A-1

KEI Norme

Item #1. See attachment "A". The inspector was informed by Kaiser's NDE Level III that A. JACKSON, Welding/NDE QA Engr, would mark out all the requirements in item #1 & add, "Rod slip to be part of package", from approx. July 1980 to Feb. 1981. (A. JACKSON does not work for Kaiser at this time & is not on site)

The Zimmer FSAR refers to AWS D.1.1, 1972 requires the following:

a. Para. 6.5.2. Requires verification of proper weld procedures.
b. Para. 6.4.1. Requires welding to be performed by qualified welders.
c. Para. 6.5.4. Requires observation of welder-welding operator & tacker is verified on interval basis for performance. (not 100%)
d. Para. 6.2. Requires only material conforming to the requirements of the Code are used.

The rod slip has the welding procedure, welders name, filler material etc. but the rod slip

8301050082 821116
PDR FOIA
DEVINE82-206 PDR

is not a QC document & the items in item #1 on the KEI form are not verified.

Item #2. See attachment "A". The inspector was informed by Kaiser's NDE Level III that A. JACKSON would mark out all the requirements in item #2, except, "Verify mark nos".

AWS D.1.1, 1972 para. 3.2.1 states in part; "Surfaces & edges to be welded shall be smooth, uniform & free from --- defects which would adversely affect the quality --- of the weld.

AWD. A

(See reverse side for instructions & responsibilities)

System or Component: HELIX SUPPORT STEEL | ISO DWG No. 8398B | Line No. MKC-17547 | MK# 2-Stiff 5K | To MK# X25

SA P1 WOP 8860 To SA P1 WOP 8860 | Nom. Pipe Size — | Nom. Wall Thks. — | Fillet Size — | Project Spec. II-2176 #2256

Class: ESSENTIAL | Welding Procedure No. 3.1.51 | Special Instruction: PARTIAL PENETRATION | SID | FILLET WELD

Filler Material Requirement:
Electrode
Type E7018 | Bare/Covered - Size 3/32 | HT#/Lot# ____ | Size 1/8 | HT#/Lot# ____ | Size 5/32 | HT#/Lot# ____
Consumable Insert NA | HT No. ____ | Backing Ring NA | HT# ____
Purge Req.: I.D. Purge NA | CFH ____ | Torch Purge NA | CFH ____

Ref. Cip/Weld No./Hanger No.

Heat Treat Requirements:

1/2 R#T #C171

Preheat Temp Req. 70 °F Min | Interpass Temp Req. 70 °F Min | Post Weld Req. NA | Procedure ____

This procedure shall not be used for welding piping.

Fit Up / Installation / NDE Requirements:

Instructions:	Req.	QA Stamp	Date	AI Hold Pts.	Record/Remarks
~~Verify proper weld procedure, welder qualification, ...~~ All Stickout Qualifying 7-31-80	X	REL 95 114	7-23-80		
~~Verify ... weld ...~~ Verify Mark No.'s	X NA 7-31-80	REL 91 MA	7-23-80		Record MK No. ____ to MK No. ____
Verify proper fit-up, insp. tack welds.	X NA 7-31-80	REL 95 114	7-23-80		
NDE: Examine weld edge preparation surface	MT PT RT Other	NA			
NDE: ROOT PASS (visually examine I.D. surface were accessable)	MT PT RT Other	NA			Verify Preheat Temp
NDE: INTERPASS	MT PT Other	NA			Verify Interpass Temp.
NDE: FINAL PASS Prior to PWHT.	MT PT UT Other	REL 92 118	10/1/80	Final Spec 14-8	Visual Per SPPM 4.6 R 7
NDE: RT prior PWHT	RT	NA			
POST WELD HEAT TREAT Verify Record Time/Temp.	NA				Attach Time/Temp. Recordings
NDE: FINAL MT/PT	NA				

Instructions:	Req.	QA Stamp	Date	AI Hold Pts.	Record/Remarks
(11) NDE: FINAL RT/UT	NA				
(12) Verify welders I.D. on weld joint. (record welder's symbol)					
(13) Tack Symbol ____	(14) Root Layers Symbol ____			(15) Intermediate Layers Symbol ____	
(16) Symbol ____	(17) Symbol ____			(18) Final Symbol ____	
(19) Verify Ferrite Content, (where applicable)	NA				Record Range
(20) 1st Repair Ref. WRD No. ____					
(21) 2nd Repair Ref. WRD No. ____					
(22) 3rd Repair Ref. WRD No. ____					Note: If 3rd repair is not acceptable, refer to Review Board Action. Attach Copy NR

APPROVALS:

[signature] 7-30-80
Const. Welding Engr.

A. [signature] 7-30-80
WELD/NDE/QC ENGR.

Lack of Weld Fit-up Verification

During the review of the diesel generator cooling water, starting air, and fuel oil piping records the inspector noted a large number of cases where the QA inspectors had failed to perform the independent verification of cleanliness, proper fit-up ..., proper weld procedure, proper filler metal, welder qualification, final weld inspection, etc. required by KE-1 form. These noted failures were documented in Q.A. Surveillance Reports. The licensee's corrective action consisted of visually inspecting the welds, establishing "traceability" of material and welder qualification based on KE-2 (weld rod issue) forms, and accepting proper fit-up on the basis of twenty welds (within different systems), randomly selected and radiographed to verify proper fit-up. Within the diesel generator subsystems being audited the inspector noted at least 39 welds listed in Surveillance Reports No. 2367, 2370, 2380 and 2412 of which only one weld was chosen for radiography. ~~[illegible]~~

6. c. The inspector found [illegible] that this problem was originally brought to the attention of the Kaiser Q.A. Manager in November 1979 by the Authorized Nuclear Inspector (A.N.I.) from The Hartford Steam Boiler Inspection and Insurance Company. At that time it appears the A.N.I. [illegible] agreed to a random selection of 20 welds for radiography. On 2/11/81 the A.N.I. [illegible] again wrote to the Kaiser Q.A. Manager to inform him that since December 4, 1979 additional welds had not been inspected for proper fit-up, and requiring 100% verification of proper fitup by radiography. (See Attachments 1, 2 and 3). The inspector also noted a partial tabulation of welds lacking QA verification exists. This partial listing contains over 400 welds, but conversations

with Kaiser QA personnel indicated the total number to be much higher than that.

Drawing No.	Line No.	Item in Question	Heat Number or Part I.D. Number	
			According to Dwg.	Actually Installed
SK M-428-6-DG-26	1DG25AC2	pipe	516405	502891
				415007
		90 ell	M287	M273
SK M-428-6-DG-27	1DG25AC2	pipe	516405	502891
				415007

(KE-1)

Alterations of Weld Records Based on Weld Rod Issue Records (KE-2).

The inspector performed an audit of the KE-1 weld records for the diesel generator cooling water, starting air, and fuel oil subsystems. A considerable number of discrepancies were found to exist between the QA weld records and the weld rod issue form, in the areas of weld rod heat number, welder identification and date. It has been the recent practice of the Documents Records personnel to resolve these discrepancies by altering the weld records to match the stores issue records. In effect QA records, which supposedly provide independent verification that each weld was made by a qualified welder using acceptable material, etc., are now being changed to conform to Construction Department records. At times the changes appear to be arbitrary such as when the records for some of the welds within a certain line were changed, but the other welds under identical circumstances were not changed. Among the several altered records noted the inspector selected two for field verification with the following results:

by K. Ward

KEI Worm Allegations

1. Allegation

Inspection criteria required by AWS deleted, item #1 & 2.

NRC Findings

Item #1, The inspector was informed by Kaiser's NDE Level III that A. JACKSON, Welding/NDE QA Engr, would mark out all the requirements & add, "Rod slip to be part of package", from approx. 7/80 - 2/81. (A. Jackson does not work for Kaiser at this time & is not on site.

The Zimmer FSAR refers to AWS D.1.1, 1972 & requires the following;

a. Para. 6.5.2 Requires verification of proper weld procedures.

b. Para. 6.4.1. Requires welding to be performed by qualified welders

c. Para. 6.5.4. Requires observation of welder welding operator & tacker is verified on interval basis for performance (Not 100%)

d. Para. 6.2. Requires only material conforming to the requirements of the code are used.

The rod slip has the welding procedure, welders name, filler material, etc. but

	HENRY J. KAISER COMPANY STORES ISSUE (Weld 2 Form)	No. W 237251 Date:

SYSTEM ______ WELD NO. ______

DRAWING NO. ______ WELD PROCEDURE ______

Stock No.	Description	Qty.	Unit	Unit Price	Amount			Account No. Charge	CR.
	HEAT #								
	QTY. RETURNED								
	NET								
	HEAT #								
	QTY. RETURNED								
	NET								
WELDER SIGNATURE:	SYMBOL:		TOTAL						

AUTHORIZED BY: FILLED BY: RECEIVED BY:

HJK Co. 193

~~[illegible]~~ Remain in weld rod issue ~~[illegible]~~ & the transferred welding Expt.

A 21072

KAISER ENGINEERS, INC.
Wm. H. ZIMMER NUCLEAR POWER STATION – WELD DATA SHEET
(See reverse side for instructions & responsibilities)

Field Weld No. ______

System or Component ______ ISO DWG No. ______ Line No. ______ MK# ______ To MK# ______

Base Mat'l SA P1 To SA P1 Nom. Pipe Size ______ Nom. Wall Thks. ______ /Fillet Size ______ Project Spec. H2256

Code Class ESSENTIAL Welding Procedure No. 3.1.51 Special Instructions ______

Filler Material Requirement:

Electrode Type E7018 Bare/Covered Size 3/32 HT#/Lot# ______ Size 1/8 HT#/Lot# ______ Size 5/32 HT#/Lot# ______

Consumable Insert NA HT No. ______ Backing Ring NA HT# ______

Purge Req.: I.D. Purge NA CFH ______ Torch Purge NA CFH ______

Ref. Cip/Weld No./Hanger No.

Heat Treat Requirements:

Preheat Temp Req. 70 °F Min Interpass Temp Req. 70 °F Min Post Weld Req. NA Procedure ______ **This procedure shall not be used for welding to piping.**

Fit Up / Installation / NDE Requirements:

Instructions	Req.	QA Stamp	Date	AI Hold Pts.	Record/Remarks
(1) Verify, proper weld procedure, welders qualif., proper filler mat'l., proper C.I./B.R.					
(2) Verify proper bevels, details for, cleanliness, damage. Verify Mark No.'s					Record MK No. ______ to MK No. ______
(3) Verify proper fit up, Insp. tack welds.					
(4) NDE: Examine weld edge preparation surface	MT PT RT Other				
(5) NDE: ROOT PASS (visually examine I.D. surface were accessable)	MT PT RT Other				Verify Preheat Temp
(6) NDE: INTERPASS	MT PT Other				Verify Interpass Temp.
(7) NDE: FINAL PASS Prior to PWHT	MT PT UT Other				Visual Per SPPM 4.6 R ______
(8) NDE RT prior PWHT	RT				
(9) POST WELD HEAT TREAT Verify Record Time/Temp.					Attach Time/Temp. Recordings
(10) NDE FINAL MT/PT					

Instructions	Req.	QA Stamp	Date	AI Hold Pts.	Record/Remarks
(11) NDE: FINAL RT/UT					
(12) Verify welders I.D. on weld joint. (record welder's symbol)					
(13) Tack Symbol ______	(14) Root Layers Symbol ______			(15) Intermediate Layers Symbol ______	
(16) Symbol ______	(17) Symbol ______			(18) Final Symbol ______	
(19) Verify Ferrite Content. (where applicable)					Record Range
(20) 1st Repair Ref. WRD No. ______					
(21) 2nd Repair Ref. WRD No. ______					
(22) 3rd Repair Ref. WRD No. ______					Note: If 3rd repair is not acceptable, refer to Review Board Action. Attach Copy NR.

APPROVALS:

Const. Welding Engr. ______ WELD/NDE QA ENGR. ______

QA Document Control Copy

WELD DATA SHEET
ENTRY CHECK LIST

BLOCK IDENTIFICATION	INFORMATION REQUIRED & EXAMPLES	RESPONSIBLE FOR ENTRY
Block 'A'		
System or Component	Enter applicable name, i.e., "Service Water"	Const. Welding Engineering
ISO Dwg No.	Enter applicable drawing No., i.e., "MSK-60(ws)-3"	Const. Welding Engineering
Line No.	Enter applicable Line No., i.e., "1WS02A24"	Const. Welding Engineering
MK No. to MK No.	Enter appropriate spool pc. identity, i.e., "1WS02A24-1" to "1WS02A24-2"	Const. Welding Engineering
Base Mat'l SA to SA	Enter appropriate mat'l specification, i.e., SA106 to SA106	Const. Welding Engineering
Nom. Pipe Size	Enter applicable pipe dia. size, i.e., "24 in."	Const. Welding Engineering
Nom. Wall Thks/	Enter appropriate wall thickness of the pipe sizes stated above, i.e., "3/8 in"	Const. Welding Engineering
Fillet Size	When the joint design references a fillet, enter appropriate fillet size, i.e., "3/8 in."	Const. Welding Engineering
Project Spec.	Enter applicable S&L project spec., i.e., "H-2254"	Const. Welding Engineering
Field Weld No.	Enter appropriate assigned field weld No., i.e., "33 WS"	Const. Welding Engineering
Code Class	Enter applicable ASME Code Class, i.e., "1," or "2," or "3"	Const. Welding Engineering
Weld Procedure No.	Enter applicable SPPM No., i.e., "3.1.3"	Const. Welding Engineering
Special Instruction	Enter Special Instruction, References, of conditions which must be followed in the Field, i.e., "Purge I.D. For x hrs."	Const. Welding Engineering
Block 'B' Filler Mat'l Req.		
Electrode Bare/Covered	Circle appropriate item, or both, as applicable, i.e., "Bare / Covered"	Const. Welding Engineering
Type	Enter appropriate type, i.e., "ER308"	Const. Welding Engineering
Size (3 Places)	Enter size as required, i.e., "3/32," 1/8," "5/32"	Const. Welding Engineering
HT#/Lot #	Enter appropriate Heat No. or Lot No. as applicable for each size rod. From KEI-WELD 2-Form, i.e., 3/32" HT#/Lot# 13475C	Q.A. Welding Inspr.
Consumable Insert	Enter check mark, ✓, or X when required	Const. Welding Engineering
HT No.	Enter appropriate Heat No. Mat'l when consumable insert is used. Transfer Heat No. from KEI-WELD 2-Form	Q.A. Welding Inspr.
Backing Ring	Same as above for consumable inserts	Const. Welding Engineering
HT No.	Same as above for consumable inserts.	Q.A. Welding Inspr.
Purge Req.		
I.D. Purge	Enter check mark, ✓, or X, when required	Const. Welding Engineering
CFH	Enter required amount of Purge, in cubic feet/hour, i.e., 15 to 18 CFH	Const. Welding Engineering
Torch Purge	Same as above for I.D. Purge	Const. Welding Engineering
CFH	Same as above for I.D. Purge, i.e., "8 to 10" CFH	Const. Welding Engineering
Block 'C' Heat Treat Req.		
Preheat Temp. Req.	Enter required preheat temp.	Const. Welding Engineering
Inter Pass Temp. Req.	Enter applicable interpass temp.	Const. Welding Engineering
Post Weld Req.	Enter check mark, ✓, or X, if Post Weld Heat Treatment is required	Const. Welding Engineering
Procedure	Enter appropriate procedure No., i.e., "SPPM 5.2"	Const. Welding Engineering
Fit Up/Installation Req.:	Instructions & Requirements	
General Instructions:	The Instructions and Requirement Column shall be reviewed by the QAE, who shall indicate with a check mark, ✓, or an X, that this "Block No." is required. He will circle the appropriate method in the "NDE Block" as required. When "Other" has been circled, the QAE will indicate in the remarks column or the instruction block what method is required. The QA Weld Inspector will verify, witness, measure and record as required by the instructions "block" or as necessary to demonstrate inspected status, those items indicated. He will stamp and date his acceptance or rejection of the indicated requirement.	
Special Instruction:		
Block No.		
2 Verify MK No.'s	Enter in the Record/Remarks Column the appropriate MK No.'s	QA Welding Inspr.
5 Root Pass. Record/Remarks Col. "Verify Preheat Temp."	Enter the verification of the preheat temp., i.e., " 60°F"	QA Welding Inspr. Stamp & Date
6 Inter Pass-Record/Remarks Co. "Verify Inter Pass Temp."	Enter the verification of the Inter Pass Temp, i.e., " 350°F"	QA Welding Inspr. Stamp & Date
8 & 11 RT Prior to PW HT Final RT/UT	When RT (Radiography) has been required the KEI QAE Level III will stamp and date, acceptance or rejection	QAE
19 Verify Ferrite Content	Enter verification of Ferrite Content in Record/Remarks Col. as to range i.e., " $>5\%$ $<15\%$	QA Welding Inspr.
20 to 22 – 1st Repair, 2nd Repair, etc. Ref. Wrd. No.	When weld joint has been found unacceptable, WRD (Weld Rework Data Sheet, KEI-WELD 1A Form) will be executed in the same manner as the KEI-WELD 1-Form. The KEI QAE or his Designee will initiate the WRD. He will forward to the Const. Weld Engr. for his Review and Procedure Application. The reviewed & signed form will be returned to the QAE for his review & procedure application. After this review & approval, the WRD will be submitted to the AI for his review and/or hold points. If after 3 attempts of rework, it is still unacceptable, an NR will initiate per QAP #16. When work/repair is acceptable, the Inspr./QAE will stamp & date acceptance.	QAE & Constr. Weld Engr.

KE-WELD-1 Form

Lack of Adequate Material Heat Number Traceability

The inspector conducted an audit of some of the installed lines in the diesel generator cooling water, starting air, and fuel oil subsystems. The audit compared the recorded heat numbers given in the as-built isometric drawings against the heat numbers stamped on the installed piping and fittings. The audit revealed that:

1. in several instances the heat numbers recorded on the drawings by the QC inspectors do not agree with what is installed. (Refer to Table ___ for a listing of the discrepancies noted)

2. in many instances a heat number could not be found on the installed item and a comparison against the recorded number could not be made.

3. at times the recorded heat numbers on the drawings had been scratched out or white out and a new incorrect heat number entered. For example ISK M-2Y2-2-DG-53 was

changed to read heat number: HA-001 as being the installed 3/4" and 1/2" piping. A review of acceptable heat number records showed that HA-001 belongs to 1 1/4", sch. 80, piping and that HA-0001 belongs to 3/4", sch. 80, piping.

4. three heat numbers found in installed piping (HA-0170, TW 24402, and 502891) do not appear in the records of acceptable heat numbers.

Table ? – Discrepancies Between Installed Piping and Traceability Records

Drawing No.	Line No.	Item in Question	Heat Number or Part Identification Number: According to Dwg.	Heat Number or Part Identification Number: Actually Installed
ISK M-428-6-DG-19	1DG28AB1	90° ells	M 276	M 267
		Tee	M 315	M 274
		Pipe	HE 6247	8464
ISK M-428-6-DG-103	1DG28AB1	flange	RVA	CB8
ISK M-428-6-DG-16	1DG27AB1	pipe	HE6247	16E4
				16D2
ISK M-428-8-DG-68	1DG01AB1	pipe	HE 6247	3416
ISK M-767-4-DG-113	1DGF2AA ½, 1DGF2BA ½	90° ells	M395	M 252
ISK M-428-6-DG-24	1DG27AE1, 1DG28AE1	pipe	HD7123	TW 24402
ISK M-428-6-DG-105	1DG28AE1	flange	RD2Y	CB8
ISK M-242-2-DG-53	1DG C5AA ¾	pipe	HA001	JE 9922
		90 ell	M 262	M 87
	1DGF6AA ½	pipe	HA001	HA0170
	1DG C5BA ¾	pipe	HA001	JE 9922
		90 ell	M 262	M 87
	1DGF6BA ½	pipe	HA001	HA0171

Lack of Adequate Material Heat Number Traceability

The inspector conducted an audit of some of the installed lines in the diesel generator cooling water, starting air, and fuel oil subsystems. The audit compared the recorded heat numbers given in the as-built isometric drawings against the heat numbers stamped on the installed piping and fittings. The audit revealed that

1. in several instances the heat numbers recorded on the drawings by the QC inspectors do not agree with what is installed. (Refer to Table __ for a listing of the discrepancies noted)
2. in many instances a heat number could not be found on the installed item and a comparison against the recorded number could not be made.
3. at times the recorded heat numbers on the drawings had been scratched out or whited out and a new incorrect heat number entered. For example ISK M-242-2-DG-53 was

changed to read heat number HA-001 as being the installed 3/4" and 1/2" piping. A review of acceptable heat number records showed that HA-001 belongs to 1 1/4", sch. 80, piping and that HA-0001 belongs to 3/4", sch. 80, piping.

4. three heat numbers found on installed piping (HA-0110, TW 24402, and 502E91) do not appear in the records of acceptable heat numbers.

Table 1 - Discrepancies Between Installed Piping and Traceability Records

Drawing No.	Line No.	Item in Question	Heat Number or Part Identification Number: According to Dwg.	Heat Number or Part Identification Number: Actually Installed
ISK M-428-6-DG-19	1DG28AB1	90° ells	M 276	M 267
		TEE	M 315	M 274
		PIPE	HE 6247	8464
ISK M-428-6-DG-103	1DG28AB1	flange	RVA	CB8
ISK M-428-6-DG-16	1DG27AB1	pipe	HE6247	16E4 16D2
ISK M-428-8-DG-63	1DG01AB1	pipe	HE 6247	3416
ISK M-767-4-DG-113	1DGF2AA ½ 1DGF2BA ½	90° ells	M395	M 252
ISK M-428-6-DG-24	1DG27AE1 1DG28AE1	pipe	HD7123	TW 24402
ISK M-428-6-DG-105	1DG28AE1	flange	RD2Y	CB8
ISK M-242-2-DG-53	1DG C5AA ¾	pipe	HA001	JE 9922
		90 ell	M 262	M 87
	1DGF6AA ½	pipe	HA001	HA0170
	1DGC5BA ¾	pipe	HA001	JE 9922
		90 ell	M 262	M 87
	1DGF6BA ½	pipe	HA001	HA0171

Drawing No.	Line No.	Item in Question	Heat Number or Part I.D. Number	
			According to Dwg.	Actually Installed
ISK M-428-6-DG-26	1DG25AC2	pipe	516405	502891 415007
		90 ell	M287	M273
ISK M-428-6-DG-27	1DG25AC2	pipe	516405	502891 415007

Radiographs for 206 welds were reviewed. No identified deficiencies were found in

517 of the ~~radiographs were found to be acceptable~~,
183 radiographs were found to be unacceptable
because ~~of~~ shims were not ~~being~~ used under the
penetrameters ~~penetrameter~~ and ~~&~~ 4 radiographs were found to be
unacceptable because ~~of~~ there were not enough shims
~~being~~ used under the penetrameters ~~penetrameters~~ as required by ~~in~~
~~accordance with~~ ASME Section III - appendix IX
Para. IX-3334.4 and ~~&~~ The M. W. Kellogg Co.
Radiographic Procedure Para. 4.1.8. ~~see~~
~~attachments "A" & "B". The above radiographs~~
~~reviewed consisted of 206 welds.~~
The inspectors also verified that the following
welds were the actual welds radiographed
by comparing the radiographs with the welds

Line No.	Weld No	Line No	Weld No.
1FC36CA621	B	1MS20B3169	D
1MS20B3169	A	1FC39CA621	C
1FC02AB818	B	1FC02AB818	A

CG&E performed an audit of M. W. Kellogg
Aug. 15 & 16, 1973 prior to awarding the contract
for the above work, see attachment "C".
Attachment "D" is CG&E approved vendor list
attachment "E" is the final inspection &
release report.

Persons Contacted: D. Kramer CGE QA
B. Ehans "
K. Shinkle Kaiser QC
K. Burgess "
B. Winters - K Foothill
T. Fester "
B. Lake "

W8×17 structural steel fabrication & erection

The inspector, while performing visual examinations of cable tray hanger welds, found deficient welds on structural steel supporting the hangers. As a result of this finding a sample area was inspected for welding quality, erection as per drawing, fabrication to applicable specification requirements, and material traceability. The area ~~selected~~ observed ~~was~~ in the

1-4 Aux. building blue switchgear room at the 546 elevation level. The area inspected was 8'3" west of G and 16'6" east of H; between columns 22 and 24 of S&L drawing # S-546 rev. AB.

The following descrepancies were noted:

1. W8×17 beam (8'3" length) positioned east to west at 1'9" south of column 24 and -10" from elevation 546, is not shown on referenced drawing and no DDC referenced on # drawing addressed this change.* No documentation could be located for the installation of this beam.

See note * A DDC was later brought to the attention of the inspector, however it was not approved.

DDC dated [illegible] indicates all the [illegible] welding [illegible] complete. [illegible]

2. W8×17 beam 6'3" in length positioned north to south 13'8" west of G, -1" from elevation 546: same descrepancy as 1 and defective welds

3. W8×17 beam 5'5" in length positioned E to W 8'10" south of 24, -1" from elevation 546. Same as #2

(4) W8X17 beam 2' 8" in length positioned N to S 9' 6" West of G and attached to beam #3 above and adjacent beam 2' 8" north. descrepancy same as #1

(5) W8x17 beams 8'3" in length positioned E to W located 5'3 3/8" and 9'7 7/8" south

24 are tack welded in place, no identification or heat numbers on beams and no KE-1 form or other documentation for tracibility of material or welders could be located. (Ref DDC-2087)

(6) Welds identified on Attachment (A) do not meet AWS-D.1.1 1972 acceptance criteria for one or more of the following deficiencies: Slag not removed from weld, Weld profile having excessive convexity, concavity, blow holes, porosity and undercut. (note: Some of these welds are now painted and were inspected for gross deficiencies only)

(7) In addition to the above, the following defects of the fabricated beams was noted: Re-entrant corners of several W8x17's in this area were observed to have notchs and no radius As required by AISC seventh edition ('69) page 4.113 (1/2" min Radius required.) see attachment A for locations.

Note

* S+L Dwg. E-189 Sheet 3, Rev H
note # 17 allows W8×17's to be
installed and then submitted on
a DDC for approval. This is
why the inspector could not locate
the DDC applicable to these beams,
as it did not appear on the latest
revision of the drawing because it
had not been approved as of 3/27/81.
see Attachment # B

[illegible] NUCLEAR [illegible] STATION			DDC No. S 2050 Page 1 of 1	
S-546	Z		Ben Evans	DATE: 5-29-80
R. B Bldg Floor Framing EL. 546'0'		DWG/SPEC. ISSUED BY: S+L	DWG/SPEC. REGISTER NO: B8643	DDC REGISTER NO.:

REASON FOR CHANGE

As per the requirements of E-189 Sh. 2 of 10 Note 11, please find attached sepia and print of S-546 Structural steel additions for support of iron conduit.

As an aid in locating W8 x 17 beams added to support electrical installation, a survey was made noting those W8 x 17 beams supporting other installations so that the drawings attached reflect all Auxiliary steel on this elevation and the type of installation it supports at this time.

Note Reference Notes

- F Foothill Electric Installation
- S Structural Installation
- H HVAC Installation
- P Piping Installation

Attachment B

Essential ☒

Non-Essential ☐

NE Cognizant Engineer Review

S&L Preparer Date

[illegible] Piping Engineer

[signature] 5-29-80 Construction Engineer

[signature] 5-29-80 Electric Const. Engineer

APPROVAL BY [illegible]

[illegible] DATE [illegible] DATE [illegible] DATE

Adjacent Material Reviewed

The RIII inspectors reviewed radiographs of the following field & shop welds for evidence of unacceptable material adjacent to the welds including other welds they may have been viewed. The NRC found no unacceptable indications in the entire radiographs viewed. They consisted of approx. 5 radiographs per weld of the 67 welds reviewed.

Fields Welds

LINE No.	Weld No.	Dia.	Line No	Weld No.	Dia.
1RH08BB10	RH174C	4"	1RH08BB10	RH176	4"
1RH08BB10	RH177	4"	1RH08BB10	RH178	4"
1RH08BB10	RH179	4"	1RH16C14	RH203	4"
1RH13BB4	RH224	4"	1RH13BB4	RH205	4"
1RH13BB4	RH226	4"	1RH08BB10	RH174A	4"
1RH36B6	RH116	6"	1RH20B6	RH115	6"
1RH08AA10	RH109	10"	1RH06BB10	RH137	10"
1RH07BB10	RH140	10"	1RH07BB10	RH141	10"
1RH07BB10	RH145	10"	1RH36A6	RH123	6"
1RH08BA10	RH105	10"	1RH08CA10	RH104A	10"
1RH08BA10	RH104	10"	1RH07BA10	RH76	10"
1RH02B6	RH15	20"	1RH02B2C0	RH15B	20"
1RH02BC20	RH16	20"	1RH02BC20	RH16A	20"
1RH02BC20	RH16B	20"	1RH02BC20	RH16C	20"
1RH02BC20	RH14	20"	1RH02BA20	RH5	16"

...No.	Weld No.	Dia.	Line No.	Weld No.	Dia.
			1RH02BA20	RH6	20"
...BA20	RH8	20"	1RH02AA20	RH2	20"
...AA20	RH1	20"	1RH02BA20	RH4	20"
...2AA20	RH3	20"	1RH02AC20	RH10	20"
...BA20	RH9	20"	1RH0AC20	RH11A	20"
...2AC20	RH11	20"	1RH01DA16	RH37	16"
...AC20	RH12	20"	1RH01C18	RH44	18"
...02BA20	RH39	16"	1RH01C18	RH41	18"
...1C18	RH43	18"	1RH02AB20	RH18	20"
...02BC20	RH17	20"	1RH02AB20	RH19A	20"
...02AB20	RH19	28"	1RH02BA20	RH40	16"
...02BB20	RH20	20"	1RH01C18	RH262	18"
...01C18	RH261	18"			

Shop Welds

...ne No.	Weld No.	Dia.	Line No.	Weld No.	Dia.
			1RH01DB16-24	3	16"
...401DB16-25	4	16"	1RH02BA20-3	A	20"
...40 BA20-6	A	20"	1RH02AB20-17	A	20"
...402AC20-10	A	20"	1RH01C18-31	A	18"
...H01C18-31	A	18"			

Five citations

6. Structural steel fabrication + erection

W8x17 beams. One area inspected in blue switchgear room. Findings:

(1) Defective erection welds (AWS-D.1.1); (2) several fabricated beams have no radius and are notched at re-entrant corners (AISC-4.113)
DDC-5775

(3) Material traceability of some of the W8x17 Beams could not be verified. no records or identification on beams.

(4) 4-W8x17's installed, but not shown on applicable drawing or DDC.

(5) Bristol inspector was also project engineer (superintendent) Bristol QA manual for erection section 1.0 Appendix B does not meet the requirements of 10CFR50 Appendix B

Kaiser procedure SPPM 4.6 Rev. 8 para. 5.2 and Sargent & Lundy specification H-2173 Supp. 7; Std.-EB-117; takes exception to AWS D1.1 1975. This exception is not [illegible] in the FSAR. Paragraph 3.8.4.2 of the FSAR stipulates applicable Codes, Standards and specifications, which are found [illegible] Table 3.8-2. Table 3.8-2 specification reference number 20 specifies AWS D1.1 197[illegible] Structural welding Code with no exceptions noted. In a meeting with S&L (on 3/5/81) concerning the above exceptions the inspector queried for engineering background and or testing to substantiate the changes. The basis of the exceptions appears to be the investigation program of Fillet Weld size on [illegible] Industries Cable pan Hangers P.O. [illegible]. This independent study of [illegible] welds was made to substantiate [illegible] undersize [illegible] due to the [illegible] been joint configuration of the cable pan hangers.† The inspector reviewed this report and concedes the study may justify the weld size as adequate, due to the flare bevel, where weld penetration is not measurable by normal visual techniques, however it does not by any means substantiate a relaxation of AWS-D1.1 1972 concerning weld properties such as, weld convex and undercut. In light of the commitment to AWS D1.1 1972 addressed in the FSAR; and that the engineering basis for the deviations specified in S+L H-2.73 Suppl.) STD-EB-17 is not all inclusive and therefore inadequate to support the exception to the AWS specification requirements.

The RIII inspectors reviewed reader sheets for radiographs, made between October, 1979 and March, 1980, of the following field welds to determine if Kaiser ~~Co~~ Co personnel had accepted welds previously rejected by Peabody Magnaflux, ~~PM~~ PM:

~~Reader Sheets Review~~

for radiographs made between 10/79 and 3/80,

~~The~~ RIII ~~inspectors reviewed reader sheets of the following welds for evidence of Kaiser overriding Peabody Magnaflux rejections. The NRC results was, no findings. (49 welds) field weld radiographs from 10/79 to 3/80~~

~~Weld No.~~ Weld No.	~~Ident.~~ Reader Sheet Identification No.	~~Weld No.~~ Weld No.	~~Ident.~~ Reader Sheet Identification No.
RH-113	RH-31	21. K-414	MS-24A
RI-7	RI-11	22. K-523	MS-27A
RH-53	RH-20	23. RH-54	RH-20
RH-55	RA-20	RH-56	RH-20
K-73	RH-20	RA-46	RH-20
RH-40	RH-26	RE-75A	RE-1
K-494	MS-37	K-288	WX-8
FW-454	MS-30A	RH-86	RH-64
HG47A2 1/2	NR-E-2252	@A3	DO-2
K-926	WR-26	@C3	DG-25
K-455	MS-26A	HGK-250	HG-16
MS22AA2	MS-311	RD-K4	RD-1
K-84	RH-38	1MS22AC2	MS-315
P.L.2M20795	LC-19	DG03AA 3/4	DG-88
LP-9	LP-3	P.L.2M20803	LC-13
K-507	MS-44	K-483	MS-43
K-508	MS-45	K-499	MS-39
K-448	MS-27A	IRRB1AA 3/4	RR-122
HP-19D	HP-5	K-288	RT-2
FC-93	FC-29	FC-5	FC-14

Weld No.	Reader Sheet Identification No.	Weld No.	Reader Sheet Identification No.
K-33	FW-4	46. FW 58A	FW-2
FWK-31	FW-2	47 K-877	WR-2
LP-13	LP-11	48 HP-55	HP-4
CYK-221	CY-49	49. K-475	MS-34
WR41AA3	WR-44		

~~None of the above reader sheets~~

~~Readers~~ Reader sheets are the documents that accompany radiographs and identify such items as the radiograph interpreters, dates, acceptance, rejection, etc. None of the above reader sheets indicated that Kaiser personnel had accepted ~~any~~ radiographs that had ~~p~~ previously been rejected by ~~Peabody~~ Peabody Magnaflux. CG&E ~~does~~ did not have ~~per~~ personnel with direct QC ~~to~~ ~~that receive~~ and/or NDE responsibilities. ~~the~~

cc:

Items of Concern - Diesel Generator Turnover Packages

1. KE-1 Weld Data records and those KE-1's stamped on ISK drawings by the QC inspectors are being revised on the bases of data taken from weld rod withdrawal slips. (Heat number, welder identification and date are being changed on KE-1 forms or where data was not entered by inspector at time weld was made, such data is now being entered based on weld rod slips)

2. Weld rod slips indicate more than one welder, one heat number used on small bore weld, however welder symbols stamped near weld and KE-1 weld data records show only one welder worked on such weld. This reinforces our position that weld rod forms are not quality records to be used in revising weld data records. (Or that Weld Data recorded by QA inspectors is inaccurate)

3. Material heat numbers on ISK drawings do not reflect, in many instances, what is installed in field. The accuracy of all small bore material traceability records is in question.

4. No records exist to show some of the installed pipe is acceptable. The heat numbers do not appear on the [illegible] list of acceptable heat numbers.

5. A large number of socket welds which were not verified by the inspectors for proper fitup (~1/16" gap verification) have been accepted based on radiographs of 20 such welds.

6. Some of the installed small bore pipe lacks heat number or color coding. Since during a period of time QC inspectors were required to accept material based on color coding and welders word of its heat number, such piping can not be considered to have material traceability.

This is some what what my report will say.
Jerwi

Pullman Power Products Shop Radiography Meeting

A meeting was held at the Wm. H. Zimmer Nuclear Power Station June 29, 1981. CG&E presented a program to the National Board of Boiler & Pressure Vessel Inspectors, State of Ohio & the Nuclear Regulatory Commission on Pullman Power Products shop radiographs which was found to be unacceptable in some respects.
The NRC at one time reviewed several radiographs from Pullman & found that the technique did not meet ASME Section III 1971 Edition Summer 1973 Addenda to which the radiographs was to be performed too. (Refe NRC Report 81-13). The problem is that there are several hundred radiographs of welds that do not meet the Code because of penetrameters not being shim to the total thickness of the weld.
The National Board, State of Ohio & NRC requests that CG&E either reshoot the radiographs that were not properly shimmed or else demonstrate that the existing radiographs are adequate to identify weld deficiencies.
CG&E had 17 welds reradiographed of various diameter & thickness but most of the welds that were reradiographed did not have a radiographic problem.

CG&E reradiographed approximately 6 welds that had the radiographic problems using the original technique plus over shimming, but staying within Code with another penetrameter on the same film. Weld No. H+S Line No. 1FC09CA8 was one of the 6 ~~reradiographed~~ & found to be acceptable demonstrating that that weld was acceptable. The National Board, State of Ohio & the NRC suggested that one original shop weld of each diameter & thickness that had an unacceptable radiographic technique either penetrameter not shimmed or that are inadequately shimmed be reradiographed using the original technique plus the same penetrameter shimmed to the total weld thickness including reinforcement on the same film all in accordance with the Code. Also that these radiographs be used as reference radiographs to evaluate all shop radiographs that are either not shimmed or that are inadequately shimmed, & demonstrate that the essential hole in the penetrameter is visible after shimming to the total thickness of the weld reinforcement.

1. What is the allegation?

a. KEI knowingly installed and ripped out unsuitable main steam relief piping, at an estimated cost of $320,000.

2. From where or whom did we get the allegation? (Including additional information).

a. Mr. APPLEGATE contacted the NRC by telephone and made allegations regarding the Wm. H. Zimmer Nuclear Power Station.

3. When did we get the allegation?

a. Following the receipt of allegations by telephone on February 28, 1980, arrangements were made to interview the alleger to obtain more detailed information. During an interview on March 3, 1980, the individual made several allegations.

4. How do we know that we are addressing the allegation?

a. Reviewed Drawings, current + revisions by to the installation,

5. Identify the manner in which the allegation was reviewed. List the documents and revisions reviewed, the individuals and dates with whom discussions were held, and direct observations made. For facts determined by conversations with individuals, document the areas discussed and the information obtained.

a. The following items were reviewed.

Welding Documentation Review

160	267B	268B	459
160A	267C	268C	460
267A	267D	268D	461

Radiographs of Welds Review

160A	460	462
459	461	594

Drawings Review

b. Had discussions with personnel on the following items:

6. State the acceptance/rejection criteria used to base all conclusions. Identify the code, standard, etc., plus any applicable addenda.

a. ~~The welding~~ welding was performed in accordance with:

b. The radiography was performed in accordance with:

c. Mark II ~~[illegible]~~ Design Assessment Report Chapter 2.0 - Zimmer Empirical Loads, ZPS-1-MARK II DAR Amendment 13, Oct 1980

7. Clearly state the conclusion. If the allegation is determined to be non-safety related -- still substantiate if the allegation is true or not.

a. The main steam relief system was modified to replace the rams head SRV discharge devices with quenchers. The were 10" sch. 40 pipe in the main steam relief system replaced by more 10" sch. 40 pipe because of rerunning. 10" extra strong & 14" extra strong pipe. KEI installed unsuitable main steam relief piping originally & replaced piping because of the modification.

8. Whether safety related or not, make sure that both the specific and generic (safety related) concerns have been addressed for each allegation.

a. All concerns have been addressed.

9. Identify the status (controlled, accepted, or rejected) that the licensee's QA program indicates for the allegation, where possible.

a. It was determined that the modification was performed in accordance with the KEI QA Program that is used on all safety related piping on site

10. Address all previous NRC inspections and investigations that are relevant to the allegations.

Report No. 50-358/80-09

11. Obtain and address any information that shows if another government agency (OSHA, etc.) and/or the licensee has dealt with the allegation.

None

12. Sworn statements will be obtained from those allegers who presented information to Mr. Applegate. Statements obtained from other persons such as QA/QC inspectors will not be sworn statements unless the investigator believes this is appropriate.

13. Since independent tests or radiographs are not intended, please assure that a determination is made that test results and radiographs are not fraudulent and report the basis for this determination.

a. All above items were of the main steam relief piping system.

14. Since it has been stated that management statements may not be accurate because they have a vested interest in the site, verify at least a percentage of management statements by such means as records or direct observation to assure their accuracy.

a. Items in the above paras. were verified.

Inspection Report #6
Unacceptable Techniques of Radiographs
of Prefabricated Pipe Welds

QCP Action

1. Reradiograph the original shop welds as radiographed originally using the same technique plus the correct penetrameter shimmed to equal the total weld thickness, including reinforcement in accordance with the Code on the same film.

2. Other radiographic welds shall be of at least one of each diameter & thickness of any system that was found to be unacceptable.

Surveillance Report # 2893 initiated on 1/5/81 concerning cable tray hanger foot connections covered with fireproofing and therefore are inaccessible to inspect. Kaiser procedure # QACMI # G-14 Rev 3 page 2 para. 5 states "Except in extenuating circumstances, QA surveillance reports which identify <u>in-process non-conformances</u> will be transferred to a NR when the non-complying condition has not been acceptably corrected within 30 calendar days." The above SR # 2893 was not transferred to a NCR as of 3/27/81. In addition to this procedural violation the inspector regards the use of surveillance reports in lieu of Non-Conformance reports as stated in G-14 Rev 3 page 1 para. 2. "[illegible] non-conformance which can be corrected without processing a Non-Conformance Report."

Q. A. SURVEILLANCE REPORT

No. 2893

To: Chuck Burgess

Organization: H.J. Kaiser Company

cc: Rex Baker

Reference: QACMI-C14

___ In-process Deficiency ✓ Clarification ___ Calibration/Test Record

___ Audit/Follow-up ___ Subcontractor Surveillance ___ Surveillance Information

GENERAL OBSERVATIONS/DESCRIPTION:

SYSTEM Cable Tray Hangers

Ref: Letter Attached

For permanent documentation that may be noted on construction inspection plans (CIP's) @ 536' Auxillary building concerning cable tray hangers.

94 of 179 cable tray hangers have (1) one or both of the foot connections covered with fireproofing. With the amount of rejections noted (0%), is this level of confidence commensurate for acceptance of connection details covered.

Report Prepared By: Kyle L. Burg

Date 1-8-81

If Deficiency is Nonconforming in Nature, List:

1. Reference Drawing, Spec. or Std. ______

2. Specific Location ______

CORRECTIVE ACTION STATEMENT

Corrective Action Verified By: ______ Date ______

FIGURE 1

HENRY J. KAISER COMPANY

P. O. BOX 201
MOSCOW, OHIO 45153

January 8, 1981

To: Rex Baker
CC W. Biehle
C. Burgess
B. Evans
P. Gittings

From: K. Burgess
Electrical Department

Subject: Connection Details (foot)

During inspection of 536 elevation of auxillary building (Cable Spread Room), cable tray hanger connection details (foot) were found covered with fireproofing on *94 of the 179 hangers inspected. Of the 85 remaining hangers that could be inspected in it's entirety, no foot connection details failed required test torque, no nelson type bolts (studs) were noted as unacceptable, and no spacers were omitted as required Per EB-116 and EB-117.

With this information being predicated for quality assertion or is the removal of fireproofing required for futher evaluation?

Kyle Burgess
Kyle L. Burgess
Lead Inspector, Electrical

*Of the 94 hangers cited for being covered, Approximately 30 of the 94 had only (1) one of it's member encased.

7. Isometric Controls

Kaiser field Construction Procedure 2-2-4

- Preparation
- Control
- Revision

} of isometric dwgs.

All based on design criteria established by S&L in design specifications and S&L Dwgs - section and elevations.

J. J. Harrison 6/29 & 30/81
USNRC

8. S&L furnish design drawings sections and elevations on the essential system - safety related

from which Kaiser developes isometric for detail installation

Contact:

Jeff Grundman - S&L field supports Coord

Status - OK

J.J. Hanin 6/29&30/81
USNRC

Prefabricated piping received in 1977 had defective welds, but construction supervision told crews not to repair them because the welds were made off-site.

4. Get reports of UT + MT + dates for original fab

5.a What is Lead H Peabody name?

Get reports UT + MT of Peabody (May 1 1980 reports?) also Sullivan

[illegible]

HEI knowingly installed & rejected out unsuitable main steam relief piping & an estimated cost of $ 320,000.

4. Review drawings, current & other revs back
Dwg Rev.

5. Name of S & L individual see a few weeks ago, see L. Wood,
Lloyd? list personnel.
Rex

6. Welding was performed in accordance with

RT was performed in accordance with

Any other NDE performed?

What made IE Report by S&L
in response to S&L questions

JIM AM NR, PM - GAP - off site

Bob - APPLEGATE - B+E security interviews -

Ted - QC insp - 19+ new allegatns pipe fitters weld rod -

Carl - valve bodies - KEI forms -

RAVIN - pre fab welds + weld procedures NR

SHAPKAR - pre fab welds - pipe + KEI forms NR -

FRED Const turnover package
Design change control Bechtel - B6 worn -

TOM - NR's -

Micr = .000,001

SECTION 3 WORKMANSHIP

3.1 General

3.1.1 All applicable paragraphs of this section shall be observed in the production and inspection of welded assemblies and structures produced by any of the processes acceptable under this Code.

3.1.2 All items of equipment for welding and oxygen cutting shall be so designed and manufactured and be in such condition as to enable qualified welders, welding operators, and tackers to follow the procedures and attain the results prescribed elsewhere in this Code.

3.1.3 Welding shall not be done when the ambient temperature is lower than zero F, when surfaces are wet or exposed to rain, snow, or high wind nor when welders are exposed to inclement conditions.

3.1.4 The sizes and lengths of welds shall not be less than those specified by design requirements and detailed drawings, nor shall they be substantially in excess of those requirements without approval. The location of welds shall not be changed without approval.

3.2 Preparation of Base Metal

3.2.1 Surfaces and edges to be welded shall be smooth, uniform, and free from fins, tears, cracks, or other defects which would adversely affect the quality or strength of the weld. Surfaces to be welded and surfaces adjacent to a weld shall also be free from loose or thick scale, slag, rust, moisture, grease or other foreign material that will prevent proper welding or produce objectionable fumes. Mill scale that withstands vigorous wire brushing, a thin rust inhibitive coating, or antispatter compound may remain, except that for girders all mill scale shall be removed from the surfaces on which flange-to-web welds are to be made by submerged arc welding or by shielded metal-arc welding with low-hydrogen electrodes.

3.2.2 In all oxygen cutting, the cutting flame shall be so adjusted and manipulated as to avoid cutting beyond (inside) the prescribed lines. Roughness of oxygen cut surfaces shall not be greater than that defined by the American National Standards Institute surface roughness value[6] of 1000 MU in. for material up to 4 in. thick and 2000 MU in. for material 4 in. to 8 in. thick, except that the ends of members not subject to calculated stress at the ends shall meet the surface roughness value of 2000 MU in. Roughness exceeding these values and occasional notches or gouges not more than $^3/_{16}$ in. deep, on otherwise satisfactory surfaces, shall be removed by machining or grinding. Cut surfaces and edges shall be left free of slag. Correction of defects shall be faired to the oxygen cut surfaces with a slope not exceeding 1 in 10. Defects in oxygen-cut edges shall not be repaired by welding except with the approval of the Engineer for occasional notches or gouges less than $^7/_{16}$ in. deep for material up to 4 in. thick and less than $^5/_8$ in. for material over 4 in. thick. Such weld repairs shall be made by suitably preparing the defect, welding with low-hydrogen electrodes not exceeding $^5/_{32}$ in. in size, observing the applicable requirements of 4.9 and 4.10 and grinding the completed weld smooth and flush with the adjacent surface to produce a workmanlike finish.

3.2.3 Visual Inspection and Repair of Plate Cut Edges[7].

3.2.3.1 In the repair and determination of limits of internal defects visually observed on sheared or oxygen-cut edges and caused by entrapped slag or refractory, deoxidation products, gas pockets, or blow holes, the amount of metal removed shall be the minimum necessary to remove the defect or to determine that the permissible limit is not exceeded. Plate edges may be at any angle with respect to the rolling direction. All repairs of the defects made by welding shall conform to the applicable provisions of this Code.

3.2.3.2 The limits of acceptability and the repair of visually observed edge defects in plates 4 in. and under in thickness shall be in accordance with Table 3.2.3, in which the length of defect is the visible long dimension on the plate cut edge and the depth is the distance that the defect extends into the plate from the cut edge.

3.2.3.3 To provide guidance for both tension and compression members relative to the evaluation of discontinuities over 1 in. in length with depth greater than 1 in., discovered by visual inspection of plate cut edges before welding or during examination of welded joints by radiography or ultrasonic inspection, [illegible] lowed:

[6] ANSI [illegible] Surface Texture, [illegible]

[7] This is not applicable in cases of stress applied [illegible] of the material.

1A. Surveillance Report #2893 initiated on 1/8/81 concerning cable tray hangers foot connections covered with fireproofing has not been resolved. violation of Kaiser procedure #

5. (A) Voided NR's: NR#E2233 was voided by correction of KE-1 form. The inspector reviewed documentation and interviewed responsible individual. The correction of the KE-1 form was not a correction but deletion of previously required inspection requirements (ref. block (1) (2) + (3) of KE1 form # 2554 for Service Water Sys. dwg. PSK 1WS32 line # 1WS17A18 MK 54.

~~(B) NR # 2027 - improperly voided. Documentation and interview with responsible individual (E. Okz) Findings. (1) no record of moved lugs are traceable material.~~

(C) NR E2714 - Improperly voided - discrepancy noted on NR voided because will be inspected

1. Welds were inspected and accepted in the cable spreading room which were painted. (resolution of NR 1139-1) and 50-55E for superstrut.
Over for 1A Ref. AWS D.1.1 para 3.10.1

2. Kaiser procedure SPPM 4.6 Rev. 8 + S&L Specification H-2173 Supp. 7 Std. EB-117 (cable tray hanger welds) takes exception to AWS D.1.1 1972 acceptance requirements. FSAR stipulates AWS D.1.1 1972 no exceptions are addressed

Takes exception to undercut to code

3. Deletion of KE-1 form inspection requirement blocks 1 + 2. Ref. AWS para. 6.2, 6.5

4. Radiographic technique - shims not utilized where required on Vendor supplied pipe (Pullman)

1. What is the allegation?

a. KEI knowingly installed and ripped out unsuitable main steam relief piping, at an estimated cost of $320,000.

2. From where or whom did we get the allegation? (Including additional information).

a. Mr. APPLEGATE contacted the NRC by telephone and made allegations regarding the Wm. H. Zimmer Nuclear Power Station.

3. When did we get the allegation?

a. Following the receipt of allegations by telephone on February 28, 1980, arrangements were made to interview the alleger to obtain more detailed information. During an interview on March 3, 1980, the individual made several allegations.

4. How do we know that we are addressing the allegation?

a. Reviewed revised drawings.

5. Identify the manner in which the allegation was reviewed. List the documents and revisions reviewed, the individuals and dates with whom discussions were held, and direct observations made. For facts determined by conversations with individuals, document the areas discussed and the information obtained.

a. The following items were reviewed.

Welding Documentation Review

160	267B	268B	459
160A	267C	268C	460
267A	267D	268D	461

Radiographs of Welds Review

160A	460	462
459	461	594

Drawings Reviewed attached PSK-IMS Sht 21 & 21A, which are the following revisions,

No.	Item	Date
0.	Redraw (original configuration replaced)	9/8/76
1.	Added Hangers	3/31/77
2.	Added 8 lugs	1/10/78
3.	Changed Hanger	5/5/78
4.	Added new spools, voided welds MS 212, & MS 195 - per S & L.	4/3/79

Rev	Item	Date
5.	Added tee section per rev. L, Equipment Trouble Report (ETR) A 1744	6/18/79
6.	Added weld MS160 & 4" dimension	10/1/79
7.	Updated per redline (Make changes from field construction to drawings)	1/9/80
8.	Deleted welds K-461 & 463 changed to K-592 & 593 per NR-2499 added hanger detail sec. D-D.	8/27/80
9.	Changed K-weld K-592 back to K-461 & changed K-593 to K-594	9/4/80

b. Had discussions with personnel on the following items;

(1) R. J. PRUSKI, Project Manager S.&L.
Discussed the modification to replace the rams head SRV discharge devices with quenchers.

(2) H.C. BRINKMANN, Principle Mech. Engr., Nuclear Projects, CG&E.
Discussed the reason for the modification of (1) above.

(3) F. J. OLTZ, Record Supervisor
R. L. WOOD, Q.A. Engr.
Found & made copies of attached drawing's.

6. State the acceptance/rejection criteria used to base all conclusions. Identify the code, standard, etc., plus any applicable addenda.

a. The welding was performed in accordance with ASME Section III 1971 Summer 1973 Addenda.

b. Visual examination performed in accordance with KE Spec. SPPM 4-1-R1

c. Radiography performed in accordance with ASME Section III 1971 Summer 1973 Addenda.

e. Ultrasonic examination performed in accordance with ASME Section III 1971 Summer 1973 Addenda.

f. Mark II Design Assessment Report Chapter 2.0 - Zimmer Empirical Loads ZPS-1 - MARK II DAR Amendment 13, Oct 1980.

7. Clearly state the conclusion. If the allegation is determined to be non-safety related -- still substantiate if the allegation is true or not.

a. The main steam relief system was originally fabricated for the rams head SRV discharge devices.

In 1975 a nuclear power plant in Germany ~~[illegible]~~ discovered new loads & because of this, several facilities started a research, including CG&E, & arrived at a modification to replace the rams head SRV discharge devices with quenchers. CG&E started the modification in 1975 prior to the complete research modification knowing that approx. 95% would be acceptable. To date the modification is not completed. The last documentation received on site for another change was dated Nov. 14, 1980 to CG&E from the NRC Licensing Branch No. 2 Division of Licensing & the subject was, "Issuance of NUREG-0487, Supplement 1, Mark II Containment Lead Plant Program Load ~~[illegible]~~ Evaluation & Acceptance Criteria. There may ~~[illegible]~~ still more changes to come because of load defination. If the site would not have started the modification in 1975, the schedual would ~~[illegible]~~ have been latter, from the dry well floor down 10" sch. 40 pipe in the main steam relief system was replaced by more 10" sch. 40 pipe because of rerunning, 10" extra strong & 12" extra strong pipe.

b. The total labor cost was $ 824,780.00 & the total material & labor cost was: $ 1,183,690.00.

8. Whether safety related or not, make sure that both the specific and generic (safety related) concerns have been addressed for each allegation.

a. All concerns have been addressed

9. Identify the status (controlled, accepted, or rejected) that the licensee's QA program indicates for the allegation, where possible.

a. It was determined that the modification was performed in accordance with the KEI QA Program that is used on all safety related piping on site

10. Address all previous NRC inspections and investigations that are relevant to the allegations.

Report No. 50-358/80-09

11. Obtain and address any information that shows if another government agency (OSHA, etc.) and/or the licensee has dealt with the allegation.

None

12. Sworn statements will be obtained from those allegers who presented information to Mr. Applegate, Statements obtained from other persons such as QA/QC inspectors will not be sworn statements unless the investigator believes this is appropriate.

13. Since independent tests or radiographs are not intended, please assure that a determination is made that test results and radiographs are not fraudulent and report the basis for this determination.

a. All above items were of the main steam relief piping system.

14. Since it has been stated that management statements may not be accurate because they have a vested interest in the site, verify at least a percentage of management statements by such means as records or direct observation to assure their accuracy.

a. Items in the above paras. were verified.

[illegible] Appendix B, Criterion XVII states, in part, that

inspection and test records shall, ~~as a minimum~~

identify [illegible] include qualifications of personnel, procedures and equipment, the type of observation, the results, and the acceptability.

5 The Wm. H. Zimmer QA Manual Section 17.1.4 states, in part, that documentation of all performance surveillance includes personnel identification and qualification, procedure, type of observation, date of performance, person or organization conducting, results and corrective action if required.

6 Contrary to the above, ~~the~~ the Bristol Quality Control Steel Erection Report, ~~form~~ which was a generic [illegible] form, did not identify weld procedure numbers, types of welding material, ~~a~~ welder identifications, ~~[illegible]~~ [illegible] numbers, or specific welds inspected.

7 This [illegible] 17 [illegible] (Attachment II)

10 CFR 50, Appendix B, Criterion I states, in part, that persons and organizations performing quality assurance functions shall report to a management level such that the required authority and organizational freedom, including sufficient independence from cost and schedule when opposed to safety considerations, are provided.

Contrary to the above, the quality assurance program of Bristol Steel and Iron Works, a contractor to the licensee, did not provide sufficient independence of the QA staff from cost and ~~sched~~ schedule.

This is a Severity Level VI violation (Supplement II)

24 Welds

TP 4.3.3.5.c (1) (a) A-4 thru A-13, A-18, A-20, A-21

" (b) A-6, A-7, A-13, A-14, A-18 thru A-21

(c) 79DG

" (2) (a) A-7

(b) A-20

CG&E ENFORCEMENT MEETING

August 5, 1981

AGENDA

Opening Remarks	Keppler
Review of Investigation Findings	Warnick
Discussion of Items of Noncompliance	Barrett
Discussion of Possible Enforcement Action, Public Meeting, Quality Confirmation Program, NRC Independent Measurements, and Related Topics	Keppler
Closing Remarks	Keppler

Kargo

SP

A5

A8

A10

M

Demy Whyrone

Dickhart

Bergmann

Sayer

void NR

7. Voiding of NR's

There are approximately 739 voided Nonconformance Reports (NR's). To date, approximately 100 manhours have been expended in reviewing these documents. It is estimated that an additional four (4) manh~~our~~s will be required to resolve or clarify the voiding of these documents. months Of this total, 393 have been superceded of which some are revised; others are duplicates and some have been rewritten. Approximately 60 voided NR's are classified as reinspection later. Some of the reinspections are necessary due to redesign, procedure revisions and for other reasons.

Fifty-six (56) documents have been changed which include some where a DDC or ECR was written to accept an "installed condition". Others were changed due to drawing revisions and similar requirements. Forty-two (42) documents are classified as voided due to documents being found at a later date. Approximately ninety-two (92) are covered by inspector error where misinterpretations of either inspection requirements or design requirements existed. Seven (7) were covered by items that were returned to the vendor and were actually reject. Voiding of these type NR's has stopped since a new procedure for rejecting vendor supplied material has been implemented.

Approximately 110 fall into other categories which will take an individual analysis to determine the cause for the voiding.

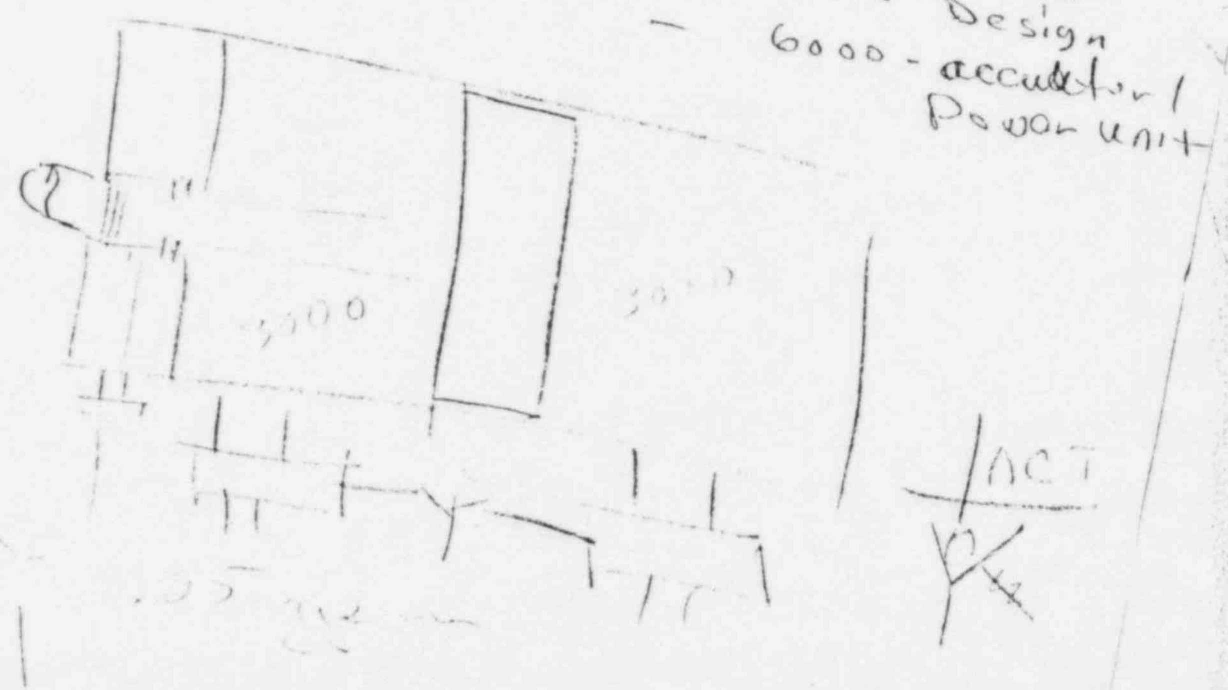
6 S&L Designated all Hydraulic Lines in Containment - Drywell as Class B. See piping line list pg 5 of 7, designated class "B"

GE "not safety related, active or passive"
T. Van Netta

Status: (Jeff Grundman)
S&L site personnel could not answer this need, need to talk to Zimmer Project Mgr. in Chicago.

J. J. Harrison 6/29&30/81
USNRC

Piping – 1850 oper. press – 3000 Design
– 6000 - accumulator / Power unit



Note.

Lines outside containment will be modified / revised in near future?

~~Record~~

New drawings
" Records
re hydro

In Near future, hanger problems.

3/26/81
Interim Rpt

Basic security-type allegations
received thru Applegate and GAP

Security of nuclear fuel - No items of noncompliance were identified. Based on information obtained in the investigation to date, it appears the security of the nuclear fuel from the time of arrival to the present, has been more than adequate.

Regarding alleged alcohol use by workers - although it appears the use of alcohol by workers was somewhat widespread, there is little evidence to indicate that alcohol use impaired the ability of workers to a degree where it adversely affected the construction of the plant.

Regarding alleged drug use - there is no evidence to indicate that drug use was significant to a degree where it impaired workers' ability to perform their jobs and adversely affected the construction of the plant.

Regarding alleged "break-in" to Peabody-Magnaflux trailer and theft of records - allegation still under investigation.

5.a. Hydro Test Data

Line No.	Design (S&L) Max. Test Press.	Max. Allowable Test Pressure	Initial/Specified Test Press	(Design) Holding Test Press	Test Di[illegible] Test
1RR39AA (239, 240)	3000	3180	3010	3000	RR-2 9/27/ 3/21/
1RR39AB (242, 246)	3000	3180	3010	3000	RR-2 3/1/7 9/22/
1RR39AC (241, 244, 247)	200	225	215	150	9/27/ RR-5
	(200	215	210	160 2/26/79)	RR-2
1RR39AD (243, 245)	3000	3180	3010	3000	RR-2 9/27/ 3/5/
1RR40AA ~~(25[illegible], 258~~,	3000	3180	3010	3000	RR-3 10/4/ 3/6/
1RR40AB (257, 261)	3000	3180	3010	3000	RR-3 10/4/7 3/4/7
1RR40AC (262, 258,	200	215	210	160	3/2/7 RR-3 10/4-7 Retest
1RR40AD (259, 263)	3000	3180	3010	3000	RR-2 3/5/7 10/4/7

Status : Sat, Meets ASME Code NB-600[illegible]

A. J. Hanson 6/29/81
USNRC 6/30/81

5. / b.

G.E

Seal Test IAW
Vendor Provided File (VPF #) 3300-111-1

Ruckter Control Tech Manual
TM .81999

Startup/Operation

5.7.3.1 thru 3.9

No. Record.

System hydro - utilized power unit to pressure thru the accuator

See Hydrostatic Test records. 5.a.

J. J. Harris
USNRC
6/24 & 30/81

Operational Test Manual

Proc

Pressure Test Simulated

1. Recirculation System I.D.

Loop A

Pump - Bingham Willamette
s/n 21018
Flow Control Valve - ITT Hammel Dahl
s/n 76 9000 001
Hyd. Actuator - Rucker Control
s/n SP 19025
Hyd. Power Unit - Rucker Control
Zimmer "A"

Loop B

Pump - Bingham Willamette
s/n 21027
Flow Control Valve - ITT Hammel Dahl
s/n 76 9000 002
Hyd. Actuator - Rucker Control
s/n SP 19028
Hyd Power Unit - Rucker Control
Zimmer "B"

Status
I.D. was visually Inspected by
NRC J.J. Harris 6/29/81

2. Visually verified hydraulic lines:

1RR39AA 1RR40AA
1RR39AB 1RR40AB
1RR39AC 1RR40AC
1RR39AD 1RR40AD

for ID and to P&ID and ISO's, verified material I.D., welds, and general piping (run) installation.

Status - Sat. , J. J. Harrison 6/29 & 30/8
USNRC

3. Inspected actuator and adjacent piping, all welds were socket weld type.

Modification had been made to GE FDDR # KN-1-299, in accordance with sketch and appeared to be acceptable.

Status - Visually Acceptable
J. J. Harrison 6/29 & 30/81
USNRC

Note: FDDR # KN-1-299 did not specifically identify what loop was damaged. Nipple pc# 31, Rucker Controls Dwg. 81999-F-402 Rev. M was broken on Loop "A" *

* Per GE, Mr T. E. Bloom 6/30/81

4. Reviewed KE-1 Weld Data sheets for Hold Points and for QC Inspection sign-offs. This included KE-2 Stores Issue forms for weld Rod Control

Problems:

- Inspection Sign-off not dated
- Missing Filler Metal Issue Slip (KE-
- Missing QAE Review
- Dates incomplete (Inspections)
- Missing Inspection Sign-off (H.P) and [illegible] for weld.
- Missing PT Reports
- final QAE not performed

J. J. Harrison 6/29/81
USNRC

Weld Data Package Review Date: 6/29/81

Dwg No. ISO-M-464.3-RR-239

Line No. 1RR39 AA 3/4"

Weld No.	0 Rev	1 Rev	2 Rev	3 Rev	Filler Metal	Insp. Review	QA & E Review	Visual	F
239-A-1	✓	OK	OK	OK	✓	2/2/79	2/6/79	✓	9/15
A-2	✓				✓ ER308			✓	9/15
A-3	✓				✓			✓	9/15
A-4	✓				✓			✓	"
A-5	✓				✓			✓	"
A-6	✓				✓			✓	"
B-1	✓				✓			✓	9/[illegible]
B-2	✓				✓			✓	9/15
B-3	✓				✓			✓ ✓	9/20
B-4	✓				✓				9/15
								✓	
C-1	✓				✓			✓	9/13
C-2	✓				✓			✓	"
C-3	✓				✓			✓	9/20
C-4	✓				✓			✓	9/13
C-5	✓				✓				"
C-									
D-1	✓				✓			✓	9/20
D-2	✓				✓			✓	9/15
D-3	✓				✓			✓	9/15

No date

Need Final Review

Weld Data Package Review   Date: 6/24/81

Dwg No. Iso-M-464-3-RR-240

Line No. 1RR39AA 3/4"

Weld No.		1 Rev	5 Rev	2 Rev	7 Rev	Filler Metal	Insp. Review	QA Review	Visual	F
240	A-1			10/5/78		✓	12/4/8[illegible]	10/26/79	✓	9/15/[illegible]
	A-2			"		✓			✓	"
	A-3			"		✓			✓	9/2[illegible]
	A-4			9/8/78		✓			✓	1/4
	A-5			"		✓			✓	"
	A-6			"		✓			✓	"
	B-1			9/8/78		✓			✓	"
	B-2			"		✓			✓	"
	B-3			9/18/78		✓			✓	1/4/7[illegible]
	C-1			9/8/78		✓			✓	1/4/79
cut	C-2		5/8/79	9/8/78		✓			✓	5/4/7[illegible]
	~~C-3~~			"		✓				1/4/7[illegible]
	~~C-4~~			"		✓				"
cut	C-5		5/8/79	9/18/78		✓				" 5/4/7[illegible]
	C-6			✓ No date		✓			✓	4/19/[illegible]
	C-7			✓		✓			✓	"
	C-8			✓		✓			✓	"
	C-9			✓		✓			✓	"
Deleted	~~D-1~~	9/1/78				✓	12/4/80		✓	9/27
	D-2				8/1/80			Need final Review	✓	8/15/[illegible]

Weld Data Package Review Date: 6/29/81

Dwg No: Iso M-464-3-RR-246

Line No. 1RR39AB 1/2"

Weld No.	2 Rev	5 Rev	6 Rev	Rev	Filler Metal	Insp. Review	QA Review	Visual	P
246 - A1	10/5/78				✓	12/8/78	2/6/79 10/20/79	✓	9/2.
A2	"				✓			✓	.
A3	"				✓			✓	
A4	9/6/78				✓			✓	1/5/
A5	"				✓			✓	"
A6	"				✓			✓	"
B1	9/7/78				✓			✓	1/5/7
B2	"				✓			✓	"
B3	9/11/78				✓			✓	"
C1	9/5/78				✓			✓	1/5/
C2	"	5/3/79			✓ ✓			✓	1/5/79 5/4/7
C3	9/5/78				✓			✓	1/5/7
C4	"				✓			✓	"
C5	9/11/78	5/3/79			✓ ✓			✓	1/5/79 5/4/7
C6	4/23/79				✓			✓	4/23/
C7	"				✓			✓	"
C8	"				✓			✓	"
C9	"				✓			✓	"
Deleted ~~D1~~									
D2			6/14/C		✓		Need final Review	✓	6/14

Weld Data Package Review Date: 6/29/81

Dwg No. ISO - M-464-3-RR-242

Line No. III 1RR39 AB 1/2"

Weld No.	0 Rev	2 Rev	Rev	Rev	Filler Metal	Insp Review	QA Review	Visual	F
242- A-1	9/14/78	OK			✓	2/2/79	2/6/79	✓	9/14
A-2	9/11/78				✓			✓	9/11
A-3	"				✓			✓	"
A-4	"				✓			✓	"
A-5	9/12/78	-						✓	9/12
B-1	9/15/78				✓			✓	9/15
B-2	9/12/78				✓			✓	9/12
B-3	9/12/78				✓			✓	"
B-4	9/20/78				✓			✓	9/20
B-5	9/13/78				✓				9/13
C-1	9/13/78				✓			✓	9/13
C-2	"				✓			✓	"
C-3	9/20/78				✓			✓	9/20
C-4	9/13/78				✓				9/13
D-1	9/13/78				✓			✓	9/13
D-2	"				✓			✓	"
D-3	9/20/78				✓			✓	9/20
D-4	"				✓		Need final Review	✓	"

Weld Data Package Review Date: 6/29/81

Dwg No. ISO M-464-3-RR-244

Line No. 1 RR 39 AC 1/2

Weld No.	0 Rev	1/2 Rev	3 Rev	Filler Metal 4/OK	[redacted]	Insp. Review	QAE Review King	Visual	P
244 - A-1	8/21/78	✓		✓		12/4/78 2/2/79 5/23/79	2/6/79 5/30/79	✓ 9/12 2/78 → ✓ 2/8/79	8/21 2/7/
A-2			✓	✓				✓	2/7/
A-3			✓	✓				✓	"
A-4			✓	✓					
cut B-1		✓ ✓		✓				✓ ✓ 9/1/78 →	9/20
B-2		✓		✓				✓	8/31
B-3		✓		✓					9/1/7
C-1		✓		✓				✓	
C-2		✓		✓				✓	8/3
C-3		✓		✓				✓	"
C-4		✓ Date		✓				✓	9/5/7
C-5		✓		✓				✓	" 8/30
D-1		✓		✓				✓	8/3
D-2		✓		✓				✓	9/1/7
D-3		✓ No		✓				✓	"
D-4		✓		✓				✓	8/31

Need final Review

Weld Data Package Review   Date: 6/29/81

Dwg No. ISO M-464-3-RR-241

Line No. 1 RR39AC 1/2"

	Weld No.	0 Rev	1/2 Rev	Rev	4X Rev	Filler Metal	Inso Review	QA Review	Visual	
241-	A-1		8/31/78				3/3/79	3/9/79	✓	9/5/
	A-2		"				12/6/79	→	✓	"
	A-3		9/1/78						✓	"
	A-4	8/28/78							✓	1/5/
	A-5	"							✓	"
	A-6	8/24/78							✓	1/5/
	B-1	8/24/78							✓	1/5/
	B-2	"							✓	"
	B-3	8/1/78								1/5
	C-1	8/28/78							✓	1/5/
cut	C-2	8/28/78	5/8/79			✓✓			✓ 5/4/79 →	1/5/7
	C-3	8/28/78							✓	1/5/
	C-4	8/28/78							✓	1/5/
cut	C-5	8/1/78	1/8/79			✓✓			5/4/79 →	1/5/
	C-6		✓			✓			✓	4/25/
	C-7		✓			✓			✓	"
	C-8		✓			✓			✓	"
	C-9		✓			✓			✓	"
	C-10		✓			✓			✓	"
	C-11		✓			✓				"
Deleted	~~D-1~~	9/1/78				✓				9/1/7
	D-2				8/14/79	✓	12/8/80		✓	8/14/

Weld Final Review

Weld Data Package Review   Date: 6/29/8

Dwg No. ISO-M-464-3-RR-243

Line No. 1RR39AD 3/4"

Weld No.		0 Rev	1 Rev	2/4 Rev	Rev	Filler Metal	Insp. Review	QA Review	Visual	F
243-	A-1		✓			✓	12/8/78-8/30/78 2/6/79	2/6/79	✓	9/8/
	A-2		✓			✓			✓	"
	A-3		✓			✓			✓	"
	A-4		✓			✓			✓	"
	A-5		✓			✓			✓	"
	B-1	8/21/78				✓			✓	
	B-2		✓			✓			✓	8/21/
	B-3		✓			✓			✓	9/11/
	B-4		✓			✓			✓	9/8/
	B-5		✓			✓				9/11/
										9/8/
	C-1		✓			✓			✓	9/8/
	C-2		✓			✓			✓	9/12/
	C-3		✓			✓			✓	"
	C-4		✓			✓			✓	9/8/
	C-5		✓			✓				"
	D-1		✓			✓			✓	9/12/
	D-2		✓			✓			✓	9/11/
	D-3		✓	8/28/78		✓✓			8/28/79	"

No Date

Need Final Review

Weld Data Package Review   Date: 6/29/81

Dwg No. ~~Iso~~ M-464-3-RR-245

Line No. 1RR 39 AD 3/4"

Weld No.	1 Rev	2 Rev	4 Rev	5 Rev	Filler Metal	Inso. Review	QA & Review	Visual	f
245 -cut A-1		10/5/78		Revised 8/27 & 28/79 8/28/79	✓ ✓	12/1/80 3/3/79 5/25/79 8/30/79	5/30/79	✓ 9/11/78 → ✓	8/7 9/1
A-2		"			✓			✓	9/21
A-3		"			✓			✓	
A-4		8/31/78			✓			✓	1/5
A-5		8/31/78			✓			✓	1/5/
A-6		8/31/78			✓				1/5/
~~A-7~~					✓				8/2
~~A-8~~									
B-1		8/30/78			✓			✓	1/5/
B-2		8/30/78			✓			✓	"
B-3		8/31/78			✓				1/5/7
C-1		8/30/78			✓			✓	1/5/
cut C-2		8/30/78	✓ ✓		✓			✓ 5/3/79 →	"
C-3		8/30/78			✓			✓	"
C-4		8/30/78			✓			✓ 5/3/79 →	"
cut C-5		9/1/78	✓		✓			✓	"
C-6			✓ ✓		✓			✓	4/19/
C-7			✓		✓			✓	"
C-8			✓		✓			✓	"
C-9			✓		✓			✓	"
Deleted ~~D-1~~	✓				✓				9/27/7
D-2				8/15/79	✓		V	✓	8/15/7

Need final Review

Weld Data Package Review Date: 6/29/8

Dwg No. Iso. M-464-4-RR-256

Line No. 1RR40 AA 3/4"

Weld No.	0 Rev	1 Rev	3 Rev	5 Rev	Filler Metal	Iso. Review	QA Review	Visual	f
256 - A-1			8/15/79		✓	12/8/80 12/15/80		✓	8/15/
A-2	8/30/78				✓			✓	8/31/
A-3		8/28/78			✓		10/26/79	✓	1/5/
A-4		8/29/78			✓			✓	1/5/
A-5		"			✓			✓	"
A-6		"			✓			✓	"
A-7		8/31/78			✓			✓	1/5/
A-8		8/30/78			✓				"
cut B-1		8/31/78		12/14/80	✓			✓ ✓	12/4 1/5/
B-2		10/9/78			✓			✓	9/8/
B-5		12/14/80			✓			✓	12/4/
B-6		9/10/80			✓		Acc. Final Review	✓	9/10/8

Weld Data Package Review Date: 6/29/81

Dwg No. ISO-M464-4-RR-260

Line No. 1RR40 AA 3/4"

Weld No.	1 Rev	4 Rev	6 Rev	7 Rev	Filler Metal	Inso. Review	QA Review	Visual	F
						10/9/78	10/10/78	✓	
260- A-1	10/9/78				✓	12/9/80	10/26/79	✓	9/5/
A-2	10/9/78				✓			✓	9/8/
A-5				12/10 12/80	✓			✓	12/12/
A-6	9/8 11/80	→			✓			✓	9/11/
A-7	9/10 10/80	→			✓			✓	"
A-8	9/8 11/80	→			✓			✓	"
A-9				12/10 12/80	✓			✓	12/1
A-10	9/8 11/80	→			✓			✓	9/11/
									"
A-11	"	→			✓			✓	
A-12			12/4 5/80		✓			✓	12/10/
cut B-1	10/9/78		12/1 3/80		✓✓			✓ 12/03/80	9/11/
cut B-2	10/9/78			12/10 12/80	✓✓			✓ 12/12/80	9/11/
cut B-3	"		12/1 3/80		✓✓			✓ 12/03/80	"
B-4	"				✓			✓	"
C-1	10/9/78				✓			✓	9/11/
C-2	"				✓			✓	"
cut C-3	"		12/8 10/80		✓✓			✓ 12/10/80	"
C-4	10/9/78				✓		Need Final Review	✓	9/11/

Weld Data Package Review   Date: 6/29/81

Dwg No. ISO-M-464-4-RR-257

Line No. 1RR40AB 1/2"

Weld No.	0 Rev	1 Rev	6 Rev	8 Rev	Filler Metal	Insp. Review	QA Review	Visual	F
257- A-1		8/16/79			✓	12/8/80 12/15/80	2/25/81	✓	8/16/
A-2	8/30/78								
A-3	8/29/78				✓			✓	
A-4	"							✓	1/5/
A-5		8/31/78			✓			✓	"
A-6	8/30/78				✓			12/4/80 ✓	"
Cut B-1		8/31/78		11/24 & 12/4/80	✓✓			✓	1/5/
B-2	✓								"
B-5				12/14/80	✓			✓	12/4/
B-6			9/14/78		✓			✓	9/14/

— stamp # written in ?

Need final Review ?

Document Review Sheet Did Not identify missing filler metal or pt records, or inprocess inspection sign-off that was written in by pen.

Weld Data Package Review Date: 6/29/81

Dwg No. ISC-M-464-4-RR-261

Line No. 1 RR40/AC 1/2" should have been AB revised on Dwg.

Weld No.	B Rev	Rev	Rev	Rev	Filler Metal	Insp. Review	QA Review	Visual	F
261 - A-5	12/11 12/80				✓	12/15/80		✓	12/12
A-9	12/11 12/80				✓			✓	"
A-12	12/3 5/80				✓			✓	12/18
D-1	12/8 10/80				✓			✓	12/8
D-2	12/3 4/80				✓			✓	12/6
D-3	12/2 4/80				✓			✓	12/6
D-4	12/11 12/80				✓			✓	12/12
D-5	12/2 4/80				✓		NEED Final Review	✓	12/6

Weld Data Package Review Date: 6/29/81

Dwg No. ISO- M-464-4-RR-258

Line No. 1RR40AC 1/2"

Weld No.	1 Rev	5 Rev	7 Rev	Rev	Filler Metal	Inso. Review	QA Review	Visual	F
258- A-1	8/10/79				✓	12/8/80 12/17/81		✓	8/10
A-3	8/30/78				✓			✓	1/5/
A-4	"				✓			✓	"
A-5	8/31/78				✓			✓	"
A-6	8/30/78				✓			✓	1/5/7
out B-1	8/31/78		11/24+12/4/80		✓✓			✓	1/5/ 12/4/
B-2	10/9/78								
B-5			12/4/80		✓			✓	12/4/
B-6		9/10+16/80			✓			✓	9/16/

Need Final Review

Weld Data Package Review — Date: 6/29/81

Dwg No. Iso. M-464-4-RR-262

Line No. 1 RR40 AC 1/2"

Weld	No.	1 Rev	5 Rev	7 Rev	Rev	Filler Metal	Insp. Review	QA Review	Visual	F
262	A-1	10/9/78				✓		2/25/81	✓	9/6/
	A-2	10/9/78				✓			✓	9/13/
	A-6		9/3 4/80			✓			✓	9/4/
	A-7		9/12 10/80			✓			✓	9/16/
	A-8		9/3 4/80			✓			✓	9/4/
	A-9			12/10 12/80		✓			✓	OK 12/12/
	A10		9/3 4/80			✓			✓	9/4/
	A11		"			✓			✓	"
	A12			12/5 [illegible]		✓			✓	12/10
	B-1	10/9/78				✓			✓	9/13/
	B-2	"				✓			✓	9/6/
	B-3	"				✓			✓	9/5/
	B-4	"				✓			✓	"
	C-1	10/9/78				✓			✓	9/7/
	C-2	"				✓			✓	9/5/
	C-3	"				✓			✓	9/13/
cut	C-4	10/9/78		12/8 10/80		✓ ✓			✓	12/10/
	E-1			12/10 12/80		✓			✓	12/12/
	E-2			"		✓			✓	"
	E-3			"		✓			✓	12/12/
	E-4			"		✓			✓	"

Reps & [illegible] original lost — ?

Need Final Review

Weld Data Package Review   Date: 6/29/81

Dwg No. Iso M-464- 4RR-259

Line No. 1 RR-40AD 3/4"

Weld No.		1 Rev	4 Rev	6 Rev	Rev	Filler Metal	Iso Review	QA Review	Visual	F
259-	A-1	8/15/79				✓	12/8/80 12/15/80	O	✓	8/15/
Deleted △3	~~A-2~~									
	A-3	8/29/78				✓			✓	1/5/
	A4	"				✓			✓	"
	A5	8/31/78				✓			✓	1/5/
	A6	8/30/78				✓			✓	1/5/
									✓	1/5/
	B1	8/31/78		11/25 & 12/4/80		✓✓			✓✓	1/5/ 12/4/
	B2	✓ O				O			✓	O
	B5	No Date		12/4/80		✓✓			✓	12/4/
	B6		9/10(?)/80			✓		NEED Final Review	✓	9/11/

Weld Data Package Review   Date: 6/29/81

Dwg No. ISO-M-464-4-RR-263

Line No. 1RR-40 AD 3/4"

Weld No.	1 Rev	4 Rev	6 Rev	7 Rev	Filler Metal	Iso. Review	QA Review	Visual	P
263- A-1	9/5/78					10/13/78	9/7/78	✓	
A-2	9/7/78	-				12/8/8-		✓	9/7/7
A-5				12/11&12/80	✓			✓	12/12/
A-6		9/5&8/80			✓			✓	9/8/
A-7		9/11&10/80						✓	
A-8		9/5&8/80			✓			✓	9/8/
A-9				12/11&12/80	✓			✓	12/12/
A-10		9/5&8/80			✓			✓	9/8/
A-11		"			✓			✓	9/8/
A12			12/4&4/80		✓				12/1/
cut B-1	9/11/78		12/1/80		✓			✓	12/3/8
B2	9/6/78			12/11&12/80	✓			✓	12/12/
cut B3	8/31/78		12/1/80		✓			✓	12/3/8
B-4	9/1/78				✓			✓	9/1/78
C-1	9/1/78				✓			✓	9/1/78
C2	8/31/78				✓			✓	"
cut C3	9/1/78		12/4&4/80		✓			✓	12/1/80
C4	9/1/78				✓		NEED Qual Review	✓	" 9/7/7

Barrett

SPINOFF ALLEGATIONS	INSPECTION RESULTS	ASSISTANCE REQUIRED
Applegate 6	Argon gas valves left open. Send confirming letter to →	Phone call. 2/6/81 1:25 P.M. CST Send letter to OSHA. to John Phillips FTS 684-2354 3784 William ~~Bill~~ Murphy Area Director U.S. Dept. of Labor Fed. Bldg. Room 4028 550 Main St. Cinc. 45202

ROUTING AND TRANSMITTAL SLIP

Date 2/7

TO: (Name, office symbol, room number, building, Agency/Post)	Initials	Date
1. Paul Barrett		
2.		
3.		
4.		
5.		

Action	File	Note and Return
Approval	For Clearance	Per Conversation
As Requested	For Correction	Prepare Reply
Circulate	For Your Information	See Me
Comment	Investigate	Signature
Coordination	Justify	

REMARKS

I've made some recommended changes to your letter to OSHA.

Looks good!

DO NOT use this form as a RECORD of approvals, concurrences, disposals, clearances, and similar actions

FROM: (Name, org. symbol, Agency/Post)	Room No.—Bldg.
Bert Da[illegible]	Phone No.

5041-102

OPTIONAL FORM 41 (Rev. 7-76)
Prescribed by GSA
FPMR (41 CFR) 101-11.206

2/6/81

Mr. William Murphy, Area Director
U.S. Dept. of Labor - OSHA
Federal Building - Room 4028
550 Main St.
Cincinnati, OH 45202

Subject: Allegation received by the U.S. Nuclear Regulatory Commission, Region III concerning the use of Argon gas at the Cincinnati Gas and Electric Co., Wm. H. Zimmer Nuclear Plant

Gentlemen:

This letter confirms the phone conversation of February 6, 1981 between Mr. John Phillips of your office and Mr. Paul A. Barrett of this office. Mr. Phillips was informed about an allegation received by the NRC, concerning the Zimmer Nuclear Plant activities, which stated:

Argon gas valves for flushing oxygen from pipes routinely are left open by the day crew, causing the night crew to be overcome by gas, a problem about which CG&E Safety Director Cummings expressed disinterest.

It is our understanding that your Department will take the necessary actions to resolve this allegation. We would appreciate receiving any documented report concerning the resolution.

If we can be of assistance, please contact us.

Sincerely,

James G. Keppler
Director

cc P.A. Barrett

Mr. William Murphy, Area Director
U.S. Dept. of Labor - OSHA
Federal Building - Room 4028
550 Main St.
Cincinnati, Ohio 45202

2/6/81

Q:00

Subject: Allegation received by the U.S. Nuclear Regulatory Commission, Region ~~III~~ concerning the use of Argon gas at the Cincinnati Gas & Electric Co., Wm. H. Zimmer Nuclear Plant.

Gentlemen:

This letter confirms the phone conversation ~~the following~~ of February 6, 1981 2/6/81 between Mr. John Phillips of your office and Mr. Paul A. Barrett of this office. ~~myself. The conversation~~ Mr. Phillips was informed about an allegation received by ~~the~~ the NRC concerning the Zimmer Nuclear Plant activities, ~~concern~~ which stated:

Argon gas valves for flushing oxygen from pipes routinely are left open by the day crew, causing the night crew to be overcome by gas, a problem about which CG&E Safety Director Cummings expressed disinterest.

It is our understanding that your Department will take ~~any~~ the necessary actions to resolve this allegation. ~~Please forward to me~~ we would appreciate receiving any documented report concerning the resolution.

If we can be of assistance, please contact us.

Paul Barrett [illegible] here 0955, then [illegible] [illegible] [illegible]

Sincerely, J.G. Keppler, Director
~~P.A. Barrett, Project Inspector~~
U.S. NRC Region III
799 Roosevelt Rd
Glen Ellyn Illinois 60137
[illegible]

SPINOFF ALLEGATIONS	INSPECTION RESULTS	ASSISTANCE REQUIRED
Applegate 13	There have been periods when there were no security surveillance cameras during nuclear fuel deliveries to the site, and perimeter security consisted for an extended period of only a four foot chickenwire fence.	1. Security staff will address this allegation, to see what requirements apply. 2/6/81 Terry Madeda ~~2. See [illegible]~~ ~~[illegible]~~ Two RIII reports exist to date. Last report in January, 1981 indicate compliance with all requirements Terry, informally writing statement on regulation about chickenwire fence + surveillance camera

SPINOFF ALLEGATIONS	INSPECTION RESULTS	ASSISTANCE REQUIRED
Applegate 14	A lax attitude toward employees behavior was evidence by complete disregard of drinking an drug use on the site, and routine hiring of temporary laborers prone to violence.	1. Interview allegers for specifics. 2. Interview craft personnel.

SPINOFF ALLEGATIONS	INSPECTION RESULTS	ASSISTANCE REQUIRED
Applegate 16	CG&E had warned PM management to silence the radiographers at Zimmer, who were criticizing CG&E's consistent approval of welds rejected by PM.	1. Interview PM management personnel. 2. Review Applegate's tape with PM official. 3. Determine if PM personnel had responsibility to read these radiographs or just shoot these radiographs. 4. Interview applicable PM radiographers. 5. Review records that reflect PM's rejection of welds and CG&E's acceptance of the same welds. Determine if these same welds are in fact acceptable or not.

SPINOFF ALLEGATIONS	INSPECTION RESULTS	ASSISTANCE REQUIRED
Applegate 17 Refer to #16	Union pipefitters and PM employees have been intimated by fear of utility and industrywide reprisals should they complain about QA practices. Do NOT need to interview any additional. A. Marc.	1. Interview PM employees on and off site. 2. Interview a representative sample of pipefitters on this issue.

SPINOFF ALLEGATIONS	INSPECTION RESULTS	ASSISTANCE REQUIRED
Applegate 19	A common "joke" among pipefitters at Zimmer is that they will be hundreds of miles away when the plant goes on line, due to their predictions of a disastrous accident.	1. Interview crafts, inspectors for any specific nuclear safety concerns. Interview all remaining QC inspectors (McCarten & Daniels both present.)

Priority 1

Kevin Ward

1. KEI knowingly installed and ripped out unsuitable main steam relief piping, at an estimated labor cost of $320,000.

Investigator Hapke

2. 2000 pound fittings were installed in 1979 on residue head valves, although 5000 pound fittings are required.

Daniels Closed

3. A radioactive waste drain is clogged with concrete which carelessly was poured into the drain.

Investigator interviews Daniels

4. A residue heat valve broke when a pipefitter bumped into it, raising new questions about the quality of metal used for valves.

Daniels Closed

5. Sensitive parts on welding rods are possibly damaged through storage at improper temperatures, and possibly lost through failure to follow proper paperwork and labelling requirements. closed

OSHA Jarrett

6. Argon gas valves for flushing oxygen from pipes routinely are left open by the day crew, causing the night crew to be overcome by gas, a problem about which CG&E Safety Director Cummings expressed disinterest. To OSHA

Ward

7. Prefabricated piping received in 1977 has defective welds, but construction supervisors told crews not to repair them because the welds were made off-site.

Have NR Index

Hapke? Ward

8. At least three sources contacted by Applegate confirmed that an estimated 20% of the plant's prefabricated welds are defective. Kellogg - supplier

5 spools fell off truck Looked at by Peabody

Hapke Erb

9. Engineering "designs" routinely are drawn after the fact to conform with piping that already had been installed. Excluding

Jarrett has one example already.

Jerry Jarrett 79-19

10. Shock-absorbing electrical tray-hangers previously found unsatisfactory are still unsafe due to faulty welds, and electrical cable trays remain dangerously full.

Hawkins NRC control — 11. Sand and mud choke the feedwater pumps and intake flues carrying makeup water to the cooling tower, because of a flaw in the plant's design. Pumps used to rectify the flaw quickly burn out. — Corrective undone.

Erb Daniels 79-29 Report — 12. A design flaw in the heat exchanger control panel permitted an operator mistakenly to force 1200 pounds of pressure through pipes only meant to handle 300 pounds, ripping the pipe and soaking electricians with a hard spray of water that would have been radioactive had the plant been in operation. — mine

Security Creed — 13. There have been periods when there were no security surveillance cameras during nuclear fuel deliveries to the site, and perimeter security consisted for an extended period of only a four foot chickenwire fence.

Daniels — 14. A lax attitude toward employee behavior was evidenced by complete disregard of drinking and drug use on the site, and routine hiring of temporary laborers prone to violence.

Daniels who fired and why — 15. Employees fired for time cheating had been cheating with the express approval of management, and the only time cheaters fired were vocal and knowledgeable critics of plant QA and safety.

Daniels — 16. CG&E had warned PM management to silence the radiographers at Zimmer, who were criticizing CG&E's consistent approval of welds rejected by PM.

Daniels — 17. Union pipefitters and PM employees have been intimidated by fear of utility and industrywide reprisals should they complain about QA practices.

OSHA Investigator — 18. A KEI employee has kept a detailed journal of safety hazards and incidents at Zimmer.

Daniels — 19. A common "joke" among pipefitters at Zimmer is that they will be hundreds of miles away when the plant goes on line, due to their predictions of a disastrous accident.

ATTENDEES AT MEETING BETWEEN MR. APPLEGATE AND HIS ATTORNEY, REPRESENTATIVES OF THE REGION III STAFF, OIA, AND IE:HQ RE: ZIMMER

James G. Keppler, Director, Region III

A. Bert Davis, Deputy Director, Region III

Robert F. Warnick, Chief, Reactor Projects Section 2B, Region III

Paul A. Barrett, Project Inspector/Zimmer, Region III

James B. McCarten, Investigator, Region III

Arthur A. Schnebelen, Special Assistant to Director, OIA/NRC

Edward C. (Ted) Gilbert, Investigator, E&I Staff, NRC

John F. Streeter, Acting Staff Director, Enforcement and Investigation, Region III

DDC -

SIS - DDC - # 571 Rev. 3
2/22/81
para. 1.1.14
$\frac{1}{8}$" less than
S&L - DDC on burning bolt holes

Must consider weight of all trays on hanger

Yellow

Control tray 1104B Chosen for high Index and different area [illegible]

Cable #	Type # / tab
~~[illegible]~~	
AP079	12126
AP080	12126
AP081	12126
AP166	12126
AP167	04106
AP168	04106
AP170	12126
AP171	04106
AP172	"
AP432	12126
AP504	04106
AP505	"
508	"
540	"
541	"
542	"
762	"
CM011	10126
DG022	12126
DG029	"
DG034	"
DG185	07126
IN032	12126
035	"
036	"

Tray 1104B

LC011	10126
015	12126
019	"
022	"
025	"
029	"
033	"
036	"
040	"
044	"
047	"
051	"
055	"
057	~~[illegible]~~ 07126.
060	~~[illegible]~~ "
062	"
064	"
LL192	02126 - Jul pull card
NB200	04126
202	"
210	"
223	"
229	"
230	"
231	"
232	"
233	"
234	"

Tray 11048

NB 235	04126
236	"
237	"
238	"
239	"
254	"
258	"
261	"
265	"
269	"
271	"
272	"
273	"
275	"
276	"
277	"
279	"
285	"
286	"
287	"
288	"
289	"
290	"
291	"
292	"
297	"
299	"
301	"

Tray 1104B

NB 302	04126
303	"
304	"
305	"
306	"
307	"
308	"
309	"
310	"
316	"
317	"
318	"
319	"
334	"
PC 013	07126
RE 055	02126
RF 128	02126
VR 018	10126
VA 019	02126
020	"
024	"
VC 023	07126
024	"
025	"
062	10126
119	"
120	"
121	"

Try 1104B

VC 122	07126
123	"
127	02126
230	04126
265	07126
VD 014	12126
VG 020	"
028	10126
032	"
081	"
082	12126
084	10126
085	10126
152	04126
170	"
171	"
VH 030	12126
040	04126
VP 022	12126
030	"
050	"
057	02126
132	12126
136	"
144	"
148	"

Tray 1104B

VQ014	10126
022	02126
030	12126
031	"
082	07126
083	"
084	"
VR030	12126
VR058	07126
VX019	12126
VX051	07126
VX052	"
VX072	04126
VX128	02126
VX156	"
VX130	"
VY014	07126
VY015	"
VY019	12126
027	"
039	04126
043	"
056	07126
057	"
WR011	12126
WS142	07126
143	02126
144	07126

t-wy 1104B

WS 145	02126	
210	12126	-
212	12126	
213	"	
215	"	-
216	04126	-
217	"	-
218	"	-
222	04126	
313	03091	, KV
316	07126	

SPINOFF ALLEGATIONS	INSPECTION RESULTS	ASSISTANCE REQUIRED
Applegate 10	It was alleged that shock-absorbing electrical tray hangers previously found unsatisfactory are still unsafe due to faulty welds, and leectrical cable trays remain dangerously full. Check std tray load schedule	1. Addressed in an inspection 7919. 2. Review recent NR's on electrical cable trays to determine if problem ~~is continuing.~~ 3. Take worst case if different than what J. Hughes reviewed -- verify adequate design + compliance with that design. 4. Shapker to inspect sample welds. 5. Make random field check

ATTENDANCE RECORD

NRC INSPECTION MEETING

XXXXXPOSTXXXXXXXXXXXXXXXXXX

DATE: March 20, 1981 TIME: 9:30/Board Room

G.T. cpy B. Ehas

NRC Post Inspection Meeting

	NAME	TITLE	COMPANY
*	1. C.J. HALE	CHIEF, REACTOR SYS SECT.	NRC; RIV; VIB
	2. J. T. YIN	Reactor Inspector	NRC: RIII
*	3. P.A. Barrett	" "	"
*	4. RF Warnick	Chief, Reactor Projects Sect	NRC - RIII
*	5. D.C. McCLINTOCK	MGR. ELECT. DEPT.	S&L
	6. J.M. McLAUGHLIN	MGR STR. DEPT	S&L
*	7. W A Chittenden	Dir. of Engrg	[illegible]
	8. J.C. LaVALLEE	PROJECT MANAGER	S&L
*	9. R.F. SCHEIBEL	PROJECT DIRECTOR	S&L
	10. R.C. Petterson	SENIOR PARTNER	S&L
	11. L.E. ACKMANN	DIR OF SERVICES	S&L
*	12. W.G. HEGENER	MGR. MECH. ENGR. DEPT.	S&L.
	13. H.H. SROKA	PROJ. DIRECTOR - CLINTON	S&L
	14. R. J. MAZZA	PROJ. DIRECTOR-[illegible]	S&L
*	15. RP EHAS	Sr QA ENGR	CINTI G+E Co
*	16. R.J. REIMAN	SR Elec. Power Plant E.	" " [illegible]
	17. E.V. ABRAHAM	PROJECT DIRECTOR	S&L
*	18. AP GILLIS	ADMIN. ASST QAD	S&L
*	19. [illegible]	ENGINEER [illegible]	[illegible]
*	20. R J Prusk	Project Manager - Zimmer	S&L
*	21. R X FRENCH	ASST. MGR. - ELEC. DEPT.	S&L
*	22. J.E. McFARLAND	HEAD, QA DIV.	S&L
	23.		
	24.		
	25.		

* PRESENT FOR 10:00 AM MEETING ON REGION III FINDINGS

Shimming of the penetrameter 4/30/81

NAME	ORGANIZATION	POSITION
Richard Jagger	Nat'l Bd. Blr. P.V. Insp.	Asst, Dir. of Insp.
Don Milan	State of Ohio	Chief Insp.
Paul A. Barrett	NRC/RIII	Zimmer Principal Insp.
David Pitcairn	NURECH	Chief Consultant
D. J. Frederick	CG&E Co.	GED-Mech. Engr.
L. Ludwig	NES	Rt Level III
G. T. Hamilton	NES	Jr. V.P.
R. F. Reedy	NUTECH	Chief Consultant
W. W. Waymire	CG&E	Mgr. Gen Engrg.
W. W. Schwiers	CG&E	Mgr. QA
B. K. Culver	CG&E	Mgr. Generation Constr.
R. H. Wertz	H.S.V.I & I.Co.	Mgr. A.N.I. of P.P.P.
D. R. Young	G,S.B.I.&I. Co.	Mgr. SIS & ANIS
E. F. Gerwin	Pullman Power Prod.	V.P. QA
M. E. Schuster	Sargent & Lundy	Asst. Head. Q&C Div.
J. F. Schapker	NRC/RIII	Reactor Inspector
K. D. Ward	NRC/RIII	Reactor Inspector
D. H. Danielson	NRC/RIII	Chief, Reactor Proj. Se
R. F. Warnick	NRC/RIII	Chief, Reactor Proj. Se
H. W. Roberds	NRC/RV	Contractor Insp.
T. Daniels	Pullman Power Prod.	Director, QA
A. Bair	Pullman Power Prod.	Manager, QA
R. Burns	NES	Gen. Mgr. Const. Serv.
E. Knox	Kaiser Engineers	Corp. QA Manager
M. F. Rulli	CG&E	NF&AER, Nuclear Eng.
J. D. Rudins	Sargent & Lundy	QC Eng., SNT-TC-IA III
F. T. Daniels	NRC/RIII	SRI-Zimmer

4/30/81

Interim
Exit 2/13/81

Attendees	Organization
T.P. Gwynn	NRC - RI
F.T. DANIELS	NRC - SRI
C.M. Erb	NRC - Const. RIII
J.F. Schapker	NRC - IE RIII
K.D. WARD	NRC RIII
P.A. Barrett	NRC RIII
R P Elhar	CG+E QA
W.B. MURRAY	CP+E GC.
W.W. SCHWIER	CG&E QA
J.B. McCARTEN	NRC-RIII

INSPECTION PLAN

Facility: Zimmer Scheduled Date(s): 2/9-13/81

Inspector: Barrett, McCarten, Shepker, Erb, Ward, and Davis

Announced/Unannounced; Routine/Special; Location: Moscow, O.

Motel/Hotel: Hilton Town/City: Sharonville, O. Telephone: 513 563-6330

Item No.	Inspection Description (Procedure No. and Paragraph)	Requirement
1	Entrance/Exit	30703B
2	Independent Investigations	92706 B
	1) Applegate	
	2) McCarten	
	3) Specific allegations from 1) + 2)	

Plan Prepared By: Date:

Reviewed By Project Inspector: R.G. Barrett Date: 2/5/81

Plan Approved By: [illegible] Date: [illegible]

INSPECTION PLAN
Report 81-02 extended

Facility: Zimmer Scheduled Date(s): 1/27-30/81

Inspector: R.A. Barrett

Announced/Unannounced; Routine/Special; Location: Moscow, O.

Motel/Hotel: ______ Town/City: ______ Telephone: ______

Item No.	Inspection Description (Procedure No. and Paragraph)	Requirement
1	Entrance / ~~Ext~~ Exit	30703
2	Independent Inspection	92706
	Applegate Allegations	

Plan Prepared By: R.A. Barrett Date:

Reviewed By Project Inspector: Date: 1/23/81

Plan Approved By: RC Knop Date: 1/23/81

e. Bristol Steel Erection Reports did not identify specific inspection details such as the welder, the weld rod used, or the weld procedure followed.

f. Several reports documenting apparent nonconforming conditions were identified with control numbers and not retained for disposition; some nonconformance reports were voided without detailing the specific justification for the disposition; some nonconformance reports were closed or voided without completing the entire disposition; and some nonconformance reports were dispositioned without adequate justification.

Surveillance Report #/date	Nonconformance Description	Disposition / date & Dispositioner
2899 12/13/80	Bolt torque verifications missing on approximately 10% of the attachments in various areas because torque wrench would not fit on painted bolts.	Accept-as-is based on a rejection rate of less than 1% on other attachments in these areas / 1/15/81 / Dispositioner was SWS? SEL. The disposition dated 1/15/ was not made by SEL by K not SEL.
2903 1/14/81	QA verification of weld fitup, tack welding, and 60°F preheat for two welds was missed.	Accept-as-is based on normal ambient temperature and acceptance of fitup by the Authorized Nuclear Inspector based on radiographs taken of 20 out of 400 welds. Disposition

Note many of the above SRs addressed several different items, each of which would require corrective action.

1) Accepted by QA (specified disposition was not defined)
2) Transferred to the nonconformance system with control number
3) Dispositioned without design control measures commensurate with the original design
4) not dispositioned missed 30 day requirement

~~Rs.~~ 2914 (1/15/81)	~~[illegible]~~ Final NDE (MT) hold points bypassed --	~~ex~~ accepted as is based on other tests (VT and Root MT) 1/23/81
F-2941 1/23/81	Junction box not supported; bolt fails to torque; 2 hole ~~[illegible]~~ strap bolt failure; hangers exceed 1/32" gap;	accepted on 2/12/81; disposition not documented
F-3070 3/24/81	Bolt spalled ~~and~~ repaired without verification	No disposition, not transferred to a ~~[illegible]~~ NR as of 8/12/81
F-3071 3/24/81	Elongated holes in baseplate	No disposition; not transferred to a NR as of 8/12/81
F-3072 3/24/81	" " " "	"

McCarten/Dearfoine

I. Allegation 7

"Prefabricated piping received in 1977 has defective welds, but construction supervisors told crews not to repair them because the welds were made off-site."

II Findings

This allegation is substantiated in part. The pipe pieces in question were identified as the Main Steam Relief pipe pieces which were ~~delivered to~~ received ~~on~~ at the site on ~~June 29, 1979~~ July 3, 1979. ~~and for which~~ A nonconformance report was written to document that the pipes had been dropped after the pipes had been improperly delivered to the site. Region III Report No. 50-358/80-09 found that Kaiser had released the MSR spool pieces for installation before their acceptability had been established. ~~and therefore~~ The licensee was found in noncompliance with 10 CFR 50 ~~Appx.~~ APPENDIX B, Criterion XV, AND Kaiser Quality Assurance Procedures No. 16 as identified in Inspection Report No. 80-09. ~~However, the allegation that the welds on the aforementioned pipes were defective is unsubstantiated, because~~ The pipes were ultrasonically examined on April 25, 1980 and found to be acceptable. ~~One item of noncompliance with NRC requirements was identified, for which the licensee had been previously cited in Inspection Rpt. No. 50-358/80-09.~~

III Investigation

A. Background Information

The following summarizes the initial investigation, applicable to this allegation, as documented in IE Report 80-09.

July 3, 1979

On ~~June 29, 1979~~ Pullman Power Products, Williamsport, Pennsyl-

McCartea/~~Gassafonia~~

Welds to be removed. Rem

vania also known as M. W. Kellogg Company, delivered five prefabricated pipe sections to the site for installation in the Main Steam Relief System, a safety-related system. The pipes were received on ~~June~~ July 3, 1979, AND ~~in a~~ a nonconformance report, IE-1911 ~~which~~ was written on ~~June~~ July 5, 1979 stating the spools ~~were~~ HAD "rolled off ~~the~~ THE truck onto the ground and struck other spools." The ~~effect~~ nonconformance report had the effect of placing the pipe spools in a hold status in the Kaiser warehouse. The welds on the five pipe sections were later ~~eventually~~ radiographed. ~~and defective welds were found on 3 of the 5~~ "The radiographs displayed apparent ~~weld~~ discontinuities

rejectable indications in welds on three of the five spool pieces. ~~However, despite the issuance of the nonconformance report,~~ on September 18-28, 1979, with disregard for the nonconformance report the pipe pieces were released to construction and installed. As documented in ~~In~~ Region III Investigation Report No. 50-358/80-09 ~~was found that~~ the licensee ~~was~~ found to be in noncompliance with NRC requirements for the release of the pipe pieces. However, during April 1980, the pipes were ultrasonically examined and the welds were found acceptable.

Goes in C.

B. Personnel Interviews

On April 24, 1981 Individual "A", who was previously interviewed by representatives of GAP was interviewed and stated ~~that~~ he had provided ~~the~~ information to GAP regarding this allegation. Individual "A" stated ~~that~~ when he SPOKE TO GAP ABOUT THIS ALLEGATION ~~was referring to the prefabricated pipe section having defective welds yet being installed by construction~~ ~~THAT WERE~~, he was referring to ~~5~~ FIVE prefabricated pipe pieces manufactured by Kellogg Inc. ~~which was delivered to the site on July 19, 1981~~ which and ~~which~~ fell off the truck" during their delivery TO THE SITE. Individual "A" stated

The RIII position concerning the radiographs taken of the spool pieces, is that radiography was not the ~~proper~~ suitable NDE process which would accurately display subsurface weld indications. The investigation and a radiologic image revealed the spool pieces would prevent accurate display of weld indications on the radiographs because of the geometric set-up of the radioactive source and film in relation to the spool pieces. The weld indications, a nonconformance report was then written on the pipes, and PM radiographers when they examined the pipes found defective welds on some of the pipes, "A" said construction installed the pipes in the plant disregarding PM's finding on the welds in question.

On April 22, 1981 Individual "A" provided a written statement attesting to the aforementioned information, however he requested the statement not be attached to this report.

On February 24, 1981 David Hang, former Level II Radiographer, PM, was interviewed and stated in August 1979 Anthony Pallon, KEI Welding Engineer, asked him to radiograph MSR pipe pieces which had fallen off the truck upon delivery to the site. Hang said the exam was to determine if any of the pipe welds had cracked during the fall. Hang stated he found welds on three of the five pipe sections examined to have unacceptable indications. He said he reported this in his Report of Radiographic Examination to Pallon and told Pallon at that time radiography was the wrong technique to use to examine pipe welds in this configuration. Hang said he told Pallon an ultrasonic examination should be performed in this case. Hang also stated in April 1980, the pipes were ultrasonically examined and the welds were found acceptable.

C. Record Reviews

On February 24, 1981 Kavin Ward, Inspector NRC, reviewed ultrasonic examination reports for the prefabricated pipe pieces numbered 1MS11B12-7BH, 1MS10BA12-1CH and 1MS08BB12-6B. These reports reflect that Pullman Kellogg, Inc. examined the aforementioned pipes on April 28, 1980 and found the welds acceptable. In addition, on April 25-18, 1980 Peabody Magna-flux

~~Services~~ ALSO ultrasonically examined the same pipe pieces and ~~also~~ found the welds ~~to be~~ acceptable.

D. Field Observations

~~None~~

On 2/24/81 the RIII inspector made visual examination of the welds on Cell 5 spool pieces. The inspector identified no unacceptable ~~surface~~ weld surface discontinuities.

E. Acceptance Criteria

It was established that Kaiser had installed the aforementioned pipe pieces in violation of NRC requirements. However, it was later found that the welds on the ~~aforementioned~~ pipes ~~sections~~ were acceptable. Therefore, these allegation is substantiated in part, because pipe pieces were installed ~~when~~ AFTER allegedly defective welds ~~were~~ WERE identified on them, even though the welds were later found to be acceptable.

WARP ~~[illegible]~~ also stated in April of 1980 he reviewed the radiographs for these pipe pieces and found the geometric configuration of the weld distorted the view of it on the radiograph. This resulted in unacceptable indications appearing on the film, however the technique was wrong and ~~[illegible]~~ he concurred the pipes should be ultrasonically examined [illegible] radiographed.

On April 8, 1980, it was established that these spool pieces had been installed and no "Hold" tag or "Deficiency" tag had been placed on them. This is in noncompliance 10 CFR 50, Appendix B, Criterion XV, and KEI Quality Assurance Procedure No. 15, 8--09-?

It was ascertained that the spool pieces had been released from the warehouse on the basis of a later version of NR E-1911 Rev. 2 on which the above-mentioned notation referencing NR E-1997 had been lined through on September 14, 1979. A copy of this version of NR E-1911 Rev. 2 is attached to this report as Exhibit M.

It was determined that the QA Document Control Supervisor had lined out the notation. He indicated that he had heard that NR E-1997 was being voided so he felt there was no point in it being cross-referenced any longer on NR E-1911 Rev. 2. The supplier QA man in the warehouse indicated to him that some pressure was being felt from construction to get the spool pieces released. The Document Control Supervisor informed the warehouse that NR E-1911 Rev. 2 had been closed out and it was all right to release the spool pieces. He said this was done on the assumption that what was considered to be a paper problem would be cleared up. The Document Control Supervisor as well as other site personnel indicated the acceptability of the spool pieces was regarded as a paper problem rather than a real problem. It was indicated that the probability of actual damage to pipes of that size and wall thickness due to mishandling upon delivery was extremely remote. NRC agrees extremely remote.

The supplier QA man advised that the spool pieces were released from the warehouse on the basis of the version of NR E-1911 Rev. 2 which had the reference to NR E-1977 lined through (Exhibit M). He indicated that the Document Control Supervisor was instructed to line through the notation by a CG&E official. The latter individual, however, denied any recollection of having given that instruction. The improper close out of NR E-1911 Rev. 2, which resulted in the release of spool pieces for installation before their acceptability had been established is in noncompliance with 10 CFR 50, Appendix B, Criterion XV, and KEI Quality Assurance Procedure No. 16. (80-~~[illegible]~~) 09-02

On April 23, 1980, Deficiency Tags were placed on the spool pieces and during the period April 25-28, 1980, Peabody personnel performed magnetic particle and ultrasonic inspections of the welds in question. Only the 3 The reports of these inspections were reviewed and the Peabody Inspectors performing these examinations were interviewed on May 1, 1980. The Peabody personnel stated that they had concluded on the basis of these examinations that the spool pieces were acceptable. It was also ascertained that on April 28, 1980, Pullman personnel visited the Zimmer site and also performed ultrasonic inspections of the welds. On the basis of these examinations, Pullman provided a statement to CG&E that these welds were acceptable. Peabody personnel advised that they had observed the examinations performed by Pullman and they agreed with the results.

& did welds look at the Pullman report.

Q-1

#7

Clarify statement in new report, that only visual inspection was necessary & UT + MT did not have to be performed on the 3 originally accepted pieces.

SPINOFF ALLEGATIONS	INSPECTION RESULTS	ASSISTANCE REQUIRED
Applegate 7	Prefabricated piping received in 1977 has defective welds, but construction supervisors told crews not to repair them because the welds were made off-site.	1. Identify pipe. 2. Review radiographs of the pipe. 3. Review applicable NRs. 4. If radiographs unavailable, take sample visual.

P. Barret

KE-2 9/79 ⇒ 10/79

Reviewed for evidence of falsification of 9 + 10

DWG	#	
KE-2		9/79
PSK-1HG-11	- 186553	
	" 4	
	198846	
	" 7	
PSK-1HG-1	-196277	
	" 6	
M462-1-HG-1	198800	
	198797	
PSK-1MS-34	185819	10/79
	185843	
	185841	
	185818	
	185763	
	185856	
	185864	
1MS-37	195934	
1MS 36	196329	9/79
1MS 37	195868	10/79
1MS 36	196359	9/79
"	196330	"
1MS 35	186618	10/79
1MS 35	186619	10/79
M-471-12-RR(93)	195134	10/79
"	188597	10/79
" -(99)	195130	10/79
"	195138	"
"	188595	"

2. Weld$SRod$SPaperwork$Sand$SLabeling$SRequirements$U

The paperwork used to account for weld rod was the KEI-2 form (weld rod issue slip). The KEI-2 form required the welder's, the welder's foreman, and the weld rod issuer's signatures, which permitted the welder to obtain weld rods for a specific weld from the rod shack (field so<toreroom).

Insert

~~The RIII inspector reviewed approximately 15 KEI-2 forms for the September - October, 1979 period (including the evening shift) and approximately 20 additional KEI-2 forms dated in 1978.~~ All of these KEI-2 forms were signed (usually by initials or mark) in the space designated ~~by~~ the rod issuer which indicated that the respective welding rods had been properly accounted by the assigned construction (non-Quality Control, non-QC) personnel. The RIII inspector could not determine if the above KEI-2 forms were for day shift or evening shift activities. None of these KEI-2 forms appeared to be falsified. The RIII inspector reviewed several other KEI-2 forms of different time periods to compare the consistency of signatures and the types ~~in~~ of inks used.

¶ The KEI-2 forms required no QC signatures and were therefore not QC records which would signify QC verifications that the correct weld rods were used. The QC verifications of weld rod were required to be made at the place and time of the actual weld activity and documented on the KEI-1 forms (weld inspet<ction records).

The RIII inspector ~~was~~ reviewed the following KEI-2 forms for evidence ~~of falsification and/or indications~~ ~~that~~ that indicated the weld rods ~~was~~ had not being properly accounted for or the KEI-2 forms ~~were~~ had be falsified.

KEI-2 #	Weld Drawing #	Rod Issue Date
136553	PSK-1HG-11	Sept. 1979
136554	"	"
133846	"	"
133847	"	"
136277	PSK-1HG-1	"
136276	"	"
138900	M462-1-HG-1	"
138787	"	"
135819	PSK-1MS-34	Oct., 1979
135843	"	"
135841	"	"
135818	"	"
135763	"	"
135856	"	"
135864	"	"
135934	1MS-37	"
136329	1MS-36	Sept., 1979
136354	"	"
135 [illegible]	MS-37	Oct. 1979
136332	1MS-36	Sept., 1979
136613	1MS-35	Oct., 1979

Dwg.	KE-2 #	Date
M 471-5-RR-207	198958	9/5/79
"	198957	"
~~"~~	~~216924~~	~~10/80~~
M 471-4-RR-170	196314	10/79
"	196436	10/79
PSK WR-37	105242	10/77
M-148-WR-40	198973	9/79
"	198784	9/79
"	198972	"
1SK-M-447-WR-75	185910	10/79
1SK WR-53	195843	10/79
"	195844	"
M-447- "	195859	10/79
"	195860	"
PSK-1WS-71	194906	10/79
PSK 1WR-06A14	170145	10/79
PSK WR-9-	199448	"
PSK - 1WR-80	199651	9/79
M 148-WR-41	185884	10/79
" -42	186707	"
M 447 -WR-71	195853	"
PSK WR-45	186632	"
M 447 WR-49	185917	"
PSK 1WR- 47	195758	"

186619	1MS-35	Oct., 1979
195134	M-471-12-RR (93)	"
133597	"	"
195130	M-471-12-RR(93)	"
195139	~~M-471-12~~ "	"
133595	"	"

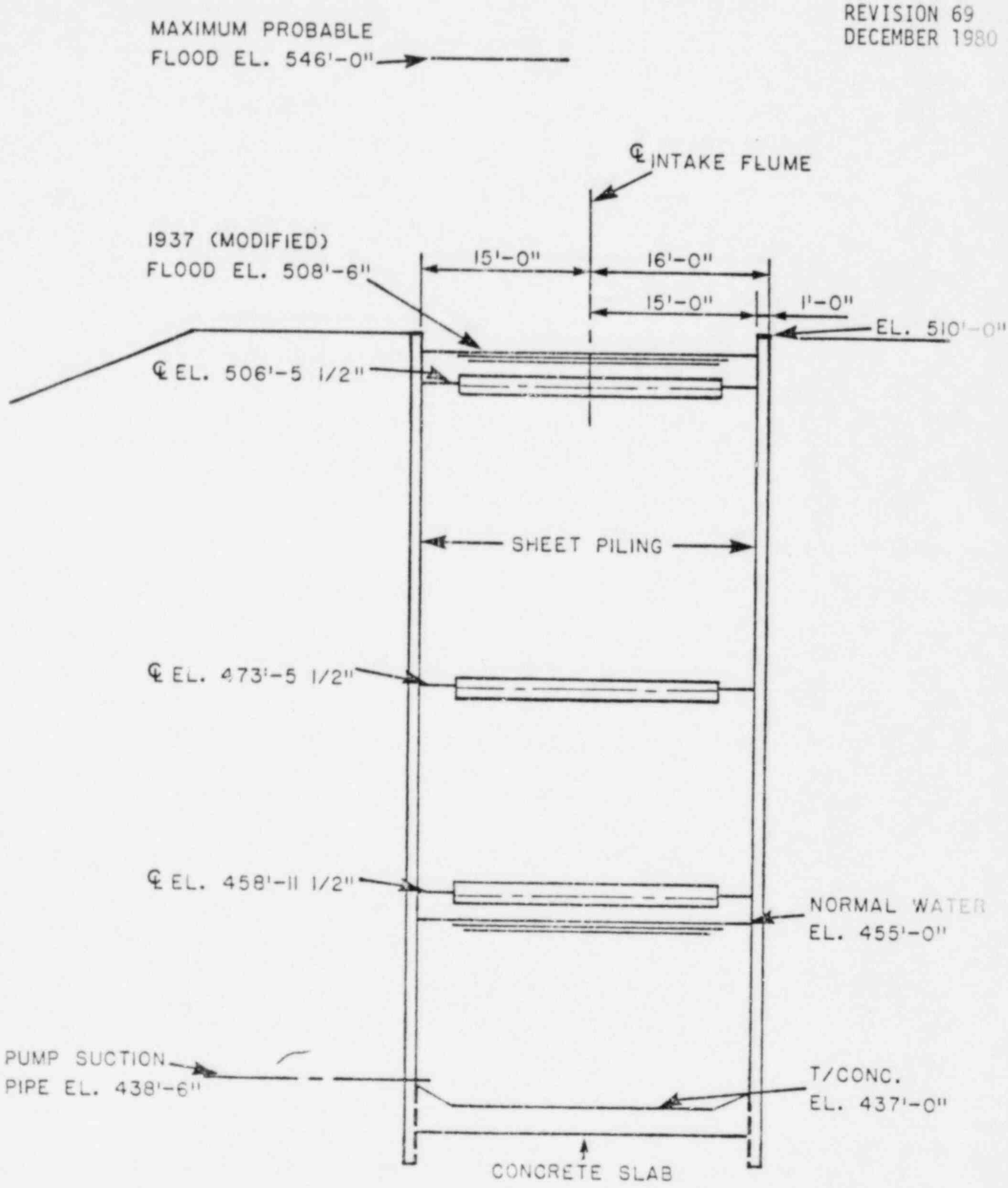


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FIGURE J.8-1

INTAKE FLUME (SECTION)

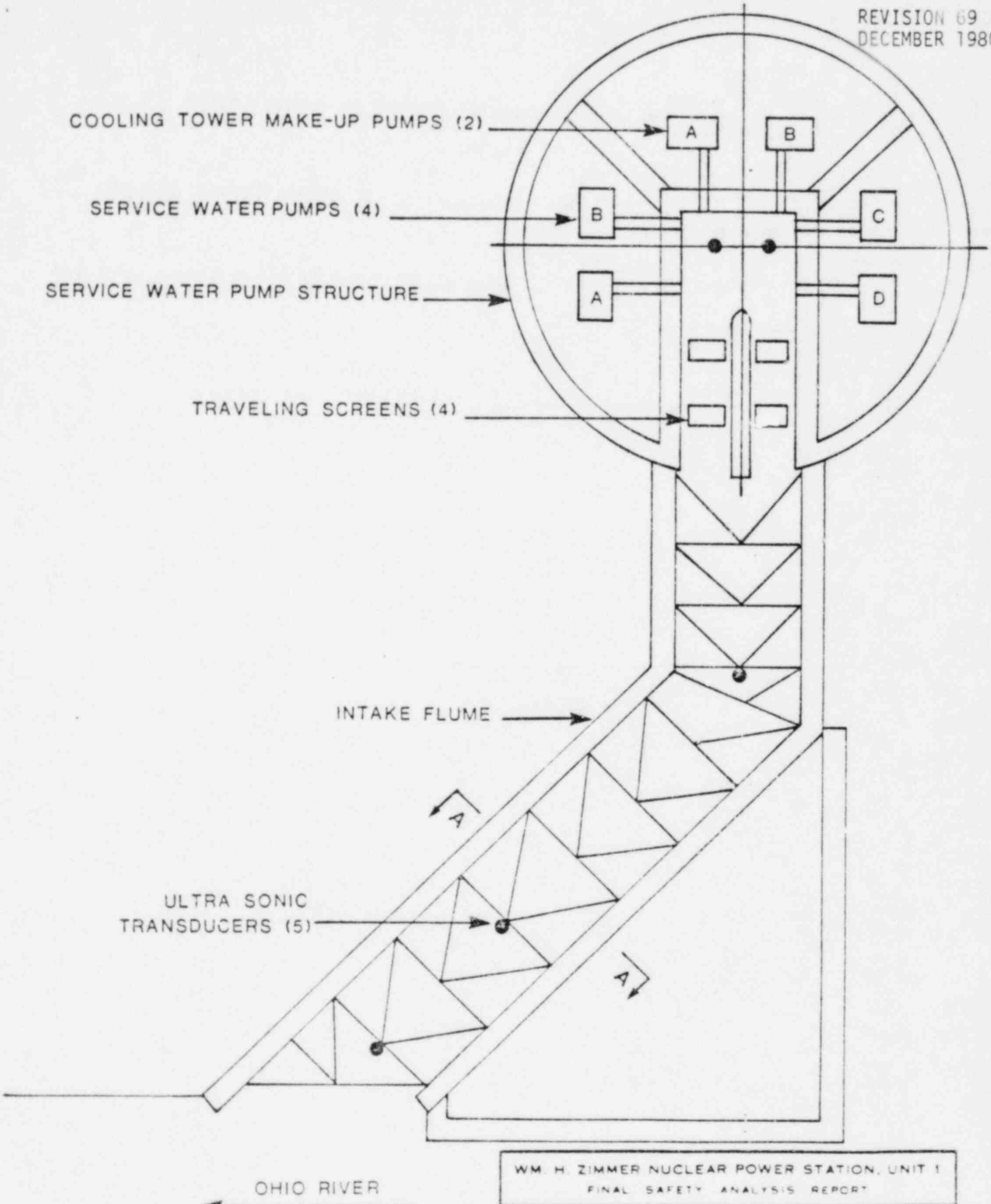

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FIGURE J.8-2

LOCATION OF TRANSDUCERS

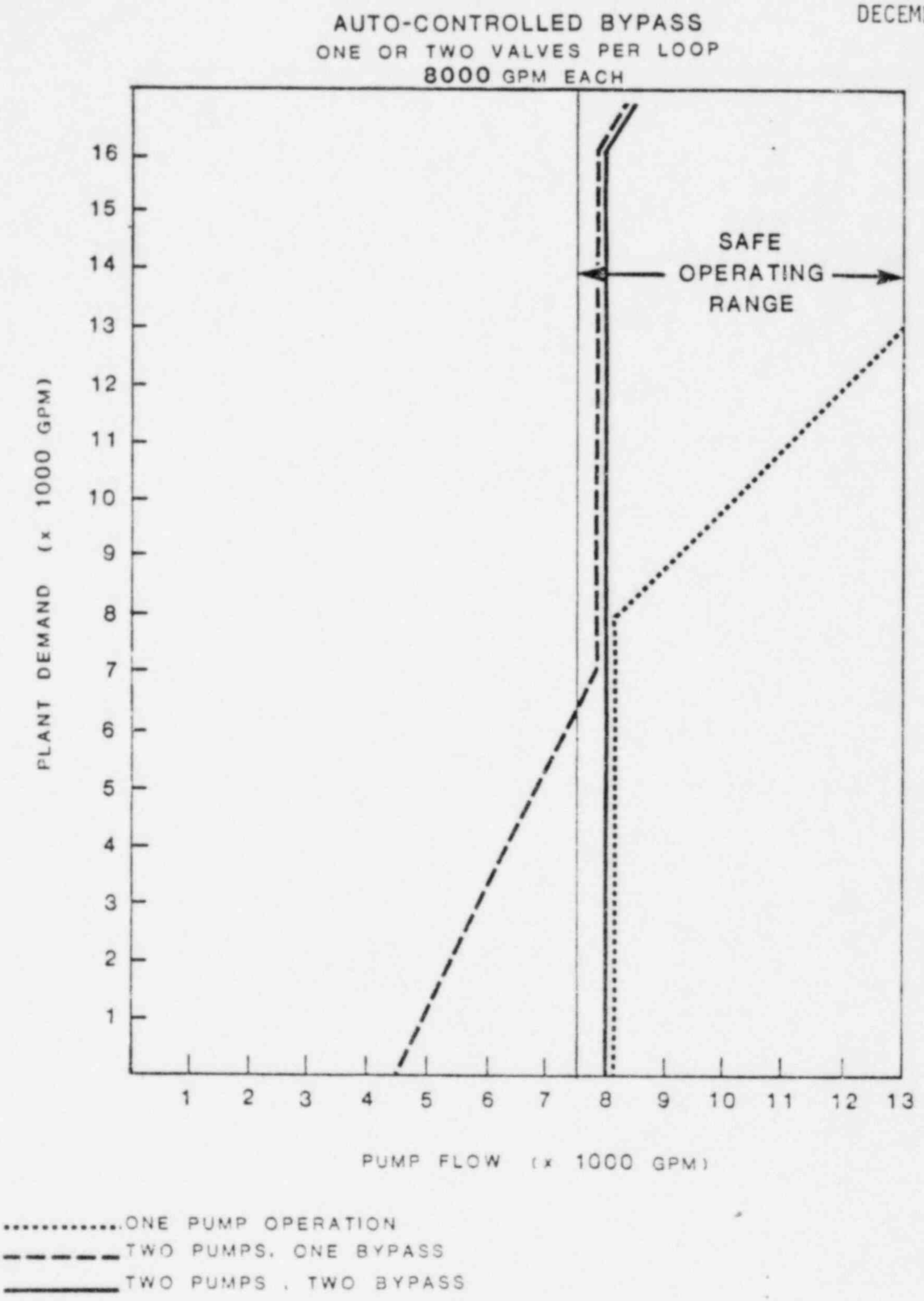

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FIGURE J.7-2

ANTICIPATED OPERATING CURVES

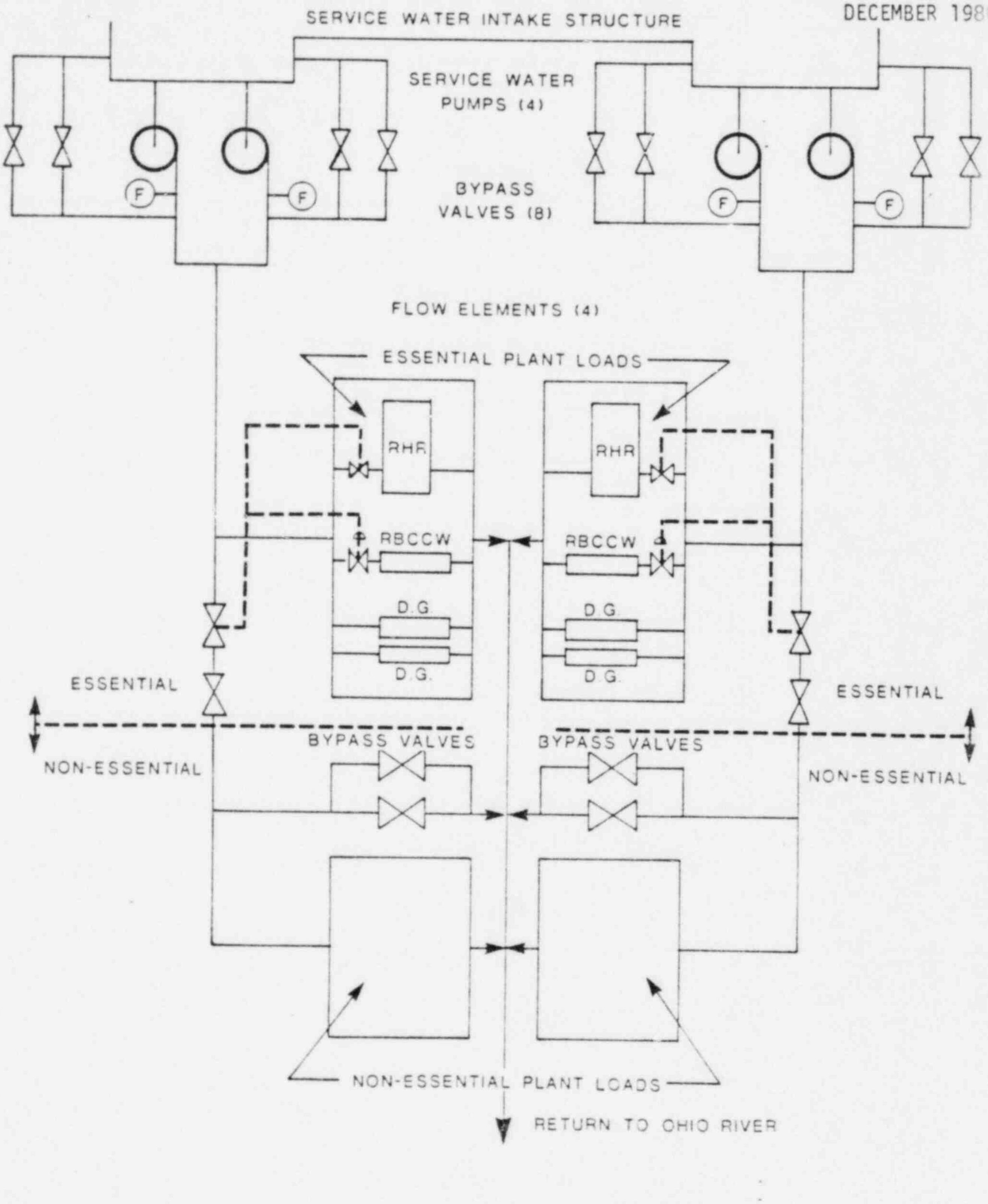

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FIGURE J.7-1

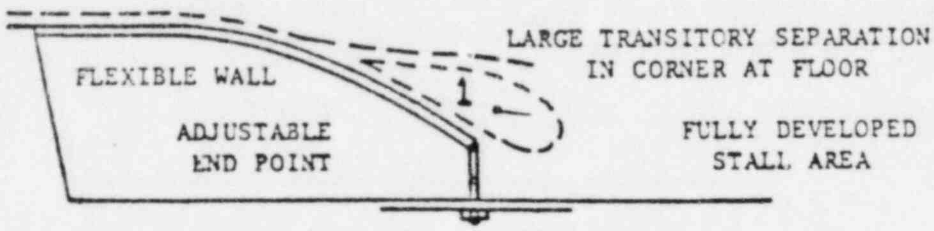
SERVICE WATER SYSTEM SCHEMATIC

TABLE J.7-1

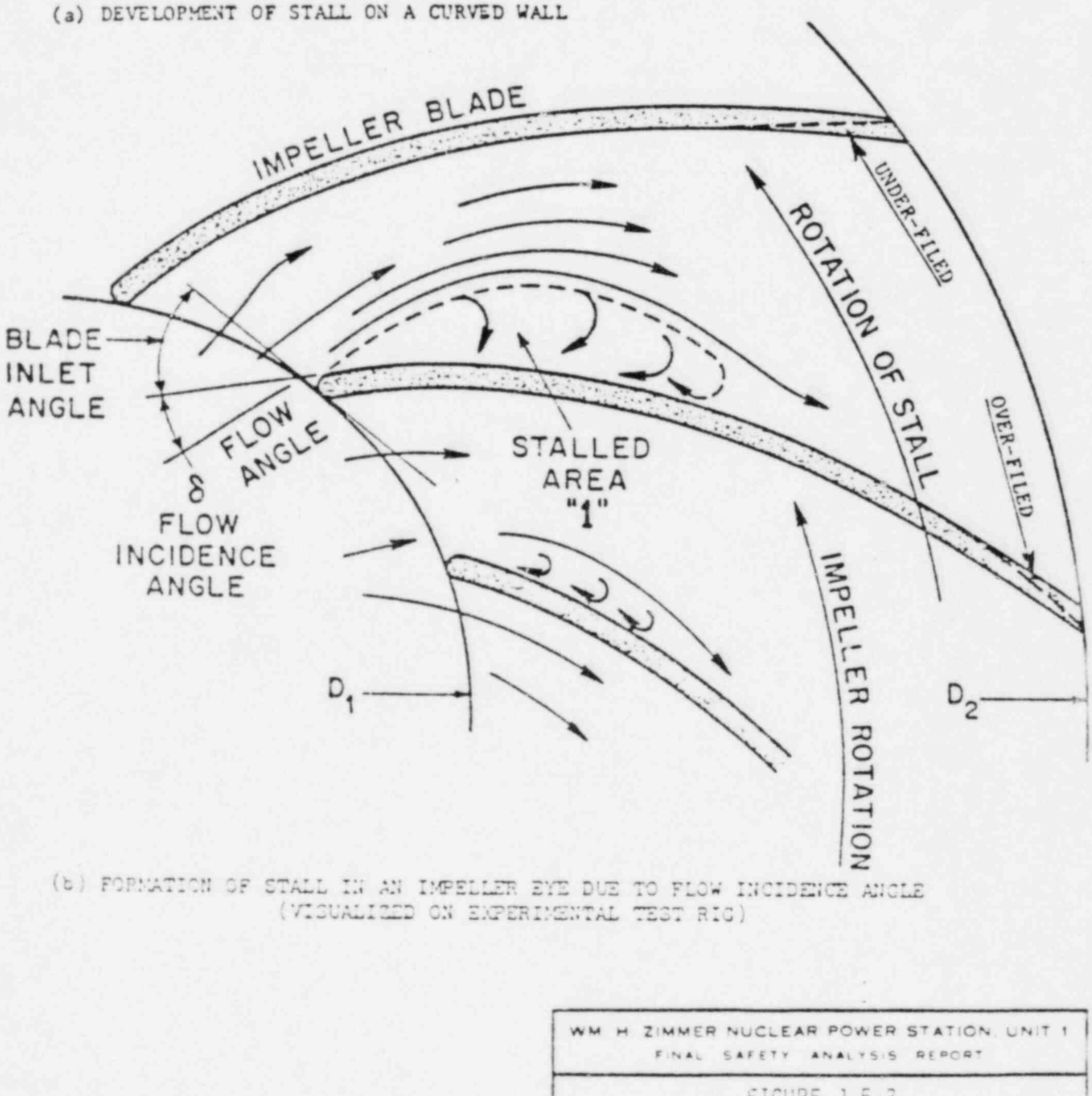
SERVICE WATER MINIMUM FLOW SYSTEM

ESSENTIAL VS. NONESSENTIAL

LOCATION	ESSENTIAL PUMP DISCHARGE AT SW STRUCTURE	NONESSENTIAL TURBINE BUILDING
Capacity Per Pump	8000 gpm	8000 gpm
Class of Valves and Piping	Section III	ANSI B31.1
Piping Modifications	Major Revisions and Additions To Section III Piping	Bypass Valves Added In Non-Essential Piping.
Physical Space for Valves and Piping	Difficult Arrangement Due to Lack of Physical Space and Requirement for Maintaining Water Tight Rooms	More Space for Pipe and Valves
Providing Water to Essential Equipment	Valve Must Close to Ensure Adequate Flow to Essential Equipment	Nonessential Portions of System Are Isolated. Flow To Essential Components Ensured
Type of Minimum Flow Control	Electric Motor-Operated Open/Close Valves Since No Essential Air System	Air-Operated Valves Can Be Modulated
Number of Minimum Flow Valves Per Pump	Two 4000 gpm Valves	One 8000 gpm Valve
Failures		
Fail Closed	Automatic Flow Control Not Ensured	Automatic Flow Control Not Ensured
Fail Open	Partial Loss of Service Water	Nonessential Portion Isolates On Low Header Pressure



(a) DEVELOPMENT OF STALL ON A CURVED WALL



(b) FORMATION OF STALL IN AN IMPELLER EYE DUE TO FLOW INCIDENCE ANGLE
(VISUALIZED ON EXPERIMENTAL TEST RIG)

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FIGURE J.5-3

FORMATION OF STALL ON CURVED WALL AND IN IMPELLER EYE

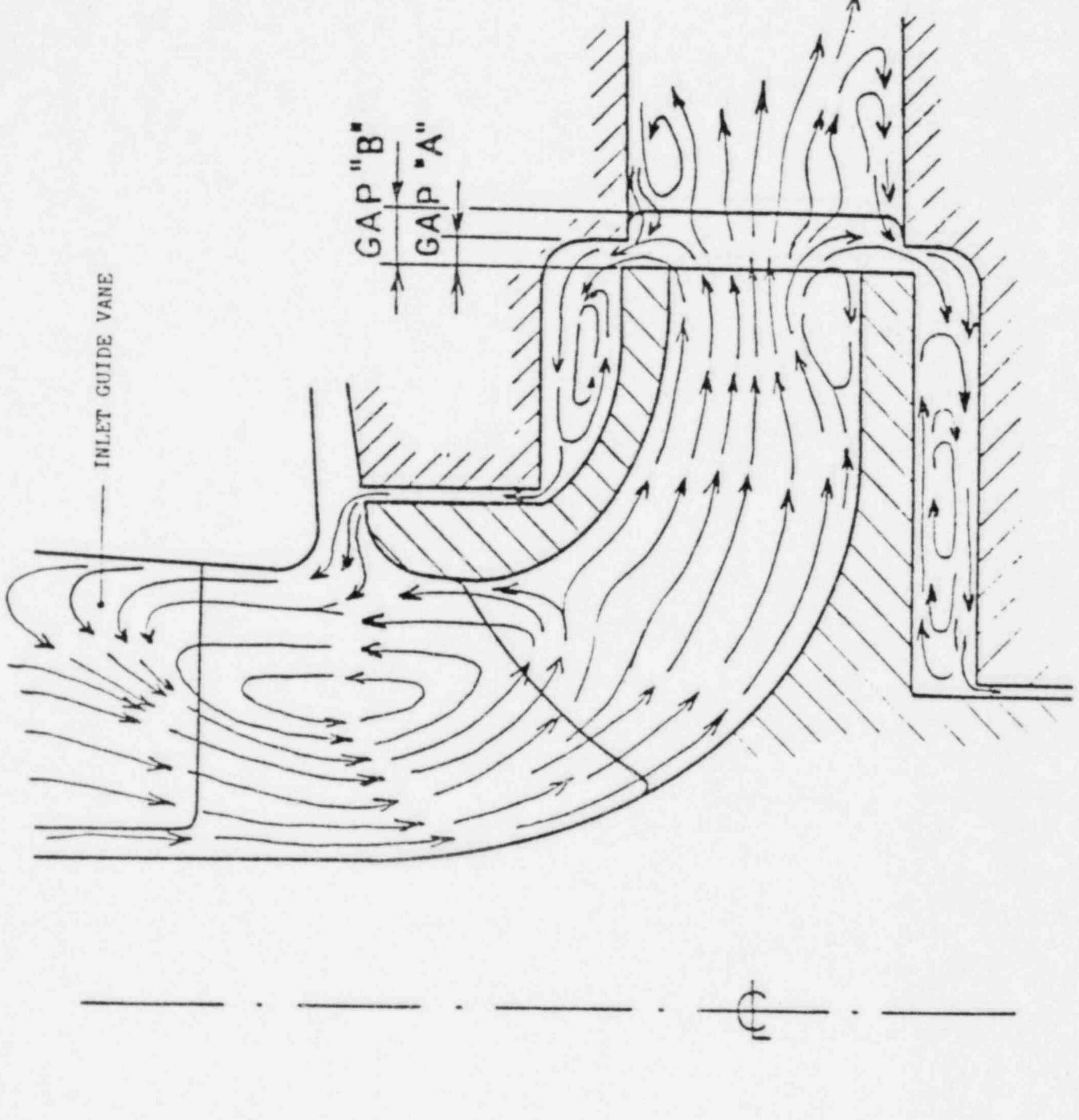

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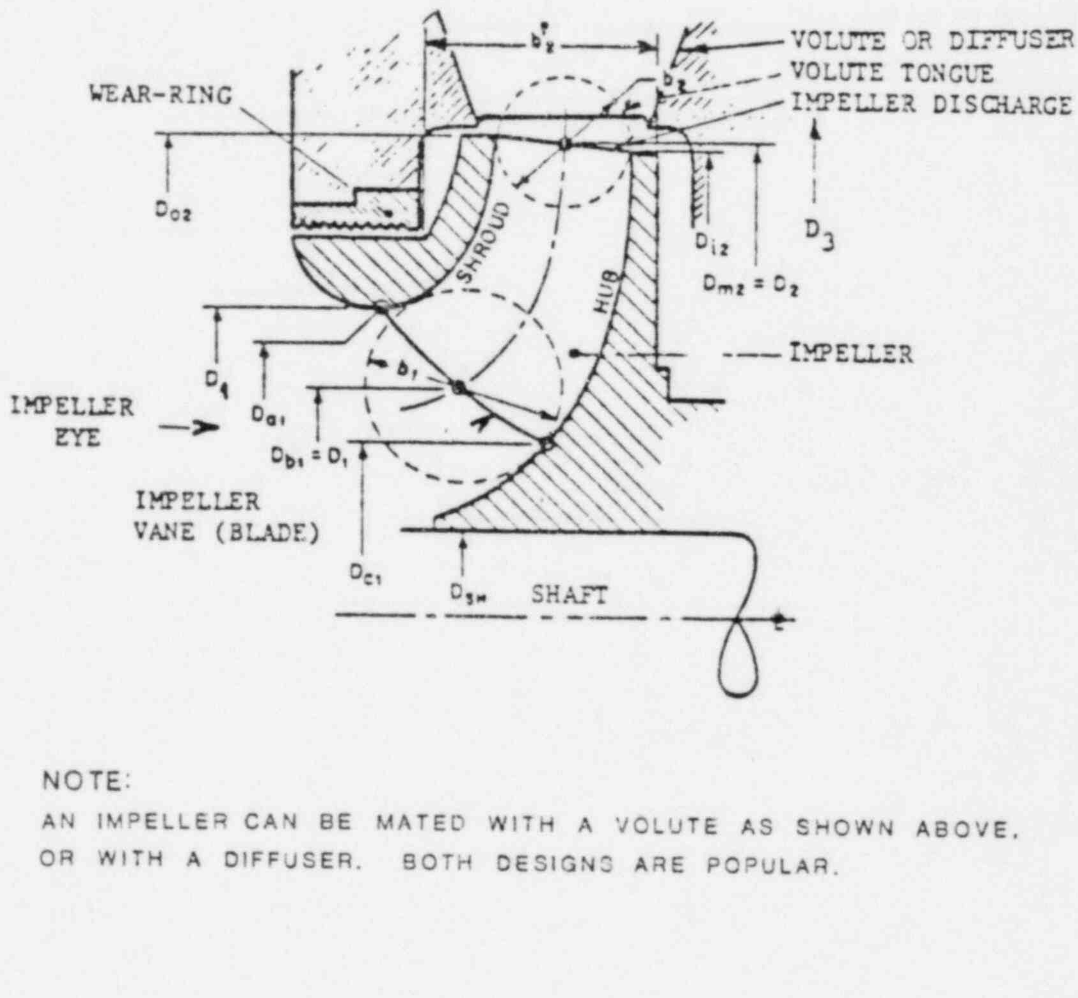
FIGURE J.5-2

SECONDARY FLOW PATTERN IN AND AROUND A PUMP IMPELLER STAGE AT OFF-DESIGN FLOW OPERATION



NOTE:
AN IMPELLER CAN BE MATED WITH A VOLUTE AS SHOWN ABOVE, OR WITH A DIFFUSER. BOTH DESIGNS ARE POPULAR.

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FIGURE J.5-1

PUMP IMPELLER MERIDIONAL VIEW

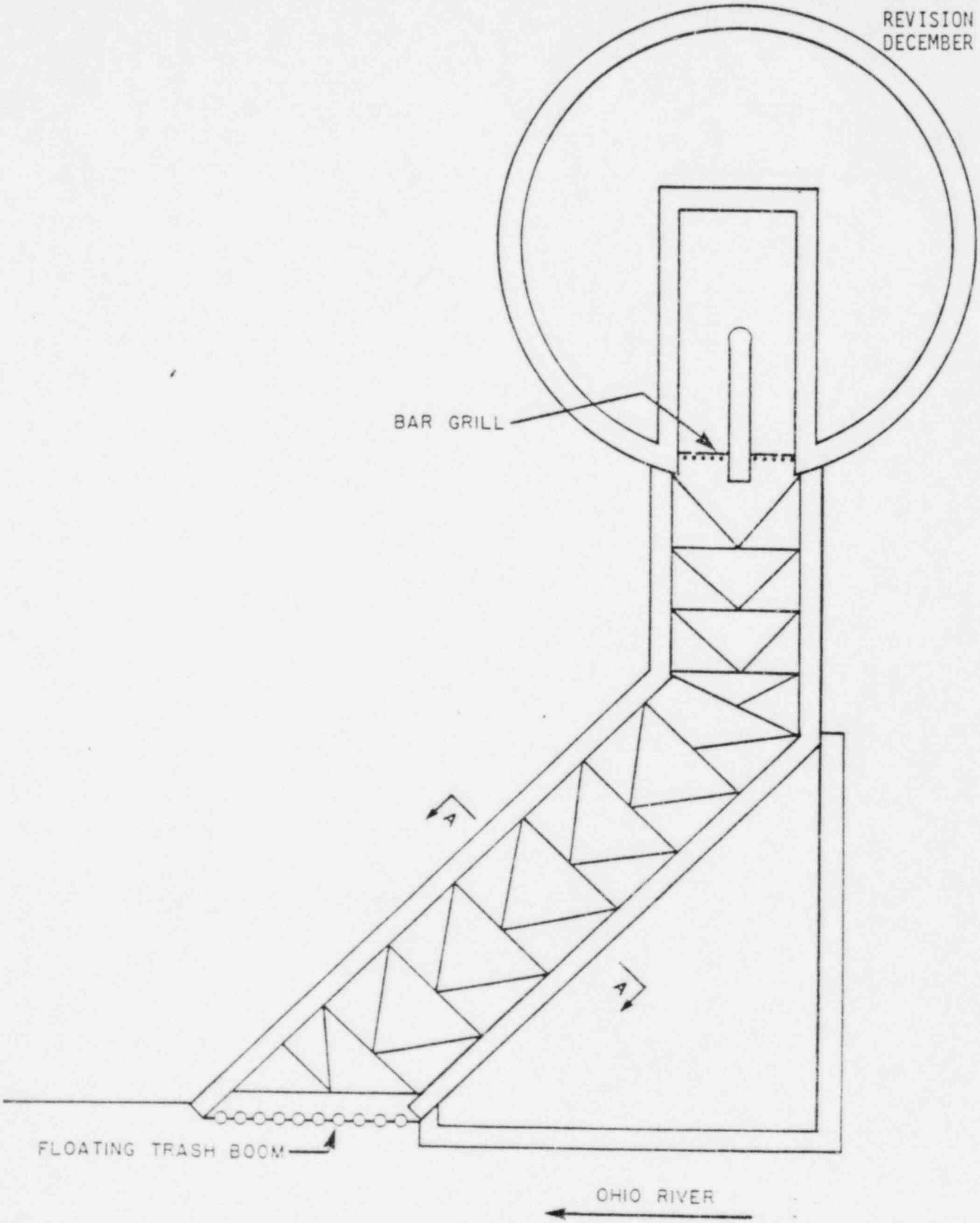

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FIGURE J.2-1

LAYOUT OF INTAKE FLUME AND
SERVICE WATER PUMP STRUCTURE

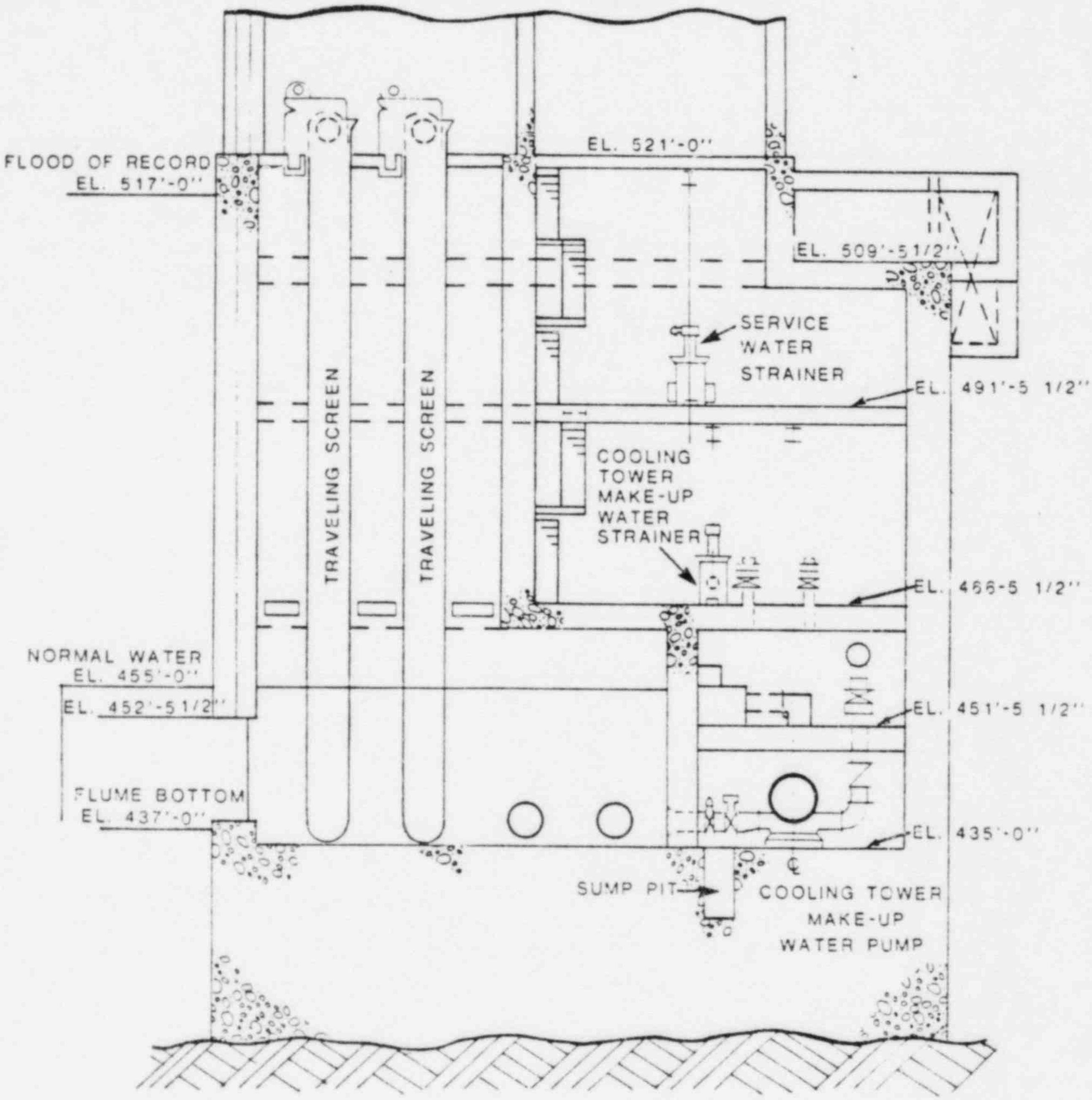

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FIGURE J.2-2

SERVICE WATER PUMP
STRUCTURE (SECTION)

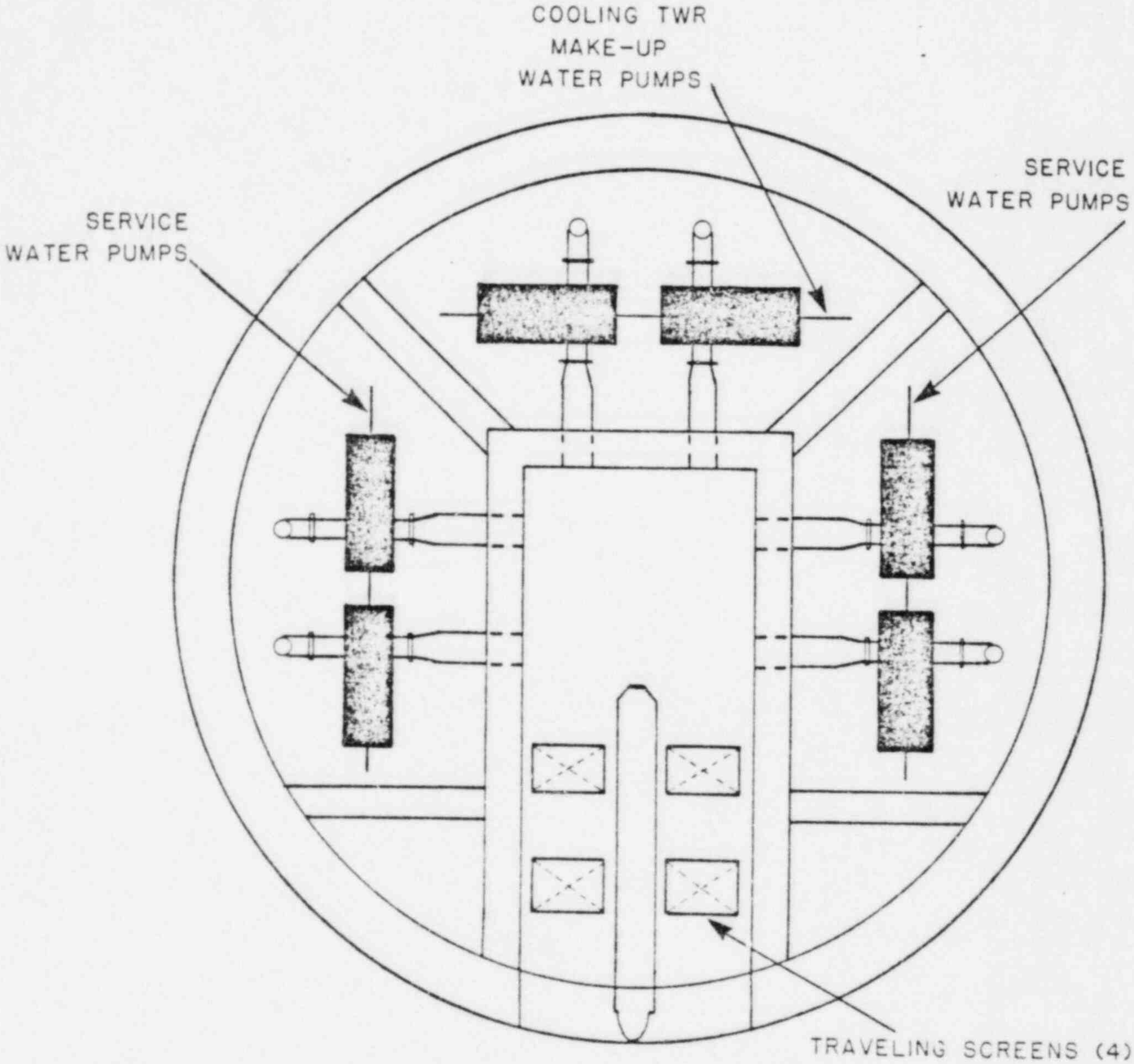

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FIGURE J.2-3

SERVICE WATER PUMP STRUCTURE PLAN
ELEVATION 435'-0"

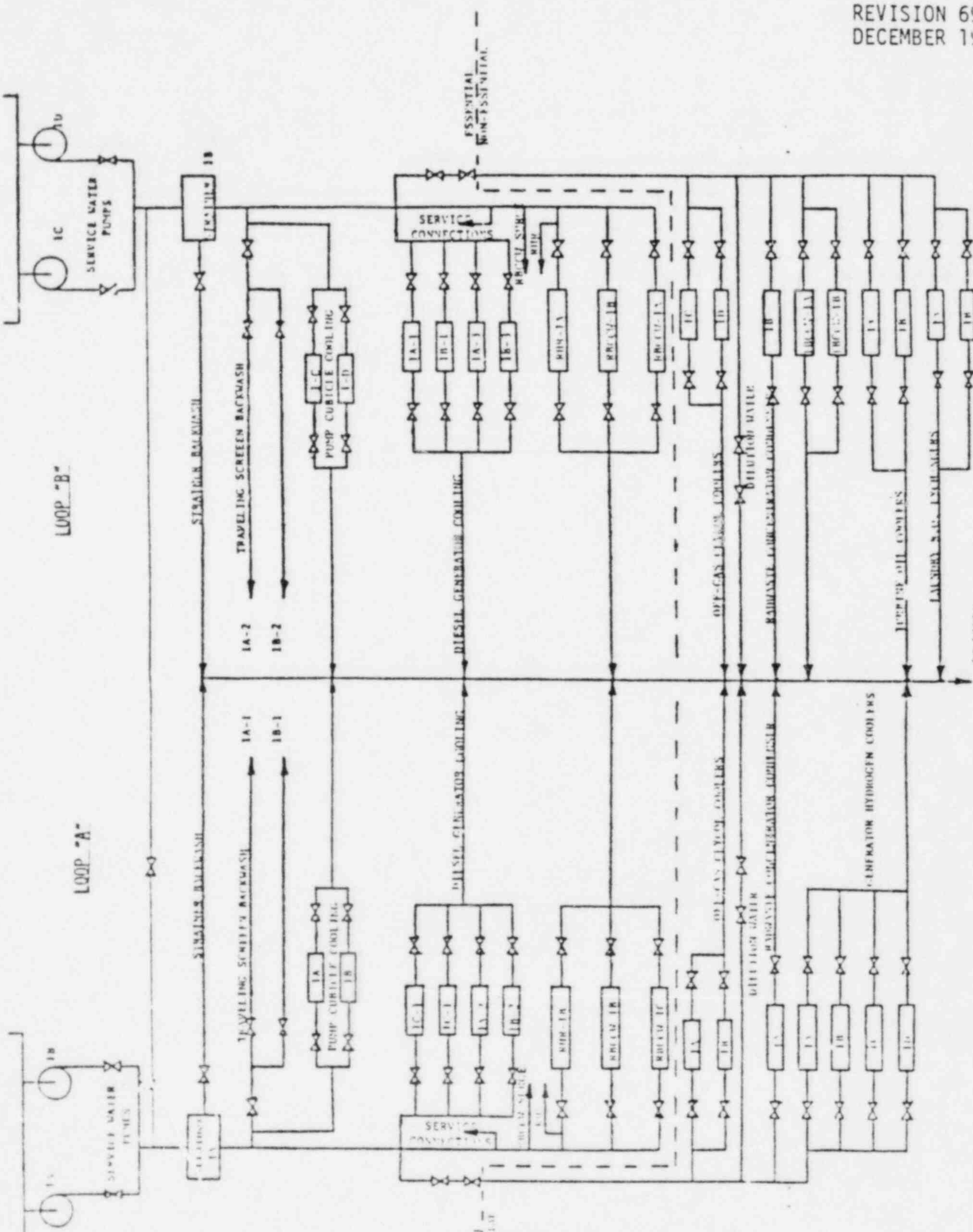

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FIGURE J.2-4

SERVICE WATER SYSTEM
SIMPLIFIED SCHEMATIC

SPINOFF ALLEGATIONS	INSPECTION RESULTS	ASSISTANCE REQUIRED
Applegate 8	At least three sources contacted by Applegate confirmed that an estimated 20% of the plant's prefabricated welds are defective.	1. Interview allegers. 2. Sample review Review radiogpraphs of Kellog welds. 3. Inspect piping. 4. Review applicable NRs. 5. Interview QC or appropriate NDE personnel. 6. See IE Report 77-03

McCarton
Daniels

SPINOFF ALLEGATIONS	INSPECTION RESULTS	ASSISTANCE REQUIRED
Applegate 5	Sensitive parts on welding rods are possible damaged through storage at improper temperatures, and possibly lost through failure to follow proper paper work and labelling requirements.	1. Review Tom Daniels' report.

APPLEGATE ALLEGATIONS	INSPECTION RESULTS	ASSISTANCE REQUIRED
#5	There has been numerous non-compliances for weld rod control* which appear to be corrected adequately. Although, in the area of maintaining warming ovens plugged in there has been some recurring problems. This appears to have been adequately addressed and corrected in the recent past. (LAST 3 MONTHS) Even though this was a problem area in following the established procedure, SPPM 3.3, the AWS requirements are much less stringent, for example, it allows low hydrogen weld rod (E7018) to be exposed to the atmosphere for up to 4 hours. In a letter received from the supplier of the portable weld rod warming ovens, they stated that the weld rods in their portable ovens would be protected against moisture on the job for up to 4 hours even if not plugged in. Therefore, there did appear to be a problem of failure to follow the approved procedure for weld rod control, but inspectors did not observe any weld rod in use which violated the AWS requirements. * IE Inspection Reports #75-05, 76-07, 76-11, 77-02, 79-07, 79-15, 80-07, 80-14, 80-19.	NONE

Talk to Tom Van Natta, GE, site
for info but verify everything by inspection
or reviews. Note specifically what you do.

In field

1. Verify actual part number of hydraulic actuator
with the respective recirculation flow control
valve number on both recirculation loops.

(B) 1st ~~pump~~	Bingham-Willamette	2nd pump (A)
Recirc. Pp. #	S/N 21027	21018
Flow Control Valve #	ITT Hammel Dahl 76 9000 002	76-9000-001
Hydraulic Actuator #	Rucker Control SP19078	S SP19025
Hydraulic Power Unit #	Zimmer B (Rucker)	Zimmer A (Rucker)
	~~MBL # B33D003~~ -	~~MBL # B33 D003~~

2. Verify hydraulic lines nos. for both recirc. loops

✓ 1RR39AA 3/4" ______	✓ 1RR40AA 3/4" ______
✓ 1RR39AB 1/2" ______	1RR40AB 1/2" ______
✓ 1RR39AC 1/2" ______	1RR40AC 1/2" ______
✓ 1RR39AD 3/4" ______	1RR40AD 3/4" ______

3. Inspect actuator ~~and~~ and adjacent piping (including
welds-- note of socket welds) for compliance
with G.E. FDDR # KN-1-299 Rev. 0 (or latest)
and ASME Section III, Article NC (Class B).

Note: FDDR only applies to AC (drain) lines. Try to verify to 2000 lb fittings use on ...

In Office

4. Review QC installation and welding records to assure
compliance with #3 above. Make sure in-process inspections
were ~~[illegible]~~ performed by QC.

5. Review pressure test procedure for the hydraulic actuator (2-seals -- main + backup) and the hydraulic lines. Either obtain copies or note procedures numbers and revision numbers.

Copies
Proc
data

Review pressure test data (results) to assure compliance with the test procedures. Either obtain copies of the test results or note the design pressures, the specified test pressures, and the actual test pressures on the actuator and all 4 lines for both

2 seals — 2 pressures

recirc. loops. Compare procedure to pipe list.

6. Find out why these actuator and lines have been classified as ASME Class B. What safety function is served?

Kaiser

- Design after the fact
  - As-Built

  Procedure (Small Bore)

  - S & L
  - Kaiser

Tom Daniels

Pat Gwyne
1971 Code

1RR39AC - 1/2"

1RR40AC - 1/2"

~~(1) Walk down -~~

~~(2) Check - all four connections at each valve.~~

~~(3) Check record for all~~

Dwg Rev. issue date

~~(4) Clean copy of FDDR KN-1-299~~

~~(5) MOD - Check all lines "2"~~

1. Copy of FDDR KN-1-299 rev. C

2. Hydro test data for 1RR40AA
Copy

3. Copy of S&L Piping Line List
showing 1RR39AA to 1RR40AD

4. Copy of Kaiser procedure for
Control of "as-builts" and S&L
review procedure for same (pertaining
to small bore pipe)

5. Why is the line no. for 1RR40AB
continued as 1RR40AC when all
others are the same?

CIC
! Was Dwg M-464-4-RR-257 & 261 mistaken
used in lieu of M-464-4-RR-
261 and 258?

McCarton

Daniels

SPINOFF ALLEGATIONS	INSPECTION RESULTS	ASSISTANCE REQUIRED
Applegate 3	A radioactive waste drain is clogged with concrete which carelessly was poured into the drain.	Review Tom Daniels' findings. Get flushing record. Get report on repairs. Identify the pipe. Get Daniels visual inspection report. Identify the drains as safety related or not.

APPLEGATE ALLEGATIONS	INSPECTION RESULTS	ASSISTANCE REQUIRED
#3	The inspector verified by direct observation that all accessable Rad Waste Drains in the Rad Waste Building and Auxiliary Building Ventilation Room were not visually plugged. Although, in order to verify they would pass liquids the flushing procedure, DR, was reviewed to insure the drains had been flushed. Some drains were covered with tape to prevent accidental/inadvertent plugging, but not enough were taped in any specific area to cause it to flood. It is not unusual for a drain to become clogged/plugged during construction of any large industrial complex, but there is no evidence to indicate that any of these drains were left in a plugged condition.	None

E. Problems Identified Through Ex-Employee Allegations Investigation

1. Unacceptable structural beams welds
2. Inadequate contractor (Bristol) QA program
3. Lack of ~~[illegible]~~ Material Traceability
   a. Structural beams
   b. Piping
   c. Weld rod
4. Surveillance reports not converted to nonconformance reports
5. Structural welds inspected after painting

~~6. Radiographs of prefabricated pipe welds accepted with insufficient shimming~~

6 ~~7~~. Nonconformance reports improperly voided.
7 ~~8~~. Cable separation violations (S&L Design)
8 ~~9~~. Lack of inspection criteria to verify cable separation

~~10. Inadequate design control of cable tray loading~~

9 ~~10. 11.~~ Inadequate corrective action on CG&E audit findings
10 ~~11. 12.~~ No CG&E audits performed of the S&L nonconformance program
11 ~~12. 13.~~ Weld inspection criteria deleted.
12 ~~13. 14.~~ Socket weld fit-ups not verified
13 ~~14. 15.~~ Structural beams installed that are not required by design
14 ~~15. 16.~~ Weld rod issue slips used as QC inspection
15 ~~16. 17.~~ Design Document Changes distribution not controlled
16 ~~17. 18.~~ Deviation from FSAR —

~~a. Cable Ampacity~~

b. Weld acceptance criterion

17 ~~18. 19.~~ Lack of controls to assure inspection of DDC activities.

APPLEGATE ALLEGATIONS	INSPECTION RESULTS	ASSISTANCE REQUIRED
#1	See KAVIN WARDS writeup	KAVIN WARD
#7	Has the pipe been specifically identified? Have pertinent radiographs been reviewed by NRC. Have the findings been documented	
#1	~~Containment~~	

Ward

SPINOFF ALLEGATIONS	INSPECTION RESULTS	ASSISTANCE REQUIRED
Applegate 1	Applegate alleged that KEI knowingly installed and ripped out unsuitable main steam relief piping at an estimated labor cost of $320,000.	1. Verify that this was done according to QA program. 2. Why was it replaced? 3. Was it controlled?

N. [illegible]

3/4

On April 14, 1981 Individual "B" was interviewed and stated he has been employed at ZImmer since 1976. "B" related during this period he worked as a pipefitter in the drain flushing crew in 1976-1977 in the radiation waste disposal system. During this work he observed that drains in the system were clogged with concrete which he and others unsucessfully tried to remove from some of the drains. ~~[illegible]~~ "B" stated Kaiser was attempting to resolve the problem at the time he left this area, but had not yetcleared the concrete from all of the drains in the system .

3/77

1976 - 1977

Interim Exit
3/26/81

Attendees	Company	Position
P.A. Barrett	NRC/RIII	Reactor Inspector
J.F. Schapker	"	"
R.M. BURTON	NRC/RIII	INVESTIGATOR
[illegible] GILBERT	NRC IE HQ	Investigator
F.T. Daniels	NRC/SRI	Senior Resident Inspect
T.P. Gwynn	NRC/RI	RESIDENT INSPECTOR
W. D. WAYMIRE	CG&E	MGR. - GEN'L ENGRG
[illegible] CULVER	CG&E	MGR - GENERATION [illegible]
F.A. MAURA	NRC-III	
S.C. Swain	CG&E	Site Construction Manager
H.C. BRINKMANN	CG&E	PRIN ME - NUCLEAR
R P Ehas	CG&E	QE.
E.A. BORGMANN	C.G.&E.	SR V-P
J.R. SCHOTT	CG&E	Plant Man.
R. MARSHALL	H.J.K.	Mgr.
C.H. Stanfield	H.J.K.	CONSTR. MGR.
E U KNOX	HJK	CORP QA MGR.
P.S GITTINGS	HJK	SITE QA MGR.
RF Warnick	NRC	Section Chief
W.W. SCHWIERS	CG&E	QA Manager
J.B. McCARTEN	NRC III	INVESTIGATOR
K.D. WARD	NRC III	Inspector

(1)

Items of Concern - Diesel Generator Turnover Packages

1. KE-1 Weld data [illegible] and the KE-1's [illegible] stamped on ISK drawings by the QC inspectors are being revised [illegible] on the basis of data taken from weld [illegible] [illegible] slips. (Heat number, welder identification [illegible] date [illegible] being changed [illegible] forms [illegible] [illegible] by inspector [illegible] time weld was [illegible] [illegible] being revised based on weld [illegible]

16 continued

2. Weld [illegible] slips indicate more than one welder on a particular weld, ~~[illegible]~~ however [illegible] inspectors stamped [illegible] KE-1 weld data records [illegible] one welder worked on such weld. ~~[illegible] our [illegible]~~ ~~forms are not [illegible]~~ ~~[illegible] records [illegible]~~ ~~inaccurate~~ This indicating that the weld ~~inspection~~ records ~~and inspectors~~ (KE-1 & KE-[illegible]) don't match.
Thus doubts are raised about the accuracy of the records.

3. Material heat numbers on ISK drawings do not reflect in many instances [illegible] installed in piping. The accuracy of all small bore [illegible] material traceability records is in question.

4. [illegible] is acceptable. [illegible] [illegible] on the Kopser [illegible]

8.3.2.2.2.2 Position "b" Conformance

The battery charger of each division is sized to carry the maximum steady-state d-c load of that division plus the battery-charging load to restore the battery from minimum charged to fully charged.

8.3.2.2.3 Conformance with IEEE 308-1971

The design of the Class 1E d-c power system is based on the criteria described in IEEE 308-1971 as modified by NRC Regulatory Guide 1.32, Position b.

Each division of the Class 1E a-c power system is provided control and d-c motive power from a corresponding division of the Class 1E d-c power system. The 480-Vac feed to each battery charger is from an a-c source in the individual division to which the particular charger belongs. In this way, separation among the independent divisions is maintained, and the power provided to the chargers can be from either offsite or onsite sources.

Instruments are provided to monitor the status of the battery-charger supply. Such instrumentation includes indication of output voltage, output current, battery ground, and breaker position. Battery chargers are provided with disconnecting means and feedback protection.

8.3.3 Fire Protection

8.3.3.1 Cable Ampacity 12 48

8.3.3.1.1 In Trays

All power cables to be used in ZPS-1 are assigned in accordance with Table 8.3-18. The tables for power cable loading are based on IEEE Transaction Paper 70TP557 TWR, "Ampacities for Cables in Randomly Filled Trays," by J. Stolpe. 72

8.3.3.1.2 Not In Trays

The thermal ampacity of power and control cables with no part of their length in solid-bottom tray are in accordance with IPCEA P-46-426, with appropriate rating factors applied for ambient, shields, and direct-current service. 72

8.3.3.1.3 Fill

The summation of the cross-sectional areas of the cables shall not exceed 60% of the tray cross-sectional area. Any tray section where the design index exceeds 1.25 (approximately 50% fill) shall have the thermal loading and weight loading checked by analysis to ensure conformance with design limits. 48 72

Conduit is sized in accordance with Sargent & Lundy Standard EDSB-10, Electrical Drafting Reference for Determining Conduit and Pipe Sizes, which limits conduit fill to the percentages established by the National Electric Code.

72

TABLE 8.3-18 12

POWER CABLE CURRENT CARRYING CAPACITY

CABLE SIZE (AWG or MCM)	1-kV (single cond.)	1-kV (3 cond.)	5-kV (3 cond.)	8-kV (3 cond. shielded)	
19/22 (9)	13*	18*	-	-	
6	21	30	-	-	
4	-	43	-	-	
2	-	61	81	-	12
1/0	72	96	-	-	
2/0	-	-	144	155	12
3/0	-	138	-	-	
4/0	-	167	204	-	
250	159	212	-	-	
300MCM	-	-	278	-	12
350	-	278	-	-	
500	283	374	-	430	
750	-	-	510	590	12

Notes: 1. Ampacities are based on the following conditions:

a. cables installed in solid metal trays, and 16

b. 90° C rating.

2. These cable sizes are the minimum cable sizes to be used except where otherwise approved by an engineer for special applications.

3. For cables installed in cable ducts or any installation other than solid metal trays, consult IPCEA ampacity tables. 16 72

* This is an extrapolation.

WH Zimmer FSAR

8.3.2.2.2.2 Position "b" Conformance

The battery charger of each division is sized to carry the maximum steady-state d-c load of that division plus the battery-charging load to restore the battery from minimum charged to fully charged.

8.3.2.2.3 Conformance with IEEE 308-1971

The design of the Class 1E d-c power system is based on the criteria described in IEEE 308-1971 as modified by NRC Regulatory Guide 1.32, Position b.

Each division of the Class 1E a-c power system is provided control and d-c motive power from a corresponding division of the Class 1E d-c power system. The 480-Vac feed to each battery charger is from an a-c source in the individual division to which the particular charger belongs. In this way, separation among the independent divisions is maintained, and the power provided to the chargers can be from either offsite or onsite sources.

Instruments are provided to monitor the status of the battery-charger supply. Such instrumentation includes indication of output voltage, output current, battery ground, and breaker position. Battery chargers are provided with disconnecting means and feedback protection.

8.3.3 Fire Protection

8.3.3.1 Cable Ampacity 12 | 48

Check physical loading restrictions identified in P-46-426

8.3.3.1.1 In Trays

All power cables to be used in ZPS-1 are assigned in accordance with Table 8.3-18. The ~~tables~~ for power cable loading are based on IPCEA Publication No. P-46-426.

Cable in free-air / not in Trays

8.3.3.1.2 Not In Trays

The thermal ampacity of power and control cables with no part of their length in solid-bottom tray are in accordance with IPCEA P-46-426, with appropriate rating factors applied for ambient, shieldS, and direct-current service.

8.3.3.1.3 Fill

The summation of the cross-sectional areas of the cables shall not exceed 50% of the tray usable cross-sectional area or two layers of cables, whichever is larger, but not to exceed 60% of the cross-sectional area in any case. | 48

Conduit is sized in accordance with Sargent & Lundy Standard EDSB-10, Electrical Drafting Reference for Determining Conduit and Pipe Sizes, which limits conduit fill to the percentages established by the National Electric Code.

8.3.3.2 Cable Fire Protection Criteria

Cabling is arranged to separate the redundant systems so that fire cannot damage more than one system or propagate from one to another. Routing of cables for redundant systems through an area where there is potential for accumulation of large quantities of oil or other combustible material is avoided. Where such routing is unavoidable, only one system of redundant cables is allowed in any such area and the cables 12
are protected by conduits or by tray covers designed to prevent combustible material from reaching the cables.

In general plant areas where the 3-foot horizontal and 5-foot vertical separation between redundant divisional trays or conduit and trays cannot 36
be met, qualified fire barriers shall be installed. For a description of barriers used due to insufficient space separation refer to Fire Protection Evaluation Report answers to Questions 7, 9, 10, 11, 12, 13, 14, 63
15, and 19.

All Class 1E and non-Class 1E cables have been qualified to IEEE 383-1974. (See also Question 9, Fire Protection Evaluation Report for non 383 cables.) 48

8.3.3.3 Fire Stops

Cable in vertical trays wireway, or cable bus which penetrate floors are provided with covers for a distance of 6 feet above the floor. In addition, a fire stop is installed.

Horizontal trays, wireway, or cable bus are scaled with a fire stop where they penetrate walls.

Openings, sleeves, or conduits beneath control boards are scaled with firestop material. 12

Fire stop material, qualified by test at PCA Laboratory utilizing silicone elastomer, will be used. 63

Where a ventilation or water seal is required in addition to firestop requirements, "building block" seals as manufactured by Nelson Electric are used.

8.3.3.4 Smoke-Detection and Sprinkler Systems

Heat and/or smoke detectors are installed in the control room, electric equipment rooms, auxiliary equipment rooms, and the cable spreading rooms. In addition, the cable spreading room has an automatic preaction 36
system.

Additional information on the fire-protection system may be found in Sections 1.2 and 9.5.

42

TABLE 8.3-18

POWER CABLE CURRENT CARRYING CAPACITY

CABLE SIZE (AWG or MCM)	1-kV (single cond.)	1-kV (3 cond.)	5-kV (3 cond.)	8-kV (3 cond. shielded)
19/22 (9)	13*	18*	-	-
6	21	30	-	-
4	-	43	-	-
2	-	61	81	-
1/0	72	96	-	-
2/0	-	-	144	155
3/0	-	138	-	-
4/0	-	167	204	-
250	159	212	-	-
300MCM	-	-	278	-
350	-	278	-	-
500	283	374	-	430
750	-	-	510	590

Notes: 1. Ampacities are based on the following conditions:

a. cables installed in solid metal trays, and

b. 90° C rating.

2. These cable sizes are the minimum cable sizes to be used except where otherwise approved by an engineer for special applications.

3. For cables installed in open cable trays, cable ducts, or any installation other than solid metal trays, consult IPCEA ampacity tables.

* This is an extrapolation.

Control & Instr. Tray are 6"
Power is 4"
2-25-[illegible]
All tray except drop at [illegible]
are solid bottom.

TO
Paul Barrett

Answers to your questions on Cable Pan Loading Report

1 - Weights of cables - per type per foot.

ANS - This information is presently at S&L however I shall obtain it for you

2. What is coding for types shown on report

ANS - The last 6 pages of the report gave this info and attached are copies for you

3 Is dimension given the OD of the cable?

ANS - Yes it is ~~the~~ OD

---

4. For Tray section what is size and type

202EA = 12" x 4" Solid bottom Dwg E-95-1 Rev. [illegible] and E-18 Rev. [illegible] at 325' Aux

114B = 24" x 6" Solid bottom Dwg E-98-2 Rev 3 & E-21 Rev. R.
Control Room

[illegible]

R P Ehas

A10. The RIII inspector made field ~~in~~ observations, reviewed and discussed site control measures, and reviewed and discussed the design basis and verifications regarding ~~of~~ cable tray loading. Tray loading was considered in three aspects - (1) cable ampacity or thermal loading (2) physical weight loading and (3) the commitments in ~~the~~ Zimmer FSAR Section 8.3.3.1.

1. The following cable tray routing points (nodes) were selected ~~[illegible]~~ for the reviews and discussions:

a. 1057A - yellow division/power tray - selected ~~chosen~~ because of the ~~a~~ high design index#, D.I., ~~@~~ # 1.44
(See paragraph 3 of this report section for explanation of Design Index)

b. 2025A - blue division/power tray - selected ~~chosen~~ because of the high ~~index~~ D.I.# ~~[illegible]~~ 1.46

c. 2023A - blue division/ ~~[illegible]~~ power tray - selected ~~chosen~~ for ~~[illegible]~~ verification of D.I.# accuracy (~~[illegible]~~ D.I. 1.13)

d. 2033A - blue division/power tray - ~~chosen~~ selected because of the high ~~design~~ D.I. # 1.44

e. 2039A - blue division/power tray - selected during field observat... because of the appearance of ~~tray~~ being highly filled.

~~g.~~ f. 2036B - blue division/control tray - ~~chosen~~ selected during field observations because of the appearance of being highly filled.

~~f.~~ g. 1073A - ~~blue~~ yellow division/power tray - selected for verification of the number of cables installed.

h. 1194B -- yellow division/control tray -- selected because of the high ~~design index~~ D.I. # 1.54

~~i. 2025B - blue division/control tray -- selected because of the high D.I. # 1.55~~

2. ~~Tray nodes~~ The RII inspector and a Licensee representative counted the cables in the following tray nodes and compared the counts to the number of cables listed in the S&L Cable Pan Loading Report, dated 2/2/81:

	Node	Field Count	Report Count
a.	1057A	27	27

Node	Field Count	Report Count
a.		
b. 2025A	24	23
c. 2039A	39	39
d. 1073A	32	~~32~~ 33
~~e. 2023B~~		

The Cable Pan Loading Report is a computerized periodical which states ~~the~~ the design status of ~~cable~~ the cable tray loads. The Report identifies the ~~specific~~ individual cable numbers which have been ~~designed~~ specified to be routed ~~in~~ through the segmented tray points (nodes

also in the O.I.

~~4~~ The RII inspector reviewed the H. J. Kaiser Cable Monitoring Report dated 2/5/31, and some ~~to the~~ cable pull (installation) cards to verify ~~i~~ that the cables specified for tray nodes 1057A, 2025A, 2023A, and 1073A in the loading ~~B~~ Report had actually been installed. For tray node ~~1057A~~, 2025A, cable no. LL145 was ~~fo~~ found to be two individual conductors and ~~which accounted~~ accounted for ~~to~~ the ~~di~~ discrepancy between the Field and Report Counts above. For tray node 1073A,

~~cable no. VP210 had not been~~

the records indicated that cable no. VP210 had not

been installed yet, which accounted for the discrepancies

between ~~in the~~ the above Field and Report Counts. No other

~~in some~~ discrepancies were identified in either the design or installation

reports and records for trays nodes 1057A, 2025A,

2023A, 2039A, and 1073A.

~~#~~ Thus the design and installation records appeared to match ~~ed~~ the

number ~~of~~ of cables actually installed in the plant.

Insert 3.

~~X. B~~ The Cable Pan Loading Report also identified the current

Design Index, D.I., number ~~number~~ for each of the respective tray nodes. The D.I.

~~Tray pan index the Design Index was written~~

On 3/17/81 and 3/18/81, the S&L Assistant Manager of

Electrical Engineers described the ~~design computer~~

computerized design index program as follows:

3. The RIII inspector inquired as to how the computerized Design Index program correlated to the Zimmer FSAR Section 8.3.3.1 concerning Cable Ampacity and Section 3.10.1.2.3.c concerning physical weight limitations.

a. F.S.A.R. Section 8.3.3.1 states the following:

8.3.3.1.1 In Trays

All power cables to be used in ZPS-1 are assigned in accordance with Table 8.3-18. The tables for power cable loading are based on IPCEA Publication No. P-46-426.

8.3.3.1.2 Not In Trays

The thermal ampacity of power and control cables with no part of their length in solid-bottom tray are in accordance with IPCEA P-46-426, with appropriate rating factors applied for ambient, shieldS, and direct-current service.

8.3.3.1.3 Fill

The summation of the cross-sectional areas of the cables shall not exceed 50% of the tray usable cross-sectional area or two layers of cables, whichever is larger, but not to exceed 60% of the cross-sectional area in any case.

Conduit is sized in accordance with Sargent & Lundy Standard EDSB-10, Electrical Drafting Reference for Determining Conduit and Pipe Sizes, which limits conduit fill to the percentages established by the National Electric Code.

d. F.S.A.R Section 3.10.1.2.3.c states "Cable tray loading of 45 psf (pounds per square foot) is used throughout."

a. On 3/17/81 and ~~3/~~ 3/19/81 The S&L Assistant Manager of Electrical Engineers described ~~the~~ ~~Program~~ the correlation between The FSAR and The Design Index program as follows:

~~a~~ The ~~P~~ power cable ampacity loading is based not ~~only~~ on IPCEA P-46-426 1962, but on ~~the~~ IEEE Paper 70TP557-PWR (by J. Stolpe) printed in 1970, ~~IEEE~~ IPCEA Publication P-54-440 1975 which based on Stolpe's Paper, and S&L standard ESA-104a revision ~~#~~ 11/1/72. ~~Insert A~~

~~4~~ The ~~std~~ Stolpe method bases ampacity on The Depth-of-F. of cables in tray rather than on the percentage fill. S&L uses a 2-inch depth-of-fill as ~~the~~ the basis of selecting a cable for a particular ampere load.

(1) ~~S&L~~ The ~~in~~ 2-inch depth-of-fill design results in a major ~~design~~

conservatism because of:

(a) Load diversity -- many cables carry current only intermittently (e.g. valve operations, sump pumps, etc.)

(b) Cable size granularity -- only a few cable types and sizes are ~~a~~ purchased, resulting in selection of oversize cables for most services. This ~~m~~ means many cables would be capable of carrying larger currents (rated) than what are ~~actually~~ actually ~~carry~~ carried.

(c) Design ~~&~~ ampere margin -- the design ampere loads used to select cables before the final equipment design data is ~~know~~ known are ~~are~~ necessarily conservative (high).

(2) ~~#~~ Because of the above ~~3~~ conservatisms, the S&L design practices are as follows:

(a) Cables are routed into trays without limiting fill.

(b) The resulting fill is monitored as the design proceeds.

(c) When the fill reaches a target level the actual heat load is calculated and if the heat load exceeds the allowable amount, sufficient cables are removed

Insert J

G

For Tray 2025A; 4" x 24" = 96 sq. in. total area, thus a useable area = 2 x 24" = 48 sq. in.

*Cable Type

Cable No.	Actual Area		Design Index Area	Sq. In.^{2}
3P131	Pi $(1.2)^2$ =	4.52	E diameter^2 = $(2.4)^2$	= 5.76
3P135	Pi $(1.2)^2$ =	4.52	+ $(2.4)^2$	= 5.76
3P212	Pi $(1.3)^2$ =	5.30	+ $(2.6)^2$	= 6.76
3P316	Pi $(1.3)^2$ =	5.30	$(2.6)^2$	= 6.76
3P456	Pi $(1.3)^2$ =	5.30	$(2.6)^2$	= 6.76
LL143	Pi $(0.3)^2$ =	.28 + .28	$(0.6)^2+(0.6)^2$	=0.36 + 0.36
	~~Pi $(0.5)^2$ =~~	~~.78~~ O.K.	~~$(1.0)^2$~~	~~= 1.0~~
	Pi $(0.35)^2$ =	0.38	$(0.7)^2$	= 0.49
	Pi $(0.35)^2$ =	0.38	$(0.7)^2$	= 0.49
	Pi $(0.35)^2$ =	0.38	$(0.7)^2$	= 0.49
	Pi $(0.9)^2$ =	2.54	$(1.8)^2$	= 3.24
	Pi $(1.1)^2$ =	3.80	$(2.2)^2$	= 4.84
	Pi $(1.1)^2$ =	3.80	$(2.2)^2$	= 4.84
	Pi $(1.3)^2$ =	5.30	$(2.6)^2$	= 6.76
	Pi $(0.75)^2$ =	1.76	$(1.5)^2$	= 2.25
	Pi $(0.55)^2$ =	0.95	$(1.1)^2$	= 1.21
	Pi $(0.85)^2$ =	2.26	$(1.7)^2$	= 2.89
VG	Pi $(0.85)^2$ =	2.26	$(1.7)^2$	= 2.89
	Pi $(0.75)^2$ =	1.76	$(1.5)^2$	= 2.25
VT	~~Pi $(0.85)^2$ =~~	~~2.26~~ O.K.	~~$(1.7)^2$~~	~~= 2.89~~ O.K.
	Pi $(0.35)^2$ =	0.38	$(0.7)^2$	= 0.49
	Pi $(0.35)^2$ =	~~0.38~~ 0.38	$(0.7)^2$	= 0.49
	Pi $(0.35)^2$ =	0.38	$(0.7)^2$	= 0.49

E of areas ~~54.97 + .28 sq. in.~~ 34 inches ~~70.16 sq.in. + 0.36~~ = 70.52

70.52

For Tray 2025A

D.I. = $\frac{\text{~~70.16~~ 70.52 sq. in.}}{\text{48 sq. in.}}$ = ~~1.46~~ 1.469

And the actual % fill = $\frac{\text{~~54.97~~ 55.25}}{96}$ = ~~57.26%~~ 57.55%

* Cable types taken from S&L Drawing # E1005 (Cable Tab Sheet)

a. (2) (c)

from the affected trays.

d To accomplish steps (2)(b) and (2)(c), S&L uses ~~the~~

The Design Index program. Design Index is a measure of tray fill. Mathematically:

$$\text{Design Index} = \frac{\text{The sum of the (cable diameters)}^2}{\text{Useable area of the tray}}$$

where Useable area (U.A.) = tray width × design depth-of-fill

(design depth-of-fill is based on square cable = 50% of tray cross-sectional area)

$$D.I. = \frac{\Sigma(d^2)}{U.A.}, \quad \Sigma \text{ means summation}, \; d \text{ means cable diameter}$$

For 24 in. × 4 in power trays;

~~For power trays 24 × 4" = 96~~

the total area = 96 square inches and

Useable area = 24" × 2" = 48 sq. inches

D.I. =

d This equation is consistent with the Stolpe method "Percent Fill"

~~Compared to~~ insert 6 & insert 5

Mathematically:

$$\text{Percent Fill} = \frac{\text{Sum of cable cross-sectional areas}}{\text{Total cross-sectional tray area}} \times 100$$

where

E

4.

where the sum of cable cross-sectional areas $= E(pi \times r^2)$

with r = radius of the cable

$pi = 3.1416$

therefore Percent Fill $= \dfrac{E(pi \times r^2)}{\text{total area}} \times 100$

The relation between design index and percent fill is therefore:

$$\frac{\text{Percent Fill}}{\text{Design Index}} = \frac{\dfrac{E(pi \times r^2)}{\text{total area}} \times 100}{\dfrac{E(dia.^2)}{\text{useable area}}}$$

Since total area, T.A. = 2 x useable area, U.A.
and $d = 2 \times r$

$$\frac{P.F.}{D.I.} = \frac{\dfrac{E[pi \times (\frac{d}{2})^2]}{2(U.A)} \times 100}{\dfrac{E(d^2)}{U.A.}} = \frac{\dfrac{\frac{pi}{4} E(d^2)}{2} \times 100}{E(d^2)}$$

$$= \frac{pi}{8} \times 100 = 39.37 \text{ per D.I.}$$

c. Thus for ~~??~~ a 4 inch deep tray: (square cables)

39.3% Actual Fill = 1.0 Design Index = 2 inch design depth-of-fill

50% " " = 1.27 " " = 2.54 " " " "

60% " " = 1.52 " " = 3.04 " " " "

And for a 6 inch deep tray:

39.3% Actual Fill = 1.0 Design Index = 3 inch design depth-of-fill

~~A Design Index of 1.25 has been determined to be the value below which no tray will be thermally overloaded.~~

[illegible] 15

d. Based on the above relationships between ~~percent fill~~ design index and depth of square, and the fact that S&L has used a ~~2~~ 2-inch depth-of-fill as the basis of selecting cables for particular ampere loads, the cables in tray nodes with a D.I. over 1.0 would have to be re-evaluated considering the increased depths. This item is unresolved pending the completion

H

~~Insert~~ ~~Insert~~

d The above design bases for cable ampacity was a ~~The~~ deviation from the FSAR which was not identified on any control document. ~~S&L could not provide any control program on any control document. No uncontrolled deviation measures to identify and control deviations from the FSAR. The lack of measures to control deviations~~ This deviation is ~~contrary~~ contrary to 10 CFR 50 Appendix B, Criterion III and the Wm. H. Zimmer QA Manual Section 3.6 as described in the Appendix A to the report transmittal letter. (358/81-13-16)

d On 3/17/81, the S&L Assistant ~~Mang~~ Manager of Electrical Engineers stated that appropriate modifications to the FSAR would be submitted to NRR. Also specific consideration would be given to the differing types of cable insulations, addressed in the ~~sta~~ publications (standards), when compared to the cable insulations used in Zimmer.

¶ The RII inspector reviewed S&L Instruction No. PI-ZI-10.1 dated 2/6/78

Rev. 0, paragraph 4.5 which states "The Senior Electrical Project Engineer shall assign an electrical engineer to run thermal loading calculations for all power tray routing points with a design index exceeding 1.25. He shall ~~compare~~ compare these ~~*~~ loadings, in watts per feet, with the watts per feet limits established for the design indexes involved."

¶ The RII inspector requested the thermal calculations for tray nodes 2025A, 1057A, ~~2037A~~ 2038A, and 2027A which had D.I.s in excess of 1.25. S&L provided calculations for nodes 2025A, 1057A, and 2027A. These calculations, which were ~~were~~ performed in in 1978 and 1979, had ~~did~~ not been reviewed or approved. ~~The~~ S&L described these as interim calculations, which would have to be ~~redone~~ redone after all of the final electrical loads in the ~~plant~~ plant were established and defined. Thermal calculations ~~were~~ had not performed for tray node 2038A.

compare FCA actual to FSAR Table

~~Add Tray ... D.I. in place calculations~~

J

~~# ... ...~~ (Attachment D) dated 2/24/81.

~~4.~~ S&L provided a controlled list of 37 routing points (nodes)

with design indexes over 1.25 for the Zimmer ~~...~~ plant. 34 of these tray points ~~..~~ exceed the 50% tray fill requirement ~~The list identified ... 37 tray nodes ... with a~~ specified in the F.S.A.R., Section 8.3.3.1. ~~...~~ Tray nodes ~~D.I. over 1.25.~~ 1104B and 20253 exceed the 60% limit. The S&L Assistment Manager stated

that thermal ~~.....~~ calculations (both allowable and

actual) will be performed in the near future for all

power trays with a D.I. over 1.25, including those on Attachment D. These

calculations will be provided to the NRC, Region III.

~~pending resolution ...~~

This item is unresolved. (358/81-13-17)

4. ~~The ... ...~~ Neither S&L Instruction No. PI-ZI-101

rev. 0 ~~did ......~~ nor any other document established

~~..~~ controls to verify the thermal loading power cable (penetration) sleeves.

~~...., A controlled list of sleeves with a D.I. ..... was not maintained for~~ and

The physical (dead weight) loading of trays (power, control, and instrument) a. ~~over 1.25~~. The Cable Pan Loading Report included

K #

the design indexes of sleeves. Sleeve # SL-111 had a D.I. of 1.29 and sleeve # SL 105 had a ~~design~~ D.I. of 1.26. A controlled list of ~~design~~ powers sleeves with a D.I over 1.25 was not maintained.

6. ~~The design index~~ S&L stated that they would use a ~~the~~ design index of 1.25 would be used as the determining factor as to ~~what~~ when calculations would be performed for physical (dead weight) loading.

Insert The . . . -

4 The RIII inspector requested the justification for using the design index program for the determining factor for ~~phys phys~~ physical loads since the design index program has absolutely no technical relation to physical weight. The RIII inspector also requested justification for using ~~the determining limit 1.25 for~~ the design index ~~value~~ of 1.25 as the determining limit for performing design ~~calculation~~ calculations.

Insert U.

The lack of design control measures to verify the adequacy of the thermal loading of power sleeves and the physical loading of trays is contrary to 10CFR50 Appendix B Criterion III and the Wm. H. Zimmer QA Manual, Section 3.11.2 as described in the Appendix A to the report transmittal letter. (358/91-13-18)

S&L stated that calculations for the physical loads of all power, control, and instrument trays, and for thermal loads of all power sleeves, with a design index over 1.25, will be performed in the near future. These calculations will be provided to the NRC, Region III.

S&L revised Instruction PI-ZZ-10.1 Rev. 1, Sections 4.5, 4.6, and 4.7 on 3/18/91 to include requirements to verify and control the thermal loading of power sleeves and the physical loading of all trays (power, control, and instrument) ~~and~~ which have a design index over 1.25.

S&L stated that both of the justifications would be provided to the NRC, Region III. This item is unresolved.

(352/81-13-~~18~~ 19)

5.

5. ~~Control of Identified Design Deviations~~

The RIII inspector observed ~~that~~ a note on the bottom of ~~a~~ the thermal calculation sheet dated 12/27/79 for cable tray # 1057A ~~ampacity~~.

The note indicated that "two cables #VC016 and VC073 are overloaded". ~~These power cables are routed through tray point # 1057A.~~ On 3/17/81, Sargent & Lundy ~~identify~~ identified this calculation sheet as an ~~uncontrolled preliminary~~ calculation. The noted ~~cab~~ overloaded cables were not identified on any control document which would have required appropriate evaluation and disposition. The S&L personnel stated that ~~document~~ ~~exist~~ a control program does not exist for such ~~des~~ design deviations.

This is contrary to 10 CFR 50, App. B, Criterion III ~~XV~~ ~~XVI~~ ~~XV~~ and the Wm. H. Zimmer QA Manual Section 3.6 as described in the Appendix to the report transmittal letter. (358/81-13-20) which states in part that "... measures shall include provisions to assure that ~~deviat~~ ... deviations ... are controlled."

N

c. The ~~RIII~~ inspector performed the following physical weight tabulation of ~~tray~~ yellow division control ~~tray~~ Tray # 1104B:

~~Must consider weight on cal trays~~

Physical loading at ~~on hanger~~

~~Control Tray 1104B~~ ~~Chosen for high loading and different area~~

Cable #	Cable Type	Cable Weight *(lbs/ft)
AP079	72126	.622
AP080	72126	"
AP091	72126	"
AP166	72126	"
AP167	04106	.316
AP168	04106	"
AP170	72126	.622
AP171	04106	.316
AP172	"	"
AP422	72126	.622
AP504	04106	.316
AP505	"	"
508	"	"
510	"	"
511	"	"
512	"	"
762	"	"
CM011	70126	.583
DG022	72126	.622
DG029	"	"
DG034	"	"
DG135	07126	.342
IN032	72126	.622
035	"	"
038	"	"

Tray 11:4B

LC011	10126	.583
015	12126	.622
019	"	"
022	"	"
025	"	"
029	"	"
033	"	"
036	"	"
040	"	"
044	"	"
047	"	"
051	"	"
055	"	"
057	~~0[illegible]~~ 07126	.342
060	~~0[illegible]~~ "	"
062	"	"
064	"	"
LL 132	03126	~~[illegible]~~ .146
NB 200	04126	~~[illegible]~~ .245
202	"	"
210	"	"
223	"	"
227	"	"
230	"	"
231	"	"
232	"	"
233	"	"
234	"	"

Tray 11091B

NB 235	041-26	.245
236	"	"
237	"	"
238	"	"
239	"	"
254	"	"
258	"	"
261	"	"
265	"	"
267	"	"
271	"	"
272	"	"
273	"	"
275	"	"
276	"	"
277	"	"
279	"	"
285	"	"
286	"	"
287	"	"
288	"	"
289	"	"
290	"	"
291	"	"
292	"	"
297	"	"
299	"	"
301	"	"

Tray 1104B

NB 302	~~04126~~	.245
303	~~"~~	"
304	~~"~~	"
305	~~"~~	"
306	~~"~~	"
307	~~"~~	"
308	~~"~~	"
309	~~"~~	"
310	~~"~~	"
316	~~"~~	"
317	~~"~~	"
318	~~"~~	"
319	~~"~~	"
334	~~"~~	"
PC 013	~~07126~~	.342
RE 055	~~02126~~	.146
RF 129	~~02126~~	"
VA 018	~~10126~~	.533
VA 019	~~02126~~	.146
020	~~"~~	"
024	~~"~~	"
VC 023	~~07126~~	.342
024	~~"~~	"
025	~~"~~	"
062	~~10126~~	.533
119	~~"~~	"
120	~~"~~	"
121	~~"~~	"

Try 11043 24

VC 122	~~07126~~	.342
123	~~"~~	"
127	~~02126~~	.146
230	~~04126~~	.245
265	~~07126~~	.342
~~VDD~~		
VD 004	~~12126~~	.622
VE 020	~~"~~	"
023	~~10126~~	.533
032	~~"~~	"
031	~~"~~	"
052	~~12126~~	.622
054	~~10126~~	.533
035	~~10126~~	"
152	~~04126~~	.245
170	~~"~~	"
171	~~"~~	"
VH 030	~~12126~~	.622
040	~~04126~~	.245
VF 022	~~12126~~	.622
030	~~"~~	"
050	~~"~~	"
057	~~02126~~	.146
132	~~12126~~	.622
136	~~"~~	"
144	~~"~~	"
143	~~"~~	"

Tr-4 11048

VQ014	~~10126~~	.533
022	~~02126~~	.146
030	~~12126~~	.622
031	~~"~~	"
032	~~07126~~	.342
033	~~"~~	"
034	~~"~~	"
VR030	~~12126~~	.622
VR056	07126	.342
VX019	~~12126~~	.622
VX051	~~07126~~	.342
VX052	~~"~~	"
VX072	~~04126~~	.245
VX128	~~02126~~	.146
VX156	~~"~~	"
VX130	~~"~~	"
VY014	~~07126~~	.342
VY015	~~"~~	"
VY019	~~12126~~	.622
027	~~"~~	"
039	~~04126~~	.245
043	~~"~~	"
056	07126	.342
057	~~"~~	"
WR017	12126	.622
WS142	~~07126~~	.342
143	~~02126~~	.146
[illegible]	07126	.342

WR013	12126 –	.622
016	" –	"
019	" –	"
022	" –	"
025	" –	"
028	" –	"
048	– 02126 –	.146
070	– 04106 –	.316
071	– " –	"
077	– 02126 –	.146
082	" –	"
087	" –	"
127	07126 /	.342
129	10126	.533
WS 140	04106 –	.316
141	12126 –	.622

WR13
16
19
22
25
28
22
70
71
77
82

87
127
129
WS 140
141

tray 1104B

WS 145	~~02126~~	.146
210	~~12126~~	.622 -
212	~~12126~~	"
213	~~"~~	"
215	~~"~~	" -
216	~~04126~~	.245 -
217	~~"~~	" -
218	~~"~~	" -
222	04126	"
X 313	03091	.326
316	07126	.342

total 73.06 lb/ft

~~Since...~~

Since tray 1104B is 2 ft x 6 inch,

Then the total weight of the cables at tray 1104B

is $\frac{73.06}{2} = \underline{\underline{36.53}}$ lb/ft²

Therefore tray 1104B (D.I. 1.54) is in compliance with the F.S.A.R., Section 3.10.1.2.3 which allows up to 40 lb/ft².

~~The ...~~

cl * The RIII inspector verified the cable weights for type 03091, 04126, and 12126 with the following ~~applicable~~ manufacturer's data:

03091 — Okonite ~~Proposal~~ Proposal Data for SGL Specification # 21603 dated 12/21/75.

04126 — Okonite Bid Quotation dated 12/23/73

12126 — Okonite Proposal Data for SGL Specification H-2161 dated 5/22/?

+ 1. Unacceptable structural beam welds

+ 2. ~~?QDC?~~ OPC - Beams welds made without inprocess QC inspection.

+ 3. Unacceptable re-entrant corners on structural beams + beams installed that were not designed.

+ 4. Traceability of structural beams not ~~[illegible]~~ maintained

+ 5. Bristol QA program inadequate (independence + inadequate inspection criteria)

+ 7. Traceability of small bore piping not maintained

+ 8. Nonconformances improperly documented on SRs.

— 9. Unacceptable cable tray hanger welds

+ 10. Inspection ~~[illegible]~~ of painted cable tray hanger welds

+ and ~~[illegible]~~ no in-process inspections of ~~[illegible]~~ cable tray hanger welds

10 + 11. Weld inspection acceptance criteria deviated from FSAR

+ Unresolved 12. Open SR identified cable tray hanger foot connections covered with fireproofing

+ 13. Insufficient shimming of the penetrameter.

Unresolved 15. Reevaluation of cable selections in trays of > D.I = 1.0.

TOT 16. Cable Tray loading design basis deviates from the FSAR

Unr. 17. Thermal calculations to be performed for power trays

10 + 18. ~~[illegible]~~ No ~~[illegible]~~ requirements to perform thermal calculations of power sleeves or ~~[illegible]~~ dead weight calculations of trays.

Unr. 19. Justify D.I. program for dead weight and justify D.I=1.25 as limit

10 20. Control program did exist to document and control design deviations.

10
9+1 + 21. Cable separation design deviates from FSAR

+ 22. No inspection criteria for cable separation in spreading room.

Unr. 23. Misrouted non safety related cable.

A,B + 27. CG+E did not perform a comprehensive audit of the 50L nonconformance program.

A,B + 24. Inadequate corrective actions taken to resolve a recurring problem of design verifications not being performed.

3E + 25. Inadequate corrective action taken to corrective unverified socket weld fittings filler material traceability

10 + 26. Weld inspection criteria deleted or designated as N/A.

Applegate 12

The reason given for this incident was totally wrong since it was not associated with a design flaw in an electrical panel. The incident was caused when two gate valves were left open allowing water from a high pressure system to be pumped into a low pressure system resulting in a rupture of the non safety related steam jet air ejector condenser 1C1CD03AA ~~the~~ west side water box. Some of the information for the following was taken from the sequence of events report and some from conversation with Mr J. Wald the Operations Quality Engineer. The immediate cause appears to be a breakdown in communication between the plant operator and shift supervisor on January 18, 1979. "The man doing work ~~shift supervisor~~ told the shift supervisor ~~plant operator~~ that 3" gate valves 1E22-F003 and 1E22-F031 were open and system was full and vented. The shift supervisor did not hear that valves F003 and F03 were open. In addition the CY flush connection to the ~~…~~ low pressure core spray (LPCS) 1E21-F025 was open. With this valve open the LPCS and CD systems were tied together through the CY system. ~~…~~ The next day the GE engineer and Shift Supervisor reviewed the HPCS check list and verified that the system was filled and vented. The HPCS pump was started and everything appeared normal for the first ten minutes with 1200 psig pressure ~~on~~ in the pump discharge piping. After 3 minutes a tremendous water hammer occurred in the discharge piping. The Shift supervisor ordered the pump to be tripped and investigation showed that the ~~end~~ water box of the SJAE condenser had cracked and opened up for 3/4 of the circumference of the condensers spraying water all over the area.

~~The inspector~~ The following corrective actions have been taken.

(1) A 600 lb Walworth swing check valve No. 1CY077 has been installed downstream of gate valves 1E22-F003 and 1E22-F031 to minimize the effects of 2 gate valves inadvertently left open. The two gate valves are safety related but the check valve is not.

(2) The Quality engineer, Mr Wald stated that valve line ups now require two signatures for verification instead of one.

The inspector checked S+L drawing M-49 and found that the latest revision shows check valve 1CY077 installed close to and down stream of the two gate valves. The inspector with Mr Danie[illegible] the resident and Mr J. Boyle climbed up and observed that the check valve had been installed as shown on M-49.

~~The Brinkman of CG&E recommended that certain pressurized piping, and also pipes and valves be dismantled and inspected. A final answer on this has not been~~

I received a copy of a letter from H. C. Brinkman to W. W. Schwiers which outline the steps taken to make certain there was no damage to valves and piping hangers in the HPCS, LPCS and CD (non safety) systems due to overpressurization or water hammer.

A stress analysis and actual pipe wall thickness readings from UT test for the piping are also included in this package.

The valve people were also contacted as ~~to~~ any limitation on their respective valves, whether safety or non safety related. I feel this information closes out this item.

Al Erb

SPINOFF ALLEGATIONS	INSPECTION RESULTS	ASSISTANCE REQUIRED
Applegate 12	A desgin flaw in the heat exchanger control panel permitted an operator mistakenly to force 1200 pounds of the pipe pressure through pipes only meant to handle 300 pounds, ripping the pipe and soaking electricians with a hard spray of water that would have been radioactive had the plant been in operation.	1. Review inspection ~~RR~~ IE- report 7929. 2. Interview witnesses of the incident. 3. Review incident to determine what caused the particular incident. 4. Evaluate safety impacts. & possible generic concerns. 5 Determine if specific pipe is S/R or not. 6. If S/R, what is properly controlled.

I. Allegation

II. Findings

III. Investigation

A. Background Information

B. Personnel Interviews

C. Record Reviews

D. Field Observations

E. Acceptance Criteria

I. Allegation

This should as close to a verbatim statement of the allegation as possible. Whenever the allegation is written we should quote it if possible.

II. Findings, Conclusions, and Action.

This should include the following:

(1) Statement of degree of substantiation of allegation
(2) Statement of compliance or noncompliance to NRC
(3) Statement of significance
(4) Statement of action (issuance of IofN, coverage in IR, report, etc.)

Break the allegations into parts if necessary.

III. Investigation

A. Background Information

This should include explanatory information as to how the allegation was interpreted and other info such as organ and NRR descriptions.

B. Personnel Interviews

Describe separately

C. Record Reviews

List

D. Field Observations

Describe hands-on

E. Acceptance Criteria

Describe regulatory requirements or lack thereof or other AC.

SPINOFF ALLEGATIONS	INSPECTION RESULTS	ASSISTANCE REQUIRED
Applegate 11	Sand and mud choke the feedwater pumps and intake flues carrying makeup water to the cooling tower, because of a flaw in the plant's design. Pumps used to rectify the flaw quickly burn out.	NRC Report 1. 5055E is already been issued on this item No further work needed. Tracked IE & NRR

Applegate #4.

This allegation stated that fittings had been knocked off ~~on~~ a valve, presumably a flow control valve.

General Electric records were researched on these valves and start up Engineer Mr Van Natta was queried as to the history ~~of these valves~~, with no record of any fittings being forcibly knocked off these valves. Mr Van Natta did say that the original hook up of the ½" hydraulic lines to the valves was incorrect and was corrected by an FDDR document from G.E. Co.

¶ ~~Recently~~ The inspector looked at the valves and hydraulic lines ~~of~~ to the actuator and pumps and found all fittings to be intact. The hydraulics of the system has been stroked and is satisfactory. The only part of this valve that is safety related is the pressure containing portion and the hydraulic system is non safety related.

8221737

1. What is the allegation?

2. From where or whom did we get the allegation? (Including additional information).

3. When did we get the allegation?

4. How do we know that we are addressing the allegation?

   Ex. A. The specific alleged broken valve?

   B. Do we have the right pipe?

5. Identify the manner in which the allegation was reviewed. List the documents and revisions reviewed, the individuals and dates with whom discussions were held, and direct observations made. For facts determined by conversations with individuals, document the areas discussed and the information obtained.

6. State the acceptance/rejection criteria used to base all conclusions. Identify the code, standard, etc., plus any applicable addenda.

7. Clearly state the conclusion. If the allegation is determined to be non-safety related -- still substantiate if the allegation is true or not.

8. Whether safety related or not, make sure that both the specific and generic (safety related) concerns have been addressed for each allegation.

9. Identify the status (controlled, accepted, or rejected) that the licensee's QA program indicates for the allegation, where possible.

10. Address all previous NRC inspections and investigations that are relevant to the allegations.

11. Obtain and address any information that shows if another government agency (OSHA, etc.) and/or the licensee has dealt with the allegation.
12. Sworn statements will be obtained from those allegers who presented information to Mr. Applegate, Statements obtained from other persons such as QA/QC inspectors will not be sworn statements unless the investigator believes this is appropriate.
13. Since independent tests or radiographs are not intended, please assure that a determination is made that test results and radiographs are not fraudulent and report the basis for this determination.
14. Since it has been stated that management statements may not be accurate because they have a vested interest in the site, verify at least a percentage of management statements by such means as records or direct observation to assure their accuracy.

Tom Daniels said no need to address these — because they are irrelevant to the allegation. RR 6/17/81

1) The following floor drains are taped over:

A. RADWASTE Bldg. Elevation 527'-0"

1. Y-20
2. Y-17

B. Auxiliary Bldg Elevation 567'-5"

1. L-26
2. G-26 (Ele ℄ @ 562'-5¼")
3. G-22
4. G-20
5. G/H-20 (Ele. ℄ 562'-6¾")
6. H-22 (Ele ℄ 562'-7⅝")
7. H/J-24
8. G/H-22

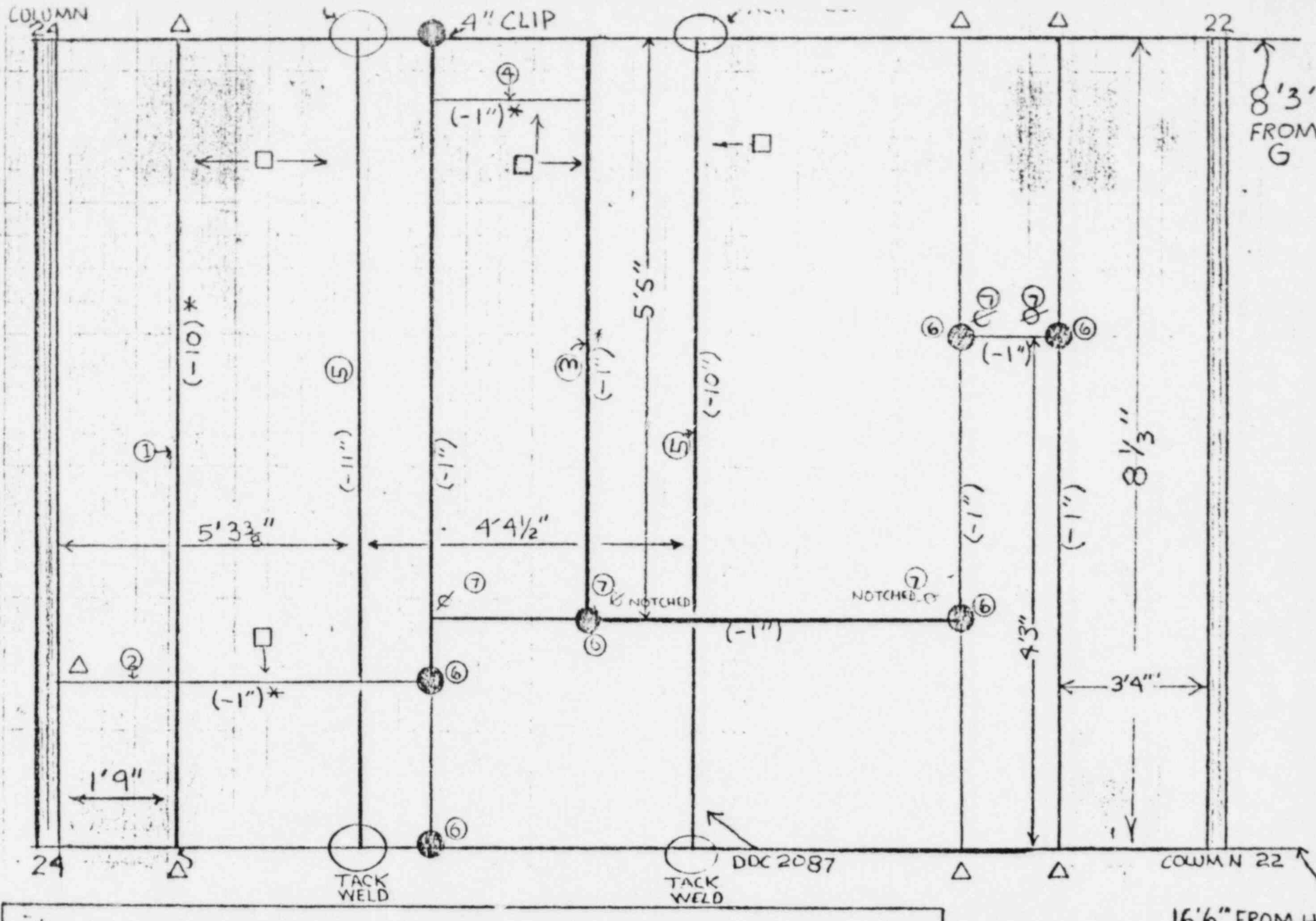
2) The following floor drains was partially ~~plugged~~ cover:

1. RADWASTE Bldg. Elevation 527'-0", W/X-20 (Ele. ℄ 525'-9")

3) The following floor drain was not located as shown on the architectural drawing A-534, rev. F:

1. RADWASTE Bldg. Elevation 513'-0", K-23

W8 X 17's - Elevation 546 Auxiliary Building
Switchgear Room



* ---	Not shown on S&L DWG. #S-546, Rev. AB or DDC's listed.
Ø ---	Re-entrant corners not coped.
△ ---	Welds or connections covered with fire proofing unable to evaluate.
□ ---	No identification on W8X17's or records to support tracibility of material.
● ---	Defective welds.

J. Schapker

Non-Conformance Report E-2233 1.

Addition inspection criteria deletion

Personnel contacted: F. Oltz, Kaiser 2/13/81

Documents reviewed: NR # E-2233

Need: Procedure for preparation of KE-1 form, KEI form #2554 (hold points delete

" #2552

#2553

#2560

CIP - M-126 Sht. 5 Rev L

Plan # WS-45

(ASME Section III (71) NA 4450)

The inspector reviewed documentation which support the above NR.

Findings: The NR was voided due to "correction" of the KE-1 form. The correction to the KE-1 form was actually not a correction but a deletion of previously stipulated hold points. No documentation supporting an engineering basis for deleting of these by passed hold points could be identified. The hold points were deleted by the documentation reviewer (Attachment A) identified above, (see NR E2233) no signature or date of deletion is annotated on the KE-1 form only the letters NA appear over the "X's". (X's are utilized in preparing the form to indicate which hold points are applicable.) KEI forms #2552, 2553, 2560 (Attachment B) are examples of correctly completed (items 1-2-3) In addition the

S/N's on gamma plugs

~~Inspector noted that traceability of the gamma plugs welded in the piping is not~~ identifiable. The KE-1 form identifies MK # for the pipe but not the plugs welded thereto. No other QA documentation could be located to identify the material for the gamma plugs. (Ref ASME Section III ('71) NA4442.)

Drawing E-162 510" Aux (outside area excluded)

① There are 9 cable buses shown for this area. They are:

Bus Designation	Segregation Code
CB-1	NS
CB-2	NS
CB-3	NS
CB-5	NS
CB-9 *	1GP *
CB-15	NS
CB-16 **	NS P
CB-19	NS .

* Essential Cable Bus containing cables DG 016, 017, 018 all of which are segregation code 1GP.

** There are two cable buses in this area, one over the other. The top bus is marked CB-16. The lower unmarked bus contains three white cables.

Note! There is also an unmarked cable bus in addition to the ones listed above that contains three white cables.

All of the cable buses above except CB-9 are non-essential. The hangers for CB-9 are ~~[illegible]~~ essential. The hangers for all buses except CB-9 are: non-essential seismic.

E-162 shows (8) type 1H1 hangers and (2) type 109HV3 hangers on the essential bus run. The CIP's for these hangers (except for the two that have not been inspected) are attached. Additionally, see NR. 3143 attached for nonconformances on cable bus on E-162.

RJR
NRC

DRAFT

To: Messrs. H. R. Sager, C. W. Beringhaus, and B. K. Culver

July 20, 1981

From: W. D. Waymire

The following excerpts come from our 7/17/81 phone conference with Bob Warnick and Paul Barrett of NRC/III:

NRC The problem I am having there I guess the Reg. Guide 1.75 requirement but I am not sure that what your commitment is to that. The breaker is not an adequate isolation device. An isolation device operates on false current only which the breaker does is not adequate isolation.

CG&E RJR The one breaker you assume that a failure of the associated cable where they come together. Now, you further assume that one of the breakers in one of the divisions fails to clear. You now applied the single failure criteria.

NRC That is not federal agreement with what Reg. Guide 1.75 is. Again, I am having some hesitancy saying that you have to comply with it because I don't know what you ? have worked out with NRR.

CG&E RJR Well, we wrote the paragraph, put it in the FSAR and it is being reviewed by NRR but of course Zimmer is not a 1.75 plant.

NRC Right, we understand.

CG&E RJR I believe if you , NRC - Get the bottom line

CG&E RJR We ought to get together with NRR

NRC and you have explicitly described what you are doing and they buy it we don't have any questions with it.

CG&E RJR What I have described is the way the single failure is applied now interesting enough your old associate Mr. Pollard was part of the team that arrived at this kind of philosophy. It has a thorough review in the IEEE but I think the answer is that we have to satisfy NRR.

NRC That is correct and we accept whatever NRR buys.

CG&E ~~Right~~-- Correct

NRC I guess the only point I am asking is to be explicit on how your isolating?

CG&E WDW What kind of language should we settle on for that particular item then to satisfy your

CG&E RJR The language has already been documented in the FSAR but what ~~happened~~-- has happened that NRR has to

CG&E WDW What we are talking about Dick is the wording in this document which we are preparing here to. Is that going to be a confirmatory order or an immediate action letter, Bob.

NRC Well, I don't know yet. I think what it is going to be Denny is a letter stating neither an immediate action letter or a confirmatory order. I think it will just be a letter from Keppler stating that it is our understanding that you are going to complete this quality confirmation program and that if additional concerns are identified then the program will be modified to incorporate them also and that we understand that this will all be completed before your operating license is issued.

CG&E WDW I see. So it will just be a letter. NRC - Just be a letter. WDW - Instruction letter?

NRC ____Tieing____ your operating license issuance with the completion of this program.

CG&E WDW So on that Item 2, would you prefer to insert after the first line which says perform 100% computer assistance analysis of associated cable, you prefer to insert the words to provide assurance that separation criteria for Class 1E circuits has been met?

NRC Yes, unless you have an objection to it. I think it is clearer.

CG&E WDW Looks like it is okay here. Everybody is shaking their heads yes.

NRC Okay, fine.

CG&E RJR Paul, we sent you about a 12 inch stack of paper on S&L's results on things that you talked to with Bob Cotta and Dick French. I didn't know if you had a chance to look at it.

NRC Paul had to step out for a minute, he just stepped back in. So repeat would you.

CG&E RJR This is Dick Reiman. We sent you some of the things that you were interested in when you were up with S&L talking to Dick French, Bob Cotta. I don't know if you had a chance to look at that or if you had any questions.

NRC No, I haven't. It is quite a large volume and I have been busy writing for the last two and 1/2 months. I do have it.

CG&E RJR I think you will find it does answer your question; at least in my interpretation.

NRC A three minute cursory review of the document and I believe it has in what we requested.

CG&E RJR Now we are doing a further analysis of Appendix R, the systems required for safe shutdown basing that on the analysis that LaSalle did which was written off as acceptable to the NRR.

NRC Okay

CG&E RJR That is in the works also.

NRC Okay. Paul has got fixed examples. Dick, I don't know what more you have. Briefly hit all of them and then you can tell me go into more detail on the ones you don't have.

CG&E RJR Okay.

NRC First Example - Okay the first example is in the cable spreading room. Its where, I am sure you have this one, Its where a yellow ~~light and~~ white and blue white cable come out of the conduit and they hang about maybe ~~two~~ 2 inches or 4 inches or so ~~above~~ right above a blue class ________ tray which means the yellow white cable does not meet separation criteria. I believe that is on the north side of the cable spreading room. It is cable no. RE053. It extends above blue cable tray No. 2072C and the cable enters into blue white TRAY. Two problems there. One is the yellow white is in the area of influence of the blue and secondly according to whatever your analysis brings out, you got a blue white and yellow white running together in the conduit.

CG&E RJR Paul, there was one you identified under the old eight and then there was three more that we called 9A, 9B, and 9C.

NRC I don't have that.

CG&E WDW Just keep going. You are doing good.

NRC The second one is the one where you install a little green TRAY and try to mount the white tray. I am pretty sure you have that one also in the cable spreading room.

The next one is near the stairwell in the cable spreading room. You got two blue cables that are going into a green ________ ________ up to the control room. It looks like a couple of construction workers inadvertently or mistakingly pulled the blue cables into the green tray. I can give you specifics if you need it.

The next one is white tray. This is the one we are talking about on the ~~depreciation~~-- association. You have got white tray No. 40. Its in the balance of plant tray 4080K contains many different divisions associated cable including for example blue white cable No. TI 192, yellow white cable No. RR781, and green white cable No. TI816. ?

NRC What I have done is I given three different examples of where you mixed your associated cables.

The next one is in the instrument relay room. You have got a white cable that is run through a yellow white conduit into the yellow tray. I am pretty sure you have this one. Cable No. DC258.

CG&E RJR That was that 9C.

NRC That cable had two actual, two cables that was on in the week and we concluded that only DC258 was the right cable.

CG&E RJR Another one was DC257.

NRC Yes, it was also a length of 257. But it was misrouted through a yellow tray.

CG&E RJR That was that tray 1040D.

NRC Correct. The last one has to do with the ~~devation~~-- deviation from the FSAR. The green tray riser that I indicated back in the previous example the way you ran two blue cables in it. That was the only chute that I recalled seeing in the entire cable spreading room. I was later told ~~that-were~~-- by you guys that are actually 8 of those tray risers installed. The FSAR says that every riser in that spreading room will be enclosed in a chute. It is my understanding that it is your intention not to do that but if you don't do that then you are going to have to explain ~~why~~-- what you do and that ______?______. That is in your FSAR.

CG&E RJR I agree.

NRC I am taking this off of an S&L Drawing No. E-898FB Rev. D Note #4. It says that the portions of cables in the cable spreading room which are not enclosed or protected by steel chutes decoder with 1/8 inch ______?______ material.

CG&E RJR Let us just see whether we have our understanding here. On 9A, there are 2 blue cables in the green tray.

9B is the yellow white cable coming out of conduit ___?___ approximately 6 inches above the cable in the blue tray.

NRC I can't here you at all.

CG&E WDW They are not talking to you, Paul. What Mike and Dick Reiman are doing are looking at the notes from your comments and comparing them against the previous inspection report items.

NRC I thought they were addressing me.

CG&E WDW They are just talking to one another. While they are doing that were there any other items in the most recent draft that you had questions on?

NRC I don't believe so.

CG&E WDW Harlan, I guess we didn't have any other items.

~~NRC~~-

Unidentified We will talk to you then next week on Monday Bob to make sure that you don't have any further questions on our definitions of the systems that are safety related and important to safety.

NRC I have asked a couple of guys to look at those lists to make sure we are in agreement and then I will get back to you after they complete their review.

CG&E Unidentifed So we will just wait for you to talk to us.

NRC Fine.

Unidentified Paul, if I could reference briefly on that last problem we had for separation, the FSAR Section 8.3.1.11.2.1.d is the one that req' the chute.

CG&E RJR What page? WDW - He just did that to be nasty. He h in front of him.

NRC Anyway, there have been other separations and violations identified subsequent to this and we are not including them in this report but they will be either in the Resident's Reports or later report.

CG&E RJR That is page 8.3-16 Subparagraph d, last one on the page, I think. We looked at the correlation between the 9A, B, & C and 8 and what you gave us. Now the two that we have, one we understand that we just talked about at the chutes. That was No. 6. In the order that you gave us, that was the last one.

NRC Yes.

CG&E RJR We need a little help on No. 4 just to see that we do understand that. We have got it written down here that there is a white tray 4080K contains many different associated cables. ~~This-i~~--- Is this the reason for the suspected violation.

NRC It is not a suspected and I will quote you the FSAR statement for that. By the way, this was discussed very thoroughly with NRR and myself and we both came to the same conclusion that you are violating the FSAR as written. Reference FSAR Section 8.3.1.13.2 "Balance of plant cables not associated with reactor protection or engineering safety feasture systems when assigned to a tray section of Class 1E segregation code are routed only in trays of that segregation code which excludes balance of plant tray." ~~8.3.1.13~~--- RJR - 8.3.1.13.2 Cable Tray Identification.

NRC Correct. I have the paragraph and the requirement in the report. I don't have anything else. The way we interpret this paragraph.

CG&E RJR Okay. So it is the way you interpret that paragraph.

NRC is that you will route associated cable only in the division that their associated with.

RJR We will take a look at that one and it will be part of the inspection.

NRC Okay. Again, I guess this will be answered by this review that you are going

RJR Right. We are calling an inspection for doing a little word engineering. It is the same thing ~~with~~ which we promised to do before. We are just going to call it an inspection.

NRC I don't ~~ifxx~~ know if any other actions are going to be needed. Just whatever you are doing there.

RJR As I mentioned before and just to give you an indication of how we are going to about this. We are using S&L's 100% analysis to help us look for potential problems and if we find a problem where there is some question about its meeting the criteria, we are going to send that to S&L for analysis and we will identify those things that we have had suspected or questioned and their resolution.

NRC I guess the first thing I would like to see personally is that you have identified all the trays for which you have more than one division of associated cable in.

RJR As I mentioned previously, that is the way that S&L analysis is conducted is to determine where there are two associated cables from different divisions within proximity and they tell us to go look at those places so that will be part of what we do. If there is some question about whether it is or it is not in conformance, we will put it back in S&L's resolve and will report on the resolution.

CG&E I think that is all we got. Do you have anything else.

NRC No, that is all.

CG&E Alright, thank you.

NRC. Okay, thank you.

A16. The RIII inspectors reviewed reader sheets for radiographs, made between October, 1979 and March, 1980, of the following field welds to determine if CG&E or H. J. Kaiser Co. personnel had accepted welds previously rejected by Peabody Magnaflux, PM:

Weld$SNo.$U	Reader$SSheet Identification$SNo.$U
1. RH-113	RH-31
2. R1-7	R1-11
3. RH-53	RH-20
4. RH-55	RH-20
5. K-73	RH-20
6. RH-40	RH-26
7. K-494	MS-37
8. FW-454	MS-30A
9. HG47A2-1/2	NR-E-2252
10. K-926	WR-26
11. K-455	MS-26A
12. MS22AA2	MS-311
13. K-84	RH-38
14. P.L.2M20795	LC-19
15. LP-9	LP-3
16. K-507	MS-44
17. K-508	MS-45
18. K-448	MS-27A

19. HP-19B	HP-5
20. FC-93	FC-29
21. K-414	MS-24A
22. K-523	MS-27A
23. RH-54	RH-20
24. RH-56	RH-20
25. RH-46	RH-20
26. RE-75A	RE-1
27. K-288	WX-8
28. RH-86	RH-64
29. @A3	DO-2
30. @C3	DG-25
31. HGK-250	HG-16
32. RD-K4	RD-1
33. 1MS22AC2	MS-315
34. DG03AA-3/4	DG-88
35. P.L.2M20803	LC-13
36. K-483	MS-43
37. K-499	MS-39
38. 1RRB1AA-3/4	RR-122
39. K-288	RT-2
40. FC-5	FC-14
41. K-33	FW-4
42. FWK-31	FW-2
43. LP-13	LP-11
44. CYK-221	CY-49

45. WR41AA3	WR-44
46. FW58A	FW-2
47. K-877	WR-2
48. HP-55	HP-4
49. K-475	MS-34

Reader sheets are the documents that accompany radiographs and identify such items as the radiograph interpreters, dates, acceptance, rejection, etc. None of the above reader sheets indicated that Kaiser personnel had accepted radiographs that had previously been rejected by Peabody Magnaflux. CG&E did not have personnel with direct QC and/or NDE responsibilities.

McCarten/Buonajuice

I Allegation No. 2

"Two thousand pound fittings were installed in 1979 on residue head valves, although five thousand pound fittings are required?"

II Findings

None

III Investigation

A. Background Information

None

B. Personnel Interviews

On February 10, 198~~0~~1, Individual "B" who was previously interviewed by representatives of GAP was interviewed and stated two thousand pound fittings were installed on two recirculation flow control valves, when five thousand pound fittings were required. He identified the fittings as being socket welded to two small hydraulic lines on the valves in question. Individual "B" stated to the best of his knowledge this deficiency has not been corrected to-date. On April 14, 1981 Individual "B" provided a written statement attesting to the aforementioned information, however he requested the

McCarten/Ciancipaia

the statement not be attached to this report.

C. Record Reviews

McCarter-Deascpraie 12 pitch

None

D. Field Observations

None

E. Acceptance Criteria

None

I Allegation 4

"The residue Heat valve broke when a pipefitter bumped into it, raising new questions about the quality of metal used for the valves."

II Findings

None

III Investigation

A. Background Information

None

B. Personnel Interviews

On February 10, 1981, Individual "B" who had been previously interviewed by representatives of GAP was interviewed. He stated that in 1979 it was reported to him that a pipefitter bumped into the Recirculation Flow Control Valve, and a small hydraulic fitting on the valve fell off. He siad it was reported to Kaiser and a Design DEficiency Notice (DDC) was issued directing the fitting be repaired. He stated the valve in question was manufactured by General Electric, who later repaired the broken fitting on the valve.

On April 14, 1981 Individual "B" provided a written statement attesting to the aforementioned information, however he requested the statement not be attached to this report.

C. Record Reviews

None

Chernajowie/McCarten 12 pitch

None

D. Field Observations

None

E. Acceptance Criteria

None

4. A residue heat valve broke when a pipefitter bumped into it, raising new questions about the quality of metal used for valves.

Finding

This allegation was not substantiated and there were no uncontrolled nuclear safety concerns.

Basis for Finding

The RIII investigators discussions with the alleger's source for this allegation revealed that the component involved was not a residue heat valve but rather an actuator for the hydraulic control lines to a flow control valve at the discharge of a recirculation pump.

The RIII inspector verified that though the flow control valve serves as a safety related pressure boundary, the hydraulic actuator has no safety related function. The RIII inspector researched the applicable General Electric records for the flow control valves and questioned the G. E. Control and Instrument Engineer responsible for these valves. The RIII inspector did not find evidence that indicated that the valves, the actuator, or fittings had been broken. The RIII inspector inspected the valves, the hydraulic lines to the actuators, the actuators, and the recirculation pumps. All of these components were intact and appeared satisfactory. The hydraulics of the system had been satisfactorily stroked.

In addition, the RIII inspectors interviewed approximately 16 pipefitters (the alleger's source was a pipefitter) who stated that they had no knowledge that would support this allegation.

1

Separate page

I <u>Allegation No. 10</u>

"Shock-absorbing electrical tray-hangers previously found unsatisfactory are still unsafe due to faulty welds, and electrical cable trays remain dangerously full."

II <u>Findings</u>

The portion of ~~the~~ the allegation that alleged electrical tray-hangers are unsafe due to faulty welds, is unresolved.

pending ~~further~~ additional inspections of hanger welds after paint and ~~[illegible]~~ fireproofing ~~has~~ have been removed; and establishment of weld quality for those welds which ~~has been removed and~~ in-process inspections were not performed; and ~~de~~ for which deviations have been ~~made~~ taken to AWS Code requirements.

¶ The portion of the allegation that alleged electrical cable trays remain dangerously full, is unresolved pending the completion and review of tray loading calculations for several tray routing points; re-evaluations of cable selections; establishment of the actual design basis and verification measures for cable tray loading; establishment of design measures to verify the thermal loading of power sleeves and the physical loading of trays; and establishment of

Six items of noncompliance were identified.

I

Allegation No. 2

"2000 pound fittings were installed in 1979 on residue head valves, although 5000 pound fittings are required."

Allegation 4

"~~The~~ A residue heat valve broke when a pipefitter bumped into it, raising new questions about the quality of metal used for valves."

II Findings

An interview with the person that originated this allegation revealed that the residue head valves and residue heat valve were not the components of concern. The components of concern in both allegations were the ~~act~~ hydraulic actuators for the recirculation flow control valves.

2. The allegation that alleged 2000 pound fittings were installed in 1979 on ~~residue head valves~~ actuators to the recirculation flow control valves, although 5000 pound fittings are required, was not substantiated.

4. The portion of the allegation that alleged that ~~the~~ a hydraulic fitting on the actuator to the recirculation flow control valve ~~residue head valve broke~~ ~~when a pipef~~ was broken, was substantiated in that a site control document had been written which identified a broken adaptor to the actuator. Neither the allegations, the interviews, the design documents, nor the QC records specified which of the two flow control valve ~~actuat~~ actuators were actually damaged.

d The portion of the allegation that alleged ~~a pipefitter~~ a pipefitter had bumped into the valve actuator was not substantiated.

d The portion of the allegation that alleged questions about the quality of the metal used in the valve actuator or the pipe connections to the actuator, was not substantiated.

Insert M

Interview of Individual "A"

On February 24, ~~April 24~~, 1981, Individual "A", who was previously interviewed by representatives of GAP was interviewed. Individual "A" stated that Individual "R" (Rick) had told Individual "A" that 6000 pound pressure fittings were required on the hydraulic lines in the Residual Heat Removal System but Individual R was told to intall 3000 pound fittings.

~~Interview of Individual "A"~~

On 4/22/81 Individual "A" provided a written statement attesting to the aforementioned information, however he requested the statement not to be attached to this report.

Interview of Individual "R"

On March 20, 1981, Individual "R" was interviewed by phone. Individual "R" stated that he had heard about a valve that had been broken but he did not have any first hand knowledge of the incident.

Individual "R" said he knew of cases in which "half-life" (3000# in-place-of 6000#) fittings were used. Two specific cases in which Individual "R" stated he has some recall ~~[illegible]~~ about ~~[illegible]~~ were:

1) 3/4 inch pneumatic lines carrying dry nitrogen which picks up the control rods.

2) A set of two inch black iron lines inside containment, which could have been hydraulic lines.

* Individual "R" repeatedly stated that it had been three years since he had been at Zimmer and he doesn't remember any specifics.

~~II Findings~~
III Investigation
A. Background

~~Findings~~

A ~~Interview~~
The above allegations ~~are~~ are ~~being~~ addressed simultaneously because the investigation determined that both allegations are addressing the same component by the same ~~source~~ alleger.

III ~~Interview~~

B. Personnel Interviews

Interview of Individual "B"

On February 10, 1981, Individual "B" who had been previously interviewed by representatives of GAP was interviewed.

Insert P

Insert P

on the same valves

... 1979 it was reported to him that ~~viewed by representatives of GAP was interviewed.~~ Individual "B" stated ~~two~~ three thousand pound fittings were installed on two recirculation flow control valves when ~~five~~ six thousand pound fittings were required. He identified the fittings as being socket welded to two small hydraulic lines on the valves in question. Individual "B" stated to the best of his knowledge this deficiency has not been corrected.

valve.

On April 14, 1981, Individual "B" provided a written statement attesting to the aforementioned information; however, he requested the statement not be attached to this report.

Insert A

A

Interview of T. F. Van Natta

On 6/25/81, Mr. T.F. Van Natta, Control ~~&~~ and Instrument Engineer for General Electric on-site, was telephonically interviewed.

Mr. Van Natta stated that the ~~two threaded adaptor~~ ~~adp~~ adaptor which connects the drain line to ~~the~~ the hydraulic ~~addressed in G.E. Field Deviation Disposition Request~~ actuator body was broken off. He said that he did not ~~No. KN-1-299 was replaced with a stronger piece~~ ~~know specifically how the adaptor was broken~~ ~~of pipe which had been not welded to a flange.~~ ~~He~~ know ~~if~~ whether or not a pipefitter had broken ~~to~~ the adaptor. ~~said the flange would allow the actuator to be easily removed for a repair if necessary.~~ Mr. Van Natta stated ~~He said the~~ that the originally installed adaptor was adequate for the designed service, but ~~th~~ it was ~~susp~~ susceptible to mechanical damage from adjacent construction activities that were being performed. ~~He~~ Therefore the ~~line~~ decision was made to replace the original adaptor design with the stronger flange design defined in ~~the~~ ~~FDDR # KN-1-299~~ General Electric Field Deviation ~~Dsp~~ Disposition Request # KN-1-299 dated 12/13/73.

4. Mr. Van Nutta stated ~~that~~ that he did not know of any 2000, 3000, 5000, or 6000 ~~psi~~ pound (per square inch) fittings ~~to~~ that were designed for the hydraulic actuator or the ~~p~~ pipe (line) connections to the hydraulic actuator. ~~He~~ He said however the actuator and ~~two~~ three of the four ~~the~~ ~~three~~ ~~line~~ hydraulic lines connecting to the actuator had a design test pressure of 3000 psig. He said The fourth line, which was addressed in FDOR# KN-1-299, was the drain line to the actuator, ~~a~~ which has design test pressure of 200 psig. and normal operating pressure of 14.7 psig, since the drain line is open to the atmosphere at the drain tank.

4. Mr. Van Nutta stated that the actuator drain ports and lines were separated from the relatively high pressure (3000 psig) side of the actuator by two seals (a main seal and a backup seal), ~~that two~~ which have a design pressure of 3000 ~~static~~ psig.

Interview
Joe Nalta
4/23/81
Powell

5^0 7^{03} 6^7 $6^{2:0}$

C. Record Review

The RIII ~~inst~~ inspector reviewed ~~Sargent & Lundy drawings M-47 ~~ ~~Sheet~~, Sheet 1 of 2, ~~[illegible] revision T, and M-47, Sheet 2 of 2 revision P, and~~ General Electric Field Deviation Disposition Request, FDDR, # KN-1-299 (designated as nonconformance request) dated 12/13/78, which addressed the Recirculation ~~Flow~~ System Flow Control ~~[illegible]~~ Valve Actuator. The ~~FDR~~ FDDR, • Exhibit Q to This IE Report 81-13, indicated that the following had occurred:

"The threaded adaptor which connects the drain port on the actuator body was broken off during installation of the 1/2" NPT hydraulic piping. This adaptor is not suitable for this application where the connection is susceptable to damage and does not provide take down ~~capa~~ capability."

The final disposition of the FDDR was as follows:

"Replace the defective adaptor with short tube

1

threaded to the actuator and socket welded to a special flange attached to the actuator mount ledge. A mating flange with a viton 'o' ring joint is also provided similar to the other actuation piping connections. See Fig. 1."

The hydraulic ~~flow control valves~~ actuators (part # 1B33 F060A ~~power unit part # B33-D003~~ and part # 1B33 F060B; power units part # B33-D003) and the respective 1/2 inch lines (pipes) were identified on Sargent & Lundy drawings M-47 Sheet 1 of 2, revision T and Kaiser isometric drawing M-47, sheet 2 of 2, revision P. The drawings identified the respective drain lines as 1RR39AC 1/2 and 1RR43AC 1/2, extending from the actuator to the isolation valves.

The FDDR indicated that the flange modification was completed July 13, 1979.

The actuators for the two recirculation flow control ~~flow~~ valves, addressed on FDDR # KN-1-297, ~~The piping actuators~~ and their respective piping, ~~were addressed on FDDR # KN-1-297,~~ ~~were~~ components, locations, and classifications were ~~identified~~ identified on the following drawings:

1) Actuator # 1B33F060A (~~two~~ drain line # 1RR39AC ~~3/4~~ 1/2")	Sargent & Lundy drawing # M-47 Sheet 1 of 2, revision T; and Kaiser isometric drawings # M-464-3-RR-244 ~~revision~~ revision __ and M-464-3-RR-241 revision __
2) Actuator # 1B33F060B (drain line # 1RR40AC 1/2")	S&L drawing # M-47, sheet 2 of 2, revision P; and Kaiser isometric drawings # M-464-4-RR-262 revision __ and M-464-4-RR-257 revision __

4

drawings indicated that the ~~and 1B33F0060B)~~
The actuators ~~(part # 1B33F0060A)~~ ~~for the second two~~ ~~recirculation~~ ~~flow control valves~~ and the portions of the respective piping which ~~was~~ were located inside the drywell, were classified as ASME Section III Class B. The portions of the respective piping located outside the drywell and past the isolation valves were classified as ASME Section III Class D (nonsafety related).

The following drawings identified ~~the~~ and routing ~~classifications~~ the ~~and~~ designs, components, locations (routings) and classifications of the respective piping (lines), which was affected by FDDR # KN-1-299.

1) Sargent & Lundy ~~S&L~~ <u>S&L Drawing #</u> — <u>Drain Lines</u>
M-47, Sheet 1 + 2, Revision T and

<u>Kaiser Isometric drawings</u>
M-464-3-RR-239 rev. _,
M-464-3-RR-240 rev _

~~4~~ 5

Neither the drawings nor the FDDR identified the use of pressure fittings. However, the Mechanical Piping list ~~spec~~ indicated that three of the four ~~the~~ hydraulic lines, connected to each of the two actuators, have a design pressure of 3000 pounds per square inch gauge, psig. The Mechanical Piping list indicated that the fourth line (drain line), connected to each of ~~the~~ the actuators, has a design pressure of 200 psig. FDDR # KN-1-299 identifies the broken actuator adaptor as the connector for the (fourth) hydraulic drain line.

QC purchase, ~~record~~ installation, and pressure test records review to be added later.

~~Background -- Neither the allegation, the interviews, nor the design documents, nor QC installation records specified which of the two actuator~~ 5 6
~~drain lines for the respective flow control valves was actual damaged.~~ 6

D. Field Observations

On 6/29/81, the RIII inspector visually inspected both of the actuators and the ~~cate~~ attached lines (at the points of attachment). The lines were installed as specified on the respective drawings. The ~~alleged~~ drain ~~lines~~ ~~line for actuator~~ installed lines for the hydraulic actuators ~~o~~ for both of the recirculation flow control valves were installed in accordance to FDDR # KN-1-299 dated 12/13/75. The inspector identified no unacceptable weld indications in ~~the socket welds~~ either actuator, flange, or piping welds directly adjacent to the actuators and flange.

The RIII inspector ~~~~ observed the two drains from the respective actuators to the penetrations ~~going~~ leading out of the drywell. The lines appeared to be installed as indicated on the Kaiser isometric drawings.

~~Appendix A~~

I Allegation No. 11

"Sand and mud choke the feedwater pumps and intake flues carrying makeup water to the cooling tower, because of a flaw in the plant's design. Pumps used to rectify the flaw quickly burn out."

II Findings

The portion of the allegation that alleged sand and mud choke the feedwater ~~This allegation was substantiated in that the~~ pumps and ~~intake~~ intake flues was substantiated in that the licensee reported, a silting condition concerning the Service Water Intake Structure, to ~~the~~ the NRC Region III ~~on~~ by phone on 6/13/79 and by letter on 6/20/79, pursuant the ~~express~~ requirements of 10CFR50.55(e).

Insert A

~~The the item~~ The silting ~~condition~~ and pump impeller wear concerns ~~is unresolved~~ are unresolved; pending notification by the licensee of the completion of the corrective ~~actions~~ measures ~~to be taken~~ described in the Wm. H. Zimmer FSAR, Appendix J, Revision 8 ~~to be taken~~ (including a sedimentation monitoring program dated December, 1980 (" " " " and plant modification ~~which will assure that the intake flume and structure are~~ The implementation of these corrective ~~actions~~ measures will be reviewed during a subsequent ~~maintained in a condition consistent with operational requirements.~~ inspection. ~~(50-358/81-13-37)~~

Insert A

The portion of the allegation that alleged the choking was caused by a flaw in the plant design, was ~~not~~ substantiated in that the plant design and operating procedures ~~substantiated~~ ~~the~~ had to be modified to control the silting condition.

The portion of the allegation that alleged ~~a~~ pumps used to rectify the flaw quickly burn out, ~~will be investigated~~ ~~was~~ was not substantiated.

~~However, as reported pump impeller wear was identified which during a subsequent inspection it determined necessary adversely affected the service water pumps. service water intake to ~~ ~~issue~~ ~~the intake flume and~~ structure ~~complies with operational requirements. (353/81-13-31)~~

However, in ~~as~~ a pump impeller wear was reported by the licensee, by phone on 9/10/79 and by ~~as~~ letters QA-1196 dated 9/6/79, QA-1239 dated 12/31/79, and QA-1371, pursuant ~~to~~ the requirements of 10 CFR 50.55(e).

¶ No items of noncompliance were identified.

III ~~Investigation~~

The RIII inspector reviewed the silting condition identified in CG&E letters, QA-1148 dated 6/20/79 and QA-1168 dated 7/23/79, ~~Exhibit R and S, respectively, to this IE Report 81-13. These~~ and the service water pump impeller wear condition identified in CG&E ~~letters~~ letters QA-1196 dated 9/16/79, QA-1233 dated 12/31/79, and QA-137 dated 12/17/80 which ~~letters~~ were sent to the NRC Region III, pursuant to the requirements of 10CFR50.55(e). ~~Specifically~~ Copies of these letters are enclosed as Attachments T, U, V, W, and X to this IE Investigation Report #81-13. ~~a silting condition involving the service water intake structure and the~~

¶ ~~These~~ The silting ~~condition~~ and the pump impeller wear conditions along with the ~~corrective~~ measures to correct these conditions are described in the ~~letters~~ following excerpts from the Wm. H. Zimmer Final Safety Analysis Report, Appendix J ~~dated~~ Revision 69, dated December 1980:

¶ Separate page

¶ The ~~corrective~~ corrective measures to be taken, ~~and~~ described in the aforementioned excerpts have been reviewed and accepted ~~by the~~ ~~NRC~~ in the Safety Evaluation Report Related to the Operation ~~by the Office~~ of Wm. H. Zimmer Nuclear Power Station, Unit 1, Issued June, 1981 by the Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, ~~in the~~ .

¶ The implementation of these corrective measures ~~will~~ is unresolved pending notification by the licensee of the completion ~~be reviewed due~~ of the corrective measures described in the Wm. H. Zimmer FSAR, Appendix J Revision 69, dated December, 1980. (358/81-13-31)

¶ No items of noncompliance were identified.

I Allegation 9

"Engineering "designs" routinely are drawn after the fact to conform with piping that already had been installed."

II Findings

Insert
~~None~~.

III Investigation

A. Background Information

None.

B. Personnel Interviews

Interview with Individual "A"

On April 24, 1981, Individual "A" who was previously interviewed by representatives of GAP was interviewed. Individual "A" stated Kaiser construction personnel utilized "Construction Aids" rather than final design drawings when fabricating and installing pipe support hangers onsite. He stated that if a pipe support hanger or pipe piece were moved, the "Construction Aid" was changed in the field without an engineer's concurrence. He said there was

II Findings

This allegation was substantiated in that site a procedure ~~has~~ specifies ~~documents~~ controls which permits the design of small bore piping and associated hangers, ~~to be~~ documented on isometric drawings, to changed in the field by marking the changes on the isometric drawings. The changes would require engineering approvals and quality assurance verifications.

No items of noncompliance or safety concerns were identified

1.0
1.3.1
1.3.2

C. Record Reviews

The RIII Inspector reviewed ~~the following~~ revision 2 ~~to~~ dated 5/4/78 and revision 3 dated 11/15/79 to ~~KE~~ Kaiser Field Construction Procedure #2-24 concerning ~~[illegible]~~ 2 inch and under piping and hanger drawings. ~~The object~~ Essentially

These procedural revisions defined how isometric drawings ~~were~~ "construction aids" were drawn at the site by Kaiser Engineers, Inc., ~~were by~~ based on ~~altering, interpreting, and clarifying and transmitting the~~ Sargent & Lundy's design criteria. S&L's design criteria were ~~is~~ specified in ~~the~~ specifications, drawings, instructions, ~~&~~ etc. in the form of ~~which are~~ general requirements for various classes, types, and configurations of piping and hangers systems.

The procedure indicated that ~~in field iso~~ the isometric drawings ~~are used to~~ were ~~the~~ drawn to ~~interpret, clarify and~~ translate the S&L general design criteria into ~~specific~~ detailed specification for individual piping and hanger systems.

~~a~~ When field changes to the designs on the original isometric drawings, due to interferences with other plant installations, 2

~~a~~ the procedure provided controls by which design changes, ~~due to~~ to pipe and hanger ~~routing/installation~~ and hanger configurations and locations, ~~changes~~ could ~~can~~ be made in the field by marking ~~to~~ the applicable isometric drawings. ~~Show to show the changes~~ The marked changes could also include ~~added~~ additional material, welds, and/or fittings. ~~The changes could would be required makes in the small bore pipe system the changes could Changes would be necessary when the small bore piping and hanger design, indicated on the original isometric drawing, could not be completed because of interferences with plant installations.~~

~~The procedure~~ The marked isometric ~~would~~ drawings changes required review and approval by the KEI Piping Engineering Department.

¶ ~~The~~ Procedure # 2-24 also ~~stip~~ stipulated ~~organiz~~ requirements and interfaces (including QC procedures) to assure ~~that~~ that ~~the~~ quality assurance inspections, ~~relevant~~ ~~rel~~ relevant to the installation of the piping and hangers, would be performed and documented.

¶ The practice of ~~installing~~ installing and modifying ~~designs of~~ small bore (2 inch and under) piping and hangers in accordance with adequately controlled ~~~~ ~~de~~ designed and quality assurance ~~and practices~~ requirements is ~~a~~ common throughout the power plant industry and ~~violates~~ violates no NRC requirements.

¶ The NRC has identified ~~~~ ~~~~ problems with the installation of pipe hangers and the ~~the~~ quality assurance inspection program alluded to in ~~the~~ Procedure # 2-24.

These problems, and were documented in Region III Inspection Reports [1] 79-37, __ __ __ __ __.
The corrective measures to resolve these problems ~~and~~ have been and are being ~~cl~~ closely monitored by Region III. The corrective measures involve additional redesign, drawing changes, and field modifications.

I

Allegation$SNo.$S2$U

"2000 pound fittings were installed in 1979 on residue head valves, although 5000 pound fittings are required."

Allegation$SNo.$S4$U

"A residue heat valve broke when a pipefitter bumped into it, raising new questions about the quality of metal used for valves."

II Findings$U

An interview with the person that originated this allegation revealed that the residue head valves and residue heat valve were not the components of concern. The components of concern in both allegations were the hydraulic actuators for the recirculation flow control valves.

2. The allegation that alleged 2000 pound fittings were installed in 1979 ~~on~~ in hydraulic actuators to the recirculation flow control valves, although 5000 pound fittings are required, was not substantiated.

However, the investigation did reveal that ~~the~~ these hydraulic pipe lines connected to the actuators previously had a specified design pressure of 6000 pounds per square inch gauge and later had a specified design pressure of 3000 psig.

4. The portion of the allegation that alleged that a hydraulic fir<tting on the actuator to the recirculation flow control valve was broken, was substantiated in that a site control document had been written which identified a broken adaptor to the actuator. ~~Neither the allegations, the interviews, the design documents, nor the QC records specified which of the two flow control valve actuators were actually damaged.~~

The portion of the allegation that alleged a pipefitter had bumped into the valve actuator was not substantiated.

The portion of the allegation that alleged questionable ~~about the~~ quality of the metal used in the valve actuator or the pipe connections to the actuator, was not substantiated, in that material identifications were installed as specified on the ~~...~~ installation drawings and the hydraulic systems were satisfactorily pressure tested.

III Investigation$U

A. Background$U

The above allegations are addressed simultaneously because the investigation determined that both allegations are addressing the same component by the same alleger.

B. Personnel$SInterviews$U

InterviewSofSIndividual$S"A"$U

On February 24, 1981, Individual "A", who was previously interviewed by representatives of GAP was interviewed. Individual "A" stated that Individual "R" had told Individual "A" that 6000 pound pressure fittings were required on the hydraulic lines in the Residual Heat Removal System but Individual "R" was told to install 3000 pound fittings.

On April 22, 1981, Individual "A" provided a written statement attesting to the aforementioned information, however, he requested the statement not be attached to this report.

InterviewSofSIndividual$S"R"$U

On March 20, 1981, Individual "R" was interviewed by phone. Individual "R" stated that he had heard about a valve that had been broken, but he did not have any first hand knowledge of the incident. Individual "R" said he knew of cases in which "half-life" (3000 lb. in*place*of 6000 lb) fittings were used. Two specific ases<<cases in which Individual "R" stated he has some recall about were:

To be addressed later

(1) 3/4 inch pneumatic lines carrying dry nitrogen which picks up the control rods.

(2) A set of two inch black iron lines inside containment, which could have been ~~dry~~ hydraulic lines.

Individual "R" repeatedly stated that it had been three years since he had been at Zimmer and he does not remember any specifics.

InterviewSofSIndividual$S"B"$U

Individual "B" stated three thousand pound fittings were installed on two recirculation flow control valves when six thousand pound fittings were required. He identified the fittings as being socket welded to two small hydraulic lines on the valves in question. Individual "B" stated to the best of his knowledge this deficiency has not sb<<been corrected.

On February 10, 1981, Individual "B", who had been previously interviewed by representatives of GAP was intef<rviewed. Individual "B" stated that on the same valves in 1979 it was reported to him that a pipefitter bumped into the valve and a small hydraulic fitting on the valve fell off. He as<<said the fitting was later identified as a nonconforming item by Kaiser and a Design Document Change (DDC) was issued directing the fitting be repaired. He stated the valve in question was manufactured by General Electric, and General Electric later repaired the broken fitting on the valve.

On April 14, 1981 Individual "B" provided a written statement attesting to the aforementioned information; however, he requested the statement not be attached to this report.

InterviewSofST.$Sf<F.$SVan$SNatto$U

On June 25, 1981, and Mr. T. F. Van Natto, Control and Instrument Engineer for General Electric onsite, was telephonically interviewed. Mr Van Notta stated that the adaptor which connects the drain line to the hydraulic actuator body, was broken off. He said that he did not know whether or not a pp<ipefitter had broken the adaptor. Mr. Van Natto stated that the originally installed adp<aptor was adequate for the designed service, but it was susceptible to mechanical damage from adjacent construction activities that were veing performed. Therefore, the decision was made to replace the original adaptor design with the stronger flange design defined in General Electric Field Deviation Disposition Request No. KN-1-299 dated December 19, 1978.

Mr. Van Natto stated that he did not know of any 2000, 3000, 5000, or 6000 pound (per square inch) fittings that were designed for the hydraulic actuator or the pipe (line) connections to the hydraulic actuator. ~~He~~ Mr. Van Natta said ~~however,~~ the actuator and three of the four hydraui<lic lines connecting to the actuator had a desin<gn test pressure of 3000 psig. He as<<said the fourth line, which was addressed

in FDDR No. KN-1-299, was the drain line to the actuator, which

... pressure of 200 psig and normal operating

... ain line is open to the

... tor drain ports and

... vely high pressure (3000 psig)

... (a main seal and a backup

... of 3000 psig.

Interview of T. E. Bloom

On June 30, 1981, Mr. T. C. Bloom, General Electric onsite, was interviewed. Mr. Bloom stated that the nipple (adaptor) on the hydraulic actuator to the recirculation flow control valve for ~~Loop A~~ recirculation Loop "A" had been broken.

C. Record$SReview$U

1. The RIII Inspector reviewed General Electric Field Deviation Disposition Request, FDDR, No. KN-1-299 (designated as nonconformance request) dated December ~~13~~ 18, 1978, wih<<which addressed the Recirculation ~~System Flow Control Valve Actuatorindi<<Actuatory indicated<<<~~ ~~that the following had<<<~~ System Flow Control Valve Actuator. ~~(Exhibit Q to this IE Report 81-13)~~ The FDDR indicated that the following had occurred:

"The threaded adaptor which connects the drain port on the actuator body was broken off during installation of the 1/2" NPT hydru<aulic piping. This ~~adapetor~~ adaptor is not suitable for this application where the connection is susceptible to damage and does not provide take down capability." The final disposition of the FDDR was as follows:

"Replace the defective adaptor with short tube threaded to the actuator and socket weld to a special flange attached to the actuator mount ledge. A mating flange with a viton "o" ring joint is also provided similar to the other actuation piping connections. See Fig. 1.

The FDDR indicated that the flange modification was complete~~d~~ on July 13, 1979. The FDDR did not ~~indicated~~ identify the specific ~~actuator~~ actuator (Loop A or Loop B) which had the defective adaptor.

2. The hydraulic acutor<<actuators for the two recirculation ~~pumps and~~ flow control valves, ~~addressed on FDDR No. KN-1-200,~~ and their respective recirculation [illegible] piping, components, locations, and ca<lassifications were identified on the following drawings:

(1)	Actuator No. 1B33F060A (drain line No. 1RR39AC 1/2")	Sargent and Lundy Drawing No. M-47 Sheet 1 of 2, Revision T; and Kaiser isometric drawings No. M-464-3-RR-244 Revision , and No. M-464-3-RR-241 Revision .
(2)	Actuator No. 1B33F060B (drain line No. 1RR40AC 1/2")	S&L Drawing No. M-47, Sheet 2 of 2, Revision P; and Kaiser isometric drawings No. M-464-4-RR-262 Revision and No. M-464-4-RR-257 Revision .

a

Recirculation Loop B Components	Sargent & Lundy Piping & Instrumentation Drawings	Kaiser Engineers Isometric Drawings
1. Actuator No. 1B33F060A- Rucker Control (S/N 19028)	M-47 Sheet 2 of 2 Revision P	
~~1. Recirculation Pump- Bingham Willamette (S/N 21027)~~		
~~2. Flow Control Valve- ITT Hammel Dahl (S/N 76 9000 002)~~		
~~3. Hydraulic Power Unit- Rucker Control (I.D.# Zimmer B)~~		
2. Piping (lines), components ~~welds~~ (fittings), welds classifications, and locations	M-47 Sheet 2 of 2 Revision P	
a. Line # 1RR40AD 3/4 inch	"	M-464-4-RR-263 and M-464-4-RR-259
(and low point drain line 1RR43AD)	"	
b. Line # 1RR40AC 1/2 inch -- hydraulic system drain line	"	M-464-4-RR-262 and M-464-4-RR-257
(and low point drain line 1RR43AC)	"	
c. Line # 1RR40AB 1/2 inch	"	M-464-4-RR-261 and M-464-4-RR-258
(and low point drain line 1RR43AB)	"	
d. Line # 1RR40AA 3/4 inch	"	M-464-4-RR-260 and M-464-4-RR-256
(and low point drain line 1RR43AA)	"	

Recirculation Loop A Components	Sargent & Lundy Piping & Instrumentation Drawings	Kaiser Engineers Isometric Drawings
1. * Actuator No. 1B33F060A - Rucker Control (S/N SP 19025) -- Rucker Drawing # 81997-F-402 rev. M	M-47 Sheet 1 of 2 Revision T	
1. Recirculation Pump - Bingham Willamette (S/N 21018)		
2. Flow Control Valve - ITT Hammel Dahl (S/N 76 9300 001)		
3. Hydraulic Power Unit - Rucker Control (I.D. # Zimmer A)		
2. * Piping (lines), components (fittings), welds classifications, and locations	M-47 Sheet 1 of 2 Revision T	
a. Line # 1RR39AD 3/4 inch ** (and low point drain line 1RR41AD)	"	M-464-3-RR-243 and M-464-3-245
* b. Line # 1RR39AC 1/2 inch -- hydraulic system drain line ** (and low point drain line 1RR41AC)	"	M-464-3-RR-244 and M-464-3 RR-241 and M-464-3-RR-247
c. Line # 1RR39AB 1/2 inch ** (and low point drain line 1RR41AB)	"	M-464-3-RR-242 and M-464-3-RR-246
d. Line # 1RR39AA 3/4 inch ** (and low point drain line 1RR41AA)	"	M-464-3-RR-239 and M-464-3-RR-240

Ref. Flow Loop B

* Note: The disposition to FDDR No. KN-1-299 was applied to both drain lines # 1RR39AC and # 1RR42AC.

** Note: Low point drain lines are installed in the lowest points of each hydraulic line to provide system maintenance. Low point drain lines are not the same as the hydraulic system

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~~The Kaiser~~

The drawings indicated that the actuators and the portions of the respective piping which were located inside the drywell were classified as ASME Section III Class B. The pr<ortions of the respective piping located outside the drywell and past the isolation valves were classified as ASME Section III Class D (nonsafety related).

3.4 The RIII inspector reviewed a Sargent & Lundy Design Document Change which specified a ~~design~~ change in design pressure from 6000 psig to 3000 psig and from 3000 psig to 150 psig for all the respective hydraulic pipe lines to the actuators for the flow control valves. The Kaiser isometric drawings reflected the ~~design change~~ ~~details~~. design pressure changes specified in the DDC. (Note: Revision 5 to ~~the~~ drawing M-464-4-RR-257/Attachment 2 to this IE Report 81-13)

~~Revision 5 to isometric drawing # M-464-4-RR-257~~

1

4. The RIII Inspector reviewed the Sargent & Lundy Mechanical Department Piping Line List dated 5/29/81, which ~~indicated~~ specified the following conditions for the hydraulic lines:

Line #	Maximum operating Pressure, (psig)	Designed Operating Pressure, (psig)	Field Test Pressure (psig)
1RR39AA	2200	3000	3000
1RR39AB	2200	3000	3000
+ 1RR39AC	100	150	200
1RR39AD	2200	3000	3000
1RR40AA	2200	3000	3000
1RR40AB	2200	3000	3000
+ 1RR40AC	100	150	200
1RR40AD	2200	3000	3000

+ These were the drain lines which were affected by FODR # KN-1-29

The RIII Inspector reviewed the Material - Take-off, listed on each of the respective Kaiser Isometric record drawings ~~(which serves as the field installation record)~~, which indicated that all the material components (piping, fittings, and valves) met or exceeded the design conditions identified on the S&L Mechanical

11

Department Piping Line List.

A The RIII Inspector reviewed the KE-1 Weld ~~Data~~ Data ~~to~~ records listed on each of the respective Kaiser isometric drawings. ~~(which~~ ~~which~~ The records indicated that welds had been made in accordance with the ASME ~~Se~~ Code Section III - 1971 Edition, with the following exceptions:

a.) Line # 1 RR 39 AA ~~AE~~ ~~to~~ -- records do not reflect dates when welds were made for any of the welds.
(dwg. # M-464-3-RR-237 - ~~when~~
Rev. ~~4~~ 3)

(dwg. # M-464-3-RR-240 -- ~~records~~ recorded dates for welds A-1, A-2, A-3, C-2 and C-5 indicate the welds were tested (PT) before they were made.
Rev. 7)

b.) Line # 1 RR 39 AC ~~B~~
(dwg. # M-464-3-RR-244 -- records do not reflect dates when welds were made for any of the welds.
Rev. 4)

(dwg. M-464-3-RR-241 -- records do not reflect dates when welds C-6, C-7, C-8, C-9, C-10, and C-11 were made.
~~(original~~ rev. 4)

~~b~~ c) Line # 1RR37AD

(dwg. # M-464-3-RR-243 -- ~~records~~ records do not reflect dates
rev. 4) when welds were made for any of the welds.

(dwg. # M-464-3-RR-245 -- records do not reflect dates when
rev. 5) welds C-5 (rework), C-6, C-7, C-8, and C-9 were ~~not~~ made.

d~~4~~) Line # 1RR40AB

(dwg. # M-464-4-RR-257 -- records reflects QC verification of
rev. 8) weld A-1 with written signoff instead of required QC stamp; weld test (PT) records not available for welds A-2, A-3, and B-2

e~~5~~) Line # 1RR40AC

(dwg. # M-464-4-RR-262 -- ~~nonconformance report~~ weld data records written to ~~identify~~ replace
rev. 7) lost weld records for welds E-2 and E-4, without justification to assure in-process inspections were performed.

f~~6~~) Line # 1RR40AD

(dwg. # M-464-4-RR-259 -- records do not reflect dates when
rev. 6) welds B-2, B-5, and B-6 were made; and weld test (PT) record was not available for weld B-2.

(dwg. # M-464-4-RR-263 -- weld test (PT) record was not available
rev. 7) for welds A-1 and A-7.

4 The final quality assurance engineer's review of the above KE-1 Weld Data records had not been performed as of 6/29/81. Therefore, the above exceptions are unresolved pending the final QA engineer's review and completion of appropriate dispositions. ~~to have been made.~~ (353/81-13-32)

5 The RIII inspector reviewed Kaiser Engineers, Inc., Quality Assurance Construction Methods Instruction, (QACMI) No. M-10, revision 6 (dated 11/16/78) and revision 7 (dated 9/13/79). QACMI M-10, Titled "Pressure Testing of Piping Systems" complied with ASME Code Section III ~~S~~ - 1971, Article NB-6000.

. d The RIII inspector reviewed the following hydrostatic test ~~data~~ reports for the respective hydraulic lines: ~~connected to the actuators.~~

Test Pressure, PSIG

Line No/~~[illegible]~~	Design ~~M~~ Maximum	Maximum ~~Maximum~~ Allowable	Actual Intial ~~Allowable~~	Actual 10 minute Holding	Report No.
1RR 39 AA	3000	3180	3010	3000	RR-28 3/7/79 Retest 9/2[illegible]
1RR 39 AB	3000	3180	3010	3000	RR-27 3/1/79 ~~[illegible]~~ Retest 9/2[illegible]
1RR39AC (DWGS: 241, 244) ~~1-RR-39AC~~	200	225	215	150	RR-53 9/27/79
(DWG: 247)	200	215	210	160	RR-26 2/26/79
1RR 39 AD	3000	3180	3010	3000	RR-25 3/5/79 Retest 9/27/[illegible]
1RR 40 AA	3000	3180	3010	3000	RR-32 3/6/79 Retest 10/4/79
1RR 40 AB	3000	3180	3010	3000	RR-31 3/14/79 Retest 10/4/79
1RR40AC	200	215	210	160	RR-30 3/2/79 Retest 10/4/[illegible]
1RR40AD	3000	3180	3010	3000	RR-29 3/5/79 Retest 10/4/[illegible]

* The above hydrostatic pressure tests were performed by using the system power unit to pressurize the lines ~~through~~ through the actuators, as described in ~~the~~ General Electric File # VPF 3300-111-1 (Rucker Control Technical Manual # TM 81999 paragraphs

5.7.3.1 through 5.7.3.9). Therefore the actuators as well as the lines (pipes, fittings, ~~valv~~ valves, ~~etc~~ etc.,) were subjected to the test pressures.

The hydrostatic test ~~data~~ reports indicated that the tests had been performed in accordance to ~~QAP~~ QACMI # M-10, revision 6 and revision 7, respectively.

111

7.

D. Field$SObservations$U

- On June 29 and 30, 1981, the RIII inspector visually inspected both of the hydraulic actuators and all of the attached lines (from the actuators to the penetrations leading out of the drywell). ~~(at the points of attachment).~~ ~~The lines were installed as specified on the respective drawings.~~ The hydraulic system drain lines ~~for~~ connected to the ~~hydraulic~~ actuators for both of the recirculation flow control valves were installed in accordance to FDDR No. KN-1-299 dated December 18, 1978. The inspector identified no unacceptable weld indications in ~~either~~ any of the welds connecting the actuator, flange, or piping. ~~welds directly adjacent to the actuator and flange.~~ ~~Th~~ The inspector noted that all of the welds were socket welds. The general piping installation, routing, material identification, and welds were as specified on the respective isometric drawings.

No items of noncompliance or safety concerns were identified.

McCarter

I Allegation No. 12

A design flaw in the heat exchanger control panel permitted an operator mistakenly to force 1200 pounds of pressure through pipes only meant to handle 300 pounds, ripping the pipe and soaking electricians with a hard spray of water that would have been radioactive had the plant been in operation.

II Findings

None

III Investigation

A. Background Information

None

B. Personnel Interviews

On April 22, 1981 Individual "A" who was previously interviewed by representatives of GAP was interviewed and stated he recalls an incident when the heat exchanger control panel was pressurized with 1200 pounds of pressurized water, when it was only meant to handle 300 pounds. "A" said he heard learned that a high pressure water entered the low pressure system, and ruptured pipes in the low pressure system. "A" said two electricians in the area were doused with water when the pipes ruptured. "A" also said other plant employees said this incident occurred because an operator apparently failed to turn off a valve, which allowed high pressure water to enter the low pressure system.

On April 22, 1981 Individual "B" provided a written statement attesting to the aforementioned information, however, he requested the statement not be attached to this report.

On April 14, 1981 Individual "B" who was previously interviewed by representatives of GAP was interviewed and stated he recalls an incident when the alfa air injector condenser on the ground floor of the turbine building was injected with high pressure water instead of low pressure water, and the pipes in the condenser ruptrured. He said other workers in the plan told him this occurred because an operator failed to close the high pressure valve and the high pressure water entered the low pressure system which ruptured the lines.

On April 24, 1981 Individual "A" provided a written statement attesting to the aforementioned information, however he requested the statement not be attached to this report.

C. Record Reviews

None

D. Field Observations

None

E. Acceptance Criteria

None

5. Sensitive parts on welding rods are possibly damaged through storage at improper temperatures and possibly lost through failure to follow proper paper o<work and labeling requirements.

Findings$U

(1) The first part of this allegation (improper temperature) has been substantiated and had nuclear safety concerns.

(2) The second part of this allegation (failure to follow proper paperwork and to labeling requirements) was not substantiated and has no uncontrolled nuclear safety concerns.

Summary$U

(1) The licensee has been cited on numerous occasions (nine IE reports) by the NRC for inadequate control of weld rods which require temperature control. Currently, the licensee corrective actions to the citations and program to control rod temperatures appears adequate.

(2) Discussions with the alleger's source for this allegation revealed that this concern was -- that during September and October 1979 there was no pipefir<tter assigned to the weld rod shack during the evening shift to account for weld rods.

We never come out clearly and say "We verified all radioactive waste drains ~~have been~~ are free of debris." Why not.

I Allegation No. 3

"A radioactive waste drain is clogged with concrete which carelessly was poured into the drain."

II Findings

The portion ~~part~~ of the ~~This~~ allegation that a radioactive waste drain was clogged was substantiated in that interviews with pertinent personnel indicated that some drains had been clogged with ~~unspecified~~ debris; however, it was not substantiated that concrete was ~~not substantiated to be~~ the debris. Flushing records dated in 1979 indicated that the drains which are nonsafety-related ~~drains~~ were cleared of all restricting debris. These drains will not handle radioactive material until such material is generated following commencement of plant operations.

No ~~significant concerns or~~ items of noncompliance or safety concerns were identified.

III Investigation

A. Background Information

This allegation was understood to express ~~interpreted to state that the alleger was~~ concern ~~ed~~ that the radwaste drains ~~were important to the safe operation of the plant and that the drains~~ may be unable to perform their function because they had been clogged with concrete.

B. Personnel Interviews

Streeter

1

Interview with Individual "A"

On February 24, 1981, Individual "A" who was previously interviewed by representatives of GAP was interviewed and stated while concrete finishing work was underway in the radioactive waste disposal system he suggested to Kaiser Construction personnel that a pipefitter should be assigned to the concrete finishing crew to assure concrete did not enter and clog the drains. However, they disagreed with his suggestion and instead directed the floor drains to be covered up with duct tape to prevent concrete from entering and clogging the drains. Individual A stated that concrete did enter the lines and clogged the radiation waste drains.

On April 22, 1981 Individual "A" provided a written statement attesting to the aforementioned information; however, he requested the statement not be attached to this report.

Individual B stated that the problem with the clogged drains occurred in 1976 and 1977.

C. The RIII Senior Resident Inspector reviewed CG&E Flushing Procedure No. DR Rev. 0, approval date 9/23/77, for the Drain System. The purpose of this procedure was stated as follows: "This document details the procedure for cleaning the liquid radwaste floor drain and equipment drain piping to the various plant sumps and drain tanks. The floor drain and equipment drain piping shall be flushed until they flow freely and all large particulate matter is removed."

Appendices to the Flushing Procedure, numbering 81 pages with approximately 15 equipment and/or floor drains per page, indicated that essentially all of the included drains had been flushed and verified in accordance with the procedure. The Appendices indicated that the verifications had been made in 1979. The licensee stated that the flushing activities were still continuing.

Is this consistent with Section?

Telephone interviews were conducted by the Senior Resident Inspector with Test Coordinator responsible for the radwaste building drain flushing activities on 2/12/81 and the Startup Engineer responsible for Drain System flushes on 2/13/81. Both individuals indicated that some drains were found to be plugged with unspecified debris. In all of those cases the drains were cleared and flow was verified.

The Senior Resident Inspector made visual inspections of all of the accessible radwaste drain ports identified on Sargent & Lundy drawings A-533 Rev. F, A-534 Rev. F, and A-515 Rev. N. These drawings identified the drains in the radwaste building (elevations 496 feet, 527 feet, 513 feet and 511 feet) and in the auxiliary building (elevations 567 feet, 5 inches, and 546 feet). None of the observed drain ports were visibly plugged.

Neither the flushing records, the personnel interviews, nor the Resident Inspector observations confirmed or denied that the drains had been clogged with concrete. These activities did confirm that the flushed drains would allow flow on the dates of the verifications.

AH?

The Resident Inspector also determined that the radwaste drains are nonsafety related.

No items of noncompliance or deviations were identified.

NRC Investigation of Activities Pursuant to the Request Submitted to the M.S.P.B.

1. KEI knowingly installed and ripped out unsuitable main steam relief piping at an estimated labor cost of \$320,000. # During the period of 2/9-13/81 and 2/23-27/81, the RIII inspector discussed and reviewed pertinent information and documentation concerning the allegation. Discussions with Mr. H. C. Brinkman, Principle Mechanical Engineer, CG&E, indicated that in 1975, a nuclear power plant in Germany discovered the need to redesign the relief system based on new discharge loads. Therefore, several utilities, including CG&E, decided on a modification to replace the already installed rams head safety relief valve (SRV) discharge devices with quenchers.

quencher

a portion of piping

CG&E decided to start the modification, knowing that ~~rework on main~~

not yet installed for the ~~MS piping~~ quenchers would have had to be removed later

steam ~~relief piping would be necessary,~~ even though the piping had not ~~been installed.~~ The basis for the decision was that approximately ~~95% of~~ 90-97 the original design would be acceptable and therefore only ~~5%~~ 3-10% would be subject to rework. CG&E's decision concluded that it would be less costly to go ahead in 1975 with the installation activities rather than to delay the construction schedule until the modification design was complete. To date, the modification design is not complete.

. The NRC has been aware of the modification activities as described in the Mark II Design Assessment Report, Chapter 2.0 -- Zimmer Empirical Loads, ZPS-1. The RIII inspector observed that the latest documentation received from the NRC Licensing Branch No. 2 at the site concerning the modification activities, was NUREG-0487, Supplement 1, titled, "Mark II Containment Lead Plant Program Load Evaluation and Acceptance Criteria." It should be noted that there may be more changes in the future due to additional load definitions.

The modification has required the replacement of 10 inch schedule 40 pipe with other 10 inch schedule 40 pipe of different configurations, 10 inch extra strong pipe, and 12 inch extra strong pipe.

During this investigation the licensee provided cost figures for modification to date. The total labor cost was $823,780.00 and the total material plus labor cost was $1,183,690.00.

The RIII inspector reviewed all revisions to the KEI isometric drawing PSK-1MS, Sheets 21 and 21A, which were pertinent to the main steam relief piping. No additional changes of the magnitude addressed in the allegation were identified. The revisions identified the following changes:

Rev. 0	Redrawn -- original configuration replaced	9/8/76
Rev. 1	Hangers added	3/31/77
Rev. 2	Eight lugs added	1/10/78
Rev. 3	Hanger changed	5/5/78
Rev. 4	New spool pieces added, welds MS212 and MS195 voided per S&L	4/3/79
Rev. 5	Piping tee section added	6/18/79
Rev. 6	Weld MS160 and a 4 inch dimension added	10/1/79

Rev. 7	Field marked (redline) updates added	1/9/80
Rev. 8	Welds K-461 and K-463 changed; weld K-592 changed to K-593 per NR-2499; hanger detail section D-D added	9/27/80
Rev. 9	Weld K-592 changed to K-461; and weld K-593 changed to K-594	9/4/80

All of the above revisions pertained to the aforementioned modification.

The RIII inspector reviewed the QC documentation for the following main steam relief piping field welds: Nos. 160, 160A, 267A, 267B, 267C, 267D, 268B, 268C, 268D, 459, 460, and 461.

The records indicated that the welds had been accomplished in accordance with ASME Section III 1971, Summer 1973 Addenda.

The RIII inspector interpreted the radiographs for the following main steam relief piping field welds: Nos. 160A, 459, 460, 461, 462, and 594.

It is noted that there are approximately five to seven radiographs for each of the above welds. The varying number of radiographs are necessary to cover the entire 360 degrees of each pipe weld. The radiography was performed in accordance with ASME Section III 1971, Summer 1973 Addenda.

The above discussions and reviews indicate that the alleged activities were performed in accordance with the KEI QA program.

No items of noncompliance or deviations were identified.

Additional information:

Also contacted: F. J. Oltz, Records Supervisor

R. L. Wood, QA Engineer

Previous reports have not yet been incorporated into this write-up.

1

1. KEI knowingly installed and ripped out unsuitable main steam relief piping, at an estimated labor cost of $320,000.

Forward

The following (numbering 1-17) ~~this~~ allegations came to the NRC from the Office of the Special Counsel of the Merit Systems Protection Board (M.S.P.B.) in a documented Request for an Investigation Pursuant to 5 USC §1206 (b) (7). The Request was submitted to the M.S.P.B. on behalf of Mr. Thomas W. Applegate by the Government Accountability Project (GAP) of the Institute for Policy Studies (IPS). It is noted that GAP and IPS are not agencies of ~~any~~ not affiliated with the United States Government.

NRC Investigation & Activities Pursuant the Request Submitted to the M.S.P.B (date).

D1.

1. continued

~~[illegible]~~ During 2/9-13/81 & 2/23-27/81,

^ the RIII inspector discussed and reviewed pertinent information and documentation concerning the allegation. Discussions with Mr. R. J. Pruski, Project Manager, Sargent & Lundy (Zimmer Architectural ~~Engineering~~ & Engineering firm) and Mr. H. C. Brinkmann, Principle Mechanical Engineer, Nuclear Projects, CG&E indicated that ~~[illegible]~~ Kaiser Engineer Inc, in fact, knew ~~that~~ that part of the ~~main~~ main steam relief piping would have to be replaced before the original piping was installed.

The discussions revealled that the main steam relief system was originally fabricated for ~~[illegible]~~ rams head Safety Relief Valve, (SRV) discharge devices. However, in 1975, a nuclear power plant in Germany discovered new discharge loads. ~~and~~ Therefore, ~~[illegible]~~ several utilities, including ~~[illegible]~~ CG&E, ~~[illegible]~~ decided on a modification to replace the rams head SRV discharge devices with quenchers. ~~CG&E started the modification which ~~would~~ would require replacement of main steam relief piping that had not yet (1975) been installed.~~

~~Dis~~ Discussions with Mr. R. J. Pruski, Project Manager, Sargent & Lundy indicated that

CG&E ~~decision~~ decided to ~~start~~ start the modification, knowing that rework on ~~piping not yet installed~~ main steam relief piping, would be necessary, even though the piping had not been installed. ~~The decision was based~~ The basis for the decision was that ~~the~~ approximately 95% of the ~~original~~ modification design would be acceptable and therefore ~~at~~ only 5% would be subject to rework. ~~The~~ CG&E's decision concluded that it would be less costly to go ahead in 1975 with the installation activities, rather than to ~~total~~ delay the construction schedule until the ~~total design~~ modification design was complete. To date, ~~the~~ the modification design is ~~not~~ not complete.

The NRC has been aware of the modification activities as described in the Mark II Design Assessment Report, Chapter 2.0 -- Zimmer Empirical Loads, ZPS-1. ~~Amendment dated 10/15/80. The IE was~~

The RIII inspector ~~was~~ observed that the latest document received from the NRC Licensing Branch No. 2 ~~to Bosn~~ at the site concerning the modification activities, was ~~Nuclear~~ NUREG-0487, Supplement 1, titled "

"Mark II Containment Lead Plant Program Load Evaluation and Acceptance Criteria." It should be noted that there may be more changes in the future due to additional load definitions.

~~Discussion with Mr. R.J. Froski, Project Manager, for Sargent & Lundy indicated~~ The modification has ~~included~~ required the replacement of 10 inch schedule 40 pipe with other 10 inch schedule 40 pipe of different configurations, 10 inch extra strong pipe, and 12 inch extra strong pipe.

During this investigation the licensee provided cost figures for modification to date. The total labor cost was $824,780.00 and the total material plus labor cost was $1,183,690.00

The RIII inspector reviewed all revisions to the ~~applicable~~ KEI isometric drawing PSK-1MS, Sheets 21 and 21A, ~~to assure~~ identify ~~any other changes~~ which were pertinent to the main steam relief piping. ~~of the magnitude addressed in the allegation. No additional~~ No additional changes of the magnitude addressed in the allegation were identified. The revisions identified the following changes:

Rev. 0 Redrawn -- original configuration replaced 9/8/76

Rev. 1	Hangers added	3/31/77
Rev. 2	8 lugs added	1/10/78
Rev. 3	Hanger changed	5/5/78
Rev. 4	New spool pieces added, welds MS 212 & MS 195 voided per S&L	4/3/79
Rev. 5	piping Tee section added	6/18/79
Rev. 6	Weld MS160 and a 4 inch dimension added	10/1/79
Rev. 7	Field marked (redline) updates added	1/9/80
Rev. 8	Welds K-461 & K-463 ~~deleted~~ changed, to Weld K-592 ~~changed to~~ K-593 per NR-2499; hanger detail section D-D added.	8/27/80
Rev. 9	Weld K-592 changed K-461; and weld K-593 changed to K-594	9/4/80

All of the above revisions pertained to the aforementioned modification.

d. The RIII inspector review the QC documentation for the following ~~welds~~ ~~fields~~ main steam relief piping field welds:

#160, 160A, 267A, 267B, 267C, 267D, 268B, 268C, ~~268~~ 268D, 459, 460, ~~461~~ and 461.

The records indicated that the ~~___~~ welds had been accomplished in accordance with ASME Section III 1971,

~~For~~ Summer 1973 Addenda.

¶ The RIII inspector interpreted the radiographs for the following main steam relief piping field welds. #160A, 459, 460, 461, 462, and 574.

It is noted that there are approximately five to seven radiographs, for each of the above welds. The varying number of radiographs are necessary to cover the entire ~~~~ ~~~~ 360 degrees of each pipe weld. The radiography was performed in accordance with ASME Section III 1971, Summer 1973 Addenda.

¶ The above ~~document~~ discussions and reviews indicate that the alleged activities were performed in accordance with the KEI QA program.

¶ No items of noncompliance or deviation ~~~~ were identified

Additional information:
Also contacted F. J. Oltz, Records Supervisor
R. L. Wood, QA Engineer
Previous reports have not yet been incorporated into this ~~write-up~~ write-up.

NRC Investigation of Activities Pursuant to the Request Submitted to the M.S.P.B.

1. KEI knowingly installed and ripped out unsuitable main steam relief piping at an estimated labor cost of $320,000. During the period of 2/9-13/81 and 2/23-27/81, the RIII inspector discussed and reviewed pertinent information and documentation concerning the allegation. Discussions with Mr. H. C. Brinkman, Principle Mechanical Engineer, CG&E, indicated that in 1975, a nuclear power plant in Germany discovered the need to redesign the relief system based on new discharge loads. Therefore, several utilities, including CG&E, decided on a modification to replace the already installed rams head safety relief valve (SRV) discharge devices with quenchers.

   CG&E decided to start the modification, knowing that rework on main steam relief piping would be necessary, even though the piping had not been installed. The basis for the decision was that approximately 95% of the original design would be acceptable and therefore only 5% would be subject to rework. CG&E's decision concluded that it would be less costly to go ahead in 1975 with the installation activities rather than to delay the construction schedule until the modification design was complete. To date, the modification design is not complete.

   - The NRC has been aware of the modification activities as described in the Mark II Design Assessment Report, Chapter 2.0 -- Zimmer Empirical Loads, ZPS-1. The RIII inspector observed that the latest documentation received from the NRC Licensing Branch No. 2 at the site concerning the modification activities, was NUREG-0487, Supplement 1, titled, "Mark II Containment Lead Plant Program Load Evaluation and Acceptance Criteria." It should be noted that there may be more changes in the future due to additional load definitions.

The modification has required the replacement of 10 inch schedule 40 pipe with other 10 inch schedule pipe of different configurations, 10 inch extra strong pipe, and 12 inch extra strong pipe.

During this investigation the licensee provided cost figures for modification to date. The total labor cost was $823,780.00 and the total material plus labor cost was $1,183,690.00.

The RIII inspector reviewed all revisions to the KEI isometric drawing PSK-1MS, Sheets 21 and 21A, which were pertinent to the main steam relief piping. No additional changes of the magnitude addressed in the allegation were identified. The revisions identified the following changes:

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Rev. 5	Piping tee section added	6/18/79
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Rev. 7	Field marked (redline) updates added	1/9/80
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Rev. 9	Weld K-592 changed to K-461; and weld K-593 changed to K-594	9/4/80

All of the above revisions pertained to the aforementioned modification.

The RIII inspector reviewed the QC documentation for the following main steam relief piping field welds: Nos. 160, 160A, 267A, 267B, 267C, 267D, 268B, 268C, 268D, 459, 460, and 461.

The records indicated that the welds had been accomplished in accordance with ASME Section III 1971, Summer 1973 Addenda.

The RIII inspector interpreted the radiographs for the following main steam relief piping field welds: Nos. 160A, 459, 460, 461, 462, and 594.

It is noted that there are approximately five to seven radiographs for each of the above welds. The varying number of radiographs are necessary to cover the entire 360 degrees of each pipe weld. The radiography was performed in accordance with ASME Section III 1971, Summer 1973 Addenda.

The above discussions and reviews indicate that the alleged activities were performed in accordance with the KEI QA program.

No items of noncompliance or deviations were identified.

Additional information:

Also contacted: F. J. Oltz, Records Supervisor

R. L. Wood, QA Engineer

Previous reports have not yet been incorporated into this write-up.

4 cy

1. KEI knowingly installed and ripped out unsuitable main steam relief piping, at an estimated labor cost of $320,000.

Forward

The following (numbering 1-17) ~~this~~ allegations came to the NRC from the Office of the Special Counsel of the Merit Systems Protection Board (M.S.P.B.) in a documented Request for an Investigation Pursuant to 5 USC § 1206 (b)(7). The Request was submitted to the M.S.P.B. on behalf of Mr. Thomas W. Applegate by the Government Accountability Project (GAP) of the Institute for Policy Studies (IPS). It is noted that GAP and IPS are not agencies of ~~any~~ not affiliated with the United States Government.

NRC Investigations Activities Pursuant the Request Submitted to the M.S.P.B (date).

D1.

1. continued

~~During~~ During 2/9-13/81 & 2/23-27/81,

A. The RIII inspector discussed and reviewed pertinent information and documentation concerning the allegation.

~~Discussions with Mr. R. J. Preski, Project Manager, Sargent Lundy & Zimmer Architectural Engineering firm and Mr. H. L. Brinkmann, Principle Mechanical Engineer, Nuclear Projects, CG&E indicated that Kaiser Engineer Inc, in fact, knew that part of the main steam relief piping would have to be replaced before the original piping was installed.~~

~~The discussions revealed that the main steam relief system was originally fabricated before 1975 for rams head Safety Relief Valve (SRV) discharge devices.~~

B. Discussions with Mr. H.C. Brinkman, Principle Mechanical Engineer, CG&E, indicated that ~~However~~ in 1975, a nuclear power plant in Germany discovered ~~the~~ discharge the need to redesign the relief system based on new discharge loads. ~~discovered~~ Therefore, several utilities, including ~~~~ C.G&E, ~~~~ decided on a modification to replace the already installed rams head Safety Relief Valve (SRV) discharge devices with quenchers. ~~CG&E started the modification which would require replacement of main steam relief piping that had not yet (1975) been installed.~~

¶ CG&E ~~decision~~ decided to ~~start~~ start the modification, knowing that rework on ~~piping not yet installed~~ main steam relief piping, would be necessary, even though the piping had not been installed. ~~The decision was based~~ The basis for the decision was that ~~the~~ approximately 95% of the original design would be acceptable and therefore ~~not~~ only 5% would be subject to rework. ~~The~~ CG&E's decision concluded that it would be less costly to go ahead in 1975 with the installation activities, rather than to ~~hold~~ delay the construction schedule until the ~~total~~ ~~design~~ modification design was complete. To date, ~~the~~ the modification design is ~~not~~ not complete.

¶ The NRC has been aware of the modification activities as described in the Mark II Design Assessment Report, Chapter 2.0 -- Zimmer Empirical Loads, ZPS-1, ~~Amendment dated 12/15/79. The Zimmer~~

The RIII inspector ~~at~~ observed that the latest document received from the NRC Licensing Branch No. 2 ~~to Zimmer~~ at the site concerning the modification activities, was ~~NUREG~~ NUREG-0487, Supplement 1, titled "

"Mark II Containment Lead Plant Program Load Evaluation and Acceptance Criteria." It should be noted that there may be more changes in the future due to additional load definitions.

¶ The modification has ~~included~~ required the replacement of 10 inch schedule 40 pipe with other 10 inch schedule 40 pipe ~~of~~ of different configurations, 10 inch extra strong pipe, and 12 inch extra strong pipe.

¶ ~~The~~ During this investigation the licensee provided ~~the~~ cost figures for modification to date. The total labor cost was $324,790.00 and the total material plus labor cost ~~was~~ was $1,183,690.00

¶ The RII inspector reviewed all revisions to the ~~applicable~~ KEI isometric drawing PSK-1MS, Sheets 21 and 21A, ~~to assure identify any other changes~~ which were pertinent to the main steam relief piping, ~~of the magnitude addressed in the allegation.~~ ~~No additional~~ No additional changes of the magnitude addressed in the allegation were identified. The revisions identified the following changes:

Rev. 0 Redrawn -- original configuration replaced 9/3/76

Rev. 1	Hangers added	3/31/77
Rev. 2	8 lugs added	1/10/78
Rev. 3	Hanger changed	5/5/78
Rev. 4	New spool pieces added, welds MS 212 & MS 195 voided per S&L	4/3/79
Rev. 5	Piping Tee section added	6/15/79
Rev 6	Weld MS 160 and a 4 inch dimension added	10/1/79
Rev. 7	Field marked (redline) updates added	1/?/80
Rev. 8	Welds K-461 & K-463 changed ~~deleted~~, To Weld K-592 ~~changed to~~ K-593 per NR-2499; hanger detail section D-D added.	8/27/80
Rev. 9	Weld K-592 changed K-461; and weld K-593 changed to K-594	9/?/80

All of the above revisions pertained to the aforementioned modification.

4. The RIII inspector review the QC documentation for the following ~~welds~~ ~~fields~~ main steam related piping field welds:

#160, 160A, 267A, 267B, 267C, 267D, 268B, 268C, ~~268~~ 268D, 459, 460, ~~461~~ and 461.

The records indicated that the ~~weld~~ welds had been accomplished in accordance with ASME Section III 1971,

~~For~~ Summer 1973 Addenda.

The RIII inspector interpreted the radiographs for the following main steam relief piping field welds. #160A, 459, 460, 461, 462, and 594.

It is noted that there are approximately five to seven radiographs for each of the above welds. The varying number of radiographs are necessary to cover the entire ~~~~ ~~~~ 360 degrees of each pipe weld.

The radiography was performed in accordance with ASME Section III 1971, Summer 1973 Addenda.

The above ~~document~~ discussions and reviews indicate that the alleged activities were performed in accordance with the KEI QA program.

No items of noncompliance or deviation ~~~~ were identified.

Additional information:

Also contacted F. J. Oltz, Records Supervisor

R. L. Wood, QA Engineer

Previous reports have not yet been incorporated into this ~~write up~~ write-up.

Cable Tray Loading (Fill)

Contrary to the FSAR Section 8.3.3.1:

1. The tables for power cable loading (~~capacity~~ ampacity) are not based on IPCEA Publication No. 9-46-426. From discussions, they appear to be based on some composite of IPCEA P-46-426 1962, IPCEA P-54-440 1975, and a professional paper #70TP557-PWR printed in 1970.

2. Also, the summation of the cross-sectional areas of some cables do in fact exceed 50% of the tray usable cross-sectional area or two layers of cables, whichever is larger, but not to exceed 60% of the cross-sectional area. This fact is based on the design index computer program that was described to me on 3/17/81 by Mr. R. X. French, Assistant Manager Electrical Engineers, who was accompanied by Mr. R. F. Cotta, S & L Senior Electrical Engineer for Zimmer, and on 3/19/81 during a telephone conversation with Mr. French.

The design index program described is as follows:

$$\text{Design index} = \frac{\text{The sum of the cable (diameter)}^2}{\text{useable area (50\% of tray cross-sectional area)}}$$

$$= \frac{E(\text{dia}^2)}{\text{useable area}}$$

For power trays 24 x 4 = 96 total area

useable area = 24 x 2 = 48 sq. inches

Cable Tray Loading (Fill)

Contrary to the FSAR Section 8.3.3.1:

1. The tables for power cable loading (~~Capacity~~ ampacity) are not based on IPCEA Publication No. 9-46-426. From discussions, they appear to be based on some composite of IPCEA P-46-426 1962, ~~IPCEA P-54-440 1975~~ S&L Standard ESA-104a Rev 11/1/72, and a professional paper #70TP557-PWR printed in 1970. This deviation was not identified ~~[illegible]~~ on any control document. This is contrary to 10CFR50 App. B, Criterion III, which states in part that "... measures shall include provisions to assure ... that deviations from such standards are controlled."

HJC

3/17/81 French stated that appropriate [illegible]dications The FSAR [wi]ll be submitted [to] NRC. Also, [a]ding consideration [wi]ll be given the differing [ca]ble insulations [dis]cussed in [th]e standards compared to [th]e cable insulation [a]t Zimmer.

2. Also, the summation of the cross-sectional areas of some cables (see attachment A) do in fact exceed 50% of the tray usable cross-sectional area or two layers of cables, whichever is larger, but not to exceed 60% of the cross-sectional area. This fact is based on the design index computer program that was described to me on 3/17/81 by Mr. R. X. French, Assistant Manager Electrical Engineers, who was accompanied by Mr. R. F. Cotta, S & L Senior Electrical Engineer for Zimmer, and on 3/19/81 during a telephone conversation with Mr. French.

The design index program described is as follows:

$$\text{Design index} = \frac{\text{The sum of the cable (diameter)}^2}{\text{useable area (50\% of tray cross-sectional area)}}$$

$$= \frac{E(dia^2)}{\text{useable area}}$$

For power trays 24 x 4 = 96 total area

useable area = 24 x 2 = 48 sq. inches

The discussions indicated that a design index of 1.0 represents a 2 inch depth of square cables and that the cable selections are based on am ~~c~~apacities at a 2 inch depth.

Since the cable cross-sectional area is actually equal to pi r^2 rather than diameter^2 then a correction factor must be applied to determine the actual % fill.

Correction factor: $E(\text{pi } r^2) = E(\text{dia}^2) \times C.F.$

$$\text{Thus } C.F. = \frac{E(\text{pi } r^2)}{E(2\ r)^2} = \frac{\text{pi } E\ r^2}{4\ E\ r^2} = \frac{\text{pi}}{4} = 0.785$$

Thus for a 24 x 4 tray, a 50% actual tray fill would be represented by a design index of $\frac{1.0}{.785} = 1.27$ and a design index of 1.0 represents an actual tray fill of 39.3%.

50% = 1.27 Design Index = 2.54 inch depth of square cable
39.3% = 1.0 Design Index = 2 inch depth of square cable
60% = 1.52 Design Index = 3.04 inch depth of square cable

Based on the above relationships, for all trays with a depth of square cables greater than 2.0 inches, the cable selections originally based on ampacities at a 2.0 inch depth, would have to be re-evaluated considering the increased depths. This item is unresolved. Mr. French noted that cable selections are made to the next larger cable size for any specific am ~~c~~apacity. This would give a degree of conservatism to the design.

Mr. French stated that a design index of 1.25 is the determining factor for design verification for both thermal (ampacity) loading and dead weight loading of cable trays.

On March 17, 1981, Mr. French stated that:

1) Sargent & Lundy will perform in the near future thermal calculations (both allowable and actual) for all power trays including those identified on Attachment A, which will have a design index over 1.25. These calculations are required by S & L Procedure #PI-Z1-10.1 Rev. 0 dated ?/6/78. The calculations will be based on actual loads, not the rated limits. These calculations will be provided to the NRC Region III. This item is unresolved.

2) S & L will provide justification for using a design index of 1.25 as the determining limit for performing design verification calculations for thermal loading of trays and sleeves, and the dead weight loading of all trays (power, control and instrument). This item is unresolved.

No controls had been established to require verification or checking of the adequacy of the design for the following:

A) The dead weight limitations, for all cable trays (power, control, and instrument), as identified in the FSAR.

B) The thermal (ampacity) loading of power cable sleeves. The RIII inspector identified sleeves #SL111, with a design index of 1.29 and #SL105, with a design index of 1.26. These were not identified and controlled on Attachment A.

This is contrary to 10 CFR 50 Appendix B, Criterion III, which states in part "....The design control measures shall provide for verifying or checking the adequacy of design...."

Mr. French stated that:

3) S & L will perform in the near future calculations for dead weight loading of all power, control, and instrument trays, which have a design index over 1.25. Calculations will be performed in the near future for thermal loading of power sleeves over a design index of 1.25. These calculations will be provided to the NRC Region III.

4) Appropriate revisions or modifications will be made to existing procedures to require design verification by calculation of cable tray dead weight limitations and design verification by calculation of thermal (ampacity) loading of power cable sleeves.

Per Attachment A "Routing Points Over 1.25" dated 2/24/81, there appears to be at least 30 cable tray points that exceed the 50% tray fill requirement specified in the FSAR Section 8.3.3.1. Two trays exceed 60% of the tray fill. These tray points are controlled by S & L. This item is unresolved pending the resolution of the excessive fill in these tray points.

For Tray 2025A; 4" x 24" = 96 sq. in. total area, thus a useable area = 2 x 24" = 48 sq. in.

Actual Area			Design Index Area	Sq. In.^{2}	
Pi $(1.2)^2$ =	4.52		E diameter^2 = $(2.4)^2$	= 5.76	
Pi $(1.2)^2$ =	4.52		+ $(2.4)^2$	= 5.76	
Pi $(1.3)^2$ =	5.309		+ $(2.6)^2$	= 6.76	
Pi $(1.3)^2$ =	5.30		$(2.6)^2$	= 6.76	
Pi $(1.3)^2$ =	5.30		$(2.6)^2$	= 6.76	
Pi $(0.3)^2$ =	.28	+ .28	$(0.6)^2+(0.6)^2$	=0.36	+ 0.36
Pi $(0.5)^2$ =	.78		$(1.0)^2$	= 1.0	
Pi $(0.35)^2$ =	0.38		$(0.7)^2$	= 0.49	
Pi $(0.35)^2$ =	0.38		$(0.7)^2$	= 0.49	
Pi $(0.35)^2$ =	0.38		$(0.7)^2$	= 0.49	
Pi $(0.9)^2$ =	2.54		$(1.8)^2$	= 3.24	
Pi $(1.1)^2$ =	3.80		$(2.2)^2$	= 4.84	
Pi $(1.1)^2$ =	3.80		$(2.2)^2$	= 4.84	
Pi $(1.3)^2$ =	5.30		$(2.6)^2$	= 6.76	
Pi $(0.75)^2$ =	1.76		$(1.5)^2$	= 2.25	
Pi $(0.55)^2$ =	0.95		$(1.1)^2$	= 1.21	
Pi $(0.85)^2$ =	2.26		$(1.7)^2$	= 2.89	
Pi $(0.85)^2$ =	2.26		$(1.7)^2$	= 2.89	
Pi $(0.75)^2$ =	1.76		$(1.5)^2$	= 2.25	
Pi $(0.85)^2$ =	2.26		$(1.7)^2$	= 2.89	
Pi $(0.35)^2$ =	0.38		$(0.7)^2$	= 0.49	
Pi $(0.35)^2$ =	9,38		$(0.7)^2$	= 0.49	
Pi $(0.35)^2$ =	0.38		$(0.7)^2$	= 0.49	
E of areas	54.97	+ .28 sq.in.	34 inches	70.16 sq.in.	+ 0.36 = 70.52

For Tray 2025A

$$\text{D.I.} = \frac{70.16 \text{ sq. in.}}{48 \text{ sq. in.}} = \underline{\underline{1.45}}$$

$$\text{And the actual \% fill} = \frac{54.97}{96} = \underline{\underline{57.26\%}}$$

Control of Identified Design Deviations

The RIII inspector observed ~~that~~ a note on the bottom of a calculation sheet dated 12/27/79 for cable tray ampacity. The note indicated that two cables "#VC016 and VC073 are overloaded". These power cables are routed through tray point #1057A. On 3/17/81, Sargent & Lundy ~~identify~~ identified this calculation sheet as an uncontrolled preliminary calculation. The noted ~~cab~~ overloaded cables ~~w~~ were not identified on any control document which would have required appropriate evaluation and disposition. The S&L personnel stated that ~~does not~~ does not exist ~~exist~~ a control program for such ~~de~~ design deviations.

This is contrary to 10 CFR 50, App. B, Criterion III which states in part that "... measures shall include provisions to assure that ~~deviat~~ ... deviations ... are controlled."

6.2 Inconsistencies in Weld Inspection Records

6.2.1 Allegation

ASME and AWS inspection criteria have been deleted or designated as "not applicable" (N/A) for certain systems. Affected systems were provided.

6.2.2 Background Information

None

6.2.3 Deleted ASME and AWS Inspection Criteria

The Region III inspectors observed that weld inspection criteria used to verify weld procedure, welder qualification, filler material, joint cleanliness, bevels, and damage had been deleted or designated as not applicable (N/A) on the following weld inspection records (KEI-1 forms).

	System or Component	ISO Dwg. No.	Beam or Mark No.	Other Information
(1)	Drywell support steel	S398B	29	Detail E of S-437

	System or Component	ISO Dwg. No.	Beam or Mark No.	Other Information
(2)	Drywell support steel	S398B	2 stif- feners 1/2 x 6- 3/4 x 25- 1/8	Line No. MKC 17S493
(3)	Drywell support steel	S398A	125	Line No. EL-535 191
(4)	Drywell support steel	S398B	67	Detail 13 of 493 Detail 2 of 447
(5)	Drywell support steel	S398A	C-63 (W8 x 10)	Bottom plate
(6)	Drywell support steel	S398A	W8 x 17	Com lugs
(7)	Service water system	PSK1WS32	55H	Line No. 1WS17A18

The records for drywell support steel indicated that the deleted criteria existed at least from July 1980 to January 1981. The record for the service water system indicated the criteria was designated as not applicable in November 1979.

The inspection criteria used to verify proper fitup and tack welds was also designated N/A for the preceding weld activities on the service water system.

6.2.3 Inconsistent Weld Rod Numbers

The licensee could not readily determine if the ASME Code Section III 1971 or if the AWS D1.1-1972 Code inspection criteria governed some of the preceding activities.

6.2.3.1 ASME Code

The ASME Code states the following:

1. NA-4130(a) -- "As used in this Section of the Code, Quality Assurance comprises all those planned and systematic actions necessary to provide adequate confidence that all components, parts, or appurtenances are manufactured and/or installed (as applicable) in accordance with the rules of this Section."

2. NA-4420 -- "The manufacturer and/or Installer shall maintain a written description of the procedures used by his organization for control of

quality and examinations, showing in detail the implementation of the quality assurance requirements of this Section of the Code."

3. NA-4510 -- "Inprocess and final examinations and tests shall be established to assure conformance with documented instructions, procedures, and drawings."

4. NA-4442.1 -- "Welding and brazing materials for all classes of construction shall be controlled in accordance with NB-4122...."

   NB-4122 -- "Welding and brazing materials shall be identified and controlled so that they can be traced to each component and/or installation of a piping system, or else a control procedure shall be employed which ensures that the specified materials are used."

5. NA-4451 -- "...Measures shall be established to assure that processes including welding and heat-treating are controlled in accordance with the rules of this Section of the Code and are accomplished by qualified personnel using qualified procedures."

6. NB-4230 -- identifies specific requirements for fitting and aligning weld joints that must be verified.

6.2.3.2 <u>AWS Code</u>

The AWS D1.1-1972 Code states:

1. Section 3.1.1 -- "All applicable paragraphs of this section shall be observed in the production and inspection of welded assemblies and structures produced by any of the processes acceptable under this Code."

2. Section 3.2.1 -- "Surfaces and edges to be welded shall be smooth, uniform, and free from fins, tears, cracks, or other defects which would adversely affect the quality or strength of the weld. Surfaces to be welded and surfaces adjacent to a weld shall also be free from loose or thick scale, slag, rust, moisture, grease, or other foreign material that will prevent proper welding...."

3. Section 3.3.1 -- "The parts to be joined by fillet welds shall be brought into as close contact as practicable. The gap between parts shall normally not exceed 3/16 inch...."

4. Section 3.3.7 -- addresses tack weld requirements that must be verified.

5. Section 6.1.1 -- "The inspector designated by the Engineer shall ascertain that all fabrication by welding is performed in accordance with the requirements of this Code.

6. Section 6.1.3 -- "He [the inspector] shall be notified, in advance, of the start of any welding operations."

7. Section 6.2 -- "The Inspector shall make certain that only materials conforming to the requirements of this Code are used."

8. Section 6.4.1 -- "The inspector shall permit welding to be performed only by welders, welding operators, and tackers who are qualified in accordance with the requirements of 5.3."

9. Section 6.5.2 -- "The Inspector shall make certain that only welding procedures that meet the provisions of 5.1 and 5.2 are employed."

10. Section 6.5.3 -- "The Inspector shall make certain that electrodes are used only in the positions and with the type of welding current and polarity for which they are classified."

11. Section 6.5.4 -- "The inspector shall, at suitable intervals, observe the technique and performance of each welder, welding operator, and tacker to make certain that the applicable requirements of Section 4 are met."

6.2.4 Findings and Conclusions

The allegation was substantiated. Appropriate inspection criteria had been deleted or designated as "not applicable" in the inspection records for certain systems.

6.2.5 Items of Noncompliance

The weld inspection criteria that were deleted or designated as not applicable are contrary to 10 CFR 50 Appendix B, Criterion III, and the Wm. H. Zimmer QA Manual, Sections 3.3 and 3.13.1. (50-358/81-13-26).

Cable Tray Loading (Fill)

Contrary to the FSAR Section 8.3.3.1:

1. The tables for power cable loading (~~capacity~~ ampacity) are not based on IPCEA Publication No. 9-46-426. From discussions, they appear to be based on some composite of IPCEA P-46-426 1962, ~~IPCEA P-54-440 1975~~ S&L Standard ESA-104a Rev. 11/1/72, and a professional paper #70TP557-PWR printed in 1970. This deviation was not identified ~~[illegible]~~ on any control document. This is contrary to 10CFR50 App. B, Criterion III, which states in part that "... measures shall include provisions to assure ... that deviations from such standards are controlled."

3/17/81 French stated that appropriate [illegible] modifications to the FSAR [illegible] be submitted [illegible]. Also, [illegible] consideration [illegible] be given [illegible] the differing [illegible] insulations [illegible] used in standards compared to cable insulations [illegible] Zimmer.

2. Also, the summation of the cross-sectional areas of some cables (see attachment A) do in fact exceed 50% of the tray usable cross-sectional area or two layers of cables, whichever is larger, but not to exceed 60% of the cross-sectional area. This fact is based on the design index computer program that was described to me on 3/17/81 by Mr. R. X. French, Assistant Manager Electrical Engineers, who was accompanied by Mr. R. E. Cotta, S & L Senior Electrical Engineer for Zimmer, and on 3/19/81 during a telephone conversation with Mr. French.

The design index program described is as follows:

$$\text{Design index} = \frac{\text{The sum of the cable (diameter)}^2}{\text{useable area (50\% of tray cross-sectional area)}}$$

$$= \frac{\Sigma(\text{dia}^2)}{\text{useable area}}$$

- For power trays 24 x 4 = 96 total area

  useable area = 24 x 2 = 48 sq. inches

DRAFT
3/19/81

Cable Tray Loading (Fill)

Contrary to the FSAR Section 8.3.3.1:

1. The tables for power cable loading (~~capacity~~ ampacity) are not based on IPCEA Publication No. 9-46-426. From discussions, they appear to be based on some composite of IPCEA P-46-426 1962, IPCEA P-54-440 1975, and a professional paper #70TP557-PWR printed in 1970.

2. Also, the summation of the cross-sectional areas of some cables do in fact exceed 50% of the tray usable cross-sectional area or two layers of cables, whichever is larger, but not to exceed 60% of the cross-sectional area. This fact is based on the design index computer program that was described to me on 3/17/81 by Mr. R. X. French, Assistant Manager Electrical Engineers, who was accompanied by Mr. R. F. Cotta, S & L Senior Electrical Engineer for Zimmer, and on 3/19/81 during a telephone conversation with Mr. French.

The design index program described is as follows:

$$\text{Design index} = \frac{\text{The sum of the cable (diameter)}^2}{\text{useable area (50\% of tray cross-sectional area)}}$$

$$= \frac{E(\text{dia}^2)}{\text{useable area}}$$

For power trays 24 x 4 = 96 total area

useable area = 24 x 2 = 43 sq. inches

The discussions indicated that a design index of 1.0 represents a 2 inch depth of square cables and that the cable selections are based on ~~capacities~~ ampacities at a 2 inch depth.

Since the cable cross-sectional area is actually equal to pi r^2 rather than diameter^2 then a correction factor must be applied to determine the actual % fill.

Correction factor: $E(\text{pi } r^2) = E(\text{dia}^2) \times \text{C.F.}$

$$\text{Thus C.F.} = \frac{E(\text{pi } r^2)}{E(2\ r)^2} = \frac{\text{pi } E\ r^2}{4\ E\ r^2} = \frac{\text{pi}}{4} = 0.785$$

Thus for a 24 x 4 tray, a 50% actual tray fill would be represented by a design index of $\frac{1.0}{.785}$ = 1.27 and a design index of 1.0 represents an actual tray fill of 39.3%.

50% = 1.27 Design Index = 2.54 inch depth of square cable

39.3% = 1.0 Design Index = 2 inch depth of square cable

60% = 1.52 Design Index = 3.04 inch depth of square cable

~~The trays identified on Attachment A, which exceeds~~

Based on the above relationships, for all trays with a depth of square cables greater than 2.0 inches, the cable selections originally based on ampacities at a 2.0 inch depth, would have to be re-evaluated considering the increased depths. This item is unresolved. Mr. French

Mr. French stated that a design index of 1.25 is the determining factor for design evaluation for the thermal (capacity) loading and dead weight loading of cable trays.

Note that cable selections made to the next larger cable, ... This would give a degree of conservatism to the design.

On 3/7/81, Mr. French stated that:

1) Sargent & Lundy will perform in the near future thermal calculations (both allowable and actual) for all power trays including those identified on Attachment A, which have a design index over 1.25. These calculations will be provided to the NRC Region III.

This item is unresolved.

These calculations are required by S&L procedure #PI-21-10.1 Rev. C dated 2/6/75. The calculations will be based on actual loads at the rated limits.

2) S&L will provide justification for using a design index of 1.25 as the determining limit for performing design verification calculations for thermal loading of power trays and sleeves, and the dead weight loading of all trays (power, control, and instrument). This item is unresolved.

No controls had been established to require verification or checking of the adequacy of the design for the following:

A) The dead weight limitations, for all cable trays (power, control, & instrument) as identified in the FSAR.

B) The thermal (ampacity) loading of power cable sleeves. The RIII inspector identified sleeves #SL 111, with a design index of 1.29 and #SL 105, with a design index of 1.26. These were not identified and controlled on Attachment A.

This is contrary to 10CFR 50 Appendix B, Criterion III which states in part: "The design control measures shall provide for verifying or checking the adequacy of design..."

Mr. French stated that:

3) S&L will perform in the near future calculations for dead weight loading of all power, control, and instrument trays, which have a design index over 1.25. Calculations will be performed in the near future for thermal loading power sleeves. These calculations will be provided to the NRC Region III.

4) Appropriate revisions or modifications will be made to existing ~~[illegible]~~ procedures to require design verification by calculation of cable tray dead weight limitations and design verification by calculation of thermal (ampacity) loading of power cable sleeves.

8

Per attachment A "Routing Points Over 1.25" dated 7/24/81, there appears to be at least 30 cable tray points that exceed the 50% tray fill requirement specified in the FSAR Section 8.3.3.1. Two trays exceed 60% of the tray fill. ~~The~~ These tray points are controlled by S&L.

~~The~~ This item is unresolved pending the resolution of ~~the~~ the excessive fill in these tray points.

~~Tray points~~

For Tray 2025A; 4" x 24" = 96 sq. in. total area, thus a useable area = 2 x 24" = 48 sq. in.

Actual Area		Design Index Area	Sq. In.^{2}	
Pi $(1.2)^2$ =	4.52	E diameter^2 = $(2.4)^2$	= 5.76	
Pi $(1.2)^2$ =	4.52	+ $(2.4)^2$	= 5.76	
Pi $(1.3)^2$ =	5.309	+ $(2.6)^2$	= 6.76	
Pi $(1.3)^2$ =	5.30	$(2.6)^2$	= 6.76	
Pi $(1.3)^2$ =	5.30	$(2.6)^2$	= 6.76	
Pi $(0.3)^2$ =	.28 + .28	$(0.6)^2+(0.6)^2$	=0.36	+ 0.36
Pi $(0.5)^2$ =	.78	$(1.0)^2$	= 1.0	
Pi $(0.35)^2$ =	0.38	$(0.7)^2$	= 0.49	
Pi $(0.35)^2$ =	0.38	$(0.7)^2$	= 0.49	
Pi $(0.35)^2$ =	0.38	$(0.7)^2$	= 0.49	
Pi $(0.9)^2$ =	2.54	$(1.8)^2$	= 3.24	
Pi $(1.1)^2$ =	3.80	$(2.2)^2$	= 4.84	
Pi $(1.1)^2$ =	3.80	$(2.2)^2$	= 4.84	
Pi $(1.3)^2$ =	5.30	$(2.6)^2$	= 6.76	
Pi $(0.75)^2$ =	1.76	$(1.5)^2$	= 2.25	
Pi $(0.55)^2$ =	0.95	$(1.1)^2$	= 1.21	
Pi $(0.85)^2$ =	2.26	$(1.7)^2$	= 2.89	
Pi $(0.85)^2$ =	2.26	$(1.7)^2$	= 2.89	
Pi $(0.75)^2$ =	1.76	$(1.5)^2$	= 2.25	
Pi $(0.85)^2$ =	2.26	$(1.7)^2$	= 2.89	
Pi $(0.35)^2$ =	0.38	$(0.7)^2$	= 0.49	
Pi $(0.35)^2$ =	9,38	$(0.7)^2$	= 0.49	
Pi $(0.35)^2$ =	0.38	$(0.7)^2$	= 0.49	
E of areas	54.97 + .28 sq.in.	34 inches	70.16 sq.in. + 0.36 = 70.52	

For Tray 2025A

$$\text{D.I.} = \frac{70.16 \text{ sq. in.}}{48 \text{ sq. in.}} = \underline{1.46}$$

$$\text{And the actual \% fill} = \frac{54.97}{96} = \underline{\underline{57.26\%}}$$

Cable Tray Loading (Fill) 1

Contrary to the FSAR sect. 8.3.3.1:

~~The cable ampacities are~~

~~the power cables used in Zimmer are in~~

1. The tables for power cable loading (ampacity) are not based on IPCEA Publication No. P-46-426.

They appear to be based on some composite of IPCEA P-46-426 1962, IPCEA P-54-440 1975, and a professional paper #70 TP 557-PWR printed in 1970.

2. Also, the summation of the cross-sectional areas of some cables do in fact exceed 50% of the tray usable cross-sectional area or two layers of cables, whichever is larger, but not to exceed 60% of the cross-sectional area. This fact is based on the design index computer program that was described to me on 3/17/81 by Mr. R. X. French, Assistant Manager Electrical Engineers who was accompanied by Mr. R. E. Cotta, S&L Senior Electrical Engineer for Zimmer, and on 3/19/81 during a telephone conversation with Mr. French.

~~Engr, CG&E Engr~~

4I The design index program described is as follows:

$$\text{Design index} = \frac{\cancel{\text{The sum of}}\ \Sigma\ \text{the cable (diameter)}^2}{\text{useable area (50\% of tray's cross-sectional area)}}$$

$$= \frac{\Sigma[\text{dia}^2]}{\text{useable area}}$$

For power trays $24 \times 4 = 96$ total area
useable area $= 24 \times 2 = 48$ sq. inches

The discussions ~~and the above equation indicates~~
~~That for power trays (24x4)~~ indicated a design index
of 1.0 represents a 2 inch ~~50%~~ depth ~~Tray fill~~ of ~~cable~~ square (diameter) cables.

D.I. = 1.0 = $\frac{\Sigma(\text{dia})^2}{48 \text{ sq. in}}$ $\Sigma(\text{dia})^2 = 48 \text{ sq. in}^2$

Since

Therefore $\frac{48 \text{ sq. in}}{96 \text{ sq. in.}} = 50\%$ tray fill

Also for power trays 24x4

D.I. 1.2 represents a 60%

$24 \times (60\% \times 4") = 2.4 \times 24 = 57.6$

$\frac{57.6}{96} = 60\%$

$\text{D.I} = \frac{57.6}{48} = 1.2$

And

FSAR

Sentence when given ne Thermal + clonal cut. problem

~~The~~ The ~~iss~~ discussions indicated that a design index of 1.0 represents a 2 inch depth of square cables and that the ~~the~~ cable selections are based on ampacities at a 2 inch depth.

~~The~~

~~Thus~~ For a 24" x 4" tray, the useable cross-sectional area would 2" x 24" = 48 sq in. feet.

⇒ ~~Soil~~ A design index of 1.0 = $\frac{\Sigma (\text{diameter})^2}{48}$

therefore $\Sigma (\text{dia})^2 = 1.0 \times 48 = 48$ sq in. useable area.

4/ Since the cable cross sectional area is actually = πr^2 rather than diameter² then a Correction Factor must be applied to determine the actual % fill.

Correction Factor: ~~Design Index~~

$$\frac{\Sigma(\pi r^2)}{\cancel{48}} = \frac{\Sigma(dia^2)}{\cancel{48}} \times C.F.$$

$$\text{Thus } C.F. = \frac{\Sigma(\pi r^2)}{\Sigma(2r)^2} = \frac{\pi\,\Sigma r^2}{4\,\Sigma r^2} = \frac{\pi}{4} = 0.7853$$

~~Thus to maintain limits of 60% and two layers~~

~~The Actual Design Index (πr^2) must be 1.20 or less and~~

~~The sum of the cable diameters must be equal to or less than~~

~~twice the tray width.~~

~~An Actual Design Index (πr^2) of 1.20 is equivalent~~

~~to a Computer Design Index (diameter²) of $\frac{1.20}{.7853} \cong 1.53$~~

~~for a tray configuration of 24" x 4".~~

Thus for a 24X4 tray, a 50% actual tray fill

would represented by a design index of $\frac{1.0}{.785} = 1.27$

and a design index of 1.0 represents an actual

tray fill of 39.3%.

50 %	=	1.27 Design Index = 2.54 inch depth of square cable
39.3 %	=	1.0 Design Index = 2 inch depth of square cable
60 %	=	1.52 Design Index = 3.04 inch depth of square cable

~~#~~ Based on the above ~~●~~ relationships, ~~■~~ for all trays with a depth of square cables greater than 2.0 inches, the cable selections, originally based on ampacities at a 2.0 inch depth, would have to be re-evaluated considering the increased depths. ~~Individual cable ampacities would have~~

~~Design Index = $\frac{\Sigma \text{ diameter}^2}{\text{useable area}}$~~

$\not{p}i$

For Tray 2025A, 4" x 24" = 96 sq. in total area, thus an useable area = 2 x 24" = 48 sq.

Actual Area		Design Index: Σ diameter^2	sq. in
$(1.2)^2$ =	4.52	$= (2.4)^2$	= 5.76
$(1.2)^2$ =	4.52	$+ (2.4)^2$	= 5.76
$(1.3)^2$ =	5.307	$+ (2.6)^2$	= 6.76
$(1.3)^2$ =	5.30	$(2.6)^2$	= 6.76
$(1.3)^2$ =	5.30	$(2.6)^2$	= 6.76
$(0.3)^2$ =	.28 + .28	$(0.6)^2 + (0.6)^2$	= 0.36 + 0.36
$(0.5)^2$ =	.78	$(1.0)^2$	= 1.0
$(0.35)^2$ =	0.38	$(0.7)^2$	= 0.49
$\pi(0.35)^2$ =	0.38	$(0.7)^2$	= 0.49
$(0.35)^2$ =	0.38	$(0.7)^2$	= 0.49
$(0.9)^2$ =	2.54	$(1.8)^2$	= 3.24
$(1.1)^2$ =	3.80	$(2.2)^2$	= 4.34
$\pi(1.1)^2$ =	3.80	$(2.2)^2$	= 4.34
$(1.3)^2$ =	5.30	$(2.6)^2$	= 6.76
$(0.75)^2$ =	1.76	$(1.5)^2$	= 2.25
$(0.55)^2$ =	0.95	$(1.1)^2$	= 1.21
$(0.85)^2$ =	2.26	$(1.7)^2$	= 2.89
$(0.85)^2$ =	2.26	$(1.7)^2$	= 2.89
$(0.75)^2$ =	1.76	$(1.5)^2$	= 2.25
$(0.85)^2$ =	2.26	$(1.7)^2$	= 2.89
$(0.35)^2$ =	0.38	$(0.7)^2$	= 0.49
$(0.35)^2$ =	0.38	$(0.7)^2$	= 0.49
$(0.35)^2$ =	0.38	$(0.7)^2$	= 0.49
Σ of areas	54.97 + .28 sq. in.	34 inches	

70.16 sq. in + 0.36 = 70.52

For: tray 2025A

D.I = $\frac{70.16 \text{ sq. in}}{48 \text{ sq. in}}$ = 1.46 , ~~and the % fill = $\frac{70.16}{96}$ = 73.08 %~~

which exceeds the FSAR maximum of 60%/50%. (Does not apply to 2025)

~~D.I = $\frac{54.97}{48}$ = 1.14~~

And the Actual % fill = $\frac{54.97}{96}$ = 57.26 %

$^{1}3^{rd}$ Floor

~~Design Index = $\frac{\Sigma \text{ diameter}^2}{\text{useable area}}$~~

For Tray 2025A, 4" x 24" = 96 sq. in total area, thus an useable area = 2 x 24" = 48 sq.

total in		Design Index Area Σ diameter^2	sq. in	
$(1.2)^2$ =	4.52	$=(2.4)^2$	= 5.76	
$(1.2)^2$ =	4.52	$+(2.4)^2$	= 5.76	
$(1.3)^2$ =	5.309	$+(2.6)^2$	= 6.76	
$(1.3)^2$ =	5.30	$(2.6)^2$	= 6.76	
$(1.3)^2$ =	5.30	$(2.6)^2$	= 6.76	
$(0.3)^2$ =	.28 + .28	$(0.6)^2+(0.6)^2$	= 0.36	+ 0.36
$(0.5)^2$ =	.78	$(1.0)^2$	= 1.0	
$(0.35)^2$ =	0.38	$(0.7)^2$	= 0.49	
$\pi(0.35)^2$ =	0.38	$(0.7)^2$	= 0.49	
$(0.35)^2$ =	0.38	$(0.7)^2$	= 0.49	
$(0.9)^2$ =	2.54	$(1.8)^2$	= 3.24	
$(1.1)^2$ =	3.80	$(2.2)^2$	= 4.84	
$\pi(1.1)^2$ =	3.80	$(2.2)^2$	= 4.84	
$(1.3)^2$ =	5.30	$(2.6)^2$	= 6.76	
$(0.75)^2$ =	1.76	$(1.5)^2$	= 2.25	
$(0.55)^2$ =	0.95	$(1.1)^2$	= 1.21	
$(0.85)^2$ =	2.26	$(1.7)^2$	= 2.89	
$(0.85)^2$ =	2.26	$(1.7)^2$	= 2.89	
$(0.75)^2$ =	1.76	$(1.5)^2$	= 2.25	
$(0.85)^2$ =	2.26	$(1.7)^2$	= 2.89	
$(0.35)^2$ =	0.38	$(0.7)^2$	= 0.49	
$(0.35)^2$ =	0.38	$(0.7)^2$	= 0.49	
$(0.35)^2$ =	0.38	$(0.7)^2$	= 0.49	
Σ of areas	54.97 + .28 sq. in.	34 inches		

70.16 sq. in + 0.36 = 70.52

For: ~~For~~ tray 2025A

$$D.I = \frac{70.16 \text{ sq. in}}{48 \text{ sq. in}} = \underline{\underline{1.46}}$$, ~~and the % fill = $\frac{70.16}{96}$ = 73.0 %~~

which exceeds the FSAR maximum of 60% / 50%. Does Not Apply to 2

$I = \frac{54.97}{48} = 1.14$ ~~[illegible]~~

And The ~~(...)~~ Actual % fill = $\frac{54.97}{96}$ = $\underline{\underline{57.26\%}}$

Cut tray configurations

A

Yellow Power

~~Cable~~ Tray 1057A chosen because high index I on loading report

cable count balanced.

D.I 1.44

Control 2029B chosen because high index

D.I 1.43

Power 2025A chosen for high index

had solid bottom. cable count field 24

D.I 1.46 loading report 23

Control 1104B chosen for high index

D.I 1.54

Power 2039A chosen because of field observation.

Counted Field 39 cables.

Load Report 39 cables Balanced

dated 2/2/81

Design Index 1.04

Control 2056 B chosen by field observation

Design Index 1.03

Control 2025B chosen for high index

D.I 1.55 Tried to field count - essentially impossible.

e/1

INV001/D DRAFT/jp

Docket No. 50-358

Cincinnati Gas and Electric
Company
ATTN: Mr. Earl A. Borgmann
Senior Vice President
Engineering Services and
Electric Production
139 East 4th Street
Cincinnati, OH 45201

Gentlemen:

This refers to the investigation at the Zimmer site which was initiated as a result of allegations made to the NRC by Quality Control inspectors who formerly worked at the Zimmer site and by the Government Accountability Project of the Institute for Policy Studies (a non-government agency). To date, the investigation which is continuing has been conducted during the period January 12 to July 16, 1981, by Messrs. P. A. Barrett and J. B. McCarten and others of this office. The results of the investigation were discussed in an enforcement conference attended by you and members of our Glen Ellyn, Illinois, offices on ~~July 31~~ August 5, 1981.

Excalated enforcement action for the violations summarized in Section of the attached investigation report is under consideration. We will send a Notice of Violation upon completion of our review of the violations.

In accordance with 10 CFR 2.790 of the Commission's regulations, a copy of this letter and the enclosed investigation report will be placed in the NRC's Public Document Room. If this report contains any information that you or your contractors believe to be exempt from disclosure under 10 CFR 9.5(a)(4), it is necessary that you (a) notify this office by telephone within seven (7) days from the date of this letter of your intention to file a request for withholding; and (b) submit within twenty-five (25) days from the date of this letter a written application to this office to withhold such information. Section 2.790(b)(1) requires that any such application must be accompanied by an affidavit executed by the owner of the information which identifies the document or part sought to be withheld, and which contains a full statement of the reasons on the basis which it is claimed that the information should be withheld from public disclosure. This section further requires the statement to address with specificity the considerations listed in 10 CFR 2.790(b)(4). The information sought to be withheld shall be incorporated as far as possible into a separate part of the affidavit. If we do not hear from you in this regard within the specified periods noted above, a copy of this letter and the enclosed investigation report will be placed in the Public Document Room.

We will gladly discuss any questions you have concerning this investigation.

Sincerely,

James G. Keppler

Director

cc w/encl:

J. R. Schott, Plant Superintendent

DMB/Document Control Desk (RIDS)

Resident Inspector, RIII

Harold W. Kohn, Power Siting Commission

Citizens Against a Radioactive Environment

Helen W. Evans, State of Ohio

con: Foster Barrett McCarten Warnick Streeter Davis Keppler

Table 5.10 Review of Pipe Weld Radiographs

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
1FC14CA851(2346)	A	0.322	8-5/8	1-2	7/76	NID*
				4-1		NID
				2-3		NID
	B			1-2		NID
				4-1		NID
				2-3		NID
	C			1-2		NID
				4-1		NID
				3-4		NID
1FC14CA8118A(2410)	A	0.322	8-5/8	1-2	1/76	NID
				2-3		NPS**
				3-4		NPS
				4-1		NPS
	B			1-2		NPS

* NID--no identified deficiencies.

** NPS--no penetrameter shim.

Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
				2-3		NPS
				3-4		NPS
				4-1		NPS
1HG47A21/2-25	A		2-1/2	4-1		NPS
				3-4		NPS
	D			1-2		NPS
				4-1		NPS
1DG14AA8-57	G	0.280	6-5/8	4-1	10/76	NPS
				3-4		NPS
	E			1-4		NID
				3-4		NID
1FW02AB23-85-55	A	1.756	23-7/8	1-2	7/75	NID
				2-3		NID
				6-1		NID
	B			1-2		NID
				4-5		NID

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Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
				6-1		NID
1FW02C23-83-29	B	1.725	24	1-2	12/75	NID
				2-3		NID
				6-1		NID
	D			1-2		NID
				3-4		NID
				6-1		NID
	C			6-1		NID
1LP02A127(1622)	B	0.375	12-3/4	4-1		NID
				2-3		NID
				1-2		NID
	E			4-1		NID
				3-4		NID
				1-2		NID
1LP02A127(1622)	F	0.375	12-3/4	1-2		NID
				3-4		NID
				4-1		NID

Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
1DG18AC823(3213)	B	0.322	8-1/8	1-2		NID
				3-2		NID
				4-1		NID
	C			4-1		NID
				1-2		NID
				3-4		NID
	D			1-2		NID
				2-3		NID
				4-1		NID
1FC01B128	A	0.396	10-3/4	1-2		NID
				2-3		NID
				4-1		NID
	B			1-2		NID
				3-4		NID
				4-1		NID
	C			1-2		NID
				2-3		NID

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Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
				4-1		NID
	D			1-2		NID
				3-4		NID
				4-1		NID
1DG18AA850	A	0.353	8-5/8	1-2		NID
				3-4		NID
				4-1		NID
	B			1-2		NID
				4-1		NID
				2-3		NID
	C			1-2		NID
				3-4		NID
				4-1		NID
1FC01CB105	M	0.365	10-3/4	1-2	3/76	NID
				3-4		NID
				4-1		NID
•	N			1-2		NID

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Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
				4-1		NID
				3-4		NID
	P			4-1		NID
				1-2		NID
				3-4		NID
	Q			1-2		NID
				3-4		NID
				4-1		NID
	T	0.237	4-1/2	3-4	3/76	NID
				4-1		NID
				2-3		NID
	U			1-2		NID
				2-3		NPS
				3-4		NPS
	S			1-2		NID
				2-3		NID
				3-4		NID
1FC02AA812(F2305)	A	0.322	8-5/8	1-2		NID

Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
				4-1		NID
				2-3		NID
	B			1-2		NID
				2-3		NID
				4-1		NID
	D			2-3		NID
				3-4		NID
				4-1		NID
	C			1-2		NID
				4-1		NID
				2-3		NID
1FC02AB817(2310)	A	0.322	8-5/8	1-2	1/76	NID
				4-1		NID
				2-3		NID
	B			2-3		NID
				4-1		NID
				3-4		NID

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Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
	C			2-3		NID
				4-1		NID
				3-4		NID
	F			1-2		NPS
				3-4		NPS
				4-1		NPS
1FC06B4128(2413)	B	0.237	4-1/2	1-2	7/76	NPS
				2-3		NPS
				4-1		NPS
1FC06B4128(2413)	A	0.237	4-1/2	1-2	7/76	NPS
				2-3		NPS
				4-1		NPS
	C			1-2		NPS
				4-1		NPS
				2-3		NPS
	D			1-2		NPS
				4-1		NPS

Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
				3-4		NPS
1FC29B684(2380)	A	0.280	6-5/8	1-2	3/76	NPS
				3-4		NPS
				4-1		NPS
	B			1-2		NID
				4-1		NID
				3-4		NID
	C			1-2		NID
				4-1		NID
				2-3		NID
	G			1-2		NID
				4-1		NID
				3-4		NID
1HG07A 2½12A(3444)	A	0.203	2-7/8	1-2	1/77	NID
				2-3		NID
				3-4		NID
				4-1		NID

Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
	B			1-2		NID
				4-1		NID
				2-3		NID
	C			1-2		NID
				3-4		NID
				4-1		NID
	F			1-2		NID
				2-3		NID
				4-1		NID
	J			1-2		NID
				2-3		NID
				3-4		NID
	H			1-2		NID
				2-3		NID
				4-1		NID
11401A35(3529)	D	0.216	3-1/2	4-1	2/77	NPS
				1-2		NPS

Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
				2-3		NPS
				3-4		NPS
	A			1-2		NID
				3-4		NPS
				4-1		NPS
				2-3		NPS
	B			1-2		NPS
				2-3		NPS
				3-4		NPS
				4-1		NPS
1FC39CA621(2314)	D	0.280	6-5/8	1-2	1/76	NID
				2-3		NID
				3-4		NID
	B			1-2		NID
				2-3		NID
				3-4		NID
				4-1		NID
	G			1-2		NID

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Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
				2-3		NID
				3-4		NID
				4-1		NID
	E			1-2		NID
				2-3		NID
				3-4		NID
				4-1		NID
	A			1-2		NID
				2-3		NID
				3-4		NID
				4-1		NID
	F			1-2		NPS
				2-3		NPS
				3-4		NPS
				4-1		NID
	J			4-1		NID
				2-3		NID
				3-4		NID

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Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
				1-2		NID
1FW01AA193016(960)	A	1.411	20	1-2	2/75	NPS
				2-3		NPS
				3-4		NPS
				4-5		NPS
				5-1		NPS
	B			1-2		NPS
				2-3		NPS
				3-4		NPS
				4-5		NPS
				5-1		NPS
1FW01AA193015(959)	A	1.411	20	1-2	2/75	NID
				2-3		NID
				3-4		NID
				4-5		NID
				5-1		NID
	B			1-2		NID
				2-3		NID

Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
				3-4		NID
1FC02AB8-18(2311)	A	0.322	8-5/8	1-2	3/76	NPS
				2-3		NPS
				3-4		NPS
				4-1		NPS
	B			1-2		NID
				2-3		NID
				3-4		NID
				4-1		NID
1FW01B23835(949)	A			6-1	2/75	NID
				1-2		NID
				2-3		NID
				3-4		NID
				4-5		NID
				5-6		NID
1FW01B23834(948)	A	1.725	24	1-2	9/75	NID
				4-5		NID
				6-1		NID

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Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
	B			6-1		NID
				1-2		NID
				2-3		NID
				3-4		NID
	E			1-2		NID
				2-3		NID
				3-4		NID
				4-5		NID
				5-6		NID
				6-1		NID
	F			1-2		NPS
				2-3		NPS
				3-4		NPS
				4-1		NID
1HP05131028	A	0.396	10-3/4	1-2	8/74	NID
				3-4		NID
				2-3		NID
1LP05A1218(1634)	A	0.375	12-3/4	1-2	7/75	NID

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Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
				2-3		NID
				3-4		NID
				4-1		NID
	B			1-2		NID
				2-3		NID
				3-4		NID
				4-1		NID
	D			4-1		NID
				3-4		NID
				2-3		NID
				1-2		NID
1LP02B102(1616)	A	0.593	10-3/4	1-2	8/75	NID
				2-3		NID
				3-4		NID
	B			1-2		NID
				2-3		NID
				3-4		NID
	C			1-2		NID

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Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
				2-3		NID
				4-1		NID
1LP02B104(1618)	A	0.593	10-3/4	1-2	5/75	NID
				2-3		NID
				3-4		NID
	B			1-2		NID
				2-3		NID
				4-1		NID
10G01AA122(368)	A	0.687	12-3/4	1-2	4/76	NID
				2-3		NID
				4-1		NID
	B			4-1		NID
				3-4		NID
	H			1-2		NID
				2-3		NID
				3-4		NID
1RD28CA1010(3491)	B	0.593	10-3/4	1-2	7/76	NPS
				2-3		NPS

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Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
				3-4		NPS
				4-1		NPS
1CY01AB16504(3129)	A	0.375	16	4-1	4/76	NID
				3-4		NID
				1-2		NID
	B			1-2		NID
				2-3		NID
				3-4		NID
				4-1		NID
	C			4-1		NID
				2-3		NID
				3-4		NID
				1-2		NID
	D			4-1		NID
				3-4		NID
				2-3		NID
1OG09AC221(2428)	C	0.375	22	1-2	8/76	NID
				2-3		NID

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Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
				3-4		NID
				4-5		NID
	D			5-6		NID
1DG09AC221(2428)	D	0.275	22	2-3	8/76	NID
				6-1		NID
1DG10AC2814	C	0.375	28	1-2	2/77	NID
				5-6		NID
				6-1		NID
1DG10AC2813	C	0.437	28	1-2	2/77	NID
				6-1		NID
				4-5		NID
1FC-09B828A	A	0.322	8-5/8	1-2		NID
				4-1		NID
				3-4		NID
	C			1-2		NID
				2-3		NID
				4-1		NID
	D			1-2		NID

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Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
				4-1		NID
				3-4		NID
	E			1-2		NID
				4-1		NID
				2-3		NID
	F			1-2		NID
				2-3		NID
				4-1		NID
1FC09CA838	A	0.322	8-5/8	1-2	4/76	NID
				3-4		NID
				4-1		NID
	C			1-2		NPS
				3-4		NPS
				2-3		NPS
				4-1		NPS
	B			1-2		NID
				4-1		NID
				2-3		NID

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Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
	D			1-2		NID
				4-1		NID
				3-4		NID
	F			1-2		NID
				4-1		NID
				3-4		NID
	G			1-2		NPS
				2-3		NPS
				3-4		NPS
				4-1		NPS
	E			1-2		NID
				4-1		NID
				2-3		NID
	H			1-2		NPS
				2-3		NPS
				3-4		NPS
				4-1		NPS
	J			1-2		NPS

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Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
				2-3		NPS
				3-4		NPS
				4-1		NPS
1FC12A8-29	C	0.322	8-5/8	1-2	6/76	NID
				2-3		NID
				3-4		NID
	D			1-2		NPS
				2-3		NPS
				3-4		NPS
				4-1		NPS
	E			1-2		NID
				4-1		NID
				2-3		NID
	K			1-2		NID
				4-1		NID
				3-4		NID
	F			1-2		NID
				4-1		NID

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Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
				3-4		NID
	G			1-2		NID
				4-1		NID
				2-3		NID
	H			1-2		NID
				4-1		NID
				3-4		NID
1HP01A204A(1727)	A	0.375	20	6-1	11/75	NPS
				5-6		NPS
				4-5		NPS
				3-4		NPS
				2-3		NPS
				1-2		NPS
1FC14AA866	B	0.353	8-5/8	1-2	5/76	NID
				4-1		NID
				2-3		NID
	C			1-2		NPS
				4-1		NPS

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Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
				2-3		NPS
				3-4		NPS
	E			1-2		NPS
				2-3		NPS
				3-4		NPS
				4-1		NPS
	A			1-2		NID
				4-1		NID
				2-3		NID
	F			1-2		NID
				4-1		NID
				2-3		NID
	G	0.280	6-5/8	1-2		NID
				4-1		NID
				3-4		NID
	D	0.353	8-5/8	1-2		NID
				4-1		NID
				3-4		NID

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Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
1MS08AA10310(3660)	A	0.365	10.75	1-2		NPS
				2-3		NPS
				3-4		NPS
				4-1		NPS
1FW02GB1849(2992)	A	1.375	18	4-1	10/75	NID
				3-4		NID
				2-3		NID
				1-2		NID
	G	1.000	12.75	1-2		NID
				2-3		NID
				3-4		NID
				4-1		NID
	C	1.375	18	1-2		NPS
				2-3		NPS
				3-4		NPS
				4-1		NPS
	J	1.000	12.75	1-2		NPS
				2-3		NPS

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Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
				3-4		NPS
				4-1		NPS
	H			2-3		NPS
				1-2		NPS
				3-4		NPS
	D	1.156	18	1-2		NPS
				4-1		NPS
				3-4		NPS
				2-3		NPS
1MS09AB10320(3665)	A	0.365	10.75	1-2		NPS
				2-3		NPS
				3-4		NPS
				4-1		NPS
1FW04AB110057(979)	A	0.840	11	1-2	1/75	NPS
				2-3		NID
				3-4		NID
				4-1		NID
	B			1-2		NPS

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Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
				2-3		NPS
				3-4		NPS
				4-1		NPS
	C			1-2		NID
				2-3		NID
				3-4		NID
				4-1		NID
1HP06B420(1738)	A	0.437	4-1/2	1-2	3/76	NID
				2-3		NID
				3-4		NID
				4-1		NPS
	B			1-2		NPS
				2-3		NPS
				3-4		NPS
				4-1		NPS
	C			1-2		NID
				2-3		NID
				3-4		NID

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Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
				4-1		NID
	D			1-2		NID
				2-3		NID
				3-4		NID
				4-1		NID
1HP01A203(1725)	A	0.375	20	2-3	1/76	NPS
				1-2		NPS
				3-4		NPS
				4-5		NPS
				5-6		NPS
				6-1		NPS
	L			1-2		NID
				2-3		NID
				6-1		NID
	D			1-2		NID
				2-3		NID
				6-1		NID
	E			6-1		NID

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Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
				4-5		NID
				1-2		NID
	H			1-2		NID
				5-6		NID
				6-1		NID
	J			6-1		NID
				5-6		NID
				3-4		NID
1MS08AC10307(3637)	A	0.365	10-3/4	1-2		NID
				3-4		NID
				4-1		NID
	B			1-2		NID
				4-1		NID
				3-4		NID
1HP03A1415(1736)	F	0.437	3-1/2	1-2	10/76	NID
				2-3		NID
				3-4		NID
	A			4-1		NID

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Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
				2-3		NID
				1-2		NID
	B			1-2		NID
				2-3		NID
				3-4		NID
				4-1		NID
	C			1-2		NID
				2-3		NID
				4-1		NID
	D			1-2		NID
				4-1		NID
				3-4		NID
1HP06C421(1739)	A	0.237	4-1/2	1-2	2/76	NPS
				2-3		NPS
				3-4		NID
				4-1		NPS
	B			1-2		NID
				2-3		NID

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Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
				3-4		NID
				4-1		NID
1MS01BB248(1020)	A	0.875	24.25	1-2	1/75	NID
				5-6		NID
				6-1		NID
	B			1-2		NID
				6-1		NID
				5-6		NID
1MS08AC10307(3637)	A	0.365	10-3/4	1-2		NID
				3-4		NID
				4-1		NID
	B			1-2		NID
				4-1		NID
				3-4		NID
1MS08AB10312(3638)	A	0.365	10-3/4	1-2		NID
				4-1		NID
				2-3		NID
1MS08AD10141	A	0.427	10-3/4	1-2		NID

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Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
				4-1		NID
				2-3		NID
	B			1-2		NID
				3-4		NID
				4-1		NID
	C			1-2		NID
				2-3		NID
				4-1		NID
1MS20B3169(2999)	D	0.437	3-1/2	1-2	5/76	NPS
				2-3		NPS
				3-4		NPS
				4-5		NPS
				5-1		NPS
	E			1-2		NPS
				2-3		NPS
				3-4		NPS
				4-5		NPS
				5-1		NPS

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Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
	G			1-2		NPS
				3-4		NPS
				4-5		NPS
				5-1		NPS
				2-3		NPS
	C			1-2		NPS
				2-3		NPS
				3-4		NPS
				4-5		NPS
				5-1		NPS
	A			1-2		NPS
				2-3		NPS
				3-4		NPS
				4-5		NPS
				5-1		NPS
1MS20B3169(2999)	F	0.437	3-1/2	1-2	5/76	NPS
				2-3		NPS
				3-4		NPS

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Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
				4-5		NPS
				5-1		NPS
	B			1-2		NPS
				2-3		NPS
				3-4		NPS
				4-5		NPS
				5-1		NPS
1MS09AB10140	A	0.427	10-3/4	1-2		NID
				4-1		NID
				2-3		NID
	B			3-4		IS***
				5-7		IS
				4-5		IS
				2-3		IS
				1-2		NID
	C			1-2		NID
				4-1		NID

***IS--insufficient shim.

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Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
				3-4		NID
	D			1-2		NID
				4-1		NID
				3-4		NID
1MS10AA10145	E	0.396	10-3/4	1-2		NID
				4-1		NID
				3-4		NID
	D			1-2		NID
				4-1		NID
				3-4		NID
	E			1-2		NID
				2-3		NID
				4-1		NID
	A			1-2		NID
				2-3		NID
				4-1		NID
	B			1-2		NID
				2-3		NID

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Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
				4-1		NID
	C			1-2		NID
				4-1		NID
				3-4		NID
1MS11A10335(3647)	A	0.365	10-3/4	1-2		NPS
				2-3		NPS
				3-4		NPS
				4-1		NPS
1MS08AB10316(3642)	A	0.365	10-3/4	1-2		NID
				4-1		NID
				3-4		NID
1MS08AC10112(1576)	A	0.365	10-3/4	1-2		NID
				4-1		NID
				2-3		NID
	B			1-2		NID
				4-1		NID
				2-3		NID
1MS01BA2411(1013)	A	0.894	24-1/4	1-2	2/75	NID

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Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
				2-3		NID
				6-1		NID
	D			1-2		NID
				3-4		NID
				6-1		NID
	E			1-2		NID
				2-3		NID
				6-1		NID
1MS01BA2410	A	0.894	24-1/4	1-2		NID
				6-1		NID
				2-3		NID
1MS11A10134	A	0.365	10-3/4	1-2		NID
				4-1		NID
				2-3		NID
	B			4-1		NID
				3-4		NID
				1-2		NID
1MS11A10338(3650)	A	0.375	10-3/4	1-2		NID

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Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
				2-3		NID
				4-1		NID
1MS09AA10321(3666)	A	0.365	10-3/4	1-2		NID
				4-1		NID
				2-3		NID
				2-3		NID
				1-2		NID
				4-1		NID
1MS08AD10298(3628)	A	0.365	10-3/4	1-2		NID
				4-1		NID
				2-3		NID
1MS10AB10127(1595)	A	0.365	10-3/4	4-1		NID
				3-4		NID
				1-2		NID
	C			4-1		NID
				3-4		NID
				1-2		NID
	B			1-2		NID

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Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
				2-3		NID
				4-1		NID
	D			1-2		NID
				4-1		NID
				3-4		NID
1MS07AC10149A	A	0.427	10-3/4	1-2		NID
				2-3		NID
				4-1		NID
	B			1-2		NID
				4-1		NID
				2-3		NID
	C			1-2		NID
				2-3		NID
				4-1		NID
1MS07AB10158A	A	0.427	10-3/4	1-2		NID
				2-3		NID
				4-1		NID
	B			1-2		NID

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Table 5.10 (continued)

Weld Identification	Weld Seam	Pipe Thickness (in.)	Pipe Outside Diameter (in.)	Radiograph Area of Interest	RT Date	Results
				2-3		NID
				4-1		NID
1MS01BA2416(1028)	A	0.894	24-1/2	1-2	1/75	NID
				2-3		NID
				3-4		NID
				4-5		NID
				5-6		NID
				6-1		NID

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5.19.1 Allegation

"A common 'joke' among pipefitters at Zimmer is that they will be hundreds of miles away when the plant goes on line, due to their predictions of a disastrous accident."

5.19.2 Background Information

No additional information was provided with this allegation as to the source or significance of the statement.

5.19.3 Investigation

Sixteen pipefitters interviewed by the RIII inspectors could not provide any information concerning any specific design or installation deficiencies.

5.19.4 Findings

No information could be developed.

5.19.5 Items of Noncompliance

No items of noncompliance were identified.

5.18.1 Allegation

"A KEI employee has kept a detailed journal of safety hazards and incidents at Zimmer."

5.18.2 Background Information

It is common practice for inspectors performing certain types of inspections to utilize notebooks to record their observations. Such notes can later be used to generate surveillance reports, nonconformance reports, or other documents as required.

5.18.3 Investigation

5.18.3.1 Interview with Thomas Applegate

On January 29, 1980, Thomas Applegate was interviewed by NRC. He stated that an individual named Yohan Reiter had told him he maintained a detailed journal of safety defects while employed as a radiation waste chemistry technician at Zimmer.

5.18.3.2 Interview with Thomas Daniels

On February 2, 1981, Thomas Daniels, NRC Senior Resident Inspector, was interviewed. He had reviewed CG&E personnel records and found an individual named Yohan Reiter. He said he had found that Reiter was employed by Westinghouse, Inc., in Ankara, Brazil. Reiter had been employed at Zimmer at the time Thomas Applegate was onsite.

5.18.3.3 Interview with Yohan Reiter

On February 5, 1981, NRC staff interviewed Yohan Reiter of Westinghouse, Inc., Ankara, Brazil by telephone. He stated he was formerly employed as a radiation chemistry technician (RCT) at Zimmer. He said he recalled meeting Thomas Applegate in the radiation waste disposal area during a routine inspections. Reiter also recalled commenting to Applegate that his field notebook was his "paper brain" in which he recorded the results of his field inspection. He said the notebook listed deficiencies identified during system walkdowns of the radioactive waste disposal system, which is a nonsafety related system. Reiter indicated that he used the notebook to record deficiencies, such as malfunctioning gauges or acid eating through floor tiles, which were then recorded on a equipment service list (ESL) and corrected by the plant maintenance staff. He added that during meetings with his supervisor, Dean Erickson, and other members of the Radiation Protection Department staff the adequacy of the resulting corrective action was discussed.

Reiter indicated that he was not keeping any detailed journal of safety defects at the plant and, if he had any concerns regarding the safe operation of the plant, he would have contacted the NRC himself.

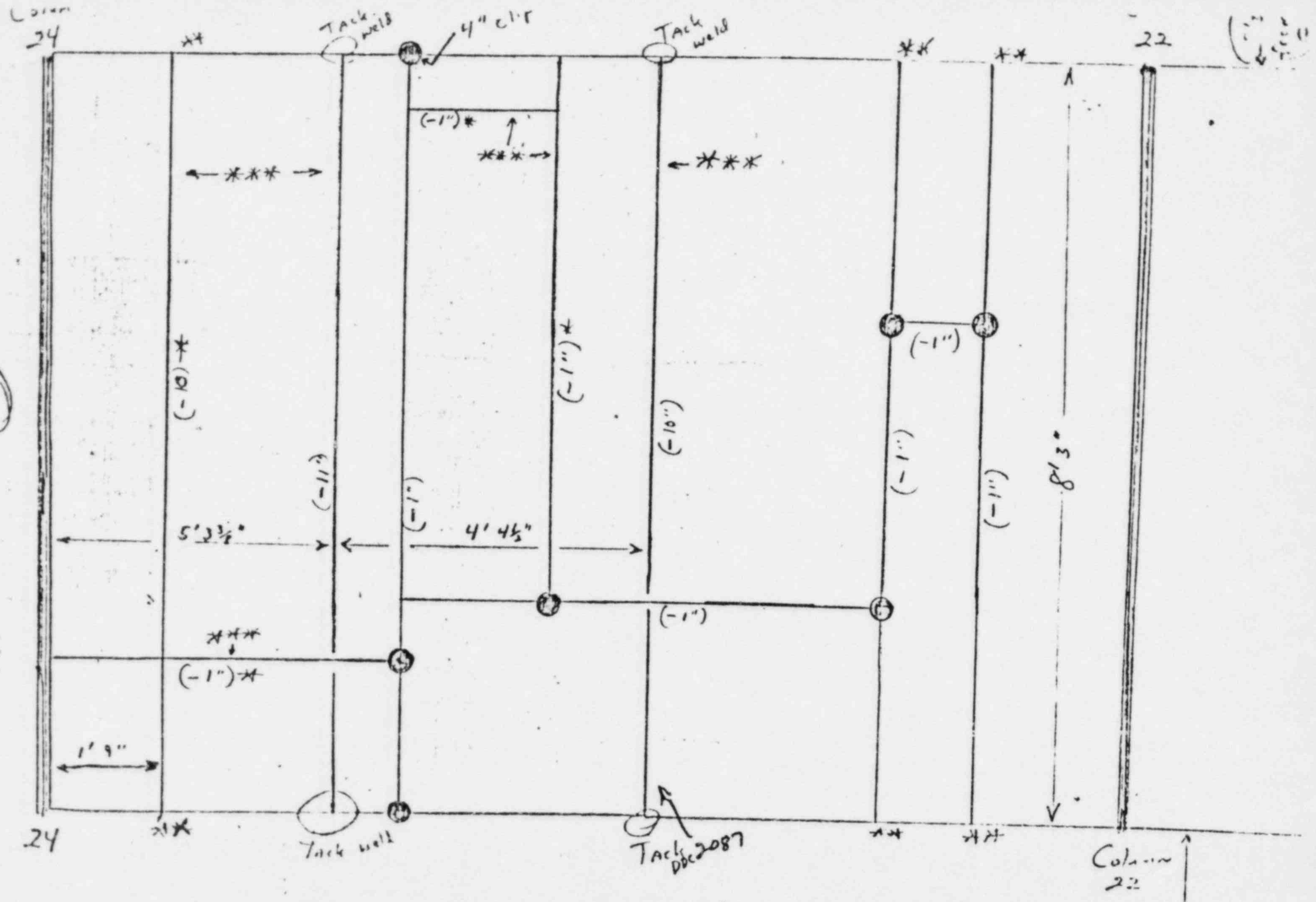
5.18.4 Findings

The individual who was alleged to have kept a journal of safety hazards and incidents at Zimmer stated that the journal was a field inspection notebook. He stated he used it to record deficiencies he identified during system walkdowns of the radiation waste disposal system. He said that to his knowledge all of the deficiencies he identified were properly corrected by the licensee.

5.18.5 Items of Noncompliance

No items of noncompliance were identified.

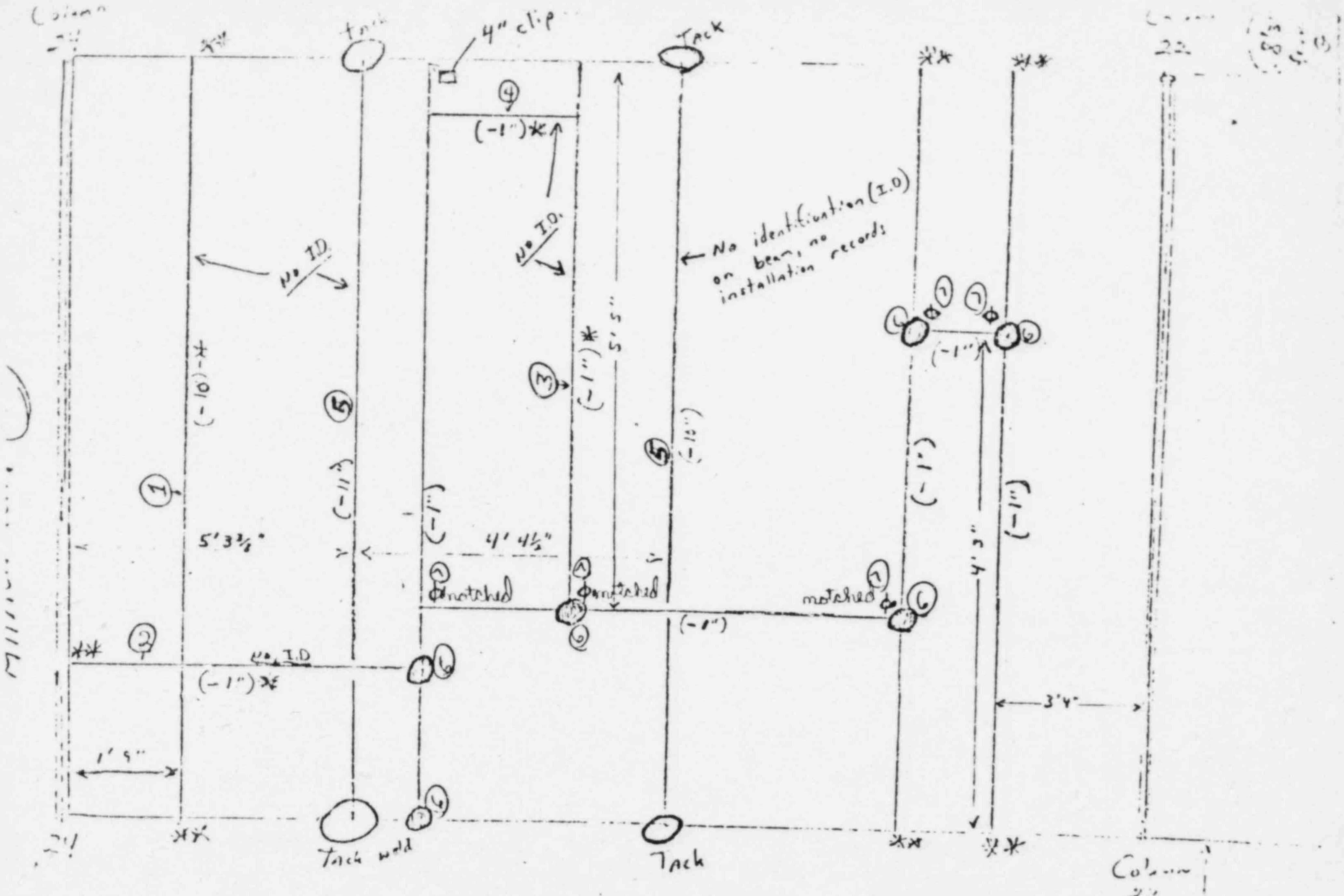
Attachment (14)



W8×17's - Elevation 546 Aux. Building Blue switchgear room

* Not shown on S+L Dwg. # 5-546 Rev AB DDC2050 ⊙ = defective welds

** Welds or connections covered with fire proofing unable to evaluate.



W 8 × 17's - Elevation 546 Aux. Building Blue switchgear Room

* Not shown on SvL Dwg. #5-546 Rev AB or DDC's listed — defective welds

ϕ reentrant corners not coped

#4

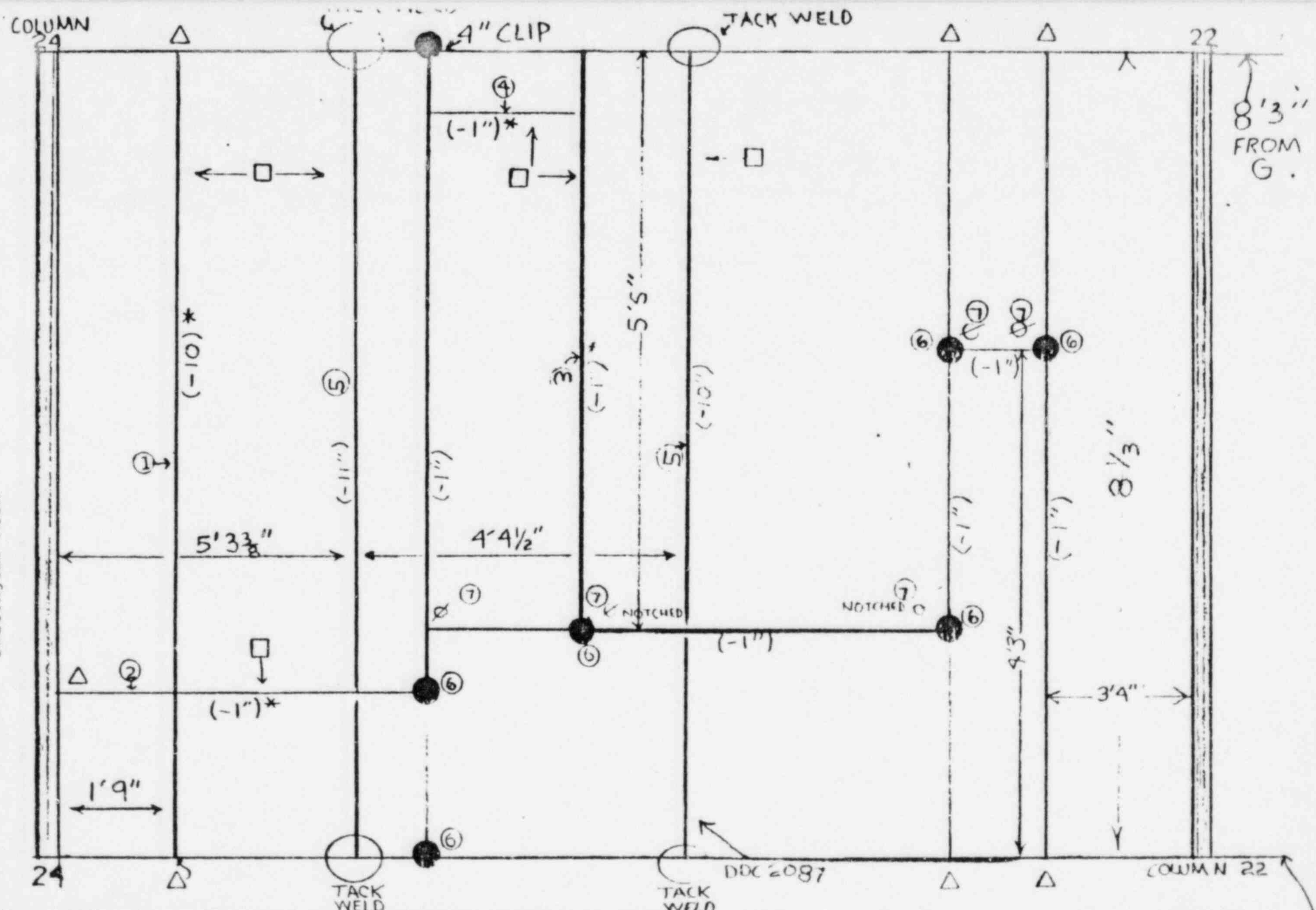
1-29-81
PBE

For Paul Barrett.

Every NR identified which deals with any mechanical device such as pipe, valve etc on any system (*) marked.

ATTACHMENT A

W8 X 17's - Elevation 546 Auxiliary Building
Switchgear Room



* --- Not shown on S&L DWG. #S-546, Rev. AB or DDC's listed.

Ø --- Re-entrant corners not coped.

△ --- Welds or connections covered with fire proofing unable to evaluate.

□ --- No identification on W8X17's or records to support tracibility of material.

Floyd

1-28
10 00 AM

Need for NRC This afternoon

1 - Identify and obtain copies of all past + present open or closed NR's relating to the RHR System

✓ 2 - Identify any NR on the RHR System that relates to
" Broken valve due to being bumped by pipe fitter "

✓ 3 - Identify any NR on the RHR system which relates to a " 2000 PSI or 5000 PSI fitting " DDC # M 4793

4 - Identify any NR on any system which is written against any mechanical device such as valve, pipe, operator 1977, 78, 79

✓ 5 - ~~Identify~~ any NR written against MW Kellogg vendor welds 1977

RP Ehas

1. Unacceptable structural beam welds

A) All Bristol welds will have to be reworked (redone).

B) All bad welds by other contractors will have to be repaired.

(1) Paint will be removed for inspections

(2) The cause for these bad welds ~~exist~~ existing will have to be determined. Appropriate corrective actions must be taken.

c) Inspections and documentation will be completed for A) + B).

2) Inadequate Bristol QA program

A) All Bristol work will have to evaluated

(1) The scope of Bristol's work will be defined

(2) A report will be prepared to identify both the acceptable and unacceptable work

(3) Justification for the acceptable work will be defined.

~~(3)~~(4) All unacceptable work will be corrected and documented.

B) The cause for the inadequate Bristol QA program will be defined and appropriate generic corrective actions will be taken.

3) Lack of Traceability of Material

A) All accessible structural beams will ~~be~~ have their respective heat numbers verified by actual inspection.

B) Justification for accepting the documented heat numbers in unaccessible beams ~~beams~~ will be defined.

c) All safety related piping will be completely inspected to verify the respective heat numbers. Note: The original inspector name will be recorded for each heat number, also.

3) D) All welds, for which the rod heat numbers have not been ~~verified~~ verified by QC, will be redone. (Verification ~~by~~ with the KEI-2 form alone is not acceptable).

E) All of the activities will be explicitly documented.

F) The cause for this problem will be ~~[illegible]~~ defined and appropriate generic actions will be taken.

4) Surveillance reports not converted to nonconformances

A) An evaluation of the S.R. program will be made to determine if it is being used improperly to document nonconformances. Appropriate corrective actions will be taken.

B) Modifications to and/or training about the S.R. and N.R. programs will be given to eliminate any confusion as to ~~what~~ which report to write.

5) Structural welds inspected after painting

A) An evaluation will be made to determine which welds are in this category. The evaluation will be documented, identifying ~~defining~~ the welds in this category and defining the justification for the welds not in this category.

B) The paint will be removed from all of the welds in this category. The welds will then be reinspected & documented. The welds will be left unpainted until ~~to~~ further evaluation by the NRC.

C) All unacceptable welds identified by the evaluations will be repaired, ~~and~~ reinspected, and documented.

D) The cause for the inspections to occur after painting will be defined and appropriate generic actions will be taken.

6) Nonconformance Reports Improperly Voided

A) A review of all voided NRs will be performed, by appropriately authorized and qualified personnel, to identify all inappropriate actions taken.

B) Corrective measures for the inappropriate actions will be defined and documented.

C) Absolutely no alterations will be made to the voided NRs.

D) The cause for the improper ~~votin~~ voiding will be defined and appropriate actions will be taken

7) Cable Separation Design Violation

A) The cause for this design violation will be defined by S&L.

B) An ~~evaluation~~ evaluation will be made and documented to identify all other design violations which resulted from the defined cause. Do not limit the evaluation to cable separation.

C) All violations will be ~~defined~~ corrected and the corrective actions will be documented.

8) Lack of Sufficient Cable Separation Inspection Criteria

A) A review will be made to assure ~~procedures~~ that inspection requirements for cable separation exist for all Class IE and associated cables. The requirements will be defined from ~~the~~ cable termination point to cable termination point.

B) Based on the above requirements, ~~an inspection and~~ a review of QC records will be performed to identify all points in ~~the~~ all cables routings that have not been inspected for separation.

8)

C) An inspection will be made ~~on~~ of all points not previously inspected.

D) All separation violations will be corrected.

E) The cause of inspection criteria ~~defect~~ deficiency will be ~~det~~ defined and appropriate generic actions will be taken.

9) Inadequate Corrective Action of CG&E Audit Findings

A) A review of all CG&E audits will be made to identify all identified adverse observations, concerns, findings, deficiencies, etc., ~~and~~ the corrective ~~measure~~ measures taken for each adverse item; and the follow-up audits to assure the effectiveness of the corrective actions.

B) ~~In~~ The review will be documented.

C) For those items which specific and/or generic corrective actions and follow-up audits have not been addressed and/or ~~not effective~~ have not been effective, the licensee will explicitly define and take the ~~what~~ actions ~~will be taken~~ necessary to resolve the items.

D) ~~X~~ Define the cause of this problem and generic corrective actions.

10) No CG&E Audits Performed ~~of~~ Concerning the S&L Nonconformance Program

A review will be done to

A) ~~CG&E will~~ define all of the contractors, vendors, designers, etc., and the respective areas ~~to~~ of each for which CG&E ~~has~~ ~~to~~ had and has the responsibility for auditing.

The review

B) ~~CG&E~~ will identify any and all audits ~~the~~ they have performed for each firm and each respective area.

10) c) For each item and/or area that has not been audited, justification will be defined as to ~~(1)~~ assurance ~~to~~ of (1) compliance with the QA program and (2) the effectiveness of the program.

D) The ~~cu~~ cause for these audits not being performed will be defined and appropriate generic corrective actions will be taken.

11) Weld Inspection Criteria Deleted

A) A review will be performed to identify all of the welds ~~and all of the weld inspection criteria affected~~ affected by ~~deleted~~ ~~criter~~ inspection criteria that has been improperly lined out, noted as not applicable, or otherwise deleted.

B) The welds and ~~a~~ respective criteria will be documented.

C) The corrective measures, to assure compliance with the applicable codes, will be defined and documented.

D) The cause for the deletions will be defined and appropriate ~~correct~~ generic corrective actions will be taken and documented.

← Absolutely no additional alterations will ~~be~~ be made to any ~~other~~ record to correct previous alterations or for any other reason.

a) Socket Weld Fit-ups Not Verified

A) All socket weld fit-ups that were not verified by visual examination will be documented.

B) Corrective measures for the nonverified fit-ups will be defined with justification that the corrective measures comply with the code.

C) The cause for this problem and generic corrective actions will be defined.

13) Structural Beams Installed that Are Not Required By Design

A) An inspection will be made of all accessible superstructures to identify ~~the~~ all beams ~~to~~ and other discrepancies that are not controlled on design documents. ~~and identified to QC.~~

B) Justification for accepting superstructures that are not accessible will be defined.

C) All beams and other discrepancies that are not controlled on design documents will be documented and proper dispositions will be made and documented.

D) The cause for this problem and generic corrective actions will be defined.

14) Weld Rod Issue Slips Used As QC Inspection

A) A review of all records, which could have been ~~o~~ marked based on the information ~~and~~ written on the weld rod issue slips, will be made.

B) All records entries which were made and which are indeterminate as to origin, will be identified and documented.

C) These entries will be verified by inspection or

c) by other acceptable means where possible.

D) Where the entries are not possible to verify, the activity will be done over or justification will be provided ~~#~~ for any other actions.

E) The cause for these ~~[illegible]~~ improper entries ~~will~~ and the generic corrective actions will be defined.

15) <u>Design Document Distribution Not Controlled</u>

A) The cause and effect of this problem will be defined and documented.

B) The specific and generic corrective actions will be defined.

16) <u>Deviation from FSAR - Weld Acceptance Criterion</u>

B ~~A~~) Define inspect all of the welds that could have been accepted based on ~~this~~ all ~~[illegible]~~ Deviations.

A ~~B~~) Revise the weld inspection criteria to adequately reflect all code requirements.

c) ~~Identify~~ Inspect ~~and document~~ to identify all welds that do not meet the revised criteria.

D) Make appropriate repairs to the unacceptable welds.

E) Define the cause for the deviations and the generic corrective actions.

17) Insufficient Controls to Assure Inspection of DDC Activities

A) Identify all DDCs regardless of status to QC

B) Establish a tracking program of DDCs which is controlled by QC.

(1) The DDCs must be tracked from the time the numbers are issued.

(2) Verify that each individual DDC has been implemented, then inspected by QC. Identify the inspections on the DDCs.

C) The control of DDCs must not rely upon construction personnel for notification or otherwise.

6) Insufficient shimming of radiographs of prefabricated pipe welds

A) All radiographs of prefabricated pipe welds will be reviewed by qualified NDE personnel to identify all of the radiographs that fall into this category. Also, radiographs and/or welds that are determined to be unacceptable for any other reason will be identified.

B) ~~R~~ Justification for the quality (acceptability) of the welds, documented by ~~the~~ the radiographs in this category, will be defined. The justification may be based on new radiographs of the welds or any other practice that is in compliance with the ASME code.

C) All unacceptable welds identified, will be properly corrected.

D) The above activities will be documented.

7) Nonconformance Reports Improperly Voided

From T. Daniels 7/7/81

I Allegation$SNo.$S3$U

"A radioactive waste drain is clogged with concrete which carelessly was poured into the drain."

II Findings$U

The portion of the allegation that alleged a radioactive waste drain was clogged, was substantiated in that interviews with two pertinent personnel indicated that some drains had been clogged with unspecified debris.

The portion of the allegation that alleged concrete clogged the drain was not substantiated.

Flushing records dated in 1979 indicated that 152 out of a total of 169 of the potential radioactive waste drains, all of which are nonsafety-related, were cleared of all restricting debris. The 17 drains which remain to be flushed are identified on the same controlled flushing procedure as the 152 which have been flushed. RIII will determine the status of the remaining 17 drains prior to plant operation. (358/81-13-)

No items of noncompliance or safety concerns were identified.

III Investigation$U

A. Background$SInformation$U

Normal practice is to flush drains with water prior to plant operation to confirm ~~confe<imr~~ that the drains are clear of l<all restricting debris. The radwaste Building drains, which are nonsafety-related, will not handle radioactive material until such material is generated following commencement of plant operations.

The tern<ms radwaste drains, radioactive waste drains, and radiation waste drains are synonymous for this allegation.

B. Personnel$SInterviews$U

InterviewSofSIndividualS<$S"A"$U

On February 24, 1981, Individual "A" who was previously interviewed by representatives of GAP was interviewed. Individual "A" stated that while concrete finishing work was underway in the radioactive waste BUILDING ~~disposal system~~ he suggested to Kaiser Construction personnel that a pipefir<tter be assigned to the concrete finishing crew to assure concrete did not enter and clog the BUILDING drains. However, they disagreed with this suggestion and instead directed the floor drains

to be covered with duct tape to prevent concrete from entering and clogging the drains. Individual "A" stated that concrete did enter the lines and clogged the ~~radiation waste drains.~~ RAD WASTE BUILDING DRAINS

On April 22, 1981, Individual "A" provided a written statement attesting to the aforementioned information; however, he requested the statement not be attached to this report.

InterviewSofSIndividual$S"B"$U

Individual "B" stated that he worked as a pipefitter in 1976-1977 in the drain flushing crew for the ~~radiation~~ RAD WASTE BUILDING DRAINS. ~~waste disposal system~~. Individual "B" stated that during thisp< period, he observed drains in the ~~system~~ RADWASTE BUILDING that were clogged with concrete, which he and others unsuccessfully tried to remove.

InterviewSofSTest$SCoordinator$Sand$SStartup$SEngineer$U

Telephone interviews were conducted by the Senior Resident Inspector on February 12, 1981 with the Test Coordinator responsible for the radwaste building drain flushing activities and on February 13, 1981 with the Startup Engineer responsible for Drain System flushes. Both individuals indicated that some drains were found to be plugged with unspecified debris. In all of those cases the drains were cleared and fo<low was

verified.

C. Record$SReview$Sand$SOnsite$SObservation$U

The Senior Resident Inspector reviewed CG&E Flushing Procedure No. DR, Rev. 0, approved September 23, 1977, for the Drain System. The purpose of this procedure was stated as follows: "This document details the procedue<re for cleaning the liquid radwaste floor drain and equipment drain piping to the various plant sumps and drain tanks. The floor drain and equipment drain piping shall be flushed until they flow freely and all large pat<rticulate matter is removed."

The Radwaste Building <<<

Appendices to the Flushing Procedure, indicated that 152 of <<out of a total of 169 of the potential radioactive waste drains related to the Radwaste Building Floor Drain Tank, the Floor Drain Sludge Tank, the Radwaste Floor Drain Sump, the Floor Drain Collector Tank, and the Chemical Waste Tank ~~has~~ had been flushed and verified in accordance with the procedure. The Appendices indicated that the verifications had been made in 1979. The licensee stated that the flushing activities were still continuing.

The Senior Resident Inspector made visual inspections of all of the accessible radwaste drain ports identified on Sargent & Lundy drawings A-533 REv. F, A-534 Rev. F, and A-515 Rev. N. These drawings identified the drains in the radwaste building (elevations 496 feet, 527 feet, 513 feet and 511 feet) and in the auxiliary building (elevations 567 feet, 5 inches, and 546 feet). None of the observed drain ports were visibly plugged. The following floor drains were covered with tape at the time of the inspection and were therefore not inspected:

A. Radwaste Building -- elevation 527 feet

1. Drain Y-20
2. Drain Y-17

B. Auxiliary Building --elevation 567 feet

1. Drain L-26
2. Drain G-26 (elevation 562 feet - 5 1/4 inches)
3. Drain G-22
4. Drain G-20
5. Drain G/H-20 (elevation 562 feet - 6 3/4 inchs<es)
6. Drain H-22 (elevation 562 feet - 7 5/8 inches)
7. Drain H/J-24
8. Drain G/H-22

Neither the g<flushing records, the personnel interview, nor the Resident Inspector observations confim<rmed or denied that the drains had been clogged with concrete. These activities did confirm that the drains, which had been flushed, would allow flow on the dates of the verifications.

No items of noncompliance or deviations were identified.

From J. Daniels O.K. w/ no comment 7/7/81

I Allegation$S5$U

"Sensitive parts on welding rods are possibly damaged through storage at improper temperatures and possibly lost through failure to follow proper paperwork and labeling requirements."

II Findings$U

1. The portion of the allegation that alleged sensitive parts on welding rods are possibly damaged through storage at improper temperatures, was substantiated based on the noncompliance history concerning weld rod temperature control documented in past IE Inspection Reports. No additional weld rod temperature control problems were identified during this investigation.

2a. The portion of the allegation that alleged welding rods were possibly lost through failure to follow proper paperwork w<requirements was not substantiated with regard to weld rod issue forms. Allegations P-2/13 and P-2/16 in this Investigation Report address QC record and QC verification problems related to weld rod control.

b. The portion of the allegt<ation that alleged welding rods were possibly lost through failure to follow proper labeling requirements was not substantiated. No information was submitted or obtained to define the specific meaning of the alleged concern about labeling requirements.

Other than referenced, no items of noncompliance or safety concerns were identified.

III Investigation$U

A. Background$SInformation$U

This allegation was interpreted to address two weld rod concerns:

1. Weld rods were possibly being damaged by improperly controlling rod temperatures prior to consumption and resulting in unacceptable welds.

2. Weld rods had been lost because the paperwork and labeling requirements were not being properly followed. Therefore, welds may have been made in<<with incorrect weld rods.

These interpretations were based on the following persone<nel interviews.

B. Personnel$SInterviews$U

Interview$Swith$SIndividual$S"A"$U

On February 24, 1981, Individual "A" who was previously interviewed by representatives of GAP was interviewed.

1. He stated he observed unaccounted for weld rod (weld rod without accompanying KE-2 weld control forms) onsite and has seen weld rod warming ovens unplugged and not being maintained at the proper tm<emperature.

2. Individual "A" also stated that during September and October 1979 a pipefitter was not assigned to the weld rod issue point during the evei<ning shift to account for weld rods. He stated that weld rod and wl<eld issue slips were left out unattended for anyone to pick up and use.

On April 22, 1981 Individual "A" provided a written statement attesting to the aforementioned information, however he requested the statement not be attached to this report.

Interviews<$Swith$SIndividual$S"B"$U

On April 14, 1981, Individual "B" who was previously interviewed by representatives of GAP was interviewed.

1. He stated Kaiser required weld rod ovens be maintained at the proper temperatures at all times. He said he could not insure that every welder maintained his oven at the right temperature, but as a supervisor he insured his men did.

2. He stated th-t<<that on occasion weld rod issue slips (KE-2 Forms) were lost and in those cases it was a common practice onsite for welders at the time of fabrication to get a blank issue form, falsify it, and present it to the Kaiser Quality Control Inspectors in order for the weld to pass inspection. He said frequently this was done months after the fact by Kaiser construction supervisors who falsified weld rod issue forms to complete weld documentation packages. He said by doing this they did not have to cut out and rework welds.

On April 14, 1981 Individual "B" provided a write<ten statement attesting to the aforementioned information, howee<ver he requested the statement not be attached to this report.

CX. Weld$SRod$STemperature$U

1. For pressure boundary (pipe) welds the ASME Code Section III 1971, Article NB-2440 states, "Suitable storage and handling of electrodes, flux and other welding materials shall be maintained. Precautions shall be taken to minimize absorption of moisture by fluxes and cored, fabricated and coated electrodes."

ASME Code Section III 1971, Article NA-4460 states, "Measures shall be established to provide work and examination instructions for handling, storage, shipping and preservation of materials, parts, components, and appurtenances to prevent damage or deterioration. When necessary for particular products, special protective environments, such as inert gas atmospheres, specific moisture content levels and temperatures, shall be provided and their existence verified."

For structural welds the AWS D1.1-1972 Code, Section 4.9.2 states, "All electrodes haveing<<having low-hydrogen coverings conforming to AWS A5.1 shall be purchased in hermetically-sealed containers or shall be dried at least one hour at temperatures between 700 F and 800 F before being used. Electrodes shall be dried prior to use if the hermetically-sealed container shows evidence of damage. Immediately after removal from hermetically-sealed containers or from drying ovens, electrodes shall be stored in ovens a<held at a temperature of at least 250 F. E70XX electrodes that are

not used within four hours, E80XX within two hours, E90XX within one hour, and E100XX and E110XX within one-half hour after removal from hermetically-sealed containers or removal from a drying or storage oven shall be redried before use. Electrodes which have been wet shall not be used."

The purpose of the low-hydrogen weld rods is to keep hydrogen out of the weld. Hydrogen could cause underbead cracking. Thus, the above code requirements are intended to minimize the moisture, which contains hydrogen, from e<being absorbed by the low-hydrogen weld rods.

During this investigation the Resident Inspector reviewed the receipt documentation for E7018 (low hydrogen) weld rod purchased on orders No. 34356, 35720, 37587, 39075, 39382, 39556, 39971, and 40318. The receipt documentation indicated that the E7018 rod had been received in sealed moisture-proof containers.

During this investigation the Resident IN<nspector verified that low hydrogen electrodes (rods) which had not been isu<sued to the field were clearly identified and stored in a clean, limited access, and dry area. In addition, in the field issue rooms (rod c<shacks), the low hydrogen rods were either in sealed containers or in holding ovens at temperatures above 250°F.

~~To help accomplish code requirements,~~ Portable rod warmers have been specified for used< near the work activities to maintain the weld rods in a dry condition until used.

KEI Welding Filler Materials Control Procedure No. SPPM 3.3, Revision 7, paragraphs 3.5.4.2 and 3.5.4.3 respeci<tively state:

"When covered electrodes are removed from a holding oven to be issued to welders they shall be placed in a portable rod warmer. Only one classification and heat or lot of electrodes shall be stored in each individual portable rod warmer. Each portable rod warmer shall be uniquely marked for identification purposes and shall be checked on a monthly basis to assure that each rod warmer maintains a correct temperature between 175°F and 400°F."

"All covered electrodes exposed to ambient conditions for more than four hours without coming in direct contact with water shall be returned to central storage for rebaking. . ."

The Resident Inspector reviewed the December, 1980 record for the Daily Temperature Check of holding ovens No. W50, W27, W38, W25, W39, W19, W11, and W26. The record indicates that oven No. W50 was 5°F under the specified 250°F on three of the 22 days checked; oven No. W25 was 5°F under the specified 250 F, one day out of 22; oven W39 was 15°F under the specified 250°F on one day of out 22; and oven W26 was 10°F under the specified 250°F on one day out of 22.

The Resident Insps<ector reviewed the record for the Monthly Check of portable rod ovens (warmers). The record indicated that the temperatures of 209 warmers were checked on January 3, 1981 and aht<<that all but 15 of the warmers were above 250°F. Of those 15 warmers, all were 200°F or higher.

During this investigation the Resident Inspector also observed that unacceptable rod warmers in the field issur<e rooms, were properly tagged and segregated in a clearly marked area.

The licensee has been cited in the past with noncompliances by the NRC as identified in the following IE Inspection Reports:

Number$U	Cited$SNoncompliance$U
75-05	Holding oven contained both stainless steel and low hydrogen carbon steel rod
76-07	(1) Portable electrode (warmer) oven not plugged in and approximately 10 electrodes were not in the warmer.

Number$U	Cited$SNoncompliance$U
	(2) Two 50 lb. cans of low hydrogen (7018) electrodes had holes in them and several cans were damaged.
	(3) Documentation for temperature calibration for three weld rod holding ovens was not available.
76-11	Partially burned and unburned weld rod was found lying outside containers or ovens in several locations in the plant.
77-02	Holding oven contained both stainless steel and low hydrogen electrodes.
~~79-07~~ 79-07	Holding oven contained both stainless <<< (1) Approximately three dozen partial, damaged, or unused electrodes were found lying on the floor, scaffolding, and in a cable tray.

Number$U	Cited$SNoncompliance$U
	(2) Three rod ovens were not provided with thermometers for directly measuring oven temperatures.
	(3) Calibration of two rod ovens was past due.
	(3) Calibration of two rod ovens<<< was past due.<<<
79-15	(1) Filler materialdK and consumable inserts maintained in ovens and on shelves without traceability to heat/lot nume<bers.
	(2. Filler me<aterial heating ovens contained food.

Number$U	Cited$SNoncompliance$U
	(3) 50 containers of nonconforming weld rod was not identified as nonconforming.
80-07	Two portable warmers were not plugged in.
80-14	One portable o<rod warmer was not po<lugged in.
80-19	One portable rod warmer was not plugged in.

The citations concerning portable rod warmers not being plugged in and holding ovens containing different types fo<<of rods were violations of site procedures and not ASME or AWS Codes.

The RIII inspectors identified no additional items of noncompliance or significant concerns relevant to weld rod temperature controls.

2a. Weld$SRod$SPaperwork$Sand$SLabeling$SRequirements$U

The paperwork used to account for weld rod was the KEI-2 form (weld rod issue slip). The KEI-2 form required the welder's, the welder's foreman, and the weld rod issuer's signatures, which permitted the welder to obtain weld rods for a specific weld from the rod shack (field storeroom).

The RIII inspector reviewed the following KEI-2 forms for evidence that indicated the weld rods had not been properly accounted ori< the KEI-2 forms had f<been falsified.

KEI-2 No.	Weld$SDrawing$SNo.$U	Rod$SIssue$SDate$U
186553	PSK-1HG-11	Sept. 1979
186554	PSK-1HG-11	Sept. 1979
198846	PSK-1HG-11	Sept. 1979
198847	PSK-1HG-11	Sept. 1979
196277	PSK-1HG-1	Sept. 1979
196276	PSK-1HG-1	Sept. 1979
198800	M462-1-HG-1	Sept. 1979
198797	M462-1-HG-1	Sept. 1979
185819	PSK-1MS-34	Oct. 1979
185843	PSK-1MS-34	Oct. 1979
185841 ~~18541~~	PSK-1MS-34	Oct. 1979
185818	PSK-1MS-34	Oct. 1979
185763	PSK-1MS-34	Oct. 1979
185856	PSK-1MS-34	Oct. 1979
185864	PSK-1MS-34	Oct. 1979
195934	1MS-37	Oct. 1979
~~[illegible]~~	~~1MS-36~~	~~Sept. 1979~~
196329	1MS-36	Sept. 1979
~~196330~~	~~1MS-36~~	~~Sept. 1979~~

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~~196359~~	~~1MS-36~~	~~Sept. 1979~~
196359	1MS-36	Sept. 1979
196330	1MS-36	Sept. 1979
195868	1MS-37	Oct. 1979
186618	1MS-35	Oct. 1979
198958	M471-5-RR-207	Sept. 1979
198957	M471-5-RR-207	Sept. 1979
196314	M471-4-RR-170	Oct. 1979
196436	M471-4-RR-170	Oct. 1979
105242	PSK-WR-37	Oct. 197~~7~~9
198973	M-148-WR-40	Sept. 1979
198784	M-148-WR-40	Sept. 1979
198972	M-148-WR-40	Sept. 1979
185910	~~1~~ISK-M-447-WR-75	Oct. 1979
195843	~~1~~ISK-WR-53	Oct. 1979
195844	~~1~~ISK-WR-53	Oct. 1979
195859	M-447-WR-53	Oct. 1979
195860	M-447-WR-53	Oct. 1979
194906	PSK-1WS-71	Oct. 1979
170145	PSK-1WR-06A14	Oct. 1979
199448	PSK-WR-9	Oct. 1979
199651	PSK-1WR-80	Sept. 1979
185884	M148-WR-41	Oct. 1979
186707	M148-WR-42	Oct. 1979
195853	M447-WR-71	Oct. 1979

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186632	PSK-WR-45	Oct. 1979
185917	M447-WR-49	Oct. 1979
195758	PSK-1WR-47	Oct. 1979
186619	1MS-35	Oct. 1979
195134	M-471-12-RR(93)	Oct. 1979
188597	M-471-12-RR(93)	Oct. 1979
195130	M-471-12-RR(99)	Oct. 1979
195138	M-471-12-RR(99)	Oct. 1979
188595	M-471-12-RR(99)	Oct. 1979

All of these KEI-2 forms were signed (usually by initials or mark) in the space designated for the rod issuer which indicated that the respective welding rods had been properly accounted by the assigned construction (non-Quality Control, non-QC) personnel. The RIII inspector reviewed several other KEI-2 forms of different time periods to compare the consistency of signatures and the types of inks used. None of these KEI-2 forms appeared to be falsified. The RIII inspector could not determine if the above KEI-2 forms were for day shift or evening shift activities.

The KEI-2 forms required no QC signatures and were therefore not QC records which would signify QC verifications that the correct weld rods were used. The QC verifications of weld rod were required to be made at the place

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and time of the actual weld activity and documented on

the KEI-1 forms (weld inspection records).

The findings related to allegations P-2/13 and P-2/16 addressed in this Investigation Report No. 81-13 revealed the following paperwork deficiencies concerning KEI-1 forms and the respective weld rod verifications by QC inspectors:

(1) QC inspection criteria had been improperly delec<ted or designated as not applicable from the KEI-1 forms (QC records).

(2) KEI-1 forms (QC records) had been improperly altered based on information on KEI-2 forms (non-QC records).

These deficiencies have been identified as items of noncompliance.

2b. Neither the personnel interviews, the record reviews, or the observation of activities related to weld rod control identified any specific meaning of the alleged concern about labeling requirements. Therefore, this concern was not substantiated.

RFW
6/11/81

I Allegation$S1$U

"Kaiser knowingly installed and ripped out unsuitable Main Steam Relief (MSR) piping, at an estimated labor cost of Three Hundred and Twenty Thousand Dollars ($320,000)".

II Findings$U

The allegation was substantiated in that an economic decision was made to install piping, of which approximately 3-10 percent would have to be removed, due to continuing changes in design loads. No attempt was made to substantiate the estimated labor cost for the portion of pipe that was installed and removed. However, costs figures were available for the total design modification relevant to the Main Steam Relief piping.

The RIII inspector identified no items of noncompliance or concerns that were significant to quality construction of the MSR piping.

III Investigation$U

A. Background$UInformation$U

The allegation was interpreted to be concerned with the monetary costs of constructing the Main Steam Relief System piping. No information was received to indicate unacceptable quality of the related construction activities.

B. Personnel$SInterviews$U

On February 24, 1981, Individual "A", who was previously interviewed by representatives of GAP, was interviewed and stated Kaiser installed a large portion of the MSR piping, knowing sections of it would later have to be removed after installation. He recalled that two years after its installation Kaiser removed large sections of the piping from the 525' level of the reactor containment building downward, and left the pipe sections above that level in place.

On April 22, 1981 Individual "A" provided a written statement attesting to the aforementioned information; however, he requested the statement not be attached to this report.

On April 14 and 16, 1981, Individuals "B" and "C", respectively, who allegedly provided information regarding this allegation to representatives of GAP were interviewed and stated they had no information concerning this allegation.

C. During the period of 2/9-13/81 and 2/23-27/81, discussions with Mr. H. C. Brinkman, Principal Mechanical Engineer, CG&E, indicated that in 1975 a nuclear power plant in Germany discovered the need to redesign the relief system based on new discharge loads. Therefore, several utilities, including CG&E, decided on a modification to replace the already installed rams head safety relief valve (SRV) discharge devices with quenchers.

In 1975 CG&E decided to start the quencher modification, knowing that part of the piping, not yet installed, would later have to be removed due to the identification of new discharge loads. The basis for the decision was that approximately 90-97% of the original quencher modification would be acceptable and therefore only 3-10% would be subject to rework. CG&E's decision concluded that it would be less costly to go ahead in 1975 with the installation activities rather than to delay the construction schedule until the quencher modification design was complete. To date, the modification design is not complete.

The NRC has been aware of the modification activities as described in the Mark II Design Assessment Report, Chapter 2.0 -- Zimmer Empirical Loads, ZPS-1. The RIII inspector observed that the latest documentation received from the NRC Licensing Branch No. 2 at the site concerning the modification activities, was NUREG-0487, Supplement 1, titled, "Mark II Containment Lead Plant Program Load Evaluation and Acceptance Criteria." It should be noted that there may be more changes in the future due to additional load definitions.

The modification has required the replacement of 10 inch schedule 40 pipe with other 10 inch schedule pipe of different configurations, 10 inch extra strong pipe, and 12 inch extra strong pipe.

During this investigation the licensee provided cost figures for modification to date. The total labor cost was $823,780.00 and the total material plus labor cost was $1,183,690.00. The NRC made no attempt to corroborate these costs or the licensee's claim that it was cheaper to proceed with an installation which was known, before installation, to require rework.

The RIII inspector reviewed all revisions to the KEI isometric drawing PSK-1MS, Sheets 21 and 21A, which were pertinent to the main steam relief piping. No additional changes of the magnitude addressed in the allegation were identified. The revisions identified the following changes:

Rev. 0	Redrawn -- original configuration replaced	9/8/76
Rev. 1	Hangers added	3/31/77
Rev. 2	Eight lugs added	1/10/78
Rev. 3	Hanger changed	5/5/78
Rev. 4	New spool pieces added, welds MS212 and MS195 voided per S&L	4/3/79
Rev. 5	Piping tee section added	6/18/79
Rev. 6	Weld MS160 and a 4 inch dimension added	10/1/79
Rev. 7	Field marked (redline) updates added	1/9/80

Rev. 8	Welds K-461 and K-463 changed; weld K-592 changed to K-593 per NR-2499; hanger detail section D-D added	9/27/80
Rev. 9	Weld K-592 changed to K-461; and weld K-593 changed to K-594	9/4/80

All of the above revisions pertained to the aforementioned quencher modification.

The RIII inspector reviewed the QC documentation for the following main steam relief piping field welds: Nos. 160, 160A, 267A, 267B, 267C, 267D, 268B, 268C, 268D, 459, 460, and 461. The records indicated that the welds had been accomplished in accordance with ASME Section III 1971, Summer 1973 Addenda.

The RIII inspector interpreted the radiographs for the following main steam relief piping field welds: Nos. 160A, 459, 460, 461, 462, and 594.

It is noted that there are approximately five to seven radiographs for each of the above welds. The varying number of radiographs are necessary to cover the entire 360 degrees of each pipe weld. The radiography was performed in accordance with ASME Section III 1971, Summer 1973 Addenda. The RIII inspector identified no unacceptable weld indications on the radiographs.

The above discussions and reviews indicate that the alleged activities were performed in accordance with the KEI QA program.

No items of noncompliance or deviations were identified.

6

I Allegation$SNo.$S3$U

"A radioactive waste drain is clogged with concrete which carelessly was poured into the drain."

II Findings$U

This allegation was substantiated in that interviews with pertinent personnel indicated that some drains had been clogged with unspecified debris. Concrete was not substantiated to be the debris. Flushing records dated in 1979 indicated that the nonsafety related drains were cleared of all restricting debris.

No significant concerns or items of noncompliance were identified.

III Investigation$U

A. Background$SInformation$U

This allegation was interpreted to state that the alleger was concerned that the radwaste drains were important to the safe operation of the plant and that the drains may be unable to perform their function because they had been clogged with concrete.

B. Personnel Interviews

Interview with Individual "A"

On February 24, 1981, Individual "A" who was previously interviewed by representatives of GAP was interviewed and stated while concrete finishing work was underway in the radioactive waste disposal system he suggested to Kaiser Construction personnel that a pipefitter should be assigned to the concrete finishing crew to assure concrete did not enter and clog the drains. However, they disagreed with his suggestion and instead directed the floor drains to be covered up with duct tape to prevent concrete from entering and clogging the drains. Individual A stated that concrete did enter the lines and clogged the radiation waste drains.

On April 22, 1981 Individual "A" provided a written statement attesting to the aforementioned information; however, he requested the statement not be attached to this report.

Individual B stated that the problem with the clogged drains occurred in 1976 and 1977.

C. The RIII Senior Resident Inspector reviewed CG&E Flushing Procedure No. DR Rev. 0, approval date 9/23/77, for the Drain System. The purpose of this procedure was stated as follows: "This document details the procedure for cleaning the liquid radwaste floor drain and equipment drain piping to the various plant sumps and drain tanks. The floor drain and equipment drain piping shall be flushed until they flow freely and all large particulate matter is removed."

Appendi~~x~~ces to the Flushing Procedure, ~~numbering 81 pages with approximately 15 equipment and/or floor drains per page,~~ indicated that

152 out of 169 related to

that ~~essentially all of the included~~ drains had been flushed and verified in accordance with the procedure. The Appendices indicated that the verifications had been made in 1979. The licensee stated that the flushing activities were still continuing.

Telephone interviews were conducted by the Senior Resident Inspector with Test Coordinator responsible for the radwaste building drain flushing activities on 2/12/81 and the Startup Engineer responsible for Drain System flushes on 2/13/81. Both individuals indicated that some drains were found to be plugged with unspecified debris. In all of those cases the drains were cleared and flow was verified.

The Senior Resident Inspector made visual inspections of all of the accessible radwaste drain ports identified on Sargent & Lundy drawings A-533 Rev. F, A-534 Rev. F, and A-515 Rev. N. These drawings identified the drains in the radwaste building (elevations 496 feet, 527 feet, 513 feet and 511 feet) and in the auxiliary building (elevations 567 feet, 5 inches, and 546 feet). None of the observed drain ports were visibly plugged.

Neither the flushing records, the personnel interviews, nor the Resident Inspector observations confirmed or denied that the drains had been clogged with concrete. These activities did confirm that the drains would allow flow on the dates of the verifications.

The Resident Inspector also determined that the radwaste drains are nonsafety related.

No items of noncompliance or deviations were identified.

3. A radioactive waste drain is clogged with concrete which carelessly was poured into the drain.

Findings

This allegation was substantiated, and there were no uncontrolled nuclear safety concerns.

Basis for Findings

The RIII investigators discussions with the alleger's source for this allegation revealed that the drains were clogged in 1976 and 1977.

The RIII Senior Resident Inspector at Zimmer stated that, based on his reviews of the plant systems, the alleged drains are nonsafety related. Further, the resident inspector's interviews with the personnel responsible for flushing the drains indicated that some drains were at one time plugged with debris. However, the personnel interviewed and the flushing records commencing in 1979, indicate that the drains have been cleaned out and flow has been verified. The RIII Resident Inspector also verified that all accessible Rad Waste Building and Auxiliary Building Ventilation Room drains were not visually plugged at the ports.

1. KEI-1 Knowingly installed and ripped out unsuitable main steam relief piping at an estimated labor cost of $320,000.

Findings

This allegation was substantiated but there were ~~had~~ no uncontrolled ~~no~~ nuclear safety concerns.

Basis for Findings

Discussions with the CG&E Principle Mechanical Engineer confirmed that MSR piping was installed with foresight that part of the pipe ~~it~~ would later be replaced. The ~~piping~~ MSR piping was already being installed for the second time in order to replace the rams head discharge devices with quenchers. This second design resulted after discovery of new discharge loads at a plant in Germany in 1975.

The NRC has been aware of the design modification as indicated by the Zimmer Mark II Design Assessment Report and NUREG-0487.

1. continued

CG&E decided to start the modification in 1975, knowing ~~that~~ that approximately 5% of ~~of~~ the piping that would be going in would have to be ~~replace~~ replaced. The ~~m~~ design modification was incomplete and would changes would be continuing. To date (1980), the design ~~modificat~~ modication is still not complete. The decision to ~~start~~ start installing the modification in 1975 was an economic ~~one~~ one, base on not delaying the construction schedule. The total labor cost to date ~~was~~ is ~~$~~ $1,183,690.00

~~d~~ The RIII inspector reviewed all ~~revisions was~~ revisions to the applicable isometric drawing for the MSR piping. All revisions indicated changes based on the above design modification. Therefore, there have been no other activities pertaining to the MSR piping of the monetary magnitude that was alleged.

The RIII inspector reviewed the QC documentation for 12 welds in the piping. ~~and~~ The RIII inspector interpreted the radiographs for six welds in the piping. The records indicate the design modification has been properly controlled.

2. ~~2~~ 2000 pound fittings were installed in 1979 on residue ~~h~~ head valves, although 5000 pound fittings are required.

Findings

This allegation was substantiated but there were no uncontrolled nuclear safety concerns.

Basis for Findings

The RIII investigators discussions with the alleger's source for this allegation ~~revealed~~ revealed that ~~fittings~~ components involved ~~was~~ were not residue head valves but rather the actuators for the hydraulic control lines to the flow control valves at the discharge of the recirculation pumps.

~~A~~ The RIII inspector ~~stated~~ verified that, ~~the actuator~~ ~~even~~ though the flow control valves serve as a safety related ~~Class 1~~ pressure boundary, the hydraulic actuator ~~is~~ has no ~~a~~ safety related function.

A design document ~~E~~ change written on 3/23/78 and approved by the designer (Sargent & Lundy) indicated that 3000 pound fittings ~~approved~~ were approved for use on the actuators in place ~~instead~~ of 6000 pound fittings.

The RIII ~~[illegible]~~ Senior Resident inspector at ~~the~~ Zimmer said that based on his reviews of the plant systems, there are no other actuators, like the ones addressed above, used anywhere else in the plant.

In addition, the RIII inspectors interviewed approximately 16 pipefitters (the allegers source was a pipefitter) that stated that they had no knowledge which would support this allegation.

3. A radioactive waste drain is clogged with concrete which carelessly was poured into ~~from~~ the drain.

Findings

This allegation was ~~not~~ substantiated, and there were no uncontrolled nuclear safety concerns.

~~Basis for finding~~

Basis for finding.

The RIII investigators discussions with the alleger's source for this allegation revealed ~~to~~ that the drains were clogged in 1976 and 1977.

The ~~RIII~~ Senior Resident inspector at Zimmer stated that, based on his reviews of the plant ~~sy~~ systems, the alleged drains are nonsafety related. Further, the resident inspector's ~~review~~ of the applicable ~~flushing~~ records and interviews with the ~~responsible~~ ~~testing~~ personnel responsible for flushing the drains indicated that some drains were ~~pl. one~~ at one time plugged with debris. However, the personnel interviewed and the flushing records ~~detailed in 1979~~ commencing in 1979, indicate that the drains have been cleaned out and flow has been verified.

The RIII Resident Inspector also verified ~~by direct~~ observation that all accessible Rad Waste Building and ~~Auxilt~~ Auxiliary Building Ventilation Room drains were not visually plugged at the ~~[illegible]~~ ports.

4. A residue heat valve broke when a pipefitter bumped into it, raising new questions about the quality of metal used for valves.

Finding

~~The~~ This allegation was not substantiated and there were no uncontrolled nuclear safety concerns.

Basis for finding

The RIII investigators discussions with the alleger's source for this allegation revealed that the components involved was ~~were~~ not a residue heat valve but rather an actuator for the hydraulic control lines to a ~~the~~ flow control valve at the discharge of a ~~the~~ recirculation pump.

The RIII inspector verified that though the flow control valve serves as a safety related pressure boundary, the hydraulic actuator has no safety related function.

The RIII inspector researched ~~reviewed~~ the applicable General Electric records for the flow control valves and questioned the

~~G.E. SS~~

~~responsible~~ G.E. Control and Instrument Engineer responsible for these ~~val~~ valves. The RIII inspector did not find evidence that indicated that the valves, ~~or the~~ the actuator, or fittings ~~to~~ had been broken. The RIII inspector ~~has~~ ~~also~~ inspected the valves, the hydraulic lines to the actuators the actuators and the ~~pump~~ recirculation pumps. ~~The~~ All of these components were in tact and appeared ~~satisfactory~~ satisfactory. The hydraulics of the system had been satisfactorily stroked.

In addition, the RIII inspectors interviewed approximately 16 pipefitters (the allegers source was a pipe fitter) ~~which~~ that stated that they had <u>no</u> knowledge that would support this allegation.

5. Sensitive parts on welding rods are possibly damaged through storage at improper temperatures and possibly lost through failure to follow proper paperwork and ~~t~~ labelling requirements.

Findings

1) ~~This allegation~~ The first part of this allegation (improper temperatures) has been substantiated and had nuclear safety concerns.

2) The second part of this allegation (failure to follow proper paperwork and ~~t~~ labelling requirements) was not substantiated and has no uncontrolled nuclear safety concerns.

Basis for findings

1) The licensee has been cited on ~~numerous~~ numerous (9 IE reports) occasions by the NRC for ~~improper and~~ inadequate control of ~~rods~~ weld rods which require temperature control. ~~To date~~ Currently, the licensee corrective actions to the citations ~~and pr~~ and program to control rod temperatures appears adequate.

2) Discussions with the alleger's source for this allegation revealed that ~~the~~ this concern was ~~that~~ -- that during September and October 1979, there ~~was~~ was no pipefitter assigned ~~to~~ to the weld rod ~~shack~~ shack during the evening shift to account for weld rods. Thus, the alleger's source did not know if the weld rod was being ~~p~~ properly returned and accounted for on KEI-2 form

5. continued

2) The RII inspector reviewed ~~the~~ weld rod issue slips, KEI-2 forms. ~~[illegible]~~ The KEI-2 form is a construction record which indicates ~~the~~ weld rod accountability. The form ~~is~~ requires ~~QC signatures~~ the welder's, the welder's foreman, and the weld rod issuer's signature. The form requires no QC signatures. ~~The form~~ Approximately 15 KEI-2 forms ~~were reviewed~~ for the September-October, 1979 period and ~~an additional~~ approximately 20 additional KEI-2 forms dated in 1978 were reviewed. All of records indicated that the respective welding rods had been properly accounted.

It should be noted that since the KEI-2 form requires no QC signature, the form is not a credible QC record.

It should also be noted that weld rod verification by QC is not ~~directly~~ alleged. However, ~~insp~~ The RII inspector have identified ~~rod use~~ programmatic problems concerning weld rod verification. ~~[illegible]~~ These problems were identified while pursuing a spinoff allegation. The specific problem is that the inspection requirement for QC to verify ~~the~~ the use of proper filler metal (weld rod) ... [illegible] deleted ~~this [illegible] deletion~~ for between July, ~~[illegible]~~ 1980 to February, 1981. The deletion is contrary to the code requirements.

Good.

7. Prefabricated piping received in 1977 has defective welds, but construction supervisors told ~~crew~~ crews not to repair them because the welds ~~were~~ were made off-site.

Findings

This allegation was not substantiated.

Basis for finding

The RIII investigators' ~~discussions~~ discussions with the alleger's source for this allegation revealed that the piping involved was five spool pieces delivered from Kellogg, Co. to the site. Upon arrival at the site on July 3, 1977 the pieces were dropped off the delivery truck.

✓ The RIII inspectors reviewed the QC documentation relevant to the pieces being dropped. The documentation indicated that radiographs of the welds on the pipe pieces were taken ~~in an attempt~~ to identify any defects that would have resulted when the pieces were dropped. The documentation indicated that, when ~~discontinuities~~ ~~indications~~ indications were identified on 3 of the 5 pieces, ~~the~~ instructions were given by Kaiser personnel to disregard the radiographs.

✓ Later documentation indicates that ultrasonic and visual examinations were made of the welds on the 3 questionable pieces. The UT + visual examinations records indicate that the welds were acceptable.

✓ All five ~~pieces~~ pieces were installed in the main steam relief system.

✓ During this inspection, the RIII inspector ~~visual~~ made visual ~~examina~~ examinations of the welds on the spool pieces. He ~~stat~~ identified no unacceptable indications. He also concluded that, based on ~~the~~ the thickness and ~~configuration~~ configuration of all of the pieces, radiography ~~was~~ ~~was~~ would not be a credible ~~technique~~ volumetric technique ~~to~~ of examination. ~~Ultrason~~ ~~Ultrason~~ ~~He~~ The RIII inspector stated that ultrasonic and visual examinations ~~and visual~~ ~~was the~~ were the proper ~~to~~ NDE techniques for ~~these~~ ~~pie~~ these pieces. The RIII inspectors ~~review~~ stated ~~of~~ that the UT results appeared proper and acceptable

8. At least three sources contacted by Applegate confirmed that an estimated 20% of the plant's prefabricated welds are defective.

Finding
This allegation was not substantiated.

Basis for finding

During the RIII inspector's discussion with one of the ~~ch~~ alleger's sources for this allegation, the source stated ~~ccnteted~~, that the 20% ~~o~~ estimate was based on: (1) ~~4 occas~~ ~~to~~ the sources first hand knowledge of four occasions in which radiographs, taken ~~of field welds overlapped~~ in 1976 of field welds in the residual heat removal system, overlapped vendor welds. ~~The~~ The ~~stat~~ source stated that the radiographs identified defects in the prefabricated pipe welds. The source ~~had stated~~ ~~and~~ had no ~~of~~ knowledge of any additional specifics concerning the four occasions.

(2) The radiographs of the three spool pieces that were dropped ~~that~~ ~~fell~~ off the truck on 7/3/79.

(3) An ~~it~~ affirmative acknowledgement given by the KEI ~~Construction Eng~~ Project Manager, when the source stated that 20% of the prefabricated pipe welds were defective.

and (4) a ~~conver~~ conversation the source had with an ex-employee of ~~pre~~ a prefabricated pipe supplier.

¶ No additional information was provided from any of the other sources.

¶ The RIII inspector reviewed approximately 200 ~~~~ radiographs taken in 1976 of field welds in the residual heat ~~removal~~ removal system. No ~~over~~ overlaps with vendor welds were ~~a~~ identified.

¶ ~~The radiogr~~ Radiography was not a credible NDE technique ~~for~~ for the three spool pieces that ~~fell off the~~ were dropped off the truck.

¶ The RIII inspectors also interpreted over 600 radiographs ~~invlo of prefabricated~~ involving over 200 prefabricated pipe welds. The inspectors identified ~~r~~ radiographic technique problems with about 25% of the radiographs. Of the remaining 75%, the ~~welds~~ ~~radiograph~~ welds appeared very good.

9. Engineering "designs" routinely are drawn after the fact to conform with piping that already had been installed.

Finding

This allegation was not substantiated. ~~[illegible]~~

~~[illegible] nuclear safety [illegible]~~

Basis for ~~the~~ finding

The ~~the~~ RIII inspector selected and reviewed the isometric drawings for piping designs in the (1) main steam relief system (2) low pressure core spray system (3) feedwater system and (4) ~~[illegible]~~ reactor isolation system. The review of ~~drawings~~ drawings, ~~[illegible]~~ included design dates, and ~~the~~ installation dates indicated ~~the~~ that the piping in all four of the above system designs were drawn before the installation of the respective piping.

The first three designs identified above ~~in~~ were large bore (2 inch and over) systems. The fourth design was a small bore system.

10. Shock-absorbing electrical tray hangers previously found unsatisfactory are still ~~unsafe~~ unsafe due to faulty welds, and electrical cable trays remain dangerously full.

Finding

This allegation is ~~unresol~~ unresolved.

Basis for finding

(1) Faulty Welds

The RIII inspectors inspected both vendor and field welds on ~~hangers~~ tray hangers in three different locations in the plant. The ~~locations~~ locations were the blue switchgear room, the cable spreading room, and a undetermined area. The inspection ~~including~~ included more than 25 hangers ~~and~~ with 4 to 10 welds per hanger. Since the welds were already painted, the inspection was inconclusive. Only one weld on a cross member of a hanger in the appeared unacceptable.

~~Since the welds were already~~

The RIII inspector discussed the ~~reported~~ ~~[10CFR50.55(e)]~~ defective vendor welds reported to the NRC pursuant 10CFR50.55(e). Discussions revealed that these vendor welds and ~~many~~ numerous field welds had been accepted based on visual examinations of painted welds. This is contrary to the AWS code. Based on these non-credible inspections, the RIII inspectors could not determine if there were additional unacceptable welds.

(2) Dangerously ~~full cable trays~~ full cable trays.

~~See the following write-up on Cable Tray Loading~~

~~and summary on next page~~

10. (2)

Summary - Cable Tray Loading

A) The ~~[illegible]~~ designer (S&L) has deviated from the FSAR.

B) Measures were not established to verify the tray loading design for dead weight and cable sleeve loading for thermal (ampacity).

c) ~~The FSAR~~ At least 30 identified and controlled trays exceeds the FSAR limit of 50% ~~[illegible]~~ fill.

d) Calculations have not been performed to verify whether or not trays have been overloaded (both thermally and dead weight)

e) Cable selections must be re-evaluated ~~[illegible]~~ because of increased cable depths.

~~f) All design alterations (Calculations/documents) are not being [illegible]~~

There are two noncompliances and four ~~one~~ unresolved ~~[illegible]~~ identified regarding tray loading.

11. Sand and mud choke the feedwater pumps and intake flues carrying makeup water to ~~the~~ the cooling tower, because of a flaw in the plant's design. Pumps used to rectify the flaw quickly burn out.

This item was previously reported to the NRC pursuant 10CFR 50.55(e). The report is still open and the item is still unresolved.

12. A design flaw in the heat exchanger control panel permitted an operator mistakenly to force 1200 pounds of pressure through pipes only meant to handle 300 pounds, ripping the pipe and soaking electricians with a hard spray of water that would have been radioactive

Finding

This allegation was substantiated but there were no uncontrolled nuclear safety concerns.

Basis for finding

The RIII inspector reviewed the sequence of events report and held a discussion with the Operations Quality Engineer concerning the alleged occurrence. The review and discussion substantiate the occurrence, but indicate a different cause.

¶ The cause ~~was~~ appeared to be a breakdown in communication. ~~The Low Pressure Core Spray was~~ Two valves, connecting the low pressure core spray system to the high pressure core spray system, were ~~left~~ ~~left~~ incorrectly left open during the start of the flushing activities of the ~~HPCS~~ HPCS. The ~~flushin~~ pre flushing checklist was signed incorrectly, verifying valve line-up. On the subsequent day the HPCS pump was started with 1200 psig pressure in the discharge piping. After approximately three minutes a water hammer ~~occurred~~ occurred which cracked the water box on the Steam Jet Air Ejector and allowed ~~water~~ water to spray all over ~~the~~ the area. The incident was reported to the NRC pursuant 10 CFR 50.55(e).

¶ The following corrective actions were taken:

(1) A swing check valve was added downstream, to ~~minim~~ minimize the effects of the two isolation valves, connecting ~~HPCS~~ to the LPCS to the HPCS, being inadvertently left open.

(2) ~~(2)~~

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#13

A. ALLEGATION: There have been periods when there were no security surveillance cameras during nuclear fuel deliveries to the site.

RESPONSE: It was determined through an interview with Mr. Dale Kers, a plant protection analyst, representing the Physical Security Licensing Branch of NMSS and a review of the following documents that the licensee is not required to provide CCTV surveillance during either deliveries or storage of unirradiated fuel at the Zimmer site.

a. NRC Material License No. SNM-1823, dated June 26, 1978.

b. 10 CFR 73.67(f)

c. Station Administrative Directive, Interim Access Control-New Fuel Storage Area, Procedure No. SE SAD.03, Revision 1, Dated August 10, 1979.

d. Appendix F - Interim Access Control - New Fuel Storage Area, Revision 10, dated July 3, 1980. Appendix F became effective November 14, 1980.

It was also determined from reviewing two Region III security inspection reports that the licensee is not utilizing CCTV to provide surveillance to the new fuel storage area; but is utilizing watchmen and barriers to detect unauthorized penetration.

B. ALLEGATION: Perimeter (new fuel storage area) security consisted for an extended period of only a four foot HIGH chicken wire fence.

RESPONSE: This allegation was not substantiated. It was determined from an interview with Mr. T. Daniels, NRC Resident Inspector, Zimmer, that from approximately December 3, 1979 to the present, the licensee has utilized an eight foot plywood barrier on the "627" elevation to direct the flow of personnel authorized access to the new fuel storage area. The utlization of this barrier was also verified during two security inspections (September 25, 1979 and January 22 and 23, 1981) by Region III personnel.

An interview with Mr. Dale Kers, a plant protection analyst, representing the Physical Security Licensing Branch of NMSS stated that the utilization of a four foot chicken wire fence to control access to the new fuel temporary storage area would not conflict with the requirements as stated in 10 CFR 73.67(f) and Part II, Section 1.1 of Regulatory Guide 5.59, dated January 1980, if monitoring of the area was A-50 conducted. The monitoring is conducted by a watchman who is continuously stationed at the access point to the new fuel storage area.

19. A common "joke" among pipefitters at Zimmer is that they will be hundreds of miles away when the plant goes on line, due to their predictions of a ~~disaster~~ disastrous accident.

<u>Finding</u>

This allegation was not substantiated.

<u>Basis for finding</u>

The RIII inspectors interviewed approximately 16 pipefitters. None of them had knowledge of ~~any~~ any specific hardware problems.

I Allegation No. 17

"Union pipefitters and PM employees have been intimidated by fear of utility and industrywide reprisals should they complain about the QA practices."

II Findings

This allegation was not substantiated. The individuals interviewed by GAP were contacted and they denied being intimidated or subjected to industry-wide reprisals for their critcism of ~~the Zimmer~~ QA practices.

III Investigation

A. Background Information

None

B. Personnel Interviews

Interview of Individuals "A" and "B"

On April 22 and 24, 1981, Individuals "A" and "B", both union pipefitters were contacted. They stated they had not been intimidated or subjected to industry-wide reprisals for their criticism of QA practices at Zimmer. Individuals "A" and "B" both stated they were fired in January 1980 as a result of Applegate's investigation into their involvement in time card cheating, but since then have been re-employed by CG&E subcontractors at Zimmer and other CG&E sites.

Interview of William Schwiers

On January 16, 1981, William Schwiers, QA Manager, CG&E was interviewed during another related investigation. He was asked to provide the names and current place of employment for Kaiser QC inspector's who had left the site since January 1, 1979. A list was provided which indicated a total of twenty-three QC inspectors had left the site since that date. Fifteen were employed at other nuclear power plants under construction, two were employed as QC inspectors in defense-related industries, and there was no known place of employment for the remaining six inspectors. Schwiers said there has been no attempt by CG&E to engage in any form of industry-wide reprisals against employees who left Zimmer.

Interview of Ernest Aldredge

On April 10, 1980, Ernest Aldredge, President, Peabody Magnaflux (PM), was interviewed and stated that neither PM nor ~~or~~ its employees had been subjected to any reprisals by CG&E or other utilities for their work at Zimmer. Aldredge stated he was contacted by Private Investigator Thomas Applegate who asked him about the termination of PM's contract at Zimmer. Aldredge stated he told Applegate the situation at Zimmer affected PM's performance record in the industry. Aldredge stated the contract was terminated because of production problems which he attributed to a lack of adequate staffing on PM's part, and frequent breakdown of PM's onsite film processing machine. Aldredge also said he was advised by Charles Wood, the PM Cincinnati Office Manager, that NRC had audited PM's records onsite and found discrepancies. Aldredge said he talked to Applegate about PM being removed from other contractor's bid lists because of the work at Zimmer, but he was referring to their poor performance record at Zimmer affecting other contracts. Aldredge stated he was not referring to any systematic attempt by CG&E to engage in any intimidation or reprisals against PM for its work onsite. Aldredge stated during the conversation with Applegate he was referring to their professional and business reputation of PM not being tarnished, and apparently Applegate misunderstood what he said and falsely accused CG&E of engaging in industry-wide intimidation of PM.

C. Record Reviews

None

D. Field Observations

None

E. Acceptance Criteria

None.

5.17.1 Allegation

"Union pipefitters and PM employees have been intimidated by fear of utility and industrywide reprisals should they complain about the QA practices."

5.17.2 Background Information

A number of site workmen and QC personnel from various reactor construction sites have stated quality concerns to their employers and/or the NRC. It has been the experience in NRC Region III that these individuals have not been subject to reprisals or "blacklisting."

5.17.3 Investigation

5.17.3.1 Interview of Individuals A and B

On April 22 and 24, 1981, Individuals A and B, both union pipefitters, were contacted by NRC. They stated they had not been intimidated or subjected to reprisals for their criticism of QA practices at Zimmer. Individuals A and B both stated they were fired in January 1980 as a result of the findings of Thomas Applegate's investigation into their involvement in timecard cheating. They have since been re-employed by CG&E subcontractors at Zimmer and other CG&E sites.

5.17.3.2 Interview of William Schwiers

On January 16, 1981, William Schwiers, QA Manager (CG&E), was interviewed. He was asked to provide the names and current place of employment for Kaiser QC inspectors who had left the site since January 1, 1979. A list was provided indicating that a total of twenty-three QC inspectors had left the site since that date. Fifteen were known to be employed at other nuclear power plants under construction, two were employed as QC inspectors in defense-related industries, and there was no known place of employment for the remaining six inspectors. Schwiers said there has been no attempt by CG&E to engage in any form of industry-wide reprisals against employees who left Zimmer.

5.17.3.3 Interview of Ernest Aldredge

On April 10, 1980, Ernest Aldredge, President of Peabody Magnaflux (PM), was interviewed by NRC. He stated that neither PM nor its employees had been subjected to any reprisals by CG&E or other utilities for their work at Zimmer. Aldredge stated he was contacted by Private Investigator Thomas Applegate who asked him about the termination of the PM contract at Zimmer. Aldredge stated he told Applegate the situation at Zimmer could affect PM's performance record in the industry. Aldredge stated the contract was terminated because of production problems that he attributed to a lack of adequate staffing on PM's part, and frequent breakdown of their onsite film processing machine.

Aldredge also said he was advised by Charles Wood, the PM Cincinnati Office Manager, that NRC had audited PM's records onsite and had found discrepancies. Aldredge said he talked to Applegate about PM being removed from other contractor's bid lists because of the work at Zimmer, but he was referring to their poor performance record at Zimmer affecting other contracts. Aldredge stated he was not referring to any systematic attempt by CG&E to engage in any intimidation or reprisals against PM for its work onsite. Aldredge stated during the conversation with Applegate that he was concerned that the professional and business reputation of PM not be tarnished. He indicated he felt that Applegate misunderstood what he said and falsely accused CG&E of engaging in industry-wide intimidation of PM.

5.17.4 Findings

This allegation was not substantiated. The individuals interviewed by GAP were contacted by NRC and they denied having been intimidated or subjected to industry-wide reprisals for their critcism of practices.

5.17.5 Items of Noncompliance

No items of noncompliance were identified.

~~Appendix A~~

10CFR50, Appendix B, Criterion V states, in part, "

"Activities affecting quality ~~shall be prescribed by documented instruct~~ ... shall be accomplished in accordance with ... procedures..."

The Wm. H. Zimmer QA Manual Section 5.1 states,

" Construction, fabrication, and manufacturing activities which affect the quality of the facility are accomplished in accordance with written instructions, procedures, and drawings which prescribe acceptable methods of carrying out those activities."

The H. J. Kaiser Procedure SPPM No. 3.3, revision 6, paragraph 6.4 states

"The Weld Rod Clerk shall issue all filler material on a weight basis. He shall record on the KEI Weld 2 form the weight of all bare rod and covered electrodes issued.

He shall also, record on the KEI Weld 2 form the heat number and/or lot number for bare rods, consumable inserts and backing rings, and the heat number and lot number for covered electrodes prior to use."

Contrary to the above,

The control ~~traceability~~ of welding rod was not maintained as required by ~~site~~ H. J. Kaiser SPPM No. 3.3 Procedure, during the second shift during September and October 1979. Specifically, a) twenty-five ~~some of the~~ weld rod issue slips (KEI Weld 2 forms) ~~completed during this period~~ showed representations of signatures (initials) of ~~individuals~~ weld rod clerks who were not assigned to work ~~during this period~~. as a weld ~~clerk~~ rod clerk ~~during~~ on the ~~second~~ dayshift shifts indicated on the respective weld rod issue slips. ~~(KEI weld 2 forms)~~.

This is a Severity Level violation (Supplement II)

(Civil Penalty -)

b) One weld rod issue slip did not show any weld rod clerk's signature.

10 CFR 50, Appendix B, Criterion XVIII states, in part, "A comprehensive system of planned and periodic audits shall be carried out to verify compliance with all aspects of the quality assurance program and to determine the effectiveness of the program."

The Wm. H. Zimmer QA Manual, Section 18.1 states, in part, "QA Division conducts a comprehensive system of planned and periodic audits of S & L, HJK and GE to verify compliance with all aspects of the quality assurance program."

Contrary to the above, during the past nine years, the Cincinnati Gas & Electric Company QA Division did not perform a comprehensive audit of the Sargent & Lundy nonconformance program.

This is a Severity Level violaiton (Supplement II)

(Civil Penalty -)

No citation

1) Sampling of WIT hole inspection.
2) Chutes used in cable spreading room

Unresolved Item

Nonconformance

9.11 New procedures Engr

79-02 Anchor bolt

Ed Jordan 492-4838 Input

10 CFR 50, Appendix B, Criterion V states, in part, "Activities affecting quality shall be prescribed by documented instructions, procedures or drawings ... Insturcitons, procedures, or drawsing shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished."

The Wm. H. Zimmer QA Manual, Section 5.3 states, "The written instructions, procedures, and drawings include acceptance criteria which ocmply with the requirements of the design documdnts and applicable codes and standards. The performance of quality and design activities are verified against these acceptance criteria."

ANSI Standard No. N45.2-1971, Section 11 states, in part, "Where a sample is used to verify acceptability of a group of items, the sample procedure shall be based on recognized standard practices and shall provide adequate justification for the sample size and selection process."

Contrary to the above, the inspection criteria for bolt hole sizes, as defined in the H. J. Kaiser Co. Instruction No. M-12, was not based on a recognized standard practice which would have provided justification for the sample size and the selection process.

This is a Severity Level violation (Supplement II)

(Civil Penalty -)

Hleeter-Garland

10 CFR 50, Appendix B, Criterion II states, in part, "The applicant shall establish...a quality assurance program which complies with the requirements of this appendix."

Contrary to the above, the quality assurance program of Bristol Steel and Iron Works, a contractor to the licensee, did not comply with the requirements of 10 CFR 50, Appendix B, Criterion I in that it did not provide independence of certain members the QA staff from cost and schedule. Specifically, the Bristol Steel and Iron Works QA Manual, Appendix B, Section 1.0, Paragraph 1.1 states, "The Erection Quality Control...is the responsibility of the Project Superintendent, who reports to the Project Manager." Both the Project Superintendent and the Project Manager had cost and scheduling responsibilities.

This is a Severity Level violation (Supplement II)

(Civil Penalty - $,000)

Streeter-Garland

10 CFR 50, Appendix B, Criterion III states, in part, "These measures (design control) shall include provisions to assure that appropriate quality standards are specified and included in design documents..."

The Wm. H. Zimmer QA Manual, Section 3.4 states, in part, "Design reviews are conducted to assure that the appropriate quality standards are specified and included in design documents."

AWS D1.1 - 1972 Code, Seciton 3.6.4 states, "For building and tubular structures, undercut shall be no more than 0.01 inch deep when its direction is transverse to primary tensile stress in the part that is undercut, nor more than 1/32 inch for all other situations."

Contrary to the above, the design control measures did not include provisions to assure that appropriate quality standards were specified in that Sargent & Lundy Specification H-2713, Supplement 7, Standard EB-117, and H. J. Kaiser Procedure No. SPPM - 4.6, Revision 8, Paragraph 5.2.9 allowed up to 1/16 inch undercut on the cable tray hanger welds.

This is a Severity Level violation (Supplement II)

(Civil Penalty - $,000)

Keeter-Garland

10 CFR 50, Appendix B, Criteria III states, in part, "Measures shall be established to assure that applicable regulatory requirements and the design basis...are translated into...drawings..."

The Wm. H. Zimmer FSAR, Section 8, provides the design babis for electrical cable separation.

The Wm. H. Zimmer QA Manual, Section 3.3.2. states, "Composite...drawings are prepared, translating the design concepts into layouts of structures, systems, and components necessary for the construction of the plant."

Contrary to the agobe, measures were not established to assure that the design basis for electrical cable separation as set forth in the FSAR was translated into drawings in that:

1. On the east side of the cable spreading room, at approximately WL 26, yellow/white (associated) cable Nol RE053 extends from a 2-in conduit (which also contains blue/white cable No. RE058), passes approximately 4 in vertically above the blue Class IE cables contained in tray No. 2072C, and enters blue/white sleeve No. 79. The FSAR design basis prohibist routing blue/white cables in the same raceway and prohibits less than a 3 ft. vertical separation between yellow/white cable No. RE053 and the blue cables in tray No. 2072C in the cable spreading room.

2. On the south side of the cable spreading room, green instrument tray No. 3029K, which was 6 in wide and approximately 30 ft. long,

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Shecter-Garland

was installed inside white control tray No. 4638B. The installation was in accordance with S&L drawings E-223, Revision G, and E-224, REvision F. Green cable No. WS724, green/white cable No. TI725, Revision F. Green cable No. WS714, green/white cable No. T1725, and other cables were installed in the green tray. Blue/white and yellow/white cables were installed in the remaining white tray. The FSAR design basis prohibits routing green, green/white, blue/white, and yellow/white cables in the same raceway.

3. On the west side of the cable spreading room, white instrument tray No. 4080K contained many different division-associated cables including blue/white cable No. TI192, yellow/white cable No. RR781, and green/white cable No. TI816. The FSAR design basis prohibits routing green, green/white, blue/white, and yellow/white cables in the same raceway.

This is a Severity Level violation (Supplement II)

(Civil Penalty - $,000)

t.

10 CFR 50, Appendix B, Criterion III states, in part, "These measures [design control] shall include provisions to assure that appropriate quality standards are specified...and that deviations from such standards are controlled."

The Wm. H. Zimmer QA Manual, Section 3.6 states "Measures are established to assure that any deviation from the applicable standards are controlled."

Contrary to the above, design control measures had not been established to assure that deviations from design conditions (quality standards) are controlled. For example, Sargent & Lundy determined, as noted on a calculation sheet dated December 27, 1979, that the design loading for two cables would allow the cables to be thermally overloaded and no program existed to control such design deviations.

This is a Severity Level violation (Supplement II)

(Civil Penalty - $,000)

.10 CFR 50, Appendix B, Criterion III states, in part, "The design control measures shall provide for verifying or checking the adequacy of design, such as by the performance of design reviews, by the use of alternate or simplified calculational methods, or by the performance of a suitable testing program."

The Wm. H. Zimmer QA Manual, Section 3.11.2 states, in part, "At S&L, design verification reviews are performed..."

Contrary to the above, design control measures had not been established by Sargent & Lundy to provide for verifying or checking the adequacy of the design for the thermal loading of power cable sleeves and the physical weight loading of cable trays.

This is a Severity Level violation (Supplement II)

(Civil Penalty - $,000)

Streeter-Garland

10 CFR 50, Appendix B, Criterion III states, in part, "Measures shall be established to assure that applicable regulatory requirements...are correctly translated into...procedures..." Criterion III, an applicable regulatory requirement, further states, in part, "Design changes, including field changes, shall be subject to design control measures commensurate with those applied to the original design..."

The Wm. H. Zimmer QA Manual, Section 3.12 states, in part, "Design changes ...including field changes, are subject to design change control measures commensurate with those applied to the original design."

Contrary to the above, measures were not established to assure that in-process nonconformances (which constitute field changes) documented in Surveillance Reports were subject to design control measures commensurate with those applied to the original design. Specifically, H. J. Kaiser Company Procedure No. QACMI, G-14, Revision 3, allowed such in-process nonconformances to be dispositioned without design control measures commensurate with those applied to the original design.

This is a Severity Level vi if dispositioned within 30 days

(Civil Penalty - $,000)

Stleeper-Garland

U

10 CFR 50, Appendix B, Criterion III states, in part, "Design control measures shall be applied to...the delineation of acceptance criteria for inspections and tests."

The Wm. H. Zimmer QA Manual, Section 3.13.1 states, in part, "Design control measures also apply to delineation of acceptable criteria for inspections and tests."

Contrary to the above:

a. The weld acceptance criteria used by H. J. Kaiser Company from July 1980 to January 1981 was not delineated for inspections in that the weld acceptance criteria was deleted.

b. The acceptance criteria for a weld performed by H. J. Kaiser Company in November 1979 was not delineated in that the acceptance criteria was designated as not applicable.

These acceptance criteria were required by ASME, Section III-1971, and AWS D1.1 - 1972 Codes.

This is a Severity Level violaiton (Supplement II)

(Civil Penalty -)

Streeter-Garland

V

10 CFR 50, Appendix B, Criterion VII states, in part, "The effectiveness of the control of quality by contractors and subcontractors shall be assessed by the applicant or designee..."

The Wm. H. Zimmer QA Manual, Section 7.3.1 states, in part, "As part of the vendor selection process, S&L makes an independent evaluation of the bidders' QA programs as a part of their total bid evaluaiton."

Contrary to the above, neither the licensee nor designee (Sargent & Lundy) assessed the effectiveness of the control of quality by vendors who supplied structural beams. Specifically, evaluations of the vendors' quality assurance programs for control of mill certifications and structural beams were not performed.

This is a Severity Level violation (Supplement II)

(Civil Penalty - $,000).

Consider making 2 citations ✓

10 CFR 50, Appendix B, Criterion X states, in part, "A program for inspection of activities affecting quality shall be established and executed by or for the organization performing the activity to verify conformance with the documented instructions, procedures, and drawings for accomplishing the activity."

The Wm. H. Zimmer QA Manual, Section 10.1.2 states, in part, "Inspections and tests are performed in accordance with written procedures which include requirements for check lists and other appropriate documentation of the inspections and tests performed."

Contrary to the above:

a. No ~~QC~~ inspection program was established to require verification of separation of cables routed from the Cable Spreading Room to the Control Room. Specifically, two cables (RI103 and CM111) of the blue division had been routed into a green division tray riser (3025A) which extended up to the Control Room, in violation of the site cable separation criteria.

b. The programs for the in-process and final weld inspections were not executed ~~were not performed~~ as required in the AWS D1.1 - 1972 Code, for the welds on 180 cable tray hangers located in the Cable Spreading Room. Specifically, the final weld inspection had been made after the welds were painted (galvanox).

This is a Severity Level violation (Supplement II)

(Civil Penalty - $,000)

10 CFR 50, Appendix B, Criterion XI states, in part, "Test procedures shall include provisions for assuring that all prerequisites for the given test have been met ... Test results shall be evaluated to assure that test requirements have been satisfied."

The Wm. H. Zimmer QA Manual, Section 11.1 states, in part, "Test programs to assure that essential components, systems, and structures will perform satisfactorily in service are ~~planned and~~ ... performed in accordance with written procedures and instructions at vendor shops and at the construction site." ~~The procedures are specific with regard to intent, method, operating requirements and acceptance criteria for each test, and include blank data sheets for recording test parameters."~~

ASME Section III - 1971 Edition, Winter 1972 Addenda, Appendix IX, Paragraph IX-3334.4 states, in part, "The shim thickness shall be selected so that the total thickness being radiographed under the penetrameter is the same a[illegible] total weld thickness..."

Contrary to the above, the NRC inspector identified ~~at least~~ 187 radiographs, taken to assure the quality of prefabricated pipe welds, which were made using a radiographic technique that did not comply with the ASME Section III - 1971 Code, Winter 1972 Addenda. Specifically, the unacceptable technique involved the lack of or insufficient shimming of the penetrameter. ~~which reflects the quality of the radiograph.~~

This is a Severity Level   violation   (Supplement II)

(Civil Penalty   )

10 CFR 50, Appendix B, Criterion XV states, in part, "Measures shall be established to control materials, parts or components which do not conform to requirements in order to prevent their inadvertent use or installation."

The Wm. H. Zimmer QA Manual, Section 15.2.2 states, "HJK is responsible for identifying and reporting nonconformance in receiving inspection, construction, or testing activities which are delegated to HJK. A tagging system is established in the HJK Quality Assurance Procedures to assure that nonconforming items are conspicously marked to prevent their inadvertnet use or installation."

Contrary to the above:

The NRC inspectors identified
a. Welds on ~~at least~~ nine structural beams and ~~at least~~ four cable tray
did not conform to requirements in that they
hangers which contained unacceptable slag, weld profiles, blowholes,
and controlled
porosity, and/or undercut were not identified by H. J. Kaiser Co.
and ~~which~~ these welds

The NRC inspectors identified did not conform to requirements in that they
b. ~~At least~~ five structural beams which had ~~unacceptable~~ notches for re-
and these notches and controlled
entrant corners instead of ~~the required~~ radii were not identified by
H. J. Kaiser Co.

they
The NRC inspectors identified did not conform to requirements in that
c. ~~At least~~ four structural beams which were not specified on any design
The beams ~~were~~
document, were installed in the Auxiliary Building Switchgear Room.
and these beams were not identified and controlled by H. J. Kaiser Co.

This is a Severity Level violation (Supplement II)

(Civil Penalty -)

~~10 CFR 50, Appendix B, Criterion V states, in part, "Activities affecting quality shall be prescribed ... and shall be accomplished in accordance with these instructions, procedures, or drawings."~~

quirements. These Surveillance Reports were dated between December 18, 1980, and April 6, 1981. A Surveillance Report No. F-3083, dated March 26, 1981, identified unacceptable welds.

This is a Severity Level violation (Supplement II)

(Civil Penalty -)

Contrary to the above, H. J. Kaiser Co.,Procedure No. QACMI, G-14, Revision 3, did not ~~adequately~~ prescribe design change control measures to assure that design changes, including field changes, would be subjected to design control measures commensurate with those applied to the original design. Specifically, H. J. Kaiser Co.,Procedure No. QACMI G-14, Revision 3, Page 1, Paragraph 2 (PURPOSE) states, "Surveillance Report will be used to identify an in-process nonconformance which can be corrected without processing a Non-conformance Report (NR)." Paragraph 2 (PROCEDURE) states, "QA Surveillance Reports will be directed to the responsible individual of the organization surveyed for a Corrective Action Statement." Paragraph 5 (PROCEDURE) states, "Except in extenuating circumstances, QA Surveillance Reports which identify in-process nonconformances will be transferred to a NR when the non-complying condition has not been acceptably corrected within 30 calendar days."

Therefore, in-process nonconformances identified on Surveillance Reports, Redoing this one

10 CFR 50, Appendix B, Criterion VIII states, in part, "Measures shall be established for the identification and control of materials, parts, and components, including partially fabricated assemblies. ~~that~~ These measures shall assure that identification of the item is maintained by heat number, part number, serial number, or other appropriate means, either on the item or on records traceable to the item, as required throughout fabrication, erection, installation, and use of the item."

The Wm. H. Zimmer QA Manual, Section 8.2 states, in part, "HJK ~~that H. J. Kaiser Co.~~ procedures provide that within the ~~H. J. Kaiser Co.~~ HJK jurisdiction the identification of items will be maintained by the method specified on the drawings, such as heat number, part number, serial number, or other appropriate means. This identification may be on the item or on records traceable to the item. The identification is maintained throughout fabrication, erection, and installation. The identification is maintained and usable in the operation and maintenance program."

Contrary to the above: (traceability)

a. The ~~traceability~~ identification of at least nine structural beams and twelve pipe lines was not maintained.

b. The traceability of welding rod was not maintained as required by site * procedure during the second shift during September and October 1979. Specifically, some of the weld rod issue slips completed during this period showed signatures (initials) of individuals who were not assigned to work during this period.

This is a Severity Level violation (Supplement II).

(Civil Penalty -)

* what is site procedure

1. What is the allegation?

2. From where or whom did we get the allegation? (Including additional information).

3. When did we get the allegation?

4. How do we know that we are addressing the allegation?

   Ex. A. The specific alleged broken valve?

   B. Do we have the right pipe?

5. Identify the manner in which the allegation was reviewed. List the documents and revisions reviewed, the individuals and dates with whom discussions were held, and direct observations made. For facts determined by conversations with individuals, document the areas discussed and the information obtained.

6. State the acceptance/rejection criteria used to base all conclusions. Identify the code, standard, etc., plus any applicable addenda.

7. Clearly state the conclusion. If the allegation is determined to be non-safety related -- still substantiate if the allegation is true or not.

8. Whether safety related or not, make sure that both the specific and generic (safety related) concerns have been addressed for each allegation.

9. Identify the status (controlled, accepted, or rejected) that the licensee's QA program indicates for the allegation, where possible.

10. Address all previous NRC inspections and investigations that are relevant to the allegations.

11. Obtain and address any information that shows if another government agency (OSHA, etc.) and/or the licensee has dealt with the allegation.

12. Sworn statements will be obtained from those allegers who presented information to Mr. Applegate, Statements obtained from other persons such as QA/QC inspectors will not be sworn statements unless the investigator believes this is appropriate.

13. Since independent tests or radiographs are not intended, please assure that a determination is made that test results and radiographs are not fraudulent and report the basis for this determination.

14. Since it has been stated that management statements may not be accurate because they have a vested interest in the site, verify at least a percentage of management statements by such means as records or direct observation to assure their accuracy.

the unspecified requirements, and

The insufficient QA indp<ependence, the inadequate records, ~~and the uncontrolled and unacceptable welds~~, taken cumulatively, comprise a QA program that is contrary to 10 CFR 50, Appendix B, Criterion II and the Wm. H. Zimmer QA Manual, Section 2 as described in the Appendix A to the report transmittal letter. (358/81-13-05)

2. 2000 pound fittings were installed in 1979 on residue head valves, although 5000 pound fittings are required.

Findings

This allegation was substantiated but there were no uncontrolled nuclear safety concerns.

Basis for Findings

The RIII investigators' discussions with the alleger's source for this allegation revealed that components involved were not residue head valves but rather the actuators for the hydraulic control lines to the flow control valves at the discharge of the recirculation pumps.

The RIII inspector verified that, though the flow control valves serve as a safety related pressure boundary, the hydraulic actuator has no safety related function.

A design document change written on 8/23/78 and approved by the designer (Sargent & Lundy) indicated that 3000 pound fittings were approved for use on the actuators in place of 6000 pound fittings.

The RIII Senior Resident Inspector at Zimmer said that based on his reviews of the plant systems, there are no other actuators, like the ones addressed above, used anywhere else in the plant.

In addition, the RIII inspectors interviewed approximately 16 pipefitters (the alleger's source was a pipefitter) who stated that they had no knowledge which would support this allegation.

7.4 CG&E Audits of Sargent & Lundy

During the investigation of allegation 5.10, the RIII inspector identified that Sargent & Lundy did not have a program to control design deviations (nonconforming designs) when identified by the S&L engineers. therefore, the RIII ~~inspe~~ inspector requested for review all of the CG&E audits of S&L to determine if CG&E had assessed ~~was assessing~~ the effectiveness of the S&L ~~and~~ nonconformance program. ~~and to determ and to determine the general content of the audits.~~

~~4.2~~ 4 ~~CG&E Audits of S&L Sargent & Lundy~~

7.4.1 Audits ~~Reviews~~ of the S&L Nonconformance Program

The Region III inspector ~~requested for~~ reviewed ~~all of~~ the following CG&E audits of S&L: ~~The following audits were provided and reviewed to determine if CG&E was assessing the effectiveness of the S&L nonconformance program and to determine the general nature of the audits.~~

Audit Dates	Audit Number When Noted
(1) 2/15-16/72	
(2) 8/8-9/74	
(3) 8/7-8/75	
(4) 7/28-19/76	
(5) 11/14-15/77	77/24
(6) 9/6-7/78	78/07
(7) 10/16-17/78	78/09
(8) 11/27-30/78	78/10
(9) 1/30-31/79	79/01
(10) 12/18-19/79	79/07
(11) 3/5-6/80	80/01
(12) 10/21-22/80	80/04

The RIII inspector did not observe ~~any other~~ any portions in any of the audits that would have represented comprehensive, system ~~and~~ planned audits of to determine the effectiveness of the nonconformance program. ~~A~~ Comprehensive system ~~and~~ planned audits ~~are~~ was required ~~to verify compliance with the QA program and determine the effectiveness of the nonconformance program~~. The audits of the nonconformance program should have addressed such things as implementation, design reviews, identification of acceptance or rejection, disposition control, and notification of affected organizations.

The RIII inspector observed only two items ~~(deficiencies)~~ in all of the above audits, covering a 9-year period, that ~~addressed~~ concerned the S&L nonconformance program. These two items, identified in one audit, were designated as deficiencies. ~~These~~ deficiencies, which ~~addressed~~ concerned distribution and logging of nonconformance ~~reports~~ reports. The deficiencies appeared to have been identified during audit activities which were not ~~were closed in Audit 77/24~~ directed at the nonconformance program.

The deficiencies were apparently resolved in Audit 77/24 which indicated that S&L Project Procedure #PIZI-8.1, Revision 0, had been prepared to describe responsibilities and instructions, and to require a log and a file of nonconformance reports.

Failure by CG&E to perform an ~~a comprehensive~~ audit to determine the effectiveness of the S&L nonconformance program during the past 9 years is contrary to 10 CFR 50, Appendix B, Criterion XVIII, and the Wm. H. Zimmer QA Manual, Section 18.1. (50-358/81-13-23).

7.4.2 General Audit Context

1. The audits generally appeared to be reactive in nature in that specific problems, which had been previously identified, were audited. The audits did not appear to be progressive and programmatic, or directed toward ~~identification~~ identification of new and generic problems. The audits appeared to identify ~~addressed~~ adverse findings for which there were no corrective actions taken or ~~and~~ follow-up audits. This matter is unresolved, pending a ~~complete~~ review by the licensee of ~~the~~ CG&E Audits, which will define ~~identified~~ the respective adverse findings, the corrective actions, and the followup audits. (358/81-13-80)

7.4.3 ~~2.6~~ Recurrences of Problems with Design Calculations, Reviews, and Verifications

~~addressed in Section 7.4,~~

~~During the review of the CG&E audits of S&L,~~ The the Region III inspector noted that the audits were identifying a recurring problem. This problem ~~was the~~ concerned ~~failure to perform~~ The performance of design calculation, reviews, and verifications by S&L. The specific problems identified in each audit ~~is~~ are as follows:

Audit Date or No.		Problems
1.	8/8-9/74	(a) ITE Imperial drawings of essential equipment had not been signed and bore no evidence of a design review.
		(b) There were inadequacies in documenting design reviews.
		(c) Structural design calculation were not in accordance with new procedures.
		(d) No direct evidence was available of the S&L review of vendor design calculations.
2.	78/07	(a) S&L had not maintained a record of support design calculations.

Audit Date or No.		Problems
		(b) DDC #2973 was approved without review by EMD even though a major support location change was clearly identified on the DDC. (This item was identified in the details of the audit report, but was not cited and had no apparent followup on subsequent audits.)
3.	78/09	(a) Very little data was available to justify the embedment criteria of 4.5 times the normal diameter of concrete expansion anchors.
		(b) Calculations could not be located which would verify that a structured review was performed to show that no reinforcement was needed for a 24 x 68 radial beam which was cut at both flanges.
4.	78/10	(a) Calculations were not available for all walls to substantiate the statement that block walls were "judged to be OK."

5

Audit Date or No.	Problems
	(b) Calculations were not available to back up design signatures which indicated design verification for five design changes approving core bores.
	(c) No approval signatures were found on any calculations for Structural Steel Modifications (including Beam #86) due to Pool Hydrodynamic loads. The modification had been released for construction.
	(d) Audit finding was closed based on calculations which were in progress but not yet complete. The calculations were for beams (embedded plates) in the primary containment to verify that the plates can support additional loads.
5. 80/04	(a) (1) The calculation required to evaluate the clamp deflection on a pipe support was not performed.

5

Audit Date or No.	Problems
	(2) Also, the weld calculation was not performed on the most critical weld.
	(b) Calculations performed by NPS were incomplete in that the deflection due to torsional rotation of the beam was not included.
	(c) Calculations performed by NPS were not in reasonable order, which made them difficult to follow.

None of the audits or corrective actions, which identified the above ~~calculation concerns,~~ problems, or determined addressed the ~~apparent~~ generic and programmatic cause of design calculations, reviews, and verifications not being performed. ~~The corrective actions that were taken did not~~ to ~~assure that the cause~~ of the problem ~~was determined~~ to preclude repetition. Failure to determine the cause and to take corrective action to preclude repetition is contrary to 10 CFR 50, Appendix B, Criterion XVI and the Wm. H. Zimmer QA Manual, Section 16.5. (50-358/81-13-24).

7.4.3 Findings And Conclusions

~~No audits~~ CG&E ~~did not~~ has never performed ~~any audits~~ an audit ~~of~~ to determine the effectiveness of the Sargent & Lundy nonconformance program. ~~during~~ CG&E will perform a review of ~~all~~ CG&E audits to define the respective adverse findings, the corrective actions, and the followup audits. The audits identified a recurring problem for which the cause was not determined and corrective action was not taken to preclude repetition.

7.4.4. Items of Noncompliance

~~One~~ Two items of noncompliance ~~was~~ were identified (Failure to performed an audit of the S&L nonconformance program~~s~~, and failure to determine the cause and preclude repetition of a recurring problem)

7.3 ~~7.4~~ Cable Separation

During the investigation of the allegation ~~and~~ addressed in Section 5.10 the RIII inspector identified two cable installations ~~that~~ that did not comply ~~#~~ with the cable separation criteria defined the Wm. H. Zimmer FSAR. Therefore, the RIII inspector informed ~~the~~ the site resident inspector, who included checks for cable separation on his routine plant tours. The Inspectors identified the following cable separation violations and additional violations addressed in the ~~the~~ Residents Inspection Reports 81- and 81 .

1

~~9.4 Cable Separation~~

~~7.4.1~~ 7.3.1 Cable Separation Requirements

~~7.4.1~~ The Region III inspectors observed ~~six~~ five installed conditions that did not comply with one or more of the following FSAR criteria concerning cable separation:

1. IEEE Std. 383-1974 defines Class 1E as: "The safety classification of the electric equipment and systems that are essential to emergency reactor shutdown, containment isolation, reactor core cooling and containment, and reactor heat removal or otherwise are essential in preventing significant release of radioactive material to the environment."

2. The Zimmer FSAR, Section 8.3.1.12.2, states, "Class 1E cable is assigned to a division according to Table 8.3-19."

The divisions are comprised of the systems addressed in the Class 1E definitions.

"A Class 1E cable is routed only in its division tray conduit, etc."

"Each non-Class 1E cable which has any part of its length in a division tray, conduit, etc., or which connects to a Class 1E power system is a division-associated cable and is not routed in tray, conduit, etc. of another division."

The terms "division-associated," "associated," "non-Class ~~I~~E," "balance-of-plant," "nonessential," and "non-ESF (non-engineered safety features)" are all used interchangeably.

3. FSAR Section 8.3.1.13 states:

.2"...Balance-of plant cables not associated with reactor protection or engineered safety features systems, when assigned to a tray section with a Class ~~I~~E segregation code, are routed only in trays with that segregation code."

.3"...Cables will have either green, yellow, or blue identification for ESF cable; orange for reactor protection system cable; white for balance-of-plant cables; and white with another color for associated cables."

4. FSAR Table 8.3-16 states, "A nonessential cable may be run in nonessential or ESF tray, but shall not occupy more than one tray system."

5. FSAR Section 8.3.1.11.2.1.d. states, "In the cable spreading room, cable tray risers (chutes) are used to route the cables into the bottom of control panels located in the control room above. Here a 1-foot horizontal, 3 foot vertical separation is maintained."

6. FSAR Section 8.3.1.12.1.3, which addresses instrument cables states, "Low-level signal cables are run in trays and/or conduits separate from all power and control cables."

7.3.2
~~7.4.3.2~~ Observed Cable Separation Violations

The NRC inspectors observed the following five
~~The six~~ installed conditions. ~~were as follows:~~

1. On the east side of the cable spreading room, at approximately WL 26, yellow/white (associated) cable No. RE053 extends from a 2-in. conduit (which also contains blue/white cable No. RE058), passes approximately 4 in. vertically above the blue Class IE cables contained in tray No. 2072C, and enters blue/white sleeve No. 79.

   Contrary to the above FSAR criteria, cables No. RE053 and RE058 were routed in the same raceway and cable No. RE053 was not installed a minimum of 3 ft above tray 2072C.

2. On the south side of the cable spreading room, green instrument tray No. 3029K, which was 6 in. wide and approximately 50 ft long, was installed inside white control tray No. 4638B. The installation was in accordance with S&L drawings E-223, Revision G, and E-224, Revision F. Green cable No. WS714, green/white cable No. TI725, and other cables were installed in the green tray. Blue/white and yellow/white cables were installed in the remaining white tray.

   Contrary to the FSAR criteria, the green and green/white cables were essentially installed in the white tray; the green, green/white, blue/white and yellow/white cables were not separated by a minimum of 1 ft horizontally; and the green tray containing instrument cables was not separate from the white tray containing control cables.

3. Near the stairwell at the center of the cable spreading room, two blue cables, No. RI103 and CM111, were routed from blue tray No. 2077A into green tray riser (chute) No. 3025A, which extended up to the control room. Green cables No. HP073 and HP096 were among the cables installed in riser 3025A.

Contrary to the FSAR criteria, the blue cables were routed in the green division riser and were not horizontally separated from the green cables by at least 1 ft.

The licensee documented blue cables No. RI103 and CM111 on Nonconformance Report No. 7549, dated March 18, 1981, as a result of the NRC finding.

No QC inspection requirements existed to verify separation criteria for cables extending up and out of raceway located in the cable spreading room to the control room.

4. The following conditions existed in the cable spreading room:

   a. White tray No. 4080K contained many different division-associated cables including blue/white cable No. TI192, yellow/white cable No. RR781, and green/white cable No. TI816.

   b. White tray riser No. RK4627 contained yellow/white cables No. TI942 and No. TI943, and blue/white cables No. TI808 and TI760.

c. White tray riser No. 4139 contained many blue/white and yellow/white cables.

The routing of blue/white, yellow/white, and/or green/white cables together in white trays appeared to be a widespread design practice. This design is contrary to the FSAR Section 8.3.1.13.2 as previously stated above.

5. In the instrument-relay room, yellow/white conduit No. RR199 extended from white tray No. 4157A to yellow tray No. 1040B. The conduit and trays contained yellow/white cable No. RR199 and white cable No. DC258 (also mislabelled DC257). Following the cable installation (pull) card, cable No. DC258 was designed to be routed through tray No. 4157A, but not tray 1040B. Since cable No. DC258 was a nonsafety-related cable there were no QC inspection requirements to verify the routing.

~~INV002/I DRAFT/jp~~

The installed conditions identified in paragraphs 7.3.2.1, 7.3.2.2, and 7.3.2.4 ~~1, 2, 4, and 6 above~~ apparently resulted from designs that deviate from the FSAR. These deviations are contrary to 10 CFR 50, Appendix B, Criterion III, and the Wm. H. Zimmer QA Manual, Section 3.1 and 3.6. (50-358/81-13-21).

The installed condition identified in paragraph 7.3.2.3 ~~4 above~~ apparently resulted from construction activities for which required QC inspection verifications had not been translated into an inspection procedure. The lack of QC inspection for the installed condition in paragraph 3 is contrary to 10 CFR 50, Appendix B, Criterion X, and the Wm. H. Zimmer QA Manual, Section 10.1.2. (50-358/81-13-22)

The misrouted cable identified in paragraph 7.3.2.5 ~~5~~ of the installed conditions apparently resulted from contruction activities for which the FSAR does not require QC inspection verification. The misrouted cable does influence cable separation and tray loading and, therefore, will have to be appropriately dispositioned. This item will be reviewed during a subsequent inspection (50-358/81-13-23).

Add (Chapter 6)

7.3.3 Cable Tray Riser Chutes

With the exception of the green tray riser identified in paragraph ~~3~~ 7.3.2.3 of the installed conditions, the RIII inspector did not observe any other risers (chutes) installed in the cable spreading room. The licensee stated that only eight chutes had been designed and installed in the spreading room and that alternate methods for achieving cable separation were being considered. S&L drawing No. E-98-FB, Revision D, Note 4, required that the portions of cables in the cable spreading room not enclosed or protected by steel chutes be coated with a 1/8 in. (after dry) application of fireproofing material. During a telephone conversation on May 7, 1981, the licensee stated that the design identified on drawing No. E-98-FB was being reconsidered for alterations. This item is unresolved pending implementation of the final separation design requirements for cable risers in the cable spreading room. (350/81-13-49).

The licensee stated that the following actions would be taken with regard to the installed conditions identified in paragraphs ~~1, 2, 4, and 6~~ 7.3.2.1, 7.3.2.2, 7.3.2.4, and 7.3.3. Either the field installations would be changed to comply with the FSAR or appropriate changes to the FSAR with engineering justifications would be submitted to NRR.

7.3.4 Finding And Conclusions

~~Cables Installed~~ ~~cables~~
~~The~~ Four locations were identified in which the cable separation requirements had not been maintained as ~~as~~ specified in the FSAR. Two unresolved matters which ~~matters~~ impact cable separation requirements were identified. Other cable separation concerns, ~~are~~ ~~addressed~~ addressed in IE Inspection Reports 81- and 81- , were identify as followup to this section.

7.3.5 Items of Noncompliance

Two items of noncompliance were identified (failure to establish measures to assure that the design basis for ~~electrical~~ cable separation as forth in the FSAR was translated into drawings and failure to establish a program to require verification of cable separation in the cable spreading room).

6
~~2~~.3 QA Surveillance Reports

An allegation was received by the NRC ~~in~~ during ~~the~~ this investigation from a site employee concerning a surveillance report procedure violation. Upon initiating the investigation of the alleged concern, the RIII inspector ~~discovered~~ identified an inadequacy in ~~the~~ the procedure which would require ~~a~~ ~~resolution~~ corrective actions that would resolve the alleged concern.

The allegation stated that Surveillance Reports were not being transferred to Nonconformance Reports ~~or repair~~ ~~in the~~ ~~required~~ in 30 days as required by procedure.

~~7.3 QA Surveillance Reports~~

6
~~8~~.3.1 The Region III inspectors reviewed the H. J. Kaiser Company ~~Procedure~~ Instruction No. QACMI G-14, Revision 3, for initiating and documenting QA Surveillance Reports (SR). QACMI G-14, page 1, paragraph 2, states that "surveillance reports will be used to identify those in-process nonconformances ~~that~~ which can be corrected without processing a Nonconformance Report (NR)." ~~The QA Surveillance Report form provides a checkpoint to identify in-process deficiencies.~~ QACMI G-14 page 2 paragraph 8.5 states "Except in extenuating circumstances, QA surveillance reports which identify in-process nonconformances will be transferred to a NR when the non-complying condition has not been acceptably corrected within 30 calendar days."

4 The following QA Surveillance Reports have been initiated to identify in-process ~~deficiencies or nonconforming items)~~ nonconformances (deficiencies):

No. 2899 dated December 18, 1980--bolt torque verification missed

No. 2903 dated January 14, 1981--weld verifications missed

No. F-2909 dated Janaury 16, 1981--bolts missing or loose

No. 2914 dated Janaury 15, 1981--NDE hold points bypassed

No. F-2941 dated January 28, 1981--broken flex, bolts fail to torque, etc.

No. F-3070 dated March 24, 1981--bolt installation not verified

No. F-3071 dated March 24, 1981--elongated holes in baseplate

No. F-3072 dated March 24, 1981--elongated holes in baseplate

No. F-3073 dated March 24, 1981--bolts do not meet torque requirements

No. F-3074 dated March 24, 1981--bolts stripped

No. F-3075 dated March 24, 1981--bolt holes elongated

No. F-3076 dated March 24, 1981--hanger needs shimming and spalling repair

No. F-3082 dated March 25, 1981--cable is too short

No. F-3083 dated March 26, 1981--unacceptable welds

No. F-3099 dated March 27, 1981--bolt deficiencies

No. F-7000 dated March 30, 1981--weld deficiencies, missing braces, etc.

No. F-7006 dated April 1, 1981--weld deficiencies

No. F-7019 dated April 6, 1981--weld deficiencies

¶ The RIII inspector made no attempt to determine the disposition of the above SRs or to determine if the SRs had been transferred to an NR within 30 calendar ~~days~~ days.

Following the directions given in QACMI G-14, Revision 3, page 2, paragraph 5, a surveillance report identifying an in-process nonconformance, will be transferred to an NR when the nonconforming condition has not been acceptably corrected. The SRs were reviewed to determine if the identified inprocess nonconformances ~~identified in the~~ would effect the original design. All of the above 18 SRs do effect the original design.

¶ Nonconforming items would ~~in effect~~ represent changes to the original design, when accepted ~~-as-is~~ or dispositioned in any other manner except as specified by the design. ~~Surveillance reports that identified nonconforming items and were not transferred to an NR did not require~~ design control measures commensurate with the original design ~~reviews by appropriate engineers. Therefore, measures were not established to assure that all in-process deficiency~~ dispositions ~~are~~ were subject to design control measures commensurate with those applied ~~reviewed and approved by appropriate design and QA engineers~~. This is contrary to 10 CFR 50, Appendix B, Criterion XV, and the Wm. H. Zimmer QA Manual, Section 15.9. (50-358/81-13-08).

The 30 day period specified in Instruction QAMCI G-14, Revision 3, in essence, permitted ~~allowed a 30 day period in which~~ nonconforming items ~~could~~ to be dispositioned without design control measures commensurate with those applied to the original design if the SR was dispositioned without being transferred to an NR.

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6.3.2 Finding And Conclusions

The site Instruction (QACMI G-14) which only ~~permitted~~ required in-process nonconformance to be transferred from surveillance ~~reports~~ reports to nonconformance reports if not acceptably corrected within 30 days, was inadequate. The 30 day period did not assure that all noncon formance, which in effect constituted design changes ~~if~~ ~~do~~, if ~~de~~ dispositioned other than specified by the original design, ~~changes~~ as would be subjected to design control measures commensurate with the original design.

The corrective actions to this inadequacy will requires the licensee to review all surveillance reports to assure that ~~a~~ the identified nonconformances are subjected to design control measures ~~—~~ commensurate with the original design. These design control measures would have been required if the in-process nonconformances were documented on nonconformance reports. In light of the required corrective actions, the alleged concern will be resolved without the need for further ~~investigat~~ investigation.

6.3.3 Items of Noncompliance

One item of noncompliance was identified. (Failure to ~~establish~~ establish measures to assure noncomformances are subjected to design control measures commensurate with those applied to the original design)

~~7.2.1~~

~~[illegible]~~

Zimmer/np INV001/B

7.2 Steel Erection Quality Control Program

The licensee initially (February, 1981) indicated that Bristol Steel and Iron Works, Inc. was the erection contractor responsible for the unacceptable welds identified on the beams addressed in section 7.1 of this ~~report~~ report. Therefore, ~~so~~ the RIII inspector decided to review the quality assurance measures ~~required~~ which should have identified the unacceptable welds.

The licensee later (March, 1981) indicated that ~~Kaiser~~ not Bristol, H. J. Kaiser, Co., was responsible for the unacceptable welds.

7.2.1 Record Reviews

The Region III inspector reviewed the Bristol Steel and Iron Works ~~QA Manual,~~ Letter QA Manual, Appendix B, Section 1.0, entitled "Erection Quality Control." Paragraph 1.1 states that "The Erection Quality Control . . . is the responsibility of the Project Superintendent, who reports to the Project Manager."

Both the Bristol Project Superintendent and the Project Manager had cost and scheduling responsibilities. ~~This is contrary to 10 CFR 50, Appendix B, Criterion I.~~ (358/81-13-51). Since the contractor had left the Zimmer site approximately ~~over three~~ 8 or four years ago, the RIII inspector could not readily determine if the Project Superintendent and Project Manager had sufficient independence from cost and schedule when opposed to safety considerations, as required by 10CFR50, Appendix B, Criterion I. Therefore this item is unresolved pending ~~confirmation of~~ the determination of the ~~weld~~ quality of Bristol welds, ~~made by Bristol,~~ which ~~will be~~ is addressed by the licensee's Quality Confirmation Program. ~~(358/81-13-51)~~ and the NRC's Independent Measurement Program. (358/81-13-51).

4 - The RIII inspector reviewed the Bristol Quality Control Steel Erection Report inspection report Q-7 dated July 14, 1975 for the inspection of the beams installed on elevation 546 ft between column rows 15-22 and F-L. The report was a "boilerplate" that did not identify any of the following specifics: weld procedure numbers, welding materials (types), welder identifications, or bolting procedure numbers, ~~or beam heat numbers.~~ The licensee stated that Bristol did not perform bolting activities, even though the inspect. record indicates differently. The report only indicated acceptance (by signature) of general categories including those listed above and others. This is contrary to 10 CFR 50, Appendix B, Criterion XVII and the Wm. H. Zimmer QA Manual, Section 17.1.1. (358/81-13-52).

7.2.3 Finding And Conclusions

The independence of the Bristol QA management from cost and scheduling considerations could not be readily determined. The Bristol Steel ~~Erection Reports (inspection records)~~ ~~failed~~ quality control inspector failed to ~~identify~~ document the ~~specific~~ weld procedure number, the welding materials (rod type) used, the welder, ~~and~~ the specific weld ~~in~~ activities inspected, and/or ~~or~~ bolting procedure number when applicable. The quality of Bristol steel erection activities will be determined in the licensee's Quality Confirmation Program and the NRC's Independent Measurement Program.

7.2.4 Items of Noncompliance

One item of noncompliance was identified. (Failure to ~~specify~~ ~~document~~ maintain sufficient records to furnish evidence of steel erection activities)

7.1 Control ~~Visual Examinations~~ of Structural Steel Beams And Beam Welds

During the investigation of the (premises) allegations addressed in Sections 4 and 5, the RIII inspector identified a beam with an unacceptable weld and two beams that were only tack welded into place.

The inspections included ~~Region III inspectors made~~ visual examinations of structural steel beams in the blue switchgear and cable spreading rooms, ~~and related~~ and reviews of related documentation.

and reviews

Therefore, the RIII inspector decided to make a more in-depth ~~review~~ inspection and review ~~inspection of~~ the controls of structural beams and beam welds.

7.1.1 Beam Observed in Blue Switchgear Room

The area observed in the blue switchgear room (elevation 546 ft) was 8 ft 3 in. west of workline G, 16 ft 6 in. east of workline H and between columns 22 and 54 of S&L drawing No. S-546, Revision AB.

The following ~~six~~ six discrepancies were identified:

1. A W8 x 17 beam (8 ft 3 in. long), positioned east to west and located 1 ft 9 in. south of column 24 and 10 in. below elevation 546 ft, was not specified on any pertinent design drawing. The beam appeared to be permanently installed ~~, but~~ and traceability of the beam heat number was not maintained. After extensive and unsuccessful retrieval efforts by QA personnel, construction personnel were requested to identify any document that would control the unspecified beam. Construction personnel provided Design Document Change (DDC) No. S-2050, dated May 29, 1980, containing only the signatures of two site construction engineers, who were identifying some of the additional W8 x 17 beams in the area covered by S&L drawing No. S-546. The DDC had no S&L architectural engineering signatures of approval as of March 27, 1981. The DDC did not identify any specific beams.

The licensee identified S&L drawing E-189, Sheet 3, Revision H, Note No. 17, which allows W8 x 17 beams to be installed and then be submitted on a DDC for S&L approval.

Put after 5.

4 The ~~W8 x 17~~ beams ~~was~~ that were not identified on any QC inspection record, ~~which~~ that required indicat~~ed~~ in-process weld inspections were not performed.

2. A W8 x 17 beam (6 ft 3 in. ~~in length~~ long), positioned north to south and located 13 ft 8 in. west of workline G and 1 in. below elevation 546 ft, was not specified on any pertinent design drawing, was not documented on any QC record, and had unacceptable welds.

3. A W8 x 17 beam (5 ft 5 in. ~~in length~~ long), positioned east to west and located 8 ft 10 in. south of column 24 and 1 in. below elevation 546 ft, was not specified on any pertinent design drawing, was not documented on any QC record, and had unacceptable welds.

4. A W8 x 17 beam (2 ft 8 in. ~~in length~~ long), positioned north to south and located 9 ft 6 in. west of workline G and attached to the beam addressed in paragraph ~~1.a.(1)(c)~~ 7.1.1.3 and extending north, was not specified on any pertinent design drawing and was not documented on any QC record.

5. Two W8 x 17 beams (8 ft 3 in. ~~in length~~ long), positioned east to west, with one located 5 ft 3 3/8 in. and the other located 9 ft 7 7/8 in. south of column 24, ~~are~~ were only tack welded in place. They displayed no identification or heat numbers and ~~are~~ were not documented ~~in a weld inspection record (KEI-1~~ on any QC record

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and that QC did not have control of the beams.

~~form)~~ or ~~any other QC control document.~~ The beams were identified on DDC-2087, which was incorporated into S&L drawing No. S-546, Revision AB. DDCs and S&L drawings by themselves ~~to~~ do not assure QC verification. ~~The beams were not identified in any QC inspection record, which indicated in-process weld inspections were not performed.~~

6. Re-entrant corners ~~of~~ on several W8 x 17 beams had notches instead of the 1/2 in. minimum radius required by the American Institute of Steel Construction (AISC), seventh edition (1969), page 4.113. The locations of these unacceptable beam corners are shown in Figure A of this section and are noted by (7) in Figure A.

The location of the above discrepancies, additional unacceptable welds, unacceptable re-entrant corners, and nontraceable beams are shown in Figure A of this section.

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The welds identified in the preceding paragraphs do not comply with the requirements of the AWS D1.1-1972 Code for one or more of the following reasons: slag was not removed; weld profiles had excessive convexity or concavity, blowholes, porosity and/or undercut.

7.1.2 Beams Observed in Cable Spreading Rooms

The inspectors identified the following discrepancies in the cable spreading rooms:

1. A W12 X14 beam No. F2500/8-66B4 had a weld that contained gross porosity. This beam was directly above cable tray hanger No. 4HV8FEC231, which was attached. The beam was located approximately 11 ft south of the north wall at the stairwell.

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2. The traceability of the heat numbers was not maintained for two W8 x 17 beams, located south of and parallel to beam No. F2500/8-66B4 (above).

The first beam was located immediately adjacent to beam F2500/8-66B4. The second beam was the fourth beam south of beam F2500/8-66B4. The first beam was installed flush to the ceiling of the cable spreading room. S&L drawing No. S-546, Revision AB, specifies the first beam to be installed 1 in. below the ceiling.

3. A weld on the 5 in. channel beam that supporting HVAC hanger No. 2071 had ~~an excessively~~ irregular weld profile, ~~was~~ excessively undercut, ~~and had~~ porosity, ~~and~~ and craters that were not filled. The channel beam ~~is~~ was located 2 ft north and 1 ft west of the cable tray hanger No. 13H2FEC008. The Waldinger, Young and Bertke (W-Y and B) Inspection Report, dated February 19, 1980, indicated that the weld was acceptable.

4. Two W8 x 17 beams, located in the northeast corner (north of WL-16 and east of WL-K), were only tack-welded into place.

~~a.~~ The beams were specified on DDC No. E-3834 dated October 20, 1978. DDC E-3834, which affected eight drawings, was posted on, but had not been incorporated into, S&L drawing No. S-546, Revision AB, dated October 22, 1980. ~~and affected eight drawings~~. A cancellation stamp on the DDC indicated that the applicable portions of DDC No. 3834 had been incorporated into some of the respective drawings. The cancellation stamp did not include drawing No. S-546 as of October 22, 1980 (Revision AB).

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The beams were not identified on any QC inspection record, which indicated in-process weld inspections were not performed. ~~and QC was unaware of their status.~~

Heat No. 72161 (purchase order No. 31134) was marked on the southern beam. The traceability of the heat number of the northern beam was not maintained.

The beams were not identified on any ~~QA~~ QC inspection record, which would have indicated their status. In process inspections were not performed on the tack welds.

NOTE: Some of the welds inspected by the RIII inspectors were painted. Therefore, the inspections were for relatively large deficiencies.

~~7.1.3. Findings~~

7.1.3. ~~Observed~~ Installation Deficiencies

Failure to control the ~~above~~ ~~un~~ welds addressed in sections 7.1.1 and 7.1.2 ~~The previously identified~~ unacceptable welds ~~are~~ is contrary to 10 CFR 50, Appendix B, Criterion XV, and the Wm. H. Zimmer QA Manual, Section 15, as described in Appendix A to the report transmittal letter (50-358/81-13-01).

For the beams identified on DDCs and addressed in paragraphs 7.1.1.1, 7.1.1.5, and 7.1.2.4 above, no measures existed ~~for DDCs~~ that would identify to QA, the installations, and work that was done by construction before the DDC was incorporated into the drawings ~~receiving S&L approval~~. Thus, no measures existed to assure that all of the required QA inspections related to DDCs (e.g., welder qualification, proper filler metal, traceability of materials, etc.) would be ~~accomplished~~ performed.

This condition was previously identified in IE Report Item No. 358/80-15-04. The corrective actions taken which had not yet been reviewed by the NRC, with regard to Item No. 358/80-15-04 did not

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include the DDCs written prior to the implementation of ~~the~~ those corrective actions and did not include the DDCs that are and have been implemented prior to receiving the S&L approvals. This item is unresolved pending the complete resolution of IE item # 358/80-15-04. (358/81-13-03)

~~These inadequate corrective actions are contrary to 10 CFR 50, Appendix B, Criterion XVI, and the Wm. H. Zimmer QA Manual, Section 16.5, as described in Appendix A to the report transmittal letter (50-358/81-13-02).~~

Failure to control unacceptable welds, (addressed sections 7.1.1 and 7.1.2),

2\. ~~4~~ The five beams with unacceptable re-entrant corners, and the four beams that were installed and not identified as a requirement on any design document ~~are~~ is contrary to 10 CFR 50, Appendix B, Criterion XV, and the Wm. H. Zimmer QA Manual, Section 15.2.2, as described in Appendix A to the report transmittal letter (50-358/81-13-03)

Failure to maintain the traceability of the nine structural beams, addressed in section 7.1.1 and 7.1.2,

3\. ~~4~~ ~~The beams for which the traceability of the heat numbers was not maintained~~ is contrary to 10 CFR 50, Appendix B, Criterion ~~VIII~~ o.k., and the Wm. H. Zimmer QA Manual, Section ~~8.2~~ o.k., as described in Appendix A to the report transmittal letter (50-358/81-13-04).

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7.1.4 Unapproved Structural Beam Vendors

Furthermore, several thousand feet of W8 x 17 beam were purchased on the following order numbers from vendors not on the approved vendor list, which means the respective vendor QA programs had not been evaluated for compliance with 10 CFR 50, Appendix B.

7.1.3 put after 7.1.2

P.O. No. 10275, PBI Steel Exchange, 2400 ft

P.O. No. 12868, U.S. Steel Supply, 1500 ft

P.O. No. 16321, Frank Adams Co., 1012 ft

P.O. No. 10009, Frank Adams Co., 1024 ft

P.O. No. 9761, Frank Adams Co., 1472 ft

P.O. No. 9628, Frank Adams Co., 450 ft

P.O. No. 9872, U.S. Steel Supply, 300 ft

These beams were not controlled to prevent their use in safety-related systems. ~~On April 10, 1981,~~ The licensee stated that these beams had been made available for installation in safety-related systems based on the mill certifications and without regard to ~~regardless of~~ the vendors not being approved. Mill certifications were available for these beams. The licensee stated that the credibility of the mill

~~Zimmer/np INV001/A~~

certifications would be established. Failure to assess the effectiveness of ~~determine that the vendor had~~ The controls to assure the quality ~~credibility~~ of the mill certifications, and structural beams, ~~for these sup beams~~ supplied by the above vendors is contrary to 10 CFR 50, Appendix B, Criterion VII, and the Wm. H. Zimmer QA Manual, Section 7.3.1, as described in Appendix A of the report transmittal letter (50-358/81-13-06).

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7.1.5. Finding And Conclusions

Welds on nine structural beams were unacceptable. Measures had not been established to assure that required QA in-process inspections, related to Design Document Changes, ~~were~~ ~~and~~ would be performed. Five beams had unacceptable (notched) re-entrant corners. Four beams were installed which were not specified on any design document. The traceability of nine structural beams were not maintained. And the licensee did not assess ~~the~~ the effectiveness of the controls to assure the quality of the mill certifications and ~~struct~~ structural beams supplied by three vendors.

7.1.6 Items of Noncompliance

Three items of noncompliance were identified (Failure to control unacceptable welds; ~~failure to control~~ unacceptable re-entrant corners on beams, and ~~failure to control~~ unspecified beams; failure to maintain traceability of beams; and failure to assess the effectiveness of vendor quality assure).

These problems and the adequacy of the structural steel are addressed in the licensee's Quality Confirmation Program.

7.1.4 Unapproved Structural Beam Vendors

Several thousand feet of W8 x 17 beam were purchased on the following order numbers from vendors not on the approved vendor list, which means the respective vendor QA programs had not been evaluated for compliance with 10 CFR 50, Appendix B.

P.O. No. 10275, PBI Steel Exchange, 2400 ft A36
~~P.O.~~ No. 12868, U.S. Steel Supply, 1500 ft
P.O. No. 16321, Frank Adams Co., 1012 ft A36
P.O. No. 10009, Frank Adams Co., 1024 ft A36
P.O. No. 9761, Frank Adams Co., 1472 ft A36
P.O. No. 9628, Frank Adams Co., 450 ft A36
P.O. No. 9872, U.S. Steel Supply, 300 ft A36

These beams were not controlled to prevent their use in safety-related systems. The licensee stated that these beams had been made available for installation in safety-related systems based on the mill certifications and without regard to the vendors not being approved. Mill certifications were available for these beams. The licensee stated that the credibility of the mill certifications would be established. Failure to assess the effectiveness of the controls to assure the quality of the mill certifications and structural beams, supplied by the above vendors, is contrary to 10 CFR 50, Appendix B, Criterion VII, and the Wm. H. Zimmer QA Manual, Section 7.3.1 (50-358/81-13-06).

This concern is addressed in the licensee's Quality Confirmation Program.

7.1.5 Bristol Steel Erection Inspections

The RIII inspector reviewed the Bristol Quality Control Steel Erection Report Inspection Report Q-7, dated July 14, 1975, for the inspection of the beams installed on elevation 546 ft between column rows 15-22 and F-L. The RIII inspector determined that the Bristol Steel and Iron Works, Inc. QC inspector failed to document details of his inspections, such as the welding materials (rod type) used, the welder, the specific weld activities inspected, and/or bolting or welding procedure number when applicable. This is contrary to 10 CFR 50, Appendix B, Criterion XVII and the Wm. H. Zimmer QA Manual, Section 17.1.1 (358/81-13-52).

This concern is addressed in the licensee's Quality Confirmation Program.

7.1.6 Findings and Conclusions

In their examination of approximately 25 structural steel beams, the NRC inspectors identified significant problems. Welds on nine structural beams were unacceptable. Five beams had unacceptable (notched) re-entrant corners. Four beams were installed which were not specified on any design document. The traceability of nine structural beams was not maintained. In addition, measures had not been established to assure that required QA in-process

When a radiograph is read, a "reader sheet" is filled out. The reader sheet identifies the weld, date of radiography, radiographic technique, interpreter, areas of the weld included, and the conclusions of the interpreter. The reader sheet is normally filed with the radiographs it represents.

Many types of defects or discontinuities can be detected through radiography, including incomplete fusion, cracks, pososity, slag, undercut, and other defects. The welding Code applied indicates the requirements for weld acceptability, and indications may be acceptable as provided in the relevant Code. Many interpretations are highly subjective, and it is possible for interpreters to disagree on the acceptability or rejectability of an observed indication. In some cases, additional radiography may be performed to provide additional information. As long as the pipe is not inaccessible, subsequent radiography is normally not difficult or too time-consuming.

In practice, the most common occurrence is that a section of a weld, rather than the whole weld, may include defects. The section of the weld containing the defects is then removed through grinding, re-welded, and re-radiographed. If the repair radiograph is acceptable, the entire weld can be accepted.

Pipe, spool pieces, and piping formations are purchased from various vendors. These items contain welds, and vendors are required to perform nondestructive examinations of these welds according to applicable Codes and standards. ASME Section III standards require 100% radiography of Class A pipe welds. When radiography is required, radiograph~~s~~ reports are provided to the utility for permanent filing after acceptance. ic

5.8.3 Investigation

5.8.3.1 Interview with Individual A

On February 24, 1981, Individual A, who was previously interviewed by representatives of GAP, was interviewed by NRC. Individual A stated he was a pipefitter assigned to assist employees of Peabody Magnaflux (PM), the firm responsible for radiographic examination of pipe welds onsite. He said that in his opinion 20% of the prefabricated pipe welds manufactured by Kellogg were defective.

He indicated that he based his opinion on a statement made by PM personnel that they had observed defective welds on prefabricated pipe spool pieces manufactured by Kellogg on four occasions when they examined Kaiser welds in the residual heat removal (RHR) system. He conjectured that the defective welds were not found by Kellogg because he understood it was Kellogg's practice to radiograph 10% versus 100% of their welds. He said PM radiographers Allen Sellars and David Binning reported this to CG&E personnel, who allegedly told them not to examine the welds because they were vendor supplied.

Individual A stated an incident involving prefabricated piping occurred in August 1979 when PM was asked to radiograph welds on sections of main steam relief (MSR) spool pieces (addressed in Allegation 5.7) that had fallen off a truck on delivery to the site. He said that, while examining the spool pieces, PM personnel found 5 of 20 welds examined to be defective. He said

Appendix

NOTICE OF VIOLATION

AND

PROPOSED IMPOSITION OF CIVIL PENALTY

Cincinnati Gas and Electric Company
Wm. H. Zimmer Nuclear Power Station

Docket No. 50-358
Construction Permit No. CPPR-88
EA No. 81-

As a result of the investigation conducted at the Wm. H. Zimmer Nuclear Power Station in Moscow, Ohio, on January 12 - August 10, 1981, the violation listed below with multiple examples was identified. The numerous examples of the violation demonstrate a significant deficiency in the implementation of your quality assurance program. That breakdown of your quality assurance program was widespread and caused the NRC to require an extensive quality confirmation program to provide confidence that safety-related structures, systems, and components will perform satisfactorily in service. Because of the safety significance of that quality assurance program breakdown, in accordance with the Interim Enforcement Policy, 45 FR 66754 (October 7, 1980), the Nuclear Regulatory Commission proposes to impose a civil penalty pursuant to Section 234 of the Atomic Energy Act of 1954, as amended, ("Act"), 42 U.S.C. 2282, PL 96-295, and 10 CFR 2.205 in the amount set forth for the violation listed below.

10 CFR 50, Appendix B, Criterion II requires holders of construction permits for nuclear powerplant to document, by written policies, procedures, or instructions, a quality assurance program which complies with the requirements of Appendix B for all activities affecting the quality of safety-related structures, systems, and components and to implement that program in accordance with those documents.

Contrary to the above, Cincinnati Gas and Electric Company and its contractors did not adequately document and implement a quality assurance program to comply with the requirements of Appendix B as evidenced by numerous examples of that noncompliance as follows:

A. 10 CFR 50, Appendix B, Criterion VIII states, in part, "Measures shall be established for the identification and control of materials... These measures shall assure that identification of the item is maintained..."

The Wm. H. Zimmer QA Manual, Section 8.2 states, in part, "H. J. Kaiser Company procedures provide that within the H. J. Kaiser Company jurisdiction the identification of items will be maintained by the method specified on the drawings, such as heat number, part number, serial number, or other appropriate means. This identification may be on the item or on records traceable to the item. The identification is maintained throughout fabrication, erection, and installation. The identification is maintained and usable in the operation and maintenance program."

Contrary to the above:

1. Based on an inspection of approximately 25 structural beams located in the Blue Switchgear Room and the Cable Spreading Room, the identification of the material in 9 of those beams was not maintained to enable verification of quality.

2. Based on an inspection of the supporting systems (i.e., cooling water, starting air, and fuel oil) for Diesel Generators A and C, the identification of the material an ~~12~~ 10 pipelines in those systems was not maintained to enable verification of quality. Included in the problem were heat numbers on 3 pipe pieces which were not on an approved heat number list. (The Diesel Generator supporting systems were selected for review because they were part of the only ASME Code Data Package which had been final accepted by Kaiser Quality Assurance. The discrepancies identified by the inspector were not identified by the final Kaiser QA review.)

The above examples raise questions about the adequacy of the quality of installed materials as well as the obvious paperwork deficiencies.

B. 10 CFR 50, Appendix B, Criterion XVI states, in part, "Measures shall be established to assure that conditions adverse to quality, such as... deviations...and nonconformances are promptly identified and corrected. In the case of significant conditions adverse to quality, the measures shall assure that the cause of the condition is determined and corrective action taken to preclude repetition."

The Wm. H. Zimmer QA Manual, Section 15.2.2 states, "HJK is responsible for identifying and reporting nonconformance in...construction... activities which are delegated to HJK."

The Wm. H. Zimmer QA Manual, Section 16.5 states, in part, "Vendors, contractors, and subcontractors are required to determine cause and corrective action to prevent recurrence of errors which could result in significant conditions adverse to quality."

AWS Code D1.1-1972, Sections 3 and 8.1.5 define requirements for weld quality and address slag, weld profiles, blowholes, porosity, and undercut.

AISC, Seventh Edition (1969), Page 4.113 requires 1/2 inch minimum radius for re-entrant corners.

ASME Code, Section III-1971 Edition, Article NB-3661.5(b) states, in part, "...a gap of approximately 1/16 in. shall be provided between the end of the pipe and the bottom of the socket before welding."

ASME Code, Section III-1971 Edition , Winter 1972 Addenda, Articles NA-4130(a), NA-4420, NA-4510, NA-4442.1, NB-4122, NA-4451, NB-4230, and NB-3661.5(b) require, in part, in-process inspections for pipe fitup, weld procedure, weld filler metal traceability, and welder qualifications...

Contrary to the above, the NRC inspectors identified the following nonconforming conditions that either had not been identified and corrected by the licensee or action had not been taken to preclude repetition:

1. Based on an inspection of the 25 structural beams described in Item A.1 above,

   a. Several welds on 9 beams did not conform with AWS D1.1-1972 requirements in that they contained unacceptable slag, weld profiles, blowholes, porosity, and/or undercut.

   b. Five beams did not conform with AISC requirements in that they had notches for re-entrant corners instead of radii creating potential stress risers.

   c. Four beams, 2 of which had unacceptable welds as described in Item B.1.a above, did not conform with design documents in that they were not specified on any design document. There were no QA records related to the 2 beams which appeared to have acceptable welds.

2. The licensee identified that the socket engagement for more than 400 socket welds was not verified in accordance with ASME Code, Section III-1971 Edition, Article NB-3661.5(b) and the condition was not corrected in that the corrective action was not commensurate with the ASME Code. The welds dated back to 1979.

3. The licensee was aware that the in-process inspections for more than 24 welds in the Diesel Generator cooling water, starting air, and fuel oil piping systems were not performed by Kaiser in accordance with ASME Code, Section III-1971 Edition, Article NB-3661.5(b), et. al., and the condition was not corrected in that the corrective action was not commensurate with the ASME Code.

4. Five licensee QA audits (audit performed 8/8-9/7~~9~~4 - no number, and Audit Nos. 78/07, 78/09, 78/10, 80/04) of Sargent & Lundy identified repetitive problems concerning S&L not performing certain design calculations, reviews, and verifications and action was not taken to preclude repetition.

5. Based on an inspection of about 100 cable tray hangers in the Cable Spreading Room, 4 did not conform with AWS D1.1-1972 requirements in that ~~they~~ the welds contained unacceptable slag, weld profiles, blowholes, porosity, and/or undercut.

C. 10 CFR 50, Appendix B, Criterion XV states, in part, "Nonconforming items shall be reviewed and accepted, rejected, repaired or reworked in accordance with documented procedures."

Kaiser Procedure QACMI G-4, "Nonconforming Material Control," provides detailed instructions for the review and disposition of reports (Nonconformance Reports) of nonconforming items. Procedure QACMI G-4 contains the following requirements:

Paragraph 3.3 - Requires QA Site Document Center NR Controller to log NRs generated by QC Inspectors or Quality Assurance Engineers in the Site Document Log and assign NRs a KEI Control Number (CN).

Paragraph 3.6 - Restricts voiding of NRs to those initiated in error or those relating to nonconforming conditions that have been corrected by the Construction Department after verbal or written communication from the QA Department. Requires an explanatory entry for voided NRs to be made next to the CN in the Site Document Log. Requires a copy of voided NRs to be retained in the Site Document Center.

Paragraph 4.3 - Requires Material Review Board action for NRs to be dispositioned "accept as is."

Contrary to the above, the sample of NRs reviewed indicate significant deficiencies with the nonconformance reporting system in the areas of voiding of reports, not entering reports into the system, improper dispositioning of reports, and incomplete report files. The deficiencies identified in the sample reviewed were as follows:

1. An NR initiated by a QC Inspector on February 3, 1981, regarding the violation of a QC "Hold" tag attached to a suppression pool plate did not have a KEI CN assigned. CN-5412 was initially assigned to this NR but CN-5412 was subsequently reassigned to another unrelated NR without the NR originally assigned CN-5412 being assigned a replacement CN. References in the Site Document Log to the original NR assigned CN-5412 were covered over with "Wite-Out," a copy was not retained in the Site Document Center, and the NR was deleted from the NR control system. (The copy of the NR reviewed by the investigator was provided by an alleger.)

2. An NR initiated by a QC Inspector on February 11, 1981, regarding excessive weave in a primary containment structural steel weld, did not have a KEI CN assigned and was not entered in the Site Document Log. The NR was simply never entered into the NR control system. (The copy of the NR reviewed by the investigator was provided by an alleger.)

3. The following NRs were voided yet they had not been initiated in error and did not relate to nonconforming conditions that had been corrected by the Construction Department:

E-1661	E-2233
E-1662	E-2466
E-1777	CN-4389
E-2191	E-5108
CN-2196	CN-5122

4. Copies of the following NRs were not retained in the Site Document Center:

CN-4930	CN-4958
CN-4931	CN-4959
CN-4955	CN-5476
CN-4956	CN-5477
CN-4957	CN-5479

(The copies of the NRs reviewed by the investigator were provided by an alleger.)

5. NR E-2996, Revision 1, which was categorized as "accept as is" was closed out March 17, 1981, without Material Review Board approval in that final disposition action (UT of T-Quencher No. 007), that was part of the basis for conditional approval by the Material Review Board, was not taken.

6. NR E-2836 was incorrectly categorized by the KEI Construction Engineer as "Accept-As-Is" when sufficient information had been provided by the KEI QA Engineer to clearly indicate the NR should have been categorized differently, because reprocessing (radiography of the final weld) was required to bring the weld into conformance with the requirements of ASME Section III and Kaiser Specification H-2256.

This matter is repetition of similar violations identified in Inspection Reports 50-358/80-05 and 50-358/80-25. [The improper action on CN-5412, CN-5476, CN-5477, CN-5479, E-2996, and the NR identified in Item 2 above occurred after corrective action (Stop Work Order 80-13 and revision of Procedure QACMI G-4) was taken in response to IE Inspection No. 50-358/80-25.]

D. 10 CFR 50, Appendix B, Criterion III states, in part, "Measures shall be established to assure that applicable regulatory requirements and the design basis...are translated into...drawings..."

The Wm. H. Zimmer FSAR, Section 8, provides the design basis for electrical cable separation that includes the following:

Associated cables (Green/White, Blue/White, and Yellow/White) from more than one Division cannot be routed in the same raceway. (FSAR Paragraph 8.3.1.13.2)

Vertical separation of three feet or more must be maintained between cables from different Divisions. (FSAR Paragraph 8.3.1.11.2.1.d)

Instrument (low-level signal) cables cannot be routed in the same raceway with power and control cables. (FSAR Paragraph 8.3.1.23.1.3)

The Wm. H. Zimmer QA Manual, Section 3.3.2. states, "Composite...drawings are prepared, translating the design concepts into layouts of structures, systems, and components necessary for the construction of the plant."

Contrary to the above, as of March 1981, the FSAR design basis for electrical cable separation had not been translated into the drawings which governed the following cable installation deficiencies in the Cable Spreading Room:

1. Associated Cable (Yellow/White) No. RE053 for Division 1 was routed in the same raceway (two-inch conduit and Class IE Sleeve No. 79) as Associated Cable (Blue/White) No. RE058 for Division 2. Also, associated Cable RE053 for Division 1 was routed so that in places there was only a vertical separation of four inches between it and cables (Blue) in Tray No. 2072C for Division 2.

2. Instrument Cable (Green) No. WS714 and others for Division 3 were routed in the same raceway (Tray No. 4638B) as Associated Control Cables (Blue/White and Yellow/White) for Divisions 2 and 1. (This deficiency was due, in part, to a design which specified the installation of a Green tray inside a White tray.)

3. Several Associated Cables from all three Divisions were routed in the same raceway (White Tray No. 4080K) including Cable (Blue/White) No. TI192, Cable (Yellow/White) No. RR781, and Cable (Green/White) No. TI816.

The above installation deficiencies were noted during brief tours of the Cable Spreading Room while pursuing other unrelated matters.

E. 10 CFR 50, Appendix B, Criterion III states, in part, "Design control measures shall be applied to...the delineation of acceptance criteria for inspections and tests."

The Wm. H. Zimmer QA Manual, Section 3.13.1 states, in part, "Design control measures also apply to delineation of acceptable criteria for inspections and tests."

Weld acceptance criteria are required by the ASME Code, Section III-1971 Edition and AWS D1.1-1972 Code.

Contrary to the above:

1. The weld acceptance criteria used by H. J. Kaiser Company from July 1980 to January 1981 were not applied to weld inspections during that period in that the weld acceptance criteria for such items as the drywell support steel were deleted.

2. The acceptance criteria for Weld 55H (isometric drawing PSK-1WS-32) performed on Service Water System Line No. 1WS71A18 by H. J. Kaiser Company in November 1979 were not applied in that they were designated as not applicable.

F. 10 CFR 50, Appendix B, Criterion XI states, in part, "Test procedures shall include provisions for assuring that all prerequisites for the given test have been met... Test results shall be evaluated to assure that test requirements have been satisfied."

The Wm. H. Zimmer QA Manual, Section 11.1 states, in part, "Test programs to assure that essential components, systems, and structures will perform satisfactorily in service are planned and performed in accordance with written procedures and instructions at vendor shops and at the construction site."

M. W. Kellogg Co. (pipe manufacturer and agency performing the prefabricated pipe weld radiography in question) Radiographic Procedure No. ES-414, dated September 26, 1972, Paragraph 4.1.8, states, "Wherever required, shims shall be used to produce a total thickness under the penetrameter equal to the nominal thickness of the base metal plus the height of the crown or reinforcement."

ASME Section III-1971 Edition, Winter 1972 Addenda, Appendix IX, Paragraph IX-3334.4 states, in part, "The shim thickness shall be selected so that the total thickness being radiographed under the penetrameter is the same as the total weld thickness..."

Contrary to the above, the NRC inspectors reviewed 700 radiographs involving 206 welds and determined that 187 of the radiographs did not comply with the ASME Code in that there was insufficient shimming of the penetrameter. The radiographed welds were prefabricated pipe welds in such systems as feedwater, diesel generator support systems, and main steam.

G. 10 CFR 50, Appendix B, Criterion III states, in part, "These measures [design control] shall include provisions to assure that appropriate quality standards are specified and included in design documents and that deviations from such standards are controlled...The design control measures shall provide for verifying or checking the adequacy of design."

The Wm. H. Zimmer QA Manual, Section 3.4 states, in part, "Design reviews are conducted to assure that the appropriate quality standards are specified and included in design documents."

The Wm. H. Zimmer QA Manual, Section [illegible] 6 states, "Measures are established to assure that any deviations from the applicable standards are controlled."

Wm. H. Zimmer QA Manual, Section 3.11.2 states, in part, "At S&L, design verification reviews are performed...."

The Wm. H. Zimmer FSAR states that cable ampacity is based on IPCEA Publication No. P-46-426. Also regarding cable ampacity, the FSAR states "the summation of the cross-sectional areas of the cables shall not exceed 50% of the tray usable cross-sectional area or two layers of cables, whichever is larger, but not to exceed 60% of the cross-sectional area in any case."

AWS D1.1-1972 Code, Section 3.6.4, states, "For building and tubular structures, undercut shall be no more than 0.01 inch deep when its direction is transverse to primary tensile stress in the part that is undercut, nor more than 1/32 inch for all other situations."

Contrary to the above:

1. As of March 1981, design control measures had not been established to assure that deviations from design conditions (quality standards) identified by Sargent & Lundy engineers were controlled. For example, Sargent & Lundy noted on a calculation sheet dated December 27, 1979, that the design thermal loading for two power cables (VC016 and VC073) in Yellow Tray No. 1057A would allow the cables to be thermally overloaded and no program existed to control those design deviations.

2. As of March 1981, design control measures had not been established by Sargent & Lundy to provide for verifying or checking the adequacy of the design for the thermal loading of power cable sleeves and the physical weight loading of cable trays.

3. As of March 1981, the cable ampacity design by Sargent & Lundy was not based on IPCEA P-46-426 (appropriate quality standard). The cable ampacity was instead based on IEEE Paper 70TP557-PWR (1970), IPCEA P-54-440, and Sargent & Lundy Standard ESA-114a.

4. As of March 1981, the design allowable undercut on cable tray hanger welds was not based on AWS D1.1-1972 Code (appropriate quality standard). The design undercut was instead based on Sargent & Lundy Specification H-2713, Supplement 7, Sargent & Lundy Standard EB-117, and H. J. Kaiser Procedure SPPM No. 4.6, "Visual Examination," Revision 8, Paragraph 5.2.9, allowed up to 1/16 inch undercut.

H. 10 CFR 50, Appendix B, Criterion X states, in part, "A program for inspection of activities affecting quality shall be established and executed by or for the organization performing the activity to verify conformance with the documented instructions, procedures, and drawings for accomplishing the activity."

The Wm. H. Zimmer QA Manual, Section 10.1.2 states, in part, "Inspections are performed in accordance with written procedures which include requirements for check lists and other appropriate documentation of the inspections and tests performed."

AWS D1.1-1972 Code, Section 3.10.1, requires work to be completed and accepted before painting.

Contrary to the above:

1. As of March 1981, a QC inspection program had not been established to require verification of separation of electrical cables routed from the Cable Spreading Room to the Control Room. An example of a nonconforming condition that should have been identified by such a program was Blue Cables RI103 and CM111 that had been routed into Tray Riser (Green) No. 3025A, which extended from Tray (Blue) No. 2077A in the Cable Spreading Room to the Control Room.

2. The programs established for in-process and final inspections of welds on 180 cable tray hangers located in the Cable Spreading Room were not executed as required in the AWS D1.1-1972 Code. Specifically, the final weld inspections were made after the welds were painted (Galvanox).

I. 10 CFR 50, Appendix B, Criterion V states, in part, "Activities affecting quality shall be prescribed by documented instructions, procedures, or drawings, of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings."

The Wm. H. Zimmer QA Manual, Section 5.1 states, "Construction, fabrication, and manufacturing activities which affect the quality of the facility are accomplished in accordance with written instructions, procedures, and drawings which prescribe acceptable methods of carrying out those activities."

The Wm. H. Zimmer QA Manual, Section 3.12 states, in part, "Design changes...including field changes, are subject to design change control measures commensurate with those applied to the original design."

Contrary to the above:

1. Kaiser Procedure QACMI G-14, "Surveillance Reports," was not appropriate to the circumstances in that it allowed in-process nonconformances which constitute field changes to be dispositioned within 30 days without being subjected to design control measures commensurate with those applied to the original design.

Examples of nonconformances so dispositioned were identified in SRs F-2899, F-2903, and F-2914.

2. Kaiser Procedure QACMI G-14 was not followed in that SRs F-2909, F-3070, F-3071, F-3072, F-3073, F-3074, F-3075, F-3076, F-3083, and F-7019 were not dispositioned within 30 days and were not transferred to Nonconformance Reports as required by Paragraph 5 of QACMI G-14.

J. 10 CFR 50, Appendix B, Criterion VII states, in part, "The effectiveness of the control of quality by contractors and subcontractors shall be assessed by the applicant or designee...."

The Wm. H. Zimmer QA Manual, Section 7.3.1 states, in part, "As part of the vendor selection process, S&L makes an independent evaluation of the bidders' QA programs as a part of their total bid evaluation."

Contrary to the above, as of March 1981, neither the licensee nor designee (Sargent & Lundy) had assessed the effectiveness of the control of quality by vendors who had supplied structural beams. Specifically, evaluations of the vendor (U.S. Steel Supply, PBI Steel Exchange, and Frank Adams Company) quality assurance programs for control of mill certifications and structural beams were not performed.

K. 10 CFR 50, Appendix B, Criterion XVII states, in part, "Sufficient records shall be maintained to furnish evidence of activities affecting quality. The records shall include...monitoring of work performance, and...include closely-related data such as qualifications of personnel, procedures, and equipment."

The Wm. H. Zimmer QA Manual, Section 17.1.4 states, in part, "Documentation of all performance surveillance includes personnel identification and qualification, procedure, type observation, date of performance, person or organization monitored, results and corrective action if required."

Contrary to the above, the Bristol Steel and Iron Works Quality Control Steel Erection Report, which was a generic boilerplate form for monitoring in-process steel erection, did not identify closely related data such as weld procedure numbers, types of welding material, welder identification, and specific welds inspected.

L. 10 CFR 50, Appendix B, Criterion XVIII states, in part, "A comprehensive system of planned and periodic audits shall be carried out to verify compliance with all aspects of the quality assurance program and to determine the effectiveness of the progam."

The Wm. H. Zimmer QA Manual, Section 18.1 states, in part, "QA Division conducts a comprehensive system of planned and periodic audits of S&L, HJK...to verify compliance with all aspects of the quality assurance program."

Contrary to the above, during the past 9 years the licensee's QA Division did not perform an audit of the Sargent & Lundy nonconformance program.

This is a Severity Level II violation (Supplement II).

(Civil Penalty - $100,000)

Some of the examples of the violation continued during a period that spanned both the old and new enforcement policies. Application of either policy or a combination of both would result in a very large civil penalty that could be imposed. However, after weighing this matter relative to other civil penalties that have been issued to licensees of plants under construction and considering the financial impact and the potential construction schedule impact of the Quality Confirmation Program, we believe a civil penalty in the amount proposed to be appropriate. All things considered, we believe this exercise of discretion in determining the amount of the civil penalty results in assurance that the licensee fully appreciates the significance of the violation and results in an adequate deterrent against future similar violations by licensees of plants under construction.

Pursuant to the provisions of 10 CFR 2.201, Cincinnati Gas and Electric Company is hereby required to submit to this office within 30 days of the date of this Notice a written statement or explanation, including for each example of the alleged violation: (1) admission or denial; (2) the reasons for the violation if admitted; (3) the corrective steps which have been taken and the results achieved; (4) the corrective steps which will be taken to avoid further violations; and (5) the date when full compliance will be achieved. Any statement or explanation may incorporate by specific reference (e.g., giving page and paragraph numbers) the provisions of your Quality Confirmation Program and your actions in response to our Immediate Action Letter of April 8, 1981. Consideration may be given to extending the response time for good cause shown. Under the authority of Section 182 of the Act, 42 U.S.C. 2232, this response shall be submitted under oath or affirmation.

Within the same time as provided for the response required above under 10 CFR 2.201, Cincinnati Gas and Electric Company may pay the civil penalty in the amount of One Hundred Thousand Dollars or may protest imposition of the civil penalty in whole or in part by a written answer. Should Cincinnati Gas and Electric Company fail to answer within the time specified, this office will issue an Order imposing the civil penalty in the amount proposed above. Should Cincinnati Gas and Electric Company elect to file an answer in accordance with 10 CFR 2.205 protesting the civil penalty, such answer may: (1) deny the violation listed in this Notice in whole or in part; (2) demonstrate extenuating circumstances; (3) show error in this Notice; or (4) show other reasons why the penalty should not be imposed. In addition to protesting the civil penalty in whole or in part, such answer may request remission or mitigation of the penalty. Any answer in accordance with 10 CFR 2.205 should be set forth separately from the statement or explanation in reply pursuant to 10 CFR 2.201, but may incorporate by specific reference (e.g., giving page and paragraph numbers) to avoid repetition. Cincinnati Gas and Electric Company's attention is directed to the other provisions of 10 CFR 2.205, regarding the procedure for imposing a civil penalty.

Upon failure to pay any civil penalty due, which has been subsequently determined in accordance with the applicable provisions of 10 CFR 2.205, this matter may be referred to the Attorney General, and the penalty, unless compromised, remitted, or mitigated, may be collected by civil action pursuant to Section 234c of the Act, 42 U.S.C. 2282.

The responses directed by this Notice are not subject to the clearance procedures of the Office of Management and Budget as required by the Paperwork Reduction Act of 1980, PL 96-511.

FOR THE NUCLEAR REGULATORY COMMISSION

Victor J. Stello, Director
Office of Inspection and Enforcement

Dated at Bethesda, Maryland
this day of , 1981

1. The 68 visual examinations that were conducted revealed 6 welds which exceeded the ASME Code allowable reinforcement height on the outside surface of the weld. The welds were HP-8, HP-9, HP-43, LP-12, LP-31 and LP-59A.

HP-8	Excessive crown height 3/16", max. allowable ~~1/8"~~ 7/32
HP-9	"
LP-12	"
LP-31	"
LP-59A	"
HP-43	Excessive crown height at one local spot 3/16", max. allowable ~~1/8"~~ 7/32

Generic$SAction$U

Assure that excessive reinforcement is removed during the preparation of ~~[illegible]~~ all welds for preservice inspection.

~~No other generic action is required by the licensee.~~

2. The 42 liquid penetrant examinations that were performed revealed what appeared to be a lack of penetration in the full penetration weld for hanger LP-K-114. The licensee's contractor had identified the presence of linear indications ~~that~~ but failed to identify the lack of full penetration. Further exploratory ~~bu~~ grinding is necessary to determine the

relevance of the indication. As stated in the ASME B&PV Code, any indication is considered unacceptable until the indication is either eliminated by surface conditioning or is demonstrated to be nonrelevant by reexamination.

Do we know this is the only problem? Did they do adequate PTs.

Generic$SAction$U

No generic action is required by the licensee.

3. The ultrasonic thickness measurement of 45 welds and adjacent base materials revealed a wall thickness violation in the base material adjacent to weld HP-12A. The wall thickness was found to be .728 inches thick. The minimum wall thickness in accordance with the piping design table 607 WZ is .862 inches thick. The licensee's inspection program had not revealed this condition. This condition is considered unacceptable and should be evaluated and the section of pipe replaced if applicable.

Do N.T. have the [illegible] contacts points missed [illegible]

Generic$SAction$U

Determine how much of this pipe was procured and where it was used. Perform appropriate evaluations and replace piping as applicable.

For all safety related systems ultrasonically measure weld and adjacent base material thickness to assure conformance with design requirements.

A of the welds in may be used. The sample size should be system material,

~~The~~ sample ~~size for~~ each system ~~should be~~ based on pressure, temperature and its importance to safety. For each failure to meet design requirements increase the sample size commensurate with the system's importance to safety.

4. When reviewing the film of the 52 pressure boundary welds that were radiographed, it was noted on several films that the inside of the pipe contained foreign particles. While performing the visual examination on the inside surface of HP-6A the foreign particles were also found. The particles appeared to be a combination of rust and dirt.

Generic$SAction$U

Demonstrate that the foreign particles found would normally be expected in systems that have been flushed and subjected to preoperational testing and would not interfere with the safe operation of the plant.

5. The 52 pressure boundary welds that were radiographed identified 5 welds with internal concavity. The welds were HP-6A, HP-33, HP-34, LP-4 and LP-41A.

HP-6A concavity condition on inside surface of the pipe wall. The concavity was apparent on licensee's film. This weld was cut out for testing at Franklin Research Center.

HP-33 concavity condition on inside surface of the pipe wall.

HP-34 The concavity was apparent on the licensee's film. A wall

LP-41A thickness check of the areas revealed a remaining wall thickness in excess of the minimum wall requirements. These welds were judged acceptable.

LP-4 concavity condition on the inside surface of the pipe wall. The concavity was apparent on the licensee's film and was accepted by the licensee's contractor. A wall thickness check revealed an area in the concavity which violated minimum wall requirements (min. .519", actual .509"). This weld area was considered unacceptable and should be evaluated and repaired if applicable.

Generic$SAction$U

No generic action is required by the licensee.

6. The 52 pressure boundary welds that were radiographed identified a slag indication 1-1/2 inches long in the radiographic film for weld HP-20. The licensee's radiographic film for this weld did not reveal the slag indication. The licensee's radiographic examination was performed before a preservice inspection surface preparation was made to the outside surface and the as-welded condition apparently masked the slag indication. When the NRC performed the radiographic test the surface

had been ground smooth. This defect exceeds the ASME code Section III allowable and should be ground out and repaired.

Generic$SAction$U

No generic action is required by the licensee.

7. The 52 pressure boundary welds that were radiographed (47 carbon steel and 5 stainless steel) identified a condition that appears as a straight line, one side being darker than the other, on the radiographic film for welds LP-29B, LP-SW-53, LP-30, HP-6~~4~~4, and FC-100. This straight line is the result of a phenomenon that exists when a radiograph is made of an object where there is an abrupt change in section. The condition in a weld that produces the "line" may be excessive root reinforcement on a weld made from one side and/or where there is offset or mismatch in a weld. The ASME Code Section III requires that offset (mismatch) and sharp corners be faired at a 3 to 1 taper over the width of the weld to eliminate stress risers, corrosion crevices, and masking in the radiographic film. A review determined that the condition was also apparent on the licensee's radiographic film. The licensee's contractor had evaluated the condition as mismatch and therefore acceptable.

The most severe conditions observed, a carbon steel weld HP-6~~4~~A and a stainless steel weld FC-100, were sent to Franklin Research Center to characterize and document the potential defects found in the root of these welds.

The carbon steel weld had elongated indications in the radiographs which resulted in acceptability by dye penetrant examination and metallography. The stainless steel flange weld had elongated indications in the radiographs that when examined by dye penetrant examination and metallography displayed an ASME Code Section III rejectable region of lack of fusion of the root. (Approximately 3" long x approximately 5/32" deep.)

The ASME Code rejectable region of lack of fusion of the root was "masked" by the ~~straight~~ "line" condition on the radiograph which was the result of considerable joint mismatch.

Generic$SAction$U

Establish an acceptance criteria to be used for evaluating the identified ~~straight~~ "line" condition. This criteria is to be acceptable to the NRC.

Evaluate all radiographs of safety related piping welds using the above established criteria.

Demonstrate that lack of fusion of the root or other ASME Code rejectable indications are not present in the welds identified as not meeting the above acceptance criteria. A sample of the welds in each system with welds not meeting the acceptance criteria may be used. The sample size should be based on system material, pressure, temperature, and its importance to safety. For each failure to meet ASME Code requirements increase the sample size commensurate with the system's importance to safety.

2. The RIII inspector reviewed the Bristol Steel & Iron Works QA Manual, ~~Section 1.0~~ Appendix B, Section 1.0 titled "Erection Quality Control". Paragraph 1.1 states that "The Erection Quality Control ... is the responsibility of the "Project Superintendent, who reports to the Project Manager.

¶ Both the Project Superintendent and the Project Manager had cost and scheduling responsibilities. 10CFR50 Appendix B Criterion I requires sufficient independence from cost and schedule.

¶ The RIII inspector reviewed the Quality Control Steel Erection Report, Q-7, (inspection report) dated 7/14/75 for the inspection of the beams installed on elevation 546 feet between column rows 15-22 and F-L. The report was a ~~The~~ boilerplate ~~report~~ ~~record~~ which, did not identify any ~~specifics~~ of the following specifics: ~~to~~ weld procedure numbers, welding materials (types), welder identifications, ~~or~~ bolting procedure ~~nos~~ numbers, or ~~and~~ beam heat numbers. The ~~record~~ report only ~~identified~~ indicated acceptance (by signature) of general categories including those ~~B~~ listed above and others. 10CFR 50 Appendix B Criterion VII [illegible] documentary evidence [illegible] requirements.... met ~~[illegible]~~,... and Criterion XVII requires the records to include data such as: qualification of personnel, procedures and equipment.

~~The AWS D1.1-1972 requires~~

The RIII inspector identified unacceptable structural beam welds, as described in section 1 of the details of this ~~manual~~ report. ~~which the~~ completed 10CFR50 Appendix B Criterion XV requires ~~all~~ nonconforming materials to ~~Erection Report identifies as acceptable.~~ be controlled.

The RIII inspector identified that traceability had not been maintained on some of the beams apparently installed by ~~Bristol Steel~~ Kaiser Foothill. The beams are documented in a later details section of this report. 10CFR50 Appendix B Criterion VIII requires that traceability ~~of the items~~ be maintained.

Kaiser Foot. Hill

The insufficient QA independence; ~~for~~ the inadequate records; and the uncontrolled and unacceptable welds; ~~and the untraceable beams~~ taken cumulatively ~~reflect~~ comprise QA program that is contrary to 10CFR50 Appendix B Criterion II and the Wm. H. Zimmer QA Manual, Section 2 as described in the Appendix A to the report transmittal letter (358/81-13-05)

3. The RIII inspectors made visual examinations of the installed materials
and reviewed pertinent documentation to determine

~~The~~ if structural beams, piping, and weld rod

were traceable to mill certifications.

a. Structural beams

(1) The traceability of the W8×17 beams, installed by the Bristol Steel Co.

in the blue switchgear, ~~were~~ was properly maintained

by recording the respective material heat ~~nu~~ numbers

on the applicable drawing and/or the beams ~~themsel~~

themselves.

(2) The traceability of ~~the~~ ~~full~~ some W8×17 beams, ~~identified~~ installed by H. J. Kaiser Co., was not maintained.
~~by xxx on Attachment B to this report, was not~~

~~maintained. These beams were not~~ ~~, installed by the~~

~~H. J. Kais Kaiser Co.~~ No ~~apparently~~ ~~H~~ records were documented

to identify heat numbers. Some ~~heat nu~~ beams were marked with heat numbers. The beams, identified by ~~Th~~ the symbol *** on Attachment B to this report, did not have any traceability maintained. ~~On Further~~ These beams were located in the Auxiliary building blue switchgear room at elevation 546 feet.

~~The lack of~~ Furthermore, several hundred feet of ~~the~~ W8X17 beams were purchased on P.O. # ________ and received from ________, who ~~which~~ was not an approved vendor. These beams were not controlled to prevent ~~assure~~ their use ~~that they were not used~~ in safety related systems. ~~The licensee stated~~ ~~On 4/10/81~~

Mill Certifications were available for these beams. ~~On 4/~~ ~~the licensee stated the licensee was~~ to ~~allow~~ make these beams ~~to be installed~~ ~~The licensee stated that the credibility of these certifications would be established.~~

On 4/10/81 the licensee stated that these beams had been made available for installation in safety related systems

~~F. Piping~~

based on the mill certifications and without regards to the vendor not being approved. The licensee also stated that the credibility of the mill certifications would ~~be~~ be established. Failure to assure that the beams were ~~purchased from a vendor~~ manufactured under suitably controlled conditions, in that, they were purchased from ~~a~~ a vendor that had ~~not~~ been approved, is contrary to 10 CFR 50 Appendix B, Criterion II and the Wm. H. Zimmer QA Manual Section 2 as described in the Appendix A to the report transmittal letter. (358/81-13-06)

b. Piping

The traceability of some of the piping ~~components~~ components

176 1313

comprising the lines in the diesel generator cooling water, starting air, and fuel oil systems ~~were~~ was not maintained. ~~The discrepancies~~ The discrepancies were as follows: ~~not maintained. The piping components are documented identified on Attachment (Table X) to this report. The components are identified by heat or part number, isometric drawing number, and line number. Table X lists 1 discrepancies. The discrepancies can be categorized by one of the following:~~

(1) The heat numbers recorded on the isometric drawings did not match the heat ~~num~~ numbers on the installed components. These piping components are documented on Attachment ~~components. (Table X)~~ to This report.

(2) ~~The heat number~~ The heat numbers recorded on the isometric drawings had been ~~m~~ marked ~~out~~ or whited out and then an incorrect heat number recorded. For ~~example~~,

ISK M-242-2-DG-53 was apparently changed to ~~cont~~ indicate heat number HA-001 for the ~~the~~ 3/4 inch and 1/2 inch installed ~~piping~~ piping. Based on ~~a~~ the records for accepted heat numbers ~~records~~, number HA-001 represented 1 1/4 inch piping.

(3) Three heat numbers (HA-0170, TW 24402, and 5:2391) found on the installed ~~the~~ ~~a~~ piping, do not appear on the ~~a~~ records ~~of~~ of accepted heat numbers.

* In many instances, heat numbers could not be found on the installed component. Therefore a comparison could not be made to ~~the~~ the ~~recorded~~ numbers recorded on the drawings.

C. Weld Rod

To be written later (Fred Maura)

Report 81-13

Compliance, 1

1. The RII inspectors made visual examinations of structural steel beams ~~welds~~ in ~~to~~ the ~~cable spreading~~ ~~and~~ blue switchgear ~~room~~ and cable spreading ~~rooms~~ rooms.

a. The area observed in the blue switchgear room (elevation 546 ft.) was ~~8 feet~~ 8 feet 3 inches west of workline ~~column~~ G, ~~and~~ 16 feet 6 inches east of workline H and between columns 22 and 54 of S&L drawing # S-546 Rev. AB.

The following descrepancies were identified:

(1) ~~A~~ The W8X17 beam (8 feet 3 inches in length) positioned east to west and located ~~at~~ 1 foot 9 inches south of column 24 ~~a~~ and 10 inches below elevation 546, was not specified on any ~~the~~ pertinent ~~design~~ design ~~the~~ ~~applicable~~ drawing. ~~A~~ ~~Design Document~~

~~[illegible]~~

1.a (1) continued.

¶ ~~Only~~ After extensive and unsuccessful retrieval efforts by S&L personnel, construction personnel were requested to identified any document that would control the unspecified beams. The construction personnel provided ~~the~~ Design Document Change, DDC, # 9-2050, dated 5-29-80. ~~which~~ The DDC only had the signatures of two site construction engineers, who were ~~requesting~~ ~~approved~~ identifying some of the additional W8×17 beams ~~in~~ in the area covered by S&L drawing S-54L. The DDC had no S&L ~~the~~ architectural engineering, AE, signatures of approval, as of 3/27/81. The ~~DDC~~ DDC did not ~~iden~~ identify all of the additional beams.

¶ The ~~construction personnel~~ licensee identified S&L drawing E-189, Sheet 3 Rev. H, Note #17 which allows W8×17 beams to be installed and then be submitted

~~8~~
3

on a DDC for S&L ~~[illegible]~~ approval.

d No program existed for DDCs which ~~identical~~ identified to QA installations and work that was done by construction before receiving S&L approval. Thus no ~~[illegible]~~ program existed to assure that ~~[illegible]~~ ~~[illegible]~~ all of the required QC inspections (e.g. welder qualification, proper filler metal, ~~[illegible]~~ traceability of materials, etc.) ~~[illegible]~~ related to the DDC would be accomplished. No QC documentation could be located for the specific beam identified by the RIII inspector.

A 2nd exam of [illegible] [illegible] in specified [illegible]

~~Change, DDC, # S-2050 dated 5-29-80~~

(2) ~~that~~ The W8X17 beam (6 feet 3 inches in length) positioned north to south and located ~~at~~ 13 feet 8 inches west of workline G and one inch below elevation 546, was not specified ~~on any design drawing~~ on any pertinent design drawing; ~~the welding on the beam was not in accordance with the specified site requirements and had unacceptable~~ was not documented on any QC record; and had ~~welds~~ unacceptable welds.

(3) ~~(the)~~ The W8X17 beam (5 feet 5 inches in length) positioned ~~north to~~ east to west and located ~~at eight~~ 8 feet 10 inches south of column 24 and one inch below elevation 546, was not specified on any pertinent ~~any~~ design drawing; ~~and~~ not documented on any QC record; and had unacceptable welds.

(4) ~~[illegible]~~ The W8X17 beam (2 feet 8 inches in length) positioned north to south, ~~and~~ located 9 feet 6 inches west of workline G, and ~~is~~ attached to the beam ~~[illegible]~~ addressed in paragraph 1.a.(1)(c). ~~was~~ and ~~the next [illegible]~~ extending north, was not specified on ~~the~~ any pertinent design drawing. and ~~[illegible]~~ ~~is~~ not ~~documents~~ documented on any QC record.

(5) ~~[illegible]~~ ~~The~~ ~~[illegible]~~ Two W8 X 17 beams (8 feet 3 inches in length) positioned east to west, ~~and~~ one located 5 feet 3 3/8 inches and the other located 9 feet 7 7/8 inches south of column 24, are only tack welded in place; display no identification ~~or~~ or heat numbers; ~~or [illegible]~~ and are not documented on ~~a~~ ~~the~~ a KEI-1 form (weld record) or any other QC control document. The beams were ~~in~~ identified ~~[illegible]~~ ~~required~~ on DDC-2037 ~~was~~ which was incorporated

6

into S&L drawing B-546 rev. AB. S&L DDCs and drawings

by themselves do not assure QC verification.

~~(6) The~~

The location of ~~noted in the bloc~~
(6) Additional unacceptable welds ~~are identified~~
are identified

on Attachment A to this report and noted by 6.

¶ The welds identified in above paragraphs (2), (3), and (6) ~~above~~ do not comply with AWS-D1.1 1972 for one or more of the following reasons: slag not removed; weld profiles having excessive convexity, concavity, blowholes, porosity and/or undercut.

¶ (7) Re-entrant corners of several W8X17 beams had notches instead of the 1/2 inch minimum radius required by AISC seventh edition (1969) page 4.113.

The locations of these unacceptable beam corners are identified on Attachment A to this report and noted by 7.

7

1. b. The ~~xxx~~ inspectors identified the following discrepancies in the cable spreading room:

(1) W12 beam # F2500/8-6CB4 has a weld that contains gross porosity. This beam is directly above cable tray hanger No. 4HV3FEC231, which is attached. The beam is located approximately eleven feet south of the north wall at the stairwell.

(2) A weld on the ~~xxx~~ five inch channel ~~member~~ beam which supports HVAC hanger #2071 had excessive irregular weld profile, excessive undercut, porosity, and craters that are not filled. The channel beam is located two feet north and one ~~xx~~ foot west of ~~hanger~~ cable tray hanger # 13H2FEC008.

(3) Two W12 ~~beam~~ beams, located at the opposite end of the spreading room from the above 5-inch channel,

??

were only tack-welded into place; ~~they~~ were ~~are~~ not marked with heat numbers for traceability; were ~~are~~ not ~~id~~ specified on any ~~and do not have~~ ~~to records~~ design ~~records~~ documents; ~~available to~~ and were ~~not~~ not identified on any QC record which would indicate their status.

¢1. Note: Some of the welds inspected by the RIII ~~inspected~~ inspectors were painted. Therefore the inspections were for gross deficiencies only.

¢ The unacceptable welds identified above are contrary to 10 CFR 50 Appendix B Criterion IX ~~which states~~ ~~identified in~~ ~~in Appendix B~~ and ~~to~~ ~~Appen~~ the Wm. H. Zimmer QA Manual, Sect 9.2 ~~which states in~~ as described in the Appendix A to the report transmittal letter. (358/81-13-01)

Need to see if QAP 4X is adequate for all DDC verification

The lack of measures to assure that all QC inspections performed, in regards to DDCs which might be ~~are~~ approved after the installation activities have been performed, is contrary to 10 CFR 50 Appendix B Criterion X and the Wm. H. Zimmer QA Manual, Section 10.1.2 as described in the Appendix A to the report transmittal letter

(358/81-13-02)

The beams with unacceptable re-entrant corners and the ~~all~~ beams that were installed and ~~that were~~ not identified as a requirement on any design document is contrary to 10CFR50 Appendix B Criterion XV and the Wm. H. Zimmer QA Manual, Section 15.2.2 as described in the Appendix A to the report transmittal letter.

(358/81-13-03)

The beams for which the traceability of the heat numbers was not maintained is contrary to 10 CFR 50 Appendix B Criterion VIII and the Wm. H. Zimmer QA Manual, Section 8.2

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10

Appendix A to the
~~at~~ as described in the report transmittal letter.
(358/81-13-04)

16. The RIII inspector reviewed the QC installation records for the diesel generator cooling water, starting air, and fuel oil piping. The records indicated that a large number of in-process QC inspections had not been performed for proper pipe fit-up, proper weld procedure, proper weld filler metal (traceability), welder qualification, etc. These inspection criteria, which are specified on the installation record (KEI-1 form), were required by the ASME Code, Section III-1971 Edition, Winter 1972 Addenda, Articles NA-4130(a), NA-4420, NA-4510, NA-4442.1, NA-4451, NB-4122, NA-4230, and NB-3661.5(b). Some of the inspections, which had not been performed, were documented on Q.A. Surveillance Reports, SR. SRs #2367, #2370, #2380 and #2412, identified 39 welds, in the diesel generator subsystems, for which required in-process inspections had not been performed. The corrective actions taken to resolve these deficiencies consisted of final visual inspections of the welds, personnel ~~records clerks~~ transferring ~~using~~ the information on KEI-2 forms

In addition the licensee had a partial listing of over 400 socket welds (including systems other than the diesel generator) for which inspections for proper pipe fit-up for cleanliness, mismatch, and socket engagement had not been performed.

The ASME Code Section III-1971 Edition, Article NB-3661.5(b) states "....A gap of approximately 1/16 inch shall be provided between the end of the pipe and the bottom of the socket before welding."

~~8~~
2

~~c.~~

H. J. Kaiser Procedure #SPPM 4.6 Rev. 8, paragraph 6.2.1 states "All welds shall be inspected at the following stages: ....At fit-up for cleanliness, mismatch, and minimum socket engagement. Socket welds shall have an approximate end gap of 1/16" prior to welding for all sizes."

Based on the SIS Report dated 11/14/79 from the Authorized Nuclear Inspector, ANI, from The Hartford Steam Boiler Inspection and Insurance Company, and the H. J. Kaiser response letter dated 12/4/79 an agreement was made that 20 of the unverified socket welds would be selected at random to be radiographed to verify proper fit-up. One of the 39 welds identified on SRS #2367, 2370, 2380, and 2412 was chosen to be radiographed. No design justification was provided to allow verification based on only 20 radiographs.

A second ~~The~~ SIS Report dated 2/11/81 from the ANI indicated that additional welds were made, after 12/4/79, without verification of fitup. The ANI indicated that all of the welds, for which the fit-up was not verified after 12/4/79, should be radiographed. ¶ The lack of justification for the 20 radiographs and recurrence of in-process fit-ups not being verified, reflect inadequate corrective actions.

b. The ~~to~~ records for ~~the~~ the diesel generator system indicated that final visual inspections, of the applicable welds, were performed.

~~6~~

c. ~~d~~ Personnel transferred information ~~out~~ written on KEI-2 forms (weld rod issue slips) to KEI-1 forms (weld inspection records) as justification for weld rod traceability, welding dates, and welder ~~mation indicated on the KEI-2 forms.~~ qualification verification. In essence, the KEI-2 form was a construction document used by the welders to obtain weld rod from the storage personnel. The QC significance of the KEI-2 form was that the QC inspectors were allowed to transfer the weld rod heat number, entered by the storage personnel, to the KEI-1 form (QC weld record) at the time and place of the weld activity only. Therefore, any information transferred from the KEI-2 form to any QC document after the time of ~~and~~ or away from the weld activity would not be credible QC verifications.

In addition, the RIII inspector noted a considerable number of discrepancies between the QC weld records, KEI-1 forms, and the weld rod issue forms, KEI-2 forms. The records indicated discrepancies between the weld rod heat numbers used, identification of the welders performing the welds, and dates the weld were made. The Document Records personnel were resolving these discrepancies by conspicuously altering the KEI-1 forms to match the KEI-2 forms. In effect the QC records, which supposedly provide independent verification, were being changed to conform with Construction Department records. The alterations appeared to be arbitrary in that some of the welds within a certain line were changed, but the other welds of identical circumstances were not changed.

The following are examples of the altered records:

4

(1) Welder$Sand$SRod$SHeat$SNumber$S(used$Sfor$Straceability)$S Changes$U

(a) Dwg. M-479-3-DG-121 for line 1~~K~~DGD9AB-1/2 contains weld records for welds A-4 thru A-21 which, according to QA inspector #81, were made by welder KOE using weld rod heat #O65118 during March 1978. Additional weld rod issue forms (#126508, 126509, 126510, 126511, 126884, 126885 and 126890) exist which indicate welder LFC, using weld rod heat #77402, may have worked on welds A-4 thru A-21. Because of these rod issue forms, on January 1981, the Documents Records personnel changed the QA records to include welder LFC and rod heat number 77402 on welds A-4 thru A-13, A-18, A-20 and A-21. No explanation was given why the records for welds A-14 thru A-17 and A-19 were not changed.

The RIII inspector verified that ~~the~~ only welder identification symbol, KOE, appears near the welds in question.

(b) Dwg. M-479-3-DG-119 for line 1DGD7AB-1/2 contains weld records for welds A-4 thru A-21 which, according to QA inspector #81, were made by welder LJP during March 1978. Weld rod issue forms (KEI-2) #123346 and 119061, enclosed with the drawing, showed welder LJP may have worked on

3

welds A-4 thru A-6, A-8 thru A-11 and A-15 thru A-17. Weld rod issue form #119066 indicates welder KOE may have worked on welds A-4 thru A-21. As a result of these KEI-2 forms the Document Records personnel changed the QA records on 1/29/81 for welds A-6, A-7, A-13, A-14 and A-18 thru A-21 by crossing out the welder symbol LJP and the date 3/29/78 and replacing them with the welder symbol KOE and date 3/22/78 respectively. No explanation was given why the records for welds A-4, A-5, A-8 thru A-12 and A-15 thru A-17 were not changed. The inspector verified that only welder identification symbol LJP appeared near all the welds.

(c) KEI-1 form for weld number 79DG on line 1DG37AA2-1/2 showed the heat # of the consumable insert used was 6059491. On 1/26/81 the number was crossed out and changed to 6058921 to agree with KEI-2 form #123099. The weld number written on the gold copy of the KEI-2 form #123099 was too faint to read. The inspector checked with the Welding Department, but the original (white copy) of KEI-2 number 123099 could not be located.

(2) Weld$SDates$SChanged$U

(a) The KEI-1 form, for weld A-7 on line 1DGD5AB-1/2, indicated the final weld inspection was performed by QA inspector #81 on 4/5/78. The date was crossed out and changed to 4/6/78 on 1/27/81 because of a weld rod issue form (#118920) which indicates welder LJP may have worked on A-7 on 4/6/78.

(b) The KEI-1 form, for weld A-20 on line 1DGD2AB-1/2, indicated final weld inspection was performed by QA inspector #81 on 4/10/78. The date was crossed out and changed to 4/11/78 on 1/27/81 because of a weld rod issue form (#123834) which indicates welder LJP may have worked on A-20 on 4/11/78.

The licensee was previously cited in IE Report 79-15-12 for transferring information from KEI QC inspector's notebooks to KEI-1 forms.

d. ~~(c)~~ No apparent actions were taken to assure that the proper weld procedure was used on any of unverified in-process weld activities.

Failure to take corrective actions when weld procedures were not verified and failure to take adequate corrective actions when proper pipe fit-up, weld filler metal (traceability), and welder qualification were not verified, is contrary to 10 CFR 50, Appendix B, Criterion XVI and the Wm. H. Zimmer QA Manual, Section 16.1 as described in the Appendix A to the report transmittal letter.

(358/81-13-25)

Clarify to 6.2

6.4 Weld Inspection Criteria Deleted

An allegation was received by the NRC during investigation from a site employee concerning the deletions of required weld inspection criteria. The employee showed the NRC inspector copies of KEI-1 forms (weld inspection records) which supported the allegation.

6.4.1 Review of Weld Inspection Records

The Region III inspectors observed that weld inspection criteria utilized to verify weld procedure, welder qualification, filler material, joint cleanliness, bevels, and damage had been deleted or designated as not applicable (N/A) on the following KEI-1 forms (weld inspection records):

System or Component	Isometric Drawing #	Beam or Mark #	Other Information
(1) Drywell Support Steel	S398B	29	Detail E of S-437
(2) Drywell Support Steel	S398B	2 stiffners 1/2 x 6-3/4 x 25-1/8	Line No. MKC 17S493

System or Component	Isometric Drawing #	Beam or Mark #	Other Information
(3) Drywell Support Steel	S398A	125	Line No. EL-535 191°
(4) Drywell Support Steel	S398B	67°	Detail 13 or 493 Detail 2 of 447
(5) Drywell Support Steel	S398A	C-63 (W8 x 10)	Bottom Plate
(6) Drywell Support Steel	S398A	W8 x 17	Cum/Lugs
(7) Service Water System	PSK1WS32	55H	Line No. 1WS17A18

The records for the Drywell Support Steel indicated that the deleted criteria existed at least from July, 1980 to January, 1981. The record for the weld in the Service Water System indicated the criteria was designated as not applicable in November, 1979.

The inspection criteria to verify proper fit-up and tack welds was also designated N/A for the above weld activities on the Service Water System.

For welds

The isometric drawings indicated that some of the weld activities may have involved the suppression pool liner; therefore the licensee could not readily determine if the ASME Section III Code - 1971 or if the AWS D1.1-1972 Code inspection criteria governed the activities.

6.4.2 ASME Code Section III 1971 Requirements

a. NA-4130--"As used in this Section of the Code, Quality Assurance comprises all those planned and systematic actions necessary to provide adequate confidence that all components, parts, or appurtenances are manufactured and/or installed (as applicable) in accordance with the rules of this Section."

b. NA-4420--"The manufacturer and/or Installer shall maintain a written description of the procedures used by his organization for control of quality and examinations, showing in detail the implementation of the quality assurance requirements of this Section of the Code."

c. NA-4510--"Inprocess and final examinations and tests shall be established to assure conformance with documented instructions, procedures, and drawings."

d. NA-4442.1--"Welding and brazing materials for all classes of construction shall be controlled in accordance with NB-4122...."

NB-4122--"Welding and brazing materials shall be identified and controlled so that they can be traced to each component and/or installation of a piping system, or else a control procedure shall be employed which ensures that the specified materials are used."

e. NA-4451--"...Measures shall be established to assure that processes including welding and heat-treating are controlled in accordance with the rules of this Section of the Code and are accomplished by qualified personnel using qualified procedures."

f. NB-4230--identifies specific requirements for fitting and aligning of weld joints which must be verified.

6.4.3 AWS D1.1-1972 Code Requirements

a. Section 3.1.1--"All applicable paragraphs of this section shall be observed in the production and inspection of welded assemblies and structures produced by any of the processes acceptable under this Code."

b. Section 3.2.1--"Surfaces and edges to be welded shall be smooth, uniform, and free from fins, tears, cracks, or other defects which would adversely affect the quality of strength of the weld. Surfaces to be welded and surfaces adjacent to a weld shall also be free from loose or thick scale, slag, rust, moisture, grease, or other foreign material that will prevent proper welding ...."

c. Section 3.3.1--"The parts to be joined by fillet welds shall be brought into as close contact as practicable. The gap between parts shall normally not exceed 3/16 inch ....

d. Section 3.3.7--addresses tack weld requirements which must be verified.

e. Section 6.1.1--"The inspector designated by the Engineer shall ascertain that all fabrication by welding is performed in accordance with the requirements of this Code.

f. Section 6.1.3--"He" (the inspector) "shall be notified, in advance, of the start of any welding operations."

g. Section 6.2--"The Inspector shall make certain that only materials conforming to the requirements of this Code are used."

h. Section 6.4.1--"The inspector shall permit welding to be performed only by welders, welding operators, and tackers who are qualified in accordance with the requirements of 5.2."

i. Section 6.5.2--"The Inspector shall make certain that only welding procedures that meet the provisions of 5.1 and 5.2 are employed."

j. Section 6.5.3--"The Inspector shall make certain that electrodes are used only in the positions and with the type of welding current and polarity for which they are classified."

k. Section 6.5.4--"The inspector shall, at suitable intervals, observe the technique and performance of each welder, welding operator, and tacker to make certain that the applicable requirements of Section 4 are met."

6.4.4 Findings and Conclusions

The weld inspection criteria which was deleted or designated as not applicable is contrary to 10 CFR 50 Appendix B, Criterion III and the Wm. H. Zimmer QA Manual, Section 3.3 and 3.13.1 as described in the Appendix A to the report transmittal letter. (358/81-13-26)

6.5.5 Items of Noncompliance

One item of noncompliance was identified (failure to delineate required weld inspection criteria).

DI:rc11

November 23, 1981

MEMORANDUM FOR: James G. Keppler, Regional Administrator

FROM: J. F. Streeter, Chief, Reactor Projects Branch 2, DRPI

SUBJECT: INVESTIGATOR/INSPECTOR SIGNATURES ON FINAL ZIMMER INVESTIGATION REPORT 50-358/81-13

As a result of comments received from the Commission, ELD, IE:HQ (EIS), RIII management, and participating investigators/inspectors, the final draft report which was the document the investigators/inspectors reviewed prior to signing the report cover page was revised. In those cases where I viewed the changes as substantive or potentially substantive, the involved investigator/inspector was contacted to assure they were in agreement with the changes. As of this date I am confident that the final report represents the collective view of the participants and management. In view of this, I elected not to delay the issuance of the report to obtain new signatures on the cover page.

J. F. Streeter, Chief
Reactor Projects Branch 2, DRPI

8207300291

*For those areas of the report in which they were involved.

OFFICE	RIII	RIII	RIII	RIII	RIII	RIII	
SURNAME	Streeter	*Barrett 11/23/81	*McCarten	*Daniels	Warnick	Davis	Keppler 11-23
DATE	11/23/81			11/24/81	11/23/81	11/23	

NRC FORM 318 (10-80) NRCM 0240 OFFICIAL RECORD COPY

McCitea Ossoprice

12 pitch

YES

Extend to 7

I Allegation 5

"Sensitive parts ~~of~~ ON welding rods are possibly damaged through storage at improper temperatures, and possibly lost through failure to follow proper ~~paper work~~ paperwork and labeling requirements."

II Findings

None

III Investigation

A. Background Information

Insert

None

B. Personnel Interviews

Interview with Individual "A"

Need copy of GAP statement

1. On February 24, 1981, Individual "A" who was previously interviewed by representatives of GAP was interviewed~~. and~~ He stated he observed unaccounted for weld rod (weld rod without accompanying KE-2 weld control forms) onsite and has seen weld rod warming ovens unplugged and not being maintained at the proper temperature. ~~Individual "A" stated there was no one assigned on night shift to the weld rod issue point onsite. For a two-month period in 1979 weld rod was left out unattended with a weld rod issue slip available for the night shift personnel to sign when draw-~~

2. Individual "A" also stated that during September and October 1979 a pipefitter was not assigned to the weld rod issue point during the evening shift to account for weld rods. He stated that weld rod ~~[illegible]~~ and weld issue slips were left out unattended

#A

II Findings

1. The portion of the allegation, that alleged ~~w~~ sensitive parts on welding rods we possibly damaged through storage at improper temperatures, was substantiated based on the noncompliance history concerning weld rod temperature control ~~[illegible]~~ documented in past IE Inspection Reports. No additional weld rod temperature control problems were identified during ~~the~~ this ~~invest~~ investigation.

2.a. The portion of the allegation, that alleged ~~sensitive~~ ~~parts on~~ welding rods were possibly lost through failure to follow proper ~~[illegible]~~ paperwork requirements, was not substantiated ~~in~~ with regards to weld rod issue forms. ~~was [illegible] substantiated as [illegible]~~ Allegations P-2/13 and P-2/14 in this Investigation Report, ~~[illegible]~~ address QC record and QC ~~[illegible]~~ verification problems related to weld rod control.

B

2.

b. The portion of the allegation that alleged welding rods were possibly lost through failure to follow proper ~~paperwork~~ labeling requirements, was ~~neither~~ not substantiated. No information was submitted or obtained to define the ~~concern~~ specific meaning of the alleged concern about labeling requirements.

4 Other than referenced no items of noncompliance or safety concerns were identified.

AWS
ASME
Weld
1973
temp control

Final

III

A. ~~Background~~ Information

This allegation was interpreted to address two weld rod concerns:

1. Weld rod were possibly being damaged by improperly controlling rod temperatures ~~prop~~ prior to ~~the~~ consumption and resulting in unacceptable welds.

~~Weld rods had ... The paperw ... the proper ... welds, was ... may ~~made~~ have ... weld rod.~~

2. Weld rods had been lost because the paperwork and labeling requirements were not being properly followed. Therefore, welds may have been made with incorrect weld rods.

These interpretations were based on the following personnel interviews.

for anyone to pick up and use.

~~ing weld~~ rod

On April 22, 1981 Individual "A" provided a written statement attesting to the aforementioned information, however he request- the statement not be attache- to this report.

Interview with Individual "B"

1. ~~A~~ On April 14, 1981, Individual "B" who was previously interviewed by representatives of GAP was interviewed. He stated Kaiser required weld rod ovens be maintained at the proper temperatures at all times. He said he could not insure that every welder maintained his oven at the right temperature, but as a supervisor he insured his men did. 2. He stated that on occasion weld rod issue slips (KE-2 Forms) were lost and in those cases it was a common practice onsite for welders at the time of fabrication to get a blank issue form, falsify it, and present it to the Kaiser Quality Control Inspectors in order for the weld to pass inspection. He said frequently this was done months after the fact by Kaiser construction supervisors who falsified weld rod issue forms to complete weld documentation packages. He said by doing this they did not have to cut out and rework welds.

On April 14, 1981 Individual "B" provided a written statement attesting to the aforementioned information, however he requested the statement not be attached to this report.

II.

C.1. ~~e~~ Weld Rod Temperature

~~I~~ For pressure boundary (asme) welds the ~~Fuo~~ ASME Code NA-4460 states

Insert 1

"Measures shall be established to provide work and examination instructions for handling, storage, shipping, and preservation of materials, parts, components and appurtenances to prevent damage or deterioration. When necessary for particular products, special protective environments, such as inert gas atmospheres, specific moisture content levels and temperature shall be provided and their existence verified."

Storage and hand[ling of] welding materials shall be taken by fluxes and c[...]

Insert 2

~~I~~ For structural welds the AWS D1.1-1972 Code, Section 4.9.2 states "All electrodes having low-hydrogen coverings conforming to AWS A5.1 shall be purchased in hermetically-sealed containers or shall be dried at least one hour at temperatures between 700 F and 800 F before being used. Electrodes shall be dried prior to use if the hermetically-sealed container shows evidence of damage. Immediately after removal from hermetically-sealed containers or from drying ovens, electrodes shall be stored in ovens held at a temperature of at least 250 F. E70XX electrodes that are not used within four hours, E80XX within two hours, E90XX within one hour, and E100XX and E110XX within one-half hour after removal from hermetically-sealed containers or removal from a drying or storage oven shall be redried before use. Electrodes which have been wet shall not be used."

¶ The purpose of the low-hydrogen weld rods is to keep hydrogen out of the weld. Hydrogen could cause underbead cracking. Thus, the above code requirements are intended to minimize the moisture, which contains hydrogen, from being absorbed by the low-hydrogen weld rods. Insert G To help accomplish ~~[illegible]~~ code requirements, portable ~~storage ovens~~ rod warmers ~~[illegible]~~ have been

Insert 8

4 The ~~Resident~~ Resident Inspector reviewed the receipt documentation for E7018 (low hydrogen) weld rod purchased on orders # 34556, 35729, 37587, 39075, 39382, 39556, 39971, and 40318. The receipt documentation indicated that the E7018 rod had been received in sealed moisture-proof containers.

4 The Resident Inspector verified that low hydrogen electrodes (rods) which had not been issued to the field were clearly identified and stored in ~~a~~ a clean, limited access, and dry area. In addition, in the field issue rooms (rod shacks), the low hydrogen rod ~~in the field issue rooms~~ were either in sealed containers or in holding ovens at temperatures above 250°F. ~~and unacceptable rod warmers properly tagged and segregated in a clearly marked area.~~

specified, used near the work activities to ~~~~ maintain the weld rods in ~~a~~ a dry condition until used.

A KEI Welding Filler Materials Control Procedure # SPPM 3.3, Revision 7, paragraphs 3.5.4.2 and 3.5.4.3 respectively state:

"When covered electrodes are removed from a holding oven to be issued to welders they shall be placed in a portable rod warmer. Only one classification and heat or lot of electrode shall be stored in each individual portable rod warmer. Each portable rod warmer shall be uniquely marked for identification purposes and shall be checked on a monthly basis to assure that each rod ~~warmer~~ warmer maintains a correct temperature between 175°F and 400°F."

"All covered lectrodes exposed to ambient conditions for more than 4 hours without coming in direct contact with water shall be returned to ~~central~~ central storage for rebaking...."

& The Resident Inspector reviewed ~~record~~ the December, 1980 record for the Daily Temperature Check of Holding ovens # W50, W27, W35, W25, W39, W19, W11, and W26.

The record indicate that oven # W50 was 5°F under the specified 250°F on ~~3 different~~ 3 of the 22 days checked; oven # W25 was 5°F under the specified 250°F, 1 ~~day~~ day out of 22; oven W39 was 15°F under the specified ~~temp~~ 250°F on 1 day out of 22; and oven W26 was 10°F under the specified 250°F on 1 day out of 22.

The Resident Inspector reviewed the record for the Monthly Check of portable rod ovens (warmers). The record indicated that temperatures of 209 warmers were checked on 1/3/81 and that all but 15 of the warmers were above 250°F. Of those 15 warmers, all were 200°F or higher.

The Resident Inspector also observed that ~~the~~ unacceptable rod warmers in the field issue rooms, were properly tagged and segregated in a clearly marked area.

~~noncompliance history - prior problem~~

The licensee has been cited ~~for~~ in the past with noncompliances by the NRC as identified in the following IE Inspection ~~IE Reports~~ Reports:

Number	Cited Noncompliance
75-05	Holding oven contained both stainless steel and low hydrogen carbon steel rod
76-07	(1) Portable electrode (warmer) oven not plugged-in ~~(2)~~ and approximately 10 electrodes were not in the warmer.

Two 50 lb. cans of
(2) low hydrogen (7018) electrodes had holes in them and several cans were damaged X

Documentation for ~~and~~ temperature calibration for
(3) three weld rod holding ovens, was not available

76-11 Partially burned and unburned weld rod was found lying outside containers or ovens in several locations in the plant.

77-02 ~~Stainless~~ Holding oven contained both stainless steel and low hydrogen ~~and~~ electrodes.

79-07 (1) Approximately three dozen partial, damaged, or ~~un~~ unused electrodes were found lying on the floor, scaffolding, and in a cable tray.

(2) Three rod ovens were not provided with thermometers for directly measuring oven temperatures.

(3) Calibration of two rod ovens were past due.

79-15 (1) Filler material and consumable ~~ed~~ inserts maintained in ~~heat~~ ovens and on shelves without ~~traceabilit~~ traceability to heat/lot numbers.

(2) Filler material heating ovens contained food.

(3) 50 containers of nonconforming weld rod ~~were~~ were stored with acceptable rod. The nonconforming rod was not identified as nonconforming. X

80-07 Two portable warmers were not plugged-in.

80-14 One portable rod warmer was not plugged-in.

80-19 One portable rod warmer was not plugged-in.

The RIII inspectors identified no additional items of noncompliance or significant concerns relevant to weld rod temperature controls.

~~It should be noted that~~

The citations concerning portable rod warmers not being plugged-in and holding ovens containing different types of rods were violations ~~with~~ of site procedures and not ASME or AWS Codes.

III
~~D~~ C. 2.a. Weld Rod Paperwork and Labeling Requirements

The paperwork ~~and labeling requirements~~ use to account for ~~the~~ weld rod ~~was~~ was the KEI-2 form (weld rod issue slip). The KEI-2 form required the welder's, the welder's foreman, and the weld rod issuer's signatures, which permitted the welder to obtain weld rods for a specific weld from the rod shack (field storeroom). ~~Therefore, it~~

The RIII inspector reviewed approximately 15 KEI-2 forms for the September - October, 1979 period (including the evening shift) and approximately 20 additional KEI-2 forms ~~&~~ dated in 1978. All of these KEI-2 forms which were signed by the rod issuers indicated that the respective welding rods had been properly accounted by the assigned construction (non-Quality Control, non-QC) ~~(non-QC) construction~~ personnel.

(No #). None of these KEI-2 forms appeared to be falsified. 2

1 # The KEI-2 forms required no QC signatures ~~and~~ were ~~was~~ therefore not QC records which would signify QC verifications that ~~the~~ correct weld rods were ~~was~~ used.

The QC verifications of weld rod were required to be made at the place and time of the actual weld activity and ~~documented~~ documented on the KEI-1 forms (weld inspection records).

The findings related to allegations P-2/13 and P-2/16 addressed in this Investigation Report #81-13 revealed the following paperwork deficiencies concerning KEI-1 forms and the ~~respective~~ respective weld rod verifications by QC inspectors:

(1) QC inspection criteria had been improperly deleted or designated as not applicable from the KEI-1 forms (QC records).

(2) KEI-1 forms (QC records) had been improperly altered based on information on KEI-2 forms (non-QC records).

These deficiencies have been identified as items of noncompliance.

2.b. ~~&~~ Neither the personnel interviews, ~~the~~ record reviews, or the observation of ~~w~~ activities related to weld rod control identified any specific meaning of ~~to~~ the alleged concern about labeling requirements. Therefore, this concern was ~~neither substantiated or~~ not substantiated.

Appendix A

Cincinnati Gas ~~and~~ & Electric Company Docket No. 50-358

As a result of the investigation conducted on January 12 through July 14, 1981 and in accordance with the Interim Enforcement Policy, 45 FR 66754 (October 7, 1980), the following violations were identified:

1. 10CFR 50, Appendix B, Criterion ~~II~~, states in part that the applicant shall establish a quality assurance program which ~~the activities affecting quality shall be accomplished~~ complies with the requirements of this ~~app~~ appendix. ~~under suitably controlled cond~~ conditions.

~~a~~ The ~~CG&E~~ Wm. H. Zimmer QA Manual, Section 2.1.2 states in part, that quality assurance ~~provide~~ actions provide a means to control the quality of the material, structure, component, or system to predetermined requirements.

Contrary to the above, the quality assurance program of Bristol Steel and Iron Works, of a contractor to the licensee, did not provide sufficient independence of the QA staff from cost and schedule; ~~and~~ did not provide sufficient documentary evidence to ~~staff~~ to identify the specific requirements, such as codes, standards or specifications which were met; and did not provide records to include data such as qualification of personnel, procedures and equipment.

This is a Severity Level __ violation (Supplement II).

2. 10CFR 50, Appendix B, Criterion III states in part that measures shall include provisions to assure that appropriate quality standards are specified and ~~inclu~~ included in design documents and that ~~deviations~~ deviations from such standards are controlled.

The Wm. H. Zimmer QA Manual, Section ~~2~~ ~~3.6~~ 3.6 states measures are established to assure that any deviations from the applicable standards are controlled.

Contrary to the above:

a. ~~S&L procedures~~ The weld inspection criteria, specified by Sargent & Lundy for structural welding ~~to have~~ deviated from the AWS D1.1-1972 Code and FSAR requirements. ~~and were not controlled.~~

b. The Sargent & Lundy design bases for thermal loading of cable trays ~~loading~~ & (cable ampacity) deviated from the design bases defined in the Zimmer FSAR. ~~and was not controlled.~~

b. Four areas were identified, in which the cable separation criteria ~~specified~~ different in the FSAR, was not complied ~~sets installations~~ which were installed per site ~~de~~ design documents, ~~which~~

c. The Sargent & Lundy design ~~requirements~~ for four different cable ~~tray~~ installations deviated from the cable separation criteria defined in the Zimmer FSAR. The cables were installed per the design. ~~and~~

d. Sargent & Lundy had determined, as noted . . calculation sheet dated 12/27/79, that the design for two cables would allow these two cables to be thermally overloaded. No program existed in which the S&L engineers could ~~identify and~~ control such design deviations when identified to assure appropriate evaluation and disposition.

This is a Severity Level __ violation (Supplement II)

3. 10CFR 50, Appendix B, Criterion III states in part that measures shall include delineation of acceptance criteria for ~~[illegible]~~ inspections and tests.

The Wm. H. Zimmer QA Manual, Section ~~[illegible]~~ 3.13.1 states in part that design ~~measures~~ control measures ~~[illegible]~~ also apply to delineation of acceptable criteria for inspections and tests.

Contrary to the above, a ~~Kaiser Engineering~~ H. J. Kaiser, Co., ~~[illegible]~~ deleted ~~a~~ ~~[illegible]~~ weld inspection criteria ~~designated~~ ~~for [illegible] inspections activities [illegible] during approximate~~ which ~~was~~ were required by codes from July, 1980 to January, 1981 and designated the criteria as not applicable for a weld performed in November, 1979.

This is a Severity Level _ violation (Supplement II).

6A

4. 10CFR50, Appendix B, Criterion III states in part that the design control measures shall provide for verifying or checking the adequacy of design.

The Wm. H. Zimmer QA Manual, Section 3.11.2 states that at S&L, design verification reviews are performed by qualified personnel ~~indep~~ independent of the preparer.

Contrary to the above ~~meas~~ measures had not been establish by S&L to verify the adequacy of the thermal loading of ~~pow~~ power cable sleeves and the physical weight loading of cable trays.

This is a Severity Level ___ violation (Supplement II)

#6 B

~~4.~~ 5. 10CFR50 Appendix B, Criterion ~~XII~~ III states in part that design changes, including field changes shall be subject to design control measures commensurate with ~~Fa~~ those applied to the original design.

The design control measures shall provide for verifying or checking the adequacy of design.

¶ The Wm. H. Zimmer QA Manual Section 3.12.B which states in part design changes, including field changes, are subject to design control measures commensurate with those applied to the original designs.

¶ Contrary to the above, nineteen surveillance reports were ~~being were~~ written in accordance with a site procedure, which allowed acceptance of nonconforming conditions, without design reviews ~~[illegible]~~ ~~which allowed acceptance of nonconforming conditions~~, commensurate with the original design. ~~the nonconforming conditions which were in effect design changes, without design reviews commensurate with the original design when accept as-is.~~

b. 10 CFR 50 Appendix B, Criterion VII states in part that the effectiveness of the control of quality by contractors and subcontractors shall be assessed by the applicant or designee.

The Wm. H. Zimmer QA Manual, Section 7.3.1 states that As part of the vendor selection process, S&L makes an independent evaluation of the bidders' QA programs as a part of their total bid evaluation. S&L's bid evaluation includes their findings concerning the recommended vendor's quality assurance program. The two evaluations (QA's and S&L's) are compared, and a decision is made as to the acceptability of the vendor's program. ~~Each successful bidder's QA/QC procedures are~~

Contrary to the above, 8158 feet of structural beams were purchased from vendors for which evaluations of the respective quality assurance programs had not been performed. The beams were not controlled to prevent their use in safety related systems.

This is a Severity Level _ violation (Supplement II).

7. ~~8.~~ 10 CFR 50, Appendix B, Criterion VIII, states in part

that ~~These~~ measures shall assure that identification of the item is maintained by heat number, part number, serial number, or other appropriate means, either on the item or on records traceable to the item, as required throughout fabrication, erection, installation, and use of the item.

The Wm. H. Zimmer QA ~~Manual~~ Manual, Section 8.2 states in part that HJK procedures provide that within the HJK jurisdiction the identification of items will be maintained by the method specified on the drawings, such as heat number, part number, serial number, or other appropriate means. This identification may be on the item or on records traceable to the item. The identification is maintained throughout fabrication, erection, and installation. The identification is maintained and usable in the operation and maintenance program.

Contrary to the above, the traceability of at least ~~seven~~ nine structural beams and ~~two~~ ~~diesel~~ ~~Turbine~~ ~~AFT~~ ~~pipe lines & diesel generator cooling water, starting~~ twelve pipe lines, was not maintained.

This is a Severity Level _ violation (Supplement II).

8
~~7~~. 10CFR50, Appendix B, Criterion X, states in part that a program for inspection of activities affecting quality shall be established and executed to verify conformance with the documented instructions, procedures and drawings.

The Wm. H. Zimmer QA Manual Section 10.1.2 states in part that inspections ~~and tests~~ are performed in accordance with written procedures which include requirements for check ~~tests~~ lists and other appropriate documentation of the inspections.

Contrary to the above: a. No QC inspection program was established to require verification of cable separation for cables extending from ~~up and out of~~ raceway located in the cable spreading room to the control room. Two cables of the blue ~~The program would have assured that~~ division, which had been routed into a green division tray riser, which extended up to the control room ~~room, which extended up to the control room,~~ in violation of the site cable separation criteria, ~~would have been identified~~

~~This is a Severity Level __ violation (Supplement II).~~

10

b. No documented evidence could be provided to assure that in-process, ~~weld inspections and~~ ~~and adequate final weld inspections, before painting~~ before painting ~~of the welds,~~ and adequate final ~~visual~~ weld inspections had been performed as required in the ~~cable tray hanger~~ AWS-D1.1-1972 Code, for ~~on the~~ the welds on ~~approx~~ ~~to~~ 180 cable tray hangers located in the cable spreading room ~~as required by AWS D1.1 1972 Code~~

The final weld inspections had been made after the welds were painted (galvanox).

This is a Severity Level __ violation (Supplement II)

9B. 10 CFR 50, Appendix B, Criterion XI, states in part that test results shall be evaluated to assure that test requirements have been satisfied.

The Wm. H. Zimmer QA Manual Section 11.1 states in part that test programs to assure that essential components, systems, and structures will perform satisfactorily in service are planned and performed in accordance with written procedures and instructions at vendor shops and at the construction site.

Contrary to the above, ~~radiogr~~ 187 radiographs, taken to attest the quality of prefabricated pipe welds, were made with a technique that ~~is~~ did not comply with the ASME Section III-1971 Code, Winter 1972 Addenda. The unacceptable technique involved the lack of or insufficient shimming of the penetrameter, which reflects ~~on~~ the quality of the radiograph.

This is a Severity Level _ violation (Supplement II).

10 ~~9~~. 10 CFR 50, Appendix B, Criterion XV, states in part that measures shall be established to control materials, parts, or components which do not conform to requirements in order to prevent their inadvertent use or installation.

The Wm. H. Zimmer QA Manual Section 15.2.2 states in part that:

H. J. Kaiser, Co. ~~HJK~~ is responsible for identifying and reporting nonconformances in receiving inspection, construction, or testing activities which are delegated to HJK. A tagging system is established in the HJK Quality Assurance Procedures to assure that nonconforming items are conspicuously marked to prevent their inadvertent use or installation.

Contrary to the above:

a. Welds on at least nine structural beams and four cable tray hangers ~~welds~~ were identified which ~~did not comply with~~ contained unacceptable slag, weld profiles, blowholes, porosity and/or undercut. The unacceptable welds were not identified on any control document ~~and had~~

b. At least five structural beams ~~w~~ were identified which had ~~notch~~ unacceptable notches for re-entrant corners ~~instead~~ instead of the required radii.

c. At least four structural beams were installed in the auxiliary building switchgear room, which ~~were~~ were not specified on any design document.

~~d~~ This is a Severity Level __ violation (Supplement II).

11. 10 CFR 50, Appendix B, Criterion XVI, states in part that measures shall assure that the cause of a condition adverse to quality is determined and corrective action is taken to preclude repetition.

The Wm. H. Zimmer QA Manual Section 16.5 states in part that vendors, contractors, and subcontractors are required to determine cause and corrective action to prevent recurrence of errors which could result in significant conditions adverse to quality.

Contrary to the above:

a. The corrective actions taken in regard to a previous NRC finding, concerning measures to assure Design Document Changes are implemented and verified by QC was not adequate. The corrective actions did not include DDCs written prior to the implementation of the corrective actions or the DDCs that are and have been implemented prior to receiving Sargent & Lundy approvals. Structural beams identified on three DDCs were either welded or tack-welded into place without QC ~~[illegible]~~ verification of the ~~[illegible]~~ in-process welding activities.

b. ~~The corrective actions~~ Five CG&E QA audits of Sargent & Lundy identified a recurring problem in which design ~~[illegible]~~ calculations and verifications were not performed. The NRC identified during this ~~[illegible]~~ investigation that controls were not established to assure design verifications & calculations of the thermal loading of power cable ~~[illegible]~~ sleeves and the physical weight loading of cable trays. The CG&E audits did not address the generic and programmatic cause, of the design calculations and verifications not being performed, to preclude ~~recurrence~~ repetition.

c. During the review of the QC installations records for the diesel generator cooling water, starting air, and fuel oil piping, The licensee inadequately supplemented the ~~the following~~ ~~[illegible]~~ following for a large number of in-process weld inspections which had not been performed:

(1) ~~Twenty Radiographs~~ Radiographs of twenty ~~welds~~ out of at least ~~over~~ 439 welds for which socket engagement had not been verified.

(2) Records for at least twenty-four ~~Record~~ Welds ~~records~~ which were altered by transferring ~~based~~ on ~~informat~~ information on ~~information~~ records that were not ~~completed~~ verified by QC inspectors at the time and place of the weld activities. ~~The licensee was previously cited for transferring weld information.~~

(2) ~~The~~ Inprocess weld verification data, ~~which~~ was ~~Information~~ transferred from ~~construction records~~ weld rod issue slips, which ~~which~~ was not verified by QC ~~inspection~~ inspectors at the time and place of the weld activities, for at least twenty four welds.

This is a Severity Level _ violation (Supplement II).

12. 10 CFR 50, Appendix B, Criterion XVIII, states in part that a comprehensive system of planned and ~~peri~~ periodic audits shall be carried out to verify compliance with all aspects of ~~the~~ the quality assurance program and to determine the effectiveness of the program.

¶ The Wm. H. Zimmer QA Manual Section 18.1 states in part that the QA Division conducts a comprehensive system of planned and periodic audits of Sargent & Lundy to verify compliance with all aspects of the quality ~~—~~ assurance program.

¶ Contrary to the above, the CG&E ~~CG&E~~ ~~the~~ QA Division did not perform a comprehensive audit of the S&L nonconformance program during the past nine years.

¶ This is a Severity Level _ violation (Supplement II).

A-1

2 of 2

Old Format ?

1. Allegation$S12$U

"A design flaw in the heat exchanger control panel permitted an operator mistakenly to force 1200 pounds of pressure through pipes only meant to handle 300 pounds, ripping the pipe and soaking electricians with a hard spray of water that would have been radioactive had the plant been in operation."

2. Findings$U

This allegation was substantiated in that the licensee had reported to NRC pursuant to 10 CFR 50.55(e) an overpressurization incident that occurred on January 19, 1979, in which the Closed Cycle Condensate (CY), Condensate (CD), and Low Pressure Core Spray (LPCS) piping were subjected to a pressure excursion from the High Pressure Core Spray, HPCS, system. The discharge pressure at the HPCS pumps at the time of the discharge was measured to be 1200 psig.

The cause of the overpressurization was not due to the design of the systems. The overpressurization was caused by operational errors that incorrectly permitted two valves to remain open, when they should have been closed.

The actions taken by the licensee to assure the quality of the affect~~ing~~ed piping and components, and to prevent recurrence have been reviewed and found satisfactory.

No additional items of noncompliance were identified.

3. Investigation$U

A. Background$U

The licensee reported the alleged pressurization condition in CC&E letter #QA-1106 dated 3/2/79, Attachment M to this IE Report 81-13, pursuant to the requirements of 10 CFR 50.55(e). The report indicated that on 1/19/79, during a construction test to demonstrate the flow rate through the High Pressure Core Spray System orifice, the steam jet air ejector was overpressurized and failed. The report alludes to two operator errors as the cause of the overpressurization. The errors involved two administratively controlled valves, which were incorrectly documented as closed.

Administratively means the valve positions (e.g. open, closed, etc.) are verified by visual inspection of the valve and documented in accordance with site procedures.

The 10 CFR 50.55(e) report also stated that the design, utilizing two administratively controlled valves in the HPCS system, was permitted by ASME Section ~~EEE~~ III Code, Article NC-7110.

The RIII inspector reviewed ASME Section III-1971 Code, Article NC-7000 (including NC-7110 and NC-7141) and determined that NC-7141, not NC-7110, permitted the design of two administratively control valves. Article NC-7141 states, "Pressure-relief devices shall be designed so that potential impairment of the overpressure protection function from service exposure to fluids or constituents of fluids can be determined by test or examination."

The 10 CFR 50.55(e) report concluded that the overpressurization incident was not due to a design deficiency, although a check valve would have compensated for the two operator errors.

B. Personnel$SInterviews$U

Interview$Swith$SIndividual$S"A"$U

On April 22, 1981, Individual "A" who was previously interviewed by representatives of GAP was interviewed. Individual "A" stated he recalled an incident when the heat exchanger control panel was pressurized with 1200 pounds of pressurized water when it was only meant to handle 300 pounds. He said he learned that high pressure water entered the low pressure system and ruptured pipes in the low pressure system. He said two electricians in the area were doused with water when the pipes ruptured. He also said other plant employees said this incident occurred because an operator apparently failed to turn off a valve which allowed high pressure water to enter the low pressure system.

On April 22, 1981, Individual "A" provided a written statement attesting to the aforementioned information; however, he requested the statement not be attached to this report.

Interview$Swith$SIndividual$S"B"$U

On April 14, 1981, Individual "B" who was previously interviewed by representatives of GAP was interviewed. Individual "B" stated he recalled an incident when the alpha air injector condenser on the ground floor of the turbine building was injected with high pressure water instead of low pressure water and the pipes in the condenser ruptured. He said other workers in the plant told him this occurred because an operator failed to close the high pressure valve and the high pressure water entered the low pressure system which ruptured the lines.

On April 24, 1981, Individual "B" provided a written statement attesting to the aforementioned information; however, he requested the statement not be attached to this report.

C. Record$SReviews$U

Region III inspectors have previously reviewed the overpressurization concern as documented in the following excerpts of IE Reports #79-06, section 8; 79-23, page 4; 79-29, pages 4 and 5; and 80-06, page 2.

Report$S#79-06,$SSection$S8$U

OverpressurizationSoSLow$SPressure$SCore$SSpray$Sand$SCondensate$U Systems$SPiping$U

"The inspector reviewed the event of January 19, 1979, during which high pressure core spray (HPCS) water entered the condensate (CD) and low pressure core spray (LPCS) systems because valves 1E22-F003 and F031 had been left open causing a rupture of the steam jet air ejector condenser 1A. The review consisted of interviews with testing and operating personnel and a review of the licensee's final report on his investigation of the event. The review showed that:

(1) Procedure OP.HP.01-4, Revision 0 was used to lineup, fill and vent the HPCS system.

(2) At the completion of the fill and vent operation the operator never completed Step 5.1.5 which required him to close valves

1E22-F003 and F-31. With these two valves open the CD and HPCS systems became crosstied thru the cycled condensate (CY) system. The operator claims he informed the Shift Supervisor that he had left the two valves open while the latter does not recall being told. This failure to follow procedures is contrary to 10 CFR Part 50, Appendix B, Criterion V and is considered to be an example of an item of noncompliance (358/79-06-06B) of the infraction level.

(3) For some unknown reason, valve 1E21-F025 which had been safety tagged closed under Switching Order No. 781317, dated November 16, 1978, was in the open position. This completed the cross connection of the LPCS and HPCS systems. Violation of Switching Order No. 781317 is contrary to 10 CFR 50, Appendix B, Criterion V and is considered an example of an item of noncompliance (358-79-06-06C) of the infraction level. The switching order was cleared on January 24, 1979. The corrective action which the licensee is currently taking regarding a previous noncompliance with the safety tagging procedure (358-79-01-01) is also applicable to this event, therefore the inspector stated no response to this item of noncompliance is required.

(4) Paragraph 13.0 of Safety Tagging Procedure EC.SAD.02, Revision 00 allows for the operation of equipment for test purposes

without the removal of the safety tags. It is possible that valve 1E21-F025 was operated for test purposes thru tags and subsequently left open by error. The inspectors have objected to Paragraph 13.0 of the Safety Tagging Procedure.

On March 21, 1979, the licensee issued operating memo 79-2, Revision 9, which specifically requires that "Do Not Operate" tags must be removed before energizing electrical equipment or opening valves. An exception is made in the case of electrical testing conducted by EOTD in which case only the EOTD master tag will be left in place.

(5) On December 12, 1977, a General Electric system engineer recommended that a check valve be installed on line 1HP18A3 downstream of valve 1E22-F031 because a similar overpressurization of a small section (up to valve 1CY013) of low pressure piping had occurred. The recommendation was rejected because the licensee thought that two valves (1E22-F003 and F031) plus administrative controls were sufficient to prevent recurrence. The licensee stated the check valve will be installed. All other ECCS systems have check valves in the line from the CY system.

The inspector stated his concern regarding repeatable occurrences where a lack of communication or understanding between parties have resulted in damage to equipment. It is our intention to closely monitor the licensee's performance during the preoperational test program to determine the adequacy of plant staffing and training as fuel load date approaches."

Insert

Report$S#79-23,$Spage$S4$U

"(Open) 10 CFR 50.55(e) Report: Overpressurization of the steam jet air ejector heat exchanger (tube side). The inspector established that a check valve has been installed as stated in the licensee's report dated March 1, 1979 (QA-1106). This item remains open pending further review by NRC RIII Operations Branch."

Report$S#79-29,$Spages$S4$Sand$S5$U

"(Closed) Overpressurization of the steam jet air ejector heat exchanger (tube side). NR number 7247R1, dated February 21, 1979, stated that over pressure to 1200 psi of the LPCS piping system occurred in addition to others. The A-E (Sargent and Lundy) analyzed the piping system and valves with dispositions as follows:

1. Carbon steel piping 3/4" up to 12" acceptable since stress was well below yield point.

2. The one stainless steel 3/4" pipe is likewise o.k.

3. Six hundred pound valwes are acceptable with the pressure experienced only being a repeat hydro test.

4. Three hundred pound and 150 pound valves the manufacturer should be consulted.

5. The relief valve causing the problem should be retested and re-set.

Further information available (Construction Engineering Report dated April 14, 1979) stated that the valve manufacturers recommended a seat leakage test be conducted on the valves and that this test was performed without any leaks being detected and it further stated that the relief valve had been removed, tested and reset of set points done. The NR was signed as completed on October 25, 1979. The inspector indicated that he had no further questions regarding this item."

Report$S#$S80-06,$Spage$S2$U

"(Closed) Noncompliance (50-358/79-06b). Failure to follow OP.HP.01-4 valve lineup. (Not closing valves IE22-F003 and IE22-F031.) The inspector reviewed the licensee's action to prevent further non-adherence to procedures and found them acceptable."

9

The licensee's General Engineering Department's report of 4/24/79, (excluding attachments and tables) which documents the final disposition of NR-7247R1, is enclosed as Attachment N to this IE Report #81-13.

Insert

Report #79-06, page 2

(Closed) Noncompliance (358/79-01-01). Failure to follow safety tagging (switching order) procedure. The inspector found that the licensee is conducting safety tagging refresher training for all operations personnel and systems engineers as stated in their letter, Borgmann to Heishman, dated February 28, 1979.

5. The RII inspectors made visual inspections of ~~some~~ both ~~the~~ ~~the~~ the following vendor and field~~s~~ welds on ~~the~~ cable Tray hangers in the cable spreading room, blue switchgear room, and ~~an unidentified area~~; elevation 473 feet auxiliary building

~~a. 2 Cable Spreading Room Hangers Han~~

~~2. a. Cable Spreading room hanger numbers 14H11FEC145, 14H11FEC147, 4H2FEC193, 15H1FEC160, 70H FEC165, and 15H2FEC175.~~

a. Cable Spreading Room Hangers

(1) No. 14H11FEC145 - no unacceptable weld discontinuities
(2) No. 14H11FEC147 - " " " "
(3) No. 4H2FEC193 - covered with fireproofing " " " "; foot connection
(4) No. 15H1FEC160 - covered with fireproofing " " "; foot connection
(5) No. 70H FEC165 (cross brace member #23HV5FEC294)- welds had irregular ~~w~~ profile, porosity, and undercut.
(6) No. 15H2FEC175 (second horizontal member from the top)- weld has undercut.
(7) No. 14H11FEC146 (cross ~~m~~ member) (apparently vendor) ~~weld has undercut~~ - an apparent vendor weld has undercut and slag.

(8) No. 16H1FEC156 (weld marked rejected) - weld has spatter and undercut

~~¶ The foot connections on hangers #(3) and (4) above were covered with fireproofing and could not be inspected. ~~The licensee provided~~~~

~~¶ ~~[illegible]~~ The above hangers had ~~from~~ four to ten welds (vendor and field) per hanger.~~

¶ All of these welds were painted, ~~therefore~~ the welds ~~could~~ were inspected for relatively large discontinuities only.

¶ The RIII inspectors reviewed approximately 180 Construction Inspection Plans (CIP), inspection records, for the hangers in the cable spreading rooms (elevation 536 feet in the north section of the auxiliary building). The ~~[illegible]~~ records indicated that all of the field welds were inspected and accepted ~~during~~ in December, 1980 and January, 1981. ~~Except~~

~~the results and~~

¶ Discussions with the ~~licensee's~~ ~~indicated that~~ ~~pertinent~~ pertinent QC management and inspection personnel revealed that the welds had been inspected ~~only~~ after being painted. No ~~other~~ ~~inspection~~ records were available to indicate that in-process ~~inspections~~ inspections ~~of the welds.~~ ~~for the welds were available. Therefore, required documentation was available to indicate that~~ were made to ~~in-process~~ ~~inspections for~~ ~~weld verifications of~~ verify proper filler metal, weld procedure, welder's qualification, surface condition ~~cleanliness~~, etc., ~~and that were apparent not performed. Also, the~~ final visual ~~examinations were not were not~~ as required ~~performed in accordance with~~ by the AWS D1.1-1972 Code Section 6.

~~Under a paragraph~~

¶ The licensee stated that the visual examinations of the tray hanger weld ~~the licensee stated that~~ were based on H.J. Kaiser Co. Procedure #SPPM 4.6, Revision 8, dated 8/29/80, ~~that~~ paragraph 5.1.3 which ~~addresses cable tray hangers~~ states "Surface condition - Joint surfaces to be examined shall be cleaned and free from slag, rust, arc burns, paint, dirt, or other contaminants that would interfere with the examination." The licensee stated that the ~~protective~~ paint ~~coating~~ (galvanox) that was applied to the hanger welds did not interfere with ~~#~~ the visual examination and in some cases actually highlighted discontinuities.

AWS D1.1-1972 code, section 3.10.1 states ~~"Painting shall be performed~~ "…. Welded joints shall not be painted until after the work has been completed and accepted…."

~~Supt~~ Vendor ~~Start~~ Superintendent under welds not inspected

The apparent lack of in-process inspections and ~~inadequa~~ inadequate visual inspections ~~&~~ of the above hanger welds is contrary to 10CFR50 Appendix B Criterion ~~IX~~ ~~IX~~ X and the Wm. H. Zimmer QA Manual, Section 10.1.2 as described in the Appendix A to the report transmittal letter. (358/81-13-09)

~~#B~~ 5

4/ The RIII inspector requested the ~~...~~ design acceptance criteria ~~by~~ which was used by QC to evaluate the undercut on hanger No. 15H2FEC175. The licensee provided S&L Specification H-2173 Supplement 7, [Standard EB-117 and H.J. Kaiser Procedure SPPM ~~..~~ 4.6, revision 8 which allows up to 1/16 inch undercut on the cable tray hanger welds. ~~The~~ The 1/16 inch criteria does not comply with AWS-D1.1 1972 Section 3.6.4 which ~~state~~ states "For buildings and tubular structures, undercut shall be no more than 0.01 inch deep when its direction is transverse to primary tensile stress in the part that is undercut, nor more than 1/32 inch for all other situations." This deviation from the AWS code is contrary to 10 CFR 50 Appendix B Criterion III ~~and~~ and the Wm. H. Zimmer QA Manual, Section 3.3 ~~Criteria~~ as ~~des~~ described in the Appendix A to the report Transmittal letter. (358/81-13-10) as described in the Appendix A to the report transmittal letter (358/81-13-09)

b. Blue Switchgear Room Hangers (Elevation 525 feet and drawing # E-96)

(1) No. 1H029 - no unacceptable weld discontinuities.
(2) No. 5H25 - foot connection covered ~~with~~ with fireproofing;
~~(2) No. 5H25~~ no visible unacceptable weld discontinuities
(3) No. 5H30 (2) - no unacceptable " "
(4) No. 1H077 - " " " "
(5) No. 1H079 - " " " "
(6) No. 1H133 - " " " "
(7) 2 Nos 5H19 - " " " "
(8) No. 109HV4 (east and west sides) - had unacceptable weld discontinuities which were controlled on construction inspection plans (records)
(9) No. ~~1H28-2~~ 1H 28-2 - no ~~unacc~~ unacceptable weld discontinuities
(10) No. 1H 28-1 - " " " "
(11) No. 1H29 - " " " "
(12) No. 5H30(2) - " " " "
(13) No. ~~H079~~ 1H077 - " " " "
(14) ~~No. H079~~ 1H133 - " " " "
(15) 5H19 (4) - " " " "
(16) 5H3 (12) - " " " "
(17) 5H2 (12) - " " " "
(18) 5H25 - " " " ";
foot connection covered with fireproofing

C. Elevation 473 feet Auxiliary Building Hangers

(1) No. 5H009 (drawing E-91) - no unacceptable weld discontinuities
(2) No. 4H3 (drawing E-14) - " " " "
(3) No. 2H1 (drawing E-14) - " " " "
(4) No. 5H010 (" E-91) - " " " "
(5) No. 5H012 (" E-91) - " " " "
(6) No. 6H1 (2) (drawing E-14) - " " " "
(7) No. 6H1 (1) (" E-14) - " " " "

~~The above two~~ Four to six welds were inspected on each of the above hangers.

Several of the tray hanger foot connection (where the hangers are attached to the structural beams) were covered with fireproofing and could not be inspected. Therefore, the RIII inspector ~~noted~~ requested QC inspection documentation to assure ~~to~~ that ~~the~~ the welds, covered by fireproofing, were acceptable. The licensee provided a copy of Surveillance Report # 2893 dated 1-8-81 which identified ~~the~~ that

~~bolt~~ ~~connections~~ ~~were~~ in the cable spreading room
94 of 179 cable tray hangers which have one or both

bolt connections covered with fireproofing. The SR

~~to~~ requested clarification as to what QC should do

since the bolt ~~conn~~ connections ~~could~~ had not ~~be~~ been inspected.
The bolt connection is ~~the point at at~~ where the hanger ~~attaches~~ attaches to the structural beam.
As of 3/27/81, the ~~report~~ SR had no disposition.

~~The~~ This item is unresolved pending the resolution of the hangers ~~as~~ identified
in ~~of~~ S.R # ~~28~~ 2893 - and ~~of~~ any other hangers connections
~~throughout~~ Throughout the plant that ~~are~~ ~~covered~~ were covered

~~and not be~~ before being inspected. (358/81-13-11)

#

About weld discontinuities to be written

8/3/81

9. Exit Interview

The inspectors and investigators met with licensee representatives periodically during the investigation and on March 26, 1981. Attendees at the March 26 meeting are designated at the end of this section. At that meeting the NRC investigation team described the reasons for the investigation; the findings regarding each allegation as of that date; and safety concerns identified during the investigation, which are described below. The team leader indicated that the investigation was not yet complete, that the findings would be reviewed with NRC Regional and Headquarters Management, and that enforcement action would be discussed in subsequent enforcement meetings. At the NRC's suggestion, the licensee agreed to meet with Region III representatives on April 10, 1981, in the Regional Office to discuss identified concerns and proposed corrective actions.

The inspectors identified the following concerns:

a. Structural beams with bad welds and re-entrant corners with notches.

?? b. Inadequacies in the QA program of the structural steel erector. (Bristol Company) Independence

c. Lack of traceability of material in structural beams, small bore piping, and weld rod heat numbers.

d. Surveillance reports not being converted to nonconformance reports in 30 days.

SR written to identify NR's ... design review.

e. Structural welds inspected after painting.

f. Radiograph technique inadequate on 25% of the prefabricated welds reviewed by NRC. (Penetrameters were not adequately shimmed.)

g. Nonconformance reports being improperly voided.

design
separation

h. A green cable tray was designed and installed inside a white tray.

i. Lack of inspection control to verify cable separation. (Three examples of failure to maintain cable separation were identified.)

j. Lack of design controls by Sargent and Lundy to require verification calculations for thermal loading of power sleeves and dead weight loading of all trays, to document design deviations identified by engineers, and to document deviations from the FSAR.

k. Inadequate action taken by CG&E to obtain correction of repetitive problems identified by CG&E in audits of Sargent & Lundy.

l. CG&E had not audited Sargent & Lundys nonconformance program.

m. Weld inspection criteria was deleted from the weld data sheet (KEI-1 form) from approximately July 1980 to February 1981.

n. Socket weld fitup was not verified on numerous small bore pipes.

o. Structural beams, which are not required on any design documents, have been installed.

p. Information from the weld rod issue slips was being transfered to the weld data sheets, raising doubts about the accuracy of the weld records.

q. Design document changes were not being controlled.

r. Site procedures allow more weld undercut than AWS D1.1-1972.

Persons Attending Exit Interview March 26, 1981

Cincinnati Gas and Electric Company

E. A. Borgman, Senior Vice President

H. C. Brinkman, Principle Mechanical Engineer - Nuclear

B. K. Culver, Manager, Generation Construction

R. P. Ehas, Quality Engineer

J. R. Schott, Plant Manager

W. W. Schwiers, Manager, Quality Assurance

S. C. Swain, Site Construction Manager

W. D. Waymire, Manager, General Engineering

Henry J. Kaiser Company

P. S. Gittings, Site QA Manager

E. V. Knox, Corporate QA Manager

R. Marshall, Site Manager

C. H. Stanfield, Construction Manager

U. S. Nuclear Regulatory Commission

P. A. Barrett, Reactor Inspector

R. M. Burton, Investigator

F. T. Daniels, Senior Resident Inspector

E. C. Gilbert, Investigator, IE:HQ

T. P. Gwyn, Resident Inspector

F. A. Maura, Reactor Inspector

J. B. McCarten, Investigator

J. F. Schapker, Reactor Inspector

K. D. Ward, Reactor Inspector

R. F. Warnick, Chief, Reactor Projects Section 2B

10. Management Meetings

Following the exit meeting held at the Zimmer site on March 26, 1981, Mr. E. A. Borgman met with J. G. Keppler and R. F. Warnick on the afternoon of March 31, 1981, in the Region III office to discuss the significance of the NRC investigation findings.

On April 8, 1981, Region III sent an Immediate Action Letter (IAL) to the licensee documenting ten corrective measures that CG&E had initiated or were planning to take concerning the problems identified by the NRC investigation team. The ten measures were established to provide assurance that similar problems do not recur during ongoing and future construction activities. The IAL and the required corrective measures are further discussed in Section 11, Licensee Commitments and Corrective Actions.

An enforcement conference was held on April 10, 1981, between E. A. Borgman and others of his staff and J. G. Keppler and other NRC personnel in the Region III office to discuss CG&E's proposed corrective action program for deficiencies identified in the NRC investigation and the measures to be taken to assure acceptable quality of future activities at the Zimmer project. This enforcement conference is documented in IE Inspection Report No. 50-358/81-14.

A followup meeting was held on April 30, 1981, between W. D. Waymire and others representing CG&E and R. F. Warnick and others of the NRC staff in the Region III office to discuss the status of measures being taken to assure acceptable quality of ongoing activities at the Zimmer project and to discuss the latest draft of the licensee's proposed corrective action program for deficiencies identified in the NRC Zimmer investigation. Details of this meeting are documented in IE Meeting Report No. 50-358/81-16.

A working level meeting was held on June 2, 1981, between W. D. Waymire and others representing CG&E and R. F. Warnick and others from the NRC at the Zimmer site to discuss the licensee's proposed quality confirmation program and the additional measures required by Region III to identify and correct construction deficiencies, to establish confidence in quality records, and to verify the quality of existing construction. This meeting is documented in IE Meeting Report No. 50-358/81-20.

The Region III Director, Deputy Director, and Section Chief in charge of the NRC investigation at Zimmer met with CG&E's President, Senior Vice President of Engineering Services and Electrical Production, and the Manager of the General Engineering Department, who is also the Acting Manager of Quality Assurance, on June 3, 1981, to discuss matters relating to NRC's Zimmer investigation. Topics discussed included the originating allegations; NRC findings relative to the allegations; problems identified during the investigation; the NRC's Immediate Action Letter of April 8, 1981, establishing controls to assure the quality of ongoing and future work; the program to confirm the quality of completed work; the licensee's internal problem identification and resolution system; status of the NRC's investigation; the role of NRC's Office of Inspector and Auditor in the investigation; and public and congressional interest in the Zimmer project. This meeting is documented in IE Meeting Report No. 50-358/81-20.

11. Licensee Commitments and Corrective Actions

11.1 Concerning Ongoing and Future Work

Region III issued an Immediate Action Letter (IAL) on April 8, 1981, to Cincinnati Gas and Electric Company for ongoing and future work at the site to give increased assurance that the work is accomplished in accordance with regulatory requirements. It required substantially more involvement in quality control inspections and the quality assurance program by CG&E personnel. Follow up inspections by the Senior Resident Inspector and specialist inspectors from the Region III office have confirmed implementation of the requirements of the letter. Details of these follow up inspections are documented in IE Inspection Reports No. 50-358/81-15 and 50-358/81-18.

A copy of the IAL is enclosed as attachment .

11.2 Concerning Existing Construction Work

Because of the problems identified during the NRC investigation, Region III has taken the position that a comprehensive review and reinspection effort by the licensee must be accomplished to confirm the quality of the existing construction work. This quality confirmation program addresses the problems identified to date and includes the following areas: (1) structural steel, (2) weld quality, (3) traceability of heat numbers on piping, (4) socket weld fitups, (5) radiographs, (6) design control and verification, (9) design document changes, (10) subcontractor QA programs, and (11) audits. The licensees quality confirmation program will be revi~~e~~sed as necessary in the event additional adverse conditions are found. A copy of the quality confirmation program is enclosed as attachment.

Reviewed 7/14/81 PO

5.7.1 Allegation

"Prefabricated piping received in 1977 has defective welds, but construction supervisors told crews not to repair them because the welds were made offsite."

During an interview with Applegate and GAP representatives, this allegation was clarified to be piping received ~~June 29~~ July 3, 1979, the subject of one of Applegate's prior allegations.

5.7.2 Background Information

The following summarizes the initial investigation of this allegation as documented in IE Investigation Report No. 50-358/80-09.

On June 29, 1979, Pullman Power Products of Williamsport, Pennsylvania, also known as the M. W. Kellogg Company, shipped five prefabricated pipe spool pieces by truck to the Zimmer site for installation in the main steam relief (MSR) system, a safety-related system. The spool pieces were received on July 3, 1979, and nonconformance report E-1911 was written on July 5, 1979, stating the spools had "rolled off the truck onto the ground." The nonconformance report had the effect of placing the spool pieces in a hold status in the Kaiser warehouse. The welds on the five spool pieces were later radiographed. The radiographs displayed apparent rejectable weld indications in welds on three of the five spool pieces. On September 18 through 28, 1979, despite the issuance of the nonconformance report, the spool pieces were released to construction and installed. As documented in

IE Investigation Report No. 50-358/80-09, the licensee was found to be in noncompliance with NRC requirements for the release of the spool pieces prior to establishing acceptability. During April and May 1980, the welds on the spool pieces were examined ultrasonically and by magnetic particle testing and found to be acceptable.

On April 8, 1980, the RIII inspector reviewed the radiographs on all five spool pieces (1MS08BB12-6B, 1MS09BA12-1AH, 1MS08BA12-58H, 1MS11B12-7BH, and 1MS10BA12-1CH). The films (radiographs) were marked "For Information Only" because an acceptable radiographic technique could not be established because of the configurations and thicknesses of the spool pieces.

RIII personnel determined that radiography was not a credible nondestructive examination (NDE) technique for the spool pieces. The configurations and relatively large thicknesses of the spool pieces in relation to the geometry of the radiographic process would prevent displays and/or accurate displays of weld indications on the radiographs. Any weld indication shown on the radiograph could be caused by undefined distortion. The ultrasonic and magnetic particle tests ultimately performed on the installed spool pieces were acceptable tachniques.

5.7.3 Investigation

5.7.3.1 Interview with Individual A

On April 24, 1981, Individual A, who was previously interviewed by representatives of GAP, was interviewed by NRC. Individual A stated he had provided information to GAP regarding this allegation, and he was referring to five prefabricated pipe spool pieces manufactured by Kellog that fell off a truck during their delivery to the site. He stated that Peabody Magnaflux (PM) radiographers examined the pieces and found defective welds on some of them. He said construction personnel installed the spool pieces in the plant, disregarding PM's finding on the welds.

On April 22, 1981, Individual A provided a written statement attesting to the preceding information; however, he requested the statement not be attached to this report.

5.7.3.2 Interview with David Hang

On February 24, 1981, David Hang, former PM Level II Radiographer, was interviewed. He stated that in August 1979 Anthony Pallon, KEI Welding Engineer, asked him to radiograph MSR spool pieces that had fallen off the truck on delivery to the Zimmer site. Hang said the examination was to determine if any of the welds on the pieces had cracked from the impact of the fall. Hang indicated that three of the five spool pieces he examined had what appeared to be unacceptable radiographic indications. He said he reported this in the Report of Radiographic Examination submitted to Pallon and also told Pallon that radiography was the wrong technique to use to examine welds of this configuration. Hang said he advised Pallon that an ultrasonic examination should be performed in this case. Hang also stated the spool pieces were ultrasonically examined in April 1980 and the welds were found to be acceptable.

5.7.3.3 Record Reviews

On February 24, 1980, RIII Inspector Kavin Ward reviewed records that indicated the five spool pieces were ultrasonically examined by Pullman Power Products (Kellogg) in April and May 1980 and examined by magnetic particle testing by Peabody Magnaflux in April 1980. The records showed that welds on all five pieces were acceptable. The magnetic particle records indicated piece 1-MS-11B-12-7BH, weld No. V, had a linear indication approximately 1/4-in. long, which was ground, retested, and found acceptable.

The RIII inspector determined that the ultrasonic and magnetic particle tests were valid examinations for the spool piece welds. C

5.7.3.4 Field Observations

On February 24, 1981, RIII Inspector Kavin Ward made visual examinations of all of the welds on the five spool pieces and identified no unacceptable indications. The spool pieces were installed in the main steam relief system at the time of the visual examinations.

5.7.4 Findings

Interviews and pertinent records revealed that the piping in question was received in 1979 instead of 1977.

The allegation that prefabricated piping received in 1979 has defective welds was not substantiated. Appropriate examination techniques performed on the piping did not reveal any unacceptable weld indications.

As documented in IE Investigation Report No. 50-358/80-09, one item of noncompliance with NRC requirements was previously cited for releasing the spool pieces before determining their acceptability.

5.7.5 Items of Noncompliance

No new additional items of noncompliance were identified.

Revised 9/12/81

5.6.1 Allegation

"Argon gas valves for flushing oxygen from pipes routinely are left open by the day crew, causing the night crew to be overcome by gas, a problem about which CG&E Safety Director Cummings expressed disinterest."

In an affidavit provided to GAP by a pipefitter (Individual A) formerly employed at Zimmer, it was alleged that workers on the day shift routinely crimped and wired argon gas hoses shut rather than closing the gas valves at the source upon leaving work. The pipefitter stated that this practice resulted in argon gas leaking from the hoses and caus~~ing~~ed the workers on the night shift to suffer from dizziness. The pipefitter further stated he advised former Kaiser Safety Director Larry Cummings of his concerns and that Cummings indicated he was not interested, because argon gas would not hurt anyone.

On February 26, 1981 during a meeting between NRC Region III personnel, a GAP representative, and Thomas Applegate at the NRC Region III office, Applegate alleged that he received information from James Bedinghaus indicating that, in late fall or early winter 1980, his son, John Bedinghaus, had been overcome by argon gas while conducting fire watch rounds in the area of the containment vessel.

5.6.2 Background Information

Argon gas is a "shielding gas" used to purge or displace the oxygen inside pipes where welding is in progress to prevent the metal from oxidizing during welding. Argon gas is colorless and odorless. It is also heavier than oxygen and therefore settles in low areas, displacing the oxygen in those areas. This occurs in the same manner that water displaces air as it is poured into and fills a glass. Mapp (which actually refers to a trade name) refers to combustible gas used in welding, typically for heating and cutting various metals. It does not displace oxygen as argon gas does. It is colorless but it has an odor which can be described as "noticeably foul." Mapp gas is generally not toxic, although significant concentrations may be ignited and become explosive.

NRC does not regulate the use of the subject gases. On February 6, 1981, the NRC Region III office telephoned the Cincinnati, Ohio, office of the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA). During a conversation with OSHA representative John Phillips, it was determined that the allegation involved a matter over which OSHA has primary jurisdiction. An understanding was also reached that any action necessary to resolve this matter would be taken by OSHA. A letter confirming this understanding, a copy of which is attached as Exhibit , was forwarded by Region III to the Cincinnati OSHA office on February 19, 1981.

By letter dated May 15, 1981, the Cincinnati OSHA office advised the NRC Region III office that an investigation of the containment suppression pool area had been conducted by OSHA on February 4-5, 1981. The letter stated OSHA addressed ~~the~~ a previous complaint alleging leaks of argon gas at Zimmer and concluded that an air contamination or oxygen deficiency situation did not exist. A copy of this letter is attached as Exhibit .

5.6.3 Investigation

5.6.3.1 Interview with James Bedinghaus

On March 12, 1981, NRC staff interviewed James Bedinghaus by telephone. Bedinghaus stated that he was a second shift security supervisor employed by W&W Security at the Zimmer Nuclear Power Station from February to November 1980. He stated that while on duty, sometime in October 1980, an incident occurred during his shift in which Security Officer Gayle Spencer became ill due to inhalation of gas. Spencer was assisted back to the guard house to recover from his illness and was later sent home. Bedinghaus learned from Spencer that Spencer was making his rounds in the area of the reactor vessel when he apparently became ill from inhalation of gas. Another worker in the area (whose identity Bedinghaus does not know) advised Spencer there was an argon gas leak where he was located and that he should leave the area immediately. Bedinghaus immediately reported this information to Kaiser Safety Inspector Dan Parlier, who went to check the area where the incident had occurred. Shortly afterwards (approximately one half hour), Parlier contacted Bedinghaus and advised him there was a Mapp gas leak, rather than an argon leak, in the area where Spencer had been. Bedinghaus indicated he was not aware of any argon gas incident involving his son John.

On March 25, 1981, James Bedinghaus provided a written statement attesting to the preceding information, a copy of which is attached as Exhibit .

5.6.3.2 Interview with John Bedinghaus

On March 12, 1981, NRC staff interviewed John Bedinghaus by telephone. Bedinghaus stated that he was a security officer employed by W&W Security at the Zimmer Nuclear Power Station from October 1980 to January 1981. He advised that while employed at Zimmer he was never involved in any incident when he became ill from or was overcome by argon or any other type of gas.

On March 25, 1981, John Bedinghaus provided a written statement attesting to the preceding information, a copy of which is attached as Exhibit .

5.6.3.3 Interview with Daniel Parlier

On March 12, 1981, Daniel C. Parlier, Kaiser Assistant Safety Representative, was interviewed at Zimmer. He stated that to his knowledge there has never been an incident where anyone was overcome by argon gas. He also stated he did not believe such an incident occurred because being overcome by argon gas would likely cause suffocation, an incident of which he would certainly be aware.

Parlier acknowledged that he had discovered instances when craft workers had crimped argon and Mapp gas hoses and had wired them closed rather than shutting the gas off at the source. He indicated he considered this practice a serious safety concern and whenever the practice was observed he immediately brought it to the attention of the appropriate craft supervisor.

Parlier checked the Kaiser Safety Department's "Unusual Incident Reports" for October 1980 to determine if a report of the incident involving Security Officer Spencer had been prepared. He located a report which described the incident in question and included the following information:

> "On October 27, 1980, at 6:30 p.m. a Mapp gas leak located in the reactor suppression pool area at elevation levels 503' and 518' was investigated by Daniel Parlier. Parlier reported that Security Officer Gayle Spencer was in the reactor suppression pool at the time of a mild Mapp gas leak. A reading taken with a M.A.S. (intended as an abbreviation for the manufacturer "Mine Safety Appliances") Explosimeter registered 0% on the upper and lower areas of the suppression pool. Spencer complained of a headache and feeling tired. He was advised by "First Aid" to see a physician if his condition worsened or Security Supervisor James Bedinghaus was to send him to a doctor if he became worse while still at work. Parlier took action to correct the Mapp gas leak by turning off the gas manifolds in the reactor building and disconnecting the gas hoses from the manifolds." A copy of this "Unusual Incident Report" is attached as Exhibit .

In addition to the "Unusual Incident Report" prepared by Parlier, he sent a note dated October 27, 1980, to his supervisor, Mike Hoyman. In the note (which was apparently a "cover note" for the incident report), Parlier advised Hoyman of the incident and concluded by indicating that the incident was a result of the craft workers "not disconnecting their gas hoses from the manifolds." (Disconnecting the hoses from the manifold would have necessitated that the gas be shut off at the manifold.) A copy of the "cover note" is attached and included as part of Exhibit .

During a subsequent telephone conversation on April 24, 1981, Daniel Parlier advised that the former Kaiser Safety Supervisor at Zimmer, Larry Cummings, was currently employed by Kaiser in Goldendale, Washington. Parlier was questioned regarding how he perceived Cummings' attitude toward gas leak incidents at Zimmer. He stated it was his opinion that Cummings was very conscientious regarding this problem and it appeared to him Cummings considered gas leaks to be a serious safety concern. Parlier also remarked he did not believe Cummings ever expressed disinterest in gas leak problems or said they were unimportant.

5.6.3.4 Interview with Larry Cummings

On April 27, 1981, NRC staff interviewed Larry Cummings by telephone. Cummings stated that he held the position of Kaiser Safety Supervisor at the Zimmer Nuclear Power Station for approximately two years until he left the site in May 1980. He verified that he was aware of instances in which workers at Zimmer crimped and wired argon gas hoses closed rather than shutting the argon gas valves off at the source. Cummings remarked that these instances occurred "less than frequently, but more often than they would like." He was unable to specify approximately how many cases of argon hose crimping the Safety Department had detected while he was at Zimmer. Cummings denied expressing disinterest in the argon hose crimping problem and advised it was a topic of concern at many Safety Department meetings. He stated that the crimping of argon hoses was a bad work practice; however, it was one that was hard to pin down because it was extremely difficult to catch the individuals responsible.

Cummings said he felt Kaiser had an adequate safety system for preventing serious argon gas problems and incidents at the site. He explained that it was Kaiser's practice and policy to place mine safety lamps wherever workers were located in low-lying areas, particularly the suppression pool area. These lamps serve as warning devices in that they remain lit unless a gas buildup reaches the lamps' air inlet and puts out the flame. Whenever a safety lamp goes out, it is an indication of gas in the area and a signal for the workers to immediately evacuate the area. Cummings stated he knew of no instances when any workers were ever overcome by argon gas.

5.6.4 Findings

There had been instances where craft workers had crimped argon gas hoses and wired them closed rather than shutting the gas off at the source. However, it was not substantiated that the gas valves were routinely left open.

Example of persons on the night crew being overcome by argon gas could not be substantiated.

The allegation that Safety Director Cummings expressed disinterest in the argon gas problem could not be substantiated.

This matter was determined to be under the jurisdiction of the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) and not under the jurisdiction of the Nuclear Regulatory Commission. Therefore, this matter was referred to OSHA. OSHA inspection did not confirm an air contamination or oxygen deficiency situation.

5.6.5 Items of Noncompliance

No items of noncompliance ~~or~~ were identified.

INV400/A DRAFT/so

5.4.1 Allegation

"A residue heat valve broke when a pipefitter bumped into it, raising now questions about the quality of metal used for valves."

5.4.2 Background

The preceding allegations were addressed simultaneously becaused the investigation determined that both allegations were addressing the same component by the same alleger.

5.4.3 Investigation

5.4.3.1 Interview of Individual "A"

On February 24, 1981, Individual A, who was previously interviewed by representatives of GAP, was interviewed by NRC. Individual A stated that Individual R had told Individual A that 6000-lb pressure fittings were required on the hydraulic lines in the residual heat removal system but Individual R was told by a supervisor to install 3000-lb fittings.

On April 22, 1981, Individual A provided a written statement attesting to the aforementioned information; however, he requested the statement not be attached to this report.

5.4.3.2 Interview of Individual R

On March 20, 1981, Individual R was interviewed by telephone. Individual R stated that he had heard about a valve that had been broken, but he did not have any firsthand knowledge of the incident. Individual R said he knew of cases in which "half-life" (3000-lb in place of 6000-lb) fittings were used. Two specific cases recalled by Individual R were the following:

(1) 3/4-in. pneumatic lines (carrying dry nitrogen) that pick up the control rods.

(2) A set of 2-in. black iron lines inside containment, which could have been hydraulic lines.

Individual R repeatedly stated that it had been three years since he had been at Zimmer and that he did not remember further specifics.

5.4.3.3 Interview of Individual B

On February 10, 1981, Individual B, who had been previously interviewed by representatives of GAP, was interviewed by NRC. Individual B stated that 3000-lb fittings were installed on two recirculation flow control valves when 6000-lb fittings were required. He identified the fittings

as being socket welded to two small hydraulic lines on the valves in question. Individual B stated that to the best of his knowledge this deficiency has not been corrected.

Individual B stated that on the same valves it was reported to him in 1979 that a pipefitter bumped into the valve and a small hydraulic fitting on the valve fell off. He said the fitting was later identified as a nonconforming item by Kaiser and a design document change (DDC) was issued directing the fitting be repaired. He stated the valve in question was manufactured by General Electric, and General Electric later repaired the broken fitting on the valve.

On April 14, 1981 Individual B provided a written statement attesting to the aforementioned information; however, he requested the statement not be attached to this report.

5.4.3.4 Interview of T. F. Van Natta

On June 25, 1981, T. F. Van Natta, Control and Instrument Engineer for General Electric onsite, was interviewed by telephone. Van Natta stated that the adaptor connecting the drain line to the hydraulic actuator body was broken off. He said that he did not know whether or not a pipefitter had broken the adaptor. Van Natta stated that the originally installed adaptor was adequate for the designed service, but it was susceptible to mechanical damage from adjacent construction activities that were being performed. Therefore, the decision was made to replace the original adaptor design with the stronger flange design defined in General Electric Field Deviation Disposition Request No. KN-1-299 dated December 18, 1978.

Van Natta said that the actuator and three of the four hydraulic lines connecting to the actuator had a design test pressure of 3000 psig. He said the fourth line, which was addressed in Field Deviation Disposition Request (FDDR) No. KN-1-299, was the drain line to the hydraulic system, which has design test pressure of 200 psig and normal operating pressure of 14.7 psig, since the drain line is open to the atmosphere at the drain tank.

Van Natta stated that the actuator drain ports and lines were separated from the relatively high-pressure (3000 psig) side of the actuator by two seals (a main seal and a backup seal), which have a design pressure of 3000 psig.

5.4.3.5 Interview of T. E. Bloom

On June 30, 1981, T. E. Bloom, General Electric onsite, was interviewed. Bloom stated that the nipple (adaptor) on the hydraulic actuator to the recirculation flow control valve for recirculation Loop A had been broken.

5.4.3.6 Record Review

1. The RIII inspector reviewed General Electric FDDR No. KN-1-299 (designated as nonconformance request) dated December 18, 1978, which

addressed the recirculation system flow control valve actuator. The FDDR indicated that the following had occurred:

"The threaded adaptor which connects the drain port on the actuator body was broken off during installation of the ½" NPT hydraulic piping. This adaptor is not suitable for this application where the connection is susceptible to damage and does not provide take down capability." The final disposition of the FDDR was as follows:

"Replace the defective adaptor with shor tube threaded to the actuator and socket weld to a special flange attached to the actuator mount ledge. A mating flange with a viton "O" ring joint is also provided similar to the other actuation piping connections."

The FDDR indicated that the flange modification was complete on July 13, 1979. The FDDR did not identify the specific actuator (Loop A or Loop B) which had the defective adaptor.

2. The hydraulic actuators for the two recirculation flow control valves and their respective piping, components, locations, and classifications were identified on the following drawings:

Table B

HYDRAULIC ACTUATOR DATA

Components	Sargent & Lundy Piping and Instrumentation Drawings	Kaiser Engineers Isometric Drawings
Recirculation Loop A		
1. Actuator No. 1B33F060A - Rucker drawing #81-999-F-402 Revision M; Rucker Control S/N SP19025	M-47 Sheet 1 of 2 Revision T	
2. Piping (lines), components (fittings), welds, classifications, and locations	M-47 Sheet 1 and 2 Revision T	
a. Line #1RR39AD 3/4" (and low point drain 1RR41AD**)	M-47 Sheet 1 of 2 Revision T	M-464-3-RR-243 and M-464-3-245

*b. Line #1RR~~2~~39AC ½" hydraulic system drain line (and low point drain line 1RR41AC**)	M-47 Sheet 1 of 2 Revision T	M-464-3-RR-244, M-464-3-RR-241 and M-464-3-RR-247
c. Line #1RR39AB ½" (and low point drain line line 1RR41AB**)	M-47 Sheet 1 of 2 Revision T	M-464-3-RR-242 and M-464-3-RR-246
d. Line #1RR39AA (and low point drain line 1RR41AA**)	M-47 Sheet 1 of 2 Revision T	M-464-3-RR-239 and M-464-3-RR-240

Recirculation Loop B

1. Actuator No. 1B33F060B Rucker Control (S/N 19028)	M-47 Sheet 2 of 2 Revision P	
2. Piping (lines), components (fittings), welds, classifications, and locations	M-47 Sheet 2 of 2 Revision P	
a. Line #1RR40AD 3/4" (and low point drain line 1RR43AD)	M-47 Sheet 2 of 2 Revision P	M-464-4-RR-263 and M-464-4-RR-259

b. Line #1RR40AC ½" hydraulic system drain line (and low point drain line 1RR43AC)	M-47 Sheet 2 of 2 Revision P	M-464-4-RR-262 and M-464-4-RR-257
c. Line #1RR40AB ½" (and low point drain line 1RR43AB)	M-47 Sheet 2 of 2 Revision P	M-464-4-RR-261 and M-464-4-RR-258
d. Line #1RR40AA 3/4" (and low point drain line 1RR43AA)	M-47 Sheet 2 of 2	M-464-4-RR-260 and M-464-4-RR-256

*The disposition to FDDR No. KN-1-299 was applied to both drain lines #1RR39AC and #1RR40AC.

**Low point drain lines are installed in the lowest points of each hydraulic line to provide system maintenance. Low point drain lines are not the same as the hydraulic system drain lines (1RR39AC and 1RR40AC) which are functional parts of the hydraulic system.

The drawings indicated that the actuators and the portions of the respective piping which were located inside the drywell were classified as ASME Section III Class B. The portions of the respective piping located outside the drywell and past the the isolation valves were classified as ASME Section III Class D (nonsafety related).

3. The RIII inspector reviewed an S&L Design Document Change that specified a change in design pressure from 6000 psig to 3000 psig and from 3000 psig to 150 psig for all the respective hydraulic pipelines to the actuators for the flow control valves. The Kaiser isometric drawings reflected the design pressure changes specified in the DDC. (Note: Revision 5 to the drawing M-464-4RR-257/Attachment Q to this IE Report 81-13 reflects an example of the specified change.)

4. The RIII inspector reviewed the S&L Mechanical Department Piping Line List dated May 29, 1981, which specified the following conditions for the hydraulic lines:

Table C

HYDRAULIC LINE CONDITIONS

Line No.	Maximum Operating Pressure (psig)	Designed Operating Pressure (psig)	Field Test Pressure (psig)
1RR39AA	2200	3000	3000
1RR39AB	2200	3000	3000
1RR39AC*	100	150	200
1RR39AD	2200	3000	3000
1RR40AA	2200	3000	3000
1RR40AB	2200	3000	3000
1RR40AC*	100	150	200
1RR40AD	2200	3000	3000

*These were the drain lines affected by FDDR No. KN-1-299.

The RIII inspector reviewed the material-takeoff record listed on each of the respective Kaiser isometric drawings indicating that all the material components (piping, fittings, and valves) met or exceeded the design conditions identified on the S&L Mechanical Department Piping Line List.

The RIII inspector reviewed the KE-1 Weld Data records listed on each of the respective Kaiser isometric drawings. The records indicated that welds had been made in accordance with the ASME Code Section III-1971 Edition, with the following exceptions:

a. <u>Line #1RR39A</u> (Drawing No. M-464-3-RR-239, Revision 3) - Records do not reflect dates when welds were made for any of the welds.

   <u>Line #1RR39AA</u> (Drawing No. M-464-3-RR-240, Revision 7) - Recorded dates for welds A-1, A-2, A-3, C-2 and C-5 indicate the welds were tested (PT) before they were made.

b. <u>Lire #1RR39AC</u> (Drawing No. M-464-3-RR-244, Revision 4) - Records do not reflect dates when welds were made for any of the welds.

   <u>Line #1RR39AC</u> (Drawing No. M-464-3-RR-241, Revision 4) - Records do not reflect dates when welds C-6, C-7, C-8, C-9, C-10, and C-11 were made.

c. Line #1RR39AC (Drawing No. M-464-3-RR-243, Revision 4) - Records do not reflect dates for any of the welds.

Line #1RR39AC (Drawing No. M-464-3-245, Revision 5) - Records do not reflect dates when welds C-5 (rework), C-6, C-7, C-8, and C-9 were made.

d. Line #1RR40AB (Drawing No. M-464-4-RR-257, Revision 8) - Record reflects QC verification of weld A-1 with written signoff instead of required QC stamp; weld test (PT) records not available for welds A-2, A-3, and B-2.

e. Line #1RR40AC (Drawing No. M-464-4-RR-262, Revision 7) - Weld data records written to replace lost weld records for welds E-2 and E-4, without justification to assure in-process inspections were performed.

f. Line #1RR40AD (Drawing No. M-464-4-RR-259, Revision 6) - Records do not reflect dates when welds B-2, B-5, and B-6 were made; and weld test (PT) record was not available for weld B-2.

Line #1RR40AD (Drawing No. M-464-4-RR-263, Revision 7) - Particle weld test (PT) record was not available for welds A-1 and A-7.

The final quality assurance engineer's review of the above KE-1 Weld Data records had not been performed as of June 29, 1981. Therefore, the above exceptions are unresolved pending the final QA engineer's review and completion of appropriate dispositions (50-358/81-13-32).

5. The RIII inspector reviewed Kaiser Engineers, Inc., Quality Assurance Construction Methods Instruction (QACMI) No. M-10, Revision 6 (dated November 16, 1978), and Revision 7 (dated September 13, 1979). Both revisions of QACMI M-10, titled "Pressure Testing of Piping Systems," complied with ASME Code SectionIII-1971, Article NB-6000.

The RIII inspector reviewed the following hydrostatic test reports for the respective hydraulic lines:

Table D

HYDROSTATIC TEST RESULTS

	Test Pressure				
Line No.	Design Max.	Max. Allow.	Actual Initial	Actual 10-Min. Holding	Report No.
1RR39AA	3000	3180	3010	3000	RR-28 3/2/79 Retest 9/27/79
1RR39AB	3000	3180	3010	3000	RR-27 3/1/79 Retest 9/27/79
1RR39AC (Drawings: 241, 244)	200	225	215	150	RR-53 9/27/79
(Drawing: 247)	200	215	210	160	RR-26 2/26/79

	Test Pressure				
Line No.	Design Max.	Max. Allow.	Actual Initial	Actual 10-Min. Holding	Report No.
1RR39AD	3000	3180	3010	3000	RR-25 3/5/79 Retest 9/27/79
1RR40AA	3000	3180	3010	3000	RR-32 3/6/79 Retest 10/4/79
1RR40AB	3000	3180	3010	3000	RR-31 3/14/79 Retest 10/4/79
1RR40AC	200	215	210	160	RR-30 3/2/79 Retest 10/4/79
1RR40AC	3000	3180	3010	3000	RR-29 3/5/79 Retest 10/4/79

The preceding hydrostatic pressure tests were performed by using the system power unit to pressurize the lines through the actuators, as described in

General Electric File No. VPF 3300-111-1 (Rucker Control Technical Manual No. TM 81999, Paragraphs 5.7.3.1 through 5.7.3.9). Therefore, the actuators as well as the lines (pipes, fittings, valves, etc.) were subjected to the test pressures. The hydrostatic test reports indicated that the tests had been performed in accordance with QACMI No. M-10, Revision 6 and Revision 7, respective to the effective dates.

5.4.3.7 Field Observations

On June 29 and 30, 1981, the RIII inspector visually inspected both of the hydraulic actuators and all of the attached lines (from the actuators to the penetrations leading out of the drywell). The inspector identified no unacceptable weld indications in any of the welds connecting the actuator, flange, or piping. The inspector noted that all of the welds were socket welds. The general piping installation, routing, material identification and welds were as specified on the respective isometric drawings. The hydraulic system drain lines connected to the actuators for both of the recirculation flow control valves were installed in accordance with FDDR No. KN-1-299 dated December 18, 1978.

5.4.4 Findings

The allegation that 2000-lb fittings were installed in 1979 in hydraulic actuators to the recirculation flow control valves, although 5000-lb fittings are required, was not substantiated. However, the investigation did reveal that the hydraulic pipelines connected to the actuators previously had a specified design pressure of 6000 pounds per square inch gauge (psig) and later had a specified design pressure of 3000 psig.

Allegation 4

The portion of the allegation claiming that a hydraulic actuator to the recirculation flow control valve was broken was substantiated in that a site control document had been written that identified a broken adaptor to the actuator.

The allegation that a pipefitter had bumped into the valve actuator was not substantiated.

The allegation that questionable quality of the metal was used in the valve actuator or the pipe connections to the actuator was not substantiated Material specified on the installation drawings were installed and the hydraulic systems were satisfactorily pressure tested.

5.4.5 Items of Noncompliance

No items of noncompliance or safety concerns were identified.

Reviewed and commented on for Re ... 9/26/81

5.2.1 Allegation 9

"2000 pound fittings were installed in 1979 on residue head valves, although 5000 pound fittings are required."

An interview with the person originating this allegation revealed that the "residue head valves" and "residue heat valve" were not the components of concern. The components of concern in both allegations, 5.2 & 5.4, were the hydraulic actuators for the recirculation flow control valves.

5.2.2 Background

The preceding allegations were addressed simultaneously because the investigation determined that both allegations were addressing the same component by the same alleger.

5.2.3 Investigation

5.2.3.1 Interview of Individual "A"

On February 24, 1981, Individual A, who was previously interviewed by representatives of GAP, was interviewed by NRC. Individual A stated that Individual R had told Individual A that 6000-lb pressure fittings were required on the hydraulic lines in the residual heat removal system but Individual R was told by a supervisor to install 3000-lb fittings.

? R

On April 22, 1981, Individual A provided a written statement attesting to the aforementioned information; however, he requested the statement not be attached to this report.

5.2.3.2 Interview of Individual R

On March 20, 1981, Individual R was interviewed by telephone. Individual R stated that he had heard about a valve that had been broken, but he did not have any firsthand knowledge of the incident. Individual R said he knew of cases in which "half-life" (3000-lb in place of 6000-lb) fittings were used. Two specific cases recalled by Individual R were the following:

(1) 3/4-in. pneumatic lines (carrying dry nitrogen) that pick up the control rods.

(2) A set of 2-in. black iron lines inside containment, which could have been hydraulic lines.

Individual R repeatedly stated that it had been three years since he had been at Zimmer and that he did not remember further specifics.

5.2.3.3 Interview of Individual B

On February 10, 1981, Individual B, who had been previously interviewed by representatives of GAP, was interviewed by NRC. Individual B stated that 3000-lb fittings were installed on two recirculation flow control valves when 6000-lb fittings were required. He identified the fittings

as being socket welded to two small hydraulic lines on the valves in question. Individual B stated that to the best of his knowledge this deficiency has not been corrected.

Individual B stated that on the same valves it was reported to him in 1979 that a pipefitter bumped into the valve and a small hydraulic fitting on the valve fell off. He said the fitting was later identified as a nonconforming item by Kaiser and a design document change (DDC) was issued directing the fitting be repaired. He stated the valve in question was manufactured by General Electric, and General Electric later repaired the broken fitting on the valve.

On April 14, 1981 Individual B provided a written statement attesting to the aforementioned information; however, he requested the statement not be attached to this report.

5.2.3.4 Interview of T. F. Van Natta

On June 25, 1981, T. F. Van Natta, Control and Instrument Engineer for General Electric onsite, was interviewed by telephone. Van Natta stated that the adaptor connecting the drain line to the hydraulic actuator body was broken off. He said that he did not know whether or not a pipefitter had broken the adaptor. Van Natta stated that the originally installed adaptor was adequate for the designed service, but it was susceptible to mechanical damage from adjacent construction activities that were being performed. Therefore, the decision was made to replace the original adaptor design with the stronger flange design defined in General Electric Field Deviation Disposition Request No. KN-1-299 dated December 18, 1978.

Van Natta said that the actuator and three of the four hydraulic lines connecting to the actuator had a design test pressure of 3000 psig. He said the fourth line, which was addressed in Field Deviation Disposition Request (FDDR) No. KN-1-299, was the drain line to the hydraulic system, which has design test pressure of 200 psig and normal operating pressure of 14.7 psig, since the drain line is open to the atmosphere at the drain tank.

Van Natta stated that the actuator drain ports and lines were separated from the relatively high-pressure (3000 psig) side of the actuator by two seals (a main seal and a backup seal), which have a design pressure of 3000 psig.

5.2.3.5 Interview of T. E. Bloom

On June 30, 1981, T. E. Bloom, General Electric onsite, was interviewed. Bloom stated that the nipple (adaptor) on the hydraulic actuator to the recirculation flow control valve for recirculation Loop A had been broken.

5.2.3.6 Record Review

1. The RIII inspector reviewed General Electric FDDR No. KN-1-299 (designated as nonconformance request) dated December 18, 1978, which

addressed the recirculation system flow control valve actuator. The FDDR indicated that the following had occurred:

"The threaded adaptor which connects the drain port on the actuator body was broken off during installation of the ½" NPT hydraulic piping. This adaptor is not suitable for this application where the connection is susceptible to damage and does not provide take down capability." The final disposition of the FDDR was as follows:

"Replace the defective adaptor with short tube threaded to the actuator and socket weld to a special flange attached to the actuator mount ledge. A mating flange with a Viton "O" ring joint is also provided similar to the other actuation piping connections."

The FDDR indicated that the flange modification was complete on July 13, 1979. The FDDR did not identify the specific actuator (Loop A or Loop B) which had the defective adaptor.

2. The hydraulic actuators for the two recirculation flow control valves and their respective piping, components, locations, and classifications were identified on the following drawings:

Table B

HYDRAULIC ACTUATOR DATA

Components	Sargent & Lundy Piping and Instrumentation Drawings	Kaiser Engineers Isometric Drawings
Recirculation Loop A		
1. Actuator No. 1B33F060A - Rucker drawing #81-999-F-402 Revision M; Rucker Control S/N SP19025	M-47 Sheet 1 of 2 Revision T	
2. Piping (lines), components (fittings), welds, classifications, and locations	M-47 Sheet 1 and 2 Revision T	
a. Line #1RR39AD 3/4" (and low point drain 1RR41AD**)	M-47 Sheet 1 of 2 Revision T	M-464-3-RR-243 and M-464-3-245

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*b. Line #1RR29AC ½" hydraulic system drain line (and low point drain line 1RR41AC**)	M-47 Sheet 1 of 2 Revision T	M-464-3-RR-244, M-464-3-RR-241 and M-464-3-RR-247
c. Line #1RR39AB ½" (and low point drain line line 1RR41AB**)	M-47 Sheet 1 of 2 Revision T	M-464-3-RR-242 and M-464-3-RR-246
d. Line #1RR39AA (and low point drain line 1RR41AA**)	M-47 Sheet 1 of 2 Revision T	M-464-3-RR-239 and M-464-3-RR-240

<u>Recirculation Loop B</u>

1. Actuator No. 1B33F060B Rucker Control (S/N 19028)	M-47 Sheet 2 of 2 Revision P	
2. Piping (lines), components (fittings), welds, classifications, and locations	M-47 Sheet 2 of 2 Revision P	
a. Line #1RR40AD 3/4" (and low point drain line 1RR43AD)	M-47 Sheet 2 of 2 Revision P	M-464-4-RR-263 and M-464-4-RR-259

b. Line #1RR40AC ½" bydraulic system drain line (and low point drain line 1RR43AC)	M-47 Sheet 2 of 2 Revision P	M-464-4-RR-262 and M-464-4-RR-257
c. Line #1RR40AB ½" (and low point drain line 1RR43AB)	M-47 Sheet 2 of 2 Revision P	M-464-4-RR-261 and M-464-4-RR-258
d. Line #1RR40AA 3/4" (and low point drain line 1RR43AA)	M-47 Sheet 2 of 2	M-464-4-RR-260 and M-464-4-RR-256

*The disposition to FDDR No. KN-1-299 was applied to both drain lines #1RR39AC and #1RR40AC.

**Low point drain lines are installed in the lowest points of each hydraulic line to provide system maintenance. Low point drain lines are not the same as the hydraulic system drain lines (1RR39AC and 1RR40AC) which are functional parts of the hydraulic system.

The drawings indicated that the actuators and the portions of the respective piping which were located inside the drywell were classified as ASME Section III Class B. The portions of the respective piping located outside the drywell and past the the isolation valves were classified as ASME Section III Class D (nonsafety related).

3. The RIII inspector reviewed an S&L Design Document Change that specified a change in design pressure from 6000 psig to 3000 psig and from 3000 psig to 150 psig for all the respective hydraulic pipelines to the actuators for the flow control valves. The Kaiser isometric drawings reflected the design pressure changes specified in the DDC. (Note: Revision 5 to the drawing M-464-4RR-257/Attachment Q to this IE Report 81-12 reflects an example of the specified change.)

4. The RIII inspector reviewed the S&L Mechanical Department Piping Line List dated May 29, 1981, which specified the following conditions for the hydraulic lines:

Table C

HYDRAULIC LINE CONDITIONS

Line No.	Maximum Operating Pressure (psig)	Designed Operating Pressure (psig)	Field Test Pressure (psig)
1RR39AA	2200	3000	3000
1RR39AB	2200	3000	3000
1RR39AC*	100	150	200
1RR39AD	2200	3000	3000
1RR40AA	2200	3000	3000
1RR40AB	2200	3000	3000
1RR40AC*	100	150	200
1RR40AD	2200	3000	3000

*These were the drain lines affected by FDDR No. KN-1-299.

The RIII inspector reviewed the material-takeoff record listed on each of the respective Kaiser isometric drawings indicating that all the material components (piping, fittings, and valves) met or exceeded the design conditions identified on the S&L Mechanical Department Piping Line List.

The RIII inspector reviewed the KE-1 Weld Data records listed on each of the respective Kaiser isometric drawings. The records indicated that welds had been made in accordance with the ASME Code Section III-1971 Edition, with the following exceptions:

a. Line #1RR39A (Drawing No. M-464-3-RR-239, Revision 3) - Records do not reflect dates when welds were made for any of the welds.

   Line #1RR39AA (Drawing No. M-464-3-RR-240, Revision 7) - Recorded dates for welds A-1, A-2, A-3, C-2 and C-5 indicate the welds were tested (PT) before they were made.

b. Line #1RR39AC (Drawing No. M-464-3-RR-244, Revision 4) - Records do not reflect dates when welds were made for any of the welds.

   Line #1RR39AC (Drawing No. M-464-3-RR-241, Revision 4) - Records do not reflect dates when welds C-6, C-7, C-8, C-9, C-10, and C-11 were made.

c. <u>Line #1RR39AC</u> (Drawing No. M-464-3-RR-243, Revision 4) - Records do not reflect dates for any of the welds.

<u>Line #1RR39AC</u> (Drawing No. M-464-3-245, Revision 5) - Records do not reflect dates when welds C-5 (rework), C-6, C-7, C-8, and C-9 were made.

d. <u>Line #1RR40AB</u> (Drawing No. M-464-4-RR-257, Revision 8) - Record reflects QC verification of weld A-1 with written signoff instead of required QC stamp; weld test (PT) records not available for welds A-2, A-3, and B-2.

e. <u>Line #1RR40AC</u> (Drawing No. M-464-4-RR-262, Revision 7) - Weld data records written to replace lost weld records for welds E-2 and E-4, without justification to assure in-process inspections were performed.

f. <u>Line #1RR40AD</u> (Drawing No. M-464-4-RR-259, Revision 6) - Records do not reflect dates when welds B-2, B-5, and B-6 were made; and weld test (PT) record was not available for weld B-2.

Line #1RR40AD (Drawing No. M-464-4-RR-263, Revision 7) - Particle weld test (PT) record was not available for welds A-1 and A-7.

The final quality assurance engineer's review of the above KE-1 Weld Data records had not been performed as of June 29, 1981. Therefore, the above exceptions are unresolved pending the final QA engineer's review and completion of appropriate dispositions (50-358/81-13-32).

5. The RIII inspector reviewed Kaiser Engineers, Inc., Quality Assurance Construction Methods Instruction (QACMI) No. M-10, Revision 6 (dated November 16, 1978), and Revision 7 (dated September 13, 1979). Both revisions of QACMI M-10, titled "Pressure Testing of Piping Systems," complied with ASME Code SectionIII-1971, Article NB-6000.

   The RIII inspector reviewed the following hydrostatic test reports for the respective hydraulic lines:

Table D

HYDROSTATIC TEST RESULTS

	Test Pressure				
Line No.	Design Max.	Max. Allow.	Actual Initial	Actual 10-Min. Holding	Report No.
1RR39AA	3000	3180	3010	3000	RR-28 3/2/79 Retest 9/27/79
1RR39AB	3000	3180	3010	3000	RR-27 3/1/79 Retest 9/27/79
1RR39AC (Drawings: 241, 244)					
	200	225	215	150	RR-53 9/27/79
(Drawing: 247)					
	200	215	210	160	RR-26 2/26/79

		Test Pressure			
Line No.	Design Max.	Max. Allow.	Actual Initial	Actual 10-Min. Holding	Report No.
1RR39AD	3000	3180	3010	3000	RR-25 3/5/79 Retest 9/27/79
1RR40AA	3000	3180	3010	3000	RR-32 3/6/79 Retest 10/4/79
1RR40AB	3000	3180	3010	3000	RR-31 3/14/79 Retest 10/4/79
1RR40AC	200	215	210	160	RR-30 3/2/79 Retest 10/4/79
1RR40AC	3000	3180	3010	3000	RR-29 3/5/79 Retest 10/4/79

The preceding hydrostatic pressure tests were performed by using the system power unit to pressurize the lines through the actuators, as described in

General Electric File No. VPF 3300-111-1 (Rucker Control Technical Manual No. TM 81999, Paragraphs 5.7.3.1 through 5.7.3.9). Therefore, the actuators as well as the lines (pipes, fittings, valves, etc.) were subjected to the test pressures. The hydrostatic test reports indicated that the tests had been performed in accordance with QACMI No. M-10, Revision 6 and Revision 7, respective to the effective dates.

5.2.3.7 Field Observations

On June 29 and 30, 1981, the RIII inspector visually inspected both of the hydraulic actuators and all of the attached lines (from the actuators to the penetrations leading out of the drywell). The inspector identified no unacceptable weld indications in any of the welds connecting the actuator, flange, or piping. The inspector noted that all of the welds were socket welds. The general piping installation, routing, material identification and welds were as specified on the respective isometric drawings. The hydraulic system drain lines connected to the actuators for both of the recirculation flow control valves were installed in accordance with FDDR No. KN-1-299 dated December 18, 1978.

5.2.1 Findings

The allegation that 2000-lb fittings were installed in 1979 in hydraulic actuators to the recirculation flow control valves, although 5000-lb fittings are required, was not substantiated. However, the investigation did reveal that the hydraulic pipelines connected to the actuators previously had a specified design pressure of 6000 pounds per square inch gauge (psig) and later had a specified design pressure of 3000 psig.

Allegation 4

The portion of the allegation claiming that a hydraulic actuator to the recirculation flow control valve was broken was substantiated in that a site control document had been written that identified a broken adaptor to the actuator.

The allegation that a pipefitter had bumped into the valve actuator was not substantiated.

The allegation that questionable quality of the metal was used in the valve actuator or the pipe connections to the actuator was not substantiated Material specified on the installation drawings were installed and the hydraulic systems were satisfactorily pressure tested.

5.2.5 Items of Noncompliance

No items of noncompliance or safety concerns were identified.

5.2 Allegation

"2000 pound fittings were installed in 1979 on residue head valves, although 5000 pound fittings are required."

An interview with the person originating this allegation revealed that the "residue head valves" were not the components of concern. The components of concern in allegations 5.2 and 5.4 were the hydraulic actuators for the recirculation flow control valves.

5.2.1 Background Information

Allegations 5.2 and 5.4 are addressed ~~identically~~ because the investigation determined that both allegations were addressing the same component by statements from the same alleger.

5.2.2 Investigation

5.2.2.1 Interview of Individual A

On February 24, 1981, Individual A, who was previously interviewed by representatives of GAP, was interviewed by NRC. Individual A stated that Individual R had told him that 6000-lb pressure fittings were required on the hydraulic lines in the residual heat removal system, but Individual R was told by a supervisor to install 3000-lb fittings.

On April 22, 1981, Individual A provided a written statement attesting to the preceding information; however, he requested the statement not be attached to this report.

5.2.2.2 Interview of Individual R

On March 20, 1981, Individual R was interviewed by telephone. Individual R stated that he had heard about a valve that had been broken, but he did not have any firsthand knowledge of the incident. Individual R said he knew of cases in which "half-life" (3000-lb in place of 6000-lb) fittings were used. Two specific cases recalled by Individual R were the following:

1. 3/4-in. pneumatic lines (carrying dry nitrogen) that actuate the control rods.

2. A set of 2-in. black iron lines inside containment, which could have been hydraulic lines.

Individual R repeatedly stated that it had been three years since he had been at Zimmer and that he could not remember further specifics.

5.2.2.3 Interview of Individual B

On February 10, 1981, Individual B, who had been previously interviewed by representatives of GAP, was interviewed by NRC. Individual B stated that 3000-lb fittings were installed on two recirculation flow control valves when 6000-lb fittings were required. He identified the fittings

as being socket welded to two small hydraulic lines on the valves in question. Individual B stated that, to the best of his knowledge, this deficiency has not been corrected.

Individual B stated that on the same valves it was reported to him in 1979 that a pipefitter bumped into the valve and a small hydraulic fitting on the valve fell off. He said the fitting was later identified as a nonconforming item by Kaiser, and a design document change (DDC) was issued directing the fitting be repaired. He stated the valve in question was manufactured by General Electric, and General Electric later repaired the broken fitting on the valve.

On April 14, 1981, Individual B provided a written statement attesting to the preceding information; however, he requested the statement not be attached to this report.

5.2.2.4 Interview of T. F. Van Natta

On June 25, 1981, T. F. Van Natta, Site Control and Instrument Engineer for General Electric onsite, was interviewed by telephone. Van Natta stated that the adaptor connecting the drain line to the hydraulic actuator body on a recirculation flow control valve had been broken off. He said that he did not know whether or not a pipefitter had broken the adaptor. Van Natta indicated that the originally installed adaptor was adequate for the designed service, but it was susceptible to mechanical damage from adjacent construction activities that were being performed. Therefore, the decision was made to replace the original adaptor design with the stronger flange design defined in General Electric Field Deviation Disposition Request No. KN-1-299, dated December 18, 1978.

Van Natta said that the actuator and three of the four hydraulic lines connecting to the actuator had a design test pressure of 3000 psig. He said the fourth line, which was addressed in Field Deviation Disposition Request (FDDR) No. KN-1-299, was the drain line to the hydraulic system, which has a design test pressure of 200 psig and normal operating pressure of 14.7 psig since the drain line is open to the atmosphere at the drain tank.

Van Natta stated that the actuator drain ports and lines were separated from the relatively high-pressure (3000 psig) side of the actuator by two seals (a main seal and a backup seal), which have a design pressure of 3000 psig.

5.2.2.5 Interview of T. E. Bloom

On June 30, 1981, T. E. Bloom, a General Electric employee, was interviewed by NRC. Bloom stated that the nipple (adaptor) on the hydraulic actuator to the recirculation flow control valve for recirculation Loop A had been broken.

5.2.2.6 Record Review

1. The RIII inspector reviewed General Electric FDDR No. KN-1-299 (designated as nonconformance request) dated December 18, 1978, which

addressed the recirculation system flow control valve actuator. The FDDR indicated that the following had occurred:

"The threaded adaptor which connects the drain port on the actuator body was broken off during installation of the 1/2" NPT hydraulic piping. This adaptor is not suitable for this application where the connection is susceptible to damage and does not provide take down capability."

The final disposition of the FDDR was as follows:

"Replace the defective adaptor with short tube threaded to the actuator and socket weld to a special flange attached to the actuator mount ledge. A mating flange with a viton "O" ring joint is also provided similar to the other actuation piping connections."

The FDDR indicated that the flange modification was complete on July 13, 1979. The FDDR did not identify the specific actuator (Loop A or Loop B) that had the defective adaptor.

2. The hydraulic actuators for the two recirculation flow control valves and their respective piping, components, locations, and classifications were identified on the following drawings (Table 5.1):

Table 5.1. Hydraulic Actuator Data

Components	Sargent & Lundy Piping and Instrumentation Drawings	Kaiser Engineers Isometric Drawings
Recirculation Loop A		
1. Actuator No. 1B33F060A--Rucker drawing #81999-F-402 Revision M; Rucker Control S/N SP19025	M-47 Sheet 1 of 2 Revision T	
2. Piping (lines), components (fittings), welds, classifications, and locations	M-47 Sheet 1 of 2 Revision T	
a. Line #1RR39AD 3/4" (and low point drain 1RR41AD*)	M-47 Sheet 1 of 2 Revision T	M-464-3-RR-243 and M-464-3-RR-245

* Low point drain lines are installed in the lowest points of each hydraulic line to provide system maintenance. Low point drain lines are not the same as the hydraulic system drain lines (1RR39AC and 1RR40AC), which are functional parts of the hydraulic system.

Table 5.1 (continued)

Components	Sargent & Lundy Piping and Instrumentation Drawings	Kaiser Engineers Isometric Drawings
b. **Line #1RR39AC 1/2" hydraulic system drain line (and low point drain line 1RR41AC*)	M-47 Sheet 1 of 2 Revision T	M-464-3-RR-241, M-464-3-RR-244 and M-464-3-RR-247
c. Line #1RR39AB 1/2" (and low point drain line line 1RR41AB*)	M-47 Sheet 1 of 2 Revision T	M-464-3-RR-242 and M-464-3-RR-246
d. Line #1RR39AA 3/4" (and low point drain line 1RR41AA*)	M-47 Sheet 1 of 2 Revision T	M-464-3-RR-239 and M-464-3-RR-240

**The disposition to FDDR No. KN-1-299 was applied ~~applieed~~ to both drain lines #1RR39AC and #1RR40AC.

Recirculation Loop B

1. Actuator No. 1B33F060B Rucker Control S/N 19028 — M-47 Sheet 2 of 2 Revision P

2. Piping (lines), components (fittings), welds, classifications, and locations — M-47 Sheet 2 of 2 Revision P

Table 5.1. Hydraulic Actuator Data

Components	Sargent & Lundy Piping and Instrumentation Drawings	Kaiser Engineers Isometric Drawings
a. Line #1RR40AD 3/4" (and low point drain line 1RR43AD*)	M-47 Sheet 2 of 2 Revision P	M-464-4-RR-263 and M-464-4-RR-259
b. **Line #1RR40AC 1/2" hydraulic system drain line (and low point drain line 1RR43AC*)	M-47 Sheet 2 of 2 Revision P	M-464-4-RR-262 and M-464-4-RR-257

Table 5.1 (continued)

Components	Sargent & Lundy Piping and Instrumentation Drawings	Kaiser Engineers Isometric Drawings
c. Line #1RR40AB 1/2" (and low point drain line 1RR43AB*)	M-47 Sheet 2 of 2 Revision P	M-464-4-RR-261 and M-464-4-RR-258
d. Line #1RR40AA 3/4" (and low point drain line 1RR43AA*)	M-47 Sheet 2 of 2 Revision P	M-464-4-RR-260 and M-464-4-RR-256

The drawings indicated that the actuators and the portions of the respective piping located inside the drywell were classified as ASME Section III Class B. The portions of the respective piping located outside the drywell and past the the isolation valves were classified as ASME Section III Class D (nonsafety related).

3. The RIII inspector reviewed an S&L design document change that specified a change in design pressure from 6000 psig to 3000 psig and from 3000 psig to 150 psig for all the respective hydraulic pipelines to

the actuators for the flow control valves. The Kaiser isometric drawings reflected the design pressure changes specified in the DDC. [Note: Revision 5 to the drawing M-464-4RR-257 (Exhibit) reflects an example of the specified change.]

4. The RIII inspector reviewed the S&L Mechanical Department Piping Line List dated May 29, 1981, which specified the following conditions for the hydraulic lines (Table 5.2):

Table 5.2. Hydraulic Line Conditions

Line No.	Maximum Operating Pressure (psig)	Designed Operating Pressure (psig)	Field Test Pressure (psig)
1RR39AA	2200	3000	3000
1RR39AB	2200	3000	3000
1RR39AC*	100	150	200
1RR39AD	2200	3000	3000
1RR40AA	2200	3000	3000
1RR40AB	2200	3000	3000
1RR40AC*	100	150	200
1RR40AD	2200	3000	3000

*These were the drain lines affected by FDDR No. KN-1-299.

The RIII inspector reviewed the material-takeoff record listed on each of the respective Kaiser isometric drawings indicating that all the material and components (piping, fittings, and valves) met or exceeded the design conditions identified on the S&L Mechanical Department Piping Line List.

The RIII inspector reviewed the KEI-1 weld data records listed on each of the respective Kaiser isometric drawings. The records indicated that welds had been made in accordance with the ASME Code Section III-1971 Edition, with the following exceptions:

a. Line #1RR39AA (Drawing No. M-464-3-RR-239, Revision 3)--Records do not reflect dates when welds were made for any of the welds.

Line #1RR39AA (Drawing No. M-464-3-RR-240, Revision 7)--Recorded dates for welds A-1, A-2, A-3, C-2 and C-5 indicate the welds were dye penetrant tested (PT) before they were made.

b. Line #1RR39AC (Drawing No. M-464-3-RR-244, Revision 4)--Records do not reflect dates when welds were made for any of the welds.

Line #1RR39AC (Drawing No. M-464-3-RR-241, Revision 4)--Records do not reflect dates when welds C-6, C-7, C-8, C-9, C-10, and C-11 were made.

c. Line #1RR39AD (Drawing No. M-464-3-RR-243, Revision 4)--
Records do not reflect dates for any of the welds.

Line #1RR39AD (Drawing No. M-464-3-RR-245, Revision 5)--
Records do not reflect dates when welds C-5 (rework), C-6, C-7, C-8, and C-9 were made.

d. Line #1RR40AB (Drawing No. M-464-4-RR-257, Revision 8)--
Record reflects QC verification of weld A-1 with written signoff instead of required QC stamp; weld test (PT) records not available for welds A-2, A-3, and B-2.

e. Line #1RR40AC (Drawing No. M-464-4-RR-262, Revision 7)--
Weld data records written to replace lost weld records for welds E-2 and E-4, without justification to assure in-process inspections were performed.

f. Line #1RR40AD (Drawing No. M-464-4-RR-259, Revision 6)--
Records do not reflect dates when welds B-2, B-5, and B-6 were made; weld test (PT) record was not available for weld B-2.

Line #1RR40AD (Drawing No. M-464-4-RR-263, Revision 7)--
Weld test record was not available for welds A-1 and A-7.

The final quality assurance engineer's review of the preceding KEI-1 weld data records had not been performed as of June 29, 1981. Therefore, the listed exceptions are unresolved pending the final QA engineer's review and completion of appropriate dispositions (50-358/81-13-32).

5. The RIII inspector reviewed Kaiser Engineers, Inc., Quality Assurance Construction Methods Instruction (QACMI) No. M-10, Revision 6 (dated November 16, 1978), and Revision 7 (dated September 13, 1979). Both revisions of QACMI M-10, entitled "Pressure Testing of Piping Systems," complied with ASME Code Section III-1971, Article NB-6000.

   The RIII inspector reviewed the following hydrostatic test reports for the respective hydraulic lines (Table 3):

Table 5.3. Hydrostatic Test Results

Line No.	Test Pressure (psig) Design Max	Max. Allow.	Actual Initial	Actual 10-Min. Holding	Report No.
1RR39AA	3000	3180	3010	3000	RR-28 3/2/79 Retest 9/27/79
1RR39AB	3000	3180	3010	3000	RR-27 3/1/79 Retest 9/27/79
1RR39AC (Drawings 241, 244)	200	225	215	150	RR-53 9/27/79
(Drawing 247)	200	215	210	160	RR-26 2/26/79

Table 5.3 (continued)

	Test Pressure (psig)				
Line No.	Design Max.	Max. Allow.	Actual Initial	Actual 10-Min. Holding	Report No.
1RR39AD	3000	3180	3010	3000	RR-25 3/5/79 Retest 9/27/79
1RR40AA	3000	3180	3010	3000	RR-32 3/6/79 Retest 10/4/79
1RR40AB	3000	3180	3010	3000	RR-31 3/14/79 Retest 10/4/79
1RR40AC	200	215	210	160	RR-30 3/2/79 Retest 10/4/79
1RR40AD	3000	3180	3010	3000	RR-29 3/5/79 Retest 10/4/79

The preceding hydrostatic pressure tests were performed by using the system power unit to pressurize the lines through the actuators, as described in General Electric File No. VPF 3300-111-1 (Rucker Control Technical Manual No. TM 81999, paragraphs 5.7.3.1 through 5.7.3.9). Therefore, the actuators as well as the lines (pipes, fittings, valves, etc.) were subjected to the test pressures. The hydrostatic test reports indicated that the tests had been performed in accordance with QACMI No. M-10, Revision 6 and Revision 7, according to the effective dates.

5.2.2.7 Field Observations

On June 29 and 30, 1981, the RIII inspector visually inspected both of the hydraulic actuators and all of the attached lines (from the actuators to the penetrations leading out of the drywell). The inspector identified no unacceptable weld indications in any of the welds connecting the actuator, flange, or piping. The inspector noted that all of the welds were socket welds. The general piping installation, routing, material identification, and welds were as specified on the respective isometric drawings. The hydraulic system drain lines connected to the actuators for both of the recirculation flow control valves were installed in accordance with FDDR No. KN-1-299 dated December 18, 1978.

5.2.3 Findings

The investigation revealed that the hydraulic lines connected to the recirculation flow control valve actuators previously had a specified design pressure of 6000 psig and later had a specified design pressure of 3000 psig.

An hydraulic actuator to the recirculation flow control valve was broken and a site control document was written that identified a broken adaptor to the actuator. The item was redesigned to be less prone to damage.

The material was used in the pipe connections to the actuator was as specified on the installation drawings. The hydraulic systems were satisfactorily pressure tested.

5.2.4 Items of Noncompliance

No items of noncompliance were identified.

Delete

6.2 Inconsistencies in Weld Inspection Records

6.2.1 Allegation

ASME and AWS inspection criteria have been del[illegible]ed or designated as "not applicable" (N/A) for certain systems. Affected systems were provided.

6.2.2 Background Information

None

6.2.3 Deleted ASME and AWS Inspection Criteria

The Region III inspectors observed that weld inspection criteria used to verify weld procedure, welder qualification, filler material, joint cleanliness, bevels, and damage had been deleted or designated as not applicable (N/A) on the following weld inspection records (KEI-1 forms).

	System or Component	ISO Dwg. No.	Beam or Mark No.	Other Information
(1)	Drywell support steel	S398B	29	Detail E of S-437

	System or Component	ISO Dwg. No.	Beam or Mark No.	Other Information
(2)	Drywell support steel	S398B	2 stif-feners 1/2 x 6-3/4 x 25-1/8	Line No. MKC 17S493
(3)	Drywell support steel	S398A	125	Line No. EL-535 191
(4)	Drywell support steel	S398B	67	Detail 13 of 493 Detail 2 of 447
(5)	Drywell support steel	S398A	C-63 (W8 x 10)	Bottom plate
(6)	Drywell support steel	S398A	W8 x 17	Com lugs
(7)	Service water system	PSK1WS32	55H	Line No. 1WS17A18

The records for drywell support steel indicated that the deleted criteria existed at least from July 1980 to January 1981. The record for the service water system indicated the criteria was designated as not applicable in November 1979.

The inspection criteria used to verify proper fitup and tack welds was also designated N/A for the preceding weld activities on the service water system.

6.2.3 Inconsistent Weld Rod Numbers

The licensee could not readily determine if the ASME Code Section III 1971 or if the AWS D1.1-1972 Code inspection criteria governed some of the preceding activities.

6.2.3.1 ASME Code

The ASME Code states the following:

1. NA-4130(a) -- "As used in this Section of the Code, Quality Assurance comprises all those planned and systematic actions necessary to provide adequate confidence that all components, parts, or appurtenances are manufactured and/or installed (as applicable) in accordance with the rules of this Section."

2. NA-4420 -- "The manufacturer and/or Installer shall maintain a written description of the procedures used by his organization for control of

quality and examinations, showing in detail the implementation of the quality assurance requirements of this Section of the Code."

3. NA-4510 -- "Inprocess and final examinations and tests shall be established to assure conformance with documented instructions, procedures, and drawings."

4. NA-4442.1 -- "Welding and brazing materials for all classes of construction shall be controlled in accordance with NB-4122...."

   NB-4122 -- "Welding and brazing materials shall be identified and controlled so that they can be traced to each component and/or installation of a piping system, or else a control procedure shall be employed which ensures that the specified materials are used."

5. NA-4451 -- "...Measures shall be established to assure that processes including welding and heat-treating are controlled in accordance with the rules of this Section of the Code and are accomplished by qualified personnel using qualified procedures."

6. NB-4230 -- identifies specific requirements for fitting and aligning weld joints that must be verified.

6.2.3.2 AWS Code

The AWS D1.1-1972 Code states:

1. Section 3.1.1 -- "All applicable paragraphs of this section shall be observed in the production and inspection of welded assemblies and structures produced by any of the processes acceptable under this Code."

2. Section 3.2.1 -- "Surfaces and edges to be welded shall be smooth, uniform, and free from fins, tears, cracks, or other defects which would adversely affect the quality or strength of the weld. Surfaces to be welde nd surfaces adjacent to a weld shall also be free from loose or thick scale, slag, rust, moisture, grease, or other foreign material that will prevent proper welding...."

3. Section 3.3.1 -- "The parts to be joined by fillet welds shall be brought into as close contact as practicable. The gap between parts shall normally not exceed 3/16 inch...."

4. Section 3.3.7 -- addresses tack weld requirements that must be verified.

5. Section 6.1.1 -- "The inspector designated by the Engineer shall ascertain that all fabrication by welding is performed in accordance with the requirements of this Code.

6. Section 6.1.3 -- "He [the inspector] shall be notified, in advance, of the start of any welding operations."

7. Section 6.2 -- "The Inspector shall make certain that only materials conforming to the requirements of this Code are used."

8. Section 6.4.1 -- "The inspector shall permit welding to be performed only by welders, welding operators, and tackers who are qualified in accordance with the requirements of 5.3."

9. Section 6.5.2 -- "The Inspector shall make certain that only welding procedures that meet the provisions of 5.1 and 5.2 are employed."

10. Section 6.5.3 -- "The Inspector shall make certain that electrodes are used only in the positions and with the type of welding current and polarity for which they are classified."

11. Section 6.5.4 -- "The inspector shall, at suitable intervals, observe the technique and performance of each welder, welding operator, and tacker to make certain that the applicable requirements of Section 4 are met."

6.2.4 Findings and Conclusions

The investigator determined that ~~allegation was substantiated.~~ Appropriate inspection criteria had been deleted or designated as "not applicable" in the inspection records for certain systems.

6.2.5 Items of Noncompliance

The weld inspection criteria that were deleted or designated as not applicable are contrary to 10 CFR 50 Appendix B, Criterion III, and the Wm. H. Zimmer QA Manual, Sections 3.3 and 3.13.1. (50-358/81-13-26).

5.2 Improper Fittings

5.2.1 Allegation

"2000 pound fittings were installed in 1979 on residue head valves, although 5000 pound fittings are required."

An interview with the individual originating this allegation revealed that the "residue head valves" or "residue heat valves" were not the components of concern. The components involved in both allegations 5.2 and 5.4 were the hydraulic actuators for recirculation flow control valves ~~on the residual heat removal (RHR) system~~.

Allegations 5.2 and 5.4 are both addressed in this section because the investigation determined that both allegations were addressing the same component by statements from the same alleger.

5.2.2 Background Information

Hydraulic actuators are used to open and close some plant valves. Actuators on the ~~RHR~~ reactor recirculation system system are provided with drain lines in case hydraulic seals in the actuator should leak. These drain lines are not pressurized (open to atmospheric pressure) and only serve to contain possible leaking hydraulic fluid.

5.2.3 Investigation

5.2.3.1 Interview of Individual A

On February 24, 1981, Individual A, who was previously interviewed by representatives of GAP, was interviewed by NRC. Individual A stated that Individual had told him that 6000-lb pressure fittings were required on the hydraulic lines in the residual heat removal system, but Individual was told by a supervisor to install 3000-lb fittings.

On April 22, 1981, Individual A provided a written statement attesting to the preceding information; however, he requested the statement not be attached to this report.

5.2.3.2 Interview of Individual

On March 20, 1981, Individual was interviewed by telephone. Individual stated that he had heard about a valve that had been broken, but he did not have any firsthand knowledge of the incident. Individual said he knew of two cases in which "half-life" (3000-lb in place of 6000-lb) fittings were used. ~~Two specific cases recalled by Individual were the following:~~ The cases concern components and location different than those addressed in this allegation and will be investigated during a subsequent inspection. (353/81-13-

1. ~~3/4-in. pneumatic lines (carrying dry nitrogen) that actuate the control rods.~~

2. ~~A set of 2-in. black iron lines inside containment, which could have been hydraulic lines.~~

Individual repeatedly stated that it had been three years since he had been at Zimmer and that he could not remember further specifics.

The two preceding cases are not addressed in this report. They will be resolved in a subsequent report (50-358/81-13-).

5.2.3.3 Interview of Individual B

On February 10, 1981, Individual B, who had been previously interviewed by representatives of GAP, was interviewed by NRC. Individual B stated that 3000-lb fittings were installed on two recirculation flow control valves when 6000-lb fittings were required. He identified the fittings as being socket welded to two small hydraulic lines on the valves in question. Individual B stated that, to the best of his knowledge, this deficiency has not been corrected.

Individual B stated that in 1979 it was reported to him that a pipefitter bumped into the valve and a small hydraulic fitting on the valve fell off. He said the fitting was later identified as a nonconforming item by Kaiser, and a design document change (DDC) was issued directing the fitting be repaired. He stated the valve in question was manufactured by General Electric, and General Electric later repaired the broken fitting on the valve.

On April 14, 1981, Individual B provided a written statement attesting to the preceding information; however, he requested the statement not be attached to this report.

5.2.3.4 Interview of T. F. Van Natta

On June 25, 1981, T. F. Van Natta, Site Control and Instrument Engineer for General Electric, was interviewed by telephone. Van Natta stated that the adaptor connecting the drain line to the hydraulic actuator body on a recirculation flow control valve had been broken off. He said that he did not know whether or not a pipefitter had broken the adaptor.

Van Natta indicated that the originally installed adaptor was adequate for the designed service, but it was susceptible to mechanical damage from adjacent construction activities that were being performed. Therefore, the decision was made to replace the original adaptor design with the stronger flange design defined in General Electric Field Deviation Disposition Request No. KN-1-299, dated December 18, 1978.

Van Natta said that the actuator and three of the four hydraulic lines connecting to the actuator had a design test pressure of 3000 psig. He said the fourth line, which was addressed in Field Deviation Disposition Request (FDDR) No. KN-1-299, was the drain line to the hydraulic system, which has a design test pressure of 200 psig and normal operating pressure of 14.7 psig since the drain line is open to the atmosphere at the drain tank.

Van Natta stated that the actuator drain ports and lines were separated from the relatively high-pressure (3000 psig) side of the actuator by two seals (a main seal and a backup seal), which have a design pressure of 3000 psig.

5.2.3.5 Interview of T. E. Bloom

On June 30, 1981, T. E. Bloom, a General Electric employee, was interviewed by NRC. Bloom stated that the nipple (adaptor) on the hydraulic actuator to the recirculation flow control valve for recirculation Loop A had been broken.

5.2.3.6 Record Review

1. The RIII inspector reviewed General Electric FDDR No. KN-1-299 (designated as nonconformance request) dated December 18, 1978, which addressed the recirculation system flow control valve actuator. The FDDR indicated that the following had occurred:

   "The threaded adaptor which connects the drain port on the actuator body was broken off during installation of the 1/2" NPT [National Pipe Thread] hydraulic piping. This adaptor is not suitable for this application where the connection is susceptible to damage and does not provide take down capability."

   The final disposition of the FDDR was as follows:

   "Replace the defective adaptor with short tube threaded to the actuator and socket weld to a special flange attached to the actuator mount ledge. A mating flange with a Viton "O" ring joint is also provided similar to the other actuation piping connections."

The FDDR indicated that the flange modification was complete on July 13, 1979. The FDDR did not identify the specific actuator (Loop A or Loop B) that had the defective adaptor.

2. The hydraulic actuators for the two recirculation flow control valves and their respective piping, components, locations, and classifications were identified on the following drawings (Table 5.1):

Table 5.1. Hydraulic Actuator Data

Components	Sargent & Lundy Piping and Instrumentation Drawings	Kaiser Engineers Isometric Drawings
Recirculation Loop A		
1. Actuator No. 1B33F060A-- Rucker drawing #81999-F-402 Revision M; Rucker Control S/N SP19025	M-47 Sheet 1 of 2 Revision T	
2. Piping (lines), components (fittings), welds, classifications, and locations	M-47 Sheet 1 of 2 Revision T	

Table 5.1 (continued)

Components	Sargent & Lundy Piping and Instrumentation Drawings	Kaiser Engineers Isometric Drawings
a. Line #1RR39AD 3/4" (and low point drain 1RR41AD*)	M-47 Sheet 1 of 2 Revision T	M-464-3-RR-243 and M-464-3-RR-245
b. **Line #1RR39AC 1/2" hydraulic system drain line (and low point drain line 1RR41AC*)	M-47 Sheet 1 of 2 Revision T	M-464-3-RR-241, M-464-3-RR-244 and M-464-3-RR-247
c. Line #1RR39AB 1/2" (and low point drain line 1RR41AB*)	M-47 Sheet 1 of 2 Revision T	M-464-3-RR-242 and M-464-3-RR-246

*Low point drain lines are installed in the lowest points of each hydraulic line to provide system maintenance. Low point drain lines are not the same as the hydraulic system drain lines (1RR39AC and 1RR40AC), which are functional parts of the hydraulic system.

Table 5.1 (continued)

Components	Sargent & Lundy Piping and Instrumentation Drawings	Kaiser Engineers Isometric Drawings
d. Line #1RR39AA 3/4" (and low point drain line 1RR41AA*)	M-47 Sheet 1 of 2 Revision T	M-464-3-RR-239 and M-464-3-RR-240
Recirculation Loop B		
1. Actuator No. 1B33F060B Rucker Control S/N 19028	M-47 Sheet 2 of 2 Revision P	
2. Piping (lines), components (fittings), welds, classifications, and locations	M-47 Sheet 2 of 2 Revision P	
a. Line #1RR40AD 3/4" (and low point drain line 1RR43AD*)	M-47 Sheet 2 of 2 Revision P	M-464-4-RR-263 and M-464-4-RR-259

**The disposition to FDDR No. KN-1-299 was applied to both drain lines #1RR39AC and #1RR40AC.

Table 5.1 (continued)

Components	Sargent & Lundy Piping and Instrumentation Drawings	Kaiser Engineers Isometric Drawings
b. **Line #1RR40AC 1/2" hydraulic system drain line (and low point drain line 1RR43AC*)	M-47 Sheet 2 of 2 Revision P	M-464-4-RR-262 and M-464-4-RR-257
c. Line #1RR40AB 1/2" (and low point drain line 1RR43AB*)	M-47 Sheet 2 of 2 Revision P	M-464-4-RR-261 and M-464-4-RR-258
d. Line #1RR40AA 3/4" (and low point drain line 1RR43AA*)	M-47 Sheet 2 of 2 Revision P	M-464-4-RR-260 and M-464-4-RR-256

The drawings indicated that the actuators and the portions of the respective piping located inside the drywell were classified as ASME Section III Class B. The portions of the respective piping located outside the drywell and past the the isolation valves were classified as ASME Section III Class D (nonsafety related).

3. The RIII inspector reviewed an S&L design document change that specified a change in design pressure for three hydraulic lines from 6000 psig to 3000 psig and for the drain line from 3000 psig to 150 psig for the actuators for the two flow control valves. The Kaiser isometric drawings reflected the design pressure changes specified in the DDC. [Note: Revision 5 to the drawing M-464-4RR-257 (Exhibit) reflects an example of the specified change.]

4. The RIII inspector reviewed the S&L Mechanical Department Piping Line List dated May 29, 1981, which specified the following conditions for the hydraulic lines (Table 5.2):

Table 5.2 Hydraulic Line Conditions

Line No.	Maximum Operating Pressure (psig)	Designed Operating Pressure (psig)	Field Test Pressure (psig)
1RR39AA	2200	3000	3000
1RR39AB	2200	3000	3000
1RR39AC*	100	150	200
1RR39AD	2200	3000	3000

*These were the drain lines affected by FDDR No. KN-1-299.

Table 5.2 (continued)

Line No.	Maximum Operating Pressure (psig)	Designed Operating Pressure (psig)	Field Test Pressure (psig)
1RR40AC*	100	150	200
1RR40AD	2200	3000	3000
1RR40AA	2200	3000	3000
1RR40AB	2200	3000	3000

The RIII inspector reviewed the material-takeoff record listed on each of the respective Kaiser isometric drawings indicating that all the material and components (piping, fittings, and valves) met or exceeded the design conditions identified on the S&L Mechanical Department Piping Line List.

The RIII inspector reviewed the KEI-1 weld data records listed on each of the respective Kaiser isometric drawings. The records indicated that welds had been made in accordance with the ASME Code Section III-1971 Edition, with the following exceptions:

*These were the drain lines affected by FDDR No. KN-1-299.

a. Line #1RR39AA (Drawing No. M-464-3-RR-239, Revision 3)--
Records do not reflect dates when welds were made for any of the welds.

Line #1RR39AA (Drawing No. M-464-3-RR-240, Revision 7)--
Recorded dates for welds A-1, A-2, A-3, C-2 and C-5 indicate the welds were dye penetrant tested (PT) before they were made.

b. Line #1RR39AC (Drawing No. M-464-3-RR-244, Revision 4)--
Records do not reflect dates when welds were made for any of the welds.

Line #1RR39AC (Drawing No. M-464-3-RR-241, Revision 4)--
Records do not reflect dates when welds C-6, C-7, C-8, C-9, C-10, and C-11 were made.

c. Line #1RR39AD (Drawing No. M-464-3-RR-243, Revision 4)--
Records do not reflect dates for any of the welds.

Line #1RR39AD (Drawing No. M-464-3-RR-245, Revision 5)--
Records do not reflect dates when welds C-5 (rework), C-6, C-7, C-8, and C-9 were made.

d. Line #1RR40AB (Drawing No. M-464-4-RR-257, Revision 8)--
Record reflects QC verification of weld A-1 with written signoff instead of required QC stamp; weld test (PT) records not available for welds A-2, A-3, and B-2.

e. Line #1RR40AC (Drawing No. M-464-4-RR-262, Revision 7)--
Weld data records written to replace lost weld records for welds E-2 and E-4, without justification to assure in-process inspections were performed.

f. Line #1RR40AD (Drawing No. M-464-4-RR-259, Revision 6)--
Records do not reflect dates when welds B-2, B-5, and B-6 were made; weld test (PT) record was not available for weld B-2.

Line #1RR40AD (Drawing No. M-464-4-RR-263, Revision 7)--
Weld test record was not available for welds A-1 and A-7.

The final quality assurance engineer's review of the preceding KEI-1 weld data records had not been performed as of June 29, 1981. Therefore, the listed exceptions are unresolved pending the final QA engineer's review and completion of appropriate dispositions (50-358/81-13-32).

5. The RIII inspector reviewed Kaiser Engineers, Inc., Quality Assurance Construction Methods Instruction (QACMI) No. M-10, Revision 6 (dated November 16, 1978), and Revision 7 (dated September 13, 1979). Both revisions of QACMI M-10, entitled "Pressure Testing of Piping Systems," complied with ASME Code Section III, 1971 Edition, Article NB-6000.

The RIII inspector reviewed the following hydrostatic test reports for the respective hydraulic lines (Table 5.3):

Table 5.3 Hydrostatic Test Results

	]Test Pressure (psig)[				
Line No.	Design Max	Max. Allow.	Actual Initial	Actual 10-Min. Holding	Report No.
1RR39AA	3000	3180	3010	3000	RR-28 3/2/79 Retest 9/27/79
1RR39AB	3000	3180	3010	3000	RR-27 3/1/79 Retest 9/27/79

Table 5.3 (continued)

	]Test Pressure (psig)[				
Line No.	Design Max	Max. Allow.	Actual Initial	Actual 10-Min. Holding	Report No.
1RR39AC (Drawings 241, 244)	200	225	215	150	RR-53 9/27/79
(Drawing 247)	200	215	210	160	RR-26 2/26/79
1RR39AD	3000	3180	3010	3000	RR-25 3/5/79 Retest 9/27/79
1RR40AA	3000	3180	3010	3000	RR-32 3/6/79 Retest 10/4/79
1RR40AB	3000	3180	3010	3000	RR-31 3/14/79 Retest 10/4/79

Table 5.3 (continued)

	]Test Pressure (psig)[				
				Actual	
	Design	Max.	Actual	10-Min.	
Line No.	Max	Allow.	Initial	Holding	Report No.
1RR40AC	200	215	210	160	RR-30 3/2/79 Retest 10/4/79
1RR40AD	3000	3180	3010	3000	RR-29 3/5/79 Retest 10/4/79

The preceding hydrostatic pressure tests were performed by using the system power unit to pressurize the lines through the actuators, as described in General Electric File No. VPF 3300-111-1 (Rucker Control Technical Manual No. TM 81999, paragraphs 5.7.3.1 through 5.7.3.9). Therefore, the actuators as well as the lines (pipes, fittings, valves, etc.) were subjected to the test pressures. The hydrostatic test reports indicated that the tests had been performed in accordance with QACMI No. M-10, Revision 6 and Revision 7, according to the effective dates.

5.2.3.7 Field Observations

On June 29 and 30, 1981, the RIII inspector visually inspected both of the hydraulic actuators and all of the attached lines (from the actuators to the penetrations leading out of the drywell). The inspector identified no unacceptable weld indications in any of the welds connecting the actuator, flange, or piping. The inspector noted that all of the welds were socket welds. The general piping installation, routing, material identification, and welds were as specified on the respective isometric drawings. The hydraulic system drain lines connected to the actuators for both of the recirculation flow control valves were installed in accordance with FDDR No. KN-1-299 dated December 18, 1978.

5.2.4 Findings

The allegation as stated, was not substantiated. However, the investigation did reveal that the design pressure rating of three hydraulic lines connected to the recirculation flow control valve actuators had been changed from 6000 psig to 3000 psig, and the design pressure rating of the drain line had been changed from 3000 to 150 psig. These design changes were considered acceptable.

An adaptor to a drain line on an hydraulic actuator to a recirculation flow control valve (not the valve itself) was broken, and a site control document was written that identified this condition. The cause of the broker adaptor was not documented and could not be determined. The item was redesigned to be less prone to damage.

The material used in the connections to the actuator was as specified on the installation drawings. The hydraulic systems were satisfactorily pressure tested, and the material was judged acceptable.

5.2.5 Items of Noncompliance

No items of noncompliance were identified.

I Allegation No. 15

"Employees fired for time cheating had been cheating with the express approval of management, and only time cheaters fired were vocal and knowledgeable critics of plant QA and safety."

II Findings

This allegation was not substantiated. The employees interviewed by GAP were contacted and they denied they had been fired for any criticism of plant QA and safety, but rather had been fired for time card cheating. No items of noncompliance with NRC requirements were identified.

III Investigation

A. Background Information

None

B Personel Interviews

Interview of Individual "A"

On February 24, 1981, Individual "A" who was previously interviewed by representatives of GAP was interviewed. Individual "A" stated Kaiser terminated his employment in January 1980 after Thomas Applegate uncovered irregularities in his time card.

He said he was not fired for his criticism of plant safety and it was not until after he was terminated that he provided any information to GAP. Individual "A" said although he had serious concerns about construction work at the plant, he was not fired by Kaiser for the reasons alleged by GAP.

On April 24, 1981 Individual "A" provided a written statement attesting to the aforementioned information, however he requested the statement not be attached to this report.

Interview of Individual "B"

On April 14, 1981, Individual "B" who was previously interviewed by representatives of GAP was interviewed. Individual "B" stated he would not characterize himself as a "vocal critic" of plant safety. He stated he had concerns about the QC program at Zimmer which he related to the investigator. However, he said he was fired for irregularities in his time card and not for his concerns about the QC program.

On April 22, 1981 Individul "B" provided a written statement attesting to the aforementioned information; however, he requested the statement not be attached to this report.

Interview of William Murray

Station Engineer

On April 14, 1981 William Murrey, ~~Employees Relations~~, CG&E, was interviewed and stated that from December 10, 1980 to January 4, 1981 Thomas Applegate, Confidential Services Incorporated (CSI), was hired by CG&E to investigate alleged time card irregularities at Zimmer. He stated CSI entered into the contract with CG&E after Applegate told them he had uncovered evidence of employee time card cheating. Murrey stated the investigation was initially contracted for a thirty day period. During that time Applegate identified two guards and three construction personnel who were involved in time card cheating. Murrey stated all five of the individuals Applegate identified were terminated. Murrey denied that the only individuals terminated were those who were vocal and knowledgeable critics of plant safety, and stated emphatically that the individuals fired were fired solely for irregularities in their time cards.

Murrey also stated that Major W. Cox, Director of CSI, said security was compromised when he left Applegate's reports unattended on his desk. Murrey said at that point the contract was ending and he and Cox concurred that time card cheating was not widespread. Both agreed that with questions about the security of the operation, the contract should be terminated. However, Murrey said Applegate was concerned about the QA problems he had identified and wanted to continue. Murrey said the concerns Applegate raised had already been identified by CG&E, QA, so he saw no reason to continue the investigation. He said Applegate was adamant in his request to continue the investigation so he referred him to William Schweirs, Quality Assurance Manager who agreed there was no need to investigate these matters further and so informed Applegate. Murrey said the contract was terminated with Cox's approval, but over Applegate's objections. Murrey provided a letter from CSI regarding the termination dated January 4, 1980, which is appended to this report as Attachment (1).

Interview of Major Cox

On April 30, 1981, Major W. Cox, Director of CSI was interviewed. Cox stated he employed Thomas Applegate as a Private Investigator for CSI. He said in November 1979 when Applegate was investigating another matter, Applegate came across evidence of employee time card cheating at Zimmer. Cox said on several occasions Applegate approached both him and CG&E about this matter. Cox told Applegate he was reluctant to pursue the matter. Cox said Applegate pursued the matter further and CG&E formally requested CSI to investigate. Cox said the investigation was initially contracted to last thirty days during which Applegate would work as an undercover person onsite with the primary task of investigating employee time card cheating. Cox said the CSI investigation commenced on December 10, 1979 and ended on January 6, 1980, and resulted in the identification of several employees involved in time card cheating. Cox said the operation ran its course and was terminated at the end of the original thirty days contract period.

Cox stated during the last weeks of the investigation Applegate said he found evidence of irregularities in pipe welds and in the plant QA program. Cox said he told William Murray about this and Murray said CG&E was already aware of the problems Applegate had identified and did not want to pursue them further. Cox recalled that Applegate learned there was a disagreement between Peabody Magnaflux employees and CG&E over the interpretation of x-rays taken of some pipes onsite. Cox said there was no attempt by CG&E to cover up any of Mr. Applegate's disclosures. Cox said it appeared to him that CG&E was already aware of the problems Applegate identified and Applegate was not providing them any new information. Cox stated after the thirty day contract period both he and CG&E decided to terminate the contract. Cox stated Applegate disagreed with this decision and wanted the investigation to continue so he could pursue irregularities he had identified in the QA program. Cox said CG&E denied Applegate's request. Cox said in his opinion Applegate held a grudge against CG&E for ending the investigation over his objections. Cox said since January 1980 he has had no further contact with Applegate regarding the Zimmer investigation. He also said Applegate has taken custody of all of the tape recordings and copies of reports made by him during the investigation.

C. Record Reviews

On April 15, 1981, the Confidential Services memo dated January 4, 1980 authored by Major W. Cox, Director of CSI, was reviewed. The first paragraph of the letter addresses Cox's concerns about the security of CSI confidential reports. The second paragraph of the letter does not support Mr. Murr~~e~~ay's statement that Director Cox agreed to terminate the investigation. ??

D. Field Observations

None.

E. Acceptance Criteria

None.

CONFIDENTIAL

Confidential Service

(513) 961-2911

Major Cox
Director

4 January 1980

Mr. William Murray
Cincinnati Gas and Electric
P. O. Box 920
Cincinnati, Ohio 45202

Dear Mr. Murray:

I am employing this letter as the vehicle by which to convey my extreme concern regarding the matter that we discussed this morning about the Confidential Reports that Agent 920 accidentally found in your unlocked desk the evening of 3 January 1980. The fact that those reports were accidentally found in an unlocked desk concerns me. The fact that you did not consider them important enough to secure them properly concerns me. Based on these concerns, I cannot permit 920 to continue to operate without assurances that his cover will not be compromised thereby placing the mission and 920's personal safety in jeopardy.

With regard to the mission, I have reviewed the 920 reports and tapes. Based on the information available to me at this point in the investigation, I cannot agree with your conclusion that the controversy surrounding the questionable construction defects at the site is without some basis.

If, in your judgment, you feel the 920 operation should continue, it can be continued only with assurances that every precaution will be taken to protect this cover.

Yours truly,

Major W. Cox
Director

MWC/npw

Cincinnati, Ohio

5.12.1 Allegation

"A design flaw in the heat exchanger control panel permitted an operator mistakenly to force 1200 pounds of pressure through pipes only meant to handle 300 pounds, ripping the pipe and soaking electricians with a hard spray of water that would have been radioactive had the plant been in operation."

5.12.2 Background Information

The licensee reported the overpressurization incident in CC&E letter No. QA-1106 dated March 2, 1979 (Exhibit), pursuant to the requirements of 10 CFR 50.55(e). The report indicated that on January 19, 1979, during a construction test to demonstrate the flow rate through the high-pressure core spray system orifice, the steam jet air ejector was overpressurized and failed. The report alludes to two operator errors as the cause of the overpressurization. The errors involved two administratively controlled valves, which were incorrectly documented as closed. ~~"Administratively" means that the valve positions (e.g. open, closed, etc.) are verified by visual inspection of the valve and documented in accordance with site procedures.~~

The 10 CFR 50.55(e) report also stated that the design, utilizing two administratively controlled valves ~~in the HPCS system~~, was permitted by the ASME Section III Code, and concluded that the overpressurization incident was not due to a design deficiency, although a check valve would have compensated for the two operator errors.

5.12.3 Investigation

5.12.3.1 Interview with Individual A

On April 22, 1981, Individual A, who was previously interviewed by representatives of GAP, was interviewed by NRC. Individual A stated he recalled an incident when the heat exchanger control panel was pressurized with 1200 pounds of pressurized water when it was only meant to handle 300 pounds. He said he learned that high-pressure water entered the low-pressure system and ruptured pipes in the low-pressure system. He said two electricians in the area were doused with water when the pipes ruptured. He related that other plant employees said this incident occurred because an operator apparently failed to turn off a valve allowing high-pressure water to enter the low-pressure system.

On April 22, 1981, Individual A provided a written statement attesting to the preceding information; however, he requested the statement not be attached to this report.

5.12.3.2 Interview with Individual B

On April 14, 1981, Individual B, who was previously interviewed by representatives of GAP, was interviewedby NRC. Individual B stated he recalled an incident when the alpha air injector condenser on the ground floor of the turbine building was injected with high-pressure water instead of low-pressure water and the pipes in the condenser ruptured. He said other workers in the plant told him this occurred because an operator failed to close the high-pressure valve and the high-pressure water entered the low pressure system that ruptured the lines.

On April 24, 1981, Individual B provided a written statement attesting to the preceding information; however, he requested the statement not be attached to this report.

5.12.3.3 Record Review

Region III inspectors have previously reviewed the overpressurization concern as documented in the following excerpts of IE Inspection Reports No. 79-06, section 8; No. 79-23, page 4; No. 79-29, pages 4 and 5; and No. 80-06, page 2.

Report No. 79-06, Section 8

"The inspector reviewed the event of January 19, 1979, during which high pressure core spray (HPCS) water entered the condensate (CD) and low pressure core spray (LPCS) systems because valves 1E22-F003 and F031 had been left open causing a rupture of the steam jet air ejector condenser 1A. The review consisted of interviews with testing and operating personnel and a review of the licensee's final report on his investigation of the event. The review showed that:

(1) Procedure OP.HP.01-4, Revision 0 was used to lineup, fill and vent the HPCS system.

(2) At the completion of the fill and vent operation the operator never completed Step 5.1.5 which required him to close valves 1E22-F003 and F-31. With these two valves open the CD and HPCS systems became crosstied thru the cycled condensate (CY) system. The operator claims he informed the Shift Supervisor that he had left the two valves open while the latter does not recall being told. This failure to follow procedures is contrary to 10 CFR Part 50, Appendix B, Criterion V and is considered to be an example of an item of noncompliance (358/79-06-06B) of the infraction level.

(3) For some unknown reason, valve 1E21-F025 which had been safety tagged closed under Switching Order No. 781317, dated November 16, 1978, was in the open position. This completed the cross connection of the LPCS and HPCS systems. Violation of Switching Order No. 781317 is contrary to 10 CFR 50, Appendix B, Criterion V and is considered an example of an item of noncompliance (358-79-06-06C) of the infraction level. The switching order was cleared on January 24, 1979. The corrective action which the licensee is currently taking regarding a previous noncompliance with the safety tagging procedure (358-79-01-01) is also applicable to this event, therefore the inspector stated no response to this item of noncompliance is required.

(4) Paragraph 13.0 of Safety Tagging Procedure EC.SAD.02, Revision 00 allows for the operation of equipment for test purposes without the removal of the safety ta s. It is possible that valve 1E21-F025 was operated for test purposes thru tags and subsequently left open by error. The inspectors have objected to Paragraph 13.0 of the Safety Tagging Procedure.

On March 21, 1979, the licensee issued operating memo 79-2, Revision 9, which specifically requires that "Do Not Operate" tags must be removed before energizing electrical equipment or opening valves. An exception is made in the case of electrical testing conducted by EOTD in which case only the EOTD master tag will be left in place.

(5) On December 12, 1977, a General Electric system engineer recommended that a check valve be installed on line 1HP18A3 downstream of valve 1E22-F013) of low pressure piping had occurred. The recommendation was rejected because the licensee thought that two valves (1E22-F003 and F031) plus administrative controls were sufficient to prevent recurrence. The licensee stated the check valve will be installed. All other ECCS systems have check valves in the line from the CY system.

The inspector stated his concern regarding repeatable occurrences where a lack of communication or understanding between parties have resulted in damage to equipment. It is our intention to closely monitor the licensee's performance during the preoperational test program to determine the adequacy of plant staffing and training as fuel load date approaches."

<u>Report No. 79-06, page 2</u>

"(Closed) Noncompliance (358/79-01-01). Failure to follow safety tagging (switching order) procedure. The inspector found that the licensee is conducting safety tagging refresher training for all operations personnel and systems engineers as stated in their letter, Borgmann to Heishman, dated February 28, 1979."

Report No. 79-23, page 4

"(Open) 10 CFR 50.55(e) Report: Overpressurization of the steam jet air ejector heat exchanger (tube side). The inspector established that a check valve has been installed as stated in the licensee's report dated March 1, 1979 (QA-1106). This item remains open pending further review by NRC Operations Branch."

Report No. 79-29, pages 4 and 5

"(Closed) Overpressurization of the steam jet air ejector heat exchanger (tube side). NR number 7247R1, dated February 21, 1979, stated that over pressure to 1200 psi of the LPCS piping system occurred in addition to others. The A-E (Sargent and Lundy) analyzed the piping system and valves with dispositions as follows:

(1) Carbon steel piping 3/4" up to 12" acceptable since stress was well below yield point.

(2) The one stainless steel 3/4" pipe is likewise o.k.

(3) Six hundred pound valves are acceptable with the pressure experienced only being a repeat hydro test.

(4) Three hundred pound and 150 pound valves the manufacturer should be consulted.

(5) The relief valve causing the problem should be retested and reset.

Further information available (Construction Engineering Report dated April 14, 1979) stated that the valve manufacturers recommended a seat leakage test be conducted on the valves and that this test was performed without any leaks being detected and it further stated that the relief valve had been removed, tested and reset of set points done. The NR was signed as completed on October 25, 1979. The inspector indicated that he had no further questions regarding this item."

Report No. 80-06, page 2

"(Closed) Noncompliance (50-358/79-06b). Failure to follow OP.HP.01-4 valve lineup. (Not closing valves IE22-F003 and IE22-F031.) The inspector reviewed the licensee's action to prevent further non-adherence to procedures and found them acceptable."

The licensee's General Engineering Department's report of April 24, 1979 (excluding attachments and tables) which documents the final disposition of NR-7247R1, is enclosed as Exhibit .

5.12.4 Findings

The licensee had reported to NRC pursuant to 10 CFR 50.55(e) an overpressurization incident that occurred on January 19, 1979, in which the closed cycle condensate (CY), condensate (CD), and low-pressure core spray (LPCS) piping were subjected to a pressure excursion from the high-pressure core spray (HPCS) system. The discharge pressure at the HPCS pumps at the time of the discharge was measured to be 1200 psig.

The cause of the overpressurization was not due to the design of the systems. The overpressurization was caused by operational errors that incorrectly permitted two valves to remain open

The actions taken by the licensee to assure the quality of the affected piping and components and to prevent recurrence have been reviewed and found satisfactory.

5.12.5 Items of Noncompliance

No new items of noncompliance were identified.

Appendix A

NOTICE OF VIOLATION

AND

PROPOSED IMPOSITION OF CIVIL PENALTIES

Cincinnati Gas and Electric Company Docket No. 50-358

As a result of the investigation conducted at the Cincinnati Gas and Electric Company Wm. H. Zimmer Nuclear Power Station on January 12 - July 14, 1981, and in accordance with the Interim Enforcement Policy, 45 FR 66754 (October 7, 1980), Section 234 of the Atomic Energy Act of 1954, as amended, ("Act"), 42 U.S.C. 2282, PL 96-295, and 10 CFR 2.205, the Nuclear Regulatory Commission proposes to impose civil penalties in the amounts set forth below for the following violations.

1. 10CFR 50, Appendix B, Criterion I states, in part, that persons and organizations performing quality assurance functions shall report to a management level such that this required authority and organizational freedom, including sufficient independence from cost and schedule when opposed to safety considerations, are provided.

Contrary to the above, the quality assurance program of Bristol Steel and Iron Works, a contractor to the licencee, did not provide sufficient independence of the QA staff from cost and ~~safety~~ schedule.

This is a Severity Level VI violation (Suppliment II)

10 CFR 50, Appendix B. Criterion III states, in part, that measures shall include provisions to assure that appropriate quality standards are specified and included in design documents and that deviations from such standards are controlled.

The Wm. E. Zimmer QA Manual, Section 3.6 states measures are established to assure that any deviation from the applicable standards are controlled.

Contrary to the above:

a. The weld inspection criteria, specified by Sargent & Lundy for structural welding, deviated from the AWS D1.1-1972 code and FSAR requirements.

b. The Sargent & Lundy design bases for thermal loading of cable trays (cable ampacity) deviated from the design bases defined in the Zimmer FSAR.

c. The Sargent & Lundy design for four different cable installations deviated from the cable separation criteria defined in the Zimmer FSAR. The cable were installed per the design.

d. Sartent & Lundy had determined, as noted on a calculation sheet dated December 27, 1979, that the design for two cables would allow these two cables to be thermally overloaded. No program existed in which the Sargent & Lundy engineers could control such design deviations when identified to assure appropriate evaluation and disposition.

This is a Severity Level violation (Supplement II)

(Civil Penalty -)

10 CFR 50, Appendix B, Criterion III states, in part, that measures shall include delineation of acceptance criteria for inspections and tests.

The Wm. H. Zimmer QA Manual, Section 3.13.1 states, in part, that design control measures also apply to delineation of acceptable criteria for inspections and tests.

Contrary to the above, H. J. Kaiser Co. deleted weld inspection criteria which were required by codes from July 1980 to January 1981 and designated the criteria as not applicable for a weld performed in November 1979.

This is a Severity Level   violation   (Supplement II)

(Civil Penalty -   )

10 CFR 50, Appendix B, Criterion III states, in part, that the design control measures shall provide for verifying or checking the adequacy of design.

The Wm. H. Zimmer QA Manual, Section 3.11.2 states, in part, that at Sargent & Lundy, design verification reviews are performed by qualified personnel.

Contrary to the above, measures had not been established by Sargent & Lundy to verigy the adequacy of the design for the thermal loading of power cable sleeves and the physical weight loading of cable trays.

This is a Severity Level   violation   (Supplement II)

(Civil Penalty -   )

10 CFR 50, Appendix B, Criterion III states, in part, that design changes, including field changes shall be subject to design control measures commensurate with those applied to the original design. The design control measures shall provide for verifying or checking the adequacy of design.

The Wm. H. Zimmer QA Manual, Section 3.12 states, in part, design changes, including field changes, are subject to design control measures commensurate with those applied to the original design.

Contrary to the above, at least nineteen surveillance reports were written in accordance with a site procedure to identify nonconforming conditions; however, this procedure did not provide requirements for a design review which is commensurate with the original design.

This is a Severity Level violation (Supplement)

(Civil Penalty -)

10 CFR 50, Appendix B, Criterion V states, in part, that instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished.

The Wm. H. Zimmer QA Manual, Section 5.3 states that the written instructions, procedures, and drawings include acceptance criteria which comply with the requirements of the design documents and applicable codes and standards. The performance of quality and design activities are verified against these acceptance criteria.

ANSI Standard No. N45.2-1971, Section 11 states, in part, that where a sample is used to verify acceptability of a group of items, the sample procedure shall be based on recognized practices and shall provide adequate justification for the sample size and selection process.

Contrary to the above, the inspection criteria defined in the H. J. Kaiser Instruction No. M-12, for bolt hole sizes, was not based on a recognized standard practice which would have provided justification for the sample size and the selection process.

This is a Severity Level   violation (Supplement II)

(Civil Penalty -   )

10 CFR 50, Appendix B, Criterion VII states, in part, that the effectiveness of the control of quality by contractors and subcontractors shall be assessed by the applicant or designee.

The Wm. H. Zimmer QA Manual, Section 7.3.1 states that as part of the vendor selection process, Sargent & Lundy make an independent evaluation of the bidders' QA programs as a part of their total bid evaluation.

Contrary to the above, 8158 feet of structural beams were purchased from vendors for which evaluations of the respective quality assurance programs had not been performed.

This is a Severity Level violation (Supplement II)

(Civil Penalty -)

10 CFR 50, Appendix B, Criterion VIII states, in part, that measures shall assure that identification of the item is maintained by heat number, part number, serial number, or other appropriate means, either on the item or on records traceable to the item, as required throughout fabrication, erection, installation, and use of the item.

The Wm. H. Zimmer QA Manual, Section 8.2 states, in part, that H. J. Kaiser Co. procedures provide that within the H. J. Kaiser Co. jurisdiction the identification of items will be maintained by the method specified on the drawings, such as heat number, part number, serial number, or other appropriate means. This identification may be on the item or on records traceable to the item. The identification is maintained throughout fabrication, erection, and installation. The identification is maintained and usable in the operation and maintenance program.

Contrary to the above:

a. the traceability of at least nine structural beams and twelve pipe lines was not maintained.

b. The traceability of welding rod was not maintained as required by site procedure during the second shift of September and October 1979. Specifically, some of the weld rod issue slips completed during this period showed signatures (initials) of individuals who were not assigned to work.

This is a Severity Level violation (Supplement II)

(Civil Penalty -)

10 CFR 50, Appendix B, Criterion X states, in part, that a program for inspection of activities affecting quality shall be established and executed to verify conformance with the documented instructions, procedures, and drawings.

The Wm. H. Zimmer QA Manual, Section 10.1.2 states, in part, that inspections are performed in accordance with written procedures which include requirements for checklists and other appropriate documentation of the inspections.

Contrary to the above:

a. No QC inspection program was established to require verification of cable separation for cables extending from raceways located in the cable spreading room to the control room. Two cables of the blue division had been routed into a green division tray riser, which extended up to the control room, in violation of the site cable separation criteria.

b. No documented evidence could be provided to verify that in-process and adequate final weld inspections had been performed as required in the AWS D1.1-1972 code, for the welds on 180 cable tray hangers located in the cable spreading room. The final weld inspection had been made after the welds were painted (galvanox).

This is a Severity Level violation (Supplement II)

(Civil Penalty -)

10 CFR 50, Appendix B, Criterion XI states, in part, that test results shall be evaluated to assure that test requirements have been satisfied.

The Wm. H. Zimmer QA Manual, Section 11.1 states, in part, that test programs to assure that essential components, systems, and structures will perform satisfactorily in service are planned and performed in accordance with written procedures and instructions at vendor shops and at the construction site.

Contrary to the above, at least 187 radiographs, taken to attest the quality of prefabricated pipe welds, were made with a technique that did not comply with the ASME Section III-1971 Code, Winter 1972 Addenda. The unacceptable technique involved the lack of or insufficient shimming of the penetrameter, which reflects the quality of the radiograph.

This is a Severity Level violation (Supplement II)

(Civil Penalty -)

10 CFR 50, Appendix B, Criterion XV states, in part, that measures shall be established to control materials, parts, or components which do not conform to requirements in order to prevent their inadvertent use or installation.

The Wm. H. Zimmer QA Manual, Section 15.2.2 states, in part, that H. J. Kaiser Co. is responsible for identifying and reporting nonconformances in receiving inspection, construction, or testing activities which are delegated to H. J. Kaiser Co. A tagging system is established in the H. J. Kaiser Co Quality Assurance Procedures to assure that nonconforming items are conspicuously marked to prevent their inadvertent use or installation.

Contrary to the above:

a. Welds on at least nine structural beams and four cable tray hangers which contained unacceptable slag, weld profiles, blowholes, porosity, and/or undercut were identified.

b. At least five structural beams were identified which had unacceptable notches for re-entrant corners instead of the required radii.

c. At least four structural beams which were not specified on any design document were installed in the auxiliary building switchgear room.

This is a Severity Level violation (Supplement II)

(Civil Penalty -)

10 CFR 50, Appendix B, Criterion XVI states, in part, that measures shall assure that the cause of a condition adverse to quality is determined and corrective action is taken to preclude repetition.

The Wm. H. Zimmer QA Manual, Section 16.5 states, in part, that vendors, contractors, and subcontractors are required to determine cause and corrective action to prevent recurrence of errors which could result in significant conditions adverse to quality.

Contrary to the above:

a. The corrective actions taken in regard to a previous NRC finding, con-concerning measures to assure Design Document Changes are implemented and verified by QC was not adequate. The corrective actions taken in response to previous NRC findings did not include Design Document Changes written prior to the implementation of the corrective actions and the Design Document Changes that are and have been implemented prior to receiving Sargent & Lundy approvals.

b. Five Cincinnati Gas & Electric Company QA audits of Sargent & Lundy identified a recurring problem in which design calculations and verifications were not performed. The NRC identified, during this investigation, that controls were not established to assure design verification calculations of the thermal loading of power cable sleeves and the physical weight loading of cable trays. The Cincinnati Gas & Electric Company audits did not address the generic and programmatic cause, of the design calculations and verifications not being performed, to preclude repetition.

c. The licensee failed to verify the socket engagement on at least 439 welds; however, the corrective action involved radiographing only twenty of the 439 welds.

d. The licensee used information from weld rod issue slips instead of performing the required in process inspections for at least twenty-four welds.

This is a Severity Level   violation   (Supplement II)

(Civil Penalty -   )

12. 10 CFR 50, Appendix B, Criterion XVII states, in part, that ~~inspection and test~~ records shall, ~~as a minimum~~ ~~identify the~~ include qualifications of personnel, procedures, ~~and~~ equipment, the type of observations, the results, and the acceptability.

¶ The Wm. H. Zimmer QA Manual Section 17.1.4 states, in part that documentation of all performance surveillance includes personnel identification and qualification, procedure, Type observation, date of performance, person or organization monitored, results and corrective action if required.

¶ Contrary to the above, ~~the~~ The Bristol Quality Control Steel Erection Report, ~~form~~ which was a generic boilerplate ~~form~~ form, did not identify weld procedure numbers, types of ~~a~~ welding material, ~~a~~ welder identifications, ~~or~~ ~~material~~ ~~beam~~ beam sheet numbers, or specific welds inspected.

¶ This is a Severity Level ■ violation (Supplement II)

10 CFR 50, Appendix B, Criterion XVIII states, in part, that a comprehensive system of planned and periodic audits shall be carried out to verify compliance with all aspects of the quality assurance program and to determine the effectiveness of the program.

The Wm. H. Zimmer QA Manual, Section 18.1 states, in part, that the QA Division conducts a comprehensive system of planned and periodic audits of Sargent & Lundy to verify compliance with all aspects of the quality assurance program.

Contrary to above, the Cincinnati Gas & Electric Company QA Division did not perform a comprehensive audit of the Sargent & Lundy nonconformance program during the past nine years.

This is a Severity Level violation (Supplement II)

(Civil Penalty -)

Pursuant to the provisions of 10 CFR 2.201, Cincinnati Gas and Electric Company is hereby required to submit to this office within 30 days of the date of this Notice a written statement or explanation, including for each alleged violation: (1) admission or denial of the alleged violation; (2) the reasons for the violation if admitted; (3) the corrective steps which have been taken and the results achieved; (4) the corrective steps which will be taken to avoid further violations; and (5) the date when full compliance will be achieved. Consideration may be given to extending your response time for good cause shown. Under the authority of Section 182 of the Act, 42 U.S.C. 2232, this response shall be submitted under oath or affirmation.

Within the same time as provided for the response required above under 10 CFR 2.201, Cincinnati Gas and Electric Company may pay the civil penalties in the cumulative amount of   or may protest imposition of the civil penalties in whole or in part by a written answer. Should Cincinnati Gas and Electric Company fail to answer within the time specified, this office will issue an Order imposing the civil penalties in the amount proposed above. Should Cincinnati Gas and Electric Company elect to file an answer in accordance with 10 CFR 2.205 protesting the civil penalties, such answer may: (1) deny the violations listed in this Notice in whole or in part; (2) demonstrate extenuating circumstances; (3) show error in this Notice; or (4) show other reasons why the penalties should not be imposed. In addition to protesting the civil penalties in whole or in part, such answer may request remission or mitigation of the penalties. Any answer in accordance with 10 CFR 2.205 should be set forth separately from the statement or explanation in reply pursuant to 10 CFR 2.201, but may incorporate by specific reference (e.g., giving page and paragraph numbers) to avoid repetition. Cincinnati Gas and Electric Company's attention is directed to the other provisions of 10 CFR 2.205, regarding the procedure for imposing a civil penalty.

Upon failure to pay any civil penalties due, which have been subsequently determined in accordance with the applicable provisions of 10 CFR 2.205, this matter may be referred to the Attorney General, and the penalties, unless compromised, remitted, or mitigated, may be colllected by civil action pursuant to Section 234c of the Act, 42 U.S.C. 2282.

FOR THE NUCLEAR REGULATORY COMMISSION

Victor Stello, Jr., Director
Office of Inspection and Enforcement

Dated at Bethesda, Maryland
this _ day of , 1981

5.7.1 Allegation

"Prefabricated piping received in 1977 has defective welds, but construction supervisors told crews not to repair them because the welds were made offsite."

5.7.2 Background Information

The following summarizes the initial investigation of this allegation as documented in IE Investigation Report No. 50-358/80-09.

On June 29, 1979, Pullman Power Products of Williamsport, Pennsylvania, also known as the M. W. Kellogg Company, shipped five prefabricated pipe spool pieces by truck to the Zimmer site for installation in the main steam relief (MSR) system, a safety-related system. The spool pieces were received on July 3, 1979, and nonconformance report E-1911 was written on July 5, 1979, stating the spools had "rolled off the truck onto the ground." The nonconformance report had the effect of placing the spool pieces in a hold status in the Kaiser warehouse. The welds on the five spool pieces were later radiographed. The radiographs displayed apparent rejectable weld indications in welds on three of the five spool pieces. On September 18 through 28, 1979, despite the issuance of the nonconformance report, the spool pieces were released to construction and installed. As documented in IE Investigation Report No. 50-358/80-09, the licensee was found to be in noncompliance with NRC requirements for the release of the spool pieces prior to establishing acceptability. During April and May 1980 the welds on the spool pieces were examined ultrasonically and by magnetic particle testing and found to be acceptable.

On April 8, 1980, the RIII inspector reviewed the radiographs on all five spool pieces (1MS08BB12-6B, 1MS09BA12-1AH, 1MS08BA12-58H, 1MS11B12-7BH, and 1MS10BA12-1CH). The films (radiographs) were marked "For Information Only" because an acceptable radiographic technique could not be established because of the configurations and thicknesses of the spool pieces.

RIII personnel felt that radiography was not a credible nondestructive examination (NDE) technique for the spool pieces. The configurations and relatively large thicknesses of the spool pieces in relation to the geometry of the radiographic process would prevent displays and/or accurate displays of weld indications on the radiographs. Any weld indication shown on the radiograph could be of undefined distortion.

5.7.3 Investigation

5.7.3.1 Interview with Individual A

On April 24, 1981, Individual A, who was previously interviewed by representatives of GAP, was interviewed by NRC. Individual A stated he had provided information to GAP regarding this allegation, and he was referring to five prefabricated pipe spool pieces manufactured by Kellog that fell off a truck during their delivery to the site. He stated that Peabody Magnaflux (PM) radiographers examined the pieces and found defective welds on some of them. He said construction personnel installed the spool pieces in the plant, disregarding PM's finding on the welds.

On April 22, 1981, Individual A provided a written statement attesting to the preceding information; however, he requested the statement not be attached to this report.

5.7.3.2 Interview with David Hang

On February 24, 1981, David Hang, former PM Level II Radiographer, was interviewed. He stated that in August 1979 Anthony Pallon, KEI Welding Engineer, asked him to radiograph MSR spool pieces that had fallen off the truck on delivery to the Zimmer site. Hang said the examination was to determine if any of the welds on the pieces had cracked from the impact of the fall. Hang indicated that three of the five spool pieces he examined had what appeared to be unacceptable radiographic indications. He said he reported this in the Report of Radiographic Examination submitted to Pallon and also told Pallon that radiography was the wrong technique to use to examine welds of this configuration. Hang said he advised Pallon an ultrasonic examination should be performed in this case. Hang also stated the spool pieces were ultrasonically examined in April 1980 and the welds were found to be acceptable.

5.7.3.3 Record Reviews

On February 24, 1980, RIII Inspector Kavin Ward reviewed records that indicated the five spool pieces were ultrasonically examined by Pullman Power Products (Kellogg) in April and May 1980 and examined by magnetic particle testing by Peabody Magnaflux in April, 1980. The records showed that welds on all five pieces were acceptable. The magnetic particle records indicated piece 1-MS-11B-12-7BH, weld No. V, had a linear indication approximately 1/4-in. long, which was ground, retested, and found acceptable.

Inspector Ward stated that the ultrasonic and magnetic processes were valid examination processes for the spool pieces.

5.7.3.4 Field Observations

On Febraury 24, 1981, RIII Inspector Kavin Ward made visual examinations of all of the welds on the five spool pieces and identified no unacceptable indications. The spool pieces were installed in the main steam relief system at the time of the visual examinations.

5.7.4 Findings

Interviews and pertinent records revealed that the piping in question was received in 1979 instead of 1977.

The allegation that prefabricated piping received in 1979 has defective welds was not substantiated. Appropriate examination techniques, performed on the piping, did not reveal any unacceptable weld indications.

The allegation that construction supervisors told crews not to repair defective welds because the welds were made off site, was essentially correct, although some facts are in error. Interviews with pertinent personnel and the nonconformance report history of the spool pieces support this allegation.

As documented in IE Investigation Report No. 50-358/80-09, one item of noncompliance with NRC requirements was previously cited for releasing the spool pieces before determining their acceptability.

5.7.5 Items of Noncompliance

No additional items of noncompliance or safety concerns were identified.

5.11.1 Allegation

"Sand and mud choke the feedwater pumps and intake flues carrying makeup water to the cooling tower, because of a flaw in the plant's design. Pumps used to rectify the flow quickly burn out."

5.11.2 Background Information

10 CFR 50.55(e) requires licensees to report to NRC the major defects found during construction or operation of power reactors. These reports are public documents and are maintained in NRC files and Public Document Rooms.

5.11.3 Investigation

The licensee reported silting conditions in CG&E letters QA-1148 dated June 20, 1979 and QA-1168 dated July 23, 1979, and service water pump impeller wear conditions in letters QA-1196 dated September 16, 1979, QA-1239 dated December 31, 1979, and QA-1371 dated December 17, 1980, sent to NRC Region III pursuant to the requirements of 10 CFR 50.55(e). Copies of these letters are attached as Exhibits .

The silting and pump impeller wear conditions, along with the measures to correct these conditions, are described in Appendix J of the Wm. H. Zimmer FSAR, Revision 69, dated December 1980, attached as Exhibit .

The corrective measures to be take , as described in the excerpts, have been reviewed and accepted in Subsection 9.2.1 of the Safety Evaluation Report (SER) Related to the Operation of Wm. H. Zimmer Nuclear Power Station, Unit 1, Supplement 1 issued in June 1981 by the Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission.

The implementation of these corrective measures is unresolved pending notification by the licensee of the completion of the corrective measures described in the Wm. H. Zimmer FSAR, Appendix J, Revision 69, dated December 1980. (358/81-13-31)

5.11.4 Findings

The statement that sand and mud choke the feedwater pumps and intake flues is correct in that the licensee reported a silting condition concerning the service water intake structure to NRC Region III by telephone on June 18, 1979 and by letters QA-1148 on June 10, 1979 and QA-1168 dated July 23, 1979 pursuant to the requirements of 10 CFR 50.55(e).

The statement that choking of the feedwater pumps was caused by a flaw in the plant design is correct in that the plant design and operating procedures had to be modified to control the silting condition.

The statement that pumps used to rectify the flaw quickly burn out does not appear to be correct. However, accelerated service water pump impeller wear was reported by the licensee by telephone on August 10, 1979 and by letters QA-1196 dated September 6, 1979, QA-1239 dated December 31, 1979, and QA-1371 dated December 17, 1980 pursuant to the requirements of 10 CFR 50.55(e).

The silting and pump impeller wear concerns are unresolved pending notification to NRC Region III by the licensee of the completion of the corrective measures described in the Wm. H. Zimmer Final Safety Analysis Report (FSAR), Appendix J, Revision 69 dated December, 1980 (including a sedimentation monitoring program and plant modifications). The implementation of these corrective measures will be reviewed during a subsequent inspection.

5.11.5 Items of Noncompliance

No items of noncompliance were identified.

5.15.1 Allegation

"Employees fired for time cheating had been cheating with the express approval of management, and only time cheaters fired were vocal and knowledgeable critics of plant QA and safety."

5.15.2 Background Information

Investigation by Thomas Applegate revealed that several individuals were involved in "timecard cheating" by being absent from site work but recorded as at work. Those individuals involved were terminated.

5.15.3 Investigation

5.15.3.1 Interview of Individual A

On February 24, 1981, Individual A, who was previously interviewed by representatives of GAP, was interviewed by NRC. Individual A stated Kaiser terminated his employment in January 1980 after Thomas Applegate uncovered irregularities in his timecard. He said he was not fired for his criticism of plant safety and it was not until after he was terminated that he provided any information to GAP. Individual A said that, although he had serious concerns about construction work at the plant, he was not fired by Kaiser for the reasons alleged by GAP.

On April 24, 1981 Individual A provided a written statement attesting to the preceding information; however, he requested the statement not be attached to this report.

5.15.3.2 Interview of Individual B

On April 14, 1981, Individual B, who was previously interviewed by representatives of GAP, was interviewed by NRC. Individual B stated that he would not characterize himself as a "vocal critic" of plant safety. He stated he had concerns about the QC program at Zimmer which he related to the RIII Investigator. However, he said he was fired for irregularities in his timecard and not for his concerns about the QC program.

On April 22, 1981 Individul B provided a written statement attesting to the preceding information; however, he requested the statement not be attached to this report.

5.15.3.3 Interview of William Murray

On April 14, 1981, William Murray, Senior Engineer, CG&E, was interviewed by NRC. He stated that from December 10, 1980 to January 4, 1981, Thomas Applegate [Confidential Services Incorporated (CSI),] was hired by CG&E to investigate alleged timecard irregularities at Zimmer. He stated CSI entered into the contract with CG&E after Applegate told them he had uncovered evidence of employee timecard cheating. Murray stated the investigation was initially contracted for a 30-day period. During that period, Applegate identified two guards and three construction personnel who were involved in timecard cheating. Murray indicated that all five of the individuals Applegate identified had been terminated. He denied that the only individuals terminated were those who were vocal and knowledgeable critics of plant safety, and stated emphatically that the individuals fired were fired solely for irregularities in their timecards.

Murray also stated that Major W. Cox, Director of CSI, felt that the investigation was compromised when Murray left Applegate's reports unattended in his desk. Murray said at that point the contract was ending and he and Cox concurred that timecard cheating was not widespread. Both agreed that, because of the questions about the security of the operation, the contract should be terminated. However, Murray said Applegate stated that he was concerned about the QA problems he had identified and wanted to continue. Murray said the concerns Applegate raised had already been identified by the QA group of CG&E and he saw no reason to continue the investigation. He said Applegate was adamant in his insistence to continue the investigation, so he referred him to William Schweirs, Quality Assurance Manager. Schweirs agreed there was no need to investigate these matters further and advised Applegate of his conclusion. Murray said the contract was terminated with Cox's approval, but over Applegate's objections. Murray provided a letter from CSI regarding the contract termination which is dated January 4, 1980 and is appended to this report as Exhibit .

5.15.3.4 Interview of Major Cox

On April 30, 1981, Major W. Cox, Director of CSI, was interviewed by NRC. Cox stated he employed Thomas Applegate as a private investigator for CSI. He indicated that, in November 1979 when Applegate was investigating another matter, Applegate came across evidence of employee timecard cheating at Zimmer. Cox stated he was reluctant to pursue the matter, but on several occasions Applegate approached both him and CG&E about this matter. Cox said Applegate continued to pursue the matter and CG&E formally requested CSI to investigate the matter. Cox stated the investigation was initially contracted to last 30 days during which Applegate would work as an undercover person onsite with the primary task of investigating employee timecard cheating. Cox said the CSI investigation began on December 10, 1979, ended on January 6, 1980, and identified several employees who were involved in timecard cheating. Cox said the operation ran its course and was terminated at the end of the original 30-day contract period.

Cox stated that during the last weeks of the investigation, Applegate had said he found evidence of irregularities in pipe welds and in the plant QA program. Cox told William Murray about this and Murray said CG&E was already aware of the problems Applegate had identified and did not want to pursue them further. Cox recalled that Applegate had learned there was a disagreement between Peabody Magnaflux employees and CG&E over the interpretation of X-rays taken of some pipes on site.

Cox said there was no attempt by CG&E to cover up any of Applegate's disclosures. Cox said it appeared to him that CG&E was already aware of the problems Applegate identified and Applegate was not providing them any new information. Cox stated that after the 30-day contract period both he and CG&E decided to terminate the contract. Cox stated Applegate disagreed with this decision and wanted the investigation to continue so he could pursue irregularities he had identified in the QA program. Cox said CG&E denied Applegate's request.

Cox said in his opinion Applegate held a grudge against CG&E for ending the investigation over his objections. Cox said that since January 1980 he has had no further contact with Applegate regarding the Zimmer investigation, and Applegate has taken custody of all of the tape recordings and copies of reports he made during the investigation.

5.15.3.5 Record Reviews

The Confidential Services memo dated January 4, 1980 authored by Major W. Cox, Director of CSI, was reviewed by the investigator. The first paragraph of the letter addresses Cox's concerns about the security of CSI confidential reports. The letter does not indicate that Cox objected to terminating the investigation.

5.15.4 Findings

The employees interviewed by GAP were contacted. They denied they had been fired for any criticism of plant QA and safety, but rather had been fired for timecard cheating.

5.15.5 Items of Noncompliance

No items of noncompliance with NRC requirements were identified.

5.18.1 Allegation

"A KEI employee has kept a detailed journal of safety hazards and incidents at Zimmer."

5.18.2 Background Information

It is common practice for inspectors performing certain types of inspections to utilize notebooks to record their observations. Such notes can later be used to generate surveillance reports, nonconformance reports, or other documents as required.

5.18.3 Investigation

5.18.3.1 Interview with Thomas Applegate

On January 29, 1980, Thomas Applegate was interviewed by NRC. He stated that an individual named Yohan had told him he maintained a detailed journal of safety defects while employed as a radiation waste chemistry technician at Zimmer.

5.18.3.2 Interview with Senior Resident Inspector

On February 2, 1981, Thomas Daniels, NRC Senior Resident Inspector, was interviewed. He had reviewed CG&E personnel records and found an individual named Yohan Reiter. He said he had found that Reiter was employed employed by Westinghouse, Inc. in Ankara, Brazil. Reiter had been employed at Zimmer at the time Thomas Applegate was onsite.

5.18.3.3 Interview with Yohan Reiter

On February 5, 1981, Yohan Reiter of Westinghouse, Inc., Ankara, Brazil, was interviewed by telephone by NRC. He stated he was formerly employed as a radiation chemistry technician (RCT) at Zimmer. He said he recalled meeting Thomas Applegate in the radiation waste disposal area during a routine inspection. Reiter also recalled commenting to Applegate that his field notebook was his "paper brain" in which he recorded the results of his field inspection. He said the notebook listed deficiencies identified during system walkdowns of the radioactive waste disposal system, which is a nonsafety related system. Reiter indicated that he used the notebook to record deficiencies, such as malfunctioning gauges or acid eating through floor

tiles, which were then recorded on a equipment service list (ESL) and corrected by the plant maintenance staff. He added that during meetings with his supervisor, Dean Erickson, and other members of the Radiation Protection Department staff the adequacy of the corrective action was discussed. Reiter indicated that he was not keeping any detailed journal of safety defects at the plant and if he had any concerns regarding the safe operation of the plant he would have contacted the NRC on his own behalf.

5.18.4 Findings

The individual who was alleged to have kept a journal of safety hazards and incidents at Zimmer stated that the journal was a field inspection notebook. He stated he used it to record deficiencies he identified during system walkdowns of the radiation waste disposal system. He said all of the deficiencies he identified were properly corrected by the licensee.

5.18.5 Items of Noncompliance

No items of noncompliance were identified.

I. Allegation$S1$U

"KEI knowingly installed and ripped out unsuitable main steam relief piping, at an estimated labor cost of $320,000."

II. Findings$U

The allegation was substantiated in that an economic decision was made to install piping for the main steam relief quencher modification, of which approximately 3-10 percent would have to m<be removed, due to continuing d<identification of changes in design loads. No attempt was made to substantiate the estimated labor cost for the portion of i<pipe that was installed and removed. However, cost figures to date were available for the tots<al design modification relevant to the main steam relief quencher piping.

No items of noncompliance or safety concers<ns were idn<entified.

III. Investigation$U

A. Background$SInformation$U

The NRC has been aware of the modification activities as described in the Mark II Design Assessment Report, Chapter 2.0 -- Zimmer Empirical Loads, ZPS-1. The RIII inspector observed that the latest documentation received from the NRC Licensing Branch No. 2 at the site concerning the modification activities was NUREG-0487, Supplement 1, titled, "Mark II Containment Lead Plant Program Load Evaluation and Acceptance Criteria." It should be noted that there may be more changes in the future due to additional load definitions.

B. Personnel$SInterviews$U

InterviewSofSIndividual$S"A"$U

On February 24, 1981, Individual "A", who was previously interviewed by representatives of GAP was interviewed. Individual "A" stated Kaiser instl<alled a large portion of the MSR piping, knowing sections of it would later have to be removed after installation. He recalled that two years after its installation Kaiser removed large sections of the piping ~~of~~ at and below the 525' level of the reactor containment building but left the pipe sections aboe<ve that level in place.

On April 22, 1981, Individual "A" provided a written statement attesting to the aforementioned information; however, he requested the statement not be attached to this report.

InterviewsSofSIndividuals$S"B"$Sand$S"C"$U

On April 14 and 16, 1981, Individuals "B" and "C", respectively, who allegedly provided information regarding this allegation to representatives of GAP were interviewed. ~~They stated th<<they had no information concerning this allegation to representatives of GAP were interviewed.~~ They stated they had no information concerning this allegation.

InterviewSofSH.$SC.$SBrinkman$U

During the period of 2/9-13/81 and 2/23-27/81, discussions with Mr. H. C. Brinkman, Principal Mechanical Engineer, CG&E, indicated that in 1975 a nuclear power plant in Germany discovered the need to redesign the relief system based on newly identified discharge loads. Therefore, several utilities, including CG&E, decided on a modification to replace the already installed rams head safety relief valve (SRV) discharge devices with quenches<rs.

In 1975 CG*<&E decided to start the quencher modification, knowing that part of the piping to be installed would later have to be removed due to the identification of new discharge loads. The basis for the decision was that approximately 90 to 97% of the original quencher modification would be acceptable and therefore only 3 to 10% would be subject to rework. CG&E concluded that it would be less costly to go ahead in 1975 with the installation activities rather than delay the construt<ction schedule until the quencher modification design was complete. To date, the modification design is not complete.

C. Record$SReview$Sand$SOnsite$SObservations$U

The modification has required the replacement of 10 inch Schedule 40 pipe with other 10 inch Schedule 40 pipe of different configurations (shapes), 10 inch extra strong pipe, and 12 inch extra strong pipe.

During this investigation the licensee provided cost figures for the modificatin<on to date. The total a<labor cost was $823,780.00 and the total material plus labor cost was $1,183,690.00. The NRC made no attempt to corroborate these costs or the licensee's claim that it was cheaper to proceed with an installation which was known, before installation, to require rework.

The RIII inspector reviewed all revisions to the KEI isometric drawing PSK-1MS, Sheets 21 and 21A, which were pertinent to the main steam relief piping. No additional h<changes of the magnitude addressed in the allegation were identified. The revisions identified the following changes:

Rev. ~~0~~ A	Redrawn -- original configuration replaced	9/8/76
Rev. 1	Hangers added	3/31/77
Rev. 2	Eight lugs added	1/10/78
Rev. 3	Hanger changed	5/5/78
Rev. 4	New spool pieces added, welds MS212 and MS195 voided per S&L	4/3/79
Rev. 5	Piping tee section added	6/18/79
Rev. 6	Weld MS160 and a 4 inh<ch dimension added	10/1/79
Rev. 7	Field marked (redline) updates added	1/9/80
Rev. 8	Welds K-461 and K-463 changed; weld K-592 changed to K-593 per NR-2499; hanger detail section D-D added	9/27/80
Rev. 9	Weld K-592 changed to K-461; and weld K-593 changed to K-594	9/4/80

All of the above revisions pertained to the aforementioned quencher modification.

The RIII inspector reviewed the QC documentation for the following main steam relief piping field welds: Nos. 160, 160A, 267A, 267B, 267C, 267D, 268B, 268~~D~~C, 459, 460, and 461.

The records indicated that the welds had been accomplished in accordance with ASME Section III 1971, Summer 1973 Addenda.

The RIII inspector interpreted the radiographs for the following main steam relief piping field welds: Nos. 160A, 459, 460, 461, 462, and 594.

~~It is noted that~~ There ~~are~~ were approximately five to seven radiographs for each of the above welds. The varying number of radiographs ~~are~~ were necessart<y to cover the entire 360 degrees of each pipe weld~~s~~. The radiography was performed in ascc<<accordance with ASME Section III 1971, Summer 1973 Addenda. The RIII inspector identified no unacceptable weld indications on the re<adiographs.

The above discussions and reviews indicate that the alleged activities were performed in accordance with the KEI QA program.

No items of noncompliance or deviations were identified.

I Allegation$S5$U

"Sensitive parts on welding rods are possibly damaged through storage at improper temperatures and possibly lost through failure to follow proper paperwork and labeling requirements."

II Findings$U

1. The portion of the allegation that alleged sensitive parts on welding rods are possibly damaged through storage at improper temperatures, was substantiated based on the noncompliance history concerning weld rod temperature control documented in past IE Inspection Reports. No additional weld rod temperature control problems were identified during this investigation.

2a. The portion of the allegation that alleged welding rods were possibly lost through failure to follow proper paperwork w<requirements was not substantiated with regard to weld rod issue forms. Allegations P-2/13 and P-2/16 in this Investigation Report address QC record and QC verification problems related to weld rod control.

b. The portion of the allegt<ation that alleged welding rods were possibly lost through failure to follow proper labeling requirements was not substantiated. No information was submitted or obtained to define the specific meaning of the alleged concern about labeling requirements.

Other than referenced, no items of noncompliance or safety concerns were identified.

III Investigation$U

A. Background$SInformation$U

This allegation was interpreted to address two weld rod concerns:

1. Weld rods were possibly being damaged by improperly controlling rod temperatures prior to ~~concimption~~ consumption and resulting in unacceptable welds.

2. Weld rods had been lost because the paperwork and labeling requirements were not being properly followed. Therefore, welds may have been made in<<with incorrect weld rods.

These interpretations were based on the following persone<nel interviews.

B. Personnel$SInterviews$U

Interview$Swith$SIndividual$S"A"$U

X On February 24, 1981, Individual "A" who was previously interviewed by representatives of GAP was interviewed.

1. He stated he observed unaccounted for weld rod (weld rod without accompanying KE-2 weld control forms) onsite and has seen weld rod warming ovens unplugged and not being maintained at the proper tm<emperature.

2. Individual "A" also stated that during September and October 1979 a pipefitter was not assigned to the weld rod issue point during the evei<ning shift to account for weld rods. He stated that weld rod and wl<eld issue slips were left out unattended for anyone to pick up and use.

On April 22, 1981 Individual "A" provided a written statement attesting to the aforementioned information, however he requested the statement not be attached to this report.

Interviews<$Swith$SIndividual$S"B"$U

On April 14, 1981, Individual "B" who was previously interviewed by representatives of GAP was interviewed.

A 1. He stated Kaiser required weld rod ovens be maintained at the proper temperatures at all times. He said he could not insure that every welder maintained his oven at the right temperature, but as a supervisor he insured his men did.

2. He stated th-t<<that on occasion weld rod issue slips (KE-2 Forms) were lost and in those cases it was a common practice onsite for welders at the time of fabrication to get a blank issue form, falsify it, and present it to the Kaiser Quality Control Inspectors in order for the weld to pass inspection. He said frequently this was done months after the fact by Kaiser construction supervisors who falsified weld rod issue forms to complete weld documentation packages. He said by doing this they did not have to cut out and rework welds.

On April 14, 1981 Individual "B" provided a write<ten statement attesting to the aforementioned information, howee<ver he requested the statement not be attached to this report.

CX. Weld$SRod$STemperature$U

1. For pressure boundary (pipe) welds the ASME Code Section III 1971, Article NB-2440 states, "Suitable storage and handling of electrodes, flux and other welding materials shall be maintained. Precautions shall be taken to minimize absorption of moisture by fluxes and cored, fabricated and coated electrodes."

ASME Code Section III 1971, Article NA-4460 states, "Measures shall be established to provide work and examination instructions for handling, storage, shipping and preservation of materials, parts, components, and appurtenances to prevent damage or deterioration. When necessary for particular products, special protective environments, such as inert gas atmospheres, specific moisture content levels and temperatures, shall be provided and their existence verified."

For structural welds the AWS D1.1-1972 Code, Section 4.9.2 states, "All electrodes haveing<<having low-hydrogen coverings conforming to AWS A5.1 shall be purchased in hermetically-sealed containers or shall be dried at least one hour at temperatures between 700 F and 800 F before being used. Electrodes shall be dried prior to use if the hermetically-sealed container shows evidence of damage. Immediately after removal from hermetically-sealed containers or from drying ovens, electrodes shall be stored in ovens a<held at a temperature of at least 250 F. E70XX electrodes that are

not used within four hours, E80XX within two hours, E90XX within one hour, and E100XX and E110XX within one-half hour after removal from hermetically-sealed containers or removal from a drying or storage oven shall be redried before use. Electrodes which have been wet shall not be used."

The purpose of the low-hydrogen weld rods is to keep hydrogen out of the weld. Hydrogen could cause underbead cracking. Thus, the above code requirements are intended to minimize the moisture, which contains hydrogen, from e<being absorbed by the low-hydrogen weld rods.

During this investigation
the Resident Inspector reviewed the receipt documentation for E7018 (low hydrogen) weld rod purchased on orders No. 34356, 35720, 37587, 39075, 39382, 39556, 39971, and 40318. The receipt documentation indicated that the E7018 rod had been received in sealed moisture-proof containers.

During this investigation
the Resident IN<nspector verified that low hydrogen electrodes (rods) which had not been isu<sued to the field were clearly identified and stored in a clean, limited access, and dry area. In addition, in the field issue rooms (rod c<shacks), the low hydrogen rods were either in sealed containers or in holding ovens at temperatures above 250°F.

~~To help accomplish code requirements,~~ Portable rod warmers have been specified for used< near the work activities to maintain the weld rods in a dry condition until used.

KEI Welding Filler Materials Control Procedure No. SPPM 3.3, Revision 7, paragraphs 3.5.4.2 and 3.5.4.3 respeci<tively state:

"When covered electrodes are removed from a holding oven to be issued to welders they shall be placed in a portable rod warmer. Only one classification and heat or lot of electrodes shall be stored in each individual portable rod warmer. Each portable rod warmer shall be uniquely marked for identification purposes and shall be checked on a monthly basis to assure that each rod warmer maintains a correct temperature between 175°F and 400°F."

"All covered electrodes exposed to ambient conditions for more than four hours without coming in direct contact with water shall be returned to central storage for rebaking. . ."

The Resident Inspector reviewed the December, 1980 record for the Daily Temperature Check of holding ovens No. W50, W27, W38, W25, W39, W19, W11, and W26. The record indicates that oven No. W50 was 5°F under the specified 250°F on three of the 22 days checked; oven No. W25 was 5°F under the specified 250 F, one day out of 22; oven W39 was 15°F under the specified 250°F on one day of out 22; and oven W26 was 10°F under the specified 250°F on one day out of 22.

The Resident Insps<ector reviewed the record for the Monthly Check of portable rod ovens (warmers). The record indicated that the temperatures of 209 warmers were checked on January 3, 1981 and aht<<that all but 15 of the warmers were above 250°F. Of those 15 warmers, all were 200°F or higher.

During this investigation
the Resident Inspector also observed that unacceptable rod warmers in the field issur<e rooms, were properly tagged and segregated in a clearly marked area.

The licensee has been cited in the past with noncompliances by the NRC as identified in the following IE Inspection Reports:

Number$U	Cited$SNoncompliance$U
75-05	Holding oven contained both stainless steel and low hydrogen carbon steel rod
76-07	(1) Portable electrode (warmer) oven not plugged in and approximately 10 electrodes were not in the warmer.

Number$U	Cited$SNoncompliance$U
	(2) Two 50 lb. cans of low hydrogen (7018) electrodes had holes in them and several cans were damaged.
	(3) Documentation for temperature calibration for three weld rod holding ovens was not available.
76-11	Partially burned and unburned weld rod was found lying outside containers or ovens in several locations in the plant.
77-02	Holding oven contained both stainless steel and low hydrogen electrodes.
~~79-07~~ 79-07	Holding oven contained both stainless <<< (1) Approximately three dozen partial, damaged, or unused electrodes were found lying on the floor, scaffolding, and in a cable tray.

Number$U	Cited$SNoncompliance$U
	(2) Three rod ovens were not provid.d with thermometers for directly measuring oven temperatures.
	(3) Calibration of two rod ovens was past due.
	(3) Calibration of two rod ovens<<< was past due.<<<
79-15	(1) Filler materialdK and consumable inserts maintained in ovens and on shelves without traceability to heat/lot nume<bers.
	(2) Filler me<aterial heating ovens contained food.

Number$U	Cited$SNoncompliance$U
	(3) 50 containers of noncon-forming weld rod was not identified as nonconforming.
80-07	Two portable warmers were not plugged in.
8C-14	One portable o<rod warmer was not po<lugged in.
80-19	One portable rod warmer was not plugged in.

The citations concerning portable rod warmers not being plugged in and holding ovens containing different types fo<<of rods were violations of site procedures and not ASME or AWS Codes.

The RIII inspectors identified no additional items of noncompliance or significant concerns relevant to weld rod temperature controls.

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2a. Weld$SRod$SPaperwork$Sand$SLabeling$SRequirements$U

The paperwork used to account for weld rod was the KEI-2 form (weld rod issue slip). The KEI-2 form required the welder's, the welder's foreman, and the weld rod issuer's signatures, which permitted the welder to obtain weld rods for a specific weld from the rod shack (field storeroom).

The RIII inspector reviewed the following KEI-2 forms for evidence that indicated the weld rods had not been properly accounted ori< the KEI-2 forms had f<been falsified.

KEI-2 No.	Weld$SDrawing$SNo.$U	Rod$SIssue$SDate$U
186553	PSK-1HG-11	Sept. 1979
186554	PSK-1HG-11	Sept. 1979
198846	PSK-1HG-11	Sept. 1979
198847	PSK-1HG-11	Sept. 1979
196277	PSK-1HG-1	Sept. 1979
196276	PSK-1HG-1	Sept. 1979
198800	M462-1-HG-1	Sept. 1979
198797	M462-1-HG-1	Sept. 1979
185819	PSK-1MS-34	Oct. 1979
185843	PSK-1MS-34	Oct. 1979
185841 ~~18541~~	PSK-1MS-34	Oct. 1979
185818	PSK-1MS-34	Oct. 1979
185763	PSK-1MS-34	Oct. 1979
185856	PSK-1MS-34	Oct. 1979
185864	PSK-1MS-34	Oct. 1979
195934	1MS-37	Oct. 1979
~~196934~~	~~1MS-36~~	~~Sept. 1979~~
196329	1MS-36	Sept. 1979
~~196330~~	~~1MS-36~~	~~Sept. 1979~~

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~~196359~~	~~1MS-36~~	~~Sept. 1979~~
196359	1MS-36	Sept. 1979
196330	1MS-36	Sept. 1979
195868	1MS-37	Oct. 1979
186618	1MS-35	Oct. 1979
198958	M471-5-RR-207	Sept. 1979
198957	M471-5-RR-207	Sept. 1979
196314	M471-4-RR-170	Oct. 1979
196436	M471-4-RR-170	Oct. 1979
105242	PSK-WR-37	Oct. 1979
198973	M-148-WR-40	Sept. 1979
198784	M-148-WR-40	Sept. 1979
198972	M-148-WR-40	Sept. 1979
185910	ISK-M-447-WR-75	Oct. 1979
195843	ISK-WR-53	Oct. 1979
195844	ISK-WR-53	Oct. 1979
195859	M-447-WR-53	Oct. 1979
195860	M-447-WR-53	Oct. 1979
194906	PSK-1WS-71	Oct. 1979
170145	PSK-1WR-06A14	Oct. 1979
199448	PSK-WR-9	Oct. 1979
199651	PSK-1WR-80	Sept. 1979
185884	M148-WR-41	Oct. 1979
186707	M148-WR-42	Oct. 1979
195853	M447-WR-71	Oct. 1979

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186632	PSK-WR-45	Oct. 1979
185917	M447-WR-49	Oct. 1979
195758	PSK-1WR-47	Oct. 1979
186619	1MS-35	Oct. 1979
195134	M-471-12-RR(93)	Oct. 1979
188597	M-471-12-RR(93)	Oct. 1979
195130	M-471-12-RR(99)	Oct. 1979
195138	M-471-12-RR(99)	Oct. 1979
188595	M-471-12-RR(99)	Oct. 1979

All of these KEI-2 forms were signed (usually by initials or mark) in the space designated for the rod issuer which indicated that the respective welding rods had been properly accounted by the assigned construction (non-Quality Control, non-QC) personnel. The RIII inspector reviewed several other KEI-2 forms of different time periods to compare the consistency of signatures and the types of inks used. None of these KEI-2 forms appeared to be falsified. The RIII inspector could not determine if the above KEI-2 forms were for day shift or evening shift activities.

The KEI-2 forms required no QC signatures and were therefore not QC records which would signify QC verifications that the correct weld rods were used. The QC verifications of weld rod were required to be made at the place and time of the actual weld activity and documented on the KEI-1 forms (weld inspection records).

The findings related to allegations P-2/13 and P-2/16 addressed in this Investigation Report No. 81-13 revealed the following paperwork deficiencies concerning KEI-1 forms and the respective weld rod verifications by QC inspectors:

(1) QC inspection criteria had been improperly delec<ted or designated as not applicable from the KEI-1 forms (QC records).

(2) KEI-1 forms (QC records) had been improperly altered based on information on KEI-2 forms (non-QC records).

These deficiencies have been identified as items of noncompliance.

2b. Neither the personnel interviews, the record reviews, or the observation of activities related to weld rod control identified any specific meaning of the alleged concern about labeling requirements. Therefore, this concern was not substantiated.

5.1.1 Allegation

"KEI knowingly installed and ripped out unsuitable main steam relief piping, at an estimated labor cost of $320,000."

5.1.2 Background Information

The Zimmer facility uses a General Electric Mark II containment system design, which includes a pressure suppression pool in the lower levels of the containment building. During large-scale testing of the subsequent Mark III containment design system and from actual Mark I operating experiences related to safety relief valve actuations, new suppression pool hydrodynamic loads associated with postulated loss-of-coolant accidents (LOCA) were identified that had not been explicitly considered in the original design of the Mark II containment system. These newly identified loads result from the dynamic effects of drywell air and steam being rapidly forced into the suppression pool during a postulated LOCA, or safety relief valve actuation. When this possible problem was identified, General Electric and NRC and its consultants performed an in-depth review of the General Electric Mark II containment system design. Utilities owning facilities that would use the Mark II containment system also formed an owners' group to share calculations, evaluations, and acceptable modifications to the BWR Mark II containments.

The NRC effort in reviewing the new dynamic loads was divided into two programs: a short-term evaluation program for the lead plants (Zimmer, La Salle, Shoreham), and a long-term program for final detailed evaluation of the adequacy of modifications. The description of the NRC load evaluation is available in NUREG-0487, "Mark II Containment Lead Plant Program Load Evaluation and Acceptance Criteria," published in November 1978. This document indicates that the lead plants, those first to use the Mark II containment system, would be reviewed by NRC to determine the acceptability of modifications made in their design to accommodate the identified loads. NUREG-0474, "A Technical Up-Date on Pressure Suppression Type Containments in Use in U.S. Light Water Reactor Nuclear Power Plants," issued in July 1978 details the ongoing NRC monitoring of the modification and analysis program. NUREG-1371, "Task Action Plans for Generic Activities (Category A)," issued in November 1978 identifies review of the Mark II pressure suppression containment as Generic Task A-8. NUREG-0510, "Identification of Unresolved Safety Issues Relating to Nuclear Power Plants, Report to Congress," issued in January 1979 identifies two generic tasks (Tasks A-8, A-39) as being related to the analysis of suppression pool dynamic loads and safety relief valve loads/temperature limits for BWR containments.

In the lead plant program load evaluation, NRC approved the design basis used for modifications to the suppression pool system, including a device known as a "T quencher" as part of the safety relief system, and additional equipment such as base and wall plates to support these new installations.

5.1.3 Investigation

5.1.3.1 Interview of Individual A

On February 24, 1981, Individual A, who was previously interviewed by representatives of GAP, was interviewed by NRC. Individual A stated that Kaiser had installed a large portion of the main steam relief (MSR) piping, knowing that sections of it would later have to be removed after installation. He recalled that, 2 years after its installation, Kaiser removed large sections of the piping at and below the 525-ft. level of the reactor containment building but left the pipe sections above that level in place.

On April 22, 1981, Individual A provided a written statement attesting to the preceding information; however, he requested that the statement not be attached to this report.

5.1.3.2 Interview of Individuals B and C

On April 14 and 16, 1981, Individuals B and C, both of whom supposedly provided information regarding this allegation to representatives of GAP, were interviewed by NRC. They both stated that they had no information concerning this allegation.

5.1.3.3 Interview of H. C. Brinkman

During the period of February 9-13, 1981 and February 23-27, 1981, discussions with H. C. Brinkman, Principal Mechanical Engineer, CG&E, indicated that experimentation had revealed the need to redesign the relief system based on newly identified discharge loads. Therefore, several utilities, including CG&E, decided on a modification to replace the already installed "rams head" safety relief valve (SRV) discharge devices with "quenchers."

In 1975, CG&E decided to start designing the quencher modification, knowing that part of the piping to be installed would later have to be removed due to the identification of new discharge loads. The basis for the decision was that approximately 90 to 97% of the original quencher modification would likely be acceptable and therefore only 3 to 10% would be subject to rework. CG&E concluded that it would be less costly to proceed with installation activities rather than delay the construction schedule until the quencher modification design was complete. To date, the modification installation is not complete.

5.1.3.4 Record Review and Onsite Observations

The MSR modification has required (in part) the replacement of 10-in. Schedule 40 pipe with other 10-in. Schedule 40 pipe of different specification that is, 10-in. extra strong pipe and 12-in. extra strong pipe (thicker walled pipe).

During this investigation, the licensee provided cost figures for the modification to date. The total labor cost was $823,780 and the total material plus labor cost was $1,183,690. NRC made no attempt to corroborate these costs or the licensee's claim that it was cheaper to proceed with an installation known to require rework before installation actually took place.

The RIII inspector reviewed all revisions to the KEI isometric drawing PSK-1MS, Sheets 21 and 21A, that were pertinent to the main steam relief piping. The revisions identified the following changes:

Rev. No.	Implemented Change	Date
Rev. 0	Redrawn--original configuration replaced	9/8/76
Rev. 1	Hangers added	3/31/77
Rev. 2	Eight lugs added	1/10/78
Rev. 3	Hanger changed	5/5/78
Rev. 4	New spool pieces added, welds MS212 and MS195 voided per S&L	4/3/79
Rev. 5	Piping tee section added	6/18/79
Rev. 6	Weld MS160 and a 4-in. dimension added	10/1/79
Rev. 7	Field-marked (redline) updates added	1/9/80
Rev. 8	Welds K-461 and K-463 changed; weld K-592 changed to K-593 per NR-2499; hanger detail section D-D added	8/27/80

Rev. No.	Implemented Change	Date
Rev. 9	Weld K-592 changed to K-461; weld K-593 changed to K-594	9/4/80

The RIII inspector reviewed the QC documentation for the following main steam relief piping field welds: 160, 160A, 267A, 267B, 267C, 267D, 268B, 268C, 459, 460, and 461. The records showed that the welds had been accomplished in accordance with the appropriate code, ASME Section III 1971, with Summer 1973 Addenda.

The RIII inspector interpreted the radiographs for the following main steam relief piping field welds: 160A, 459, 460, 461, 462, and 594. There were approximately five to seven radiographs for each of these welds. A varying number of radiographs were necessary to cover the entire 360 degrees of each pipe weld. The radiography was performed in accordance with the appropriate code, ASME Section III 1971, with Summer 1973 Addenda. The RIII inspector identified no unacceptable weld indications on the radiographs.

The preceding discussions and reviews indicate that the [redacted] activities were performed in accordance with the KEI QA program.

5.1.4 Findings

CG&E made an economic decision to install piping for the main steam relief system, approximately 3 to 10% of which would have to be removed due to continuing identification of changes in design loads. No attempt was made to substantiate the estimated labor cost for the portion of pipe that was installed and removed. However, cost figures to date were available for the total design modification relevant to the main steam relief piping.

5.1.5 Items of Noncompliance

No items of noncompliance or deviations were identified.

I Allegation$SNo.$S11$U

"Sand and mud choke the feedwater pumps and intake flues carrying makeup water to the cooling tower, because of a flaw in the plant's design. Pumps used to rectify the flaw quickly burn out."

II Findings$U

The portion of the allegation that alleged a<sand and mud choke the ff<eedwater pumps and intake flues was substantiated in that the licensee reported a silting condition concerning the Service Water Intake Structure to the NRC Region III by phone on June 18, 1979 and by letters QA-1148 on June 20, 1979 and QA-1163 dated July 23, 1979, pursuant to the requiree<ments of 10 CFR 50.55(e).

The portion of the allegation that alleged the choking of the pumps was caused by a flaw in the plant design was substantiated in that the plant design and operating procedures had to be modified to control the silting condition.

The portion of the allegation that alleged pumps used to rectify the fal<<flaw quickly burn out was not substantiated. However, accelerated service water pump impeller wer<ar was reported by the licensee by phone on August 10, 1979 and by letters QA-1196 dated September 6, 1979, QA-1239 dated December 31, 1979, and QA-1371 dated December 17, 1980, pursuant to the requirements of 10 CFR 50.55(e).

The silting and pj<ump impeller wear concerns are unresolved pending notification to the NRC Region III by the licensee of the completion of the corrective measures described in the Wm. H. Zimmer FSAR, Appendix J, Revision 69 dated December, 1980 (including a sedimentation monitoring program and plant modifications ~~dated December 1980~~). The implementation of these corrective measures will be reviewed during a subsequent inspection.

No items of noncompliance were identified.

III Investigation$U

The licensee reported ~~RIII inspector reviewed~~ the alleged silting condition identified in CG&E letters, QA-1148 dated June 20, 1979 and QA-1168 dated July 23, 1979, and the service water pump impeller wear condition identified in CG&E letters QA-1196 dated September 16, 1979, QA-1239 dated December 31, 1979, and QA-1371 dated December 17, 1980 ~~which were sent~~ to the NRC Region III pursuant to the requirements of 10 CFR 50.55(e). Copies of these letters are enclosed as Attachments T, U, V, W, and X to this IE Investigation Report No. 81-13.

The silting and the pump impeller wear conditions along with the measures to correct these conditions are described in the following excerpts from the Wm. H. Zimmer Final Safety Analysis Report, Ap;<pendix J Revision 69, dated December, 1980.

The corrective measures to be taken as described in the ~~aforementioned~~ excerpts have been reviewed and accepted in the Safety Evaluation Report Related To The Operation Of Wm. H. Zimmer Nuclear Power Station, Unit 1, Supplement 1 Issued June, 1981, Subsection 9.2.1 by the Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission.

The implementation of these corrective measures is unresolved pending notification by the licensee of the completion of the corrective measures described in the Wm. H. Zimmer FSAR, Appendix J Revision 69, dated December, 1980. (353/81-13-31)

No items of noncompliance were identified.

J.1 INTRODUCTION

Two potential 50.55(e) items were reported on the Zimmer Power Station service water system:

a. service water pumps accellerated impeller wear, and

b. silt buildup in the intake structure.

Investigations concluded:

a. The service water pump accellerated impeller wear was definitely reportable. Pump and service water system modifications were required.

b. Silt buildup in the intake structure could be prevented with proper maintenance procedures and, therefore, was not reportable under 50.55(e). 69

This report is intended to document studies conducted in arriving at these conclusions. It also provides detailed understanding of the phenomena involved and explains how the plant modifications and operating procedures will prevent reoccurrence.

Prior to Zimmer Power Station's reporting the two potential 50.55(e) items, the NRC had accepted the service water system in the Zimmer Power Station Safety Evaluation Report (SER, NUREG-0528). The intended modifications to the existing service water system, together with revised operating procedures, fully resolved both these potential 50.55(e) items.

Nevertheless, Zimmer Power Station has elected to install an auxiliary pumping system to meet criteria beyond those required for licensing. This auxiliary pump system is described in this appendix.

J.2 OVERVIEW PLANT ORIENTATION

J.2.1 General

The service water system is designed to take water from the Ohio River, remove heat rejected from various plant components, and return the water to the Ohio River. The service water system is designed to provide a source of cooling water to both essential and nonessential equipment. The essential portion of the service water system is designed to remain operational after simultaneous occurrence of a seismic event, loss of offsite power, failure of any one active or passive component, and the design-basis loss-of-coolant accident. The service water system is designed to remain operational during the maximum probable flood and extreme low water conditions. The service water system design has been accepted by the NRC in the Zimmer Safety Evaluation Report (NUREG-0528), dated January 1979.

J.2.2 Service Water Pump Structure

The water is drawn into the service water system via the intake flume to the service water pump structure (see Figure J.2-1). The service water pump structure houses the four essential service water pumps and two nonessential cooling tower makeup pumps. These six pumps take suction from a common pump bay. The Ohio River water flows into this pump bay via the intake flume through two sets of traveling screens to prevent 69
debris from entering the pump bay (see Figures J.2-2 and J.2-3).

J.2.3 Service Water Pumps

The service water system has four motor-driven, horizontal, single-stage, double suction, double volute, centrifugal pumps manufactured by Bingham-Willamette Company. The service water pumps are designed to operate at 1800 rpm, 1250 hp, and provide 12,500 gallons per minute (gpm) of water at 295 ft total dynamic head (TDH).

J.2.4 Service Water Distribution Piping

The service water system piping is divided into two separate distribution systems with a common return line to the Ohio River. Each independent loop consists of two pumps, joined into a common header providing strained Ohio River water to various plant components (see Figure J.2-4). Each independent service water loop is divided into an essential division (shown on Figure J.2-4 above dotted line) and an isolable nonessential division shown on Figure J.2-4 below dotted line). The essential loads service water pump cubicle cooling, diesel-generator cooling, residual heat removal (RHR), reactor building closed cooling water (RBCCW) are redundant. The cooling requirements for postaccident conditions can be met by either loop. During full power operation, both loops are required to handle the nonessential loads (radwaste and turbine auxiliaries). During full power operation, either two pumps, one on each loop, or three pumps, two on one loop and one on the other loop, are required to meet maximum plant demand. During emergency shutdown and subsequent long-term cooling, one pump on either loop is capable of meeting the essential cooling loads.

J.3 INITIATING EVENTS

In March of 1978, two of the service water pumps were initially placed into service. The two pumps were run, only one at a time, periodically as needed during the construction of the plant. The remaining two pumps were run only for testing purposes (to check for motor rotation, etc.). In March of 1979, one of the two pumps that had been operating was removed from service for maintenance. The two pumps that had operated had accumulated a run time of approximately 3000 hours each. The casing was opened and impeller erosion was found. The damage was initially believed to be due to cavitation. It was believed that uncontrolled flow (runout) during construction activities or suction pipe blockage was the cause of the postulated cavitation. In April of 1979, a testing program was initiated to determine the cause of the impeller erosion. 69

J.4 INVESTIGATION

In early April 1979, a diver was sent into the pump bay to inspect the suction piping. It was reported that 2 feet of silt had accumulated over the top of the suction pipe. It was also reported that the pumps became noisy when two pumps were operating. An in-plant pump test was arranged to monitor vibration during one- and two-pump operation. During two-pump operation, an increase in noise and vibration was noted. It was initially theorized that the water had made "rat holes" in the silt and that when two pumps were operating together, the interaction between the pumps caused the suction to be "starved". Another theory was that air was being sucked into the pumps in a vortex. By mid-July, the pump bay had been cleared of all silt and the pumps were again ready for another similar in-plant test. A similar increase in noise and vibration was observed when two pumps were operated simultaneously. A diver was again sent down to inspect the suction pipes during pump operation and confirmed that no suction blockage was present nor were there air vortices. It was then theorized that the noise and vibration was due to pump internal recirculation caused by low flow. It was determined that a better test, including flow measurement, would be needed. On August 9, 1979, an additional in-plant test was performed. This test included flow measurement as well as vibration. It was observed that there was a significant increase in noise and vibration below approximately 10,000 gpm. These tests were believed to confirm that the cause of the impeller wear, as evidenced by noise and vibration, was due to internal recirculation within the pump. Cavitation caused by insufficient NPSH was not a factor. 69

On August 10, 1979, this was reported to the Region III offices of the NRC as possibly reportable under the requirements of 50.55(e). After subsequent study and investigation, it was determined that this was indeed a reportable item because it met the following two criteria:

a. If uncorrected, it would have affected the safety performance of the service water pumps.

b. Although the pump meets the performance at the design point, it is a significant deviation from the performance specification and does not meet the broad operating range specified (0%-100% design flow).

Programs were immediately implemented to:

a. Modify the pump to accommodate a lower minimum flow without recirculation problems.

b. Modify the service water system controls to prevent pump operation below the minimum flow requirements.

J.5 DESCRIPTION OF THE PHENOMENA

J.5.1 Pumps

In general, when a pump is specified, one design performance point is given. Frequently, a desired operating range is also identified. In the case of the service water pumps, the design point was 12,500 gpm, 295 ft TDH. A desired operating range of 0%-100% design flow (12,500 gpm) was specified.

When a manufacturer designs a pump, the pump is designed for one operating point, the best efficiency point (BEP). The manufacturer will guarantee that the pump will meet purchaser's performance design point (which is not necessarily the manufacturer's BEP). However, the manufacturer will not usually guarantee an operating range.

There are several consequences to operating at points on the pump curve other than the BEP. To understand this, one must first understand the internal flow paths in a pump. Figure J.5-1 shows a cross-section of a pump cut along the length of the shaft. The flow, in general, enters along the shaft into the impeller eye, gains energy due to the centrifugal forces, and exits the impeller into the diffuser or volute at right angles to the shaft. A more detailed view of the flow paths of the fluid in an impeller is shown in Figure J.5-2. Figure J.5-3 shows a detailed section of the impeller cut across the shaft and the flow paths of the fluid at off-peak performance. During operation at the BEP, the blade inlet angle and the flow angle coincide, such that, the flow incidence angle is zero. As operation begins to deviate for the BEP, the flow incidence angle increases. Small incidence angles affect the efficiency of the pump but do not subject the pump to any abnormal wear or performance deterioration. When the flow differs significantly from the BEP, the flow incidence angle increases causing an uneven pressure and velocity distribution across the impeller vanes. This is evidenced by increased noise and vibration in the pump. If this flow incidence angle is large enough, flow separation occurs. This causes the local fluid pressure to decrease below the vapor pressure and the fluid vaporizes. These vapor bubbles are violently collapsed by higher local pressure regions along the impeller vane and minute portions of metal are actually displaced. If this continues for extended periods of time, accelerated wear can be detected. If this accelerated wear is permitted to continue unnoticed, performance will begin to deteriorate. This type of deterioration takes place over extended periods of time and immediate catastrophic failure does not result. The impact of this phenomena varies with the pump design parameters. 69

The Zimmer service water pumps appeared to exhibit this noise and vibration characteristic of low flow internal recirculation at flows below approximately 10,000 gpm. The pumps were very quiet and smooth at flows at or above 12,500 gpm. It was therefore concluded that this phenomena would not affect the performance of the pumps when called upon to perform their safety function. Since this accelerated wear situation occurred during plant construction, a study was made to determine if this phenomena would be encountered in normal, day-to-day, full power operation.

J.5.2 Seasonal River Variances

The Ohio River elevation and temperature change with the seasons. Both of these seasonal changes can affect the operation of the service water pumps. The river temperature can vary from a mid-summer high of 85° F to a mid-winter low of 35° F. This temperature change has an effect on the tube side inlet temperature of the plant heat exchangers which can affect the service water pump flows. Because of the location of the plant in relation to the nearest upstream and downstream dams (Meldahl 7 miles upstream and Markland 88 miles downstream), the normal water elevation can vary widely. Since the service water pumps take suction directly from the river, this elevation change affects the net positive suction head (NPSH) available at the pumps.

The service water pump flow is determined by the plant system demand. During accident conditions, this demand is constant (approximately 12,500 gpm). During normal full power operation, service water flows are determined by cooling required by plant components. The required cooling medium flows are determined by the design conditions of the individual components. 69

Heat exchangers, like pumps, are designed for one set of design conditions (inlet and outlet temperatures for both the shell side and the tube side flows). If any parameter is changed, the other parameters will also change.

For simplification, the heat exchanger flow requirements for the Zimmer Plant can be placed into three categories - continuous, modulating, and intermittent. Continuous flows are those that have a fixed flow regardless of plant operating conditions (for example, service water pump cubicle coolers). Modulating flows are those that are controlled by a temperature control valve that modulates to vary the flow of the cooling fluid (service water) to maintain a constant process fluid (shell side) temperature (for example, RBCCW, TBCCW). Miscellaneous flows are those that maintain a constant flow when operating but are only operated intermittently (for example, radwaste concentrator condenser, diesel-generator testing, and RHR system operation).

The river variations have a negligible effect on the continuous and intermittent flows. However, the effects on the modulating flows cannot be neglected. By design, the outlet temperature of the process side of the heat exchangers with modulating flows is controlled to be maintained constant. If the heat transferred from the process side to the cooling side is assumed relatively constant, then the cooling flow required will vary with the cooling medium (service water) inlet temperature. In order to meet the required cooling capacity for accident conditions, the heat exchangers (and therefore the service water pumps) must be sized for the flows required to meet that cooling capacity at the highest possible river temperature. The design Ohio River temperature is 95° F. As stated previously, the river temperature can actually vary from 35°-85° F.

The design flow for the accident condition is approximately 12,500 gpm total supplied by one pump on either loop. The design flows for normal operating conditions (based on 95° F river water) are approximately 12,500 gpm per loop. The actual expected flow during normal operation with normal expected river temperatures can vary from approximately 2000-7000 gpm per loop with both loops required to be operating.

The net positive suction head required (NPSHR) is the pressure required at the pump impeller eye to prevent the vaporization of the pumped fluid. This parameter is dependent on the pump characteristics and is determined during the pump shop tests. The net positive suction head available (NPSHA) is the pressure available at the impeller eye taking into consideration fluid elevation, fluid vapor pressure at design temperature, and suction friction losses. The NPSHA is dependent on the specific pump installation and is calculated based on known parameters. To avoid cavitation, the NPSHA should be greater than the NPSHR. 69

The river elevation has an effect on the NPSHA. The minimum NPSHA during normal conditions occurs when the river is at pool and provides 47 ft NPSHA. The service water system is designed for extreme low water as well as maximum probable flood. If there were a loss of the downstream dam (Markland), the river pool could theoretically drop and the NPSHA would drop to 35 ft NPSHA. If the assumption is made that the dam fails concurrently with the record low river flow, the water elevation could theoretically drop further and there would be only 33 ft NPSHA. The pumps are designed for 31 ft NPSHR. Therefore, it can be concluded that the design point is conservative and the design is adequate for all postulated river elevations.

When the Zimmer Plant was originally designed, it was believed that the service water pumps would operate over the complete range of conditions (LOCA requirement as well as normal operating requirements) so no flow control, other than the heat exchanger controls, was specified. Since the minimum flow of the original pumps was shown to be approximately 10,000 gpm and the normal day-to-day requirements were clearly below these pump minimum flow requirements, improvements were pursued in the pump design and service water system design.

J.6 PUMP MODIFICATIONS

Several options concerning modifications and design changes to the original pump design were pursued with the pump vendor. The first option considered was to modify the existing impeller. This modification was shop tested. The results of the tests showed that the impeller still met the design performance point and provided a minimum flow of 7500 gpm. This improvement was obtained without sacrificing the NPSH conservatism. The second option considered was a complete new pump design. As a result of this investigation, it was determined that no commercially available pump could meet the desired flow range (2000-7000 gpm) and still meet the required design point (12,500 gpm) without sacrificing NPSH requirements. The third option was to design a new impeller to better accommodate the wide range of flows. The pump vendor arrived at an optimum impeller design for the existing pump casing. The new design included a smaller eye area which increased the suction velocity. The new design had the same number of vanes, but had the two halves of the double-suction impeller staggered. This change made the impeller even stronger and should reduce the pressure pulsations and vibrations. The vane inlet angles were also changed to reduce the mismatch of vane angle and flow angle at off-peak performance. This new impeller was also shop tested. The results of the shop test showed that the new design impeller meets the original design point (12,500 gpm) without sacrificing the NPSH margin. The minimum flow for this impeller is approximately 7500 gpm. 69

From the above, it was concluded that the new design impeller is the best choice because it is stronger and gives better off-peak performance without sacrificing the original design performance point. It is believed that this new impeller design is the best solution available given the site-specific design constraints. It was decided that these new design impellers would be installed and their operation would be demonstrated prior to fuel load. It was also concluded that the 7500 gpm pump minimum flow was not sufficiently low; therefore, system modifications were investigated as well.

J.7 SERVICE WATER SYSTEM MODIFICATIONS

It was decided that the pump modifications alone were not sufficient to protect the pumps, so a minimum flow control system was designed with the following criteria:

a. The system must maintain flow at or above 8000 gpm per pump at all times during plant operation.

b. The system must not degrade the already accepted system design.

c. Flow measurement should be provided at each pump.

d. The flow measurement should have an alarm to sound if flow decreases below 7500 gpm.

e. No changes would be made to the pump auto-start, manual-trip logic.

Figure J.7-1 and Table J.7-1 show the modification options and their relative merits. One option was to use two essential, motor-operated, 4000 gpm valves for each pump located in the service water pump structure that would allow water to be bypassed directly back to the river. The second option was to install one 8000 gpm nonessential, air-operated, modulating control valve per pump to be located in the turbine building that would allow water to be bypassed into the service water discharge line. The decision was made to install the nonessential valves. These nonessential valves would be located downstream of the isolation valves and would therefore be in nonessential piping. The essential valve added complexity to an already complex essential system and would require logic changes to an essential system. Failure of essential valves in the open position could jeopardize the capability of the service water system to meet the demands of the essential cooling loads. Failure of the nonessential valves in the open position would not jeopardize the capability of the service water system to meet the essential cooling loads because if a design-basis accident were to occur, the nonessential portion of the system would be isolated. The failure of either the essential or nonessential valves in the closed position would not immediately affect pump safety performance and manual actions could be taken, if necessary. 69

The isolation of the nonessential portion of the service water system could cause loss of minimum flow control. Only two events would cause this nonessential portion isolation. The first is a loss of off-site power. Upon return of emergency diesel power, the isolation valves will close. The second is a low service water header pressure signal indicating a major service water pipe break. Although these events are rare, the pump design criteria required that a minimum pump flow of 8000 gpm be maintained at all times. System modifications were initiated such that, in the unlikely event of nonessential portion isolation, the minimum flow is maintained by automatic opening of the associated RHR and RBCCW heat exchanger service water valves on the appropriate service water loop. Procedural changes are being implemented to have the diesel-generator cooler service water valves open at all times.

Once it was decided that two 8000 gpm control valves would be installed in each service water loop (one control valve per pump), a decision on the automatic or manual control was needed. Three options were considered - two remote manual valves; one control valve, one remote manual valve; and two control valves. Two remote manual valves would require an operator to manually open a valve when the low flow alarm is sounded. To have one automatic control valve and one manual valve would only require operator action when two pumps were running on one loop. Two control valves would not require any operator action to maintain flow at or above 8000 gpm per pump for any operating condition. For this reason, two control valves were chosen. Figure J.7-2 shows the anticipated operating curve for various plant demands. The control signal for the minimum flow control valves will come from ultrasonic flow elements located at each pump. 69

It was concluded that the chosen design met the design criteria. Two nonessential modulating control valves will be installed in each service water loop. The control signal from each pump will control one valve, therefore ensuring protection for each pump. In the unlikely event of nonessential portion isolation, the combination of RHR, RBCCW, and diesel-generator coolers will be sufficient to protect the service water pumps from extended run time in the low flow recirculation mode. The valves will be installed in the isolable, nonessential portion of the service water system so any failure of the control system could be isolated from the essential portion of the loop affected, if necessary. Flow elements are being installed on each pump with control and alarm functions. No changes were proposed to the auto-start, manual-trip system logic. Work on this system is proceeding and the minimum flow control system will be installed and operating prior to fuel load.

J.8 SILT SITUATION

J.8.1 Source of Siltation

The sediment in the flume is the result of runoff in the Ohio River drainage basin. The Ohio River drainage basin consists of parts of Ohio, Pennsylvania, New York, West Virginia, Maryland, Virginia, North Carolina, and Kentucky. As previously discussed, a significant buildup of silt occurred in the intake flume and pump bay during plant construction. During this period, water velocities in the flume were lower than normal because only 1/2 to 1/3 normal plant service water flow was being pumped through the system.

The Ohio River carries heavy loads of suspended sediment during floods. The suspended sediment consists of clay, silt, and fine sand. The material requires a long detention time for the sediment to deposit; therefore, a major part of the suspended sediment should not deposit in the flume during normal operation of the plant but will be carried through the pumps back into the river or the cooling tower basin. Some of the larger diameter particles of sediment will settle in the flume and service water pump bay. The intake and service water pump structure (SWPS) will require monitoring and periodic dredging. This is normally considered a part of maintenance and operations of a power plant. 69

The Wm. H. Zimmer Nuclear Power Station is located on the right bank of the Ohio River, 0.3 mile downstream from Moscow, Ohio, at river mile 443. The Captain Anthony Meldalh Dam is 7 miles upstream from Zimmer. Zimmer is in the Markland Dam pool and the dam is 88 miles downstream from Zimmer.

The service water pump structure consists of a concrete caisson sitting on rock. The intake flume is a steel sheetpile structure with the piles driven to rock. The intake flume is approximately 150 feet long and 30 feet wide and is angled downriver at 45° to prevent barge impact. The flume has three levels of braces at elevations 458 ft 11½ in., 473 ft 5½ in., and 506 ft 5 in. The top of the sheetpile walls is at elevation 510 ft 0 in. The flume has a concrete slab at the bottom at elevation 437 ft 0 in. A floating trash boom will be located at the entrance of the flume to prevent large floating objects from entering the flume. A bar grill is located at the entrance to the SWPS to prevent smaller objects from entering the pump bay (see Figure J.2-1).

The normal pool elevation of the Ohio River is 455 ft 0 in. The 1937 modified flood of record is elevation 508 ft 6 in. The design maximum probable flood is at elevation 546 ft 0 in. (see Figure J.8-1).

The service water pump structure has four service water pumps, two on each side, located at elevation 435 ft 0 in. The two cooling tower makeup pumps are also located at this elevation. There are four traveling screens in this area.

The intake flume was constructed in 1976. A temporary sheetpile cut-off wall was installed at the entrance to the flume and the top of the cut-off wall is at elevation 463 ft 0 in. The flume was dewatered and the concrete slab at elevation 437 ft 0 in. was placed in mid-September of 1976. This was the beginning of the sediment deposition in the intake flume whenever the river exceeded elevation 463 ft. The concrete plugs that held water out of the service water pump structure were removed on February 16, 1978. This was the beginning of sediment deposition in the service water pump structure pump bay. Two pieces of the sheetpile cutoff wall were lifted up in March 1978 to ensure flow of river water to the flume when the river was below elevation 463 ft. The balance of the sheetpile cutoff wall was removed in September 1979. One service water pump, with a capacity of 12,500 gpm, has been pumping water intermittently from the service water pump structure since March 1978.

The siltation was discovered in April 1979 as part of a pump field test
investigation. The depth of the sediment was approximately 12 feet at
the mid-point of the flume. The sediment tapered to an approximate
5-foot depth at the service water pump structure and at the river end
of the flume. The coarser material and fine sand was deposited at the
river end of the intake flume. The finer material, with longer detention
times, was carried further into the flume and into the service water pump
structure. The very fine sedimentation material was pumped through the 69
system and back into the river. This is documented in the Harza Engineer-
ing Company Report attached hereto as Attachment J1.

The Harza Engineering Company was retained in May 1979 to investigate the siltation and estimate future sedimentation rates. The siltation estimates were based on two river sampling surveys. The survey at low water was conducted in June 1979 and the survey at high water in March 1980. The March 1980 survey consisted of obtaining suspended sediment samples and bed material samples above and below Meldahl Dam and the Zimmer intake flume. No appreciable difference in suspended sediment above or below Meldahl Dam or the Zimmer intake flume was observed.

The final Harza Report for a flume discharge of 31,000 gpm predicts an annual sedimentation rate in the intake flume under average annual flow conditions of 12.8 feet and 16.6 feet under 25-year annual flow conditions. The corresponding sedimentation rates in the service water pump structure would be 6.8 feet and 8.7 feet, respectively. The corresponding maximum monthly sedimentation rates in the intake flume would be 2.2 feet and 2.4 feet, respectively. Twenty-five year annual flow conditions and 40-year annual flow conditions would be 2.2 feet, 2.4 feet, and 3.8 feet, respectively. The corresponding sedimentation rates in the service water pump structure would be 1.2 feet, 1.3 feet, and 2.0 feet. The sedimentation in the intake flume during a 100-year flood would be 4.2 feet and 4.4 feet for a 200-year flood. The corresponding sedimentation rates in the service water pump structure for the 100-year flood and 200-year flood would be 2.2 feet and 2.3 feet, respectively. Approximately 75% of the annual sedimentation will be deposited in the December-May time frame. The largest sedimentation buildup would be expected in the month of March.

J.8.2 Silt Prevention

After consideration of the quantity of silt expected to accumulate annually, a permanent continuous monitoring system was developed. This monitoring system makes use of five ultrasonic transducers located in strategic locations in the intake flume and pump bay (see Figures J.8-2 and J.8-3). Similar devices are now in use throughout the plant to measure sludge levels in tanks. Although there are five transducers, only four indicators will be used. Due to the difficulty in reaching the transducers in the pump bay, redundant transducers will be installed for maintenance. However, only one indicator will be used at a time. The monitoring panel will be located in the service water pump structure. Alarms will sound in the main control room as well as locally. Installation of this system is proceeding and successful operation will be demonstrated prior to fuel load.

Because traditional silt removal devices could not be used in the pump bay area, a system of spray nozzles was designed. These nozzles (shown in Figures J.8-4 and J.8-5) use the cooling tower makeup pumps for their water source. The objective is to keep the silt in suspension to prevent deposition. It is anticipated this spray piping will be operated periodically as needed to resuspend any sediment that may 69
have settled since the last jetting period. The silt that is resuspended will be pumped through the service water system in the normal flow paths. The pump vendor has been contacted and no severe wear problems are expected due to this higher concentration of silt. This piping will be installed and operating in the fall of 1980 and any adverse effects on the pumps will be discovered prior to fuel load. Any occurrence of deterioration or accelerated wear should be discovered with the vibration monitors to be added to the pumps and by the monthly inservice inspection (performance) checks (vibration, flow, pressure, temperature, and speed). Although this piping is not essential, it is designed to withstand a seismic event without causing damage to an essential component.

When this silt accumulation was discovered, there was between 5 and 12 feet of sediment in the intake flume and pump strucutre. Several methods were used to remove the sediment. The initial cleanout of the pump structure was by divers and pumps. This cleanout was accomplished by a diver using a small jetting pump to loosen large accumulations of silt and then using a larger centrifugal pump like a vacuum cleaner to pump the resuspended silt out of the flume. The initial cleanout of the intake flume was accomplished primarily by the use of a clamshell bucket. The silt was put directly into a truck and transported to the settling basin located approximately 1/2 mile north of the plant. The initial silt remaining after the clamshell operation in the intake flume was removed by divers using a method similar to the method used to clean the pump bay.

Subsequent long-term cleanout of the pump bay should not be required. Operation of the spray header piping will not allow the silt to accumulate.

Subsequent cleanout of the intake flume could be accomplished using several different types of devices. The first type is an airlift type device shown pictorially in Figure J.8-6 and schematically in Figure J.8-7.

The device works by sequentially applying vacuum and high pressure air to three separate chambers. As vacuum is applied, the chamber fills with a high density slurry. When the chamber is full, air pressure is applied and the slurry is discharged. This device would be supported by a portable crane and moved to various locations within the flume until the flume was clear. This device has been demonstrated in the flume. Other types of pumping devices are under investigation and will be demonstrated during the next flood season. Each device currently under investigation would use an intermediate pumping station located at the top of the flume walls (see Figure J.8-8) to serve several purposes. The intermediate pumping station would allow mixing of the high density slurry with clean water for dilution, if necessary. It would also serve as a booster station so the slurry could be pumped the 1/2 mile north of the plant to the settling basin (see Figure J.8-9). During construction, the settling basin has served as a borrow pit for fill, as required, and will be used as a settling basin for cooling tower blowdown and demineralizer backwash during plant operation. The settling basin has a volume of approximately 1000 acre-feet. A distance of approximately 1200 feet from input to overflow will allow for approximately 40 days detention time. This basin has already been approved and discharges to the river (if any) will be in accordance with the NPDES permit. It is not anticipated that this basin will have any discharge to the Ohio River for 5 to 7 years and possibly longer if the effects of groundwater 69
seepage and evaporation are included.

The intermediate pumping station which is normally located at the top of the intake flume will be moved to higher elevations if the river should approach the 510 ft "Top of Flume" elevation. It will be returned to the top of the flume after the river has receded sufficiently to permit. During such periods when the pump has been removed, intake flume 73
cleanout operations will not occur.

A second backup pump will be available and stored so as to be protected from the 546 ft elevation maximum probable flood. This second pump may be used during periods of maintenance on the "normal" pump.

Thus, several methods have already demonstrated their capability to remove silt. The biggest safety factor involved is the time available to remove the silt before it becomes a problem. Figure J.8-10 shows the relative pertinent elevations. Given that the spray nozzles will keep the pump bay, travelling screen, and bar grille areas clear, then all that is needed is to be ensured that the silt will not accumulate such that, a low river elevation would allow the silt to act as a dam. It is anticipated that the silt level at which cleaning operations begin will be below this level. Actual values will be determined from experience and will be included in 69
a technical specification.

Normally, with the river in pool, there is 18 feet of water over the flume bottom. During spring run-off, this depth would, of course, be greater. Starting at river pool (elevation 455 feet), if Markland dam would somehow disappear, the water level could theoretically drop to elevation 445 feet leaving 8 feet of water above the flume bottom. If this loss of the dam is concurrent with the all-time historic low flow of the Ohio River, the water level could theoretically drop to elevation 442 feet leaving 5 feet of water over the flume bottom.

To give some idea of the time required for silt removal, a test was conducted. One diver was able to clear a 6-foot wide path through 1 to 2 feet of silt in a 6-hour period. 69

During the postulated drought that would allow the river to drop to elevation 442 feet, practically no silt would accumulate. With the river at pool, with normal rainfall, it would take approximately 7 months to deposit 5 feet of silt (see the Harza Report, Attachment J1). Thus, since normal silt deposition occurs at a slow rate, there is ample time to clean the silt before any depth of consequence develops.

Silt deposition occurs more rapidly during the spring runoff. Even during these conditions, approximately 3 months is required to deposit 8 feet of silt (see the Harza Report, Attachment J1). Again, ample time is available to clean the silt before any depth of consequence occurs.

The highest siltation rate occurs during the maximum probable flood (elevation 546 feet). During the maximum probable flood, approximately 5.9 feet and 3.0 feet would accumulate in the intake flume and pump bay, respectively (see the Harza Report, Attachment J1). An accumulation of this amount of silt would be well below the river pool and would not adversely affect the safety performance of the service water system. There would be approximately 12 feet of water above the top of the silt when the river returned to pool. Past experience has shown that the pumps are able to meet the flow requirements even with silt 2 feet above the suction pipe. Three feet of silt in the pump bay would still be approximately 2 feet below the top of the suction pipe.