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IE BULLETIN 79-14

SAFETY-RELATED PIPING SYSTEMS

INSPECTION PLAN

MONTICELLO NUCLEAR

GENERATING PLANT

Prepared for:

Northern States Power Company

Prepared by:

Nuclear Technology, Inc.

Prepared by:

D. K. McWilliams

D. K. McWilliams, P.E.

T. N. Vogel

T. N. Vogel, P.E.

Issued by:

A. B. Higginbotham

A. B. Higginbotham, P.E.

PREFACE

On July 2, 1979, the United States Nuclear Regulatory Commission issued IE Bulletin 79-14, "Seismic Analyses for As-Built Safety-Related Piping Systems." The concern expressed in the Bulletin is that input information used for the seismic analysis of safety-related piping systems may not be representative of the as-built configuration. To address this concern, the Bulletin requires that each utility compare the as-built configuration of the piping systems to the input information used for the seismic analysis. All nonconformances which are identified from the comparison must be evaluated for their effect on system operability. In addition, reanalysis or hardware modification may be required to rectify the identified nonconformance.

The purpose of this document is to present the inspection plan which will be used to compare the as-built data with the analytical input data for the safety-related piping 2.5 inches in diameter and greater, and Seismic Category I piping at the Monticello Nuclear Generating Plant.

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1.0 INTRODUCTION

Recently, the United States Nuclear Regulatory Commission (NRC) identified a series of generic issues which could potentially cause the seismic analysis of safety-related piping systems to yield inaccurate results. One of these issues involves the correlation of the as-built piping configuration to the information used for the seismic analysis of the piping systems.

Due to this concern, the NRC published IE Bulletin 79-14 (Reference 1), and the subsequent supplement to the Bulletin (Reference 5) which require that an inspection be conducted to verify that the input information for the seismic analysis of safety-related piping systems reflect as-built configurations. Further, the Bulletin requires that, where deviations from seismic analysis input information are found, the licensee must consider the need to reevaluate the seismic analyses to the as-built configuration or modify the hardware.

This report describes the inspection to be conducted on the Seismic Category I and safety-related piping systems at Northern States Power Company's Monticello Nuclear Generating Plant in response to IE Bulletin 79-14. The inspection will compare the as-built configuration to the information which is required for the seismic analysis of

the piping, e.g., piping size and wall thickness, piping configuration geometry, valve locations, valve operator orientations, and support locations, and type of support. The inspection covers the Seismic Category I and safety-related piping systems defined in Section 2.0.

Resolution of identified discrepancies will consist of one the following three approaches as allowed by the Bulletin:

1. An engineering evaluation of the discrepancies to show the original analyses are still valid.
2. A reanalysis of the as-built configuration, or
3. Modification of hardware to comply with the input information for the seismic analysis.

The final resolution of all discrepancies will be documented in a final report which will confirm that the as-built piping configuration is in conformance with the requirements of the Final Safety Analysis Report (Reference 2) for the plant.

2.0 APPLICABLE SYSTEMS AND REPORTING SCHEDULE

NUTECH, with support from Northern States Power Company (NSP) and Bechtel Power Corporation (Bechtel), will conduct an inspection of the safety-related piping systems for the Monticello Nuclear Generating Plant. The purpose of the inspection is to compare the as-built piping configurations to the information used as input to the piping seismic analyses. Any discrepancies found during the inspection will be resolved as described in Section 4.0. All work associated with the inspection will be in accordance with the requirements of IE Bulletin 79-14.

The piping systems to be inspected consist of all Seismic Category I systems which were dynamically analyzed by computer and all safety-related systems with outside diameters of 2½-inches or greater. The list of the Seismic Category I and safety-related systems to be considered is given in Table 2.1 along with the applicable line segments and isometric drawing numbers as available at this point in time.

The inspection of the piping systems will be conducted in two phases. The Phase 1 inspection will cover, as a minimum, one system in each set of redundant, normally accessible systems and all non-redundant accessible systems where accessible systems are defined to be those systems located

in areas of the plant which can be entered during reactor operation. The remaining redundant systems and the inaccessible systems will be inspected in Phase 2. The inspection phase in which each line segment is to be inspected is provided in Table 2.1.

The Phase 1 inspections are to be completed and results reported to the NRC on or before September 21, 1979. The results of the inspections of the Phase 2 piping systems will be reported on or before October 8, 1979, for the accessible systems and October 30, 1979, for the inaccessible piping.

TABLE 2.1

PIPING SYSTEMS TO BE CONSIDERED

SYSTEM	APPLICABLE LINE SEGMENTS	REFERENCE DRAWING NUMBER	INSPECTION PHASE
PRIMARY CONTAINMENT AND ATMOSPHERIC CONTROL	CP1-18HE	FIELD RUN ---	1
	CP2-18HE		1
	CP3-18HE	NO DRAWINGS	1
	CP4A-20HE		1
	CP4B-20HE		1
	CP4-20HE		1
	CP5-18HE		1
CORE SPRAY	TW12-8GE, HE		1
	TW13-2½GE, HE	6425, 6354	1
	TW6-12HE	6350	1
	TW7-10GE	5815, 6400	1, 2
	TW7-8ED, EF	5815, 6400	1, 2
	TW8-8GE, HE	6400, 6353	1
	TW9-2½GE, HE	6411, 6354	1
	TW10-12HE	6350	1
	TW11-10GE	6405	1
	TW11-8ED, EF	6405	1
HPCI	C16-14HE	6402	1
	PS18-8ED	5 3	1, 2
	RS2-18HE	6349	1
	RS2-16HE	6349	1
	RS2-20HE	6349	1
	SC16-8ED	6351	1
	SC16-8HB	6351	1
	TW1-14HE	5458	1
	TW3-12ED	5458, 5466, 6414	1 (partial 2)
	TW4-4ED, HE	5466	1
	V52-16HE	6349, 5463	1
	RV46-2½HB		1
RCIC	PS17-3ED	6417	1 (partial 2)
	RS3-8HE	6349	1
	TW5-6HE	5462, 6415	1

TABLE 2.1 (Continued)

PIPING SYSTEMS TO BE CONSIDERED

SYSTEM	APPLICABLE LINE SEGMENTS	REFERENCE DRAWING NUMBER	INSPECTION PHASE
RHR	TW20-16DB,DC	6348,5821	2
	TW20-18DC	" "	2
	TW21-3HE	6425,6353	2
	TW22-14GE	6347	2
	TW23-12GE	6425,6353	2
	TW23-10GE	6425,6353	2
	TW24-12GE,HE	" "	2
	TW25-4GE,HE	" "	2
	TW27-20HE	6347	2
	TW28-20HE	"	1
	TW30-14GE	5467,5821,6400	1
	TW30-16GE,DB	" " "	1
	TW14A-18HE (Valve)	6347	2
	TW14A-20HE (Valve)	"	2
	TW14B-18HE	"	1
	TW14B-20HE	"	1
	TW15-14HE	"	2
	TW17-14HE	"	2
	TW19-10GE		2
	TW19-14GE		2
	TW16-14HE	6347	1
	TW18-14HE	6347	1
	TW29-10GE	6425,5465	1
	TW29-14GE	6425,5465	1
	TW20-14GE	6348,5821	2
	TW20-16GE	" "	2
	TW30-16DB,DC	5467,5821,6400	2
	TW30-18DC	" " "	2
	TW31-3HE		1
	TW33-12GE	5467,6411,6401	1
	TW33-10GE	" "	1
	TW34-12GE	6411	1
	TW34-10HE	"	1
	TW35-4GE,HE	"	1
	TW36-4GE,HD		1,2
	TW37-4GE,HC		1,2
	REW10- 18EF,ED,HE		2,2,1 (partial 2)
	REW11-8HE		1 (partial 2)
	FPW12-8GE		1
	SW9-8GE		1 (partial 2)
	D82-3"HE	SK-L-285	1
	D83-3"HB	"	1
	D84-3GE,HB	SK-L-285	1
	RV54-4"HB		1
	RV55-4"HB		1
	SC10-3"HB	6425	1
	SC29-3"HB	6425	1

TABLE 2.1 (Continued)

PIPING SYSTEMS TO BE CONSIDERED

SYSTEM	APPLICABLE LINE SEGMENTS	REFERENCE DRAWING NUMBER	INSPECTION PHASE
RHR SERVICE WATER	SW9-12-GF	5452,6342,6429,6422	1
	SW9-18-GF	" " " "	1
	SW9-16-GF	" " " "	1
	SW9-18-GF,GE	" " " "	1
	SW11-16GF	" " " "	1
	SW10-12GF	5451,5460,6424,6429	2
	SW10-18GF	" " " "	2
	SW10-16GF	" " " "	2
	SW12-16GF	6346	2
	SW57-16GF		1
	SW58-16GF		1
	SW57-18GF		1
	SW58-18GF		1
EMERGENCY SERVICE WATER	SW13-4HF	6401,6431	1
	SW30A-3HF	6446,6431	1
	SW25-4HF	6401,6431	2
	SW30B-3HF	6446,6431	2
	SW21-4HF	6431,6447	1,2
	SW27-3HF	6420,6443,6447	1,2
	SW59-4HF		1
REACTOR WATER CLEANUP	REW3-4EF	6433	2
	REW3-4ED	"	(partial 2)
	REW6-3DB	6423	2
	REW6-3ED	"	2
STANDBY LIQUID CONTROL	CH1-2 1/2HS	6440	1
CONTROL ROD DRIVE	CRD13A-4DB	6451	1
	CRD13B-4DB	6451	1
	CRD14A-6DB	"	1
	CRD14B-6DB	6451	1
	CRD15A-4DB	"	1
	CRD15B-4DB	6451	1
	CRD16A-6DB	M-274	1
	CRD16B-6DB	M-249	1
	CRD18-12DB	M-234	1

TABLE 2.1 (Concluded)

PIPING SYSTEMS TO BE CONSIDERED

SYSTEM	APPLICABLE LINE SEGMENTS	REFERENCE DRAWING NUMBER	INSPECTION PHASE
OFF GAS	OG27-18HC		1
FEEDWATER	FW2A-14DE,ED	6426	2
	FW2B-14DE,ED	6427	2
	FW2A-10ED	6426	2
	FW2B-10ED	6427	2
	FW5-4ED	6404	2
PRIMARY REACTOR STEAM	PS1-18ED	6407	2
	PS2-18ED	6408	2
	PS3-18ED	6409	2
	PS4-18ED	6410	2
	PS15-3ED	6416	2
REACTOR RECIRCULATION	REW32-22"GE	161F277 & 729E909	2
	REW13A-28"GE		2
	REW13B-28"GE		2
	REW14-12"GE		2
	REW15-12"GE		2
	REW16-12"GE		2
	REW17-12"GE		2
	REW18-12"GE		2
	REW19-12"GE		2
	REW20-12"GE		2
	REW21-12"GE		2
	REW22-12"GE		2
	REW23-12"GE		2
	REW24-4"GE		2
	REW25-4"GE		2
	REW26-4"GE		2
	REW27-4"GE		2

3.0 DESCRIPTION OF INSPECTION

The actual inspection consists of three separate tasks: (1) an as-built inspection of the piping systems at the plant site, (2) a compilation of the input data for the piping analyses, and (3) a correlation of the results from Tasks 1 and 2 above to show conformance/nonconformance between the installed and analyzed piping. The details associated with each task are described in the following sections.

3.1 As-Built Inspection

NUTECH, with support from NSP, is responsible for completing the as-built inspection of the piping systems. The inspection will consist of measuring and recording physical dimensions and hardware information in enough detail to allow a complete comparison with the analysis input data. The actual information to be gathered at the site and the methods used to obtain the data are provided in Table 3.1.

Prior to the inspection, data books will be prepared by NUTECH for each system. A sample data book is provided in Appendix A. As can be seen, this book specifies the dimensions and other information to be gathered at the site. The information contained in the data books is

based on the drawings listed in Table 2.1. Additional sources of information relating to the piping systems and specific data for each source are provided in Appendix B.

The data book provides a location for signatures of the inspection team members and for the approval of the NUTECH site Project Engineer, all of which are required to complete the inspection. The work copies of the data books will be maintained at the site until completion of the inspection. The data recorded in the work copies will be transcribed to the NUTECH office copy which will be on file at the NUTECH office in San Jose, California, and will be the basis for the work described in Section 3.3.

3.2 Compilation of Analysis Input Data

Bechtel is responsible for compilation of the input data for the analysis of the piping systems. This work effort will consist of organizing dimensions and hardware information used in the piping stress analysis (see Table 3.1) in a form easily comparable to the information obtained from the as-built inspection and recorded in the data books. All information will be signed off and transmitted to NUTECH in accordance with approved quality assurance programs.

3.3 Correlation of As-Built and Analytical Data

NUTECH is responsible for correlating the results of the inspections described in Sections 3.1 and 3.2, and identifying any nonconformance which is determined.

The as-built data and the analytical data will be in conformance so long as the differences remain within the tolerances specified in Table 3.2. These tolerances, while allowing for some deviation, are sufficiently restrictive to ensure system operability under specified earthquake loadings. Any measurement which exceeds the specified tolerance limit will be identified as a nonconformance and will be evaluated in accordance with the requirements of Section 4.0.

In addition, any abnormal conditions which are found at the time of the site inspection will be reported immediately to NSP via the nonconformance report form provided on Page 4-4. These would include conditions such as nonfunctioning supports, e.g., damaged supports or improperly installed supports, and obvious discrepancies in piping configuration.

TABLE 3.1

INSPECTION DATA

TYPE OF DATA	METHOD OF FIELD VERIFICATION	VERIFICATION IF OTHER THAN FIELD
I. Piping Data (1)		
a. Size	Tape Measurement of OD	
b. Wall Thickness	Ultrasonic Digital Thickness Gage	
c. Configuration	Tape Measurement of Lengths (2)	
d. Branch Connection	Visual Comparison with Fab Drawings	
e. Material	N/A	Piping Specification
II. Insulation		
Thickness	Tape Measurement of Thickness	
III. In-Line Eqpt.		
a. Valves		
1. Location	Tape Measurement of Pipe Length (2)	
2. Operator Orientation	Visual Inspection	
3. Weight	N/A	Vendor/Vendor Dwg.
4. Center of Gravity	N/A	Vendor Drawing/ Independent Calc.
b. Other Large Equipment		
1. Location	Tape Measurement of Pipe Length (2)	
2. Weight	N/A	Vendor/Vendor Dwg.
3. Center of Gravity	N/A	Vendor Drawing/ Independent Calc.
IV. Supports		
a. Location	Tape Measurement of Pipe Length (2)	
b. Type	Visual Comparison with Fab. Drawing.	
c. Anchorage	Tape Measurement of Diameter of Bolt or Weld Thickness.	
d. Orientation	Visual Inspection	
e. Size or Load Capacity	Visual Comparison	
f. Design and Assembly Details.	Visual Comparison	
V. Clearance		
a. Floor or Wall Penetrations.	Visual Inspection (2)	
b. Directional Changes	Visual Inspection (2)	

NOTE 1: For insulated piping, data to be obtained by removing insulation and providing direct access to the system.

NOTE 2: Requires determination of approximate pipe temperature ($\pm$ 50F°).

TABLE 3.2

INSPECTION CORRELATION TOLERANCES[1]

TYPE OF DATA	TOLERANCE
I. Piping Data	
a. Size (Outside Diameter)	± 5% of OD
b. Wall Thickness	± 12% of nominal thickness
c. Configuration	Max of ± 5% of straight run length, 6" or 1 OD
d. Branch Connection	Same type as piping spec.
e. Material	Same type as piping spec.
II. Insulation	
a. Type	Same type as piping spec.
b. Thickness	± 20% of piping spec.
III. In-Line Equipment	
a. Valves	
1. Location	Max of ± 5% of straight run length, 6" or 1 OD
2. Operator Orientation	± 15° for operator angle
3. Weight	± 10% of total weight
4. Center of Gravity	± 10% of distance
b. Other Large Equipment	
1. Location	Max of ± 5% straight run length, 6" or 1 OD
2. Weight	± 10% of total weight
3. Center of Gravity	± 10% of distance
IV. Supports	
a. Location	6" for pipe sizes < 4" 2 pipe diameters for pipe size >4" but ≤ 12" 24" for pipe size > 12"
b. Type	Same type as design documents
c. Anchorage	Same as design drawings
d. Orientation	± 5° for vertical supports ± 15° for remaining supports
e. Size or Load Capacity	Same size or load capacity or larger than indicated on design drawings.
f. Design and Assembly Details	Same as design drawings
V. Clearances	
a. Wall Penetration	1/8" minimum
b. Directional Changes	Visually ensure no evidence of contact with adjacent items.

1. Based on information developed and supplied by Bechtel (References 3 & 6).

4.0 REPORTING AND RESOLUTION OF NONCONFORMANCES

NUTECH is responsible for resolution of all nonconformances subject to NSP review and approval. In resolving each identified nonconformance, the following approach is to be taken:

1. An engineering evaluation will be made of the nonconformance to determine if the nonconformance might impair the operability of the system. This evaluation will be performed at two levels. The first level consists of applying engineering judgment to the nonconformance to obtain an immediate, i.e., within two (2) days, evaluation of the impact of the nonconformance on system operability. The second-level evaluation will be made within thirty (30) days and consists of an analytical evaluation of the discrepancy. This evaluation may require the same degree of sophistication as was utilized in the original seismic analyses or a less rigorous analysis technique may be adequate for resolution.

   If it is determined at either level of the evaluation that system operability is impaired, a nonconformance report form, as shown on Page 4-4, must be completed and reported to NSP immediately to ensure timely reporting to the NRC in accordance with technical specification requirements.

2. An additional evaluation of the nonconformance will be made to determine if the analyses described in the FSAR are no longer conservative. Where it is determined that the original analyses are conservative, no further action is required. However, if the original analyses are found to be unconservative, then additional action is necessary and will consist of either of the following:

   a. Reanalysis of the piping system to as-built conditions will be done in cases where the nonconformances do not warrant hardware modifications. The piping system will be reanalyzed to the as-built conditions and the design requirements given in the piping system design specification. A revised stress report and revised drawings, reflecting the as-built conditions, will be issued to document the acceptability of the nonconformance.

   b. Installation or modification of hardware to comply with the original stress analysis will be done in cases where this approach is deemed appropriate. Where modifications are made to the hardware, revised drawings and stress reports will be issued to document the changes.

Additional documentation in the form of summary reports will be prepared as described in the following section.

FIGURE 4.1

NONCONFORMANCE REPORT

SYSTEM _____ NONCONFORMANCE NO. _____

DESCRIPTION OF NONCONFORMANCE:

PROPOSED RESOLUTION OF NONCONFORMANCE:

ORIGINATED BY:	CHECKED BY:	APPROVED BY:	DATE:

CORRECTIVE ACTION TAKEN:

ACTION TAKEN BY:	DATE:	

_____ _____ _____

PLANT COORDINATOR PLANT SUPERINTENDENT, ENGINEERING/RADIATION PROTECTION DATE

5.0 DOCUMENTATION

The following items will be developed during the course of the inspection program. Together with this document they form the complete documentation for the program:

- Data books for recording the as-built condition of each piping system.
- Isometric drawings showing all data utilized in the original piping analyses.
- Nonconformance reports for each nonconformance that is determined during the inspection program to impair system operability.
- Design or stress reports for any reanalysis which is performed to demonstrate acceptability of reported nonconformances.
- Revised drawings to reflect actual as-built conditions including any system modifications that may be required.
- A final summary report to be provided to the NRC which summarizes the results of the inspections and describes the resolution for the nonconformances that were identified during the inspections.

6.0 REFERENCES

1. IE Bulletin 79-14, "Seismic Analysis for As-Built Safety-Related Piping Systems," Original Issue dated July 2, 1979, and Revision 1, dated July 18, 1979.
2. MONTICELLO NUCLEAR GENERATING PLANT, MONTICELLO, FINAL SAFETY ANALYSIS REPORT, Northern States Power Company, Minneapolis, Minnesota.
3. Letter from C. B. Hogg to D. Anthony, dated July 24, 1979; Subject, "Job 10040, Monticello Nuclear Generating Plant Unit 1, Northern States Power Company, NRC IE Bulletin 79-14, As-Built Tolerances."
4. Letter from C. B. Hogg to D. Anthony, dated July 30, 1979; Subject, "Job 10040, Monticello Nuclear Generating Plant Unit 1, Northern States Power Company, NRC IE Bulletin 79-14, Response to Item 1."
5. Supplement to IE Bulletin 79-14, "Seismic Analysis for As-Built Safety-Related Piping Systems," dated August 15, 1979.
6. Letter from C. B. Hogg to D. Anthony, dated August 8, 1979; Subject, "Job 10040, Monticello Nuclear Generating Plant Unit 1, Northern States Power Company, NRC IE Bulletin 79-14, Revised As-Built Tolerances."

A P P E N D I X A

SAMPLE DATA BOOK

nutech

San Jose, California

Project Monticello Nuclear Generating Plant File No. 30.0237.

Owner Northern States Power Company

Client Northern States Power Company

CONTROLLED COPY NO. _____

STANDBY LIQUID

CONTROL SYSTEM

PIPING SEGMENTS:

CH1-2½-HS

BOOK 1 OF 1

OUTSIDE CONTAINMENT

NAVCO DWG. #A6440

PREPARED BY _____ _____ _____

APPROVED BY _____ 9114190

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San Jose, California

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Owner Northern States Power Company

Client Northern States Power Company

SURVEY NOTES

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San Jose, California

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SURVEY NOTES

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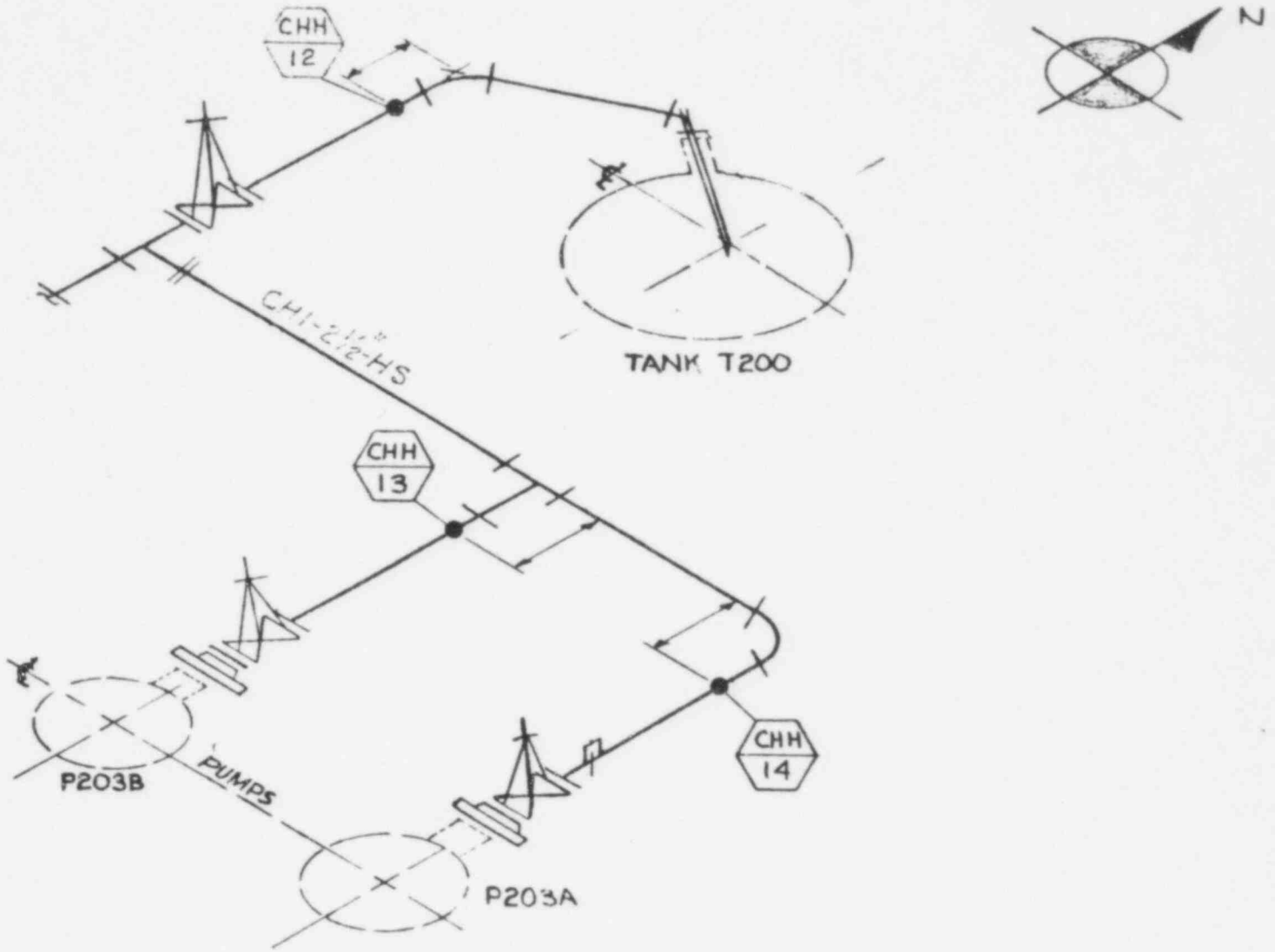

STANDBY LIQUID CONTROL

SUPPORT 150.

OUTSIDE CONTAINMENT

DWG. NO. A6440

REV. 8 12-18-69

D R A W I N G A6440

PIPING SPECIFICATIONS

SLC SYSTEM

LINE DESIGNATION	PIPE SCH.	PIPE THICK-NESS	PIPE CIRCUM-FERENCE	AVERAGE MEASURED THICKNESS[1]	MEASURED CIRCUM-FERENCE[1]	TEMP.	COMMENT
CH1-2 1/2-HS	40S	0.203	9.03				

[1]Field Measurement

DRAWING A6440

VALVE INFORMATION LIST FOR PIPING SEGMENT CH1-2 1/2 -HS

SLC SYSTEM

VALVE DESIG-NATION	MANUFAC-TURER [1]	MODEL NO. [1]	VALVE SIZE & TYPE [1]	MOUNTING [1]		VALVE LENGTH [1]	VALVE WEIGHT	VALVE CG LOCATION	VALVE STEM ANGLE WITH VERTICAL [1]	PIPING SEGMENT	COMMENTS
				FLANGE	WELDED						
SP29 -M3			2 1/2" Gate							CH1-21/2-HS	
SP29 -M3			2 1/2" Gate							CH1-21/2-HS	
SP29 -M3			2 1/2" Gate							CH1-21/2-HS	

[1] Recorded in field.

DRAWING A6440

SUPPORT MEMBER LIST FOR PIPING SEGMENT CH1-2 1/2-HS

SLC SYSTEM

SUPPORT NO.	DESCRIPTION	MANUFACTURER	SUPPORT MODEL/ TYPE	MFG. RATED STIFFNESS (lbs/in)	HOT LOAD (lbs)	COLD LOAD (lbs)	FIELD MEASURE-MENT[1,2] (in)	EQUIVALENT MEASURED LOADS[2] (lbs)	PIPING SEGMENT	COMMENTS:
CHH-12	Rigid Support	Bergen Paterson							CH1-21/2-HS	
CHH-13	Rigid Support	Bergen Paterson							CH1-21/2-HS	
CHH-14	Rigid Support	Bergen Paterson							CH1-21/2-HS	

[1] Spring Deflection

[2] For dual hanger supports, the measurement at each spring box are denoted ( )/( )

[3] No scales

nutech

San Jose, California

Project Monticello Nuclear Generating Plant File No. 30.0237

Owner Northern States Power Company

Client Northern States Power Company

BERGEN PATERSON SUPPORT INFORMATION

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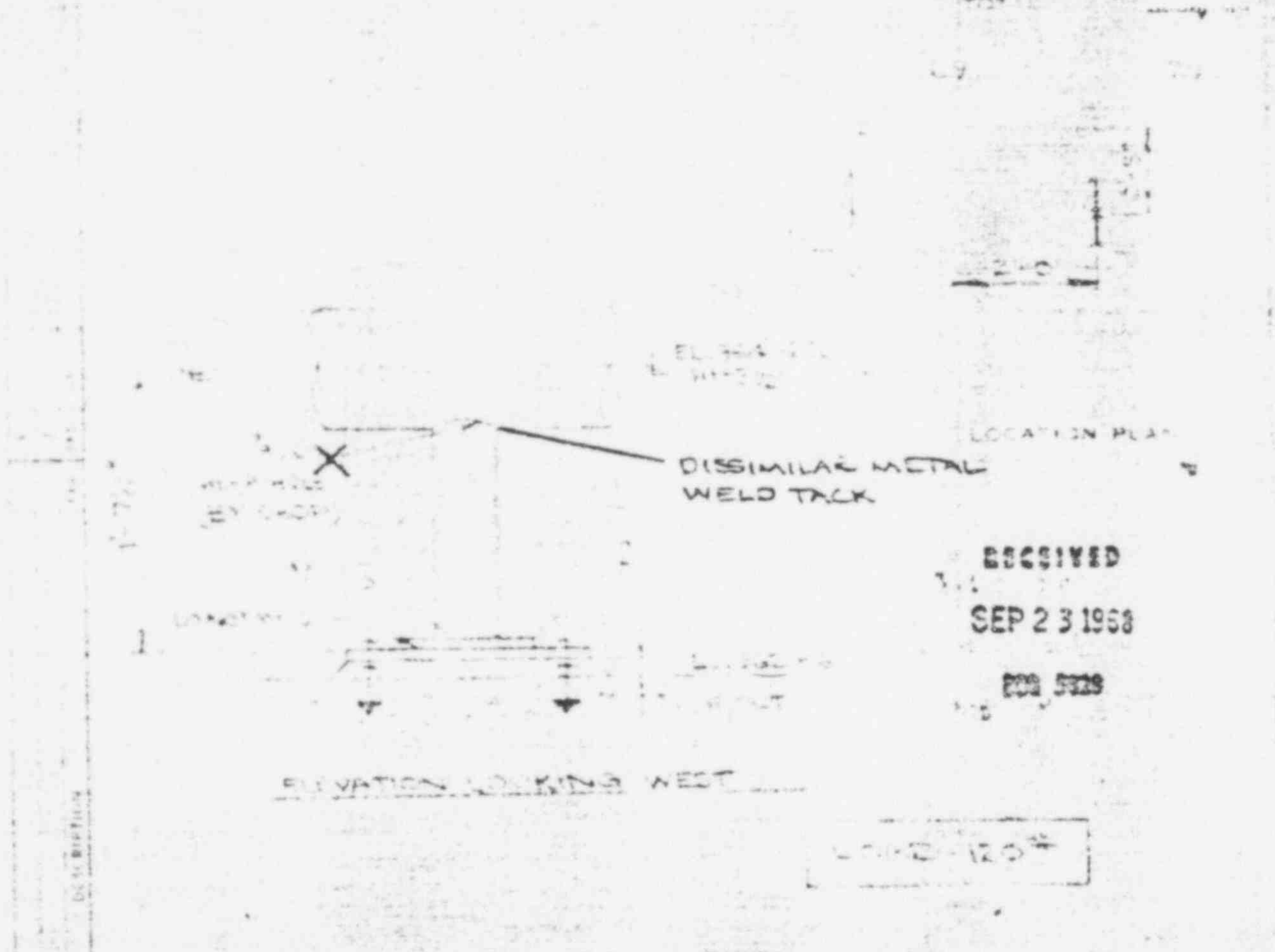

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BERGEN-PATERSON PIPESUPPORT CORP.

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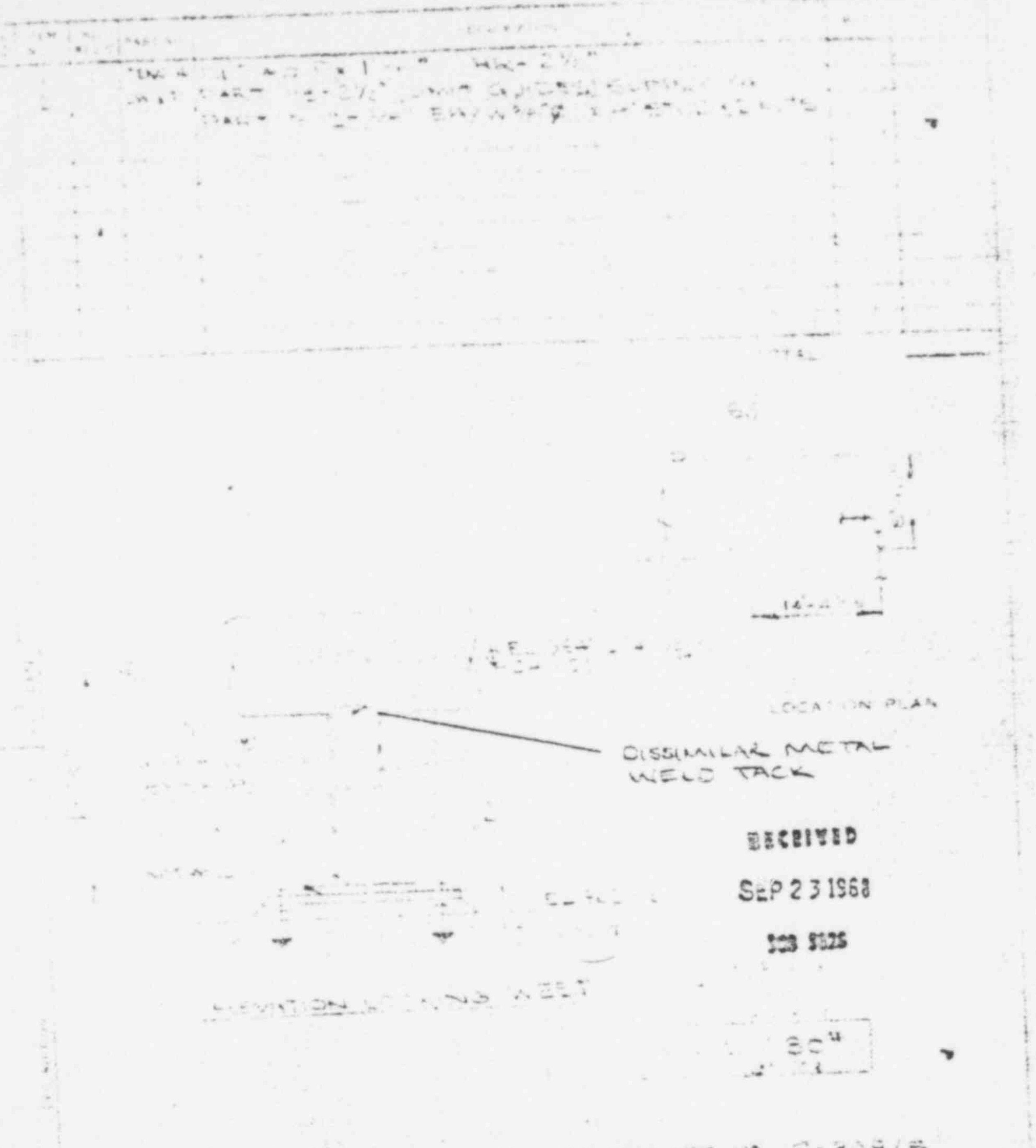
VERY POOR ORIGINAL

8114207



RECEIVED
SEP 23 1968

APPROVED
KEC 9/23/68

CUSTOMER ORDER No. 5828-M-115-AC REF. CONT. DWG. No. C-309/5

BECHTEL CORP

SAME

MONTICELLO UNIT No.1

CHEMICAL

M-283/1

MARK NO CH-2

BERGEN-PATERSON PIPESUPPORT CORP

9-20-68

67-9015

2812

VERY POOR ORIGINAL

914208

DISSIMILAR METAL WELD TACK

LOCATION PLAN

RECEIVED SEP 23 1968

ELEVATION LOOKING NORTH

CUSTOMER ORDER NO. 5524-M-63-AC REF. CONC. DWG. NO. C-50975

BECHTEL CORP.

SAME

MONTICELLO UNIT No. 1

APPROVED KEC 9/23/68

CH-H-13

BERGEN-PATERSON PIPESUPPORT CORP.

VERY POOR ORIGINAL

314209

nutech

San Jose, California

Project Monticello Nuclear Generating Plant File No. 30.0237

Owner Northern States Power Company

Client Northern States Power Company

SURVEY NOTES

3144210

Revision						Page ____
Prepared By/Date						of ____
Checked By/Date						

A P P E N D I X B

SUPPORTING DOCUMENTATION

The data utilized for the inspection plan is contained in various documents developed by Bechtel, GE, and National Valve and Manufacturing Company (NAVCO). A general description of the data provided in each type of document is given in the following pages. Specific document information, i.e., document number, revision, date of revision, and title, is listed in Tables B.1 through B.3 for the Bechtel, NAVCO, and GE supplied items, respectively.

BECHTEL DOCUMENTS

1. PIPING AND INSTRUMENTATION DIAGRAMS (P&ID's)

A schematic representation of the piping, process control and instrumentation for a specific mechanical system and shows the functional relationship among the various components. A P&ID serves as the primary record of system requirements for piping, duct work, valves, dampers, instruments and related equipment. The following items are schematically represented on P&ID's.

a. Mechanical equipment

b. All valves and dampers, including vent and drain valves, except instrument valves and instrument take off root valves.

c. Local and remote instruments in sufficient detail to delineate the function(s) of the instrumentation and its interface with the process.

d. Piping and duct work

- Piping and ducts
- Vent and drain (including valves)

- Special fittings
- Sampling line
- Permanent startup and flushing connections

e. Information included

- Instrument designations
- Equipment names and number
- Piping identification
- Duct work identification
- Valve identification and size, where different from line
- Direction of flow
- Interfaces for line and duct class change
- Interconnection reference including grid references
- Identification of components furnished by others.

2. PIPING AREA DRAWINGS

These are scaled (1/4 in = 1 ft) drawings dimensionally representing all mechanical equipment and piping 2-1/2 inches and larger. The designation "piping" includes pipe, fittings (elbows, tees, flanges, reducers, etc.), valves, headers, expansion joints, flow nozzles and other components in the piping system. Valve orientation is also shown.

3. LINE DESIGNATION TABLES

The line designation tables provide a single source document for use in defining the requirements noted below for each process piping line in the plant.

a. Line identification including pipe size, class and line number

b. Line description

c. Design/ratings in pressure and temperatures

d. P&ID number

e. Seismic Category

f. Insulation Class

4. PIPING CLASS SHEETS

The piping class sheets define the characteristics of unique material classes within the piping system. The information contained on the piping class sheets is:

a. Class - Classes are designated by a two letter code. The first letter designates the primary valve and flange rating; and the second letter the type of material.

b. Pipe - the pipe material specification is called out for all applicable sizes of pipe for the applicable class sheet. Wall thickness for all sizes are shown.

c. Fittings - The fitting material specification is specified, along with the type of acceptable weld connection.

d. Flanges - The flange material specification is called out and also the type of flange to pipe joint and style of flange face.

e. Gaskets - For all applicable sizes, the recommended gasket material is specified.

f. Bolting - The bolt and associated nut material are specified.

g. Valves - The valve rating, type of end connection, and applicable valve type are specified.

h. Joints - The applicable drawing showing the weld end preparation and weld end transition is referenced.

i. Branch connection - The drawing of acceptable branch connections is included.

5. INSULATION CLASSIFICATION AND THICKNESS

This is a tabulation of the insulation thickness versus pipe size for different types of insulation class.

6. STRESS ISOMETRICS

These were sketches prepared by Bechtel or subcontractor to stress analyze the piping system. They were based on the area drawings.

NAVCO DOCUMENTS

1. FABRICATION ISOMETRICS

These are isometric presentations of the piping system in the configuration at the plant. These isometrics were primarily prepared by NAVCO (pipe fabricator at Monticello) and were used for fabrication and construction. The isometrics were prepared from the Bechtel area drawings described above.

GE DOCUMENTS

1. PIPING AND PIPING SUPPORT DRAWINGS

These are drawings which provide the piping data utilized in the analysis of the Reactor Recirculation System. The information consists of the piping configuration, pipe size, and pipe fittings.

In addition, the location, direction, type, and size or rating of the piping supports are also provided in these drawings.

2. DATA SHEET

This document lists the material and wall thickness requirements for the Reactor Recirculation System piping.

TABLE B.1

BECHTEL DOCUMENT LIST

TYPE	DRAWING NUMBER BECHTEL	DRAWING NUMBER NSP	REV.	DATE	TITLE
Piping and Instr. Diagrams	M-100	NH-36032	3	6/05/72	P&I Diagram-Legend
	M-102	NH-36033	F	3/28/79	Main Steam
	M-106	NH-36037	F	4/05/79	Condensate & Feedwater, Sheet 2
	M-108	NH-36039	L	4/09/79	Condensate & Demineralized Water Storage System
	M-112	NH-36664	B	7/03/79	R.H.R. & Emergency Service Water System
	M-115	NH-36241	J	5/02/78	Nuclear Boiler System
	M-116	NH-36242	F	3/05/79	Reactor Vessel Instrumentation
	M-117	NH-36243	E	6/05/78	Reactor Recirculation System
	M-118	NH-36244	F	5/20/79	Control Rod Hydraulic System, Sheet 1
	M-119	NH-36245	B	7/03/79	Control Rod Hydraulic System, Sheet 2
	M-120	NH-36246	D	7/28/78	Residual Heat Removal System, Sheet 1
	M-121	NH-36247	F	7/28/78	Residual Heat Removal System, Sheet 2
	M-122	NH-36248	B	7/20/77	Core Spray System
	M-123	NH-36249	E	5/25/78	High Pressure Coolant Injection System, Sheet 1
	M-124	NH-36250	C	12/03/76	High Pressure Coolant Injection System, Sheet 2
	M-125	NH-36251	D	11/17/76	Reactor Core Isolation Cooling System, Sheet 1
	M-126	NH-36252	C	11/17/76	Reactor Core Isolation Cooling System, Sheet 2
	M-127	NH-36253	E	10/05/78	Standby Liquid Control System
	M-128	NH-36254	D	1/13/78	Reactor Water Cleanup System
	M-129	NH-36255	C	8/14/75	Reactor Water Filter-Demin. System
	M-130	NH-46162	K	7/17/78	Primary Containment Nitrogen Control System
	M-133	NH-36051	E	2/22/79	Diesel Oil System
	M-142	NH-36159	D	8/14/75	Off-Gas System
	M-143	NH-36258	F	3/05/76	Primary Containment Atmosphere Control System
	M-145	NH-36881	B	8/16/72	Standby Gas Treatment System P&ID
	M-811	NH-36665	D	2/04/77	Service Water System - Intake Structure

TABLE B.1 (Continued)

BECHTEL DOCUMENT LIST

TYPE	DRAWING NUMBER BECHTEL	DRAWING NUMBER NSP	REV.	DATE	TITLE
Piping Area Drawings	M-202	NF-36583	12	3/28/73	Plan Below El. 920'-0" Turbine Bldg. Area 1
	M-203	NF-36584	14	3/28/73	Plan Between El.920'-0"& El.930'-0" " "
	M-204	NF-36585	12	3/29/73	Plan at El. 930'-0" & El.931'-0" " "
	M-205	NF-36586	7	2/12/71	Operating Floor Plan at El. 951'-0" " "
	M-206	NF-36587	10	3/30/73	Section A-A " "
	M-207	NF-36588	12	2/12/71	Section B-B " "
	M-208	NF-36589	12	2/12/71	Section C-C " "
	M-209	NF-36590	12	4/07/73	Section D-D " "
	M-210	NF-36591	8	2/12/71	Section E-E " "
	M-211	NF-36592	7	2/12/71	Section F-F " "
	M-217	NF-36593	14	2/12/71	Plan Below El. 920'-0" Turbine Bldg. Area 2
	M-218	NF-36594	13	4/7/73	Plan Between El. 920'-0" &El.930'-0" " "
	M-219	NF-36595	A	7/11/78	Plan at El. 930'-0" & El. 931'-0" " "
	M-220	NF-36596	7	2/12/71	Operating Floor Plan at El. 951'-0" " "
	M-221	NF-36597	B	7/17/78	Section A-A " "
	M-222	NF-36598	8	2/12/71	Section B-B " "
	M-223	NF-36599	14	4/17/73	Section C-C " "
	M-224	NF-36600	9	4/10/73	Section D-D " "
	M-225	NF-36601	A	7/17/78	Section E-E " "
	M-226	NF-36602	12	2/12/71	Section F-F " "
	M-227	NF-36518	7	6/16/73	Section G-G, Areas 1 and 2
	M-228	NF-36436	1	2/12/71	Supplementary Piping Details - Areas 1 and 2
	M-229	NF-36517	8	4/07/73	Misc. Plans and Sections - Areas 1 and 2
	M-232	NF-36371	8	6/05/72	Plan Below El. 923'-0" Reactor Bldg. Area 3
	M-233	NF-36372	11	11/12/73	Plan Below El. 935'-0" " "
	M-234	NF-36513	10	11/13/74	Plan Below El. 948'-0" " "
	M-235	NF-36504	C	2/10/78	Plan Below El. 962'-6" " "
	M-236	NF-36505	8	2/12/71	Plan Below El. 985'-6" " "
	M-237	NF-36506	5	2/12/71	Plan Below El. 1001'-2" " "
	M-238	NF-36507	6	2/12/71	Plan Below El. 1027'-8" " "
	M-239	NF-36508	1	2/12/71	Plan at El. 1027'-8" " "
	M-240	NF-36509	11	4/26/73	Section A-A (Col S Looking North) " "
	M-241	NF-36510	11	5/29/74	Section B-B (Col. N Looking North) " "
	M-242	NF-36511	12	3/12/75	Section C-C (Col. M Looking North) " "
	M-243	NF-36373	9	2/12/71	Section D-D (Col. 9 Looking West) " "

TABLE B.1 (Continued)

BECHTEL DOCUMENT LIST

TYPE	DRAWING NUMBER BECHTEL	DRAWING NUMBER NSP	REV.	DATE	TITLE
					Reactor Bldg. Area 3
	M-244	NF-36512	12	11/18/74	Section E-E (Col. 6 Looking West) " "
	M-245	NF-36374	11	4/23/73	Section F-F (Col. 3 Looking East) " "
	M-246	NF-36669	8	3/13/75	Plans & Sections-H.P.C.I. Turbine Pump Room
Piping	M-247	NF-36693	6	2/12/71	Area 3 Piping Dwg. Misc. Sects. & Details
Area	M-248	NF-36752	4	2/12/71	Area 3 Standby Liquid Control System
	M-249	NF-36689	3	(No date)	C.R.D. Hydraulic Piping-Plan, Eastside Below 952'-0"
Drawings	M-250	NF-36690	1	2/12/71	C.R.D. Hydraulic Piping-Inside Drywell
(Concluded)	M-251	NF-36602	1	2/12/71	C.R.D. Hydraulic Piping-Sect. A-A Looking North
	M-264	NF-36759	4	2/12/71	Area 3 - R.H.R. Piping in Drywell
	M-267	NF-36811	4	2/12/71	Exh. Stack Equip. Area Plan View
	M-268	NF-36782	4	2/12/71	Area 3-Sects. A-A, B-B, D-D, F-F above El. 1001'2"
	M-273	NF-36704	2	2/12/71	CRD Hydraulic Piping Section B-B & Details
	M-274	NF-36707	3	(No date)	" " " Plan Below EL952
	M-275	NF-36711	2	2/12/71	" " " Section C-C
	M-296	NF-36852	0	2/12/71	Main Steam Piping in Tunnel - Area 3
	M-621	NH-46118	0	11/12/69	Exhaust Stack Lines Detail
	M-801	NF-36379	8	2/12/71	Intake Structure Plan at EL919
	M-802	NF-36439	3	2/12/71	" " " at EL934
	M-803	NF-36378	8	2/12/71	" " " Section A-A and B-B
	M-804	NF-36440	8	2/12/71	" " " Section C-C, D-D and E-E
	M-805	NF-36441	3	2/12/71	" " " Access Tunnel
	M-272	NF-36271	B	8/04/78	Main Steam
	M-1000	NQ-59273	5	5/13/74	RV24A-10"-HB
	M-1001	NQ-59274	5	5/13/74	RV25A-10"-HB
Isometrics	M-1002	NQ-59276	4	5/13/74	RV26A-10"-HB
	M-1003	NQ-59277	4	5/13/74	RV27A-10"-HB
	M-1007	NL-59281	1	5/28/74	Pipe Support RV24A
	M-1008	NL-60399	3	5/28/74	Pipe Support RV24
	P-273				Main Steam Equalizer Header Drain to Condenser
	P-277				Main Steam Analizer Drain to CRW

TABLE B.1 (Concluded)

BECHTEL DOCUMENT LIST

TYPE	DRAWING NUMBER		REV.	DATE	TITLE
	BECHTEL	NSP			
Pipe Supports Drawings	M-1009	NL-60333	2	5/28/74	Pipe Supports RV25
	M-1010	NL-60337	2	5/28/74	Pipe Supports RV25A
	M-1011	NL-60339	2	5/28/74	Pipe Supports RV26
	M-1012	NL-60336	2	5/28/74	Pipe Supports RV26A
	M-1013	NL-60340	2	5/28/79	Pipe Supports RV27
	M-1014	NL-60335	3	5/28/74	Pipe Supports RV27A
	M-1016	NL-60334	1	6/06/74	Pipe Supports PS1, PS2, PS3 and PS4
	M-1018	NL-60341	0	12/11/73	HPCI Vent V52A-2" Pipe Support
	P-274				Main Steam Outside Containment Support
	P-275				Main Steam Bypass Line Support
	P-276				Supports for Isometric P-273
	P-278				Supports for Isometric P-277
Other Documents	M-40	-	5	11/12/69	Pipe Class Sheet Specification
	M-163	ND-57641	5	(No date)	Line Designation Tables
	M-159				Insulation Summary

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TABLE B.2

NAVCO DOCUMENT LIST

DRAWING NUMBER		REV	DATE
NAVCO	NSP		
5445	NX-13142-86	0	3/25/68
5446	NX-13142-87	2	9/11/69
5447	NX-13142-88	3	9/11/69
5448	NX-13142-89	3	9/11/69
5449	NX-13142-90	3	9/11/69
5450	NX-13142-91	2	3/2/70
5451	NX-13142-92	7	4/21/70
5452	NX-13142-93	7	4/22/70
5453	NX-13142-99	1	7/12/68
5454	NX-13142-94	2	10/9/68
5455	NX-13142-95	3	1/6/70
5456	NX-13142-96	4	10/10/69
5457	NX-13142-97	3	10/19/68
5458	NX-13142-100	1	8/21/68
5459	NX-13142-98	3	2/25/70
5464	NX-13142-101	0	8/5/68
5466	NX-13142-102	2	8/12/68
5467	NX-13142-103	2	9/12/68
5468	NX-13142-104	0	9/10/68
5470	NX-13142-105	0	9/13/68
5471	NX-13142-106	1	9/16/68
5814	NX-13142-85	1	12/31/68
5816	NX-13142-107	0	9/15/68
5818	NX-13142-108	0	3/4/69
6331	NX-13142-1	1	6/26/68
6332	NX-13142-2	3	7/22/70
6333	NX-13142-3	1	4/8/68
6334	NX-13142-4	0	3/25/68
6335	NX-13142-5	1	8/12/69
6336	NX-13142-6	5	3/2/70

TABLE B.2 (Continued)

NAVCO DOCUMENT LIST

DRAWING NUMBER		REV	DATE
NAVCO	NSP		
6337	NX-13142-7	4	3/2/70
6338	NX-13142-8	1	6/11/68
6339	NX-13142-9	1	6/13/68
6340	NX-13142-10	1	6/13/68
6341	NX-13142-11	2x	6/24/68
6342	NX-13142-12	6	4/21/70
6343	NX-13142-13	2	5/7/69
6344	NX-13142-14	0	4/3/68
6345	NX-13142-15	12	3/20/70
6346	NX-13142-16	4	3/3/70
6347	NX-13142-17	12	12/15/70
6348	NX-13142-18	13	12/16/70
6349	NX-13142-19	9	12/16/70
6350	NX-13142-20	11	12/16/70
6351	NX-13142-21	5	8/7/70
6352	NX-13142-22	1	3/31/69
6353	NX-13142-23		
6354	NX-13142-24		
6355	NX-13142-25	2	12/10/68
6400	NX-13142-26	13	4/20/70
6401	NX-13142-27	5	4/7/70
6402	NX-13142-28	4	4/20/70
6403	NX-13142-29	4	6/23/69
6404	NX-13142-30	A	11/22/74
6405	NX-13142-31	10	3/12/70
6406	NX-13142-32	1	2/5/69
6407	NX-13142-33	A	3/24/79
6408	NX-13142-34	A	3/24/79
6409	NX-13142-35	A	3/24/79
6410	NX-13142-36	A	3/24/79
6411	NX-13142-37	13	5/25/70

TABLE B.2 (Continued)

NAVCO DOCUMENT LIST

DRAWING NUMBER		REV	DATE
NAVCO	NSP		
6412	NX-13142-38	2	2/27/69
6413	NX-13142-39	2	3/3/69
6414	NX-13142-40	12	4/20/70
6415	NX-13142-41	5	12/18/70
6417	NX-13142-43	13	12/21/70
6418	NX-13142-44	2	3/7/69
6419	NX-13142-45	7	12/16/70
6420	NX-13142-46	6	3/3/70
6421	NX-13142-47	4	10/16/70
6422	NX-13142-48	7	6/2/70
6423	NX-13142-49	A	12/22/77
6424	NX-13142-50	7	4/22/70
6425	NX-13142-51	8	9/30/69
6426	NX-13142-52	A	4/7/78
6427	NX-13142-53	12	5/18/70
6428	NX-13142-54	10	12/9/69
6429	NX-13142-55	14	4/9/70
6431	NX-13142-57	9	4/24/70
6432	NX-13142-58	B	2/2/78
6433	NX-13142-59	15	10/15/70
6434	NX-13142-60	2	11/24/69
6435	NX-13142-61	3	11/14/69
6436	NX-13142-62	8	6/20/70
6437	NX-13142-63	1	2/26/69
6438	NX-13142-64	1	4/4/69
6439	NX-13142-65	1	3/26/69
6440	NX-13142-66	8	12/18/69
6441	NX-13142-67	3	11/14/69
6442	NX-13142-68	2	6/23/69
6443	NX-13142-69	2	6/25/70

TABLE B.2 (Concluded)

NAVCO DOCUMENT LIST

DRAWING NUMBER		REV	DATE
NAVCO	NSP		
6444	NX-13142-70	2	6/23/69
6445	NX-13142-71	3	8/13/69
6446	NX-13142-72	8	4/14/70
6447	NX-13142-73	1	7/7/69
6448	NX-13142-74	1	6/16/69
6449	NX-13142-75	3	8/15/69
6450	NX-13142-76	1	6/12/69
6451	NX-13142-77	3	6/2/71
6452	NX-13142-78	2	2/19/70
6453	NX-13142-79	3	2/19/70
6454	NX-13142-80	1	6/16/69
6455	NX-13142-81	1	6/23/69
6456	NX-13142-82	1	6/23/69
6457	NX-13142-83	2	2/23/70
6458	NX-13142-84	2	2/23/70

TABLE B.3

GE DOCUMENT LIST

TYPE	DOCUMENT NUMBER	REV	DATE	TITLE
Drawing	161F277	1	12/22/67	Vermont Yankee Recirculation Loop Piping
	729E909	0	08/05/67	Vermont Yankee Recirculation Loop Suspension
Specification	21A2100AC	4	11/11/68	Recirculation Loop Piping Data Sheet