE | BY |
| 4 | ISSUED FOR REVIEW | DATE | BY |
| 5 | ISSUED FOR REVIEW | DATE | BY |
| 6 | ISSUED FOR REVIEW | DATE | BY |
| 7 | ISSUED FOR REVIEW | DATE | BY |
| 8 | ISSUED FOR REVIEW | DATE | BY |
| 9 | ISSUED FOR REVIEW | DATE | BY |
| 10 | ISSUED FOR REVIEW | DATE | BY |
| 11 | ISSUED FOR REVIEW | DATE | BY |
| 12 | ISSUED FOR REVIEW | DATE | BY |
| 13 | ISSUED FOR REVIEW | DATE | BY |
| 14 | ISSUED FOR REVIEW | DATE | BY |
| 15 | ISSUED FOR REVIEW | DATE | BY |
| 16 | ISSUED FOR REVIEW | DATE | BY |
| 17 | ISSUED FOR REVIEW | DATE | BY |
| 18 | ISSUED FOR REVIEW | DATE | BY |
| 19 | ISSUED FOR REVIEW | DATE | BY |
| 20 | ISSUED FOR REVIEW | DATE | BY |
| 21 | ISSUED FOR REVIEW | DATE | BY |
| 22 | ISSUED FOR REVIEW | DATE | BY |
| 23 | ISSUED FOR REVIEW | DATE | BY |
| 24 | ISSUED FOR REVIEW | DATE | BY |
| 25 | ISSUED FOR REVIEW | DATE | BY |
| 26 | ISSUED FOR REVIEW | DATE | BY |
| 27 | ISSUED FOR REVIEW | DATE | BY |
| 28 | ISSUED FOR REVIEW | DATE | BY |
| 29 | ISSUED FOR REVIEW | DATE | BY |
| 30 | ISSUED FOR REVIEW | DATE | BY |
| 31 | ISSUED FOR REVIEW | DATE | BY |
| 32 | ISSUED FOR REVIEW | DATE | BY |
| 33 | ISSUED FOR REVIEW | DATE | BY |
| 34 | ISSUED FOR REVIEW | DATE | BY |
| 35 | ISSUED FOR REVIEW | DATE | BY |
| 36 | ISSUED FOR REVIEW | DATE | BY |
| 37 | ISSUED FOR REVIEW | DATE | BY |
| 38 | ISSUED FOR REVIEW | DATE | BY |
| 39 | ISSUED FOR REVIEW | DATE | BY |
| 40 | ISSUED FOR REVIEW | DATE | BY |
| 41 | ISSUED FOR REVIEW | DATE | BY |
| 42 | ISSUED FOR REVIEW | DATE | BY |

AUXILIARY BUILDING UNIT 1 CLASS 2/3
SYSTEM N-3-7A
ISOMETRIC AUXILIARY FEEDWATER TURBINE AND MOTOR DRIVEN PUMP DISBURGE PIPING FOR SEISMIC, THERMAL AND STATIC ANALYSIS

WATTS BAR NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING 363-60

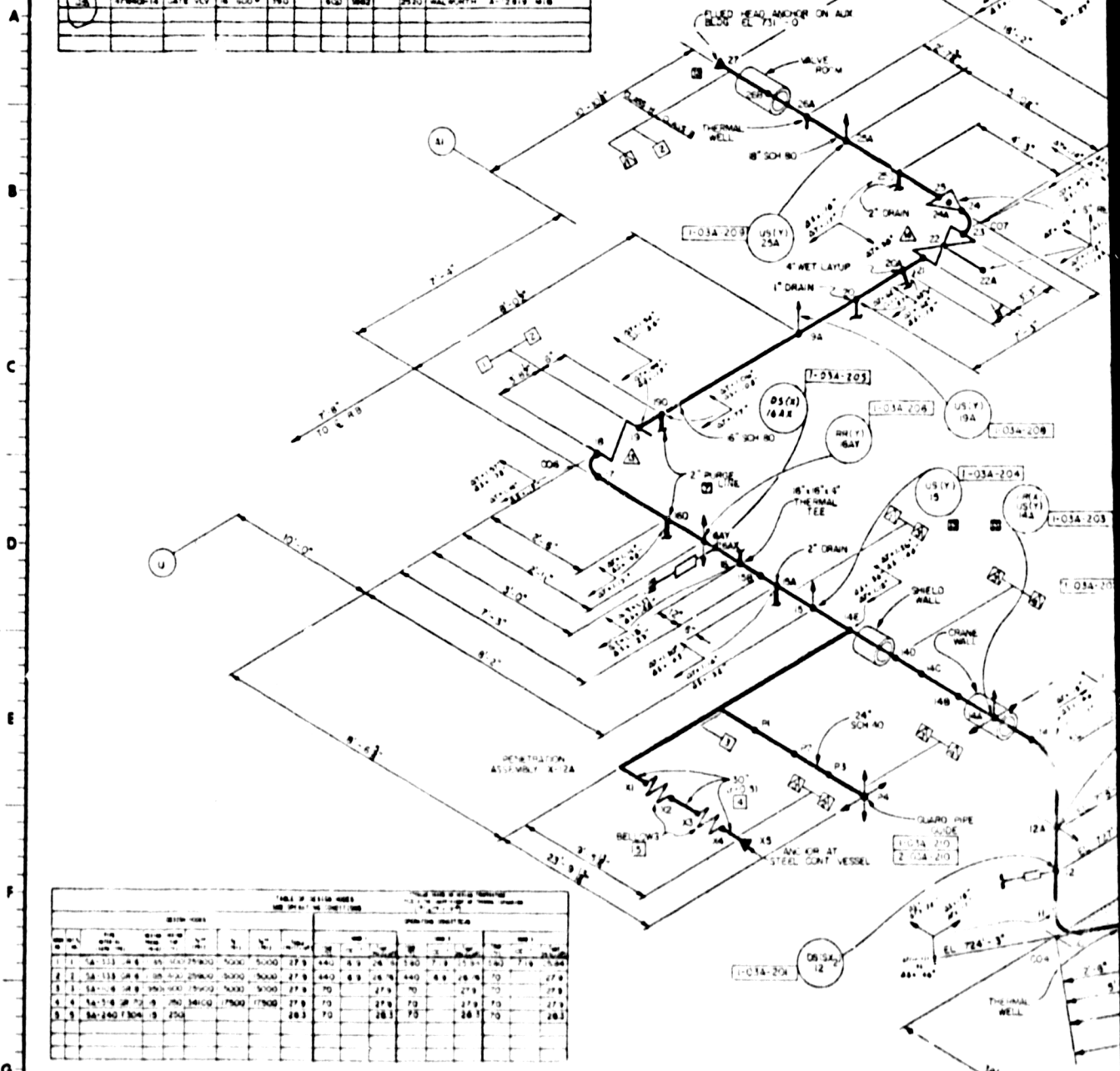
INSPECTED AND APPROVED FOR ISSUE
R. M. [Signature]

NOVEMBER 3-8-76 85 W 47W427-200 R7

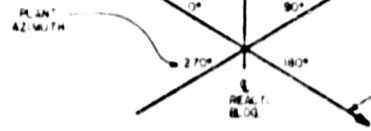
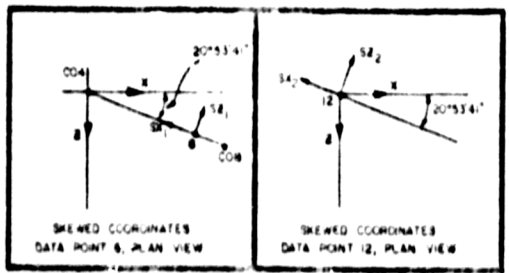
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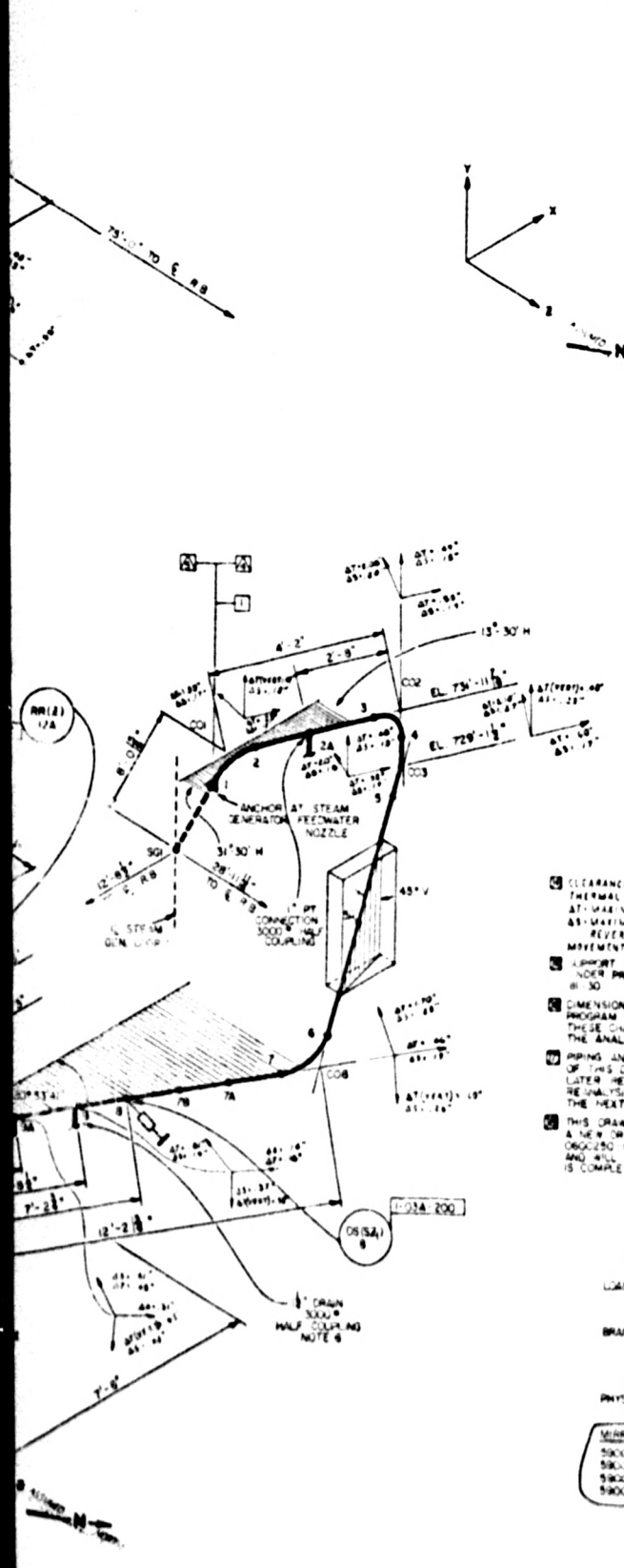
19121.R3

| VALVE TABLE | | | | | | | | | |
|-------------|--------|------|----------|------|--------|-----------------------|------|--------|---------|
| VALVE NO. | TYPE | SIZE | LOCATION | DATE | STATUS | REMARKS | DATE | STATUS | REMARKS |
| 27 | 4" VLV | 4" | 1403 | 1963 | OPEN | VALVE WITH A: 2186 MS | | | |
| 28 | 4" VLV | 4" | 1402 | 1963 | OPEN | VALVE WITH A: 2019 MS | | | |



| TABLE OF PIPE SIZES | | | | | | | | | |
|---------------------|--------|--------|------|-------|------|--------|---------|------|--------|
| LINE NO. | FROM | TO | SIZE | TYPE | DATE | STATUS | REMARKS | DATE | STATUS |
| 1 | SA-111 | SA-112 | 4" | STEEL | 1963 | OPEN | | | |
| 2 | SA-112 | SA-113 | 4" | STEEL | 1963 | OPEN | | | |
| 3 | SA-113 | SA-114 | 4" | STEEL | 1963 | OPEN | | | |
| 4 | SA-114 | SA-115 | 4" | STEEL | 1963 | OPEN | | | |
| 5 | SA-115 | SA-116 | 4" | STEEL | 1963 | OPEN | | | |





UNIT 1

CONDUIT DEFINITION

SYM. DEF. UNIT 1

| | |
|-------------|-----------------------------|
| 1 (R2) (2) | RESTRAINT |
| 2 (R2) (2) | DIR. RESTRAINT |
| 3 (R2) (2) | UNIDIRECTIONAL SUPPORT |
| 4 (R2) (2) | SLACK SUPPORT |
| 5 (R2) (2) | AVAILABLE SPRING SUPPORT |
| 6 (R2) (2) | CONSTANT FORCE SUPPORT |
| 7 (R2) (2) | FIXING RESTRAINT |
| 8 (R2) (2) | THIS ANCHOR |
| 9 (R2) (2) | VALVE IDENTIFICATION NUMBER |
| 10 (R2) (2) | WIRE NUMBER-SEE TABLE |
| 11 (R2) (2) | NOTE NUMBER |
| 12 (R2) (2) | COLUMN LINE |
| 13 (R2) (2) | TANGENT INTERSECT POINT |
| 14 (R2) (2) | PIST IDENTIFIED NUMBER |
| 15 (R2) (2) | SPRING UP POINT |
| 16 (R2) (2) | SUPPORT ZONE |

SUPPORT ZONE ID NUMBERS

- 1 AUXILIARY BUILDING
- 2 STEEL CONTAINMENT VESSEL
- 3 SHIELD BUILDING
- 4 INTERIOR CONCRETE STRUCTURE
- 5 STEAM GENERATOR

NOTES

- 1 UNIT 1 AS SHOWN
- 2 ENTIRE PIPE IS HIGH ENERGY AND THE CLASS B DIMENSIONS ARE FOR SUPPORT LOCATIONS ONLY
- 3 ALL ELBOWS ARE LONG RADII
- 4 ENTIRE PIPE HAS MIRROR INSULATION
- 5 BRANCH LINE ANALYSIS BY ALTERNATE ANALYSIS METHOD
- 6 BRANCH LINE ANALYSIS CONTINUED AS EDS PROBLEM 0600200-02-01
- 7 SUPPORT ID NO. [] FOR UNIT 1 PIPING
- 8 THIS DRAWING SUPERSEDES EDS DRAWING 0600200-02-01 REV. 2 REANALYSIS BY TVA TO INCLUDE NCR 474401-423
- 9 FOR ANALYSIS INFORMATION SEE REPORT CE8-ME-78-5 FINAL DOCUMENTATION LOG
- 10 PIPE BREAK LOCATIONS ARE POSTULATED AT DATA POINTS 4, 4E, 9, 9E IN MAIN PIPING AND AT TERMINAL ENDS OF THE FOLLOWING BRANCH PIPING: 18" DRAIN LINE AT 9' 2" DRAIN LINE AT 15A & 20D, AND 2" PIPE LINE AT 4D & 5D
- 11 PIPING BEYOND THIS POINT IS DEADWEIGHT SUPPORTED ONLY EXISTING RIGID RESTRAINT (RR) IS ACCEPTABLE FOR THIS ANALYZED UNIDIRECTIONAL SUPPORT (US)

- 1 CLEARANCE MUST BE MAINTAINED TO ALLOW FOR THERMAL PLUS SEISMIC PIPING MOVEMENTS AT MAXIMUM THERMAL MOVEMENT
- 2 MAXIMUM SEISMIC MOVEMENT (DIRECTION IS REVERSING) LOCAL VALVE SLAM MOVEMENT INCLUDED MOVEMENTS LESS THAN 1/8" ARE NOT SHOWN
- 3 SUPPORT LOCATION FOR UNIT 1 WAS DETERMINED UNDER PROGRAM IDENTIFIED BY CE8 REPORT NO. 81-30
- 4 DIMENSION CHANGE FOR UNIT 1 DETERMINED BY PROGRAM IDENTIFIED BY CE8 REPORT NO. 81-30 THESE CHANGES HAVE BEEN INCORPORATED INTO THE ANALYSIS REPRESENTED BY R2 OF THIS DWG
- 5 PIPING ANALYSIS MODEL IS CURRENTLY TO REV. 2 OF THIS DWG PIPING CHANGES SHOWN ON ANY LATER REV. OF THIS DWG W/ILE NOT REQUIRED REANALYSIS BUT WILL BE INCORPORATED INTO THE NEXT REANALYSIS
- 6 THIS DRAWING 474401-208 R2 IS FOR UNIT 1 ONLY A NEW DRAWING NO. 474401-423, PROBLEM NO. 0600200-02-01 HAS BEEN ASSIGNED FOR UNIT 2 AND WILL BE ISSUED WHEN THE UNIT 2 ANALYSIS IS COMPLETED

COMPARISON DRAWINGS

| | |
|------------------|------------|
| LOAD TABLES | 475401-400 |
| | 475401-401 |
| | 475401-438 |
| BRANCH LINE DATA | 475401-437 |
| | 475401-438 |

REFERENCE DRAWINGS

| | |
|-----------|----------------------|
| PHYSICALS | 474401-208, 218, 417 |
| | 474401-378 |

MIRROR INSULATION DRAWING NUMBERS

| | |
|------------|------------------|
| 580020000C | SH 1 OF 2 REV. B |
| 580020000C | SH 1 OF 3 REV. C |
| 580020000C | SH 2 OF 3 REV. C |
| 580020000C | SH 1 OF 1 REV. D |

ANALYSIS INCLUDES
ECN NO. 2800
NCR NO. 48NCE3834
INSPECTED AND APPROVED FOR ISSUE

| | | |
|---|------|--|
| 1 | 3100 | REVISED PER EGN 3100 TO ADD PIPE MOVEMENT DATA AND NOTES |
| 2 | 2178 | REV PER EGN 3178 FOR UNIT 1 |
| 3 | 3104 | REV PER EGN 3104 TO ADD PIPE MOVEMENT DATA AND NOTES |

SCALE (NPS) EXCEPT AS NOTED

REACTOR BUILDING B AUX BLOC UNIT 1

PROBLEM: 0600200-02-01
SUPPORT LOCATION DWG
FEEDWATER PIPING, STEAM GEN. NO. 1

WATTS BAR NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

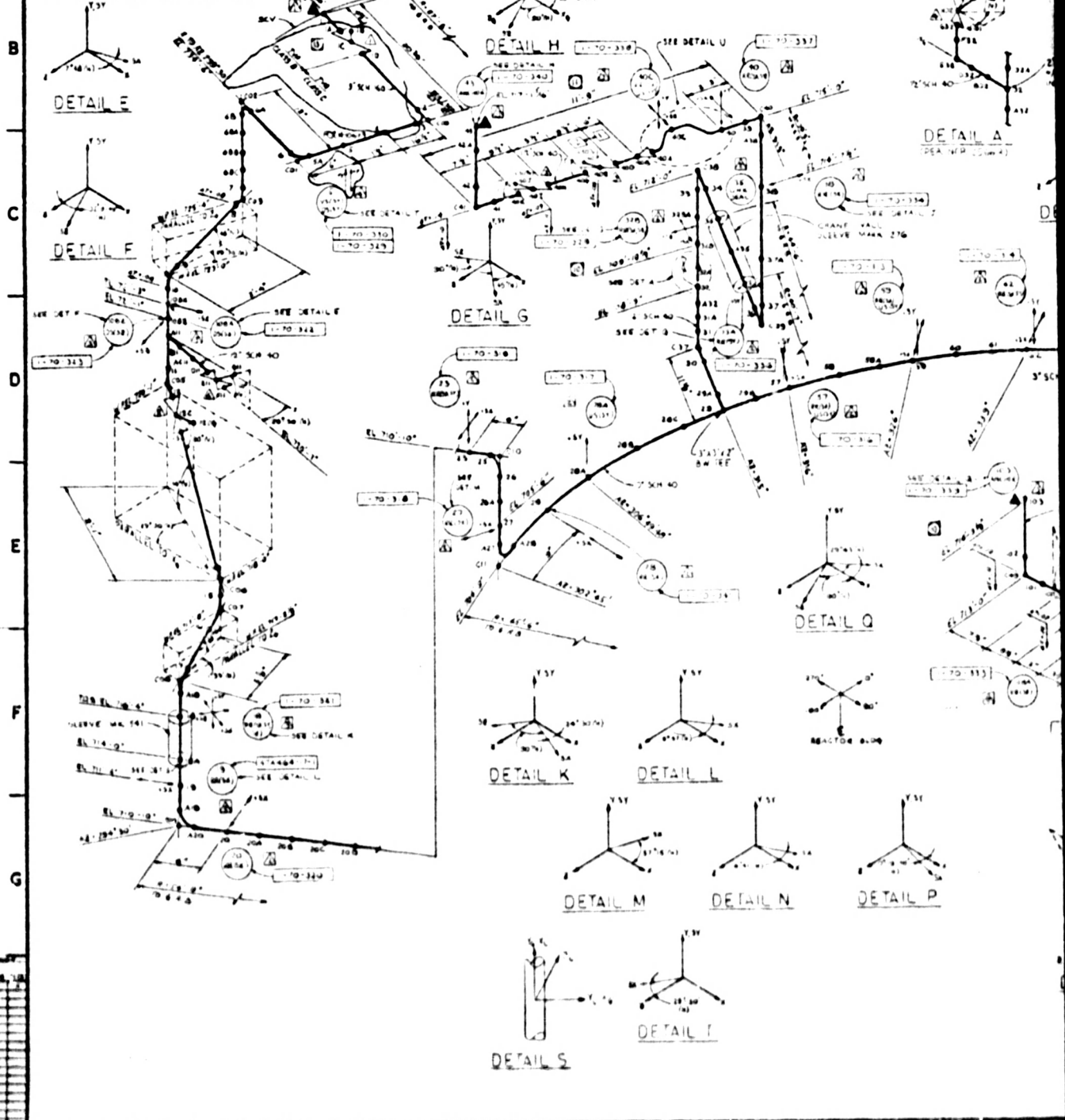
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CHECKED BY: [Signature]
APPROVED BY: [Signature]

DATE: 2/11/83
DRAWING NO: 474401-208 R3

850 160 408 - 02

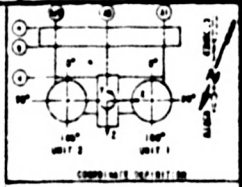
| DESIGN MODES | | | | | | | | | | | | OPERATING CONDITIONS | | | | | | | | | | | | PLATE NO. | | | TYPE | | |
|--------------|----------------------|------------------------|----------------|------------|---------------------|--|--------------|------------|------------|-----------|--------------|----------------------|------------|-----------|--------------|------------|------------|-----------|-----------|------|---------|--|--|-----------|--|--|------|--|--|
| MATERIAL | YIELD STRENGTH (PSI) | TENSILE STRENGTH (PSI) | ELONGATION (%) | TEMP. (°F) | SHEAR MODULUS (PSI) | THERMAL EXPANSION (10 ⁻⁶ /°F) | COND. 1 | | | | COND. 2 | | | | COND. 3 | | | | PLATE NO. | TYPE | ST. NO. | | | | | | | | |
| | | | | | | | STRESS (PSI) | STRAIN (%) | TEMP. (°F) | TIME (HR) | STRESS (PSI) | STRAIN (%) | TEMP. (°F) | TIME (HR) | STRESS (PSI) | STRAIN (%) | TEMP. (°F) | TIME (HR) | | | | | | | | | | | |
| A | 50,000 | 70,000 | 25 | 70 | 11,000,000 | 12.0 | 0.002 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | | | | | | | | | | |
| B | 50,000 | 70,000 | 25 | 70 | 11,000,000 | 12.0 | 0.002 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | | | | | | | | | | | |

α = IS THE COEFFICIENT OF THERMAL EXPANSION (10⁻⁶/°F)
 σ = VALUE BASED ON DESIGN TEMPERATURE
 E = MODULUS OF ELASTICITY (PSI × 10⁶)

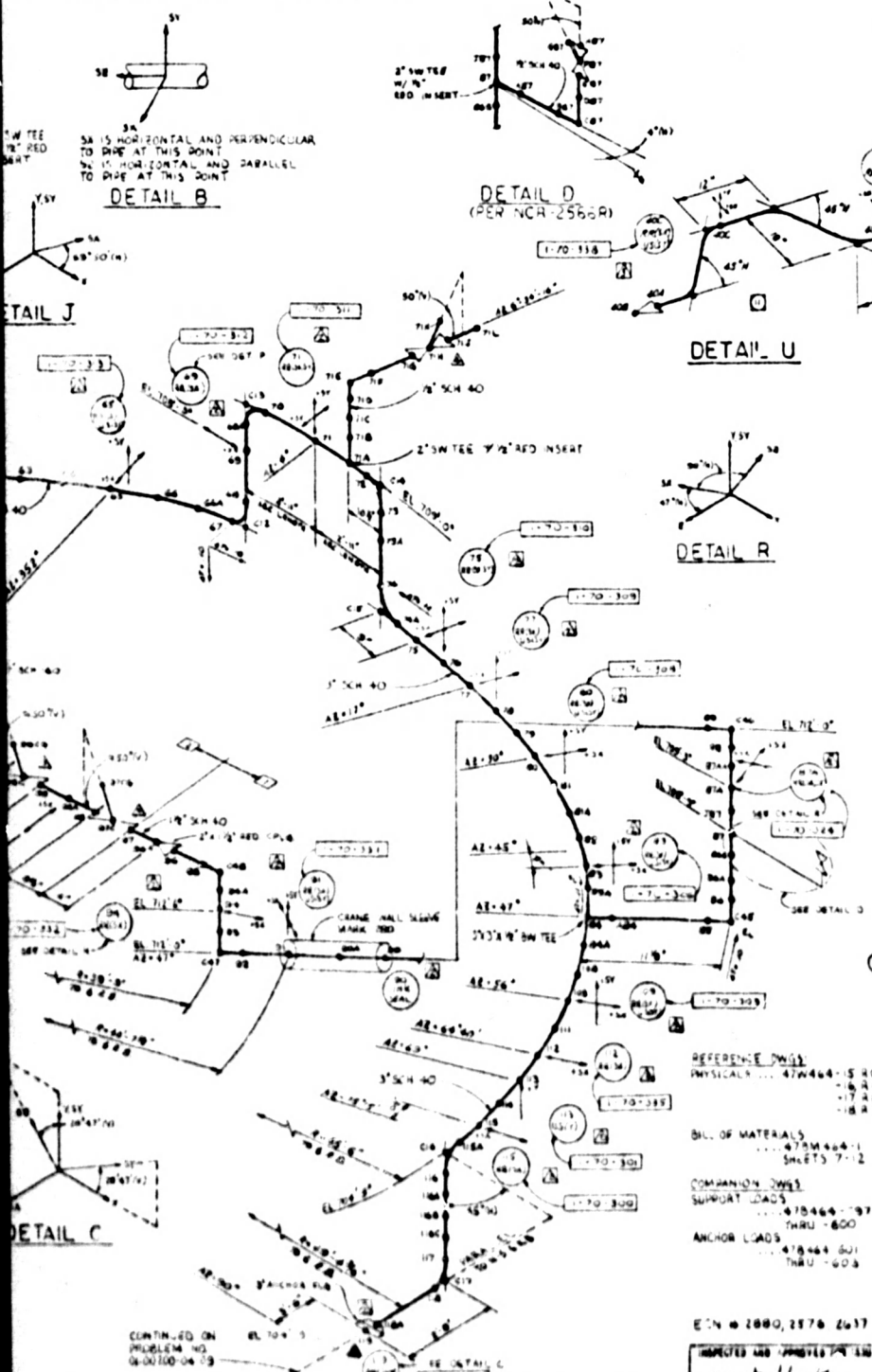


| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|

| NO. | DATE | BY | REVISION | DESCRIPTION |
|-----|----------|----|----------|-------------------------|
| 1 | 11/14/68 | JL | 1 | ISSUED FOR CONSTRUCTION |
| 2 | 11/14/68 | JL | 2 | REVISIONS TO SHEET 12 |
| 3 | 11/14/68 | JL | 3 | REVISIONS TO SHEET 12 |
| 4 | 11/14/68 | JL | 4 | REVISIONS TO SHEET 12 |
| 5 | 11/14/68 | JL | 5 | REVISIONS TO SHEET 12 |
| 6 | 11/14/68 | JL | 6 | REVISIONS TO SHEET 12 |
| 7 | 11/14/68 | JL | 7 | REVISIONS TO SHEET 12 |
| 8 | 11/14/68 | JL | 8 | REVISIONS TO SHEET 12 |
| 9 | 11/14/68 | JL | 9 | REVISIONS TO SHEET 12 |
| 10 | 11/14/68 | JL | 10 | REVISIONS TO SHEET 12 |
| 11 | 11/14/68 | JL | 11 | REVISIONS TO SHEET 12 |
| 12 | 11/14/68 | JL | 12 | REVISIONS TO SHEET 12 |



| SYMBOL | DEFINITION |
|---------|-----------------------------|
| (R) (E) | FIXED RESTRAINT |
| (R) (S) | SEISMIC RESTRAINT |
| (R) (D) | UNIDIRECTIONAL SUPPORT |
| (R) (T) | SYMMETRIC SUPPORT |
| (R) (L) | FIXABLE SPRING SUPPORT |
| (R) (C) | CONSTANT FORCE SUPPORT |
| (R) (F) | FIXED END RESTRAINT |
| (R) (M) | MOVING |
| (R) (A) | FIXED END ANCHOR |
| (R) (N) | VALVE IDENTIFICATION NUMBER |
| (R) (H) | PIPE NUMBER-SEE TABLE |
| (R) (I) | NOTE NUMBER |
| (R) (O) | COLOR LINE |
| (R) (P) | TANGENT INTERSECT POINT |
| (R) (Q) | JOINT IDENTIFICATION NUMBER |
| (R) (R) | SYMMETRIC LAP POINT |
| (R) (S) | RESTRAINT IDENTIFICATION |
| (R) (T) | SEISMIC ZONE |
| (R) (U) | SUPPORT MARK NO. |



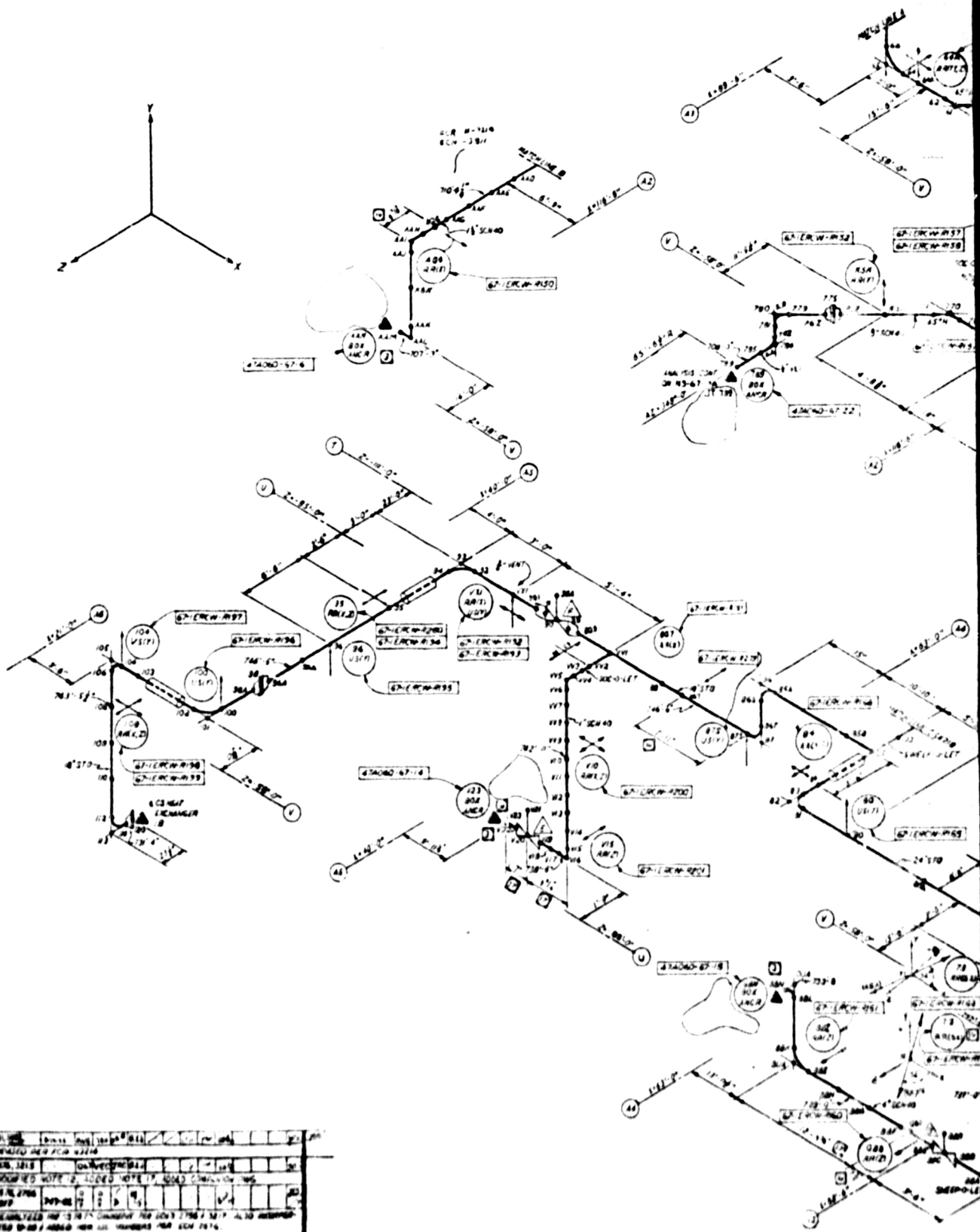
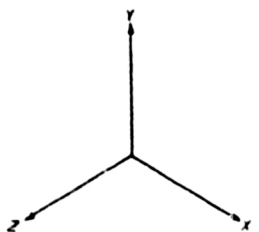
- NOTES
- ALL PIPING IS UNINSULATED.
 - ALL MODE 1 PIPING IS SCH 40 EXCEPT AS NOTED. ALL MODE 2 PIPING IS SCH 80.
 - ALL MODE 1 SOCKET WELD FITTINGS ARE 500# ALL MODE 2 SOCKET WELD FITTINGS ARE 3000#.
 - ALL 3\"/>

| | |
|-------------|---|
| NO. | 1518 |
| REVISED PER | PER 10-68 |
| DATE | 11-14-68 |
| BY | JL |
| CHECKED | JL |
| APPROVED | JL |
| DESIGNED | JL |
| ENGINEER | JL |
| PROJECT | REACTOR BUILDING UNIT 1 |
| PROBLEM | PROBLEM 060020C-04-08 PER X-908 |
| ANALYSIS | ISOMETRIC-STATIC, THERMAL & DYN-MIC ANALYSIS OF COMPONENT COOLING WATER THERMAL BARRIER SUPPLY TO RC PUMPS 1 & 4. |
| PLANT | WATTS BAR NUCLEAR PLANT |
| AUTHORITY | TENNESSEE VALLEY AUTHORITY |
| DIVISION | DIVISION OF ENGINEERING DESIGN |
| SUBMITTED | 11/14/68 |
| APPROVED | JL |
| ENGINEER | JL |
| NO. | 47W464-242 R2 |

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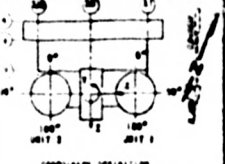
1 2 3 4 5 6

A
B
C
D
E
F
G



| | | | | |
|-----|----------|----------------|-----------------|-----------|
| NO. | DATE | DESCRIPTION | BY | CHKD. |
| 1 | 10/15/50 | INITIAL SURVEY | J. H. [unclear] | [unclear] |
| 2 | 11/15/50 | REVISION | [unclear] | [unclear] |
| 3 | 12/15/50 | REVISION | [unclear] | [unclear] |
| 4 | 1/15/51 | REVISION | [unclear] | [unclear] |
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| DESIGN MODES | | | | | OPERATING CONDITIONS | | | | |
|--------------|-------------|-----------|----------|----|----------------------|---------|---------|---------|---------|
| NO. | NAME | MODEL NO. | DATE | BY | COND. 1 | COND. 2 | COND. 3 | COND. 4 | COND. 5 |
| 1 | BASELINE | 100 | 10/10/77 | JM | 1 | 1 | 1 | 1 | 1 |
| 2 | SEISMIC | 101 | 10/10/77 | JM | 1 | 1 | 1 | 1 | 1 |
| 3 | TEMPERATURE | 102 | 10/10/77 | JM | 1 | 1 | 1 | 1 | 1 |
| 4 | WIND | 103 | 10/10/77 | JM | 1 | 1 | 1 | 1 | 1 |

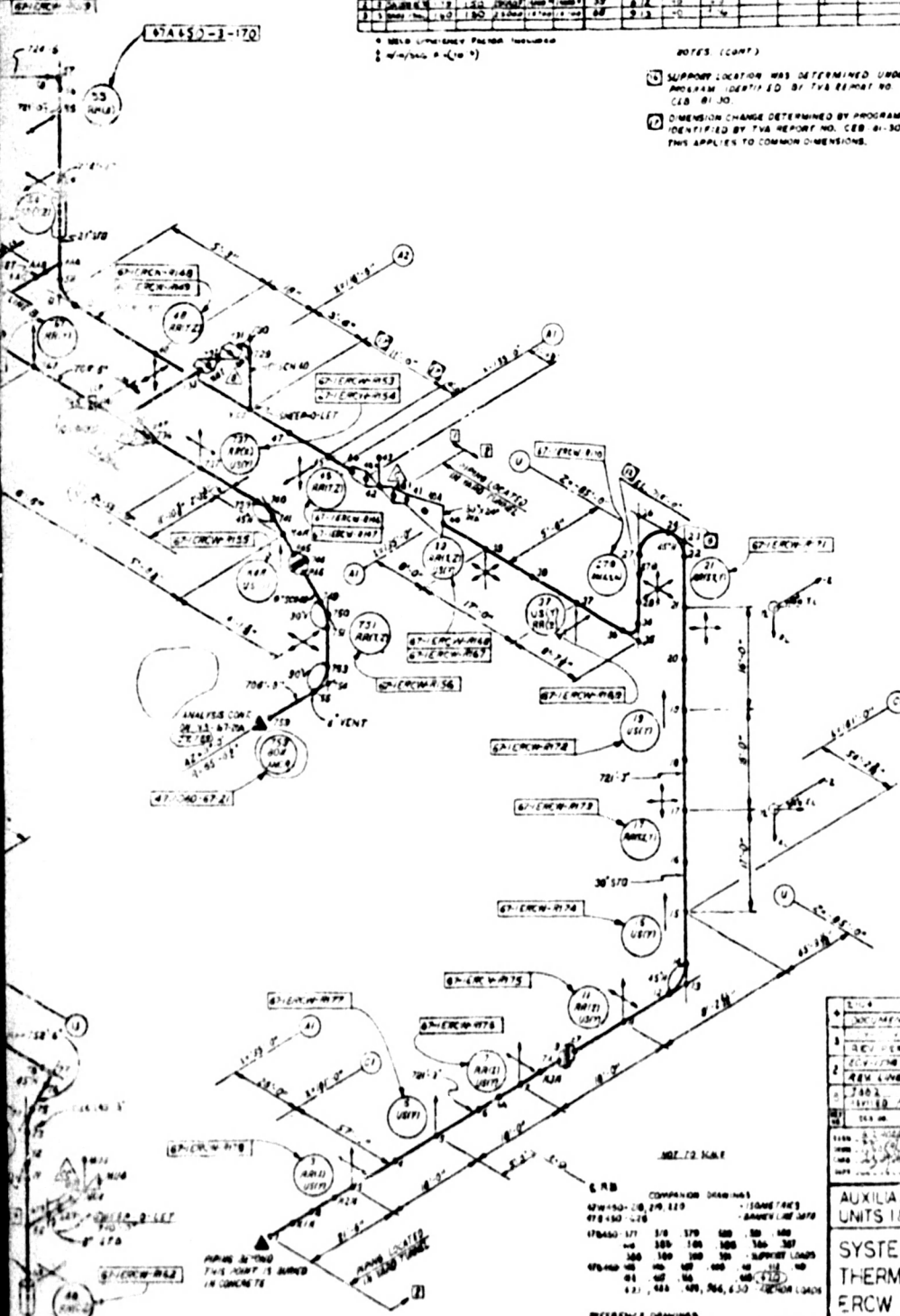


| SYMBOL | DEFINITION |
|----------|-----------------------------|
| (Symbol) | FIXED RESTRAINT |
| (Symbol) | FIXED SUPPORT |
| (Symbol) | SPRING SUPPORT |
| (Symbol) | SLIDING SUPPORT |
| (Symbol) | CONTACT FORCE SUPPORT |
| (Symbol) | FRICTION RESTRAINT |
| (Symbol) | ANCHOR |
| (Symbol) | FIXED ANCHOR |
| (Symbol) | TAPE RESTRICTION NUMBER |
| (Symbol) | WELD NUMBER-SEE TABLE |
| (Symbol) | NOTE NUMBER |
| (Symbol) | COLOR LINE |
| (Symbol) | TARGET INTERSECT POINT |
| (Symbol) | JOINT IDENTIFICATION NUMBER |
| (Symbol) | SPRING UP POINT |
| (Symbol) | SUPPORT NAME NUMBER |

NOTES (CONT.)

1 SUPPORT LOCATION WAS DETERMINED UNDER PROGRAM IDENTIFIED BY TVA REPORT NO. CEB 81-30.

2 DIMENSION CHANGE DETERMINED BY PROGRAM IDENTIFIED BY TVA REPORT NO. CEB 81-30. THIS APPLIES TO COMMON DIMENSIONS.



- 1 THIS REPRESENTS A LATERAL RESTRAINT AT THIS POINTS INDICATES A RESTRICTED LATERAL RESTRAINT.
- 2 ALL PIPING IN THIS SYSTEM IS INDICATED WITH 1" ALLIGATOR MARKING.
- 3 PIPING BEYOND THIS POINT SHALL BE SUPPORTED BY ALTERNATE MEANS. SEE REPORT CEB 81-30.
- 4 THE DASHED PIPING IS OBTAINED WITH PROBLEM NO. 67-11A.
- 5 THIS POINT BEHIND THE SUPPORT IS AS A 7' DIA. HOLE IN THE WALL.
- 6 ALL PIPING BEYOND THIS POINT CONTINUED ON SYSTEM V3-67-2A, UNITS 1 & 2 UNIT.
- 7 ALL PIPING 2" AND SMALLER IS SOCKET WELDED.
- 8 PIPING ANALYSIS MODEL IS CURRENTLY TO REVISION 1 OF DRAWING 67-ERCW-148. CHANGE TO REVISION 2 OF ANY LATER REVISION OF THE DRAWING MADE WILL REQUIRE REANALYSIS BUT WILL BE INCORPORATED INTO THE NEXT REANALYSIS OF THE MODEL.
- 9 THIS IS AN ANALYSIS REPRESENTATION AND NOT A CONSTRUCTION DRAWING.
- 10 ALL PIPING IS MODERATE ENERGY.
- 11 ALL PIPING IS CLASS C.

| | | | |
|-----|----------------------|------|----|
| NO. | DESCRIPTION | DATE | BY |
| 1 | DOCUMENTATION CHANGE | | |
| 2 | REVISIONS | | |
| 3 | REVISIONS | | |
| 4 | REVISIONS | | |
| 5 | REVISIONS | | |
| 6 | REVISIONS | | |
| 7 | REVISIONS | | |
| 8 | REVISIONS | | |
| 9 | REVISIONS | | |
| 10 | REVISIONS | | |

AUXILIARY BUILDING
UNITS 1 & 2 COMMON

SYSTEM N3-67-1A ISOMETRIC: STATIC, THERMAL AND SEISMIC ANALYSIS OF ERCW HEADER 1B

WATTS BAR NUCLEAR PLANT
TENNESSEE VALLEY AUTHORITY
DIVISION OF ENGINEERING DESIGN

DESIGNED BY: [Signature]
CHECKED BY: [Signature]
APPROVED BY: [Signature]

KNOXVILLE 1-7-77 86 W 47W450-27 80

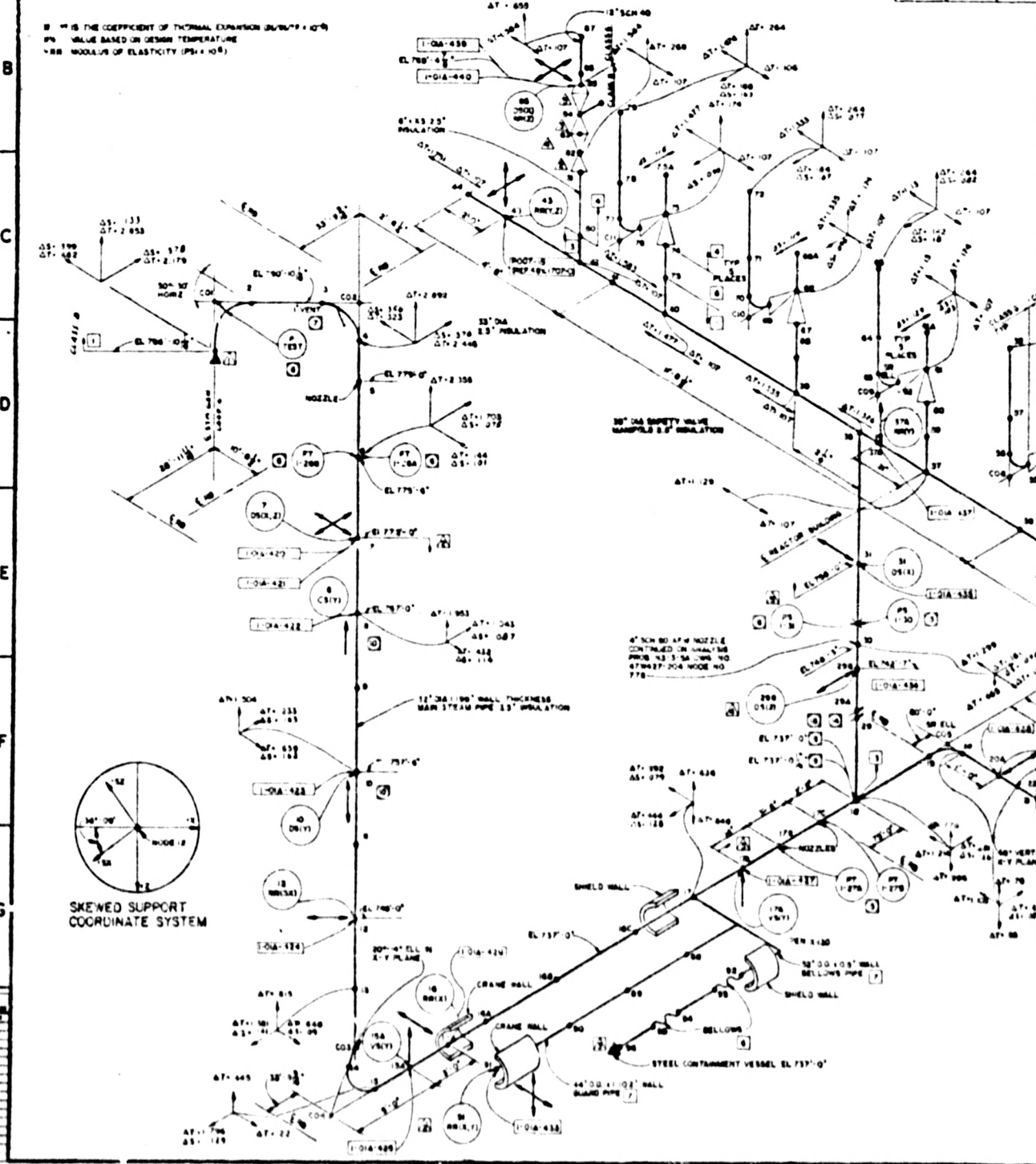
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8501160408-04

| DESIGN MODES | | | | | | | | | | OPERATING CONDITIONS | | | | | | | | | | WALL EL. | | | TYPE | | |
|--------------|---------------|---------------------|-------------------|-----------|-------|-------|-----------------|----------------------|----------------------|----------------------|-----------------------|-----------------------|------------------------|------------------------|-------------------------|-----------------------------|----------------------------------|-------------------------------|------------------------|---------------------|---------------|----------|-------------|--|--|
| MODE NO. | PIPE MATERIAL | DESIGN PRESS. (PSI) | DESIGN TEMP. (°F) | E (PSI) | μ | ν | α (1/°F) | σ_{ult} (PSI) | σ_{all} (PSI) | COND. | σ_{hoop} (PSI) | σ_{long} (PSI) | σ_{shear} (PSI) | σ_{axial} (PSI) | σ_{radial} (PSI) | $\sigma_{tangential}$ (PSI) | $\sigma_{circumferential}$ (PSI) | $\sigma_{longitudinal}$ (PSI) | σ_{shear} (PSI) | WALL THICKNESS (IN) | WALL EL. (FT) | TYPE | | | |
| 1A | SA508-32 | 1185 | 600 | 28400 | 0.27 | 0.30 | 7.15E-6 | 157 | 7.15 | 28.0 | 575 | 7.04 | 25.847 | 575 | 7.04 | 25.847 | 70 | 27.9 | 70 | 27.9 | 1 | PCV-120 | PHILORE | | |
| 2 | SA508-32 | 1185 | 600 | 28400 | 0.27 | 0.30 | 7.15E-6 | 157 | 7.15 | 28.0 | 575 | 7.04 | 25.847 | 575 | 7.04 | 25.847 | 70 | 27.9 | 70 | 27.9 | 2 | 47800-1 | GATE | | |
| 3 | SA508-32 | 1185 | 600 | 28400 | 0.27 | 0.30 | 7.15E-6 | 157 | 7.15 | 28.0 | 575 | 7.04 | 25.847 | 575 | 7.04 | 25.847 | 70 | 27.9 | 70 | 27.9 | 3 | PCV-120 | RELIEF | | |
| 4 | SA508-32 | 1185 | 600 | 28400 | 0.27 | 0.30 | 7.15E-6 | 157 | 7.15 | 28.0 | 575 | 7.04 | 25.847 | 575 | 7.04 | 25.847 | 70 | 27.9 | 70 | 27.9 | 4 | SA508-32 | SHIELD WALL | | |
| 5 | SA508-32 | 1185 | 600 | 28400 | 0.27 | 0.30 | 7.15E-6 | 157 | 7.15 | 28.0 | 575 | 7.04 | 25.847 | 575 | 7.04 | 25.847 | 70 | 27.9 | 70 | 27.9 | 5 | SA508-32 | SHIELD WALL | | |
| 6 | SA508-32 | 1185 | 600 | 28400 | 0.27 | 0.30 | 7.15E-6 | 157 | 7.15 | 28.0 | 575 | 7.04 | 25.847 | 575 | 7.04 | 25.847 | 70 | 27.9 | 70 | 27.9 | 6 | SA508-32 | SHIELD WALL | | |
| 7 | SA508-32 | 1185 | 600 | 28400 | 0.27 | 0.30 | 7.15E-6 | 157 | 7.15 | 28.0 | 575 | 7.04 | 25.847 | 575 | 7.04 | 25.847 | 70 | 27.9 | 70 | 27.9 | 7 | 47800-2 | SA508-32 | | |
| 8 | SA508-32 | 1185 | 600 | 28400 | 0.27 | 0.30 | 7.15E-6 | 157 | 7.15 | 28.0 | 575 | 7.04 | 25.847 | 575 | 7.04 | 25.847 | 70 | 27.9 | 70 | 27.9 | 8 | SA508-32 | SHIELD WALL | | |

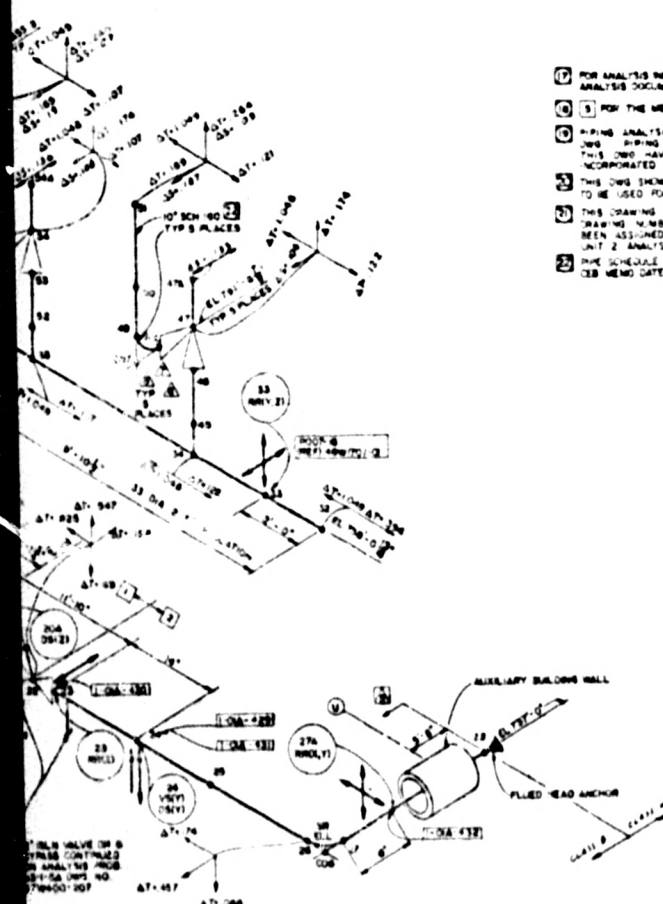
μ IS THE COEFFICIENT OF THERMAL EXPANSION (1/°F) (°F)
 ν IS THE POISSON'S RATIO
 α IS THE COEFFICIENT OF THERMAL EXPANSION (1/°F) (°F)
 σ_{ult} IS THE TENSILE STRENGTH (PSI)
 σ_{all} IS THE ALLOWABLE STRESS (PSI)
 E IS THE MODULUS OF ELASTICITY (PSI)



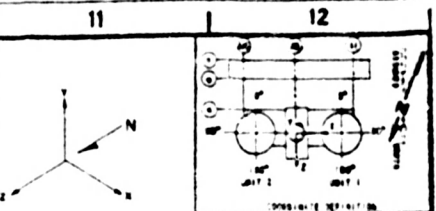
| MODE NO. | PIPE MATERIAL | DESIGN PRESS. (PSI) | DESIGN TEMP. (°F) | E (PSI) | μ | ν | α (1/°F) | σ_{ult} (PSI) | σ_{all} (PSI) | COND. | σ_{hoop} (PSI) | σ_{long} (PSI) | σ_{shear} (PSI) | σ_{axial} (PSI) | σ_{radial} (PSI) | $\sigma_{tangential}$ (PSI) | $\sigma_{circumferential}$ (PSI) | $\sigma_{longitudinal}$ (PSI) | σ_{shear} (PSI) | |
|----------|---------------|---------------------|-------------------|-----------|-------|-------|-----------------|----------------------|----------------------|-------|-----------------------|-----------------------|------------------------|------------------------|-------------------------|-----------------------------|----------------------------------|-------------------------------|------------------------|------|
| 1A | SA508-32 | 1185 | 600 | 28400 | 0.27 | 0.30 | 7.15E-6 | 157 | 7.15 | 28.0 | 575 | 7.04 | 25.847 | 575 | 7.04 | 25.847 | 70 | 27.9 | 70 | 27.9 |
| 2 | SA508-32 | 1185 | 600 | 28400 | 0.27 | 0.30 | 7.15E-6 | 157 | 7.15 | 28.0 | 575 | 7.04 | 25.847 | 575 | 7.04 | 25.847 | 70 | 27.9 | 70 | 27.9 |
| 3 | SA508-32 | 1185 | 600 | 28400 | 0.27 | 0.30 | 7.15E-6 | 157 | 7.15 | 28.0 | 575 | 7.04 | 25.847 | 575 | 7.04 | 25.847 | 70 | 27.9 | 70 | 27.9 |
| 4 | SA508-32 | 1185 | 600 | 28400 | 0.27 | 0.30 | 7.15E-6 | 157 | 7.15 | 28.0 | 575 | 7.04 | 25.847 | 575 | 7.04 | 25.847 | 70 | 27.9 | 70 | 27.9 |
| 5 | SA508-32 | 1185 | 600 | 28400 | 0.27 | 0.30 | 7.15E-6 | 157 | 7.15 | 28.0 | 575 | 7.04 | 25.847 | 575 | 7.04 | 25.847 | 70 | 27.9 | 70 | 27.9 |
| 6 | SA508-32 | 1185 | 600 | 28400 | 0.27 | 0.30 | 7.15E-6 | 157 | 7.15 | 28.0 | 575 | 7.04 | 25.847 | 575 | 7.04 | 25.847 | 70 | 27.9 | 70 | 27.9 |
| 7 | SA508-32 | 1185 | 600 | 28400 | 0.27 | 0.30 | 7.15E-6 | 157 | 7.15 | 28.0 | 575 | 7.04 | 25.847 | 575 | 7.04 | 25.847 | 70 | 27.9 | 70 | 27.9 |
| 8 | SA508-32 | 1185 | 600 | 28400 | 0.27 | 0.30 | 7.15E-6 | 157 | 7.15 | 28.0 | 575 | 7.04 | 25.847 | 575 | 7.04 | 25.847 | 70 | 27.9 | 70 | 27.9 |

| ASST. NO. | DATE | BY | REVISION | DESCRIPTION |
|-----------|----------|-----|----------|------------------------------|
| 001 | 12/28/68 | JCS | 1 | ISSUED FOR CONSTRUCTION |
| 002 | 01/15/69 | JCS | 2 | REVISED TO SHOW FIELD LAYOUT |
| 003 | 02/10/69 | JCS | 3 | REVISED TO SHOW FIELD LAYOUT |
| 004 | 03/10/69 | JCS | 4 | REVISED TO SHOW FIELD LAYOUT |
| 005 | 04/10/69 | JCS | 5 | REVISED TO SHOW FIELD LAYOUT |
| 006 | 05/10/69 | JCS | 6 | REVISED TO SHOW FIELD LAYOUT |
| 007 | 06/10/69 | JCS | 7 | REVISED TO SHOW FIELD LAYOUT |
| 008 | 07/10/69 | JCS | 8 | REVISED TO SHOW FIELD LAYOUT |
| 009 | 08/10/69 | JCS | 9 | REVISED TO SHOW FIELD LAYOUT |
| 010 | 09/10/69 | JCS | 10 | REVISED TO SHOW FIELD LAYOUT |
| 011 | 10/10/69 | JCS | 11 | REVISED TO SHOW FIELD LAYOUT |
| 012 | 11/10/69 | JCS | 12 | REVISED TO SHOW FIELD LAYOUT |

- SUPPORT ZONE ID NUMBERS**
- 1 STEAM GENERATOR
 - 2 INTERIOR CONCRETE STRUCTURE
 - 3 STEEL CONTAINMENT VESSEL
 - 4 SHIELD BUILDING
 - 5 AUXILIARY BUILDING



- NOTES**
- 1 FOR ANALYSIS INFORMATION SEE CEB REPORT CEB-ME-70-5 FINAL ANALYSIS DOCUMENTATION LOG
 - 2 FOR THE MEMBER BETWEEN NODES 29 AND 29A
 - 3 PIPING ANALYSIS MODEL IS CURRENT TO REVISION 10 OF THIS JOB. PIPING CHANGES SHOWN ON ANY LATER REVISION OF THIS JOB HAVE NOT BEEN INCORPORATED INTO THIS MODEL BUT WILL BE INCORPORATED INTO THE NEXT REVISION OF THIS MODEL.
 - 4 THIS DRAWING SHOWS THE ANALYSIS SUPPORT LOCATION AND IS NOT TO BE USED FOR SUPPORT FABRICATION OR INSTALLATION.
 - 5 THIS DRAWING 47W400-216 IS FOR UNIT 1 ONLY. A NEW TRAINING NUMBER 47W400-223 AND 0800250-08-04 HAS BEEN ASSIGNED FOR UNIT 2 AND WILL BE ISSUED WHEN THE UNIT 2 ANALYSIS IS COMPLETED.
 - 6 THE SCHEDULE CHANGE NEEDED FOR STRESS QUALIFICATION PER CEB MEMO DATED DEC. 2, 1968 WERE AS FOLLOWS: CEB 82-202-01



Possible Rupture Locations

| NO. | DESCRIPTION |
|-----|-----------------------------|
| 1 | STEAM GENERATOR |
| 2 | INTERIOR CONCRETE STRUCTURE |
| 3 | STEEL CONTAINMENT VESSEL |
| 4 | SHIELD BUILDING |
| 5 | AUXILIARY BUILDING |

- 1 ALL ELBOWS LR UNLESS OTHERWISE NOTED
 - 2 ENTIRE PIPE IS INSULATED AS SHOWN (MIRROR INSULATION)
 - 3 ENTIRE PIPE IS HIGH ENERGY
 - 4 RUPTURE LOCATION HAS BEEN IDENTIFIED PER THE GUIDELINES OF DESIGN CRITERIA 4B-2C, 1C-11-10 AND AS SHOWN BY THE LETTER 'R' IN JOINT 204 AND 205. THE RETENACITY RUPTURE LOCATIONS AT JOINT 7 AND JOINT 7C DO NOT EXCEED THE RUPTURE CRITERIA AND ARE DEEMED TO MEET MINIMUM RUPTURE LOCATION CRITERIA.
 - 5 BRANCH CONNECTION ANALYZED IN ACCORDANCE WITH THE LETTER 'B' IN JOINT 204, 205. SUPPORT TO BE PROVIDED BY THE BRANCH CONNECTION TO BE SUPPORTED IN ACCORDANCE WITH ALTERNATE ANALYSIS CRITERIA.
 - 6 RUPTURE STRESSES ALLOWABLE RUPTURE STRESS 11,000 PSI
- | JOINT | MEMBER | RUPTURE STRESS | STRESS LOCATION |
|-------|--------|----------------|-----------------|
| 1 | COL | 23728 | 15.5 INCH |
| 2 | SE | 31378 | 15.5 INCH |
| 3 | SH | 30578 | 15.5 INCH |
| 4 | TA | 4517 | 15.5 INCH |
- 7 ERECTED TEE CENTERLINE ELEVATION BEFORE COLD PULLING
 - 8 ERECTED TEE CENTERLINE ELEVATION AFTER COLD PULLING
 - 9 SUPPORTS AT JOINTS 204 AND 205 ARE AS SHOWN
 - 10 BELLOWES WELDED TO SCYFFERS COLD PULL
 - 11 1/2" COLD PULL GAP AFTER COLD PULL FORCE - 2075 LBS. SUPPORTS SHOULD BE ADJUSTED TO CARRY PIPE DEADWEIGHT DURING COLD PULL OPERATION
 - 12 SUPPORT LOCATIONS WERE DETERMINED UNDER PROGRAM IDENTIFIED BY THE LETTER 'R' IN JOINT 204
 - 13 CLEARANCE MUST BE MAINTAINED TO ALLOW FOR THERMAL PLUS SEISMIC PIPING MOVEMENTS AT ALL BRANCH THERMAL MOVEMENTS (N) INCLUDES COLD PIPING MOVEMENTS (N) MAXIMUM SEISMIC MOVEMENTS IN ALL DIRECTIONS (N) INCLUDES THERMAL MOVEMENTS, RELIEF VALVE THRUST, JOINT PRESSURE LOAD ON BELLOWES, AND MOVEMENTS LESS THAN 0.4" ARE NOT SHOWN

COMP DWGS 47W400-408
 47W400-409 47W400-410
 47W400-421

REF DWGS 47W400-116, 217, 444
 47W410-115, 47W410-117
 47W410-118

| | | | |
|----------|----------|----------|----------|
| NO. | 116 | NO. | 408 |
| DATE | 12/28/68 | DATE | 01/15/69 |
| BY | JCS | BY | JCS |
| CHECKED | JCS | CHECKED | JCS |
| APPROVED | JCS | APPROVED | JCS |

AUXILIARY BUILDING UNIT 1

SYSTEM C600200-06-04 ISO-32" MAIN STEAM LINE FROM GEN (LOOP 4) TO AUX BLDG ANCR

WATTS BAR NUCLEAR PLANT
 TENNESSEE VALLEY AUTHORITY

DATE OF ISSUE: 12/28/68

ISSUED FOR: ECR 1481

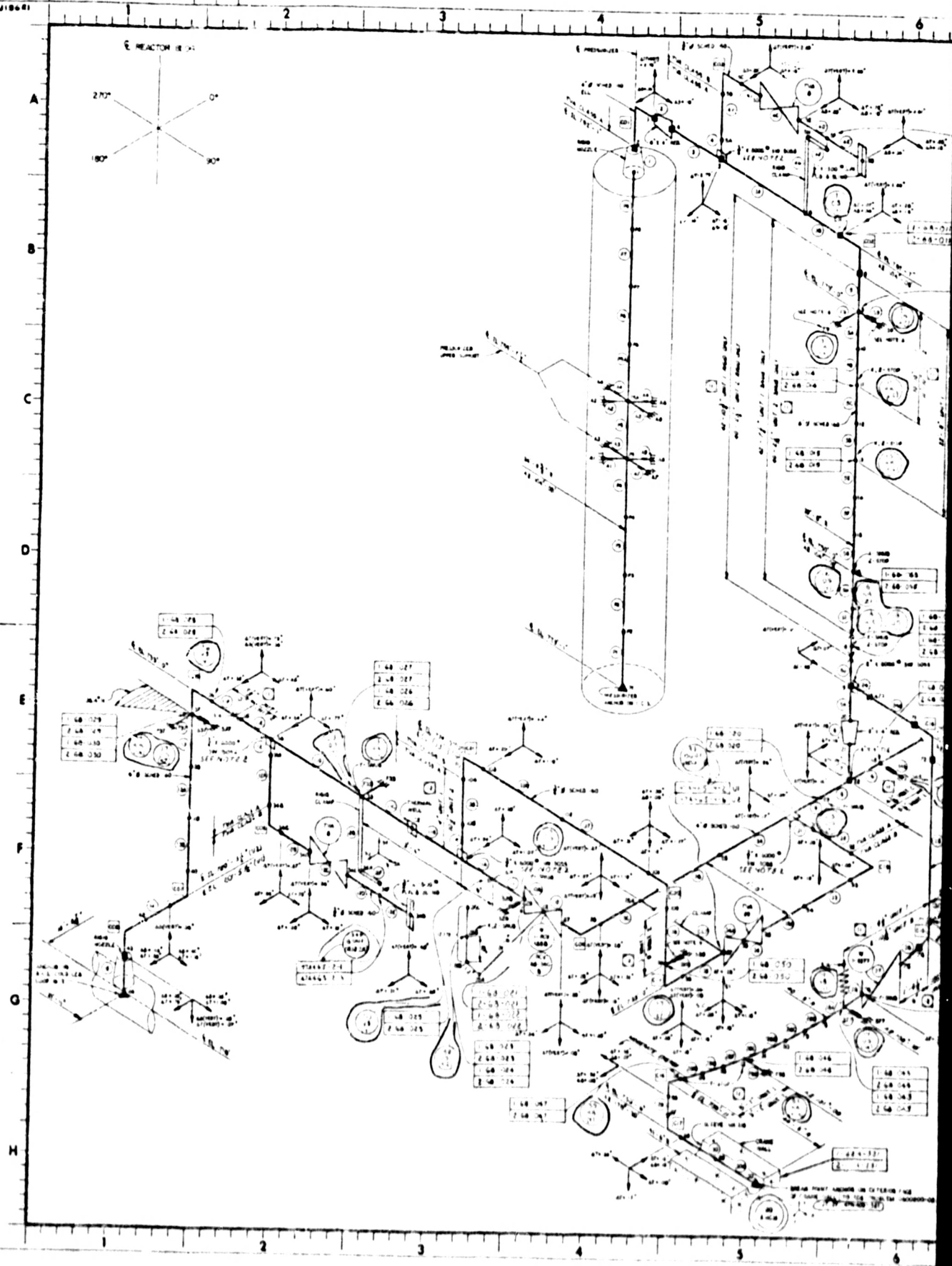
INSPECTED AND APPROVED FOR: JCS

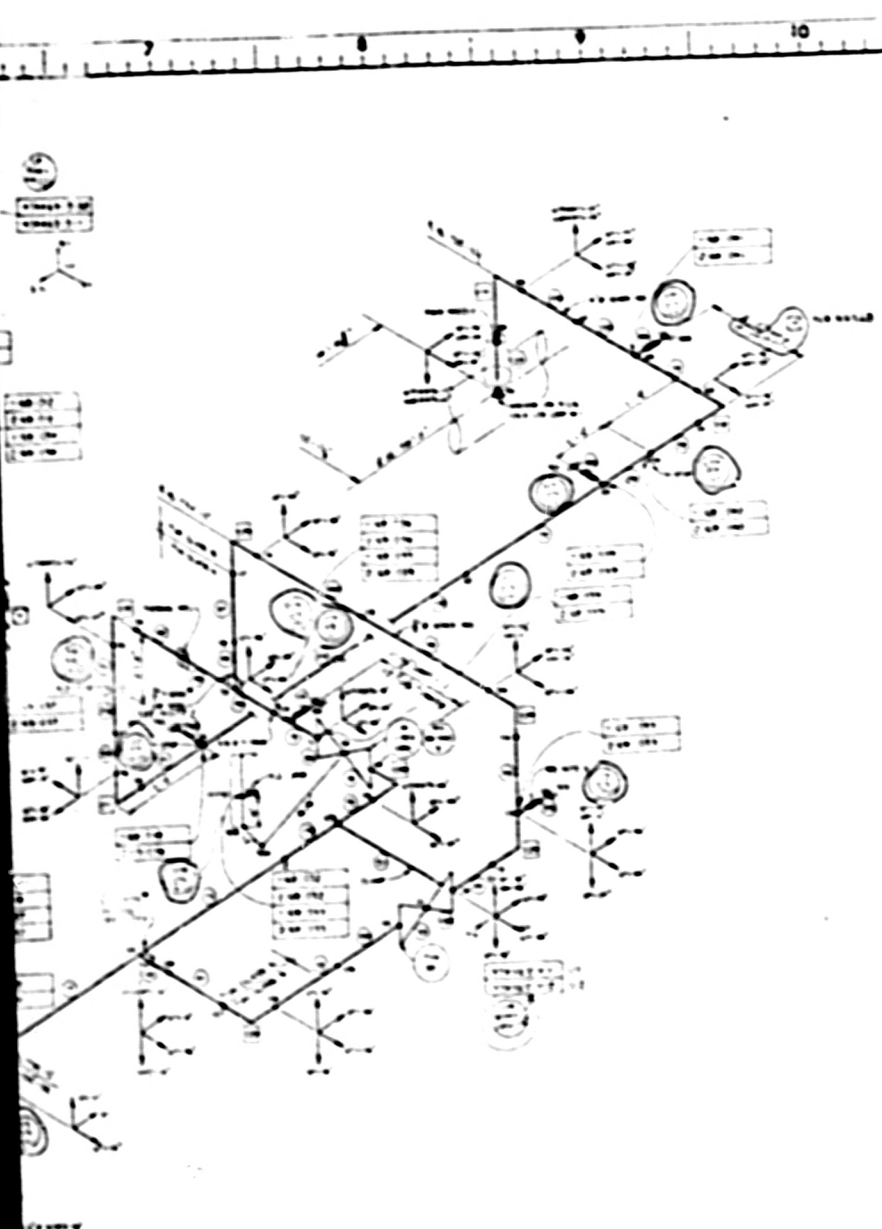
APPROVED: JCS

NO. 47W400-216

THIS DRAWING SUPERSEDES THE DRAWING NUMBER 0800250-08-04

8501160 408-05





LEGEND

| SYMBOL | DESCRIPTION |
|---------------------|-------------------------------|
| (Circle with dot) | Instrument |
| (Circle with slash) | Valve |
| (Circle with 'X') | Isolation Valve |
| (Circle with 'A') | Pressure Transducer |
| (Circle with 'B') | Temperature Transducer |
| (Circle with 'C') | Flow Transducer |
| (Circle with 'D') | Level Transducer |
| (Circle with 'E') | Position Transducer |
| (Circle with 'F') | Control Element |
| (Circle with 'G') | Control Rod |
| (Circle with 'H') | Control Rod Drive Mechanism |
| (Circle with 'I') | Control Rod Positioner |
| (Circle with 'J') | Control Rod Drive Motor |
| (Circle with 'K') | Control Rod Drive Gear |
| (Circle with 'L') | Control Rod Drive Shaft |
| (Circle with 'M') | Control Rod Drive Pin |
| (Circle with 'N') | Control Rod Drive Tube |
| (Circle with 'O') | Control Rod Drive Head |
| (Circle with 'P') | Control Rod Drive Base |
| (Circle with 'Q') | Control Rod Drive Support |
| (Circle with 'R') | Control Rod Drive Guide |
| (Circle with 'S') | Control Rod Drive Seal |
| (Circle with 'T') | Control Rod Drive O-Ring |
| (Circle with 'U') | Control Rod Drive Gasket |
| (Circle with 'V') | Control Rod Drive Bolt |
| (Circle with 'W') | Control Rod Drive Nut |
| (Circle with 'X') | Control Rod Drive Washer |
| (Circle with 'Y') | Control Rod Drive Spacer |
| (Circle with 'Z') | Control Rod Drive Pin Support |

- REVISIONS**
1. Original design.
 2. Revised design to include cold water supply connection.
 3. Revised design to include instrumentation.
 4. Revised design to include control rod drive mechanism.
 5. Revised design to include control rod drive motor.
 6. Revised design to include control rod drive gear.
 7. Revised design to include control rod drive shaft.
 8. Revised design to include control rod drive pin.
 9. Revised design to include control rod drive tube.
 10. Revised design to include control rod drive head.
 11. Revised design to include control rod drive base.
 12. Revised design to include control rod drive support.
 13. Revised design to include control rod drive guide.
 14. Revised design to include control rod drive seal.
 15. Revised design to include control rod drive O-ring.
 16. Revised design to include control rod drive gasket.
 17. Revised design to include control rod drive bolt.
 18. Revised design to include control rod drive nut.
 19. Revised design to include control rod drive washer.
 20. Revised design to include control rod drive spacer.
 21. Revised design to include control rod drive pin support.

STANDARD Dwg
 STANDARD 100 200 300 400
 STANDARD 500 600 700 800
 STANDARD 900 1000 1100
 STANDARD 1200 1300 1400
 STANDARD 1500 1600 1700
 STANDARD 1800 1900 2000

PROJECT NO. 100 200 300 400
 500 600 700 800
 900 1000 1100 1200
 1300 1400 1500 1600
 1700 1800 1900 2000

PERSONNEL SERVICE CONTRACT
 NO. TO RECORD

APPROVED AND SPECIFIED FOR THIS PROJECT

30/10/1971

WATTS BAR NUCLEAR PLANT
 TENNESSEE VALLEY AUTHORITY

PROJECT NO. 100 200 300 400
 500 600 700 800
 900 1000 1100 1200
 1300 1400 1500 1600
 1700 1800 1900 2000

PROBLEM 0600200-13-02
 ISOMETRIC-STATIC, THERMAL & DYNAMIC ANAL
 4" DIA PZR SPRAY LINE FROM PZR TO RCS
 COLD LEG LOOP NO. 1 & RCS COLD LEG LOOP
 NO. 2 & BWR PT TO EDS PROBLEM 0600200-08-11)

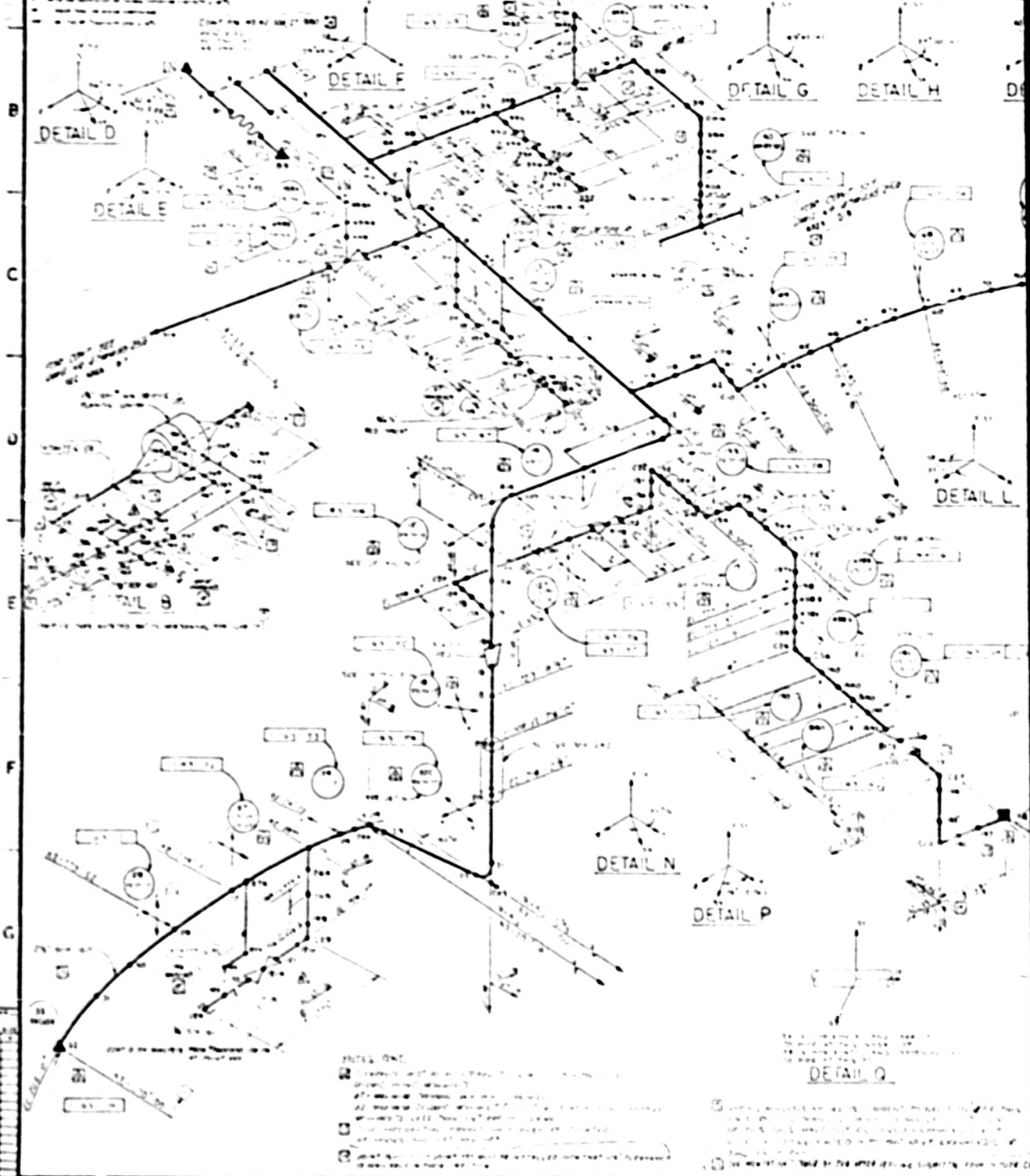
APPROVED
 DATE 10/10/71
 BY J. H. [Signature]
 FOR [Signature]

ENNOVILLE, TENN. 37665-200

8501160408-06

1 2 3 4 5 6

| DESIGN MODES | | | | | | | | | | OPERATING CONDITIONS | | | | | | | | | |
|--------------|-----|------|-------------|------|------|-----|------|-------------|------|----------------------|-----|------|-------------|------|------|--|--|--|--|
| MODE | NO. | NAME | DESCRIPTION | UNIT | TYPE | NO. | NAME | DESCRIPTION | UNIT | TYPE | NO. | NAME | DESCRIPTION | UNIT | TYPE | | | | |
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| 2 | 2 | ... | ... | ... | ... | 2 | ... | ... | ... | ... | 2 | ... | ... | ... | ... | | | | |
| 3 | 3 | ... | ... | ... | ... | 3 | ... | ... | ... | ... | 3 | ... | ... | ... | ... | | | | |
| 4 | 4 | ... | ... | ... | ... | 4 | ... | ... | ... | ... | 4 | ... | ... | ... | ... | | | | |
| 5 | 5 | ... | ... | ... | ... | 5 | ... | ... | ... | ... | 5 | ... | ... | ... | ... | | | | |
| 6 | 6 | ... | ... | ... | ... | 6 | ... | ... | ... | ... | 6 | ... | ... | ... | ... | | | | |



DETAIL Q

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- 3. ...
- 4. ...
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- 6. ...

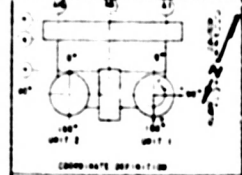
DETAIL Q

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- 2. ...
- 3. ...
- 4. ...
- 5. ...
- 6. ...

7 8 9 10 11 12

| NO. | REV. | DATE | BY | CHKD. | DESCRIPTION |
|-----|------|------|----|-------|-------------|
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| PROPERTY DATA | | | | | | | | | |
|---------------|-------------|------|-------|------|----|-------|-------------|------|-------|
| ITEM NO. | DESCRIPTION | UNIT | VALUE | DATE | BY | CHKD. | DESCRIPTION | UNIT | VALUE |
| 1 | TEMPERATURE | °F | ... | | | | | | |
| 2 | ... | ... | ... | | | | | | |



DETAIL I

DETAIL J

DETAIL K

DETAIL C

DETAIL A

DETAIL R

| SYMBOL | DEFINITION |
|----------|-----------------------------|
| (Symbol) | RESTRAINT |
| (Symbol) | FIXED SUPPORT |
| (Symbol) | INTERSECTION SUPPORT |
| (Symbol) | SPRING SUPPORT |
| (Symbol) | MOVABLE SPRING SUPPORT |
| (Symbol) | CONSTANT FORCE SUPPORT |
| (Symbol) | FLUCTUATING RESTRAINT |
| (Symbol) | BEARING |
| (Symbol) | FLUCTUATING SPRING |
| (Symbol) | VALVE IDENTIFICATION NUMBER |
| (Symbol) | PIPE NUMBER SEE SCALE |
| (Symbol) | WIRE NUMBER |
| (Symbol) | CONDUIT LINE |
| (Symbol) | TANGENT INTERSECT AT |
| (Symbol) | JOINT IDENTIFY BY NUMBER |
| (Symbol) | STRONG LAP JOINT |
| (Symbol) | SUPPORT ZONE |
| (Symbol) | ALPHABET MARK NUMBER |

- NOTES:
- 1. ALL DEVICES REQUIRED BY THIS DRAWING ARE A DESIGN REQUIREMENT AND MUST BE INSTALLED AS SHOWN.
 - 2. CLASS 1 WIRING BEYOND ITS 35 KVA SHOULD HAVE BEEN PROVIDED FOR SEISMIC EFFECTS ON THE MAIN PIPE.
 - 3. ALL ENERGY PARTS ARE BETWEEN 375 AND 425 PSI.
 - 4. ALL JOINTS SHOULD BE WELDED SOCKET WELD JOINTS.
 - 5. ALL JOINTS ON HORIZONTAL PIPE HAVE TO BE MADE WITH AN APPROPRIATE SYSTEM AS DEFINED IN THE FIELD MANUAL.
 - 6. FINAL ANALYSIS OF WIRE IN THE PEN TO RCL CONNECTION IS IN PROGRESS. THE RESULTS WILL BE REPORTED TO THE DESIGNER AS SOON AS AVAILABLE.

| | | |
|--|------------|-------------|
| REACTOR BUILDING UNIT 1 | | CLA 312.1 |
| PROBLEM 0600200-09-05 PEN T-X-22 | | |
| ISOMETRIC-STATIC, THERMAL & DYNAMIC ANALYSIS OF SIS, BORON INJECTION FROM PEN TO RCL COLD LEGS 1 & 4 | | |
| WATTS BAR NUCLEAR PLANT | | |
| TENNESSEE VALLEY AUTHORITY | | |
| DESIGNED BY | CHECKED BY | APPROVED BY |
| ... | ... | ... |
| KNOXVILLE 98 M 47N435-217 | | |

REFERENCE DATA INITIALS

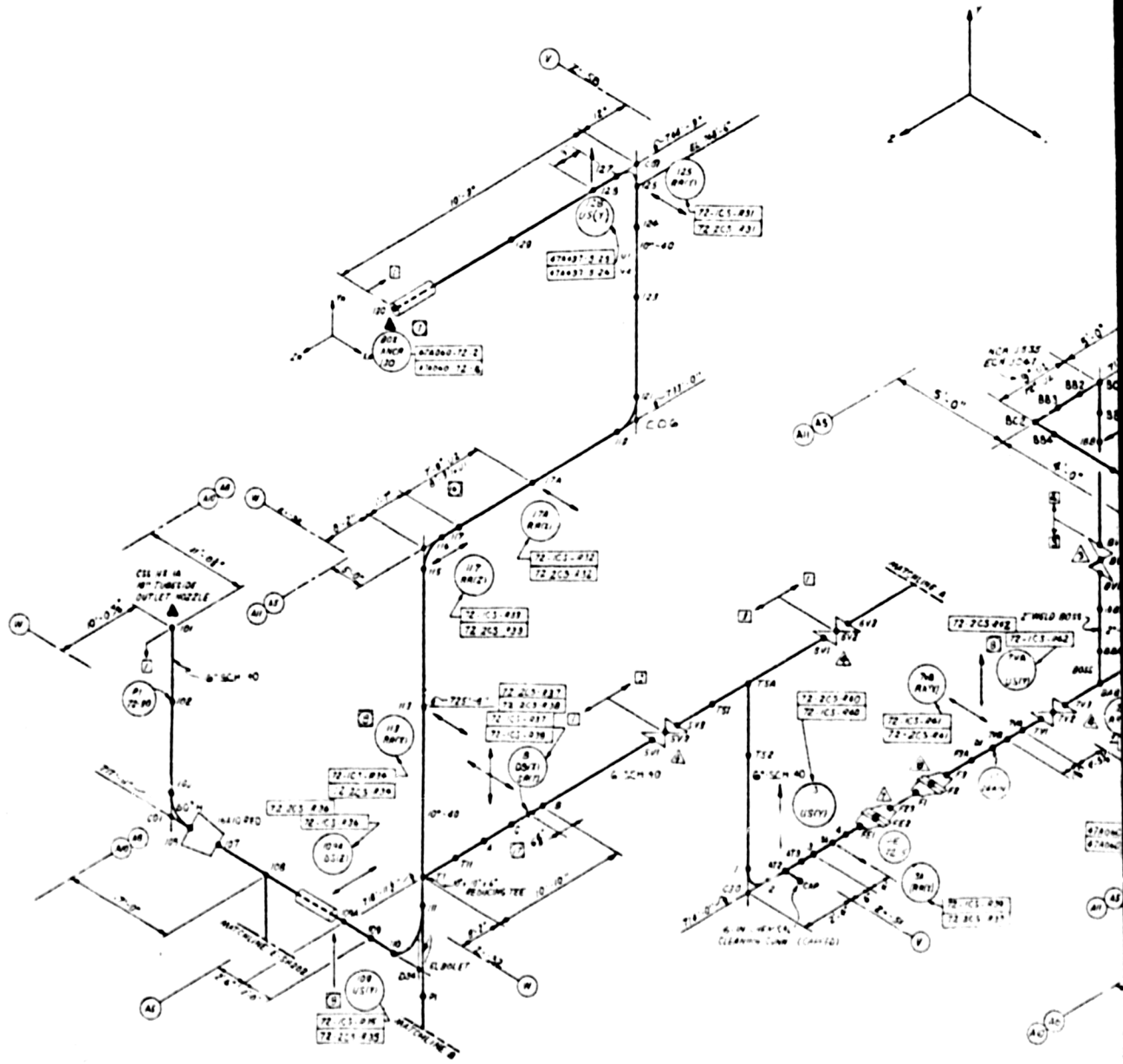
DATE: 10/12/84

ECN = 262,2576

INSPECTED AND APPROVED FOR ISSUE

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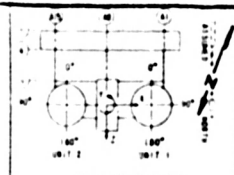
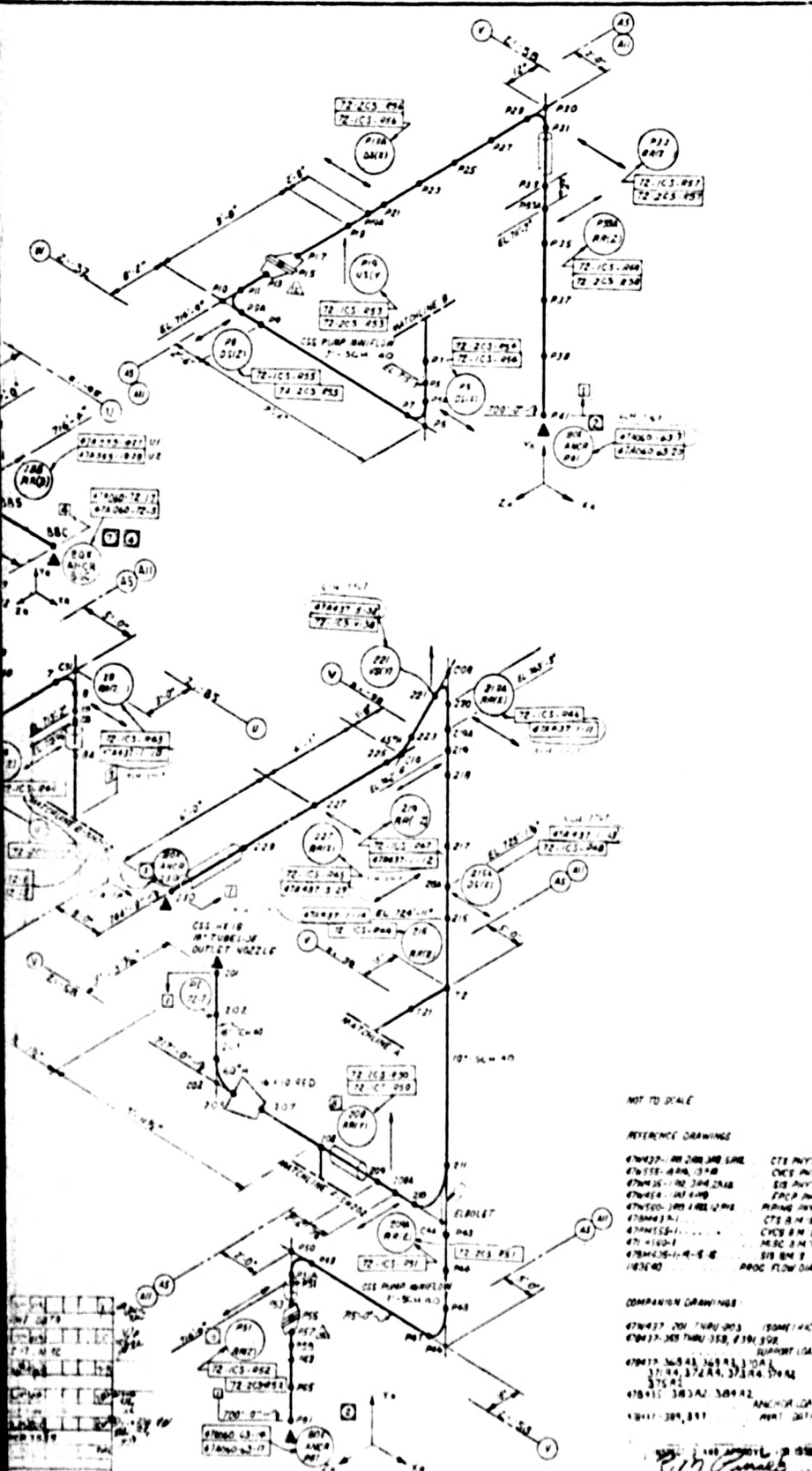


(NOTES CONT.)

- 1 SUPPORT LOCATION WAS DETERMINED UNDER PROGRAM IDENTIFIED BY TWA REPORT NO. 488 B110.
- 2 PIPING ANALYSIS MODEL IS CURRENT TO REVISION 7 OF THIS DWS. PIPING CHANGES SHOWN ON ANY LATER REVISION OF THIS DWS ARE NOT REQUIRED REANALYSIS BUT WILL BE INCORPORATED INTO THE NEXT REANALYSIS OR THIS PROGRAM.
- 3 THESE INSTRUMENT LINES HAVE PIPING INSTALLED BUT ARE JUDGED TO BE DELETED FROM ANALYSIS AS PER EVALUATION CALCULATION ONE LINE.

BY TWA 15 43 14/68
 JUNE 15 1968 (DATE HAND SELECTED AS NOTED)

| | | | | | |
|----|------|---------|------------|---------|------------|
| 11 | 8213 | ADD'S | COMPARISON | DWG | 47W437-201 |
| 10 | 7742 | REVISED | REVISED | REVISED | REVISED |
| 9 | 7742 | REVISED | REVISED | REVISED | REVISED |
| 8 | 7742 | REVISED | REVISED | REVISED | REVISED |
| 7 | 7742 | REVISED | REVISED | REVISED | REVISED |
| 6 | 7742 | REVISED | REVISED | REVISED | REVISED |
| 5 | 7742 | REVISED | REVISED | REVISED | REVISED |
| 4 | 7742 | REVISED | REVISED | REVISED | REVISED |
| 3 | 7742 | REVISED | REVISED | REVISED | REVISED |
| 2 | 7742 | REVISED | REVISED | REVISED | REVISED |
| 1 | 7742 | REVISED | REVISED | REVISED | REVISED |



COORDINATE DEFINITION

LEGEND

| SYMBOL | DEFINITION |
|----------|-----------------------------|
| [Symbol] | FIELD RESTRAINT |
| [Symbol] | METRIC RESTRAINT |
| [Symbol] | UNIDIRECTIONAL SUPPORT |
| [Symbol] | STRAINC SMOOTHER |
| [Symbol] | VARIABLE SPRING SUPPORT |
| [Symbol] | CONSTANT FORCE SUPPORT |
| [Symbol] | FICTITIOUS RESTRAINT |
| [Symbol] | ANCHOR |
| [Symbol] | FICTITIOUS ANCHOR |
| [Symbol] | TAKE IDENTIFICATION NUMBER |
| [Symbol] | WALL NUMBER-SEE TABLE |
| [Symbol] | NOTE NUMBER |
| [Symbol] | COLUMN LINE |
| [Symbol] | ANCHOR INTERSECT POINT |
| [Symbol] | JOINT IDENTIFICATION NUMBER |
| [Symbol] | STRAINC LAP POINT |
| [Symbol] | RESTRAINT DESIGN ON |
| [Symbol] | EXTERNAL SHEAR FORCE POINT |
| [Symbol] | SUPPORT JAW NO |

- NOTES:
- ALL LINES 2" AND SMALLER REQUIRE SOCKET WELD FITTINGS.
 - ANCHOR TO BE DESIGNED BY SYSTEM N3-72-1A (ISOMETRIC 47943-104) UNITS 1&2 AND P&I OF THIS ANALYSIS ARE P&I AND 400 RESPECTIVELY IN SYSTEM N3-63-7A.
 - ANCHOR TO BE DESIGNED BY SYSTEM N3-72-1A (ISOMETRIC 47943-104).
 - WALL SLAVEY: BORIC ACID BLENDER 2" DISCHARGE TO RWST
 - UNIT 2 ANCHOR WILL BE DESIGNED BY N3-63-4A, 2" & 1.5" AND 1.5".
 - FOR NOTE TABLE SEE 47943-103.
 - PIPING ON OTHER SIDE OF ANCHOR IS SUPPORTED BY ALTERNATE ANALYSIS.
 - AUXILIARY BUILDING SPECTRA IS 1000 FOR ALL BOWS.
 - PIPING ON OTHER SIDE OF ANCHOR IS SUPPORTED AND DESIGNED BY SYSTEM N3-63-1A, 1.5".
 - ALL WIDE I PIPING AND PIPING CIVIL HANDS ARE INSULATED WITH 2" OF CALCEUM SILICATE.
 - UNIT 2 ROUTING OF THIS PIPING SECTION IS SHOWN ON SA 105 AND IDENTIFIED AS N3-72-1A.
 - FICTITIOUS SUPPORT FOR ANALYSIS PURPOSE ONLY. BLENDE WITH PLATE ACTING AS 2" SLAVE.
 - SEE REPORT C&E 76-1 FOR ALTERNATE ANALYSIS.
 - FINAL ANALYSIS DENSIFICATION LOG 028-011-16-4.
 - ALL PIPING IS CLASS B, MODERATE ENERGY.

NOT TO SCALE

REFERENCE DRAWINGS

47943-103 200 200 200 LINE CTS P&I'S
 47943-104 300 300 300 C&E P&I'S
 47943-105 300 300 300 S&I P&I'S
 47943-106 300 300 300 T&P P&I'S
 47943-107 300 300 300 M&I P&I'S
 47943-108 300 300 300 CTS R&I'S
 47943-109 300 300 300 C&E R&I'S
 47943-110 300 300 300 M&I R&I'S
 47943-111 300 300 300 S&I R&I'S
 47943-112 300 300 300 P&I R&I'S

COMPANION DRAWINGS

47943-103 200 200 200 ISOMETRIC
 47943-104 300 300 300 ISOMETRIC
 47943-105 300 300 300 ISOMETRIC
 47943-106 300 300 300 ISOMETRIC
 47943-107 300 300 300 ISOMETRIC
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 47943-111 300 300 300 ISOMETRIC
 47943-112 300 300 300 ISOMETRIC

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| NO. | DESCRIPTION | DATE | BY | CHECKED |
| 1 | ISSUED FOR CONSTRUCTION | | | |
| 2 | REVISION | | | |
| 3 | REVISION | | | |
| 4 | REVISION | | | |
| 5 | REVISION | | | |

AUXILIARY BUILDING
 UNITS 1, 2 OPP H
 SYSTEM N3-72-1A
 ISOMETRIC-STATIC, THERMAL & DYNAMIC
 ANALYSIS FOR CSS HEAT EXCHANGER
 DISCHARGE TO CSS SPRAY HEADERS
 & 6" TEST LINE TO RWST

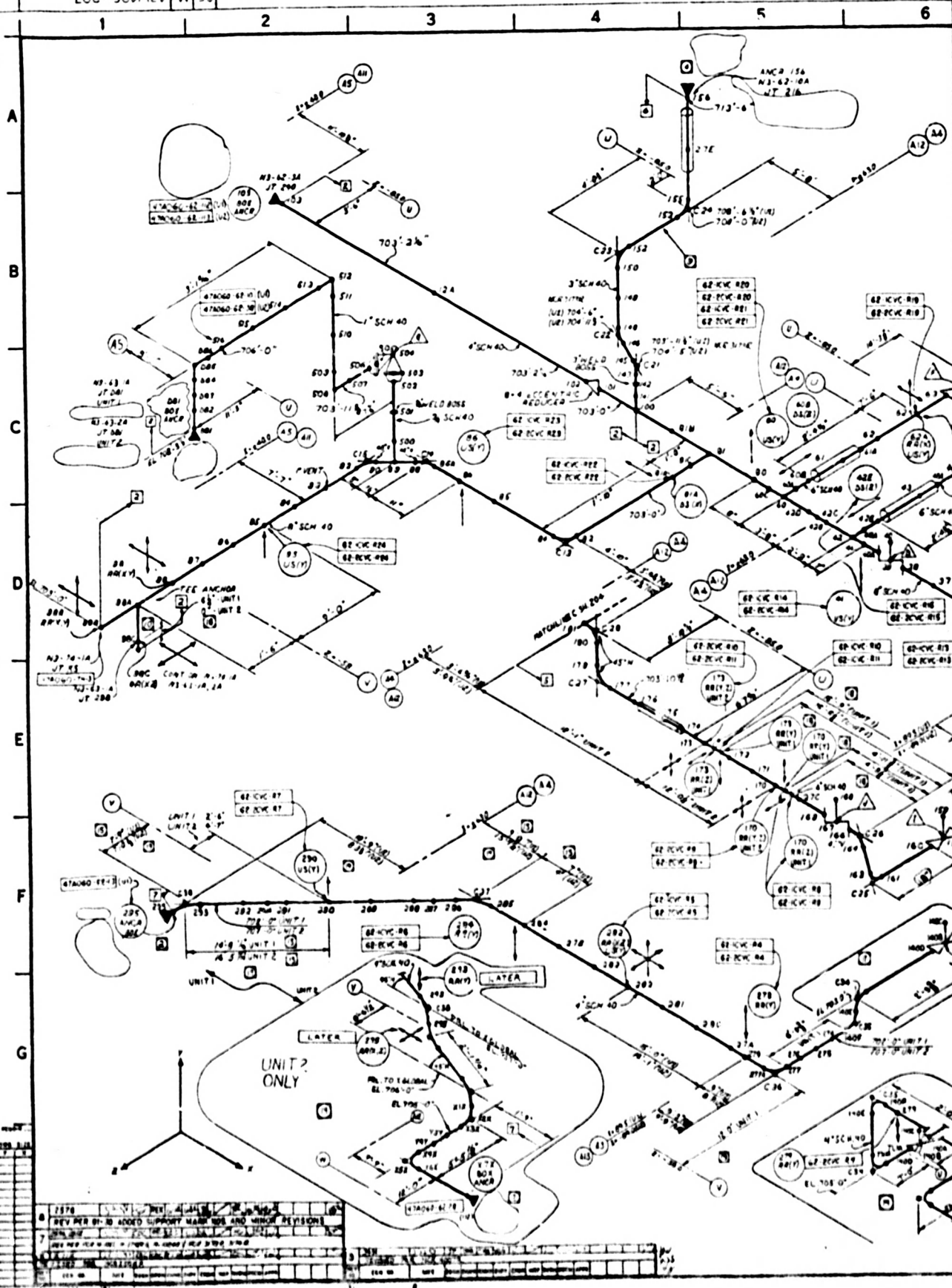
WATTS BAR NUCLEAR PLANT
 TENNESSEE VALLEY AUTHORITY
 DIVISION OF ENGINEERING DESIGN

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| [Signature] | [Signature] | [Signature] |

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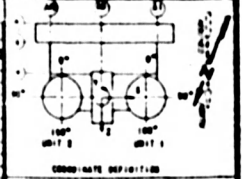
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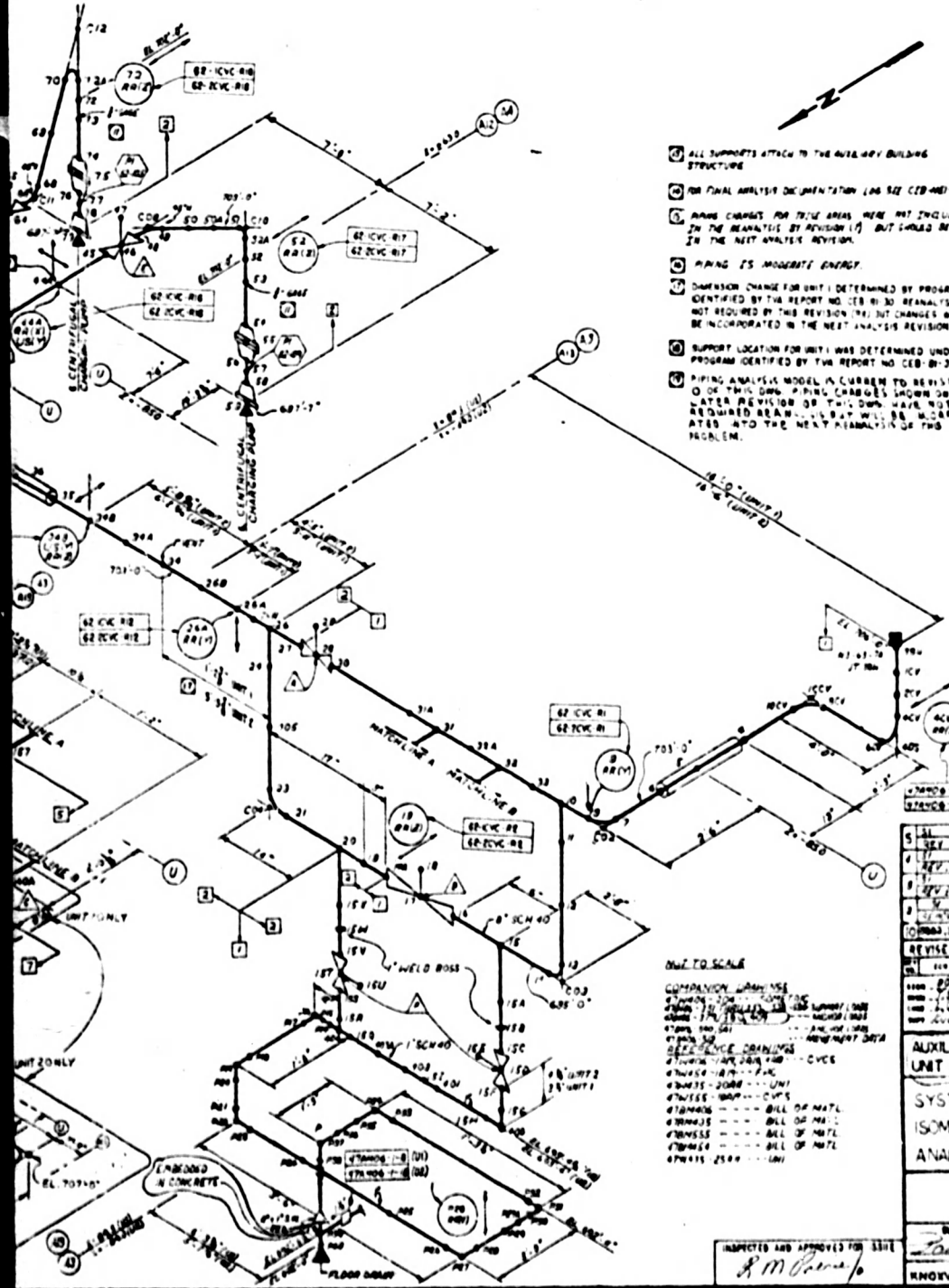
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| 88 | REVISED PER PERMITS | | | |
| 89 | REVISED PER PERMITS | | | |
| 90 | REVISED PER PERMITS | | | |
| 91 | REVISED PER PERMITS | | | |
| 92 | REVISED PER PERMITS | | | |
| 93 | REVISED PER PERMITS | | | |
| 94 | REVISED PER PERMITS | | | |
| 95 | REVISED PER PERMITS | | | |
| 96 | REVISED PER PERMITS | | | |
| 97 | REVISED PER PERMITS | | | |
| 98 | REVISED PER PERMITS | | | |
| 99 | REVISED PER PERMITS | | | |
| 100 | REVISED PER PERMITS | | | |

| DESIGN NOTES | | | OPERATION CONDITIONS | | | | | | | |
|--------------|-------------|------|----------------------|---------|---------|---------|---------|---------|---------|---------|
| NO. | DESCRIPTION | DATE | COND. 1 | COND. 2 | COND. 3 | COND. 4 | COND. 5 | COND. 6 | COND. 7 | COND. 8 |
| 1 | ... | ... | | | | | | | | |
| 2 | ... | ... | | | | | | | | |



LEGEND

| SYMBOL | DEFINITION |
|--------|-----------------------------|
| | DESTROYED RESTRAINT |
| | RESTRAINT |
| | DIAGNOSTIC RESTRAINT |
| | DIAGNOSTIC SUPPORT |
| | DIAGNOSTIC CHARGE |
| | DIAGNOSTIC PROBE SUPPORT |
| | DIAGNOSTIC FLOOR SUPPORT |
| | FICTITIOUS RESTRAINT |
| | ANCHOR |
| | FICTITIOUS GROUND |
| | VALVE IDENTIFICATION NUMBER |
| | WELD NUMBER-SEE TABLE |
| | NOTE NUMBER |
| | COLD AIR LINE |
| | TARGET INTERCEPT POINT |
| | JOINT IDENTIFICATION NUMBER |
| | SPRING LAP POINT |
| | SUPPORT MARK NO. |



- 1 ALL SUPPORTS ATTACH TO THE AUXILIARY BUILDING STRUCTURE
- 2 FOR FINAL ANALYSIS DOCUMENTATION, LONG SIZE CED-402-RB IS
- 3 ANCHOR CHARGES FOR THESE AREAS WERE NOT INCLUDED IN THE REANALYSIS BY REVISION 1) BUT SHOULD BE INCORPORATED IN THE NEXT ANALYSIS REVISION.
- 4 PIPING IS MODERATE ENERGY.
- 5 DIMENSION CHANGE FOR UNIT 1 DETERMINED BY PROGRAM IDENTIFIED BY THE REPORT NO. CED-BI-30. REANALYSIS IS NOT REQUIRED BY THIS REVISION. ANY DIMENSION CHANGES WILL BE INCORPORATED IN THE NEXT ANALYSIS REVISION.
- 6 SUPPORT LOCATION FOR UNIT 1 WAS DETERMINED UNDER PROGRAM IDENTIFIED BY THE REPORT NO. CED-BI-30.
- 7 PIPING ANALYSIS MODEL IS CURRENT TO REVISION 0 OF THIS DOW. PIPING CHARGES SHOWN OR ANY LATER REVISION OF THIS DOW, HAVE NOT REQUIRED REANALYSIS, BUT WILL BE INCORPORATED INTO THE NEXT REANALYSIS OF THE PROBLEM.

- NOTES:
- THE XY RESTRAINT AT 42A AND 62A MUST BE PROVIDED WITH 1/2" MINIMUM CLEARANCE BETWEEN PIPE AND SUPPORT ON THE WEST SIDE OF 42A AND ON THE EAST SIDE OF 62A, AND 1/4" CLEARANCE IN THE VERTICAL UP DIRECTION.
 - TERMINAL POINT OF ANALYSIS PIPING FROM THIS POINT ON IS TO BE SUPPORTED USING ALTERNATE ANCHOR ANALYSIS AND SUPPORT CRITERIA.
 - ANCHOR TO BE DESIGNED BY SYSTEM N3-62-7A.
 - ANCHOR TO BE DESIGNED BY SYSTEM N3-62-10A.
 - ANCHOR TO BE DESIGNED BY SYSTEM N3-62-3A.
 - ANCHOR TO BE DESIGNED BY SYSTEM N3-62-2A.
 - THE LAPPING IS INCLUDED TO FOLD IN THE XY DIRECTION.
 - PIPING TWO PINES AND SMALLER HAVE SOCKET WELDED JOINTS.
 - 3" CALCIUM SILICATE INSULATION ON EMERGENCY BOILER ON DUNE, ALL OTHERS WERE NOT INSULATED.
 - ANCHOR TO BE DESIGNED BY SYSTEM N3-62-1A.
 - 1" HAWK CONNECTOR TO BE USED DURING INITIAL FLUSHING AFTER LUBRICATING OIL OFF WITH LINE O.P.

REVISIONS

| NO. | DATE | BY | DESCRIPTION |
|-----|------|-----|-------------|
| 1 | ... | ... | ... |
| 2 | ... | ... | ... |

REVISION CHECK

BY: [Signature] DATE: [Date]

AUXILIARY BUILDING UNIT 1, UNIT 2 (OPPOSITE HAND EXCEPT AS NOTED)

SYSTEM N3-62-1A

ISOMETRIC - STATIC, THERMAL, SEISMIC ANALYSIS OF CVCS SUCTION PIPING

WATTS BAR NUCLEAR PLANT TENNESSEE VALLEY AUTHORITY

INSPECTED AND APPROVED FOR STATE: [Signature]

NO. [Number] DATE [Date]