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C. K. McCoy
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Vogtle Project

Georgia Power
the southern electric system

March 31, 1994

LCV-0210-B

Docket Nos. 50-424
50-425

TAC Nos. M80515
M80516

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555

Gentlemen:

VOGTLE ELECTRIC GENERATING PLANT
DIFFERENTIAL SETTLEMENT OF BURIED PIPE ADDITIONAL INFORMATION

The August 23, 1991, letter from the NRC to Mr. W. G. Hairston, III transmitted the Safety Evaluation Report (SER) regarding the VEGP settlement monitoring program. In section 2.4 of the SER, "Differential Settlement of Buried Pipe," the staff questioned the validity of the piping analyses. A January 8, 1993, letter from Mr. C. K. McCoy to the NRC responded to the SER concern regarding the validity of the piping analyses by reporting the evaluation of all safety related buried piping.

During an June 15, 1993, telephone conference to discuss this submitted evaluation data, further questions were asked by the staff. Enclosure 1 is our responses to these questions. Also, the staff requested additional data which are provided as Enclosures 2, 3a, 3b, and 4.

Should you have any additional questions, please inquire.

Sincerely,

C. K. McCoy

CKM/JLL/gmb

cc: (See next page)

A001

cc: Georgia Power Company
Mr. J. B. Beasley, Jr.
Mr. M. Sheibani
NORMS

U. S. Nuclear Regulatory Commission
Mr. S. D. Ebneter, Regional Administrator
Mr. D. S. Hood, Licensing Project Manager, NRR
Mr. B. R. Bonser, Senior Resident Inspector, Vogtle

LCV-0210B

ENCLOSURE 1

1. QUESTION:

What is the definition of "actual differential settlement"?

ANSWER:

The "actual differential settlement" of the buried pipe is the total amount of differential settlement (at the marker where pipe enters the structure) from the time the pipe/support (as applicable) was installed until the settlement reading at the time of the engineering evaluation.

A detailed explanation of the methodology for determining the "actual differential settlement" for buried pipe, including our conservative assumptions, is contained in section 1 on page 2 of our letter ELV-03975 dated January 8, 1993.

2. QUESTION:

Provide the settlement data and the calculations of "actual differential settlement" for the following locations:

Line Number	Marker Number
1-1202-029-6"	196
1-2403-044-4"	132-R
1-2403-043-4"	132-R
1-2403-066-3"	145-R
1-2403-043-4"	145-R
2-1202-030-6"	260-R

ANSWER:

Copies of the relevant pages of the survey data sheets have been previously provided with Mr. C. K. McCoy's letter dated January 7, 1994 (LCV-0210). The civil calculation are provided as Enclosure 2.

3. QUESTION:

Provide the stress/support analysis and model for line numbers 1-1202-029-6" and 2-1202-030-6".

ANSWER:

Copies of relevant pages of the stress/support calculations and model are Enclosures 3a and 3b.

4. QUESTION:

The "actual differential settlement" value for line number 2-1202-030-6" at marker 260-R is approximately 77 percent of the design differential settlement. Was the approach for reviewing similar cases which exceed 75 percent, as outlined on the Settlement Monitoring Program Flow Chart, used in conjunction with this line?

ANSWER:

The Settlement Monitoring Program Flow Chart outlines the design methodology used to monitor the differential settlement of interconnecting pipes between buildings. The criteria for comparison of the "actual differential settlement" to 75 percent of the design differential settlement was established as an early indicator to identify any interconnecting pipes which might require closer monitoring or modification to the pipe/support to prevent an overstressed condition from occurring.

As we have previously stated, buried pipe is not addressed by our normal settlement monitoring program and regular engineering reviews have not been conducted. However, the method outlined in the flow chart was used during this evaluation process of the buried pipe, including line 2-1202-030-6'.

Although the "actual differential settlement" of this buried pipe was higher than the 75 percent early indicator used for future settlement of interconnecting pipes, the amount was evaluated and it was determined not to be a concern based on engineering judgment. In addition the 75 percent early indicator was not considered a valid concern in the case of this buried pipe because of the probability of settlement of the compacted backfill. Since the "actual differential settlement" is based on our conservative assumption (zero settlement for compacted backfill), a high value may appear to be of concern but the real value is likely to be considerably less.

In the process of preparing the responses to these questions, a field walk down was performed to visually inspect the critical support on this line. This inspection confirmed that a gap still exists between the pipe and the support strap (the controlling component of the support), thereby verifying the fact that no stresses have been induced into the support strap by differential settlement. The result of this walkdown (i.e. the existence of a gap between pipe and strap) confirms that our assumption is overly conservative and appears to substantiates our original position that the compacted backfill will settle at approximately the same magnitude as the structures, thereby producing minimal differential settlement.

5. QUESTION:

The Settlement Monitoring Program Flow Chart has no provisions when the "actual differential settlement" still exceeds the design differential settlement after the process has been completed. Modify the flow chart to reflect this comment.

ANSWER:

The flow chart has been revised. The revised flow chart is Enclosure 4.

6. QUESTION:

For line 2-1202-030-6" at marker 260-R, explain why the allowable differential settlement submitted in the January 8, 1993 letter ELV-03975 to the NRC is different from that submitted previously.

ANSWER:

The "allowable differential settlement" for this line was based on the support being the controlling factor. During the latest evaluation, more refined analyses were performed for those cases where the support is controlling. In the process of performing these analyses, a design input error was found in the original analysis. Reanalysis corrected the error and resulted in a lower allowable value for the support.

ENCLOSURE 2

Calculation X2A30.1.6

Project	Prepared By	Date
VOGTLE	R. FLOWERS	6-15-92
Subject/Title	Reviewed By	Date
SETTLEMENT MONITORING PROGRAM	(S.N. AMIN)	6-17-92
DIFFERENTIAL SETTLEMENT OF BURIED PIPE	Calculation Number XZCA30.1.6	Sheet 1 of 77

SHEET 1a FOLLOWS

PURPOSE OF CALCULATION

THIS CALCULATION IS REQUIRED TO DETERMINE THE ACTUAL DIFFERENTIAL SETTLEMENT FOR THE FOLLOWING SAFETY RELATED BURIED PIPES : SEE FOLLOWING PAGE SHEET 1a.

~~1-1202-029-6"~~
1-2403-044-4"
1-2403-053-2"
1-2403-043-4"
~~1-2403-066-3"~~
~~1-2403-069-2"~~

~~2-1202-029-6"~~
~~2-1202-030-6"~~
2-2403-053-2"
2-2403-043-4"

ZAF 7-14-92
JOC 9/10/92

ASSUMPTIONS

1) NO SETTLEMENT WILL OCCUR IN THE SOIL
2) SETTLEMENT OF THE STRUCTURE AT THE TIME OF INSTALLATION FOR THE PIPE AND/OR SUPPORT WILL BE DETERMINED BY USING A STRAIGHT LINE INTERPOLATION OF THE DATA.
3) DATA USED FOR TOTAL SETTLEMENT WAS TAKEN USING THE DATES PREVIOUSLY SUBMITTED TO THE NRC* (i.e. DURING MAY & JUNE 1989).

REFERENCES

1) QUANTITY TRACKING SYSTEM (QTS) PIPE LOG LISTING
2) QTS SUPPORT STATUS LOG
3) QTS WELD LOG LISTING
4) SETTLEMENT SURVEYING DATA

* THIS DATA WAS ISSUED TO THE NRC BY LETTER ELV-01376 WRITTEN ON MARCH 19, 1990 BY MR W G. HAIRSTON, III.

Project	Prepared By	Date
VOGTLE	R. FLOWERS	9-2-92
Subject/Title	Reviewed By	Date
SETTLEMENT MONITORING PROGRAM	J Chaffin	9/10/92
DIFFERENTIAL SETTLEMENT OF BURIED PIPE	Calculation Number XZCA30.1.6	Sheet 1a of 77

SHEET 1b FOLLOWS

LIST OF SAFETY RELATED BURIED PIPE AND INTERFACING STRUCTURE :

Line No.	Interface
1-1202-029-6"	NSCW Valvehouse Train A
1-1202-030-6"	NSCW Valvehouse Train A
1-1202-029-6"	Tunnel 1T2B
1-1202-030-6"	Tunnel 1T2B
1-2403-044-4"	Diesel Generator Building
1-2403-066-3"	Diesel Generator Building
1-2403-053-2"	Diesel Generator Building
1-2403-051-2"	Diesel Generator Building
1-2403-068-3"	Diesel Generator Building
1-2403-043-4"	Diesel Generator Building
1-2403-044-4"	DFOST Pumphouse
1-2403-044-4"	DFOST Pumphouse Footing (See note 1)
1-2403-066-3"	DFOST Pumphouse
1-2403-053-2"	DFOST Pumphouse
1-2403-069-2"	DFOST Pumphouse
1-2403-069-2"	DFOST Pumphouse Footing (See note 1)
1-2403-051-2"	DFOST Pumphouse
1-2403-068-3"	DFOST Pumphouse
1-2403-043-4"	DFOST Pumphouse
2-1202-029-6"	NSCW Valvehouse Train A
2-1202-030-6"	NSCW Valvehouse Train A
2-1202-029-6"	Tunnel 2T2B
2-1202-030-6"	Tunnel 2T2B
2-2403-044-4"	Diesel Generator Building
2-2403-066-3"	Diesel Generator Building
2-2403-053-2"	Diesel Generator Building
2-2403-051-2"	Diesel Generator Building
2-2403-068-3"	Diesel Generator Building
2-2403-043-4"	Diesel Generator Building
2-2403-044-4"	DFOST Pumphouse
2-2403-044-4"	DFOST Pumphouse Footing (See note 1)
2-2403-066-3"	DFOST Pumphouse
2-2403-053-2"	DFOST Pumphouse
2-2403-069-2"	DFOST Pumphouse
2-2403-069-2"	DFOST Pumphouse Footing (See note 1)
2-2403-051-2"	DFOST Pumphouse
2-2403-068-3"	DFOST Pumphouse
2-2403-043-4"	DFOST Pumphouse

Notes: 1. This interface is at the DFOST Pumphouse Footing and has soil adjacent to the footing both inside and outside of the structure.

Project	Prepared By	Date
VOGTLE	R. FLOWERS	9-9-92
Subject/Title	Reviewed By	Date
SETTLEMENT MONITORING PROGRAM	J. Chaffin	9/10/92
DIFFERENTIAL SETTLEMENT OF BURIED PIPE	Calculation Number YZCA30.1.6	Sheet 16 of 77

SHEET 2 FOLLOWS

PURPOSE OF CALCULATION (CONT.)

THIS CALCULATION ALSO DOCUMENTS THE INFORMATION LISTED IN THE TABLES ISSUED IN LETTERS SG-11455, DATED JULY 29, 1992, AND SG-11622, DATED SEPTEMBER 3, 1992.

APPENDIX A PROVIDES SUMMARY SHEETS OF EACH PIPE LINE LISTED SHOWING THE ASSOCIATED STRESS CALCULATION, THE INFORMATION EXTRACTED FROM THE STRESS CALC. USED IN DETERMINING THE MAXIMUM PERMISSIBLE ALLOWABLE DIFFERENTIAL SETTLEMENT, EFFECTED SUPPORTS, ETC.

APPENDIX B SUMMARIZES THE INFORMATION EXTRACTED FROM THE ASSOCIATED PIPE SUPPORT CALCULATIONS IN DETERMINING THE MAXIMUM PERMISSABLE ALLOWABLE DIFFERENTIAL SETTLEMENT WITH RESPECT TO THE SUPPORTS.

Project	Vogtle Electric Generating Plant	Prepared By	R FLOWERS	Date	6-15-92
Subject/Title	Settlement Monitoring Program	Reviewed By	(S.N.AMIN)	Date	6-17-92
	Differential Settlement of Buried Pipe	Calculation Number	X2CA30.1.6	Sheet	2 of 77

DIFFERENTIAL SETTLEMENT BETWEEN BURIED PIPING AND STRUCTURE

Pipe Line No. 1-1202-029-6"

Isometric 1K5-1202-029-06 Latest Revision 11

Nearest Support V1-1202-029-H007 Latest Support Revision 2

Interfacing Structure 1T2B TUNNEL

Nearest Settlement Marker 196

INSTALLATION DATES

The following information was obtained from the Quantity Tracking System (QTS) Pipe Log Listing, Support Status Report, Weld Log Listing, etc. (see Attachment 1).

Pipe Installation Date:

Revision of Isometric at Installation Date —

Spool Piece ID 029-S-28 Installation Date 12-23-84

Weld ID 029-W-26 Installation Date 12-23-84

Support Installation Date:

Revision of Support drawing on Installation Date 1

Support Installation Date 1-13-85

Comments:

Project	Vogtle Electric Generating Plant	Prepared By R. FLOWERS	Date 6-15-92
Subject/Title	Settlement Monitoring Program	Reviewed By F. B. NAMIN	Date 6-17-92
	Differential Settlement of Buried Pipe	Calculation Number X2CA30.1.6	Sheet 3 of 77

DIFFERENTIAL SETTLEMENT BETWEEN BURIED PIPING AND STRUCTURE

Pipe Line No. 1-1202-029-6"

Interfacing Structure 1T28 TUNNEL

Nearest Settlement Marker 196

SETTLEMENT OF STRUCTURE AT INSTALLATION DATE

This information is taken from the settlement surveying data (see Attachment 2) and a straight line interpolation was used to calculate the settlement on the installation date.

Pipe

Date 9-27-84 Settlement 0.022 Ft.

Date 1-10-85 Settlement 0.020 Ft.

Date 12-23-84 Settlement 0.020 Ft. ← Installation Date

Support

Date 1-10-85 Settlement 0.020 Ft.

Date 4-16-85 Settlement 0.024 Ft.

Date 1-13-85 Settlement 0.020 Ft. ← Installation Date

TOTAL SETTLEMENT OF STRUCTURE AT MARKER

This information is taken from the settlement surveying data (see Attachment 2).

Date 5-10-89 Settlement 0.051 Ft.

DIFFERENTIAL SETTLEMENT INDUCED IN PIPE AND SUPPORT

(Current Total Settlement) - (Settlement on Installation Date)

Pipe 0.031 Ft. = 0.37 inches

Support 0.031 Ft. = 0.37 inches

Project	Prepared By	Date
Vogtle Electric Generating Plant	R. Flowers	6-15-92
Subject/Title	Reviewed By	Date
Settlement Monitoring Program	(S.N. Amin)	6-17-92
Differential Settlement of Buried Pipe	Calculation Number XZCA30.1-6	Sheet 4 of 77

DIFFERENTIAL SETTLEMENT BETWEEN BURIED PIPING AND STRUCTURE

Pipe Line No. 1-2403-044-4"

Isometric 1RS-2403-044-02 Latest Revision 15

Nearest Support N/A Latest Support Revision N/A

Interfacing Structure Diesel Generator Building

Nearest Settlement Marker 132-R

INSTALLATION DATES

The following information was obtained from the Quantity Tracking System (QTS) Pipe Log Listing, Support Status Report, Weld Log Listing, etc. (see Attachment 1).

Pipe Installation Date:

Revision of Isometric at Installation Date —

Spool Piece ID 044-S-06 Installation Date 1-22-84

Weld ID 044-W-060 Installation Date 3-11-84

Support Installation Date:

Revision of Support drawing on Installation Date N/A

Support Installation Date N/A

Comments:

Pipe is embedded in building slab. No differential settlement induced in support.

Use weld installation date for pipe.

Project	Vogtle Electric Generating Plant	Prepared By R. FLOWERS	Date 6-15-92
Subject/Title	Settlement Monitoring Program	Reviewed By (S.N. AMIN)	Date 6-17-92
	Differential Settlement of Buried Pipe	Calculation Number X2CA30-1-6	Sheet 5 of 77

DIFFERENTIAL SETTLEMENT BETWEEN BURIED PIPING AND STRUCTURE

Pipe Line No. 1-2403-044-4"

Interfacing Structure DIESEL GENERATOR BUILDING

Nearest Settlement Marker 132-R

SETTLEMENT OF STRUCTURE AT INSTALLATION DATE

This information is taken from the settlement surveying data (see Attachment 2) and a straight line interpolation was used to calculate the settlement on the installation date.

Pipe

Date N/A Settlement N/A Ft.

Date 4-26-84 Settlement 0.0 Ft.

Date 3-11-84 Settlement 0.0 Ft. ← Installation Date

Support

Date N/A Settlement N/A Ft.

Date N/A Settlement N/A Ft.

Date N/A Settlement N/A Ft. ← Installation Date

TOTAL SETTLEMENT OF STRUCTURE AT MARKER

This information is taken from the settlement surveying data (see Attachment 2).

Date 5-2-89 Settlement 0.045 Ft.

DIFFERENTIAL SETTLEMENT INDUCED IN PIPE AND SUPPORT

(Current Total Settlement) - (Settlement on Installation Date)

Pipe 0.045 Ft. = 0.54 inches

Support N/A Ft. = N/A inches

Project	Vogtle Electric Generating Plant	Prepared By R. FLOWERS	Date 6-15-92
Subject/Title	Settlement Monitoring Program	Reviewed By (S.N AMIN)	Date 6-17-92
	Differential Settlement of Buried Pipe	Calculation Number X2CA30.1.6	Sheet 8 of 77

DIFFERENTIAL SETTLEMENT BETWEEN BURIED PIPING AND STRUCTURE

Pipe Line No. 1-2403-043-4"

Isometric 1KS-2403-043-02 Latest Revision 12

Nearest Support N/A Latest Support Revision N/A

Interfacing Structure DIESEL GENERATOR BUILDING

Nearest Settlement Marker 132-R

INSTALLATION DATES

The following information was obtained from the Quantity Tracking System (QTS) Pipe Log Listing, Support Status Report, Weld Log Listing, etc. (see Attachment 1).

Pipe Installation Date:

Revision of Isometric at Installation Date —

Spool Piece ID 043-S-07 Installation Date 3-11-84

Weld ID 043-W-07 Installation Date 1-27-85

Support Installation Date:

Revision of Support drawing on Installation Date N/A

Support Installation Date N/A

Comments:

PIPE IS EMBEDDED IN BUILDING SLAB. NO DIFFERENTIAL SETTLEMENT INDUCED IN SUPPORT.

USE WELD INSTALLATION DATE FOR PIPE.

Project	Vogtle Electric Generating Plant	Prepared By R. FLOWERS	Date 6-15-92
Subject/Title	Settlement Monitoring Program	Reviewed By (SNAMIN)	Date 6-17-92
	Differential Settlement of Buried Pipe	Calculation Number X2CA30.1.6	Sheet 9 of 77

DIFFERENTIAL SETTLEMENT BETWEEN BURIED PIPING AND STRUCTURE

Pipe Line No. 1-2403-043-4"

Interfacing Structure DIESEL GENERATOR BUILDING

Nearest Settlement Marker 132-R

SETTLEMENT OF STRUCTURE AT INSTALLATION DATE

This information is taken from the settlement surveying data (see Attachment 2) and a straight line interpolation was used to calculate the settlement on the installation date.

Pipe

Date 1-2-85 Settlement 0.019 Ft.

Date 4-25-85 Settlement 0.025 Ft.

Date 1-27-85 Settlement 0.020 Ft. ← Installation Date

Support

Date N/A Settlement N/A Ft.

Date N/A Settlement N/A Ft.

Date N/A Settlement N/A Ft. ← Installation Date

TOTAL SETTLEMENT OF STRUCTURE AT MARKER

This information is taken from the settlement surveying data (see Attachment 2).

Date 5-2-89 Settlement 0.045 Ft.

DIFFERENTIAL SETTLEMENT INDUCED IN PIPE AND SUPPORT

(Current Total Settlement) - (Settlement on Installation Date)

Pipe 0.025 Ft. = 0.30 inches

Support N/A Ft. = N/A inches

Project	Vogtle Electric Generating Plant	Prepared By R FLOWERS	Date 6-15-92
Subject/Title	Settlement Monitoring Program	Reviewed By [illegible] (S N-AMIN)	Date 6-17-92
	Differential Settlement of Buried Pipe	Calculation Number X2CA30.1.6	Sheet 10 of 77

DIFFERENTIAL SETTLEMENT BETWEEN BURIED PIPING AND STRUCTURE

Pipe Line No. 1-2403-066-3"

Isometric 1K5-2403-058-01 Latest Revision 10

Nearest Support V1-2403-066-H001 Latest Support Revision 2

Interfacing Structure DIESEL FUEL OIL STORAGE TANK

Nearest Settlement Marker 145-R *

INSTALLATION DATES

The following information was obtained from the Quantity Tracking System (QTS) Pipe Log Listing, Support Status Report, Weld Log Listing, etc. (see Attachment 1).

Pipe Installation Date:

Revision of Isometric at Installation Date —

Spool Piece ID 066-S-15 Installation Date 5-27-84

Weld ID 066-W-02 Installation Date 11-11-84

Support Installation Date:

Revision of Support drawing on Installation Date 1

Support Installation Date 2-3-85

Comments:

USE WELD INSTALLATION DATE FOR PIPE.

* NEAREST MARKER IS 1000-R ; HOWEVER, THIS MARKER WAS INSTALLED AFTER SOME SETTLEMENT OF THE STRUCTURE HAD OCCURRED. USING DATA FROM MARKER 145-R WILL RESULT IN MORE ACCURATE RESULTS.

Project	Vogtle Electric Generating Plant	Prepared By R. FLOWERS	Date 6-15-92
Subject/Title	Settlement Monitoring Program	Reviewed By (1/3 N-A MIN)	Date 6-17-92
	Differential Settlement of Buried Pipe	Calculation Number X2CA30.1.6	Sheet 11 of 77

DIFFERENTIAL SETTLEMENT BETWEEN BURIED PIPING AND STRUCTURE

Pipe Line No. 1-2403-066-3"

Interfacing Structure DIESEL FUEL OIL STORAGE TANK

Nearest Settlement Marker 145-R

SETTLEMENT OF STRUCTURE AT INSTALLATION DATE

This information is taken from the settlement surveying data (see Attachment 2) and a straight line interpolation was used to calculate the settlement on the installation date.

Pipe

Date 4-28-84 Settlement 0.0 Ft.

Date 12-18-84 Settlement 0.012 Ft.

Date 11-11-84 Settlement 0.010 Ft. ← Installation Date

Support

Date 12-18-84 Settlement 0.012 Ft.

Date 3-7-85 Settlement 0.014 Ft.

Date 2-3-85 Settlement 0.013 Ft. ← Installation Date

TOTAL SETTLEMENT OF STRUCTURE AT MARKER

This information is taken from the settlement surveying data (see Attachment 2).

Date 5-1-89 Settlement 0.041 Ft.

DIFFERENTIAL SETTLEMENT INDUCED IN PIPE AND SUPPORT

(Current Total Settlement) - (Settlement on Installation Date)

Pipe 0.031 Ft. = 0.37 inches

Support 0.028 Ft. = 0.34 inches

Project	Vogtle Electric Generating Plant	Prepared By R. FLOWERS	Date 5-26-92
Subject/Title	Settlement Monitoring Program	Reviewed By J. Chaffin	Date 7/9/92
	Differential Settlement of Buried Pipe	Calculation Number X2CA30.1-6	Sheet 46 of 77

DIFFERENTIAL SETTLEMENT BETWEEN BURIED PIPING AND STRUCTURE

Pipe Line No. 1-2403-043-4"

Isometric 1KS-2403.043-01 Latest Revision 10

Nearest Support V1-2403-043-H002 Latest Support Revision 3

Interfacing Structure DIESEL FUEL OIL STORAGE TANK

Nearest Settlement Marker 145-R

INSTALLATION DATES

The following information was obtained from the Quantity Tracking System (QTS) Pipe Log Listing, Support Status Report, Weld Log Listing, etc. (see Attachment 1).

Pipe Installation Date:

Revision of Isometric at Installation Date —

Spool Piece ID 043-S-01 Installation Date 10-21-84

Weld ID 043-W-02 Installation Date 10-14-84

Support Installation Date:

Revision of Support drawing on Installation Date 0

Support Installation Date 12-16-84

Comments:

USE SPOOL PIECE INSTALLATION DATE FOR PIPE.

Project	Vogtle Electric Generating Plant	Prepared By R. FLOWERS	Date 6-26-92
Subject/Title	Settlement Monitoring Program	Reviewed By J. Chaffin	Date 7/9/92
	Differential Settlement of Buried Pipe	Calculation Number X2CA30-1-6	Sheet 47 of 77

DIFFERENTIAL SETTLEMENT BETWEEN BURIED PIPING AND STRUCTURE

Pipe Line No. 1-2403-043-4"

Interfacing Structure DIESEL FUEL OIL STORAGE TANK

Nearest Settlement Marker 145-R

SETTLEMENT OF STRUCTURE AT INSTALLATION DATE

This information is taken from the settlement surveying data (see Attachment 2) and a straight line interpolation was used to calculate the settlement on the installation date.

Pipe

Date 4-28-84 Settlement 0.0 Ft.

Date 12-18-84 Settlement 0.012 Ft.

Date 10-21-84 Settlement 0.009 Ft. ← Installation Date

Support

Date 4-28-84 Settlement 0.0 Ft.

Date 12-18-84 Settlement 0.012 Ft.

Date 12-16-84 Settlement 0.012 Ft. ← Installation Date

TOTAL SETTLEMENT OF STRUCTURE AT MARKER

This information is taken from the settlement surveying data (see Attachment 2).

Date 5-1-89 Settlement 0.041 Ft.

DIFFERENTIAL SETTLEMENT INDUCED IN PIPE AND SUPPORT

(Current Total Settlement) - (Settlement on Installation Date)

Pipe 0.032 Ft. = 0.38 inches

Support 0.029 Ft. = 0.35 inches

Project	Prepared By	Date
Vogtle Electric Generating Plant	R FLOWERS	5-27-92
Subject/Title	Reviewed By	Date
Settlement Monitoring Program	J. Chaffin	7/9/92
Differential Settlement of Buried Pipe	Calculation Number XZCA30.1.6	Sheet 50 of 77

DIFFERENTIAL SETTLEMENT BETWEEN BURIED PIPING AND STRUCTURE

Pipe Line No. 2-1202-030-6"

Isometric 2RS-1202-030-03 Latest Revision 6

Nearest Support VZ-1202-030-H022 Latest Support Revision 2

Interfacing Structure NSCW VALVEHOUSE TRAIN A

Nearest Settlement Marker Z60-R

INSTALLATION DATES

The following information was obtained from the Quantity Tracking System (QTS) Pipe Log Listing, Support Status Report, Weld Log Listing, etc. (see Attachment 1).

Pipe Installation Date:

Revision of Isometric at Installation Date —

Spool Piece ID 030-S-25 Installation Date 9-7-86

Weld ID 030-W-28A Installation Date 10-16-86

Support Installation Date:

Revision of Support drawing on Installation Date 1

Support Installation Date 2-1-87

Comments:

USE WELD INSTALLATION DATE FOR PIPE

Project	Vogtle Electric Generating Plant	Prepared By R. Flowers	Date 6.26.92
Subject/Title	Settlement Monitoring Program	Reviewed By J. Chaffin	Date 7/9/92
	Differential Settlement of Buried Pipe	Calculation Number X2CA30.1.6	Sheet 51 of 77

DIFFERENTIAL SETTLEMENT BETWEEN BURIED PIPING AND STRUCTURE

Pipe Line No. 2-1202-030-6"

Interfacing Structure NSCW VALVEHOUSE TRAIN A

Nearest Settlement Marker 260-R

SETTLEMENT OF STRUCTURE AT INSTALLATION DATE

This information is taken from the settlement surveying data (see Attachment 2) and a straight line interpolation was used to calculate the settlement on the installation date.

Pipe

Date 8-28-86 Settlement 0.021 Ft.

Date 10-31-86 Settlement 0.023 Ft.

Date 10-16-86 Settlement 0.023 Ft. ← Installation Date

Support

Date 1-5-87 Settlement 0.032 Ft.

Date 4-7-87 Settlement 0.037 Ft.

Date 2-1-87 Settlement 0.033 Ft. ← Installation Date

TOTAL SETTLEMENT OF STRUCTURE AT MARKER

This information is taken from the settlement surveying data (see Attachment 2).

Date 6-15-89 Settlement 0.052 Ft.

DIFFERENTIAL SETTLEMENT INDUCED IN PIPE AND SUPPORT

(Current Total Settlement) - (Settlement on Installation Date)

Pipe 0.029 Ft. = 0.35 inches

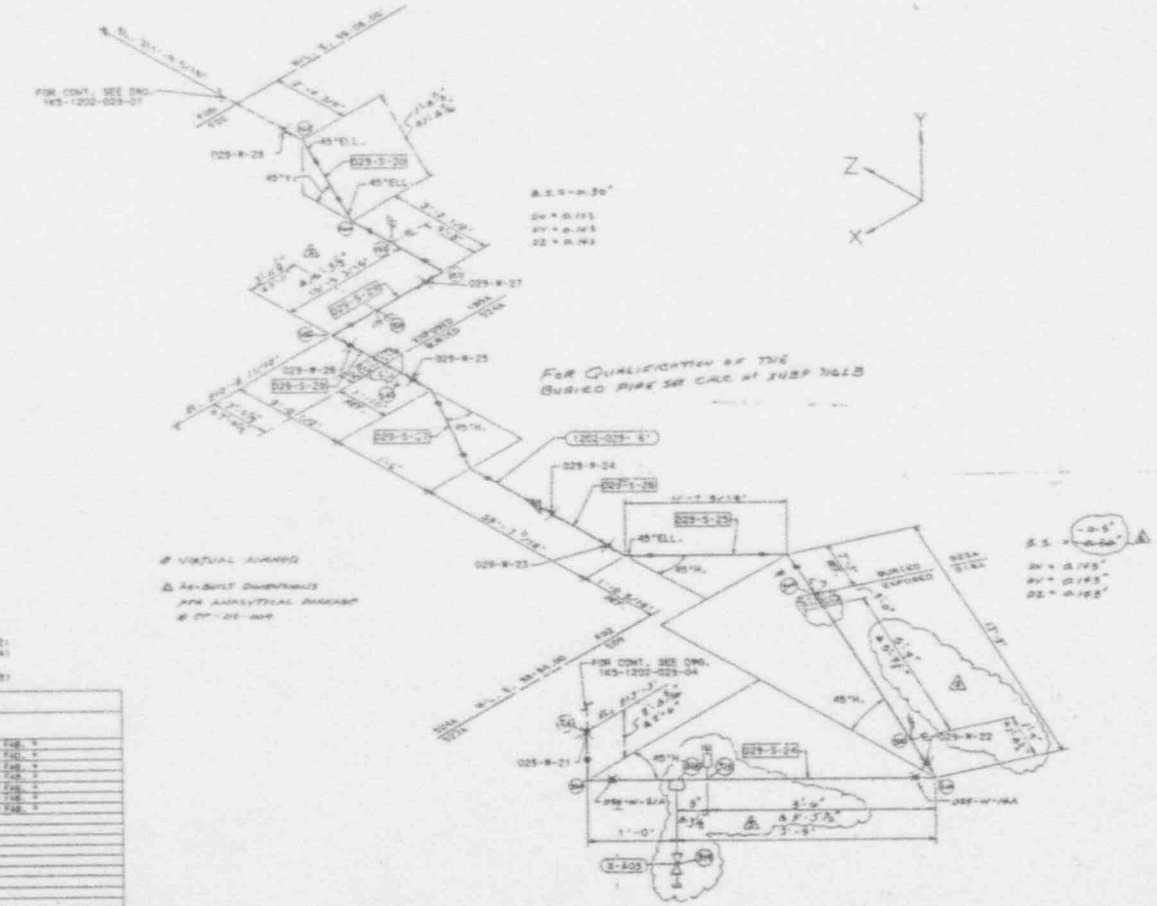
Support 0.019 Ft. = 0.23 inches

ENCLOSURE 3a

Stress / Support Analysis
Line 1-1202-029-6"

PIPE SUPPORT LIST

NODE	SUPPORT TAG NO
1EK	V1-1202-029-H804
1E0	[illegible]
1E0	[illegible]
1E0B	[illegible]
2EE	[illegible]
21E	V1-1202-029-H817



VIRTUAL ANCHOR

Δ AS-BUILT DIMENSIONS PER ANALYTICAL PACKAGE

* FIELD TO FABRICATE USING SURPLUS MATERIAL FROM SPOOLS:
1. 029-S-01, 029-S-02, 029-S-15, 029-S-16 (ISO: 1K5-1202-029-01)
2. 029-S-03, 029-S-04, 029-S-05, 029-S-06, 029-S-07, 029-S-08 (ISO: 1K5-1202-029-02)
3. 029-S-13, 029-S-14 (ISO: 1K5-1202-029-04)
4. 029-S-17, 029-S-18, 029-S-19, 029-S-20, 029-S-21, 029-S-22 (ISO: 1K5-1202-029-08)

SPOOL STATUS				
SPOOL NUMBER	REV. NO.	SHOP SH'T. NO.	ACT. PRG.	REMARKS
[illegible]	0		[illegible]	FIELD TO FAB. *
[illegible]	0		[illegible]	FIELD TO FAB. *
[illegible]	0		[illegible]	FIELD TO FAB. *
[illegible]	0		[illegible]	FIELD TO FAB. *
[illegible]	0		[illegible]	FIELD TO FAB. *
[illegible]	0		[illegible]	FIELD TO FAB. *
[illegible]	0		[illegible]	FIELD TO FAB. *
029-S-24	0		[illegible]	FIELD TO FAB. *

NOTE:
1. FOR GENERAL NOTES SEE DWG. AX4DR001

NOT FOR CONSTRUCTION

DESIGN TEMPERATURE = 150 °F
DESIGN PRESSURE = 100 PSIG

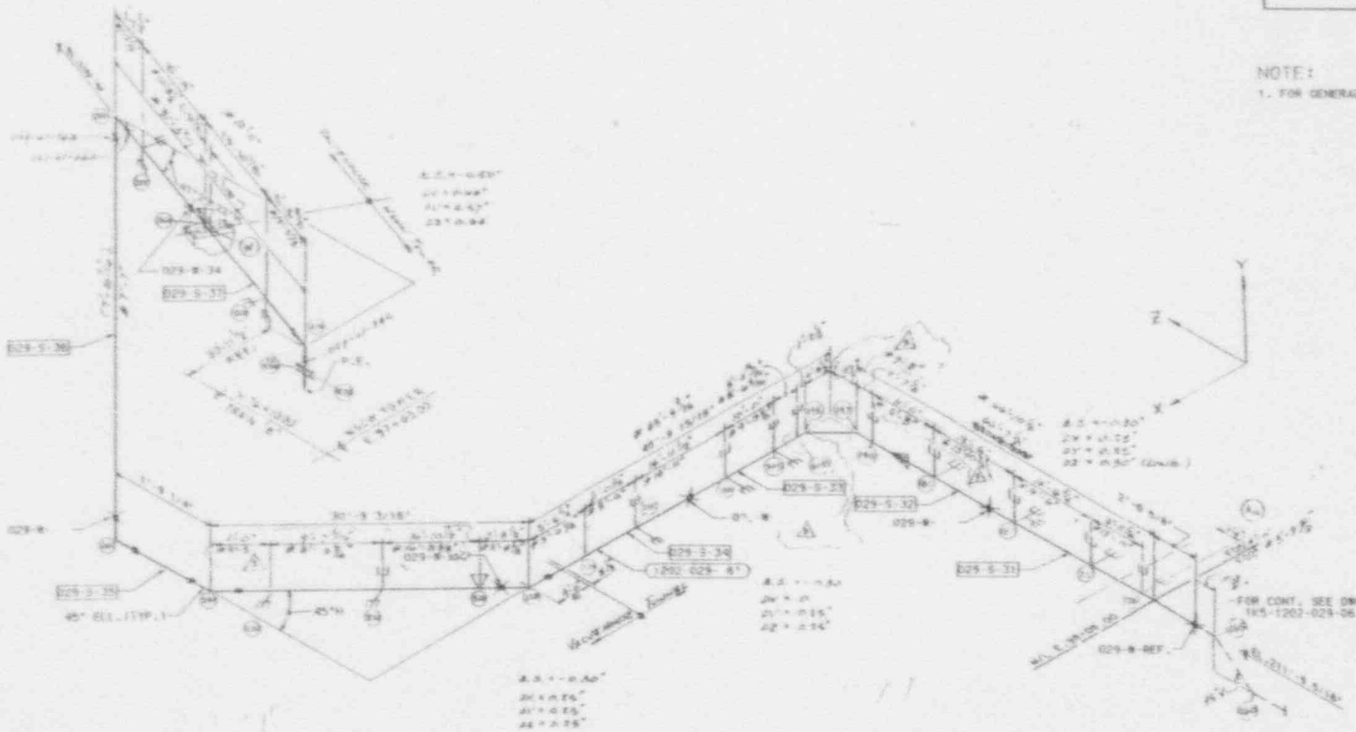
SHT 16 OF 16 SHTS

BECHTEL
LOS ANGELES

GEORGIA POWER COMPANY
ALVIN W. VOGTLE NUCLEAR PLANT

NUCLEAR SERVICE COOLING WATER SYSTEM
STRESS ISOMETRIC
N.S.C.W. TOWER AREA 7F & 7E

SCALE: N.T.S. | JOB NO. 9510 | DRAWING NO. 1K5-1202-029-09 | REV. 3



NOTE:
1. FOR GENERAL NOTES SEE DWG. AX4E0R001

NOT FOR CONSTRUCTION

BECHTEL
LOS ANGELES

GEORGIA POWER COMPANY
ALVIN W. VOGTLE NUCLEAR PLANT

NUCLEAR SERVICE COOLING WATER SYSTEM
STRESS ISOMETRIC
N.S.C.W. TOWER, AREA 75'

SCALE: N.T.S. | DRAWING NO. 1X4K5-1202-029-07 | REV 3

JOB NO. 9510

ME101

I N P U T C A R D I M A G E S

```
INPUT
CARD     1         11        21        31        41        51        61        71       80
 SEQ     +         +         +         +         +         +         +         +        +
   1     ***       NSCW BUILDING ( FILE NAME=NEWBS)
   2     ***       FROM NSCW TRANSFER PUMP A LOCATED IN TOWER B TO DISCH IN TOWER A
   3     ***       LINE NO 1202-029-6"  ISOMETRIC  1K5-1202-029-06
   4     ***                                   AND 1K5-1202-029-07
   5     ***       SIMILAR LINE
   6     ***       LINE NO 1202-030-6"  ISOMETRIC  1K5-1202-030-05
   7     ***                                   AND 1K5-1202-030-06
   8     ***
   9     ***     1. THIS MODEL REFLECTS USING NEW BUILDING SETTLEMENT VALUE AT THE
  10     ***        INTERFACE OF TUNNEL/SOIL PENETRATION.
  11     ***        NEW BUILDING SETTLEMENT DISPLACEMENT CONSIDER AT N.P 150=-0.5"
  12     ***
  13     HED                                           TIT=NSCW TRANSFER LINES,
  14                                                   PROJNO=17553800,
  15                                                   UNITS=2,EDIT=0,
  16                                                   PROBNO=1K5120202906,
  17                                                   USER=V.R.PATEL,
  18                                                   MODES=40,PERIOD=.028,
  19                                                   EIGEN=1,SYNTH=4,
  20     ***RUN                                           LDCASE=WT1(A),
  21     ***RUN                                           LDCASE=THRM1(T),
  22     RUN                                           LDCASE=THRMBS(S),
  23     ***RUN                                           LDCASE=SAMSS(A),
  24     ***RUN                                           LDCASE=SEISOB(A),
  25     ***RUN                                           LDCASE=SEISSS(A),
  26     ***       ISO. 1K5-1202-029-06
  27     SAP   1400.00       211-9.313  0.00
  28     ***
  29     ***       D.P. 140 IS A VIRTUAL ANCHOR
  30     ***
  31     ANC   140                                     AA=2.6E4,AB=2.6E4,          *A   TAG NOT USED - CARD IGNORED
  32     ANC   140                                     AA=2.6E4,AB=2.6E4,          *T   TAG NOT USED - CARD IGNORED
  33     ANC   140           0.00                      AA=2.6E4,AB=2.6E4,          *S   THRMBS
  34                                                   CODE=SC374,CLASS=2,
  35                                                   MAT=SA312-TP304L,E=28.3E6,
  36                                                   OD=6.625,THI=.28,
  37                                                   DPRESS=100,PPRESS=100,
  38                                                   PRESS=100,
  39                                                   LBS/FT=31.48,
  40                                                   TEMP=70,                    *S   THRMBS
  41                                                   TEMP=150,                   *T   TAG NOT USED - CARD IGNORED
  42                                                   SC=15700,SH=15700,
  43     ***       BURIED PIPING/TUNLS BULDG. SETTLEMENT & S.A.M.
  44                                                   PHASE=BURD,DX=0.143,        *A   TAG NOT USED - CARD IGNORED
  45                                                   DY=0.143,DZ=0.143,          *A   TAG NOT USED - CARD IGNORED
  46           145                  7-2-1/2    L
  47           150-3-11-1/4
  48     RAD   150           1                       AA=37.0E8,PHASE=TUNLS,
  49                                                   DISP=-0.50,                 *S   THRMBS
  50     RAD   150                  1                AA=2.43E5,PHASE=TUNLS,
  51           153-11-5-15/16                  L     SEGMNT=2,
  52           155                  2-3
  53     RAD   1551                                    PHASE=TUNLS,
  54     RAD   155           1                         PHASE=TUNLS,
```

LOAD CASE(S)

KCV

1K5-1202-029-06

CALC. NO. _____ SHT. 6A OF 15

AUTHOR V.R.Patel DATE 3/13/92

CHECKER VS DATE 3-13-92

```
.                                                      DISP=-0.0,                 *S   .
.          160                  0-11-1/2   L                                           .
.          165        1-2-5/8   1-2-5/8    L                                           .
.   ***       ISO. 1KS-1202-029-07                                                     .
.          166                  2-4-3/8                                                .
.   ***       MATCHLINE E 9806.00 DWG F05 AND F02                                      .
.          170                  4-0                                                    .
.   RAD    1701                                        PHASE=TUNLS,                    .
.   RAD    170        1                                PHASE=TUNLS,                    .
.                                                      DISP=-0.0,                 *S   .
.          175                  13-11-1/4              SEGMNT=2,                       .
.   RAD    1751                                        PHASE=TUNLS,                    .
.   RAD    175        1                                PHASE=TUNLS,                    .
.                                                      DISP=-0.0,                 *S   .
.          180                  14-6-3/4               SEGMNT=2,                       .
.   RAD    1801                                        PHASE=TUNLS,                    .
.   RAD    180        1                                PHASE=TUNLS,                    .
.                                                      DISP=-0.0,                 *S   .
.   RAD    180                  1                      PHASE=TUNLS,                    .
.          185                  13-6                   SEGMNT=2,                       .
.   RAD    1851                                        PHASE=TUNLS,                    .
.   RAD    185        1                                PHASE=TUNLS,                    .
.                                                      DISP=-0.0,                 *S   .
.          190                  11-0                   SEGMNT=2,                       .
.   RAD    190        1                                PHASE=TUNLS,                    .
.                                                      DISP=-0.0,                 *S   .
.          197                  9-7-1/8    L           SEG=2,                          .
.          1980-8-1/2           0-8-1/2    L                                           .
.          2031-2-1/4                                                                  .
.   RAD    203        1                                PHASE=TUNLS,                    .
.                                                      DISP=-0.0,                 *S   .
.          2058-4-15/16                                SEG=2,                          .
.   RAD    205        1                                PHASE=TUNLS,                    .
.                                                      DISP=-0.0,                 *S   .
.   RAD    205                  1                      PHASE=TUNLS,                    .
.          21010-0                                     SEGMNT=2,                       .
.   RAD    210        1                                PHASE=TUNLS,                    .
.                                                      DISP=-0.0,                 *S   .
.   RAD    210                  1                      PHASE=TUNLS,                    .
.          21514-11-1/2                                SEG=2,                          .
.   RAD    215        1                                PHASE=TUNLS,                    .
.                                                      DISP=-0.0,                 *S   .
.   RAD    215                  1                      PHASE=TUNLS,                    .
.          2205-0-1/2                                  SEGMNT=2,                       .
.          2235-6-1/4                      L                                           .
.          2252-7.9523          2-7.9523               SIF=2.1,                        .
.   ANC    225                                         PHASE=TUNLS,               *A   .  TAG NOT USED - CARD IGNORED
.   ANC    225                                                                    *T   .  TAG NOT USED - CARD IGNORED
.   ANC    225        -0.50                                                       *S   .  THRMBS
.   ACE                                                TITLE=CAT I TUNNEL OBE,         .
.   ACE                                                LDNAME=SEISOB,                  .
.   ACE                                                TYPE=1,COEF=CS4,                .
.   ***       X2CR5-15 HOR ACCEL DAMP=1%                                               .
.   ACE                                                DIRXON=X+ :,                    .
.            .01,.22,.03,.22,.05,.47,.07,.47,.08,.59,.12,.59,.13,.82,.20,1.18,         .
.            .30,1.23,5.0,1.23,                                                        .
.   ***                                                                                .
.   ***       X2CR5-16 VER ACCEL DAMP=1%                                               .
.   ACE                                                DIRXON=Y,                       .
.            .01,.17,.03,.17,.06,.42,.12,.90,.40,.90,5.0,.50,                          .
```

Rev. 5

1KS-1202-029-07

- CALC. NO. ____ SHT. 6B OF 15
- AUTHOR [illegible] DATE 3-13-92
- CHECKER JS DATE 3-13-92

```
115 . EOA                                                                                .
116 . ACE                                         TITLE=CAT I TUNNEL SSE,                 .
117 . ACE                                         LDNAME=SEISSS,                          .
118 . ACE                                         TYPE=1,COEF=CS4,                        .
119 . ***      X2CR5-13 SSE HOR ACCEL DAMP=2%                                            .
120 . ACE                                         DIRXON=X+Z,                             .
121 .          .01,.39,.03,.39,.045,.48,.05,.64,.064,.64,.27,1.78,5.0,1.78,              .
122 . ***      X2CR5-14 SSE VER AACCEL DAMP=2%                                           .
123 . ACE                                         DIRXON=Y,                               .
124 .          .01,.27,.03,.27,.043,.34,.14,1.16,5.0,1.16,                               .
125 . EOA                                                                                .
126 . ***      LOAD COMBINATIONS PER DC-1017 REV. 4                                      .
127 . ***CMB                                          ZERO=0*WT1,                         .
128 . ***CMB                                          SAMOB=0.70*SAMSS,                   .
129 . ***CMB                                          THRMPO=THRM1&ZERO,                  .
130 . ***CMB                                          THRMNE=THRM1#ZERO,                  .
131 . ***CMB                                          NEWWT=0.75*WT1,                     .
132 . ***CMB                                          SEISMX=SEISSS&SEISOB,               .
133 . ***CMB                                          SEITHM=SEISMX+THRMPO+SAMSS+         .
134 . ***                                             ABS(THRMBS),                        .
135 . ***CMB                                          SETHWT=SEITHM+WT1,                  .
136 . ***CMB                                          SETHTW=SEITHM+NEWWT,                .
137 . ***CMB                                          THRMSE=THRMNE-SEISMX-SAMSS-         .
138 . ***                                             ABS(THRMBS),                        .
139 . ***CMB                                          THWTSE=WT1+THRMSE,                  .
140 . ***CMB                                          LOADPO=SEISMX&SETHWT&SETHTW         .
141 . ***CMB                                          MAXLOD=1.15*LOADPO,                 .
142 . ***CMB                                          LOADNE=THRMSE#THWTSE,               .
143 . ***CMB                                          MINLOD=1.15*LOADNE,                 .
144 . ***STD                                          LIST=NONE,                          .
145 . ***RLS                                          LIST=WT1+THRM1+THRMBS+SAMSS         .
146 . ***                                             SEISOB+SEISSS+MAXLOD+MINLOD         .
147 . ***SLA                                          INCLUD=WT1,                         .
148 . ***OLA                                          INCLUD=WT1+SEISOB,LEVEL=B,          .
149 . ***OLA                                          INCLUD=WT1+SEISOB,LEVEL=C,          .
150 . ***OLA                                          INCLUD=WT1+SEISSS,LEVEL=D,          .
151 . ***TEA                                          INCLUD=THRM1+SAMOB,                 .
152 . END                                                                                .
    .  +       +       +       +       +       +       +       +       +                .

         152 CARDS IN INPUT DECK
         145 CARDS IN LOAD CASE THRMBS

           0 WARNINGS
           0 ERRORS
           0 FATAL ERRORS
ME101DK    VERSION M8    STOP  ON 03/12/92 AT 12:20:34,  CPU=     3.44, BIO=     110, DIO=     101, PGF=    1103
ME101DK    VERSION M8    EXECUTION TIMES                 CPU=     1.89, BIO=      16, DIO=      43, PGF=     340
FORTRAN STOP
ME101I     VERSION M8    START ON 03/12/92 AT 12:20:35,  CPU=     4.16, BIO=     134, DIO=     115, PGF=    1278
```

Rev 5

CALC. NO. KS-1202-029-06 SHT. 66 OF 15
AUTHOR V R Patel DATE 3-13-92
CHECKER VS DATE 3-13-92

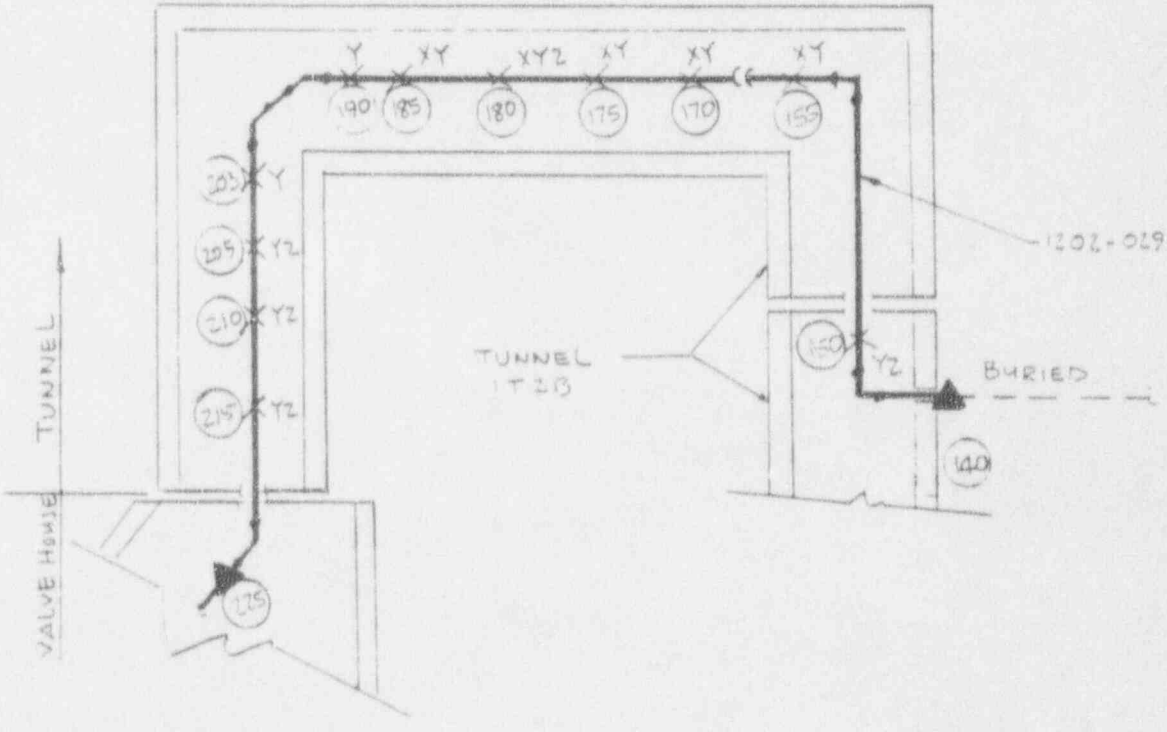
Project	Prepared By	Date
VOGTLE NUCLEAR PLANT, UNIT-1	L R Patel	3-16-92
Subject/Title	Reviewed By	Date
PIPE STRESS EVALUATION	Doug Smith	3-23-92
	Calculation Number: XS-1202-029-06 (5)	Sheet: 4A of 5

PURPOSE:- TO EVALUATE THE PIPING INTEGRITY PER BUILDING SETTLEMENT MONITORING PROGRAM (CONSIDER -.5" DIFFERENTIAL BUILDING SETTLEMENT AT TUNNEL/SOIL)

REFERENCE:- 1. DG1017 REV 6

2. ME101 RUN # CL2031, DATED 03/12/92 (THIS MODELL ENVELOPES AND SUPERSEDES THE 3 CASES IDENTIFIED ON SHT 4A FOR BUILDING SETTLEMENT CASES)

EVALUATION:-



DIFFERENTIAL BUILDING SETTLEMENT DISPLACEMENT:

1) TUNNEL (IT2B) / SOIL PENETRATION (BURIED) = -.5"
2) TUNNEL (IT2B) / TUNNEL (IT2B) = -0.3"
3) TUNNEL (IT2B) / VALVE HOUSE = -0.5"

Project	Prepared By	Date
VOGTLE NUCLEAR PLANT, UNIT-1	I R Patel	3-16-92
Subject/Title	Reviewed By	Date
PIPE STRESS EVALUTION	[signature]	3-23-92
	Calculation Number 1C5-1202-029-06 (5)	Sheet 78 of 15

AS A CONSERVATIVE CASE (WORST CASE) BUILDING SETTLEMENT DISPLACEMENTS ARE CONSIDER AT N.P 150 = -.5" AND AT N.P 225 = -.5"

MAX PIPE STRESS = 14510 P_{si} < 3 S_c = 3 X 15700 = 47100 f_s

∴ INTERACTION = 14510/47100 ≅ .31

CONCLUSION: THE ANALYSIS HAS BEEN REVIEWED AT REVISED DIFFERNTIAL BUILDING SETTLEMENT CONDITION AND FOUND SATISFACTORY FOR .5" INLIEU OF .3" AT TUNNEL / SOIL INTERFACE.

Note: DC-1017 Rev. 6 is currently involved in the DMCN change to reflect new differential settlement value of .5" for line # 1-1202-029-6" at the tunnel / soil interface.

Project	Prepared By	Date
VOGTLE NUCLEAR PLANT UNIT-1	V.R.Patel	6/19/92
Subject/Title	Reviewed By:	Date
BUILDING SETTLEMENT		06/19/92
MONITORING PROGRAM	Calculation Number X4CPS-0167	Sheet 2A of 10

PURPOSE :- TO CALCULATE A RESERVE LOAD CAPACITY AND MAXIMUM PERMISSIBLE ALLOWABLE DIFFERENTIAL SETTLEMENT OF FOLLOWING PIPE SUPPORT

1) V1-2403-066-H001, ISO :- 1K5-2403-058-01
2) V1-1202-029-H007, ISO :- 1K5-1202-029-06

REFERENCE:- 1) PIPE STRESS CALC # 1K5-2403-058-01 2/3
2) PIPE SUPPORT CALC # V1-2403-066-H001 R/5 (INCLUDING PIPSAN)
3) PIPE STRESS CALC # 1X4CP-7162
4) CCN # 1 OF S/R V1-1202-029-H007
5) CCN # 1 OF X4CP-R1512
6) PIPE RACK CALC # R1512

EVALUATION:- 1) V1-2403-066-H001

MAX. CRITICAL WELD I.R
= .91 AT N/U LOADS / N/U ALLOWABLE FROM SUPP 1A OF 8 REF.
AND = .93 AT FAULTED LOAD / FAULTED ALLOWABLE

DESIGN LOAD CONSIDERED IN SUPPORT EVALUATION
= + 1381# FAULTED (REF-2)
= 1051# UPSET (")

∴ MAX PERMISSIBLE SUPPORT LOAD
FAULTED = 1(I.R) 1381 / .93(I.R) = 1485#

UPSET = 1(I.R)(1151)/.91(I.R) = 1155#

∴ RESERVE LOAD CAPACITY, FAULTED = 1485 - 1381 = 104# SAY 90
UPSET = 1155 - 1051 = 104# SAY 90

AND MAX PERSSIBLE BUILDING SETTLEMENT LOAD
= EXIST BUILD. SETTLE. LOAD + RESERVE LOAD

Project	Prepared By	Date
VOGTLE NUCLEAR PLANT, UNIT-1	I R Patel	6/19/92
Subject/Title	Reviewed By	Date
BUILDING SETTLEMENT MONITORING PROGRAM		06/19/92
	Calculation Number XCCPS-2167	Sheet 10B of 10

(SHT 16 OF 15, REF. 1 AT .5" DEFF. BUILDING SETTLEMENT)

$= 566^{\#} + 90^{\#}$

$= 656^{\#}$

∴ MAX. PERMISSIBLE ALLOWABLE DIFFERENTIAL SETTLEMENT

$= \frac{656}{566} \times .5 \simeq \boxed{.59"}$

SUMMARY :- RESERVE LOAD CAPCITY = $\boxed{90^{\#}}$

& MAX PERMISSIBLE DIFFERNITAL SETTLEMENT = $\boxed{.58"}$

(2) V1-1202-029-H007

MAX IR OF 'T1' PLATE (V_Y) = 5058/6000 = .843 @ JOINT 10 (REF 5, SHT 6 OF 6)

AND MAX. IR OF Moment (M_X) OF 'T1' PLATE = $\frac{74460}{84000} \simeq .89$ (REF 5, SHT 6 OF 6)

∴ PERMISSIBLE ADDITIONAL MOMENT = 84000 − 74460 = 9540 $^{\#}$ INCH

∴ $V_{Y\,max} = (9540)(84^2)/(66^2)(18) = 858^{\#}$ FOR LOAD FACTOR = 1.0

∴ RESERVE LOAD CAPACITY = 858$^{\#}$, SAY 450$^{\#}$

AND MAX PERMISSIBLE BUILDING SETTLEMENT LOAD

= EXIST BS LOAD + RESERVE LOAD

$= 2184^{\#} + 450^{\#} = 2634^{\#}$ (SHT 14 OF 15, REF 3 AT .5" DEFF. BUILDING SETTLEMENT)

∴ MAX PERMISSIBLE ALLOWABLE DIFF SETTLEMENT

$= \left(\frac{2634}{2184}\right)(.5) \simeq .60"$

SUMMARY :- RESERVE LOAD CAPACITY = $\boxed{450^{\#}}$; & MAX. PERMISSIBLE DIFF SETTLEMENT = $\boxed{.60"}$

FORM25.DS

Line No.	Stress Calculation No.	Bldg. Loc.	Exist. Sett. (DC-1017) △ ES	Issued Calc. Rev
1-1202-029-6"	1K5-1202-029-06 (Rev. 4)	TUNNEL	.3	5

Sact	Sallow	△ MPAp	Prop. Sett. (DC-1017) △ PS	By	Chk	Comments
10575	47100	1.34	.50	[signature] 08/05/92	JS 8-6-92	

Parameters:

△ CS = The Design Criteria differential settlement used in the analysis per DC-1017 Rev. 6

Sact = The actual pipe stress resulting from △ ES

Sallow = The ASME Code allowable stress

△ MPAp = The maximum permissible allowable differential settlement valu

where: △ MPAp = (Sallow / Sact) x (△ CS)

△ PS = The propo[illegible] settlement value for DMCN to the current DC-1017

Effected Pipe Supports	PSDL
V1-1202-029-H006	See Attached
V1-1202-029-H007	See Attached

RESTRAINT LOAD SUMMARY | ME101/K3 | DATE 022586 | PAGE 145

TITLE : NSCW TRANSFER LINES
PROJECT NUMBER : 9510-001
PROBLEM NUMBER : X4CP-7162
USER : EYG
LOAD CASE : (5) PSDL. REV. 4

CALC NO. X4CP 7162 SHEET 14 OF 15
ORIGINATOR EY Dam DATE 2-6-86
CHECKER [signature] DATE 3-7-86
Iso No. 1K5-1202-029-06

CACL. REV. (5) BY: V.R. Patel 3-15-92 CK'D: JS 3-23-92

~~Rev. 3~~

~~CASE 1 (NF 333)~~

DATA TYPE PT	LOAD TITLE	GLOBAL FORCES (LB) FX	FY	FZ	GLOBAL MOMENTS (FT-LB) MX	MY	MZ	DISPLACEMENT (IN) DX	DY	DZ
140 ANC (VIRTUAL ANCHOR)	WT1	1.	-140.	-3.	147.	4.	-36.	.000	-.008	.000
	THRM1	797.	-1.	-143.	3.	3577.	0.	.029	.000	.000
	THRMBS	10.	-80.	-7.	5146.	54.	994.	.000	-.031	.000
	SAMSS	669.	283.	1375.	2453.	3162.	474.	.120	.128	.143
	SEISOB	46.	27.	9.	134.	166.	57.	.002	.001	.000
	SEISSS	81.	34.	77.	170.	221.	70.	.003	.001	.000
	MAXLOD	1749.	1289.	1675.	9107.	8072.	1739.	.176	.180	.154
	MINLOD	-875.	-1571.	-1845.	-8934.	-3953.	-1811.	-.142	-.191	-.164
130 RAD (V1-1202-029-H007) (SEE NOTE BELOW) (5)	WT1	0.	~~-425.~~ 445	0.	0.	0.	0.	.000	.000	.000
	THRM1	0.	3.	0.	0.	0.	0.	.093	.000	-.000
	THRMBS	0.	~~1080.~~ 2184 (5)	0.	0.	0.	0.	(5) ~~.002~~ .011	~~-.300~~ -.5	.000
	SAMSS	0.	477.	0.	0.	0.	0.	.037	.000	.007
	SEISOB	0.	~~72.~~ 76	0.	0.	0.	0.	.006	.000	.000
	SEISSS	0.	~~115.~~ 120	0.	0.	0.	0.	.008	.000	.000
	MAXLOD	0.	2450 ~~1460. *(1030%)~~	0. SF=1.16 (1.0)	0.	0.	0.	.161	.348	.008
	MINLOD	0.	-1042 ~~-2319. *(264%)~~ (5)	0. SF=1.14 (1.0)	0.	0.	0.	-.053	-.345	-.009
150 RAD	WT1	0.	0.	5.	0.	0.	0.	.000	.000	.000
	THRM1	0.	0.	-111.	0.	0.	0.	.093	.000	-.000
	THRMBS	0.	0.	~~18.~~ 76 (5)	0.	0.	0.	~~.002~~ .011	~~-.300~~ -5	.000
	SAMSS	0.	0.	1654.	0.	0.	0.	.037	.000	.007
	SEISOB	0.	0.	~~86.~~ 90	0.	0.	0.	.006	.000	.000
	SEISSS	0.	0.	~~155.~~ 160	0.	0.	0.	.008	.000	.000
	MAXLOD	0.	0.	2094. ~~*(132%)~~	0. SF=1.14 (1.11) (5)	0.	0.	.161	.345	.008
	MINLOD	0.	0.	-2217. ~~*(150%)~~	0. SF=1.14 (1.1)	0.	0.	(5) -.053	-.345	-.009
155 RAD	WT1	-4.	0.	0.	0.	0.	0.	.000	.000	.001
	THRM1	780.	0.	0.	0.	0.	0.	.000	.000	-.291
	THRMBS	-31.	0.	0.	0.	0.	0.	.000	-.300	-.001
	SAMSS	813.	0.	0.	0.	0.	0.	.000	.000	.003
	SEISOB	165.	0.	0.	0.	0.	0.	.000	.000	.001
	SEISSS	292.	0.	0.	0.	0.	0.	.000	.000	.002
	MAXLOD	1203.	0.	0.	0.	0.	0.	.000	.345	.008
	MINLOD	-2208.	0.	0.	0.	0.	0.	.000	-.345	-.342

540 11/19/86 ; 445 11-20-86

~~* LOAD INCREASED (W/O 15% MARGIN)~~

(5) - WT & SEISMIC LOADS IN SHT. 14 THRU 14 B PER NF-426, 11-19-86. SHT 14

CONTINUED ON ... 14A

RESTRAINT LOAD SUMMARY

DATE 02-1-86 PAGE 143

TITLE : ASCW TRANSFER LINES
PROJECT NUMBER : 9510-001
PROJ-LEP NUMBER : X4CP-7162
USER : EYG
LOAD CASE :

CALC NO X4CP- 7162 SHEET 14A OF 15
ORIGINATOR EY Sa DATE 2-6-86
CHECKER [signature] DATE 3-5-86
Iso No: IKS-1202-029-06

CALC. REV. 5 BY:- V.R.Patel 3-13-92 SKD:- JS 3-23-92

~~REV. 3~~

~~CASE 2 (AF331)~~

5 ~~PSDL. REV 4~~

DATA TYPE PT	LOAD TITLE	GLOBAL FORCES (LB) FX	FY	FZ	GLOBAL MOMENTS (FT-LB) MX	MY	MZ	DISPLACEMENT (IN) DX	DY	DZ
140 ANC										
	WT1	1.	-140.	-3.	147.	4.	-36.	.000	-.008	.000
	THRM1	759.	-1.	-143.	3.	3577.	0.	.029	.000	.000
	THRMBS	-23.	196.	24.	-1243.	-121.	362.	-.001	.008	.000
	SAMSS	1075.	163.	1145.	1038.	5682.	363.	.041	.006	.000
	SEISOB	46.	27.	43.	138.	165.	57.	.002	.001	.000
	SEISSS	81.	34.	77.	170.	221.	70.	.003	.001	.000
	MAXLOD	2230.	336.	1430.	2991.	11045.	815.	.186	.612	.006
	MINLOD	-1356.	-614.	-1601.	-2818.	-6926.	-887.	-.052	-.024	.000
150 RAD										
	WT1	0.	-425.	0.	0.	0.	0.	.000	.000	.000
	THRM1	0.	3.	0.	0.	0.	0.	.093	.000	-.000
	THRMBS	0.	-310.	0.	0.	0.	0.	-.004	.030	-.000
	SAMSS	0.	261.	0.	0.	0.	0.	.213	.000	.007
	SEISOB	0.	72.	0.	0.	0.	0.	.006	.000	.000
	SEISSS	0.	115.	0.	0.	0.	0.	.008	.000	.000
	MAXLOD	0.	427.	0.	0.	0.	0.	.367	.000	.008
	MINLOD	0.	-1271.	0.	0.	0.	0.	-.260	.000	-.009
156 RAD										
	WT1	0.	0.	5.	0.	0.	0.	.000	.000	.000
	THRM1	0.	0.	-111.	0.	0.	0.	.093	.000	-.000
	THRMBS	0.	0.	-36.	0.	0.	0.	-.004	.006	-.000
	SAMSS	0.	0.	1594.	0.	0.	0.	.213	.000	.007
	SEISOB	0.	0.	86.	0.	0.	0.	.006	.000	.000
	SEISSS	0.	0.	153.	0.	0.	0.	.008	.000	.000
	MAXLOD	0.	0.	2055.	0.	0.	0.	.367	.000	.008
	MINLOD	0.	0.	-2174.	0.	0.	0.	-.260	.000	-.009
155 RAD										
	WT1	[illegible]	0.	0.	0.	0.	0.	.000	.000	.001
	THRM1	-780.	0.	0.	0.	0.	0.	.000	.000	-.291
	THRMBS	~~35.~~ 177	0.	0.	0.	0.	0.	.000	~~.000~~ 0.0	~~-.000~~ .002
	SAMSS	1588.	0.	0.	0.	0.	0.	.250	.250	.095
	SEISOB	~~164.~~ 172	0.	0.	0.	0.	0.	.000	.000	.001
	SEISSS	~~292.~~ *306	0.	0.	0.	0.	0.	.000	.000	.002
	MAXLOD	~~1650.~~ 1724 ~~(1000%)~~	0.	0.	0.	0.	0.	~~.287~~	~~.432~~	~~.372~~
	MINLOD	~~-2396~~ ~~-2355.~~ -2571	0.	0.	0.	0.	0.	~~-.287~~	~~-.432~~	~~-.507~~

SSW 1/19/86 K.S. 11-20-86

VI-1202-029-H006

SF=1.0

S.F. = ~~1.07~~ 1.024 5

5 NOTE:- SEE NOTE-1 ON SHT 14 OF 15

~~* LOAD INCREASED (W/O 15% MARGIN)~~

SHT 14A CONTINUED ON SHT 14B

RESTRAINT LOAD SUMMARY   ME101/K3   DATE 020886   PAGE 144

TITLE : NSCW TRANSFER LINES
PROJECT NUMBER : 9510-001
PROBLEM NUMBER : X4CF-7162
USER : EYG   (5) ~~PSDL REV. 4~~
LOAD CASE :

CALC NO. X4CF- 7162	SHEET 14B OF 15
ORIGINATOR EY Ban	DATE 2-6-86
CHECKER [signature]	DATE 3-5-86
Iso No: 1R5-1202-029-06	

CALC. REV. (5)   BY: VRPatel 3-13-92   CK'D JS 3-23-92

~~REV. 3~~   ~~CASE 2 (NF 331)~~

SSKO 11/19/86   K.S. 11-20-86

DATA TYPE PT	LOAD TITLE	GLOBAL FORCES (LB) FX	FY	FZ	GLOBAL MOMENTS (FT-LB) MX	MY	MZ	DISPLACEMENT (IN) DX	DY	DZ
155 RAD (VI-1202-029-H006)										(5)
	WT1	0.	~~-344.~~ -360	0.	0.	0.	0.	.000	.000	.001
	THRM1	0.	-54. (5)	0.	0.	0.	0.	.000	.000	-.291
	THRMBS	0.	~~123.~~ 482	0.	0.	0.	0.	.000	~~-.300~~	~~-.000~~ .002
	SAMSS	0.	129.	0.	0.	0.	0.	.250	.250	.495
	SEISOB	0.	~~61.~~ 66	0.	0.	0.	0.	.000	.000	.001
	SEISSS	0. 441	~~95.~~ 100	0.	0.	0.	0.	.000	.000	.002
	MAXLOD	0. ~~1009~~	109. ~~*(30%)~~	0. SF=1.0	0.	0.	0.	~~.287~~	~~.632~~	~~[illegible]~~
	MINLOD	0. ~~-751~~ -772	~~-860~~ ~~*(70%)~~ -1127	0. SF=1.0	0.	0.	0.	~~-.287~~	-.632	-.907
~~170 RAD~~										
	~~WT1~~	~~5.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~.000~~	~~.000~~	~~.000~~
	~~THRM1~~	~~33.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~.000~~	~~.000~~	~~-.224~~
	~~THRMBS~~	~~-74.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~.000~~	~~-.300~~	~~.000~~
	~~SAMSS~~	~~317.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~.250~~	~~.250~~	~~.499~~
	~~SEISOB~~	~~62.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~.000~~	~~.000~~	~~.000~~
	~~SEISSS~~	~~101.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~.000~~	~~.000~~	~~.001~~
	~~MAXLOD~~	~~624.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~.287~~	~~.632~~	~~.575~~
	~~MINLOD~~	~~-581.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~-.287~~	~~-.632~~	~~-.833~~
~~170 RAD~~										
	~~WT1~~	~~0.~~	~~-338.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~.000~~	~~.000~~	~~.000~~
	~~THRM1~~	~~0.~~	~~68.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~.000~~	~~.000~~	~~-.224~~
	~~THRMBS~~	~~0.~~	~~-14.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~.000~~	~~-.300~~	~~.000~~
	~~SAMSS~~	~~0.~~	~~94.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~.250~~	~~.250~~	~~.499~~
	~~SEISOB~~	~~0.~~	~~51.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~.000~~	~~.000~~	~~.000~~
	~~SEISSS~~	~~0.~~	~~94.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~.000~~	~~.000~~	~~.001~~
	~~MAXLOD~~	~~0.~~	~~10[illegible].~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~.287~~	~~.632~~	~~.575~~
	~~MINLOD~~	~~0.~~	~~-627.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~-.287~~	~~-.632~~	~~-.833~~
~~175 RAD~~										
	~~WT1~~	~~-2.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~.000~~	~~.000~~	~~.000~~
	~~THRM1~~	~~-43.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~.000~~	~~.000~~	~~-.115~~
	~~THRMBS~~	~~33.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~.000~~	~~-.300~~	~~.000~~
	~~SAMSS~~	~~64.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~.250~~	~~.250~~	~~.495~~
	~~SEISOB~~	~~110.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~.000~~	~~.000~~	~~.000~~
	~~SEISSS~~	~~195.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~.000~~	~~.000~~	~~.001~~
	~~MAXLOD~~	~~337.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~.287~~	~~.632~~	~~.578~~
	~~MINLOD~~	~~-373.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~0.~~	~~-.287~~	~~-.632~~	~~-.707~~

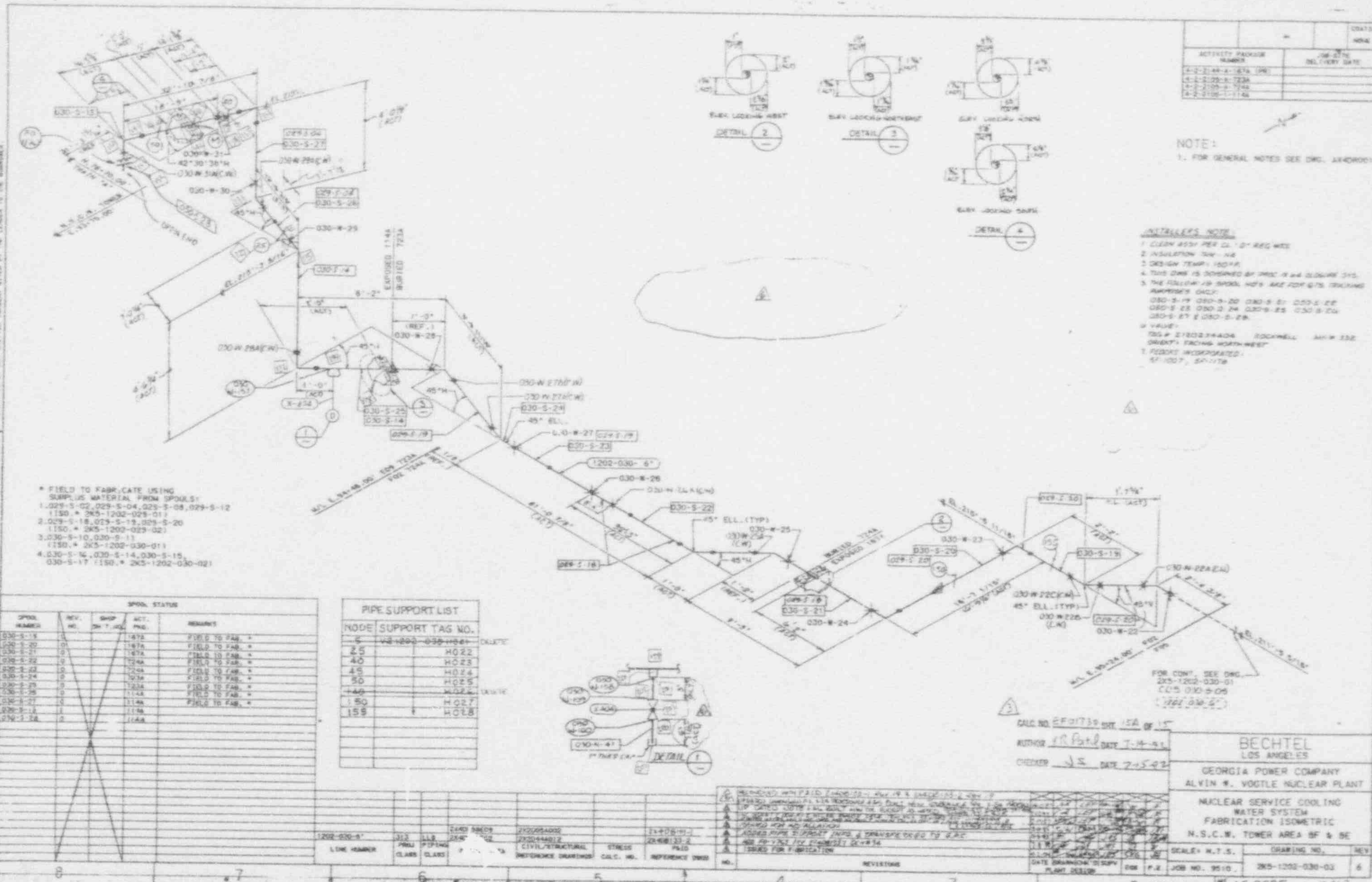
(5) NOTE: SEE NOTE-1 ON SHT 14 OF 15

~~* LOAD INCREASED (W/O 15% MARGIN)~~

SHT 14B CONTINUED ON SHT 14C

ENCLOSURE 3b

Stress / Support Analysis
Line 2-1202-030-6"


NOTE:
1. FOR GENERAL NOTES SEE DWG. 1X4DR001
INSTALLERS NOTE:
* FIELD TO FABRICATE USING SURPLUS MATERIAL FROM SPOOLS:
1.029-S-02,029-S-04,029-S-08,029-S-12 (ISO.# 2K5-1202-029-01)
2.029-S-18,029-S-19,029-S-20 (ISO.# 2K5-1202-029-02)
3.030-S-10,030-S-11 (ISO.# 2K5-1202-030-01)
4.030-S-14,030-S-14,030-S-15, 030-S-17 (ISO.# 2K5-1202-030-02)
SPOOL STATUS
PIPE SUPPORT LIST
NODE
SUPPORT TAG NO.
25 H022
40 H023
45 H024
50 H025
150 H027
159 H018
DETAIL 1
DETAIL 2
DETAIL 3
DETAIL 4
FOR CONT. SEE DWG. 2K5-1202-030-01
BECHTEL
LOS ANGELES
GEORGIA POWER COMPANY
ALVIN W. VOGTLE NUCLEAR PLANT
NUCLEAR SERVICE COOLING WATER SYSTEM
FABRICATION ISOMETRIC
N.S.C.W. TOWER AREA 9F & 9E
SCALE: N.T.S.
DRAWING NO.
REV
JOB NO. 9510
2K5-1202-030-02
6
ISSUED FOR FABRICATION
REVISIONS
LINE NUMBER
1202-030-6"
REFERENCE DRAWINGS
STRESS CALC. NO.
P&ID REFERENCE DWGS
CALC. NO.
AUTHOR
CHECKER
45° ELL.
EXPOSED
BURIED

ME101

I N P U T   C A R D   I M A G E S

```
INPUT
CARD      1        11        21        31        41        51        61        71       80
 SEQ  .   +         +         +         +         +         +         +         +        +  .  LOAD CASE(S)
   1  .  ***        FILE NAME=EF01730.INP                                                     .
   2  .  ***                                                                                  .
   3  .  ***        CREATED FROM WESTDYNE CK.PKG FILE ANILOHA DATED 8-19-87                   .
   4  .  ***        (PARTIAL PIPING)                                                          .
   5  .  ***                                                                                  .
   6  .  ***        ISO:-2K5-1202-030-03                                                      .
   7  .  ***                                                                                  .
   8  .  CTL                                                  MTABLE=B,                       .
   9  .  HED                                                  TITLE=NSCW SYSTEM(1202),        .
  10  .                                                       PROJNO=17553800,                .
  11  .                                                       PROBNO=EF01730,                 .
  12  .                                                       USER=V.R.PATEL,                 .
  13  .                                                       UNIT=2,                         .
  14  .                                                       MODES=30,PERIOD=.03,EIGEN=1,    .
  15  .                                                       SYNTH=4,                        .
  16  .                                                       EDIT=0,                         .
  17  .  ***        WT1=DEAD WEIGHT                                                           .
  18  .  ***        THRM1=DESIN TEMP=150                                                      .
  19  .  ***        THRM2=MIN.ENV.TEMP=40                                                     .
  20  .  ***        THRMBS=BUILDING SETTLEMENT                                                .
  21  .  ***        SEISOB=OBE INERTIA                                                        .
  22  .  ***        SEISSS=SSS INERTIA                                                        .
  23  .  ***        SAMSS=SSESAM                                                              .
  24  .  ***                                                                                  .
  25  .  RUN                                                  LDCASE=WT1(B),                  .
  26  .  RUN                                                  LDCASE=THRM1(A),                .
  27  .  RUN                                                  LDCASE=THRM2(C),                .
  28  .  RUN                                                  LDCASE=THRMBS(D),               .
  29  .  RUN                                                  LDCASE=SAMSS(F),                .
  30  .  RUN                                                  LDCASE=SEISOB(B),               .
  31  .  RUN                                                  LDCASE=SEISSS(B),               .
  32  .  ***        ISO:-2K5-1202-030-03                                                      .
  33  .  ANC    118                                                                       *B  .  WT1     SEISOB SEISSS
  34  .  ANC    118                                                                       *A  .  THRM1
  35  .  ANC    118                                                                       *C  .  THRM2
  36  .  ANC    118            -0.3                                                       *D  .  THRMBS
  37  .  ***      SAM VALUES PER DC-1005 (NSCW VALVE HOUSE/SOIL)                              .
  38  .  ANC    118                                           PHASE=BURIED,DX=.143,       *F  .  SAMSS
  39  .                                                       DY=.143,DZ=.143,            *F  .  SAMSS
  40  .                                                       OD=6.625,THI=.280,              .
  41  .                                                       LBS/FT=31.48,                   .
  42  .                                                       E=28.3E6,                       .
  43  .                                                       MAT=SA312-TP304L,               .
  44  .                                                       TEMP=150,                   *A  .  THRM1
  45  .                                                       EXP=-0.31,                  *C  .  THRM2
  46  .                                                       TEMP=70,                    *D  .  THRMBS
  47  .                                                       SC=15700,SH=15700,              .
  48  .                                                       CODE=SC374,CLASS=2,             .
  49  .                                                       DPRESS=100,PPRESS=100,          .
  50  .         199 2.1213             2.1213                 DTITLE=BRANCH LINE,             .
  51  .         122 0.7071             0.7071     L                                           .
  52  .         123           1.521                                                           .
  53  .         124           1.521                                                           .
  54  .         125           1.521               L                                           .
```

3

CALC. NO. EF-01-730 SHT. 60 OF 15

AUTHOR VRPatel DATE 7-10-92

CHECKER JS DATE 7-15-92

```
 .          126 -1.2705              1.2705
 .          127 -1.2705              1.2705                 DTITLE=21202030H022,
 .   RAD    127           1.0                               AA=1.0E6,
 .   RAD    127 -.7071               -.7071                 AA=1.0E6,
 .          128 -2.4528              2.4528                 SIF=1.9,
 .          129 -2.2871              2.2871
 .          131 -2.2871              2.2871       L
 .          132           2.0
 .          134           2.042                   L
 .          135 0.86                 0.7884                 DTITLE=21202030H023,
 .   RAD    135           1.0                               AA=1.0E6,
 .   RAD    135 -.6757               0.7372                 AA=1.0E6,
 .          136 2.9896               2.7404
 .          137 2.9896               2.7404
 .          138 2.9896               2.7404                 DTITLE=21202030H024,
 .   ANC    138                                             AA=1.0E6,AB=1.0E6,AC=1.0E6,
 .                                                          ARA=1.0E8,ARB=1.0E8,ARC=1.0E8,
 .                                                          COSAX=.7372,COSAZ=.6757,
 .                                                          COSCX=-.6757,COSCZ=.7372,
 .       138139 0.6066               0.5561                 SIF=1.9,
 .          141 0.3072               0.2816                 DTITLE=PEN.N-FACE,
 .          142 1.4743               1.3515                 DTITLE=PEN.S-FACE,
 .          143 2.7925               2.5598
 .          144 2.7925               2.5598
 .          147 2.7925               2.5598                 DTITLE=21202030H025,
 .   RAD    147           1.0                               AA=1.0E6,
 .   ***       SAM VALUES PER DC-1005 (NSCW VALVE HOUSE/TOWER)
 .                                                          DISP=-.5                  *D  .  THRMBS
 .                                                          PHASE=TOWER,DY=.4,        *F  .  SAMSS
 .                                                          AA=1.0E6,
 .   RAD    147 -0.6757              0.7372                 PHASE=TOWER,DX=.4,DZ=.4,  *F  .  SAMSS
 .
 .          148 1.8237               1.6717
 .          150 1.8237               1.6717       L
 .          151           -1.0                              SIF=1.9,
 .          152           -.25                              OD=12.5,THI=2.94,LBS/FT=0.0,
 .                                                          ADDWT=60,
 .          154           -.25
 .   ***        1" O.D BRANCH LINE
 .       199200           -0.276                            OD=6.625,THI=.28,LBS/FT=0.0,
 .                                                          SIF=2.55,
 .          201           -0.146                            OD=1.315,THI=.133,
 .                                                          LBS/FT=3.36,SIF=2.1,
 .          202           -0.25                             SIF=2.1,
 .          203           -0.123                            DTITLE=VALVE-XA04,
 .                                                          OD=1.97,THI=.27,LBS/FT=0.0,
 .          204           -0.4       0.4                    ADDWT=14,
 .       203206           -0.333                            SIF=2.1,
 .          207           -0.594                            OD=1.315,THI=.133,
 .                                                          LBS/FT=3.36,SIF=2.3,
 .                                                          LDNAME=SEISOB,
 .   ACE                                                    TITLE=OBE PVRC NSCW BLDG,
 .   ACE                                                    TYPE=1,COEF=CS4,
 .   ACE                                                    DIRXON=X+Z,
 .   ACE
 .              0.010,0.251, 0.030,0.253, 0.050,0.465,
 .              0.069,0.498, 0.070,0.508, 0.071,0.499,
 .              0.098,0.766, 0.100,0.745, 0.394,0.744,
 .              0.399,0.742, 0.411,0.730, 0.507,0.730,
 .              1.023,0.438, 2.046,0.280, 3.959,0.103,
 .              4.991,0.060, 5.000,0.060,
 .   ACE                                                    DIRXON=Y,
```

3

CALC. NO. EF-01-730 [illegible] SHT. [illegible] OF 15

AUTHOR VRPatel DATE 7-10-92

CHECKER JS 7-15-92

```
115  .              0.010,0.251, 0.030,0.251, 0.050,0.464,
116  .              0.069,0.499, 0.070,0.514, 0.097,0.736,
117  .              0.098,0.745, 0.100,0.714, 0.291,0.712,
118  .              0.296,0.710, 0.799,0.321, 1.310,0.203,
119  .              5.000,0.060,
120  .  EOA
121  .  ACE                                                LDNAME=SEISSS,
122  .  ACE                                                TITLE=SSE PVRC NSCW BLDG,
123  .  ACE                                                TYPE=1,COEF=CS4,
124  .  ACE                                                DIRXON=X+Z,
125  .              0.010,0.390, 0.030,0.390, 0.045,0.478,
126  .              0.050,0.637, 0.064,0.551, 0.094,0.729,
127  .              0.098,0.766, 0.099,0.755, 0.100,0.759,
128  .              0.273,1.305, 0.483,1.301, 1.279,0.754,
129  .              5.000,0.071,
130  .  ACE                                                DIRXON=Y,
131  .              0.010,0.268, 0.030,0.263, 0.032,0.276,
132  .              0.050,0.464, 0.052,0.469, 0.079,0.598,
133  .              0.097,0.736, 0.098,0.745, 0.100,0.714,
134  .              0.112,0.714, 0.155,0.835, 0.392,0.844,
135  .              1.008,0.403, 1.122,0.375, 4.773,0.065,
136  .              5.000,0.060,
137  .  EOA
138  .  CMB                                                ZERO=0*WT1,
139  .  CMB                                                THRMPO=THRM1&THRM2&ZERO,
140  .  CMB                                                THRMNE=THRM1#THRM2#ZERO,
141  .  CMB                                                NEWWT=0.75*WT1,
142  .  CMB                                                BS=ABS(THRMBS),
143  .  CMB                                                SAMOB=0.70*SAMSS,
144  .  CMB                                                N1=THRMPO+NEWWT+BS,
145  .  CMB                                                N2=THRMNE+WT1-BS,
146  .  CMB                                                NORMP=N1&ZERO,
147  .  CMB                                                NORMN=N2#ZERO,
148  .  CMB                                                U1=NEWWT+SEISOB+BS+SAMOB,
149  .  CMB                                                U2=U1+THRMPO,
150  .  CMB                                                U3=WT1-SEISOB-BS-SAMOB,
151  .  CMB                                                U4=U3+THRMNE,
152  .  CMB                                                UPSETP=U1&U2&ZERO,
153  .  CMB                                                UPSETN=U3#U4#ZERO,
154  .  CMB                                                F1=NEWWT+SEISSS+BS+SAMSS,
155  .  CMB                                                F2=F1+THRMPO,
156  .  CMB                                                F3=WT1-SEISSS-BS-SAMSS,
157  .  CMB                                                F4=F3+THRMNE,
158  .  CMB                                                FAULTP=F1&F2&ZERO,
159  .  CMB                                                FAULTN=F3#F4#ZERO,
160  .  STD                                                LIST=NONE,
161  .  RLS                                                LIST=WT1+THRM1+THRM2+BS
162  .                                                     +SAMOB+SAMSS+SEISOB+SEISSS
163  .                                                     +NORMP+NORMN+UPSETP
164  .                                                     +UPSETN+FAULTP+FAULTN,
165  .  SLA                                                INCLUD=WT1,
166  .  OLA                                                INCLUD=WT1+SEISOB,LEVEL=B,
167  .  OLA                                                INCLUD=WT1+SEISOB,LEVEL=C,
168  .  OLA                                                INCLUD=WT1+SEISSS,LEVEL=D,
169  .  TEA                                                INCLUD=THRM1+THRM2+SAMOB,
170  .  END
     .  +        +        +        +        +        +        +        +
```

3

CALC. NO. EF-01-730 SHT. 6F OF 15

AUTHOR V R Patel DATE 7-10-92

CHECKER JS DATE 7-15-92

FORM8.BS ********** (V2-1202-030-H022 to be deleted in future)

Line No.	Stress Calculation No.	Bldg. Loc.	Exist. Sett. (DC-1017) Δ ES	Issued Calc. Rev.
2-1202-030-6"	EF-01-730 (Rev. 2)	NSCW	.3	3 See Note 1

Sact	Sallow	Δ MPAp	Prop. Sett. (DC-1017) Δ PS	By	Chk	Comments
10975 See Note 1	47100	1.29	.30	VRPatel 7-15-92	JS 7-15-92	

NOTES: 1. Completely reanalyzed due to input error.
Sact = 10975 from reanalysis per calc. EF-01-730 Rev. 3.

Parameters:

Δ ES = The Design Criteria differential settlement used in the analysis per DC-1017 Rev. 6

Sact = The actual pipe stress resulting from Δ ES

Sallow = The ASME Code allowable stress

Δ MPAp = The maximum permissible allowable differential settlement valu

where: Δ MPAp = (Sallow / Sact) x (Δ ES)

Δ PS = The propose settlement value for DMCN to the current DC-1017

Effected Pipe Supports	PSDL
V2-1202-030-H022	See Attached
V2-1202-030-H023	See Attached

RESTRAINT LOAD SUMMARY

(3)

TITLE : NSCW SYSTEM(1202)
PROJECT NUMBER : 17553800
PROBLEM NUMBER : EF01730
USER : V.R.PATEL
LOAD CASE :

CALC. NO. EF-01-730 SHT. 14AM OF 15
AUTHOR VRPatel DATE 7-10-92
CHECKER _____ DATE _____

DATA PT	TYPE	LOAD	TITLE	GLOBAL FORCES (LB) FX	FY	FZ	GLOBAL MOMENTS (FT-LB) MX	MY	MZ	DISPLACEMENT (IN) DX	DY	DZ
118	ANC											
		WT1		-24.	-193.	4.	316.	-83.	-305.	0.000	0.000	0.000
		THRM1		217.	-382.	-319.	376.	1014.	-1249.	0.000	0.000	0.000
		THRM2		-75.	132.	110.	-129.	-349.	430.	0.000	0.000	0.000
		BS		67.	2409.	483.	6347.	796.	4781.	0.000	0.300	0.000
		SAMOB		228.	821.	325.	2142.	852.	1718.	0.100	0.100	0.100
		SAMSS		326.	1172.	464.	3059.	1217.	2455.	0.143	0.143	0.143
		SEISOB		99.	143.	154.	80.	604.	546.	0.000	0.000	0.000
		SEISSS		130.	165.	177.	85.	692.	626.	0.000	0.000	0.000
		NORMP		266.	2396.	595.	6960.	1748.	4982.	0.000	0.300	0.000
		NORMN		-166.	-2985.	-798.	-6160.	-1227.	-6334.	0.000	-0.300	0.000
		UPSETP		593.	3360.	1074.	9182.	3204.	7246.	0.100	0.400	0.100
		UPSETN		-494.	-3949.	-1277.	-8382.	-2683.	-8598.	-0.100	-0.400	-0.100
		FAULTP		722.	3732.	1236.	10104.	3657.	8063.	0.143	0.443	0.143
		FAULTN		-623.	-4321.	-1439.	-9304.	-3137.	-9415.	-0.143	-0.443	-0.143
127	RAD	V21202030H022										
(25)		WT1		0.	-373.	0.	0.	0.	0.	0.000	0.000	0.000
		THRM1		0.	303.	0.	0.	0.	0.	0.007	0.000	-0.007
		THRM2		0.	-104.	0.	0.	0.	0.	-0.002	0.000	0.002
		BS		0.	2987.	0.	0.	0.	0.	0.093	0.003	0.094
		SAMOB		0.	1010.	0.	0.	0.	0.	0.049	0.001	0.050
		SAMSS		0.	1442.	0.	0.	0.	0.	0.070	0.001	0.071
		SEISOB		0.	185.	0.	0.	0.	0.	0.023	0.000	0.023
		SEISSS		0.	212.	0.	0.	0.	0.	0.026	0.000	0.026
		NORMP		0.	3011.	0.	0.	0.	0.	0.100	0.003	0.097
		NORMN		0.	-3464.	0.	0.	0.	0.	-0.096	-0.003	-0.101
		UPSETP		0.	4205.	0.	0.	0.	0.	0.172	0.004	0.169
		UPSETN		0.	-4659.	0.	0.	0.	0.	-0.168	-0.005	-0.173
		FAULTP		0.	4665.	0.	0.	0.	0.	0.197	0.005	0.194
		FAULTN		0.	-5119.	0.	0.	0.	0.	-0.193	-0.005	-0.197
127	RAD	V21202030H022		SEE SHT. 14AN OF 15								
(25)		WT1		15.	0.	15.	0.	0.	0.	0.000	0.000	0.000
		THRM1		2.	0.	2.	0.	0.	0.	0.007	0.000	-0.007
		THRM2		-1.	0.	-1.	0.	0.	0.	-0.002	0.000	0.002
		BS		341.	0.	341.	0.	0.	0.	0.093	0.003	0.094
		SAMOB		276.	0.	276.	0.	0.	0.	0.049	0.001	0.050
		SAMSS		395.	0.	395.	0.	0.	0.	0.070	0.001	0.071
		SEISOB		65.	0.	65.	0.	0.	0.	0.023	0.000	0.023
		SEISSS		100.	0.	100.	0.	0.	0.	0.026	0.000	0.026
		NORMP		355.	0.	355.	0.	0.	0.	0.100	0.003	0.097
		NORMN		-328.	0.	-328.	0.	0.	0.	-0.096	-0.003	-0.101
		UPSETP		696.	0.	696.	0.	0.	0.	0.172	0.004	0.169
		UPSETN		-669.	0.	-669.	0.	0.	0.	-0.168	-0.005	-0.173
		FAULTP		849.	0.	849.	0.	0.	0.	0.197	0.005	0.194
		FAULTN		-822.	0.	-822.	0.	0.	0.	-0.193	-0.005	-0.197

2K5-1202-030-03

RESTRAINT LOAD SUMMARY

△3

CALC. NO. EF-01-730 SHT. 14A OF 15

TITLE : NSCW SYSTEM(1202)
PROJECT NUMBER : 17553800
PROBLEM NUMBER : EF01730
USER : V.R.PATEL
LOAD CASE :

AUTHOR V R Patel DATE 7-10-92

CHECKER _____ DATE _____

DATA PT	TYPE	LOAD	TITLE	LOCAL FORCES(LB) FA	FB	FC	LOCAL MOMENTS (FT-LB) MA	MB	MC	DIRECTION COSINES COS AX	COS AY	COS AZ	COS BX	COS BY	COS BZ	COS CX	COS CY	COS CZ
118	ANC																	
		WT1		-24	-193	4	316	-83	-305	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00
		THRM1		217	-382	-319	376	1014	-1249	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00
		THRM2		75	132	110	-129	-349	430	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00
		BS		67	2409	483	6347	796	4781	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00
		SAMOB		228	821	325	2142	852	1718	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00
		SAMSS		326	1172	464	3059	1217	2455	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00
		SEISOB		99	143	154	80	504	546	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00
		SEISSS		130	165	177	85	692	626	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00
		NORMP		266	2396	595	6960	1748	4982	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00
		NORMN		-166	-2985	-798	-6160	-1227	-6334	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00
		UPSETP		593	3360	1074	9182	3204	7246	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00
		UPSETN		-494	-3949	-1277	-8382	-2683	-8598	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00
		FAULTP		722	3732	1236	10104	3657	8063	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00
		FAULTN		-623	-4321	-1439	-9304	-3137	-9415	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00
127	RAD	V21202030H022																
		WT1		-373	0	0	0	0	0	0.00	1.00	0.00						
		THRM1		303	0	0	0	0	0	0.00	1.00	0.00						
		THRM2		-104	0	0	0	0	0	0.00	1.00	0.00						
		BS		2987	0	0	0	0	0	0.00	1.00	0.00						
		SAMOB		1010	0	0	0	0	0	0.00	1.00	0.00						
		SAMSS		1442	0	0	0	0	0	0.00	1.00	0.00						
		SEISOB		185	0	0	0	0	0	0.00	1.00	0.00						
		SEISSS		212	0	0	0	0	0	0.00	1.00	0.00						
		NORMP		3011	0	0	0	0	0	0.00	1.00	0.00						
		NORMN		-3464	0	0	0	0	0	0.00	1.00	0.00						
		UPSETP		4205	0	0	0	0	0	0.00	1.00	0.00						
		UPSETN		-4659	0	0	0	0	0	0.00	1.00	0.00						
		FAULTP		4665	0	0	0	0	0	0.00	1.00	0.00						
		FAULTN		-5119	0	0	0	0	0	0.00	1.00	0.00						
127	RAD	V21202030H022																
		WT1		-21	0	0	0	0	0	-0.71	0.00	-0.71						
		THRM1		-3	0	0	0	0	0	-0.71	0.00	-0.71						
		THRM2		1	0	0	0	0	0	-0.71	0.00	-0.71						
		BS		483	0	0	0	0	0	-0.71	0.00	-0.71						
		SAMOB		391	0	0	0	0	0	-0.71	0.00	-0.71						
		SAMSS		558	0	0	0	0	0	-0.71	0.00	-0.71						
		SEISOB		92	0	0	0	0	0	-0.71	0.00	-0.71						
		SEISSS		141	0	0	0	0	0	-0.71	0.00	-0.71						
		NORMP		468	0	0	0	0	0	-0.71	0.00	-0.71						
		NORMN		-506	0	0	0	0	0	-0.71	0.00	-0.71						
		UPSETP		951	0	0	0	0	0	-0.71	0.00	-0.71						
		UPSETN		-989	0	0	0	0	0	-0.71	0.00	-0.71						
		FAULTP		1168	0	0	0	0	0	-0.71	0.00	-0.71						

(25)

2K3-1202-030-01

RESTRAINT LOAD SUMMARY

(3) CALC. NO. EF-01-730 SHT. 14A OF 15

TITLE : NSCW SYSTEM(1202)
PROJECT NUMBER : 17553800
PROBLEM NUMBER : EF01730
USER : V.R.PATEL
LOAD CASE :

AUTHOR V R Patel DATE 7-10-92

CHECKER _____ DATE _____

DATA PT	TYPE	LOAD	TITLE	GLOBAL FORCES (LB) FX	FY	FZ	GLOBAL MOMENTS (FT-LB) MX	MY	MZ	DISPLACEMENT (IN) DX	DY	DZ
135	RAD	V21202030H023										
(40)			WT1	0.	-446.	0.	0.	0.	0.	0.000	0.000	0.000
			THRM1	0.	66.	0.	0.	0.	0.	-0.081	0.000	-0.074
			THRM2	0.	-23.	0.	0.	0.	0.	0.028	0.000	0.025
			BS	0.	643.	0.	0.	0.	0.	0.000	0.001	0.000
			SAMOB	0.	243.	0.	0.	0.	0.	0.000	0.000	0.000
			SAMSS	0.	348.	0.	0.	0.	0.	0.000	0.000	0.000
			SEISOB	0.	118.	0.	0.	0.	0.	0.000	0.000	0.000
			SEISSS	0.	128.	0.	0.	0.	0.	0.001	0.000	0.000
			NORMP	0.	374.	0.	0.	0.	0.	0.028	0.000	0.025
			NORMN	0.	-1112.	0.	0.	0.	0.	-0.081	-0.001	-0.074
			UPSETP	0.	735.	0.	0.	0.	0.	0.029	0.001	0.026
			UPSETN	0.	-1473.	0.	0.	0.	0.	-0.082	-0.001	-0.074
			FAULTP	0.	850.	0.	0.	0.	0.	0.029	0.001	0.026
			FAULTN	0.	-1588.	0.	0.	0.	0.	-0.082	-0.002	-0.075
135	RAD	V21202030H023	SEE SHT. 14AP OF 15									
(40)			WT1	15.	0.	-16.	0.	0.	0.	0.000	0.000	0.000
			THRM1	-258.	0.	281.	0.	0.	0.	-0.081	0.000	-0.074
			THRM2	89.	0.	-97.	0.	0.	0.	0.028	0.000	0.025
			BS	215.	0.	235.	0.	0.	0.	0.000	0.001	0.000
			SAMOB	206.	0.	225.	0.	0.	0.	0.000	0.000	0.000
			SAMSS	294.	0.	321.	0.	0.	0.	0.000	0.000	0.000
			SEISOB	113.	0.	124.	0.	0.	0.	0.000	0.000	0.000
			SEISSS	144.	0.	157.	0.	0.	0.	0.001	0.000	0.000
			NORMP	315.	0.	504.	0.	0.	0.	0.028	0.000	0.025
			NORMN	-458.	0.	-347.	0.	0.	0.	-0.081	-0.001	-0.074
			UPSETP	634.	0.	852.	0.	0.	0.	0.029	0.001	0.026
			UPSETN	-777.	0.	-696.	0.	0.	0.	-0.082	-0.001	-0.074
			FAULTP	753.	0.	982.	0.	0.	0.	0.029	0.001	0.026
			FAULTN	-896.	0.	-825.	0.	0.	0.	-0.082	-0.002	-0.075
138	ANC	V21202030H024	SEE SHT. 14AP OF 15									
(45)			WT1	-9.	-413.	-2.	0.	5.	2.	0.000	0.000	0.000
			THRM1	39.	14.	35.	-330.	2.	-362.	0.000	0.000	0.000
			THRM2	-13.	-5.	-12.	114.	-1.	124.	0.000	0.000	0.000
			BS	99.	264.	94.	2134.	93.	2238.	0.000	0.000	0.000
			SAMOB	175.	141.	179.	1247.	1454.	1310.	0.000	0.000	0.000
			SAMSS	250.	202.	255.	1782.	2077.	1872.	0.000	0.000	0.000
			SEISOB	317.	103.	302.	286.	176.	284.	0.000	0.000	0.000
			SEISSS	488.	109.	466.	328.	227.	327.	0.000	0.000	0.000
			NORMP	134.	0.	128.	2288.	98.	2364.	0.000	-0.001	0.000
			NORMN	-117.	-681.	-108.	-2504.	-89.	-2598.	0.000	0.000	0.001
			UPSETP	625.	212.	609.	3820.	1728.	3958.	0.000	-0.001	-0.001
			UPSETN	-609.	-925.	-590.	-4037.	-1718.	-4193.	0.001	0.000	0.001
			FAULTP	872.	278.	849.	4397.	2402.	4562.	-0.001	-0.001	-0.001
			FAULTN	-855.	-992.	-830.	-4614.	-2393.	-4796.			

2KS-1202-030-01

CALC. NO. EF-01-730 SHT. 144P OF 15

TITLE : NSCW SYSTEM(1202)
PROJECT NUMBER : 17553800
PROBLEM NUMBER : EF01730
USER : V.R.PATEL
LOAD CASE :

AUTHOR VRPatel DATE 7-10-92

CHECKER _____ DATE _____

DATA PT	TYPE	LOAD	TITLE	LOCAL FORCES(LB) FA	FB	FC	LOCAL MOMENTS (FT-LB) MA	MB	MC	DIRECTION COSINES COS AX	COS AY	COS AZ	COS BX	COS BY	COS BZ	COS CX	COS CY	COS CZ
135	RAD	√21202030H023																
		WT1		-446	0	0	0	0	0	0.00	1.00	0.00						
		THRM1		66	0	0	0	0	0	0.00	1.00	0.00						
		THRM2		-23	0	0	0	0	0	0.00	1.00	0.00						
		BS		643	0	0	0	0	0	0.00	1.00	0.00						
		SAMOB		243	0	0	0	0	0	0.00	1.00	0.00						
		SAMSS		348	0	0	0	0	0	0.00	1.00	0.00						
		SEISOB		118	0	0	0	0	0	0.00	1.00	0.00						
		SEISSS		128	0	0	0	0	0	0.00	1.00	0.00						
		NORMP		374	0	0	0	0	0	0.00	1.00	0.00						
		NORMN		-1112	0	0	0	0	0	0.00	1.00	0.00						
		UPSETP		735	0	0	0	0	0	0.00	1.00	0.00						
		UPSETN		-1473	0	0	0	0	0	0.00	1.00	0.00						
		FAULTP		850	0	0	0	0	0	0.00	1.00	0.00						
		FAULTN		-1588	0	0	0	0	0	0.00	1.00	0.00						
135	RAD	√21202030H023																
(40)		WT1		-22	0	0	0	0	0	-0.68	0.00	0.74						
		THRM1		381	0	0	0	0	0	-0.68	0.00	0.74						
		THRM2		-131	0	0	0	0	0	-0.68	0.00	0.74						
		BS		318	0	0	0	0	0	-0.68	0.00	0.74						
		SAMOB		305	0	0	0	0	0	-0.68	0.00	0.74						
		SAMSS		436	0	0	0	0	0	-0.68	0.00	0.74						
		SEISOB		168	0	0	0	0	0	-0.68	0.00	0.74						
		SEISSS		212	0	0	0	0	0	-0.68	0.00	0.74						
		NORMP		683	0	0	0	0	0	-0.68	0.00	0.74						
		NORMN		-471	0	0	0	0	0	-0.68	0.00	0.74						
		UPSETP		1156	0	0	0	0	0	-0.68	0.00	0.74						
		UPSETN		-944	0	0	0	0	0	-0.68	0.00	0.74						
		FAULTP		1332	0	0	0	0	0	-0.68	0.00	0.74						
		FAULTN		-1119	0	0	0	0	0	-0.68	0.00	0.74						
138	ANC	√21202030H024																
(45)		WT1		-5	-413	2	1	5	1	0.74	0.00	0.68	0.00	1.00	0.00	-0.68	0.00	0.74
		THRM1		52	14	0	-488	2	-43	0.74	0.00	0.68	0.00	1.00	0.00	-0.68	0.00	0.74
		THRM2		-18	-5	0	168	-1	15	0.74	0.00	0.68	0.00	1.00	0.00	-0.68	0.00	0.74
		BS		106	264	30	705	93	2389	0.74	0.00	0.68	0.00	1.00	0.00	-0.68	0.00	0.74
		SAMOB		95	141	156	391	1454	1419	0.74	0.00	0.68	0.00	1.00	0.00	-0.68	0.00	0.74
		SAMSS		135	202	223	559	2077	2027	0.74	0.00	0.68	0.00	1.00	0.00	-0.68	0.00	0.74
		SEISOB		336	103	101	213	176	191	0.74	0.00	0.68	0.00	1.00	0.00	-0.68	0.00	0.74
		SEISSS		519	109	156	246	227	218	0.74	0.00	0.68	0.00	1.00	0.00	-0.68	0.00	0.74
		NORMP		155	0	31	874	98	2405	0.74	0.00	0.68	0.00	1.00	0.00	-0.68	0.00	0.74
		NORMN		-129	-681	-28	-1192	-89	-2432	0.74	0.00	0.68	0.00	1.00	0.00	-0.68	0.00	0.74
		UPSETP		586	212	288	1478	1728	4015	0.74	0.00	0.68	0.00	1.00	0.00	-0.68	0.00	0.74
		UPSETN		-561	-925	-286	-1796	-1718	-4041	0.74	0.00	0.68	0.00	1.00	0.00	-0.68	0.00	0.74
		FAULTP		809	278	410	1678	2402	4650	0.74	0.00	0.68	0.00	1.00	0.00	-0.68	0.00	0.74

2K5-1202-030-03

RESTRAINT LOAD SUMMARY

CALC. NO. EF-01-730 SHT. 14AR OF 15

TITLE : NSCW SYSTEM(1202)
PROJECT NUMBER : 17553800
PROBLEM NUMBER : EF01730
USER : V.R.PATEL
LOAD CASE :

AUTHOR V R Patel DATE 7-10-92

CHECKER _____ DATE _____

DATA PT	TYPE	LOAD	TITLE	GLOBAL FORCES (LB) FX	FY	FZ	GLOBAL MOMENTS (FT-LB) MX	MY	MZ	DISPLACEMENT (IN) DX	DY	DZ
147	RAD		√21202030H025									
(50)		WT1		0.	-490.	0.	0.	0.	0.	0.000	0.000	0.000
		THRM1		0.	0.	0.	0.	0.	0.	0.097	0.000	0.089
		THRM2		0.	0.	0.	0.	0.	0.	-0.033	0.000	-0.031
		BS		0.	199.	0.	0.	0.	0.	0.000	0.500	0.000
		SAMOB		0.	111.	0.	0.	0.	0.	0.189	0.280	0.206
		SAMSS		0.	159.	0.	0.	0.	0.	0.270	0.400	0.295
		SEISOB		0.	124.	0.	0.	0.	0.	0.000	0.000	0.000
		SEISSS		0.	130.	0.	0.	0.	0.	0.001	0.000	0.001
		NORMP		0.	0.	0.	0.	0.	0.	0.097	0.499	0.089
		NORMN		0.	-689.	0.	0.	0.	0.	-0.033	-0.500	-0.031
		UPSETP		0.	66.	0.	0.	0.	0.	0.287	0.779	0.296
		UPSETN		0.	-926.	0.	0.	0.	0.	-0.223	-0.780	-0.237
		FAULTP		0.	120.	0.	0.	0.	0.	0.368	0.899	0.384
		FAULTN		0.	-978.	0.	0.	0.	0.	-0.304	-0.900	-0.326
147	RAD		√21202030H025 SEE SHT. 14AR OF 15									
(50)		WT1		0.	0.	0.	0.	0.	0.	0.000	0.000	0.000
		THRM1		0.	0.	0.	0.	0.	0.	0.097	0.000	0.089
		THRM2		0.	0.	0.	0.	0.	0.	-0.033	0.000	-0.031
		BS		1.	0.	1.	0.	0.	0.	0.000	0.500	0.000
		SAMOB		75.	0.	82.	0.	0.	0.	0.189	0.280	0.206
		SAMSS		108.	0.	118.	0.	0.	0.	0.270	0.400	0.295
		SEISOB		84.	0.	92.	0.	0.	0.	0.000	0.000	0.000
		SEISSS		130.	0.	142.	0.	0.	0.	0.001	0.000	0.001
		NORMP		1.	0.	1.	0.	0.	0.	0.097	0.499	0.089
		NORMN		-1.	0.	-1.	0.	0.	0.	-0.033	-0.500	-0.031
		UPSETP		160.	0.	175.	0.	0.	0.	0.287	0.779	0.296
		UPSETN		-160.	0.	-175.	0.	0.	0.	-0.223	-0.780	-0.237
		FAULTP		238.	0.	260.	0.	0.	0.	0.368	0.899	0.384
		FAULTN		-238.	0.	-260.	0.	0.	0.	-0.304	-0.900	-0.326

2KS-1202-030-03

RESTRAINT LOAD SUMMARY

(3) CALC. NO. EF-01-730 SHT. 14AR OF 15

TITLE : NSCW SYSTEM(1202)
PROJECT NUMBER : 17553800
PROBLEM NUMBER : EF01730
USER : V.R.PATEL
LOAD CASE :

AUTHOR V R Patel DATE 7-10-92

CHECKER _____ DATE _____

DATA PT	TYPE	LOAD	TITLE	LOCAL FORCES(LB) FA	FB	FC	LOCAL MOMENTS (FT-LB) MA	MB	MC	DIRECTION COSINES COS AX	COS AY	COS AZ	COS BX	COS BY	COS BZ	COS CX	COS CY	COS CZ
149	RAD	√21202030H025																
		WT1		-490	0	0	0	0	0	0.00	1.00	0.00						
		THRM1		0	0	0	0	0	0	0.00	1.00	0.00						
		THRM2		0	0	0	0	0	0	0.00	1.00	0.00						
		BS		199	0	0	0	0	0	0.00	1.00	0.00						
		SAMOB		111	0	0	0	0	0	0.00	1.00	0.00						
		SAMSS		159	0	0	0	0	0	0.00	1.00	0.00						
		SEISOB		124	0	0	0	0	0	0.00	1.00	0.00						
		SEISSS		130	0	0	0	0	0	0.00	1.00	0.00						
		NORMP		0	0	0	0	0	0	0.00	1.00	0.00						
		NORMN		-689	0	0	0	0	0	0.00	1.00	0.00						
		UPSETP		66	0	0	0	0	0	0.00	1.00	0.00						
		UPSETN		-924	0	0	0	0	0	0.00	1.00	0.00						
		FAULTP		120	0	0	0	0	0	0.00	1.00	0.00						
		FAULTN		-978	0	0	0	0	0	0.00	1.00	0.00						
147	RAD	√21202030H025																
(50)		WT1		0	0	0	0	0	0	-0.68	0.00	0.74						
		THRM1		0	0	0	0	0	0	-0.68	0.00	0.74						
		THRM2		0	0	0	0	0	0	-0.68	0.00	0.74						
		BS		1	0	0	0	0	0	-0.68	0.00	0.74						
		SAMOB		112	0	0	0	0	0	-0.68	0.00	0.74						
		SAMSS		159	0	0	0	0	0	-0.68	0.00	0.74						
		SEISOB		125	0	0	0	0	0	-0.68	0.00	0.74						
		SEISSS		192	0	0	0	0	0	-0.68	0.00	0.74						
		NORMP		1	0	0	0	0	0	-0.68	0.00	0.74						
		NORMN		-1	0	0	0	0	0	-0.68	0.00	0.74						
		UPSETP		237	0	0	0	0	0	-0.68	0.00	0.74						
		UPSETN		-237	0	0	0	0	0	-0.68	0.00	0.74						
		FAULTP		352	0	0	0	0	0	-0.68	0.00	0.74						
		FAULTN		-352	0	0	0	0	0	-0.68	0.00	0.74						

2KS-1202.030-03

ME101LC VERSION M8 STOP ON 07/02/92 AT 11:50:01, CPU= 48.78, BIO= 1075, DIO= 10785, PGF= 11248
ME101LC VERSION M8 EXECUTION TIMES CPU= 12.01, BIO= 255, DIO= 3571, PGF= 414
ME101SA VERSION M8 START ON 07/02/92 AT 11:50:02, CPU= 49.02, BIO= 1089, DIO= 10788, PGF= 11337

Design Calculations (3) Southern Company Services

Project	Prepared By	Date
VOGTLE NUCLEAR PLANT, UNIT-2	V. R Patel	7-13-92
Subject/Title	Reviewed By	Date
PIPE STRESS EVALUATION		7-15-92
	Calculation Number	Sheet
	EF-01-730	7E of 15

PURPOSE:- TO RECONCILE THE DISCREPANCY IN THE ANALYSIS OF DIFF BUILDING SETTLEMENT AND SEISMIC ANCHOR MOTION LOAD CONDITION FOR PIPING ISO: 2KS-1202-030-03 FROM BURIED PIPE (VIRTUAL ANCHOR) TO NSCW TOWER TRAIN "A".

REFERENCE: 1) PIPE STRESS CALC # EF-01-730 REV. 2.
2) ME101 RUN # "2K4042" DATED 07/02/92

EVALUATION: PIPING OF THE ISO 2KS-1202-030-03 FROM BURIED PIPING (VIRTUAL ANCHOR) TO NSCW TOWER TRAIN "A" IS REANALYSED PER REF-2 AND THE RESULTS ARE ACCEPTABLE AS BELOW

EQ B STRESS = 1584 Psi < 15700 Psi (REF 2) @ D.P 147

EQ 9 STRESS (LVL B) = 2345 Psi < 18840 Psi (SEE SHT 8M OF 15) @ D.P 138

EQ 9 STRESS (LVL D) = 2474 Psi < 28260 Psi (SEE SHT 8M OF 15) @ D.P 138

EQ 10 STRESS = 11183 Psi < 23550 Psi (REF 2) @ D.P 139

B.S STRESS = 10975 Psi < 3XSc = 47100 Psi @ D.P 128 (REF-2)

VALVE END LOAD: SEE SHT 10G OF 15, VALVE ACCELERATION (SHT 13A OF 15), FLANGE LOAD (SHT 8L OF 15), AND PENETRATION DIPLACEMENT (SHT 12C, 12D & 12E OF 15) HAS INSIGNIFICANTE EFFECT.

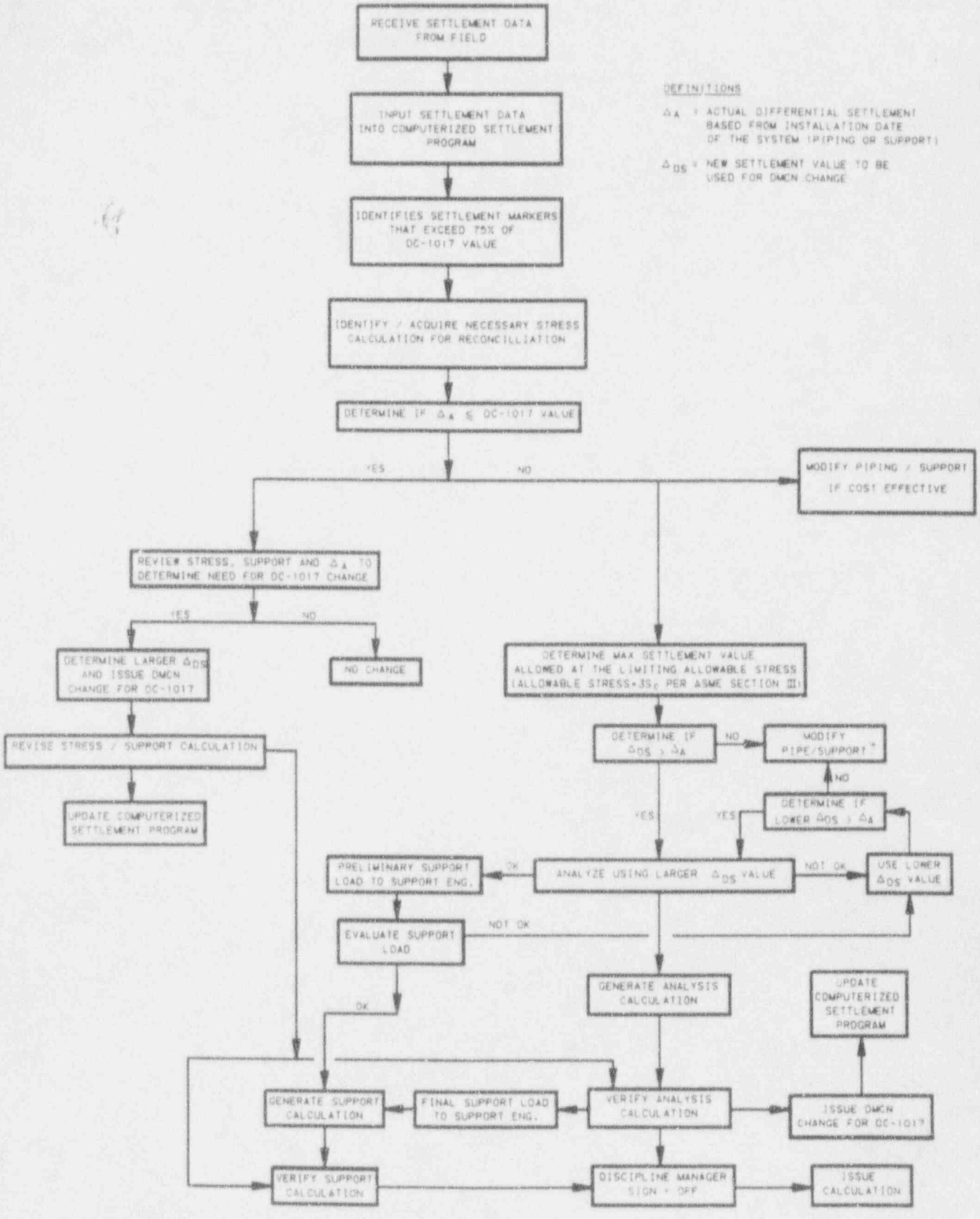
CONCLUSION: PIPE STRESS ANALYSIS IS FOUND SATISFACTORY, THEREFORE THE DEVIATION IS ACCEPTED.

ENCLOSURE 4

Settlement Monitoring Flow Chart

SETTLEMENT MONITORING PROGRAM

FLOW CHART



DEFINITIONS

Δ_A = ACTUAL DIFFERENTIAL SETTLEMENT BASED FROM INSTALLATION DATE OF THE SYSTEM (PIPING OR SUPPORT)

Δ_{DS} = NEW SETTLEMENT VALUE TO BE USED FOR DMCN CHANGE