Florida Power
CORPORATION

INTEROFFICE CORRESPONDENCE

Nuclear Engineering (OFFICE) CZI (MAC) 231-5112 (PHONE)

SUBJECT: Crystal River Unit No. 3
Quality Document Transmittal - Analysis/Calculations
File: CALC

TO: Records Management - NR2A

The following analysis/calculation package is submitted as the QA Record copy:

DOCNO (FPC DOCUMENT IDENTIFICATION NUMBER)	REV	SYSTEM(S)	TOTAL PAGES TRANSMITTED
M-75-0012	0	MS	~~330~~ 331

TITLE
PIPING ANALYSIS CR-5 REV.0 : MAIN STEAM FROM PEN. #107 TO TURBINE STOP VALVE

KWDS (IDENTIFY KEYWORDS FOR LATER RETRIEVAL)
PIPING ANALYSIS, CR-5, MAIN STEAM, STOP VALVE

DXREF (REFERENCES OR FILES - LIST PRIMARY FILE FIRST)
DWG : 305-752

VEND (VENDOR NAME)	VENDOR DOCUMENT NUMBER (DXREF)	SUPERSEDED DOCUMENTS (DXREF)
G/CI	CR-5 REV.0	N/A

TAG		
MSH-17, 99, 228	MSH-117, 25, 119	MSH-178, 206, 249
MSH-18, 19, 20	MSH-26, 232, 248	MSH-179, 180, 207
MSH-229, 21, 23	MSH-27, 121, 216	MSH-28, 269, 24
MSH-22, 230, 231	MSH-124, 205	

PART NO.		

COMMENTS (USAGE RESTRICTIONS, PROPRIETARY, ETC.)
ATTACHMENTS ARE AVAILABLE IN THE RECORDS MANAGEMENT SYSTEM

NOTE:
Use Tag number only for valid tag numbers (i.e., RCV-8, SWV-34, DCH-99), otherwise; use Part number field (i.e., CSC14599, AC1459). If more space is required, write "See Attachment" and list on separate sheet.

ORIGINATING ENGINEER	DATE	VERIFICATION ENGINEER	DATE	SUPERVISOR NUCLEAR ENGINEERING	DATE
Genevieve Cave	8/18/94	N/A			11/18/94

cc: MAR Office (If MAR Related) ☐ Yes ■ No
MAR/Project File
Mgr., Nucl. Config. Mgt.
File (CALC) -- FPES - "Original" ~~w/attach~~
Mgr. Site Nucl. Eng. Serv. ~~w/attach~~

Supervisor, Nuclear Document Control w/Plant Doc. Rev. Eval. and Analysis / Calc. Summary
Plant Document Review Required ☐ Yes ■ No
A.E. _____ ☐ Yes ■ No
(If Yes, Transmit / Attach)

Florida Power Corporation

PLANT DOCUMENT REVIEW EVALUATION

DOCUMENT TYPE / NUMBER TO BE EVALUATED

PIPING ANALYSIS (CR-5) M-75-0012 Rev. 0

PART I

INSTRUCTIONS: Calculations, Document Change Notices, and Plant Equipment Equivalency Replacements have the potential to affect plant documents. The Originator of any of these documents is required to determine which, if any, plant organizations should review the subject document for impact. The Originator should use the best judgment to make this determination based on the nature of the changes. If in doubt as to whether or not a plant organization should review a particular document, it is suggested that the subject organization be contacted.

The Originator is to check the appropriate boxes below and attach to the subject package as follows:

Calculations - Insert behind Analysis/Calculation Transmittal
DCNs - Insert behind DCN page 1
PEEREs - Insert behind PEERE page 2
CIDPs - Insert behind CIDP page 1

The above referenced document must be distributed as follows:

- [■] No Review Required
- [ ] Senior Radiation Protection Engineer
- [ ] Manager, Site Nuclear Services
- [ ] Supervisor, Operations Engineering & Support
- [ ] Manager, Nuclear Maintenance
- [ ] Manager, Nuclear Plant Technical Support
- [ ] Other(s):

ORIGINATOR / DATE: Genevieve Carré 8/18/94

SUPERVISOR / DATE: [signature] 11/18/94

Upon completion of Part I, attach to the subject document, check "Plant Document Review Required" block, as applicable, and give to Nuclear Engineering Clerk for distribution.
CIDPs - Distribute with Attachments
Calcs - Distribute with Transmittal Memo, Summary - PEERE - Distribute with Attachments - DCNs - Distribute with Attachments and Drawings

PART II

INSTRUCTIONS: Upon receipt of the subject document, the assigned Reviewer enters the "Reviewing Department" name below, reviews the subject document for impact on plant procedures, and completes the evaluation below.

REVIEWING DEPARTMENT

PLANT REVIEW IMPACT EVALUATION: The above referenced document has been reviewed and evaluated as follows:

- [ ] No Action Required
- [ ] Action Required: The below listed document(s) is affected and requires revision and/or other actions as indicated (i.e., generate a new procedure, void a procedure, etc.)

DOCUMENTS / ACTIONS

REVIEWER / DATE

SUPERVISOR / DATE

Upon completion, forward evaluation form only to Nuclear Document Control (NA2A)
* If the Supervisor or designee acts as the Originator or Reviewer, the applicable "Originator/Reviewer" block should be NA'd.

ANALYSIS/CALCULATION
DOC ID # M-75-0012 ATT # _____
REV 0 SHEET 1 OF 27

CR-5

Main Steam from Pen. #107 to Turbine

Stop Valve

7/23/69
Rev. 1
12/10/70

DESIGN REVIEW CERTIFICATION

I, Santo Ferrarello, certify that I have independently reviewed
Responsible Engineer

the design for CR-5 Main Steam from Pen. #107 to Turbine Stop Valve
Structure, System, Component

of the Crystal River Unit #3, that is being designed for Florida
Nuclear Plant

Power Corporation, in accordance with the GAI DESIGN

REVIEW PROCEDURE; moreover, this design review has been conducted in such

manner that the information documented herewith does to the best of my

knowledge meet the design intent and has covered the following areas:

[X] Design Criteria

[X] Applicable Codes and Standards

[X] Calculation Approach

[X] Mathematics of Calculations or Computer Solution

[X] PSAR Commitments

[ ] Other (See Attachment)

ANALYSIS/CALCULATION
DOC ID # M-75-0012 ATT # _____
REV 0 SHEET 2 OF 27

S. F. Ferrarello
Name

Piping Engineer
Title

Piping Engineering (0430)
Department

January 7, 1975
Date

GILBERT ASSOCIATES, INC.
ENGINEERS AND CONSULTANTS
READING, PA.

CLIENT FPC

PROJECT CR3

FILING CODE

NO. | PAGE

SYSTEM CR-5

ORIGINATOR

DATE

CALCULATION FOR SEISMIC ANALYSIS CHANGES

REVIEWER

DATE

RESULTS

MARK NUMBER	DESCRIPTION OF CHANGE
MSH 17	PA 6½" East ; SA 5⅞" E
231	PA + SA 4'-0½" SOUTH

ANALYSIS/CALCULATION
DOC ID # M-75-0012 ATT # _____
REV 0 SHEET 3 OF 27

FILING

GAI 357 REV. 10-72

GILBERT ASSOCIATES, INC. ENGINEERS AND CONSULTANTS READING, PA.	CLIENT FLORIDA POWER CORPORATION PROJECT CRYSTAL RIVER UNIT #3	FILING CODE 2S203- (CT) PAGE 2 OF 5
SYSTEM	Main Steam	ORIGINATOR W. C. Ish... DATE 3/31/74
CALCULATION FOR CR - 5	PIPING ANALYSIS REVIEW SUMMARY	REVIEWER S. Ferrentino DATE 1/7/75

1. Drawing number P1-355-752

2. Type analysis needed - Thermal Yes Seismic Yes Deadload Yes

3. Analysis Identification Code CR-5

ANALYSIS/CALCULATION
DOC ID # M-75-0012 ATT # ______
REV 0 SHEET 4 OF 27

A. Check Isometric Drawings

1. Check hangers, restraints, anchors, sheet numbers, directions and allowables to see if indicated on drawing properly.

2.

	PT. A TO PT. B	DES. PRESS.	DES. TEMP.	OPER. PRESS.	OPER. TEMP.	LINE SPEC.	MAT'L SPEC.	COLD MOD. E X 10^6	HOT MOD. E X 10^6	COEF. OF EXP."/100'
LINE 1	1 to 144	1050	600	965	590	600-1	A106 GR B	27.9	25.77	4.60
LINE 2										
LINE 3										
LINE 4										

3. PIPE DATA

(at Pin 107 →)

LINE NO.	1	1	1	1			
Nom. Dia.	24"	10"	6"	24			
O.D.	24.0	10.75	6.625	24			
Sched.	60	60	40	80			
Wall th.	.965	.500	.280	1.218			
Pipe lb/ft	238	54.7	18.97	297			
Cont. lb/ft	5.3	2.0	1.0	5			
INS. lb/ft	32.4	14.82	9.03	33			
Total wt. lb/ft	275.7	71.51	29.00	335			

4. Sign drawing
5. Send drawing to analyst for computer input

FILING

GAI 350 REV. 10-72

GILBERT ASSOCIATES, INC.
ENGINEERS AND CONSULTANTS
READING, PA.

CLIENT: FLORIDA POWER CORPORATION

PROJECT: CRYSTAL RIVER UNIT #3

FILING CODE

NO. 425-C-1 PAGE 2 OF 5

SYSTEM: PIPING

ORIGINATOR: N. L. Eisenhut
DATE 1/2/75

CALCULATION FOR: CR - 5 CHECK OF DEADLOAD AND SEISMIC ANALYSES

REVIEWER: A Fiorelli
DATE 1/7/75

A. DEADLOAD

1. Check support orientations OK

2. Check analysis modelling assumptions OK

3. List errors in geometric and physical data

PIPE Schedule should have increased from .965" TO 1.218" for approximately 7' of Pipe at anchor A2 } Conservative Error

B. SEISMIC

1. Check support orientations
MSH 248 Should be located 1'2" East of MSH 248 NOT 2'0" } this has no appreciable effect

2. Check analysis modelling assumptions

3. List errors in geometric and physical data
Same as at A.3 above } Conservative Error

ANALYSIS/CALCULATION
DOC ID # M-75-0012 ATT # _____
REV 0 SHEET 5 OF 27

4. Check modelling ~~of mass points~~ OK

5. Check QLD card input PERFORMED BY ALE 6/24/74

5a. List the number of modes used 53
Natural frequency of the highest mode used is 9.1

5b. Are the acceleration multipliers
1.0 in X direction YES
0.667 in Y direction YES
1.0 in Z direction YES

5c. Is the earthquake severity .05 G's YES

5d. List the Floor Response Curve Name CRW2
Is this choice of curve correct? YES

FILING CODE

GAI 350 REV. 10-72

GILBERT ASSOCIATES, INC. ENGINEERS AND CONSULTANTS READING, PA.	CLIENT FLORIDA POWER CORPORATION	FILING CODE	
	PROJECT CRYSTAL RIVER UNIT 3	W.O.	PAGE 2 OF 5
SYSTEM		ORIGINATOR A. B. [illegible] DATE 5 [illegible]	
CALCULATION FOR CR - 5 CHECK OF THERMAL AND PRESSURE STRESS		REVIEWER [illegible] DATE 1/7/75	

C. SEISMIC ANCHOR MOVEMENT STRESS

1. If analysis is performed, check anchor displacements on input.

2. If analysis is not performed, list reason. WCJ 6/24/[illegible]

CR-3 was analized and [illegible] [illegible] were not significant. CR-5 is very similar to CR-3

D. LONGITUDINAL PRESSURE STRESS

PIPE SIZE	SCH.	LINE PRESSURE	×	FLOW AREA / METAL AREA	=	LONGITUDINAL PRESSURE STRESS
24"	60	925	×	382 / 70	=	5048 PSI
10"	60	925	×	74.7 / 16.1	=	4292 PSI
6"	40	925	×	28.9 / 5.58	=	4791 PSI

E. THERMAL Performed [illegible] 4/4/74

1. Check support orientations OK

2. Check analysis modelling assumptions OK

3. List errors in geometric and physical data

Same as A-3 Page 2 — Conservative error

4. If thermal is not performed, list reason.

ANALYSIS/CALCULATION
DOC ID = M-75-092 ATT # ____
REV 0 SHEET 6 OF 27

GAI 350 REV. 10-72

FILING

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READING, PA.

CLIENT: FLORIDA POWER CORPORATION
PROJECT: CRYSTAL RIVER UNIT #3

FILING CODE:
NO. C-[illegible]
PAGE: 4 of 5

SYSTEM: Main Steam

ORIGINATOR: [illegible]
DATE: [illegible]

CALCULATION FOR: CR - 5 STRESS SUMMARY

REVIEWER: A Fiorentino
DATE: 1/7/75

ANALYSIS IDENTIFICATION: CR-5

REFERENCE ISOMETRIC: P1-305-752

RESULTS

PRIMARY STRESS SUMMARY (DEADLOAD + PRESSURE + SEISMIC)

Max. Long'l. Pressure Stress — + 5078 PSI

Max. Deadload Stress at Pt. 9 + 2766 PSI

Max. Seismic Stresses

(X-Y Design Quake) 4494 PSI at Pt. 122

(Y-Z Design Quake) 4402 PSI at Pt. 112

$S_{seismic}$ = 2 (Max. Seismic)

= 2 (4494 PSI) = + 8988 PSI

17,022 PSI

Sh = 15,000 PSI

1.2 Sh = 1.2 X 15,000 PSI = 21,915 PSI Safety Value Limit @ Pt. 124 — 4,913

1.2 Sh > Smax. S_{max} = 21,915

15,000 PSI < 21,915 PSI see point by Point summary - page 4 of 5

SECONDARY STRESS SUMMARY (THERMAL + SEISMIC ANCHOR MOVEMENT)

SA = f[(1.25 Sc + .25 Sh)]

= 1[(1.25)(15,000 PSI) + (.25)(15,000 PSI)]

= 1[22,500 PSI]

= 22,500 PSI Allowable Stress

Max. Thermal Stress @ Pt. 112 = +12,952 PSI

Max. Seismic Anchor Movement Stress (where required) = + * PSI

Allowable Stress > Max. Analysis Stress $S_{max.}$ = 12,952 PSI

22,500 PSI > 12,952 PSI

*Seismic Anchor Movement Stress is negligible (less than 10%) in comparison to the Allowable Stress.

ANALYSIS/CALCULATION
DOC ID # M-75-0012 ATT # ____
REV 0 SHEET 7 OF 27

FILING

GILBERT ASSOCIATES, INC.
ENGINEERS AND CONSULTANTS
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CLIENT FLORIDA POWER CORPORATION
PROJECT CRYSTAL RIVER UNIT #3
SYSTEM CDS 14"-M-5 STEAM
CALCULATION FOR FURTHER INVESTIGATION OF STRESS

ANALYSIS/CALCULATION
DOC ID M-75-0012 ATT 4
REV 0 — SHEET 8 OF 27

COMBINATION OF STRESS AT POINTS OF MAXIMUM STRESS

PT. NO.	STRESSES DL. & LP.	X-Y, S	Y-Z, S	S MAX.	S_h	1.2 x S_h
121	55 + 5048	2 x 269	—	10,554	15,000	18,000
112	440 + 5048	—	2 x 4406	17,904	15,000	18,000
122	440 + 5048	2 x 4494	—	17,943	15,000	18,000

PT NO

121
5,641
4,913 (Solute Value combined)
10,554

122
14,476
3,467 (S.Y.)
17,943

112
14,300
3604 (S.Y.)
17,904

NONE OF THE MAXIMUM COMBINED STRESSES (S MAX.) ARE LARGER THAN THE CALCULATED ALLOWABLE STRESS (1.2 x S_h). THEREFORE THE SYSTEM IS NOT OVERSTRESSED.

RESULTS

REVIEWER [illegible] DATE 11/27/75
ORIGINATOR R. L. [illegible] DATE 4/19/74
W.O. 2207/4505 PAGE
FILING CODE

GAI 350 REV. 10-72

FILING

GILBERT ASSOCIATES, INC. ENGINEERS AND CONSULTANTS READING, PA.	CLIENT FLORIDA POWER CORPORATION	FILING CODE
	PROJECT CRYSTAL RIVER UNIT #3	NO. PAGE 5 OF 6
SYSTEM MAIN STEAM		ORIGINATOR DATE
CALCULATION FOR CR - 5 EVALUATION OF STRESSES AND LOADS		REVIEWER A Ferrello DATE 1/7/75

A. EVALUATION OF STRESSES

CASE 1) STRESS IS GREATER THAN ALLOWABLE

a. If input errors cause high stress, return to analyst for reanalysis.

b. If high stress exists with no input errors, return to support designer.

CASE 2) STRESS IS LESS THAN ALLOWABLE

a. If there are no input errors proceed to Support Load Summary.

b. If input errors exist, engineer is to evaluate their effect and to decide whether they are significant enough to warrant a reanalysis.

B. EVALUATION OF LOADS

1. List all supports on load sheets. ✓

2. Record loadings on load sheets. ✓

3. Send load sheets to designers for Independent Design Review of the the supports. ✓

ANALYSIS/CALCULATION
DOC ID # M-75-0012 ATT # _____
REV 0 SHEET 9 OF 27

FILING

GILBERT ASSOCIATES, INC.
ENGINEERS AND CONSULTANTS
READING, PA.

CLIENT: FPC

PROJECT: CR 3

FILING CODE:

W.O.:

PAGE: 1 OF 3

SYSTEM: CR-5 MAIN STEAM

ORIGINATOR: W.C. Johnson

DATE: 1/7/75

CALCULATION FOR: TABULATION OF HIGHEST STRESS POINTS

REVIEWER: J. Fiorello

DATE: 1/7/75

RESULTS

To meet the A.E.C. Pipe Rupture Criteria (outside containment) the points in this analysis with the highest stress have been tabulated (see page 3 of 3). An explanation of each of the columns is the following:

1. Listing by rank of highest stress point to lowest in accordance with Column 12
2. Analysis Point Number
3. Thermal Expansion Stress For Point Shown in Column 2
4. Thermal Stress Divided by 18000 PSI then multiplied by 100
5. Deadload Stress For Point Shown in Column 2
6. Longitudinal Pressure Stress For Point Shown in Column 2
7. Seismic Stress For Point Shown in Column 2
8. Sum of Thermal, Deadload, Pressure and Seismic Stress For Point Shown in Column 2

ANALYSIS/CALCULATION
DOC ID: M-75-002 ATT #
REV 0 SHEET 10 OF 27

FILING

GAI 350 REV. 10-72

GILBERT ASSOCIATES, INC.
ENGINEERS AND CONSULTANTS
READING, PA.

CLIENT FPC
PROJECT CR-3
FILING CODE
W.O. PAGE 2 OF 3
SYSTEM CR-3 MAIN STEAM
ORIGINATOR W.C. Johnson
DATE 1/9/75
CALCULATION FOR TABULATION OF HIGHEST STRESS POINTS
REVIEWER C. Swamy
DATE 1/10/75
RESULTS

9 SUM OF STRESSES IN COLUMN 8 DIVIDED BY 30000 PSI THEN MULTIPLIED BY 100

10 SAFETY VALVE DISCHARGE LOADING STRESS FOR POINT SHOWN IN COLUMN 2

11 SUM OF THERMAL, DEADLOAD, PRESSURE, SEISMIC AND SAFETY VALVE STRESS FOR POINT SHOWN IN COLUMN 2

12 SUM OF STRESSES IN COLUMN 11 DIVIDED BY 30000 PSI THEN MULTIPLIED BY 100

ANALYSIS/CALCULATION
DOC ID # M-75-002 ATT # _____
REV 0 SHEET 11 OF 27

FILING UNIT

GILBERT ASSOCIATES, INC.
ENGINEERS AND CONSULTANTS
READING, PA.

CLIENT FPC

PROJECT CR-3

FILING CODE

W.O. | PAGE 3 OF 3

SYSTEM CR-3 Main Steam

ORIGINATOR D.C. Johnson

DATE 1/7/75

CALCULATION FOR
TABULATION OF HIGHEST STRESS POINTS

REVIEWER

DATE 1/7/75

ANALYSIS/CALCULATION
DOC ID # M-75-0012 ATT #
REV 0 SHEET 12 of 278

1 RANK	2 Pt #	3 THERMAL STRESS	4 % ALLOW. THERMAL STRESS	5 DEADLOAD STRESS	6 PRESSURE STRESS	7 SEISMIC STRESS	8 THERMAL + DEADLOAD + PRESSURE + SEISMIC	9 % ALLOW. THERMAL + DEADLOAD + PRESSURE + SEISMIC	10 SAFETY VALVE STRESS	11 THERMAL + DEADLOAD + PRESSURE + SEISMIC + SAFETY VALVE	12 % ALLOW. THERMAL + DEADLOAD + PRESSURE + SEISMIC + SAFETY VALVE
1	112	12952	72	-440	5078	44'06	22846	77	3614	26450	89
2	122	12187	68	-440	"	4494	22169	74	3467	25636	86
3	103	11840	66	-440	"	2530	19858	67	2673	22531	76
4	131	9541	53	-440	"	2800	17529	60	2644	20523	69
5	121	9005	50	- 55	"	269	14377	48	4913	19290	65
6	4	11918	67	13	"	686	17665	59	152	17617	60
7	7	2909	17	-2334	"	6656	16947	57	19	16966	57
8	42	10058	56	287	"	1087	16417	55	124	16601	56
9	1	6881	38	78	"	899	12856	43	99	12955	44
10	13	5818	33	-1230	"	446	12542	42	358	12900	43
11	102	6442	36	-469	"	147	12106	41	394	12500	42
12	2	6503	37	70	"	396	12017	41	84	12101	41
13	140	4597	26	-106	"	97	9848	33	881	10729	36
14	144	4233	24	-114	"	78	9473	32	694	10167	34

* TECHNIQUE USED IN THESE ANALYSES FOR ACTUALLY LESS SINCE NO CREDIT WAS TAKEN FOR PENETRATION. WHICH WOULD INCREASED 0.D. OF SCHEDULE

RESULTS

FILING CODE

CAI 350 REV. 10-72

LOCATIONS OF HIGHEST STRESS POINTS FOR 24" MAIN STEAM LINE FROM PENETRATION #107 TO TURBINE STOP VALVE.

References P-304-011 Analysis # CR 5
P-304-012
P-304-025

Number	Location	Stress (PSI)
1.	Connection to Valve MSV-45F 1' 3" West of MSH-220.	26,450
2.	Connection to Valve MSV-41F 1' 3" East of MSH-220.	25,636
3.	Connection to Valve MSV-48F 3' 9" West of MSH-220.	22,531
4.	Connection to Valve MSV-36F 3' 9" East of MSH-220.	20,523
5.	At MSH-220.	19,290
*6.	8' 10" East of MSH-17.	17,817
*7.	3' 7" West of MSH-17.	16,966
**8.	11' North of MSH-117.	16,601
*9.	Connection to Turbine Stop Valve Assembly.	12,955
10.	Connection to Valve MSV-56 2' 1½" West of MSH-28.	12,900
11.	At MSH-28.	12,500
*12.	9' 6" below turbine stop valve connection.	12,101
13.	Connection to Valve MSV-28 also at MSH-269.	10,729
14.	At F.W. 281 connection to Penetration 107 at Reactor Building.	10,167

ANALYSIS/CALCULATION
DOC ID - M-75-0012 ATT # _____
REV 0 SHEET 13 OF 27

* In Turbine Building.

** Turbine side of M.S. Isolation valve MSV 414.

Note: AEC Stress valwe for which breaks are to be postulated is 30,000 psi.

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ENGINEERS AND CONSULTANTS
READING, PA.

CLIENT: Florida Power Corporation

PROJECT: Crystal River Unit #3

Page 1 of 12

P.O. 04-4203-C71

ORIGINATOR

DATE 5/2/74

SYSTEM: A7

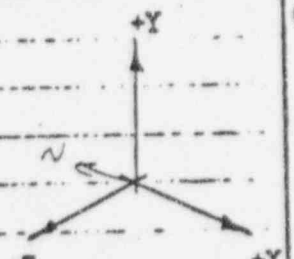
CALCULATION FOR: CR - 5A Pipe Supports

REVIEWER J Fennell

DATE 1/7/75

Comments

Note: All loads act on pipe.
Positive directions are shown here.



ANALYSIS/CALCULATION
DOC ID # M-75-0012 ATT #
REV 0 SHEET 14 OF 27

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
MSA-17	deadload	9	-102	-964	-6	3508	-2
Sheet No.	seismic	1854	15048	52035	4542	1954	2362
	thermal	2227	200592	91980	9579	-1026	26603
Type	calc. load (+)	21580	215570	143114	14115	5436	60232
Anchor	allow. load (+)						
Analysis	calc. load (-)	-18337	-15142	-52042	-4548	——	-2364
point A1	allow. load (-)						

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
MSA-17	deadload					6646	
Sheet No.	seismic					56	
2 of 17	thermal					0	
Type	calc. load (+)					6732	
Spring	allow. load (+)						
Analysis	calc. load (-)					——	
point H1	allow. load (-)						

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
MSA-77	deadload					1029	
Sheet No.	seismic					66	
1 of 2	thermal					0	
Type	calc. load (+)					1095	
SPRING	allow. load (+)						
Analysis	calc. load (-)					——	
point H2	allow. load (-)						

GAI 350 REV. 10-72

GILBERT ASSOCIATES, INC.
ENGINEERS AND CONSULTANTS
READING, PA.

CLIENT: Florida Power Corporation

PROJECT: Crystal River Unit #3

Page 2 of 12

NO. 04-4203-C71

SYSTEM: A-1

ORIGINATOR: [illegible]

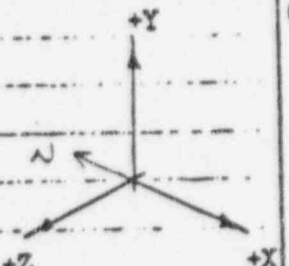
DATE: 5/7/74

CALCULATION FOR: CR - 5A Pipe Supports

REVIEWER: J Fiorilla

DATE: 1/7/75

Note: All loads act on pipe.
Positive directions are shown here.



ANALYSIS/CALCULATION
DOC ID # M-75-0012 ATT
REV 0 SHEET 15 OF 27

Comments

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
MSH 228	deadload						0
Sheet No.	seismic						7816
	thermal						0
Type	calc. load (+)						7816
Hydraulic	allow. load (+)						
Analysis	calc. load (-)						-7816
point LN	allow. load (-)						

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
MSH-18	deadload					5000	
Sheet No.	seismic					250	
[illegible]	thermal					0	
Type	calc. load (+)					6250	
Spring	allow. load (+)						
Analysis	calc. load (-)					—	
point HC	allow. load (-)						

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
MSH-19	deadload					4294	
Sheet No.	seismic					340	
[illegible]	thermal					0	
Type	calc. load (+)					4634	
Spring	allow. load (+)						
Analysis	calc. load (-)					—	
point HD	allow. load (-)						

GAI 350 REV. 10-72

GILBERT ASSOCIATES, INC.
ENGINEERS AND CONSULTANTS
READING, PA.

CLIENT: Florida Power Corporation

PROJECT: Crystal River Unit #3

Page 2 of 12

NO. 04-4203-071

SYSTEM: MS

ORIGINATOR: [illegible]

DATE: 5/2-

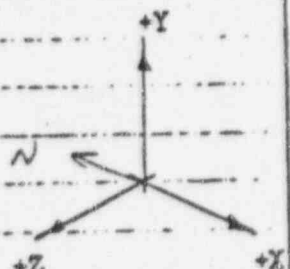
CALCULATION FOR: CR - 5A Pipe Supports

REVIEWER: A Fiorello

DATE: 1/7/75

Comments

Note: All loads act on pipe.
Positive directions are shown here.



ANALYSIS/CALCULATION
DOC ID # M-75-0012 ATT #
REV 0 SHEET 16a OF 27

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
MSH-20	deadload					4906	
Sheet No.	seismic					470	
20120	thermal					0	
Type	calc. load (+)					5376	
Spring	allow. load (+)						
Analysis	calc. load (-)					—	
point HE	allow. load (-)						

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
MSH-229	deadload				0		
Sheet No.	seismic				6004		
	thermal				0		
Type	calc. load (+)				6004		
Hydraulic	allow. load (+)						
Analysis	calc. load (-)				-6004		
point HV	allow. load (-)						

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
MSH-21	deadload					5192	
Sheet No.	seismic					286	
20121	thermal					0	
Type	calc. load (+)					5478	
Spring	allow. load (+)						
Analysis	calc. load (-)					—	
point HF	allow. load (-)						

GAI 350 REV. 10-72

GILBERT ASSOCIATES, INC.
ENGINEERS AND CONSULTANTS
READING, PA.

CLIENT: Florida Power Corporation

PROJECT: Crystal River Unit #3

Page 4 of 7

G.O. 04-4203-071

ORIGINATOR

DATE 5/21/74

SYSTEM: M

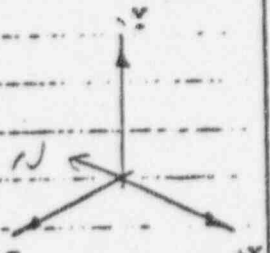
CALCULATION FOR: CR - 51 Pipe Supports

REVIEWER S. Ferraiolo

DATE 1/7/74

Comments

Note: All loads act on pipe.
Positive directions are shown here.



ANALYSIS/CALCULATION
DOC ID M-75-0012 ATT
REV 0 SHEET 19 OF 27

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
M1H-22	deadload					5529	
Sheet No.	seismic					120	
2.1.2	thermal					0	
Type	calc. load (+)					5649	
SPRING	allow. load (+)						
Analysis	calc. load (-)					—	
point HG	allow. load (-)						

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
MSH-230	deadload				0		0
Sheet No.	seismic				1806		9638
	thermal				0		0
Type	calc. load (+)				1806		9638
HYDRAULIC	allow. load (+)						
Analysis	calc. load (-)				-1806		-9638
point (MX) PX	allow. load (-)						

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
M1H-22	deadload					4057	
Sheet No.	seismic					52	
2.1.2	thermal					0	
Type	calc. load (+)					4109	
SPRING	allow. load (+)						
Analysis	calc. load (-)					—	
point 4H	allow. load (-)						

GAI 350 REV. 10-72

GILBERT ASSOCIATES, INC.
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READING, PA.

CLIENT: Florida Power Corporation

PROJECT: Crystal River Unit #3

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W.O. 04-4203-C71

SYSTEM: M S

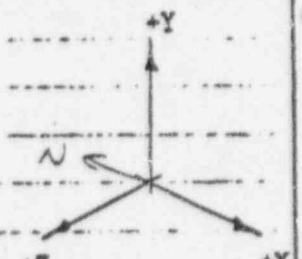
ORIGINATOR: [illegible] DATE 5/2/74

CALCULATION FOR: CR - 5A Pipe Supports

REVIEWED: J F Iurato DATE 11/7/75

Comments

Note: All loads act on pipe.
Positive directions are shown here.



ANALYSIS/CALCULATION
DOC ID - M-75-0012 ATT. 1
REV 0 SHEET 18 OF 27

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
MSH-231	deadload					0	
Sheet No.	seismic					3606	
	thermal					0	
Type	calc. load (+)					3606	
HANGER	allow. load (+)						
Analysis	calc. load (-)					-3606	
point IH	allow. load (-)						

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
MSH-117	deadload					0	0
Sheet No.	seismic					1908	5128
301117	thermal					0	0
Type	calc. load (+)					1908	5128
	allow. load (+)						
Analysis	calc. load (-)					-1908	-5128
point (MH) PI	allow. load (-)						

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
MSH-25	deadload					5009	
Sheet No.	seismic					80	
30125	thermal					0	
Type	calc. load (+)					5089	
SPRING	allow. load (+)						
Analysis	calc. load (-)					—	
point HK	allow. load (-)						

GAI 350 REV. 10-72

GILBERT ASSOCIATES, INC.
ENGINEERS AND CONSULTANTS
READING, PA.

CLIENT Florida Power Corporation

PROJECT Crystal River Unit #3

Page 6 of 12

NO. 04-4203-071

ORIGINATOR [illegible]

DATE 5/2 [illegible]

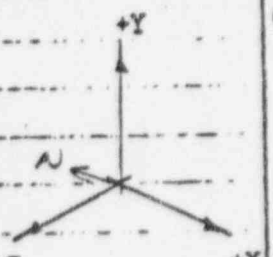
SYSTEM MS

CALCULATION FOR CR - 5A Pipe Supports

REVIEWER J Fanoble

DATE 1/7/75

Note: All loads act on pipe.
Positive directions are shown here.



Comments

ANALYSIS/CALCULATION
DOC ID. # M-75-0012 ATT #
REV 0 SHEET 19 OF 27

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
[illegible]	deadload					0	0
Sheet No.	seismic					1620	4142
20119	thermal					0	0
Type	calc. load (+)					1620	4142
[illegible]	allow. load (+)						
Analysis	calc. load (-)					-1620	-4142
point (HL) PL	allow. load (-)						

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
MSH-26	deadload					3149	
Sheet No.	seismic					28	
20126	thermal					0	
Type	calc. load (+)					3177	
Strut	allow. load (+)						
Analysis	calc. load (-)					—	
point HM	allow. load (-)						

K = 670#

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
MSH-23	deadload				0		
Sheet No.	seismic				9668		
	thermal				0		
Type	calc. load (+)				9668		
Hydraulic	allow. load (+)						
Analysis	calc. load (-)				-9668		
point H1	allow. load (-)						

GAI 350 REV. 10-72

GILBERT ASSOCIATES, INC.
ENGINEERS AND CONSULTANTS
READING, PA.

CLIENT: Florida Power Corporation

PROJECT: Crystal River Unit #3

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J.O. 04-4203-CT2

SYSTEM: MS

ORIGINATOR: A. Gaines

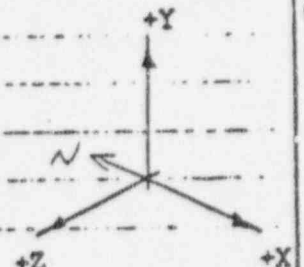
DATE: 5-2-74

CALCULATION FOR: CR - 511 Pipe Supports

REVIEWER: A. Fennello

DATE: 11/7/75

Note: All loads act on pipe.
Positive directions are shown here.



ANALYSIS/CALCULATION
DOC ID. M-75-0012 ATT #
REV 0 - SHEET 20 - OF 27

Comments

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
MSH-217	deadload					5070	
Sheet No.	seismic					9802	
	thermal					2597	
Type	calc. load (+)					17569	
Pipe	allow. load (+)						
Analysis	calc. load (-)					-3822	
point HD	allow. load (-)						

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
[illegible]	deadload					0	0
Sheet No.	seismic					2174	5302
[illegible]	thermal					0	0
Type	calc. load (+)					2174	5302
[illegible]	allow. load (+)						
Analysis	calc. load (-)					-2174	-5302
point (HP) PP	allow. load (-)						

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
MSH-212	deadload					18616	
Sheet No.	seismic					5240	
	thermal					-1569	
Type	calc. load (+)					23856	
Pipe	allow. load (+)						
Analysis	calc. load (-)						
point HD	allow. load (-)						

GAI 350 REV. 10-72

GILBERT ASSOCIATES, INC.
ENGINEERS AND CONSULTANTS
READING, PA.

CLIENT: Florida Power Corporation

PROJECT: Crystal River Unit #3

P.O. 04-4203-C71

SYSTEM: MS

ORIGINATOR: ALE

DATE: 5/21/74

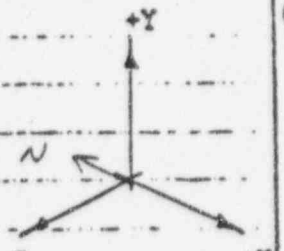
CALCULATION FOR: CR - 5A Pipe Supports

REVIEWER: J. Fiumello

DATE: 1/7/75

Comments

Note: All loads act on pipe.
Positive directions are shown here.



ANALYSIS/CALCULATION
DOC ID # M-75-0012 ATT #
REV 0 SHEET 21 OF 27

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
	deadload				0	0	
Sheet No.	seismic				1178	508	
	thermal				0	0	
Type	calc. load (+)				1178	508	
	allow. load (+)						
Analysis	calc. load (-)				-1178	-508	
point	allow. load (-)						

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
	deadload				0	0	0
Sheet No.	seismic				339	50	64
	thermal				0	0	0
Type	calc. load (+)				339	50	64
	allow. load (+)						
Analysis	calc. load (-)				-339	-50	-64
point	allow. load (-)						

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
	deadload					668	
Sheet No.	seismic					10	
	thermal					0	
Type	calc. load (+)					678	
	allow. load (+)						
Analysis	calc. load (-)					—	
point	allow. load (-)						

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READING, PA.

CLIENT: Florida Power Corporation

PROJECT: Crystal River Unit #3

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NO. 04-4203-C71

SYSTEM: MC

ORIGINATOR: A. Clement

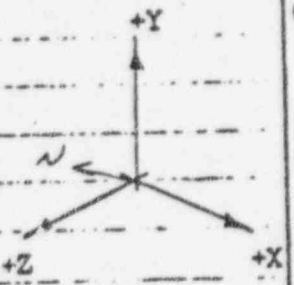
DATE: 5/2/94

CALCULATION FOR: CR - EA Pipe Supports

REVIEWER: J Finarelli

DATE: 1/7/95

Note: All loads act on pipe.
Positive directions are shown here.



ANALYSIS/CALCULATION
DOC ID # M-75 P012 ATT. #
REV 0 SHEET 22 OF 27

Comments

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
MSH 248	deadload					0	
Sheet No.	seismic					536	
	thermal					0	
Type	calc. load (+)					536	
	allow. load (+)						
Analysis	calc. load (-)					-536	
point IA	allow. load (-)						

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
MSH 205	deadload				0	0	0
Sheet No.	seismic				404	278	580
	thermal				0	0	0
Type	calc. load (+)				404	278	580
	allow. load (+)						
Analysis	calc. load (-)				-404	-278	-580
point PC	allow. load (-)						

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
MSH 240	deadload						0
Sheet No.	seismic						586
	thermal						0
Type	calc. load (+)						586
Hydraulic	allow. load (+)						
Analysis	calc. load (-)						-586
point IC	allow. load (-)						

GAI 350 REV. 10-72

GILBERT ASSOCIATES, INC.
ENGINEERS AND CONSULTANTS
READING, PA.

CLIENT: Florida Power Corporation

PROJECT: Crystal River Unit #3

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P.O. 04-4203-C71

SYSTEM: 115

ORIGINATOR: [illegible] T.

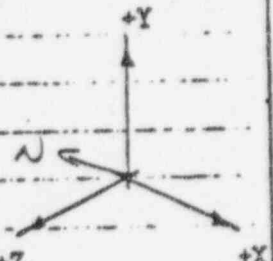
DATE: 5/[illegible]-74

CALCULATION FOR: CR - 5 Pipe Supports

REVIEWER: A Farrell

DATE: 1/7/75

Note: All loads act on pipe.
Positive directions are shown here.



ANALYSIS/CALCULATION
DOC ID # M-75-0012 ATT # [illegible]
REV 0 SHEET 23 OF 27

Comments

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
MSH 179	deadload					500	
Sheet No.	seismic					42	
30179	thermal					0	
Type	calc. load (+)					542	
S[illegible]G	allow. load (+)						
Analysis	calc. load (-)					—	
point ID	allow. load (-)						

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
MSH 180	deadload					549	
Sheet No.	seismic					102	
30180	thermal					0	
Type	calc. load (+)					651	
P[illegible]G	allow. load (+)						
Analysis	calc. load (-)					—	
point IE	allow. load (-)						

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
MSH 254	deadload				0		0
Sheet No.	seismic				114		70
30[illegible]	thermal				0		0
Type	calc. load (+)				114		70
[illegible]	allow. load (+)						
Analysis	calc. load (-)				-114		-70
point (IF) PE	allow. load (-)						

GAI 350 REV. 10-72

GILBERT ASSOCIATES, INC.
ENGINEERS AND CONSULTANTS
READING, PA.

CLIENT: Florida Power Corporation

PROJECT: Crystal River Unit #3

Page 11 of 12

G.O. 04-4203-072

SYSTEM: M-3

ORIGINATOR: [illegible]

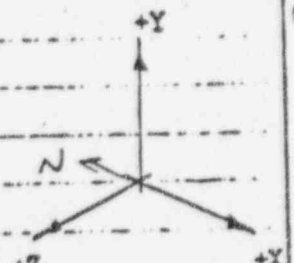
DATE: 5/2

CALCULATION FOR: CR - 5 / Pipe Supports

REVIEWER: J. Fitzpatrick

DATE: 11/7/95

Note: All loads act on pipe.
Positive directions are shown here.



ANALYSIS/CALCULATION
DOC ID # M-25-0012 ATT #
REV 0 SHEET 24 OF 27

Comments

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
MSH-25	deadload					8000	
Sheet No.	seismic					3060	
[illegible]	thermal					55	
Type	calc. load (+)					11115	
[illegible]	allow. load (+)						
Analysis	calc. load (-)					—	
point [illegible]	allow. load (-)						

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
[illegible]	deadload			4534	20	4630	
Sheet No.	seismic			26232	7276	822	
	thermal			-80	-32375	-36	
Type	calc. load (+)			30816	7296	5452	
Guide	allow. load (+)						
Analysis	calc. load (-)			-21828	-39631	—	
point HT	allow. load (-)						

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
M-11-269	deadload					5856	
Sheet No.	seismic					2574	
	thermal					8	
Type	calc. load (+)					9438	
Rigid	allow. load (+)						
Analysis	calc. load (-)					—	
point HU	allow. load (-)						

GAI 350 REV. 10-72

GILBERT ASSOCIATES, INC.
ENGINEERS AND CONSULTANTS
READING, PA.

CLIENT: Florida Power Corporation

PROJECT: Crystal River Unit #3

Page 12 of

G.A. 04-4203-C71

SYSTEM: 1

ORIGINATOR

DATE 5/21/

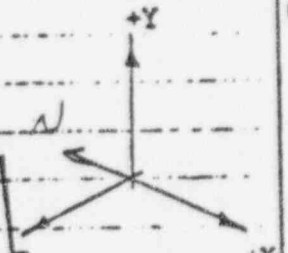
CALCULATION FOR: CR 5A Pipe Supports

REVIEWER A Fiorentino

DATE 11/7/75

Comments

Note: All loads act on pipe.
Positive directions are shown here.



CALCULATION
ANALYSIS/CALCULATION NO.
DOC ID: M-75-0012 ATT.
REV. 0 SHEET 25 OF 2627
for Gilbert

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
1 SA-13	deadload	-3667	-84	647	-14	1743	2
Sheet No.	seismic	1154	4824	3361	816	304	10898
	thermal	2	136755	0	-2796	-1	-2660
Type	calc. load (+)	—	141495	9982	2598	2047	10900
	allow. load (+)						
Analysis	calc. load (-)	-4821	-4928	—	-830	—	-1555
point P2	allow. load (-)						

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
1 SA 24	deadload					5641	
Sheet No.	seismic					68	
20124	thermal					0	
Type	calc. load (+)					5709	
Sprin=	allow. load (+)						
Analysis	calc. load (-)					—	
point H7	allow. load (-)						

Mk. No.	analysis	Mx	My	Mz	Fx	Fy	Fz
	deadload						
Sheet No.	seismic						
	thermal						
Type	calc. load (+)						
	allow. load (+)						
Analysis	calc. load (-)						
point	allow. load (-)						

1" = 500"

GAI 350 REV. 10-72

Florida Power

DATA TRANSMITTAL SHEET

PREPARED BY	DATE	FILE CODE
SVP	1-10-84	M-R 83-4-6-1

PROJECT: Security Barriers

PLANT: Crystal River Unit #3

TYPE OF DATA
- [ ] TRACING/SEPIA/MYLAR
- [ ] PRINTS
- [ ] APERTURE CARDS
- [ ] SPECIFICATIONS OR R.O.'S
- [ ] BILLS OF MATERIALS
- [ ] MANUFACTURERS PRINTS
- [ ] INSTRUCTION MANUALS
- [X] OTHER

STATUS OF DATA
- [ ] PRELIMINARY
- [ ] FOR APPROVAL
- [ ] APPROVED/ACCEPTED
- [ ] ACCEPTED "AS NOTED"
- [ ] NOT ACCEPTED
- [ ] "AS BUILTS" OR FINAL ISSUE
- [ ] REVISED
- [X] OTHER

PURPOSE OF DATA
- [ ] REVIEW & COMMENT
- [ ] APPROVAL
- [ ] BIDDING PURPOSES
- [ ] CONSTRUCTION
- [ ] FABRICATION
- [X] LICENSING
- [X] INFORMATION ONLY
- [ ] OTHER

ACTION TO BE TAKEN
- [ ] ACKNOWLEDGE
- [ ] APPROVE & RETURN
- [ ] REVISE & RESUBMIT
- [X] SEE SPECIAL INSTRUCTIONS
- [ ] CERTIFY
- [ ] NEW FILE DATA DESTROY OLD
- [ ] OTHER
- [ ] REVIEW & SUBMIT COMMENTS (SEE BELOW)

NO. COPIES	ROUTE TO	PLT. CODE
OR	~~EMM~~	S
OR	~~PRT~~	S

NO. COPIES	DISTRIBUTION	PLT. CODE
1c	PDB	
1c	FILE	
	(SHIP. 22)	3
1c	FILE	
1c	EMM	
1c	CJK	

SPECIAL INSTRUCTIONS:

See Below

RETURN COMMENTS TO

BY DATE

DATA NUMBER	REVISION	TITLE OR DESCRIPTION
		CR-5 Insert For Piping Analysis

DOCUMENT CONTROL
C2E
RECORD STORAGE
SHIPMENT 22
DRAWER 3

ANALYSIS/CALCULATION
DOC ID # M-75 0012 ATT # ____
REV 0 SHEET 26 OF 27

ADDITIONAL COMMENTS OR INSTRUCTIONS

NOTE: Please file this insert with Piping Analysis CR-5.

ENGINEER APPROVAL	DATE	VERIFICATION APPROVAL	DATE	SUPERVISION APPROVAL	DATE
E. H. Morea	1/10/84	Ray F Tedd	1/10/84	Ray B Tedd	1/10/84

Rev 8/83

INSERT FOR PIPING ANALYSIS CR-5

NOTE: See MAR 83-04-06-01 for Security Safeguards Information pertaining to CR-5.

ANALYSIS/CALCULATION
DOC ID # M-75-0012 ATT #
REV 0 SHEET 27 OF 27

Attachments to Calculation M 75-0012 are contained only in the Records Management System copy of this calculation. Refer to the Records Management System for that information, if needed