UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
799 ROOSEVELT ROAD
GLEN ELLYN, ILLINOIS 60137

SEP 17 1982

MEMORANDUM FOR: James G. Keppler, Regional Administrator

THRU: R. F. Warnick, Acting Director, Office of Special Cases

FROM: W. D. Shafer, Chief, Midland Section

SUBJECT: GAP COMMUNICATIONS (MS. BILLIE GARDE)

On September 17, 1982, I was requested to contact Ms. Billie Garde to answer some general questions about the Midland project. To the best of my recall, the following was discussed:

(1) She asked about the status of the six GAP affidavits.

I explained that the OI investigation was progressing and that some of the people had been contacted. I stated that when the investigations were completed that OI would turn the information over to our staff for technical review and inspection.

(2) She asked about the status of the Zack investigation.

I informed her that the investigation was progressing and that Midland had priority after LaSalle. I also told her that CPCo had a copy of the Zack affidavit. She said they did not get it from GAP.

She stated that she was very concerned that we have not pursued the issue as to whether CPCo should have reported the Zack problem under 10 CFR 50.55(e). I explained that this issue would be addressed in our investigation and inspection effort.

(3) We discussed several current issues at the site as follows:

(a) Investigations

1. I stated that the investigation into the March 10, 1982 meeting where Messrs. Cook and Landsman alleged they had been lied to was nearing completion and that a final report would be forthcoming.

2. I informed her that a request for an investigation into the potential violation of the board order had been forwarded to OI in HQ. I told her I did not know if an investigation had commenced.

(b) Discussed the development of the Work Authorization Procedure

I stated that RIII had determined that a formal communications mechanism was needed to ensure that all work authorizations would be in writing.

(c) Pipe Support and Restraint Problems

I discussed Isa Yin's inspection report and CPCo's subsequent inspection findings in this area. I stated that we have informed CPCo that we want a 100% reinspection of all supports and restraints installed prior to 1981.

(d) Misrouted Electrical Cables

I stated that we had informed CPCo that a reinspection of all SR cable was mandatory.

(e) Midland Section

I identified the Midland Section personnel and stated that the remedial soils work interface was the highest priority we had. I also stated that we were waiting for CPCo's commitments for improving their program and that you would not allow any major soils work to proceed until the Midland Section was satisfied that the program was acceptable.

(4) After discussing item 3(e) above, Ms. Garde stated she was disappointed that GAP input was not solicited during the formation of the Midland Section. I stated that this was a management decision and could not comment further. However, I stated that she was welcome to contact me at anytime in order to ensure good communications. Ms. Garde stated she would like to meet with the Midland Section and would get back to me regarding when. I encouraged her to do so. She stated that open communications were very important in that when she made a press release she would be able to discuss what the NRC was doing.

(5) Ms. Garde discussed the SSER and wanted to know if R. Landsman's concern about the board violation would be addressed in it. I said I doubted if it would. The SSER document would extensively identify the design elements for the remedial soil underpinning activities. We expected the SSER to be issued on October 4, 1982.

(6) Ms. Garde stated that she was preparing to meet with D. Saunders and was trying to obtain his affidavit. I wished her good luck and stated that we would be reviewing the relevant allegations we have obtained from Mr. Saunders.

(7) I informed Ms. Garde that our section was developing a monthly status report which would indicate the status of RIII's effort at Midland. I told her the report would be docketed and if she wanted access to it she would have to request it through formal channels. She said she would do that.

I believe that this summary was the extent of our conversation. It was not necessarily in the order I have described above, but I do believe I have covered the most salient issues. I intend to send Ms. Garde a copy of this summary.

Should you have any questions regarding this communication, I will be happy to discuss them with you.

W.D. Shafer
W. D. Shafer, Chief
Midland Section

cc: A. B. Davis

6/28/83 LTR TO LONE TREE COUNCIL FRM
JGK - RESPONDING TO 5/31/83 LTR FRM
LONE TREE COUNCIL - IDCVP

Lone Tree Council file

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
799 ROOSEVELT ROAD
GLEN ELLYN, ILLINOIS 60137

JUN 28 1983

Lone Tree Council
ATTN: Mr. Leo R. Romo
Corresponding Secretary
P. O. Box 421
Essexville, MI 48732

Dear Mr. Romo:

This is in response to your letter dated May 31, 1983, in which you expressed your thoughts about Consumers Power Company's independent third party design and construction verification program (IDCVP) and the construction completion program (CCP) including the independent third party construction implementation overview (CIO).

The IDCVP at Midland is a detailed examination of design adequacy and construction quality using as a basis three safety-related systems. A copy of TERA's plan for the IDCVP is attached for your information (Attachment 1). The IDCVP proposed for Midland is similar to, but more extensive than, independent reviews conducted at other plants. TERA selected the auxiliary feedwater system using the selection criteria on pages 14 and 15 of Attachment 1. The NRC agrees that these are appropriate selection criteria. The NRC selected a second system, standby electrical power, for the IDCVP from the three candidate systems identified by Consumers Power Company. The three candidate systems were selected by Consumers Power Company based on systems important to probabilistic risk assessment analysis. The third system, control room heating, ventilation, and air conditioning, was selected independently by the NRC, not from the candidate systems. Our choice of the second and third systems was made in part after considering suggestions made by members of the public. A copy of TERA's first status report (Attachment 2), is also attached for your information and as you can see, the TERA team already has identified and confirmed items on the auxiliary feedwater system which may become significant findings. The extent to which TERA will examine construction is detailed in Section 3.2 of Attachment 1. The program scope for the three selected systems will concentrate on the criteria of the as-built conditions versus the design criteria. Additional sampling and verification, however, will be conducted on other systems if discrepancies or problems are found allowing program flexibility as discussed in Section 3.2.7 of Attachment 1.

~~8307050184~~

You have also raised a concern regarding the NRC's permitting Stone and Webster Engineering Corporation (SWEC) to start the CIO prior to the NRC having completed its review of the Consumers Power Company proposal for the third party overview. Region III felt it was desirable to have the overview program begin in order to assure that Consumers Power Company CCP systems are working properly. The SWEC overview presently involves nine people onsite performing the CIO. These activities started on April 28, 1983. The CIO is not a 100% inspection, rather it is an audit of Consumers Power Company's implementation of the CCP. In addition, the NRC Midland team will be reviewing the quality of the CPCo CCP and the SWEC CIO to assure adequate implementation. It should also be noted that the CCP has not been approved to date by the NRC. CPCo CCP activities have been limited to program preparation and some training.

We believe the actions being taken should provide assurance to the community that the plant has been constructed safely. We believe the intent of the three actions you suggest will be accomplished by the CCP and the third party programs in place.

We hope this is responsive to your concerns. If you have further questions, please do not hesitate to contact us.

Sincerely,

Original signed by
A. Bert Davis

James G. Keppler
Regional Administrator

Attachment: As stated

cc w/attachment and ltr dtd 5/31/83:
See attached distribution list

NRR concurrence per telecon D. Hood JJH 6/28/83

OFFICE	RIII						
SURNAME	Gardner/ls	Harrison	Warnick	Streeter	Lewis	Davis	Keppler
DATE	6/27/83	6/27/83	6/27/83	6/27/83	6/27	6/27	6/28

NRC FORM 318 (10-80) NRCM 0240

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cc w/attachment and ltr dtd 5/31/83:
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The Honorable Frederick P. Cowan, ASLB
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Howard Levin, TERA
Billie P. Garde, Government
  Accountability Project
Lynne Bernabei, Government
  Accountability Project

ENGINEERING PROGRAM PLAN
PROJECT INSTRUCTION PI-3201-009
MIDLAND INDEPENDENT
DESIGN AND CONSTRUCTION
VERIFICATION PROGRAM
PROJECT 3201

MAY 18, 1983
REVISION: 2

017
COPY NO.

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ATTACHMENT 1

8305200567

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1.0 GENERAL

1.1 BACKGROUND AND PURPOSE

The Nuclear Regulatory Commission (NRC) issued a letter on July 9, 1982 which requested that Consumers Power Company (CPC) provide for an independent assessment of the design adequacy of the Midland plant. CPC responded to this request on October 5, 1982 by submitting an outline of the scope of a proposed independent review program. A public meeting was held on October 25, 1982 at the NRC's Bethesda, Maryland offices to discuss details of the proposed program, the scope of which included an evaluation of the Midland Unit 2 Auxiliary Feedwater (AFW) system. During this meeting, the NRC requested that the scope of the independent design assessment program be expanded, including an assessment of the quality of construction. The NRC requested that CPC identify three candidate systems for scope expansion based upon their contribution to plant risk, from which one system would be selected.

CPC responded to NRC by a letter dated December 3, 1982 which identified the Standby Electric Power system (diesel generator), Safeguards Chilled Water system and Containment Isolation system as candidate systems. A public meeting was held on February 8, 1983 at Midland, Michigan to discuss details of the program related to the evaluation of the AFW system and to provide status.

On March 22, 1983 the NRC selected the Standby Electric Power system and the Control Room HVAC system for scope expansion. Proposed elements of the scope of evaluation for these systems as well as the AFW system were discussed at another public meeting held on April 13, 1983 at the NRC's Bethesda, Maryland offices.

PROJECT INSTRUCTION

PI- 0201 - 009	SUBJECT: Engineering Program Plan Midland Independent Design and Construction Verification Program
REV.: 2 DATE: 5/18/83	
PAGE 2 of 145	PREPARED BY: [signature] APPROVED BY: [signature]

TERA Corporation has been selected by CPC to scope, manage, and implement the Midland Independent Design and Construction Verification (IDCV) Program. By a letter dated May 3, 1983, the NRC approved the selection of TERA. The selection is based upon the firm's technical qualifications, experience, and independence from the Midland project. Such independence includes all individuals who may contribute to the IDCV Program.

This project instruction, or Engineering Program Plan (the Plan), has been established to outline the scope, philosophy of review, methodology, independence requirements, organization, control, documentation, reporting, and quality assurance requirements for the Midland IDCV Program.

The IDCV approach selected is a review and evaluation of a detailed "vertical slice" of the Midland project with a focus on providing an overall assessment of the quality of the design and the constructed plant. Therefore, the primary emphasis of the IDCV evaluation is on the end results of the design and construction process and not on an evaluation of the process itself which is typical of the more common quality assurance audit. The "vertical slice" constitutes a carefully selected sample of three safety systems from which the results of the IDCV may be extrapolated to other similarly designed and constructed systems. Thus, the IDCV is intended to provide the necessary assurance to CPC, NRC, and the public that the Midland Plant is designed and constructed such that it is capable of functioning in accordance with its safety design bases and that applicable licensing commitments have been properly implemented.

1.2 OVERVIEW OF IDCV SCOPE

The Midland IDCV consists of two major components: the Independent Design Verification (IDV) Program and the Independent Construction Verification (ICV) Program. The Unit 2 Auxiliary Feedwater (AFW) system, the Standby Electric Power (SEP) system and the Control Room Heating, Ventilating and Air Conditioning (CR-HVAC) system related to control room habitability have been selected as applicable samples of the design engineering and construction efforts at the Midland plant. The AFW system was selected by TERA based upon the system selection criteria discussed in Section 1.3 of this Plan. The SEP and control room HVAC systems selected by the CPC and NRC have a sufficiently high profile for each of these criteria to justify their selection.

The scope of review corresponds directly to the design and construction chains, addressing major activities and outputs of the various contributing engineering and construction disciplines. Accordingly, the products of the design and construction process, from concept to installation, hydros, functional and preoperational testing and turnover will be evaluated. Interfaces between CPC, Babcock and Wilcox (B&W), the nuclear steam system supplier (NSSS) vendor, Bechtel, the architect-engineer (A-E), and other contractors will be identified and evaluated relative to such items as the proper transfer and interpretation of design or construction information.

Figure 1.2-1 shows the inter-relationship between the Midland design and construction process and the Midland IDCV program. The following figures present the IDCV scope for the AFW, SEP and CR-HVAC systems in the form of matrices which identify the initial level of review and evaluation in each design or construction area respectively:

INTER-RELATIONSHIP BETWEEN THE MIDLAND DESIGN AND CONSTRUCTION PROCESS AND THE MIDLAND IDCV PROGRAM

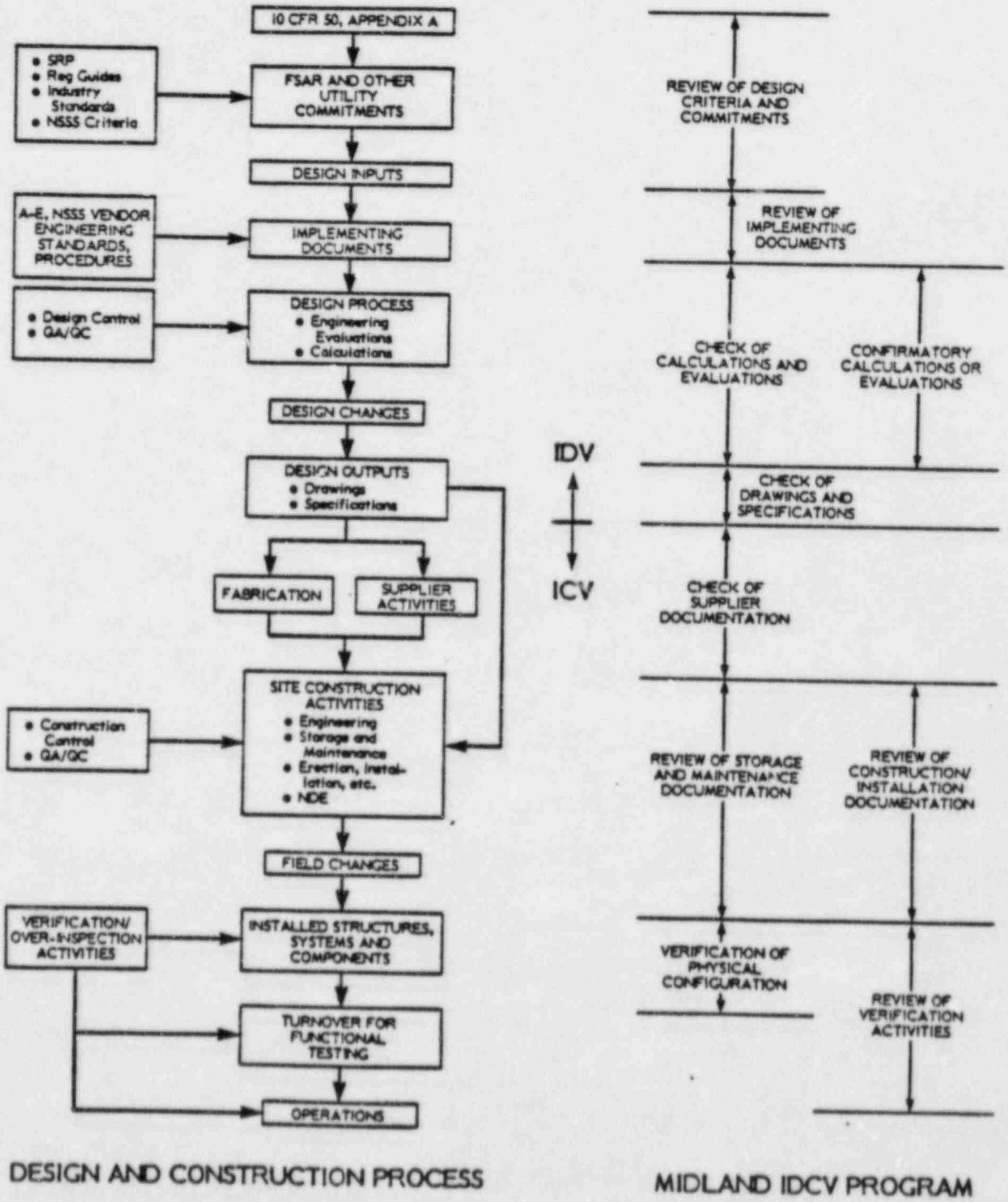


FIGURE 1.2-1

INITIAL SAMPLE REVIEW MATRIX FOR THE AUXILIARY FEEDWATER SYSTEM
MIDLAND INDEPENDENT DESIGN VERIFICATION PROGRAM[1]

TOPIC NUMBER	DESIGN AREA	SCOPE OF REVIEW: REVIEW OF DESIGN CRITERIA AND COMMITMENTS	REVIEW OF IMPLEMENTING DOCUMENTS	CHECK OF CALCULATIONS AND EVALUATIONS	CONFIRMATORY CALCULATION OR EVALUATION	CHECK OF DRAWINGS AND SPECIFICATIONS
	<u>AFW SYSTEM PERFORMANCE REQUIREMENTS</u>					
1.1-1	SYSTEM OPERATING LIMITS	X	X	X		
1.2-1	ACCIDENT ANALYSIS CONSIDERATIONS	X	•			
1.3-1	SINGLE FAILURE	X	X	X	•	
1.4-1	TECHNICAL SPECIFICATIONS	X	X			
1.5-1	SYSTEM ALIGNMENT/SWITCHOVER	X	X			
1.6-1	REMOTE OPERATION AND SHUTDOWN	X				
1.7-1	SYSTEM ISOLATION/INTERLOCKS	X	X			
1.8-1	OVERPRESSURE PROTECTION	X	•	•	•	
1.9-1	COMPONENT FUNCTIONAL REQUIREMENTS	X	X	X		X
1.10-1	SYSTEM HYDRAULIC DESIGN	X	X	X	•	
1.11-1	SYSTEM HEAT REMOVAL CAPABILITY	X	X	X	•	
1.12-1	COOLING REQUIREMENTS	X				
1.13-1	WATER SUPPLIES	X	X			
1.14-1	PRESERVICE TESTING/CAPABILITY FOR OPERATIONAL TESTING	X	•	•		
1.15-1	POWER SUPPLIES	X	X			•
1.16-1	ELECTRICAL CHARACTERISTICS	X	•	•		
1.17-1	PROTECTIVE DEVICES/SETTINGS	X	X			X
1.18-1	INSTRUMENTATION	X	X	X		X
1.19-1	CONTROL SYSTEMS	X	X	X		•
1.20-1	ACTUATION SYSTEMS	X				•
1.21-1	NDE COMMITMENTS	X	•			•
1.22-1	MATERIALS SELECTION	X	X			
1.23-1	FAILURE MODES AND EFFECTS	•	•		•	

<u>KEY</u>

X - INITIAL SCOPE OF REVIEW

(X) - DELETED SCOPE OF REVIEW

• - ADDED SCOPE OF REVIEW

<u>NOTE</u>

1. INITIAL SAMPLE DOCUMENTED IN REV. 0 AND 1 OF THIS PLAN HAS BEEN MODIFIED EFFECTIVE 4/13/83

FIGURE 1.2-2a

INITIAL SAMPLE REVIEW MATRIX FOR THE AUXILIARY FEEDWATER SYSTEM MIDLAND INDEPENDENT DESIGN VERIFICATION PROGRAM (CONTINUED)[1]

TOPIC NUMBER	DESIGN AREA	SCOPE OF REVIEW: REVIEW OF DESIGN CRITERIA AND COMMITMENTS	REVIEW OF IMPLEMENTING DOCUMENTS	CHECK OF CALCULATIONS AND EVALUATIONS	CONFIRMATORY CALCULATION OR EVALUATION	CHECK OF DRAWINGS AND SPECIFICATIONS
	<u>AFW SYSTEM PROTECTION FEATURES</u>					
II.1-1	SEISMIC DESIGN	X				
II.2-1	• PRESSURE BOUNDARY	X	X	X	X	X
II.3-1	• PIPE/EQUIPMENT SUPPORT	X	X	X	X	X
II.4-1	• EQUIPMENT QUALIFICATION	X	X	X		X
II.5-1	HIGH ENERGY LINE BREAK ACCIDENTS	X				
II.6-1	• PIPE WHIP	X	X	X		X
II.7-1	• JET IMPINGEMENT	X				
II.8-1	ENVIRONMENTAL PROTECTION	X				
II.9-1	• ENVIRONMENTAL ENVELOPES	X	X	X	X	X
II.10-1	• EQUIPMENT QUALIFICATION	X	X	X		X
II.11-1	• HVAC DESIGN	X				
II.12-1	FIRE PROTECTION	X	X	X		
II.13-1	MISSILE PROTECTION	X				
II.14-1	SYSTEMS INTERACTION	X	X	X		
	<u>STRUCTURES THAT HOUSE THE AFW SYSTEM</u>					
III.1-1	SEISMIC DESIGN/INPUT TO EQUIPMENT	X	X	X		X
III.2-1	WIND & TORNADO DESIGN/MISSILE PROTECTION	X				
III.3-1	FLOOD PROTECTION	X				
III.4-1	HELBA LOADS	X				
III.5-1	CIVIL/STRUCTURAL DESIGN CONSIDERATIONS	X				
III.6-1	• FOUNDATIONS	X	X	X		
III.7-1	• CONCRETE/STEEL DESIGN	X	X	X		X
III.8-1	• TANKS	X	X	X		

KEY

X - INITIAL SCOPE OF REVIEW

(X) - DELETED SCOPE OF REVIEW

• - ADDED SCOPE OF REVIEW

NOTE

1. INITIAL SAMPLE DOCUMENTED IN REV. 0 AND 1 OF THIS PLAN HAS BEEN MODIFIED EFFECTIVE 4/13/83

FIGURE 1.2-2b

INITIAL SAMPLE REVIEW MATRIX FOR THE AUXILIARY FEEDWATER SYSTEM MIDLAND INDEPENDENT CONSTRUCTION VERIFICATION PROGRAM[1]

TOPIC NUMBER	SYSTEM/COMPONENT	SCOPE OF REVIEW: REVIEW OF SUPPLIER DOCUMENTATION	REVIEW OF STORAGE AND MAINTENANCE DOCUMENTATION	REVIEW OF CONSTRUCTION/ INSTALLATION DOCUMENTATION	REVIEW OF SELECTED VERIFICATION ACTIVITIES	VERIFICATION OF PHYSICAL CONFIGURATION
	<u>MECHANICAL</u>					
I.1-1c	• EQUIPMENT	X	X	X	X	X
I.2-1c	• PIPING	X		X	X	X
I.3-1c	• PIPE SUPPORTS	X		X	X	X
	<u>ELECTRICAL</u>					
II.1-1c	• EQUIPMENT	X	X	X	X	X
II.2-1c	• TRAYS AND SUPPORTS	X		•	•	X
II.3-1c	• CONDUIT AND SUPPORTS	X		•	•	X
II.4-1c	• CABLE	X	X	X	X	X
	<u>INSTRUMENTATION AND CONTROL</u>					
III.1-1c	• INSTRUMENTS	X	X	X	X	X
III.2-1c	• PIPING/TUBING	X				X
III.3-1c	• CABLE	X		•	•	X
	<u>HVAC</u>					
IV.1-1c	• EQUIPMENT	X	X	X	X	X
IV.2-1c	• DUCTS AND SUPPORTS	X				X
	<u>STRUCTURAL</u>					
V.1-1c	• FOUNDATIONS	X		X		
V.2-1c	• CONCRETE	X		X		X
V.3-1c	• STRUCTURAL STEEL	X		X		X
VI.1-1c	<u>NDE/MATERIAL TESTING PROGRAM</u>					•

<u>KEY</u>

X - INITIAL SCOPE OF REVIEW

X - DELETED SCOPE OF REVIEW

• - ADDED SCOPE OF REVIEW

<u>NOTE</u>

1. INITIAL SAMPLE DOCUMENTED IN REV. 0 AND 1 OF THIS PLAN HAS BEEN MODIFIED EFFECTIVE 4/13/83

FIGURE I.2-3

INITIAL SAMPLE REVIEW MATRIX FOR THE STANDBY ELECTRIC POWER SYSTEM
MIDLAND INDEPENDENT DESIGN VERIFICATION PROGRAM

TOPIC NUMBER	DESIGN AREA	SCOPE OF REVIEW: REVIEW OF DESIGN CRITERIA AND COMMITMENTS	REVIEW OF IMPLEMENTING DOCUMENTS	CHECK OF CALCULATIONS AND EVALUATIONS	CONFIRMATORY CALCULATION OR EVALUATION	CHECK OF DRAWINGS AND SPECIFICATIONS
	STANDBY ELECTRIC POWER SYSTEM PERFORMANCE REQUIREMENTS					
1.1-2	SYSTEM OPERATING LIMITS - DG	X	X	X		
1.2-2	ACCIDENT ANALYSIS CONSIDERATIONS - DG, AC, DC	X	X			
1.3-2	SINGLE FAILURE - DG, PDS, AC, DC	X	X	X	X	
1.4-2	TECHNICAL SPECIFICATIONS - DG, DC	X	X			
1.6-2	LOCAL OPERATION - DG	X				
1.7-2	SYSTEM INTERLOCKS - DG	X	X			
1.9-2	COMPONENT FUNCTIONAL REQUIREMENTS - DG, PDS, AC, DC	X	X	X		X
1.12-2	COOLING/HEATING REQUIREMENTS - DG	X	X	X		
1.14-2	PRESERVICE TESTING/CAPABILITY FOR OPERATIONAL TESTING - DG	X	X	X		X
1.16-2	ELECTRICAL CHARACTERISTICS - DG, PDS, AC, DC	X	X	X		X
1.17-2	PROTECTIVE DEVICES/SETTINGS - DG, PDS	X	X	X		
1.18-2	INSTRUMENTATION - DG, AC, DC	X	X	X		X
1.19-2	CONTROL SYSTEMS - DG	X	X	X		X
1.20-2	ACTUATION SYSTEMS - DG	X	X	X		X
1.23-2	FAILURE MODES AND EFFECTS - DG, PDS, AC, DC	X	X	X		
1.24-2	ELECTRICAL LOAD CAPACITY - DG, PDS, AC, DC	X	X	X	X	
1.25-2	ELECTRICAL LOADS SEQUENCING - DG, PDS	X	X	X		X
1.26-2	ELECTRICAL LOAD SHEDDING - DG, PDS	X	X	X		
1.27-2	FUEL OIL SYSTEM - DG	X	X	X		
1.28-2	LUBE OIL SYSTEM - DG	X	X			
1.29-2	STARTING MECHANISM AND AIR SUPPLY SYSTEM - DG	X	X	X		X
1.30-2	COMBUSTION AIR SUPPLY - DG	X	X	X		
1.31-2	INDEPENDENCE - DG, PDS, AC, DC	X	X	X		
1.32-2	CABLE SIZING/ROUTING/SEPARATION - PDS	X	X	X	X	X

KEY
DG - DIESEL GENERATOR
DGB - DIESEL GENERATOR BUILDING
PDS - POWER DISTRIBUTION SYSTEM
AC - PREFERRED 120V AC POWER SYSTEM SERVICING AFW SYSTEM
DC - 125V DC POWER SYSTEM SERVICING AFW SYSTEM

FIGURE 1.2-4a

INITIAL SAMPLE REVIEW MATRIX FOR THE STANDBY ELECTRIC POWER SYSTEM
MIDLAND INDEPENDENT DESIGN VERIFICATION PROGRAM (CONTINUED)

TOPIC NUMBER	DESIGN AREA	SCOPE OF REVIEW: REVIEW OF DESIGN CRITERIA AND COMMITMENTS	REVIEW OF IMPLEMENTING DOCUMENTS	CHECK OF CALCULATIONS AND EVALUATIONS	CONFIRMATORY CALCULATION OR EVALUATION	CHECK OF DRAWINGS AND SPECIFICATIONS
	STANDBY ELECTRIC POWER SYSTEM PROTECTION FEATURES					
II.1-2	SEISMIC DESIGN	X				
II.2-2	• PRESSURE BOUNDARY - DG	X	X	X		
II.3-2	• PIPE/EQUIPMENT SUPPORT - DG, PDS	X	X	X	X	X
II.4-2	• EQUIPMENT QUALIFICATION - DG, PDS	X	X	X		X
II.5-2	HIGH ENERGY LINE BREAK ACCIDENTS	X				
II.6-2	• PIPE WHIP - PDS, AC, DC	X				
II.7-2	• JET IMPINGEMENT - PDS, AC, DC	X				
II.8-2	ENVIRONMENTAL PROTECTION	X				
II.9-2	• ENVIRONMENTAL ENVELOPES - DG, PDS	X				
II.10-2	• EQUIPMENT QUALIFICATION - DG, PDS	X	X	X		X
II.11-2	• HVAC DESIGN - DG	X				
II.12-2	FIRE PROTECTION - DG	X	X	X		
II.13-2	MISSILE PROTECTION - DG	X				
II.14-2	SYSTEMS INTERACTION - DG, PDS, AC, DC	X	X			
	STRUCTURES THAT HOUSE THE STANDBY ELECTRIC POWER SYSTEM					
III.1-2	SEISMIC DESIGN/INPUT TO EQUIPMENT - DGB	X	X	X		X
III.2-2	WIND & TORNADO DESIGN/MISSILE PROTECTION - DGB	X	X	X		X
III.3-2	FLOOD PROTECTION - DGB	X	X	X		
III.4-2	HELBA LOADS - DGB	X				
III.5-2	CIVIL/STRUCTURAL DESIGN CONSIDERATIONS					
III.6-2	• FOUNDATIONS - DGB	X	X	X		
III.7-2	• CONCRETE/STEEL DESIGN - DGB	X	X	X		X
III.8-2	• TANKS	X	X	X	X	X

KEY
- DG - DIESEL GENERATOR
- DGB - DIESEL GENERATOR BUILDING
- PDS - POWER DISTRIBUTION SYSTEM
- AC - PREFERRED 120V AC POWER SYSTEM SERVICING AFW SYSTEM
- DC - 125V DC POWER SYSTEM SERVICING AFW SYSTEM

FIGURE I.2-4b

INITIAL SAMPLE REVIEW MATRIX FOR THE STANDBY ELECTRIC POWER SYSTEM
MIDLAND INDEPENDENT CONSTRUCTION VERIFICATION PROGRAM

TOPIC NUMBER	SYSTEM/COMPONENT	SCOPE OF REVIEW: REVIEW OF SUPPLIER DOCUMENTATION	REVIEW OF STORAGE AND MAINTENANCE DOCUMENTATION	REVIEW OF CONSTRUCTION/ INSTALLATION DOCUMENTATION	REVIEW OF SELECTED VERIFICATION ACTIVITIES	VERIFICATION OF PHYSICAL CONFIGURATION
	MECHANICAL					
I.1-2c	• EQUIPMENT - DG	X	X	X	X	X
I.2-2c	• PIPING - DG	X		X		X
I.3-2c	• PIPE SUPPORTS - DG	X		X		X
	ELECTRICAL					
II.1-2c	• EQUIPMENT - DG, PDS, AC, DC	X	X	X	X	X
II.2-2c	• TRAYS AND SUPPORTS - PDS	X		X	X	X
II.3-2c	• CONDUIT AND SUPPORTS - PDS	X		X	X	X
II.4-2c	• CABLE - PDS	X	X	X	X	X
	INSTRUMENTATION AND CONTROL					
III.1-2c	• INSTRUMENTS - DG	X	X	X	X	X
III.2-2c	• PIPING/TUBING - DG	X		X		X
III.3-2c	• CABLE - DG, PDS	X	X	X	X	X
	HVAC					
IV.1-2c	• EQUIPMENT - DG	X				X
IV.2-2c	• DUCTS AND SUPPORTS - DG	X				X
	STRUCTURAL					
V.1-2c	• FOUNDATIONS - DG	X		X		
V.2-2c	• CONCRETE - DG	X		X		
V.3-2c	• STRUCTURAL STEEL - DG	X		X		

KEY
DG - DIESEL GENERATOR
DGB - DIESEL GENERATOR BUILDING
PDS - POWER DISTRIBUTION SYSTEM
AC - PREFERRED 120V AC POWER SYSTEM SERVICING AFW SYSTEM
DC - 125V DC POWER SYSTEM SERVICING AFW SYSTEM

FIGURE I.2-5

INITIAL SAMPLE REVIEW MATRIX FOR THE CONTROL ROOM HVAC SYSTEM
MIDLAND INDEPENDENT DESIGN VERIFICATION PROGRAM

TOPIC NUMBER	DESIGN AREA	SCOPE OF REVIEW: REVIEW OF DESIGN CRITERIA AND COMMITMENTS	REVIEW OF IMPLEMENTING DOCUMENTS	CHECK OF CALCULATIONS AND EVALUATIONS	CONFIRMATORY CALCULATION OR EVALUATION	CHECK OF DRAWINGS AND SPECIFICATIONS
	<u>CONTROL ROOM HVAC SYSTEM PERFORMANCE REQUIREMENTS</u>					
1.1-3	SYSTEM OPERATING LIMITS	X	X	X		
1.2-3	ACCIDENT ANALYSIS CONSIDERATIONS	X	X			
1.3-3	SINGLE FAILURE	X	X	X		
1.4-3	TECHNICAL SPECIFICATIONS	X	X			
1.5-3	SYSTEM ALIGNMENT/SWITCHOVER	X	X			
1.7-3	SYSTEM ISOLATION/INTERLOCKS	X	X	X		X
1.9-3	COMPONENT FUNCTIONAL REQUIREMENTS	X	X	X		X
1.10-3	SYSTEM PNEUMATIC DESIGN	X	X	X	X	X
1.12-3	COOLING/HEATING REQUIREMENTS	X	X	X		
1.14-3	PRESERVICE TESTING/CAPABILITY FOR OPERATIONAL TESTING	X	X			
1.15-3	POWER SUPPLIES	X	X			
1.18-3	INSTRUMENTATION/DETECTION	X	X	X		X
1.19-3	CONTROL SYSTEMS	X	X			X
1.20-3	ACTUATION SYSTEMS	X	X	X		X
1.21-3	NDE COMMITMENTS	X	X	X		
1.22-3	MATERIALS SELECTION	X	X	X		X
1.23-3	FAILURE MODES AND EFFECTS	X	X	X		
1.33-3	FILTRATION	X	X	X		X
1.34-3	PRESSURIZATION	X	X	X		X
1.35-3	VENTILATION	X	X	X	X	X

FIGURE I.2-6a

INITIAL SAMPLE REVIEW MATRIX FOR THE CONTROL ROOM HVAC SYSTEM
MIDLAND INDEPENDENT DESIGN VERIFICATION PROGRAM (CONTINUED)

TOPIC NUMBER	DESIGN AREA	SCOPE OF REVIEW: REVIEW OF DESIGN CRITERIA AND COMMITMENTS	REVIEW OF IMPLEMENTING DOCUMENTS	CHECK OF CALCULATIONS AND EVALUATIONS	CONFIRMATORY CALCULATION OR EVALUATION	CHECK OF DRAWINGS AND SPECIFICATIONS
	CONTROL ROOM HVAC SYSTEM PROTECTION FEATURES					
II.1-3	SEISMIC DESIGN	X				
II.2-3	• PRESSURE BOUNDARY	X	X	X		
II.3-3	• DUCT/PIPE/EQUIPMENT SUPPORT	X	X	X		X
II.4-3	• EQUIPMENT QUALIFICATION	X	X	X		X
II.5-3	HIGH ENERGY LINE BREAK ACCIDENTS	X				
II.6-3	• PIPE WHIP	X				
II.7-3	• JET IMPINGEMENT	X				
II.8-3	ENVIRONMENTAL PROTECTION	X				
II.9-3	• ENVIRONMENTAL ENVELOPES	X	X	X	X	X
II.10-3	• EQUIPMENT QUALIFICATION	X	X	X		X
II.12-3	FIRE PROTECTION	X	X			
II.13-3	MISSILE PROTECTION	X				
II.14-3	SYSTEMS INTERACTIONS	X				
	STRUCTURES THAT HOUSE THE CONTROL ROOM HVAC SYSTEM					
III.1-3	SEISMIC DESIGN/INPUT TO EQUIPMENT	X	X	X		
III.5-3	CIVIL/STRUCTURAL DESIGN CONSIDERATIONS	X				
III.7-3	• CONCRETE/STEEL DESIGN	X	X			
III.9-3	• LEAK TIGHTNESS	X	X	X		

FIGURE I.2-6b

INITIAL SAMPLE REVIEW MATRIX FOR THE CONTROL ROOM HVAC SYSTEM
MIDLAND INDEPENDENT CONSTRUCTION VERIFICATION PROGRAM

		SCOPE OF REVIEW				
TOPIC NUMBER	SYSTEM/COMPONENT	REVIEW OF SUPPLIER DOCUMENTATION	REVIEW OF STORAGE AND MAINTENANCE DOCUMENTATION	REVIEW OF CONSTRUCTION/ INSTALLATION DOCUMENTATION	REVIEW OF SELECTED VERIFICATION ACTIVITIES	VERIFICATION OF PHYSICAL CONFIGURATION
	MECHANICAL					
I.1-3c	• EQUIPMENT	X	X	X	X	X
I.2-3c	• PIPING	X		X		X
I.3-3c	• PIPE SUPPORTS	X		X		X
	ELECTRICAL					
II.1-3c	• EQUIPMENT	X		X	X	X
II.2-3c	• TRAYS AND SUPPORTS	X		X		X
II.3-3c	• CONDUIT AND SUPPORTS	X		X		X
II.4-3c	• CABLE	X		X		X
	INSTRUMENTATION AND CONTROL					
III.1-3c	• INSTRUMENTS/DETECTORS	X	X	X	X	X
III.2-3c	• PIPING/TUBING	X		X		X
III.3-3c	• CABLE	X		X		X
	HVAC					
IV.2-3c	• DUCTS AND SUPPORTS	X	X	X		X
	STRUCTURAL					
V.2-3c	• CONCRETE	X		X		X
V.3-3c	• STRUCTURAL STEEL	X		X		X
VI.1-3c	NDE/MATERIALS TESTING PROGRAM					X

FIGURE I.2-7

Figures

System	Design Verification	Construction Verification
AFW	1.2-2a, 2b	1.2-3
SEP	1.2-4a, 4b	1.2-5
CR-HVAC	1.2-6a, 6b	1.2-7

It should be noted that the scope of technical review is dynamic and subject to change as more emphasis will be given to specific review areas that meet prescribed criteria. These criteria are documented in Section 3.1.2 of this Plan. Accordingly, the review matrices generally represent the initial IDCV "sample". On April 13, 1983, a change of the AFW system initial sample was effected. This change is noted on Figures 1.2-2a, 1.2-2b and 1.2-3.

1.3 SYSTEMS SELECTION CRITERIA

The selection of the auxiliary feedwater system was based upon the following six criteria:

- Importance to Safety - The system should have a relatively high level of importance to the overall safety of the Midland Plant.
- Inclusion of Design and Construction Interfaces - The system should be one which involves multiple interfaces among engineering and construction disciplines as well as design and construction organizations, such as the NSSS vendor, architect engineer, constructor, and subtier contractors. The system should also be one where design or construction changes have occurred and thus provide the ability to test the effectiveness of the design and construction process exercised by principal internal and external organizations or disciplines in areas of design or construction change.

- Ability to Extrapolate Results - The system should be sufficiently representative of other safety systems such that the design criteria, design and construction control and change processes are similar so that extrapolation of findings to other systems can be undertaken with confidence.

- Diverse in Content - The major engineering and construction disciplines should all have input to the design of the system.

- Sensitive to Previous Experience - The system should be one which includes design or construction disciplines or interfaces which have previously exhibited problems and thus a test of the system should be indicative of any generic condition.

- Ability to Test As-Built Installation - The system configuration should be sufficiently completed that the as-built configuration can be verified against design.

The AFW system was selected after consideration of a number of other candidate systems. The Midland Plant probabilistic risk assessment (PRA) was utilized as a tool to assess the relative importance to safety of plant systems on the basis of their contribution to overall plant risk. The profile for this criterion as well as each of the other five criteria is sufficiently high for the AFW, SEP and CR-HVAC systems to justify their selection.

1.4 INDEPENDENCE REQUIREMENTS

The Midland IDCV program will be conducted in accordance with the "independence" criteria documented in a letter from Nunzio J. Palladino, Chairman, NRC, to the Honorable John D. Dingell, Chairman, Committee on Energy and Commerce, United States House of Representatives, dated February 1, 1982. This letter was originally written as applicable to Pacific Gas and Electric Company's Diablo Canyon project; however, it is being applied to the Midland IDCV program and the reader should interpret the words PG&E or Diablo Canyon to mean CPC or Midland, respectively. The following criteria are excerpted from Enclosure 3 of this letter:

> "The competence of the individuals or companies is the most important factor in the selection of an auditor. Also, the companies or individuals may not have had any direct previous involvement with the activities at Diablo Canyon (Midland) that they will be reviewing.
>
> In addition, the following factors will be considered in evaluating the question of independence:
>
> 1) Whether the individuals or companies involved had been previously hired by PG&E (CPC) to do similar seismic (delete seismic) design work.
>
> 2) Whether any individual involved had been previously employed by PG&E (CPC) (and the nature of the employment).
>
> 3) Whether the individual owns or controls significant amounts of PG&E (CPC) stock.
>
> 4) Whether members of the present household of individuals involved are employed by PG&E (CPC).
>
> 5) Whether any relatives are employed by PG&E (CPC) in a management capacity.
>
> In addition to the above considerations, the following procedural guidelines will be used to assure independence:
>
> 1) An auditable record will be provided of all comments on draft or final reports, any changes made as a result of such comments, and the reasons for such changes; <u>or</u> the consultant will issue only a final report (without prior licensee comment).
>
> 2) NRC will assume and exercise the responsibility for serving the report on all parties."

The individuals taking part in the Midland IDCV program meet the preceding criteria and have signed a statement attesting to this fact.

TERA Corporation is under contract to CPC to provide the engineering services necessary to complete the Midland IDCV program. Prior to this contract, TERA has never been under contract to CPC.

The contract requires TERA to maintain an auditable record to document the process leading to Findings as well as meetings to discuss Findings. Section 4.0 of this Plan addresses documentation and protocol requirements governing external communications which have been developed to meet obligations of the contract and NRC requirements. The protocol will be conducted in accordance with the requirements documented in a letter from James G. Keppler, Administrator, NRC Region III to James W. Cook, Vice President, CPC dated March 28, 1983, as interpreted by TERA.

Section 5.0 of this Plan addresses the report generation process, during the IDCV program to report Findings and at its conclusion as a final report. TERA will maintain an auditable record of all comments on the draft final report.

2.0 ORGANIZATION AND CONTROL

2.1 PROJECT ORGANIZATION

The project organization is addressed in Section 2.1 of the Project Quality Assurance Plan (PQAP), Midland Independent Design and Construction Verification Program, Project 3201. Figure 2.1-1 provides the project organization chart. Technical and administrative personnel (not shown) receive assignments directly from the Project Manager (PM). The PM serves as the principal point of contact

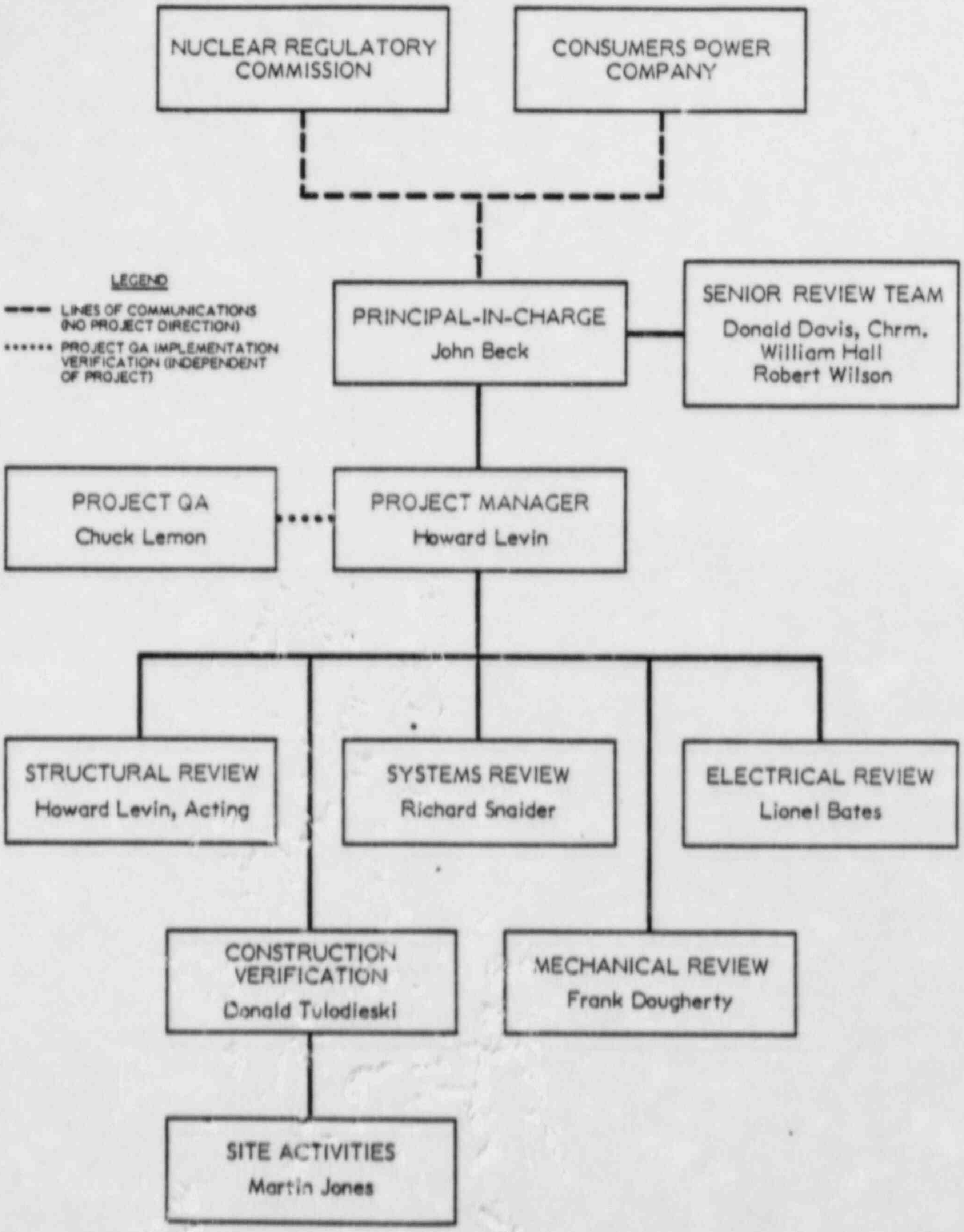


FIGURE 2.1-1
PROJECT ORGANIZATION
MIDLAND INDEPENDENT DESIGN AND CONSTRUCTION VERIFICATION

with CPC. The Project Quality Assurance Engineers report directly to the Executive Vice President, TERA. They will identify internal quality assurance deficiencies, work with the PM in providing clarification relative to identified deficiencies and any recommendations made by them for resolution.

2.2 AUTHORITY AND RESPONSIBILITY

The project authority and responsibility is addressed in Section 2.2 of the PQAP, Project 3201, as augmented by various project instructions and engineering control procedures which are referenced in the PQAP.

The Principal-in-Charge (PIC) is responsible for helping establish the general philosophy of review, setting forth guidance to the Project Manager and the Lead Technical Reviewers (LTR), assisting as an interface with the Senior Review Team (SRT), NRC and CPC and reviewing/concurring in reports issued to CPC, NRC and other outside parties.

The Project Manager is responsible for overall planning and direct supervision of all in-house activities undertaken to fulfill the contract requirements. All documentation, correspondence, reports, calculations, etc., issued to CPC, NRC and other outside parties are to be issued under his signature or otherwise receive his approval as required by the applicable Engineering Control Procedure or Project Instruction.

The Project Manager is responsible for overall planning and management of all outside activities performed by subcontractors or Associates, but may delegate responsibility for supervision to other individuals within the project.

Documentation may be issued to the subcontractor or Associate under the signature of the designated individual.

The Senior Review Team (SRT) is responsible for the review of Open, Confirmed or Resolved (OCR) Item Reports, as requested by the PIC, Finding Reports, Finding Resolution Reports, as well as Interim Technical Reports and Final Reports. The SRT may at any time recommend to the PIC that the PM expand the scope of review, provide clarification or reassess elements of the review to assess the technical validity and significance of project team conclusions and the proper classification of OCRs and Findings. (These reports are defined in Section 5.0 of this Plan). The SRT is also responsible for the review of Monthly Status Reports, OCRs as directed by the SRT Chairman, and any Draft Interim Technical Reports to maintain current awareness and assure a high level of technical quality. They will also provide recommendations to resolve differing technical views which may arise among project team membes. The SRT Chairman is responsible for coordination and direction of SRT activities.

The Lead Technical Reviewers (LTR) are responsible for management and implementation of all review activities within their discipline of review, including supervision of individuals on the project and outside activities performed by Associates. The LTRs report to the Project Manager. The LTRs are responsible for the classification of OCRs and Findings, the preparation of Finding Reports and Finding Resolution Reports.

The Project Quality Assurance Engineer is responsible for verification of the implementation of the PQAP and will perform audits evaluating the implementation of applicable procedures and instructions in accordance with Section 6.3 and ECP-5.6.

2.3 ADMINISTRATIVE CONTROL

The project administrative control is addressed in Section 4.0 of the PQAP, Project 3201, as augmented by various project instructions and engineering control procedures which are referenced in the PQAP.

Procedures and instructions are addressed which will be implemented to control documentation generated on the Midland IDCV project which is subject to quality assurance and control measures or is required to provide an auditable record of the IDCV review process leading to Findings. The following documents are controlled: engineering evaluations, documents such as Monthly Status Reports, Draft and Final Interim Technical Reports and Draft and Final Reports, calculations, analyses, computer analyses, PQAP, quality assurance documents, personnel qualifications, correspondence, Open, Confirmed and Resolved Item Reports, Observations, Finding Reports, Finding Resolution Reports, the Engineering Program Plan and records documenting external communications and meetings.

3.0 ENGINEERING PROGRAM PLAN METHODOLOGY

This section provides the overall method of approach for the IDV and ICV portions of the IDCV with particular emphasis on those features of the methodology which are common to both. Specific details of the methodology for the IDV and ICV are addressed below in Sections 3.1 and 3.2, respectively.

The initial review step includes the identification and review of pertinent documents to permit an understanding of the design and construction chains including the interrelationships between the organizations and suborganizations participating in the Midland project. Next, the design bases in the form of regulatory requirements and design criteria are identified and reviewed in parallel with a review of project design and construction related experience. The design bases review provides an overall understanding of the plant and system design. The project design and construction experience review ensures that the IDCV program encompasses previously identified problem areas to verify that these have been adequately addressed and that they do not exist elsewhere in the same or similar form.

For the systems, components, and structures identified in Sections 3.1.3 through 3.1.5 and 3.2.3 through 3.2.5, detailed information which documents the implementation of the design and construction commitments will be identified, reviewed, and evaluated. The IDCV review and evaluation process will be documented in accordance with the procedures addressed in Section 4.0 of this Plan. The reporting of Findings including the disposition of items potentially leading to Findings will be reported in accordance with the procedures addressed in Section 5.0 of this Plan. The IDCV will be conducted in accordance with applicable provisions of 10 CFR 50, Appendix B, which are addressed in Section 6.0 of this Plan.

3.1 INDEPENDENT DESIGN VERIFICATION METHODOLOGY

ANSI N45.2.11 defines design verification as the "process of reviewing, conforming, or substantiating the design by one or more methods to provide assurance that the design meets specified inputs." Design inputs include design bases or criteria, regulatory requirements, codes and standards, and other design commitments. The IDV includes a determination of the design inputs; an evaluation of their accuracy, consistency, and adequacy; and an evaluation of the implementation of these commitments. The emphasis will be on making a determination of the overall quality of the design and an assessment of its compliance with licensing commitments. The review approach has been designed to be introspective in making this overall quality assessment by integrating the many design inputs and licensing commitments. This integrated assessment will ensure that all parameters have been considered which are important for the system in meeting its functional requirements.

The IDV methodology will utilize the applicable guidelines of ANSI N45.2.11. The methodology will include diverse approaches such as checking original calculations, conducting alternative confirmatory calculations, or checking design ouputs including drawings, or specifications. Where independent calculations are utilized, they may incorporate methods which are either similar to or different from the original design. In certain instances these independent calculations will be "blind," in that the original design calculations will be compared to the independent calculations upon their completion, without prior review by the IDV analyst.

The categories to be reviewed for certain design areas include review of design criteria and commitments, review of implementing documents, checks of calculations and evaluations, confirmatory calculations or evaluations, and checks of drawings and specifications. These categories are defined in Section 3.1.1. As a rule, all design areas will not be reviewed in each of the preceding categories. For example, a design area for the AFW system is "heat removal capability." This item would not typically have drawings and specifications associated with it as a direct output. In other instances, it may be the judgment of the review team based upon experience that emphasis is not needed in certain categories for each design area.

The bases for sample selection are presented in Section 3.1.2. The definition of the scope of review is provided in the following sections:

System	Section
AFW	3.1.3
SEP	3.1.4
CR-HVAC	3.1.5

The IDV will be conducted utilizing detailed checklists which are described in Section 3.1.6. Additional sampling and verification that may be conducted as a result of the IDV are discussed in Section 3.1.7.

3.1.1 CATEGORIES OF REVIEW: THE DESIGN CHAIN

The categories of review selected include the major design activities identified in the design chain. The IDV review categories included are:

- Review of design criteria and commitments
- Review of implementing documents
- Check of calculations and evaluations
- Confirmatory calculations or evaluations

- Check of drawings and specifications

Each of these categories is described in detail in sections 3.1.1.1 through 3.1.1.5 respectively. Checklists have been prepared for each of these categories to aid IDCV reviewers in the implementation of their review. These checklists are discussed in section 3.1.6.

3.1.1.1 Review of Design Criteria and Commitments

An identification and review of the design criteria and commitments concerning each specific design area will be performed. This review category provides the assurance that all necessary design inputs are considered in the IDV. The results of this review of design criteria and commitments are then used in subsequent stages where appropriate. The review of design criteria and commitments begins with an identification of appropriate criteria for the system. Such criteria may be determined from sources such as the FSAR, the docket file, 10 CFR 50, Appendix A, criteria supplied by the NSSS vendor, industry codes and standards, and other documents which provide criteria for system design.

3.1.1.2 Review of Implementing Documents

Implementing documents are those design documents which translate the design inputs into working level documentation. Typically, implementing documents include design criteria documents, project procedures, standard design practices, specific plant design basis documents, drawings, and calculations. Most frequently, implementing documents are intermediate steps in the design process which are subsequently used to produce design outputs. It is important that design inputs are properly interpreted and documented in implementing documents. Therefore, the objective of the review is to determine the existence and general reasonableness of the documentation and whether the documentation correctly reflects the design inputs. Design outputs are defined as documents such as drawings, specifications, and similar materials defining technical requirements for the fabrication, installation, or construction of the system. The design output documents are reviewed for the application of the design criteria and commitments as part of the check of drawings and specifications.

3.1.1.3 Check of Calculations and Evaluations

When specified, a detailed check of calculations and evaluations is made (i.e. inputs, assumptions, methodology, outputs, etc.). This activity follows the review of design criteria and commitments and the review of implementing documents. The check may take several forms, ranging from a number-by-number detailed mathematical check to a review and evaluation of outputs for reasonableness. The overall presentation of the sampled calculations and evaluations will also be reviewed to verify that all steps are clearly presented and consistent throughout. The IDV reviewer may, at his discretion, choose to conduct an alternative calculation as a means of confirming his judgment on the adequacy of the design calculation or evaluation. Where computer programs were used in the analysis, the reviewer will verify that appropriate inputs have been used in the calculation, and that the appropriate outputs have been identified. Additionally, it will be necessary to determine that the computer programs used have been verified in accordance with appropriate verification procedures.

3.1.1.4 Confirmatory Calculations or Evaluations

For selected areas, confirmatory calculations or evaluations will be performed. Generally, these evaluations will be made to confirm judgements relative to the review of areas which are suspect to the IDCV reviewer; however, "blind" confirmatory calculations will be undertaken in pre-selected areas to independently verify the original design calculations. Such confirmatory calculations will be performed by obtaining the necessary input data and independent specification of calculation or evaluation objective. The reviewer will select and apply the appropriate techniques to achieve the end results. Such calculation methods will be performed without benefit of first reviewing the existing design calculational method. In order to preserve the "blind" nature of this approach, it will be necessary that a person other than the reviewer of the implementing documents perform the confirmatory calculation or evaluation. The confirmatory calculation or evaluation will be performed under procedures appropriate for the type of calculation or evaluation being performed. To the extent appropriate, the calculation or evaluation will be equivalent to that initially performed. After completion of the confirmatory calculation or evaluation, a comparison between the original calculation and the confirmatory methods will be made to determine whether differences exist. If differences occur, a determination will be made to assess whether these differences are due to the inherent nature of the calculation methods chosen or due to errors.

For example, differences may result due to the selection by the originator of simplifying or conservative assumptions. In the event that the original calculation is more conservative than the confirmatory calculation and meets design basis acceptance criteria, no further action will be necessary. On the other hand, if the confirmatory calculation uses more conservative methods, a check of the original calculation will be made to determine whether the difference in degree of conservatism is appropriate.

3.1.1.5 Check of Drawings and Specifications

Where appropriate, design outputs such as drawings and specifications will be reviewed and checked to assure that they accurately and consistently reflect that which has been called for in design documents such as calculations or engineering evaluations. Drawings and specifications will also be reviewed to determine whether design change notices and field change notices have been incorporated. In cases where several related drawings exist, a cross-comparison among drawings will be made. Additionally, a review will be made of correspondence with vendors to determine the existence of deviations from the specifications and the approval by the design organization of such changes.

3.1.2 BASES FOR SAMPLE SELECTION

The systems selection criteria which are documented in Section 1.3 of this Plan also apply to the selection of specific structures or components to be reviewed within each design area of the IDV, including the depth of review in each design area. As a rule, the selection is based upon engineering judgment, as statistical techniques are considered to be largely inappropriate for a design verification program. Senior members of the project team with requisite experience are responsible for selecting the sample and determining its size. This process provides greater assurance than a random sampling plan since the initial IDV sample is purposely biased towards typical problem areas. Furthermore, the initial sample is considered broad enough to ensure that significant deficiencies could not propagate through the systems under evaluation without being detected.

In the course of designing a nuclear power plant, numerous reviews and evaluations are typically performed. These reviews and evaluations may result in the identification of areas requiring additional work. These reviews and evaluations reflect the project's design experience and are a valuable input to the refinement of the IDV scope and sample selection. In order to make use of this information, a review is made of the ongoing CPC inspection programs, 50.55e reports, CPC Safety Concern and Reportability Evaluation (SCRE) reports, Bechtel Management Corrective Action Reports (MCAR), NRC inspection reports, audit reports, and similar documentation. Three principal criteria are used to modify the technical review scope and the initial sample, providing more emphasis or a higher frequency of sampling to:

- Criterion 1 - Areas experiencing repeated problems within the industry or specifically on the Midland Project, to verify that these do not exist in the same or similar form,

- Criterion 2 - Areas previously receiving a lower level of review to achieve a sufficient level of assurance, and

- Criterion 3 - Areas where suspect items or Findings have been identified to provide further confirmation, close out outstanding issues and fully assess the extent and root cause.

3.1.3 DEFINITION OF REVIEW SCOPE FOR THE AFW SYSTEM

Section 3.1.1 identified the categories of review which essentially correspond to major activities of the design chain. When combined with a listing of each of the design areas (or topics), a matrix is formed which can be utilized to direct the conduct of the IDV effort for each system in the program. This matrix is shown on Figures 1.2-2a and 1.2-2b for the AFW system. A set of "X" marks are shown which indicate the review scope applicable to each design area. The criteria discussed in Sections 1.3 and 3.1.2 of this Plan were incorporated to develop the initial matrix. The design areas of the IDV review matrix for the AFW system are divided into three major divisions: AFW System Performance Requirements, AFW System Protection Features, and Structures that House the AFW System. The design areas addressed within each of these major divisions are discussed in Sections 3.1.3.1, 3.1.3.2, and 3.1.3.3 of this Plan, respectively. The initial review scope as documented in Revisions 0 and 1 of this Plan has been modified based upon meeting one or more of the criteria documented in Section 3.1.2. This change is indicated on Figures 1.2-2a and 1.2-2b by a circled "X" for items deleted from scope and by the symbol "*" for items added to scope.

Because the AFW system sample selection interfaces with other systems, it is necessary to define the boundaries for items within the scope of the IDCV. In general for the AFW system, the selection was made to include all components identified as being part of the AFW system on Bechtel P&ID drawing M439 sheets 3A, revision 9, and 3B, revision 10. Specific interface points are as follows:

AFW SYSTEM SAMPLE SELECTION BOUNDARIES

Interfacing System	Interface Point (component included in AFW)
Main Steam	Valves 074 and 077 [1]
NSSS	Steam Generator Nozzles
Service Water A	Valve 283
Service Water B	Valve 282
Unit 2 Condensate Tank (from)	Valve 008
Condenser Hotwells	Valve 006
Unit 1 Condensate Tank (return)	Valve 019
Cooling Pond (return)	Valve 017
ac/dc Power System [2]	Breaker or fuse interfacing AFW components with power source
ESFAS	AFW actuation system and FOGG
Main FW Loop A	Valve 303
Vents and Drains	First Valve
HVAC	AFW pump room fan coolers and associated ductwork and supports

NOTES:

1. P&ID M-432, Sheet 1A, Revision 5

2. Power supplies dedicated to AFW system are within sample selection boundaries.

In view of the fact that the design process involves a great number of individuals and organizations who may have contributed to the project engineering activities, it is necessary to define a reasonable set of limits on the scope of the IDV. Criteria were established by the project team to define the end points of the design chain applicable to this project. The majority of the design was performed by Bechtel. However, portions of the design may have been performed or affected by work performed by other organizations including, but not limited to, Babcock & Wilcox (B&W), engineering contractors, and equipment vendors. For the purposes of the verification program, the following limitations were applied. The information obtained by Bechtel from B&W does not receive, as part of the IDV program, an independent evaluation of the process by which B&W developed its data. The verification program verifies that data obtained from B&W are consistent and reasonable based upon engineering judgment. If the B&W data are suspect, additional investigation into the causes may be warranted. Equipment vendors are reviewed to verify that the documents with which they were supplied are accurate and current and that the results of their design efforts conform with the specified requirements given to them by Bechtel or CPC. Vendor documentation will be reviewed to determine that his product does, in fact, meet applicable requirements of the specifications. In the event that deviations are determined to exist, the appropriate IDCV Program reporting procedures will be applied. For engineering contractors, the scopes of work applicable to these contractors will be determined and, in general, they will be treated as if they were part of the Bechtel design organization. That is, they will not be treated like a vendor who is given a specification and is expected to deliver a product in conformance with that specification. They will be treated as part of a design organization which has similar responsibilities to other parts of the Bechtel project organization.

The following sections discuss the initial scope of review for each of the design areas.

3.1.3.1 AFW System Performance Requirements

The AFW system will be reviewed to assess its capability to perform as required by the design criteria and commitments. Included in the scope of this portion of review are design areas such as system operating limits, single failure, component functional requirements, electrical, instrumentation and control, and hydraulic design.

3.1.3.1.1 System Operating Limits - Topic I.1-1

The specified system operating limits will be reviewed to determine whether they have been appropriately specified in consideration of functional performance requirements during normal (startup and shutdown), transient and accident conditions. These performance requirements will be generally based upon NSSS considerations. Specified limits such as heat removal requirements, pressure requirements, time constraints, and system logic will be reviewed. To accomplish the preceding, the review will consist of a design criteria and commitments review, a review of implementing documents, and a check of calculations and evaluations.

3.1.3.1.2 Accident Analysis Considerations - Topic I.2-1

The FSAR accident analyses will be reviewed to identify those accidents in which the AFW may be involved either as a contributor or as an engineered safety system which helps mitigate the consequences of an accident. An evaluation will be made to determine if the system has been appropriately considered in these analyses and also to provide feedback into Topic I.1-1 to assure that system operating limits appropriately reflect accident analysis considerations. In addition, CPC/Bechtel actions in response to the B&W Anticipated Transient Operator Guidelines (ATOG) will be reviewed to assure that the design and operator guidelines are in compliance.

3.1.3.1.3 Single Failure - Topic I.3-1

All "active" components (e.g. pumps, motor-operated valves etc.) of the AFW system will be reviewed to determine whether the failure of one component can incapacitate the system or whether the system has sufficient redundancy, including power supplies, to withstand a single failure. (This will include a review of the flow logic "matrix" (FOGG system - Feed Only Good Generator) that is designed to prevent AFW flow to a depressurized steam generator, and provide steam flow to the turbine-driven pump only from the "good" generator). Automatic and manual initiation of the system will be reviewed. To accomplish the preceding, the review will consist of a design criteria and commitments review, a review of implementing documents, and a check of design evaluations.

3.1.3.1.4 Technical Specifications - Topic I.4-1

The technical specifications will be reviewed to assure that important plant operating limits associated with the AFW system are appropriately and accurately specified, consistent with the intent of the NRC's Standard Technical Specifications.

3.1.3.1.5 System Alignment/Switchover - Topic 1.5-1

System alignment criteria and commitments under all modes of operation will be reviewed along with P&IDs and other implementing documents. Additionally, since the AFW system incorporates substantial switchover capability between Units 1 and 2 available water sources, all switchovers and potential alignments will be reviewed against applicable procedures (if available) to determine whether the system can meet design objectives. Any switchovers designed to occur automatically will be reviewed against single failure criteria as discussed previously. Switchovers requiring manual activities will be reviewed by determining time required versus time available to accomplish necessary actions.

3.1.3.1.6 Remote Operation and Shutdown - Topic 1.6-1

The criteria and commitments for safe shutdown from outside the control room will be identified and reviewed. Selected components employed to meet the remote operation requirements will be reviewed as described under Topic 1.9-1, Component Functional Requirements. Other design features applicable to remote operation will be reviewed under Topic 1.16-1, Electrical Characteristics and Topic 1.18-1, Instrumentation.

3.1.3.1.7 System Isolation/Interlocks - Topic 1.7-1

The AFW system criteria, commitments, and implementing documents will be reviewed to determine the adequacy of all isolation requirements and interlocks which have been designed to implement system performance requirements. The single failure review in Topic 1.3-1 will address these items as well.

3.1.3.1.8 Overpressure Protection - Topic I.8-I

The AFW system criteria and commitments will be reviewed to assess the need for and incorporation of protective devices which may be required to prevent system overpressurization for modes of operation. This review will serve as input into Topic I.10-I, System Hydraulic Design.

3.1.3.1.9 Component Functional Requirements - Topic I.9-I

Selected mechanical, electrical, instrumentation and control (E,I&C) components specified and used in the AFW system will be reviewed for compliance to their functional requirements. The development of the functional requirements will be traced from the AFW system design criteria as dictated by licensing commitments, industry codes and standards, plant environmental conditions, and system performance requirements for the intended operating modes. The design criteria and commitments used for the AFW system will be checked to ensure the inclusion of all required design inputs. Component functional requirements design criteria include factors such as flow rate, allowable pressure drops, NPSH, voltage, device settings, and similar characteristics. The design process (calculations or analyses) used to translate the overall system design criteria into specific component specifications will also be reviewed. Finally, the validated component functional requirements will be compared to the component procurement specifications. Equipment seismic and environmental qualification will be considered separately.

3.1.3.1.10 System Hydraulic Design - Topic I.10-1

A review of criteria and commitments and implementing documents will be made for the system hydraulic design. The system hydraulic design review will also include a detailed check of calculations and evaluations of the system hydraulic parameters. This activity will incorporate results obtained from the configuration verification effort which is part of the ICV. For example, line sizes, lengths of pipe, and numbers of pipe fittings will be checked in the ICV effort. These quantities will then be compared against the basis for calculations of pressure drop in various portions of the AFW system.

3.1.3.1.11 System Heat Removal Capability - Topic I.11-1

Calculations and evaluations performed to demonstrate the adequecy of the system's heat removal capability will be checked. The scope includes a comparison between the results of the hydraulic design evaluation and the system requirements for heat removal.

3.1.3.1.12 Cooling Requirements - Topic I.12-1

Cooling requirements for AFW mechanical and electrical components will be checked and a determination made that these heat loads have been considered as design criteria for the interfacing systems.

3.1.3.1.13 Water Supplies - Topic I.13-1

The criteria established for water supply, from both safety and nonsafety sources, will be identified. A review will be made of implementing documents for proper use of these criteria.

3.1.3.1.14 Preservice Testing and Capability for Operational Testing - Topic 1.14-1

A determination will be made of the design criteria and commitments which exist for preservice testing and the capability for operational testing, including a review of implementing documents and associated evaluations that support the testing programs. The results of this review will be used in the ICV portion of the IDCV, which will verify that the system has been constructed such that it can function in accordance with its design criteria and commitments.

3.1.3.1.15 Power Supplies - Topic 1.15-1

The applicable design criteria for AFW power supplies will be identified from NSSS vendor, regulatory and industry requirements. The documents implementing the design criteria will be checked to verify the proper consideration of the applicable criteria determined from the criteria review. The AFW logic system and schematic diagrams will be reviewed to ensure that requirements relative to the quality of power supplies (diversity and redundancy) are met. In particular the review will include the assurance that the AFW system will meet design criteria including the loss of offsite power and station blackout.

3.1.3.1.16 Electrical Characteristics - Topic 1.16-1

The AFW system electrical characteristics as determined by design criteria and commitments will be reviewed to verify that all required commitments and criteria have been addressed. The areas of criteria and commitment review shall include cable physical separation, system electrical separation, cable and raceway sizing and terminal voltage on power circuits. Cable sizing calculations will be reviewed and applied to selected power circuits in the AFW system.

3.1.3.1.17 Protective Devices/Settings - Topic 1.17-1

Implementing documents will be reviewed to check for the inclusion of applicable design criteria and commitments for protective devices/settings. AFW schematic diagrams and component specifications will be reviewed to ensure that protective device/settings criteria have been properly implemented for motors and penetration assemblies. Protective device bypass features for thermal overload and opening torque switch will be verified for motor operated valves that are safety related.

3.1.3.1.18 Instrumentation - Topic 1.18-1

The instrumentation and alarms required to operate, monitor and protect the AFW system, as determined by design criteria, commitments and expected plant operations, will be reviewed against that specified for the AFW system to verify the adequacy of the instrumentation. Selected instrument accuracies under applicable plant operating conditions will be reviewed and evaluated. Selected instrument logic diagrams will be reviewed for proper circuit electrical design. Calculations for alarm set points or time delays for selected representative devices (e.g. steam generator water level trip point) will be reviewed for compliance with design criteria. The implementing specifications or lists documenting the consideration of the applicable design criteria will be reviewed to verify that the criteria are reflected in the devices shown for review.

3.1.3.1.19 Control Systems - Topic 1.19-1

Design criteria and commitments governing the steam generator water level and AFW turbine control systems will be checked to verify the inclusion of necessary regulatory, industry, and system performance requirements. Design specifications or other implementing documentation will be reviewed to verify that the necessary requirements were used as input to the control system design. This review will include a check of calculations or evaluations relative to control system performance, time response, component characteristics, and separation from actuation systems. Failure Modes Effects Analyses (FMEA) will be reviewed in conjunction with Topic 1.23-1, Failure Mode and Effects, to verify that system failures are in the safe direction. Control system circuitry design (voltages, currents, polarity) will be reviewed to verify that selected components will function as intended in the control circuit. The circuitry design review will include a review of applicable instrument loop diagrams, logic diagrams, and valve and motor schematic diagrams.

3.1.3.1.20 Actuation Systems - Topic 1.20-1

The auxiliary feedwater actuation system (AFWAS - which includes FOGG, feed only good generator) design criteria and commitments will be reviewed to verify the proper consideration of regulatory commitments, industry codes and standards, plant operational requirements and operator actions. AFW system logic diagrams for selected motor operated valves and pump motors will be reviewed against design commitments as will the applicable schematic diagrams. In addition, the AFWAS procurement specification will be reviewed against the design criteria and commitments.

3.1.3.1.21 Nondestructive Examination Commitments - Topic I.21-I

A determination will be made of the design criteria, commitments and implementing documents (e.g. testing plans, manuals and procedures) which exist for NDE of AFW system piping, components, and structures. The results of this determination will serve as input to the ICV portion of the IDCV which will review NDE records to verify the quality of construction.

3.1.3.1.22 Materials Selection - Topic I.22-I

This activity will include the review of criteria and implementing documents related to establishing the bases for the material specification process of selected structural elements, components, and a portion of the AFW piping system. Included will be a review of material selection requirements related to such factors as strength, toughness, hardness, compatability, electrical insulation properties, protective coatings, corrosion resistance, fire protection, and other chemical and physical requirements appropriate to the particular structure, component, or system.

3.1.3.1.23 Failure Modes and Effects - Topic I.23-I

The Midland FSAR contains a synopsis of a failure modes and effects evaluation performed to assess the capability of the AFW system to accomplish its intended safety functions. The IDCV FSAR evaluation will serve as the starting point of the review process for this topic, followed by a review of any implementing evaluations that support the FSAR FMEA. An independent confirmatory FMEA is under consideration, the scope of which will be based upon results of the initial review efforts. It is contemplated that this analysis will concentrate on electrical, instrumentation, and control systems components and the effects of their failure.

3.1.3.2 AFW System Protection Features

In addition to the review of the capability of the AFW system to perform its required functions, a review will be made of external factors which could affect the capability of the system to achieve these functions. Included in the scope of this portion of the review are factors such as seismic design, high energy line break accidents (HELBA), environmental protection, fire protection, missile protection, and systems interaction. The following sections address these and other design areas related to system protection.

3.1.3.2.1 Seismic Design - Topic II.1-1

Seismic design criteria and associated commitments related to the AFW system will be reviewed, and the establishment of the proper basis for the associated design process will be confirmed. Included will be the review of seismic design parameters and methodologies which were utilized in the seismic design process for structures, systems, and components associated with the AFW system.

3.1.3.2.2 Seismic Design--Pressure Boundary - Topic II.2-1

This activity will include a review of the commitments, implementing documents, calculations, drawings, and specifications associated with the seismic design of a selected portion of the AFW piping system. The utilization of the proper design input, such as response spectra, piping and component weights, and other piping characteristics, will be verified. The ASME code evaluations will be reviewed to verify that pertinent acceptance criteria are met. Drawings and specifications will be reviewed for consistency with design calculations. Included will be an independent confirmatory seismic analysis of a selected portion of the piping system based upon independently verified as-built dimensions utilizing a verified computer program. Pipe stresses and support loads will be calculated. To preserve the "blind" nature of the confirmatory calculation, the individuals who perform the calculation will not have prior benefit or knowledge of the specific calculational approach followed by the original analysts. Upon completion, a comparison will be made between the original design and IDV calculated forces and stresses at key locations. Any discrepancies will be identified and their cause determined.

3.1.3.2.3 Seismic Design--Pipe/Equipment Support - Topic II.3-1

A review of a selected portion of the AFW system will be conducted to verify that selected pipe supports have been designed and specified in accordance with criteria and commitments. Included will be the review of design loads, load combinations, and the methods of analysis utilized. The associated design drawings and specifications will be reviewed for consistency. The support loads calculated during the confirmatory piping analysis of Topic II.2-1 will be compared to the design loads for all supports in the selected portion of the AFW system. Several support types (e.g., snubber, rigid restraint, anchor, spring hanger, etc.) will then be sampled, and an independent confirmatory analysis will be made to verify the capability of the original design organization to properly design and size these supports given the design loads. This analysis will be based upon independently verified as-built dimensions. In addition, the design calculations, drawings and specifications associated with the anchorage and support of selected AFW system equipment will be reviewed for conformance to requirements.

3.1.3.2.4 Seismic Design--Equipment Qualification - Topic II.4-1

This activity will include the review of commitments, implementing documents, calculations, drawings, and specifications associated with the seismic qualification of selected equipment. Qualification requirements including response spectra, load combinations, and equipment functional criteria will be reviewed. The review will include various types of AFW system equipment of representative complexity such as the following: electrical-motor control center, motor-operated valve, and electrical panel; mechanical-AFW pump, motor-operated valve and heat exchanger.

3.1.3.2.5 High Energy Line Break Accidents - Topic II.5-1

HELBA criteria and associated commitments related to the AFW system will be reviewed, and the establishment of the proper basis for the associated design process will be confirmed. Included will be a review of HELBA design parameters and the methodologies which have been utilized in the HELBA design process for structures, systems, and components associated with the AFW system.

3.1.3.2.6 HELBA/Pipe Whip - Topic II.6-1

Design criteria, implementing documents, calculations, drawings, and specifications associated with pipe whip resulting from postulated high energy line breaks will be reviewed. Included will be the review of the definition of the methodology employed in determining postulated pipe break locations, the magnitude of associated pipe whip loads, and the techniques utilized for pipe restraint design. In addition, calculations for selected AFW system pipe rupture restraints will be reviewed, including the associated drawings and specifications for consistency with these calculations.

3.1.3.2.7 HELBA--Jet Impingement - Topic II.7-1

The design criteria and commitments applicable to preventive protective measures taken to assure acceptable consequences due to postulated jets will be reviewed. This topic will be reviewed in conjunction with Topic II.6-1, Pipe Whip, and Topic III.4-1, HELBA Loads, and will be considered in the evaluation of Topic III.7-1, Concrete/Steel Design.

3.1.3.2.8 Environmental Protection - Topic II.8-1

The design criteria and commitments applicable to all issues related to the plant's environmental protection will be reviewed. The environmental protection review will consist of a determination of the appropriate environmental envelopes, the qualification requirements for equipment to these envelopes, and the HVAC design criteria which are necesary to assure that the environmental envelopes will not be exceeded.

3.1.3.2.9 Environmental Envelopes - Topic II.9-1

The environmental envelope design criteria will be determined by a review of existing criteria and commitments and a review of the system arrangement. These environmental envelopes will be verified by a review of implementing documents and a check of calculations and evaluations which were used to determine the environmental parameters. Drawings and specifications for AFW equipment will be checked for consistency with the environmental envelope specified. In addition, a confirmatory calculation or evaluation will be performed to verify the environmental envelope specification for one portion of the AFW system.

To preserve the "blind" nature of the confirmatory calculation, the individuals who perform the calculation will not have prior benefit or knowledge of the specific calculational approach followed by the original analysts. Upon completion, a comparison will be made between the original design and IDV environmental envelopes at key locations. Any significant discrepancies will be identified and their cause determined.

3.1.3.2.10 Environmental/Equipment Qualification - Topic II.10-1

Equipment qualification requirements will be reviewed to determine whether the correct environmental envelopes were specified and, given these envelopes, whether the qualification methods specified were adequate to demonstrate that the component would meet its functional requirements. The review will include various types of AFW system equipment of representative complexity such as electrical cable, connectors, transmitters and motor-operated valves.

3.1.3.2.11 HVAC Design - Topic II.11-1

Requirements imposed upon the HVAC system design as a result of the need to meet environmental envelope or equipment qualification parameters will be checked. This will be achieved by a verification of the design interface between the AFW system design and the HVAC system design.

3.1.3.2.12 Fire Protection - Topic II.12-1

The applicable fire protection criteria will be determined for the AFW system. A review will be made of fire protection evaluations to determine whether the fire protection system meets the necessary requirements for the AFW system. Included in this review will be the designation and location of minimum AFW safe shutdown components, physical separation, designation of fire zones, ratings of fire barriers, construction and qualification of fire barrier penetration seals, associated circuits analysis and protection, fire hazards analysis, remote shutdown transfer switch design, fire detection and suppression systems, and emergency lighting pertaining to AFW system components. The scope of this review includes fires within the AFW pump rooms and fires external to the rooms which would affect redundant safe shutdown AFW components.

3.1.3.2.13 Missile Protection - Topic II.13-1

A review of criteria and commitments will be made of the potential missiles which could affect the AFW system and the protection provided for system components. The review includes missiles external to the AFW system and those that could be generated within the AFW system and will serve as input to Topic III.7-1, Concrete/Steel Design.

3.1.3.2.14 Systems Interaction - Topic II.14-1

As part of the overall systems review, the potential for systems interaction and means of prevention thereof will be reviewed. The review will include an examination of criteria utilized to analyze potential systems interactions, whether they be physical (electrical, mechanical, hydraulic), or spatial (thermal, fluid, mechanical, radiation). The procedures and results for the Midland systems interaction walkdowns will also be reviewed and, if possible, ongoing walkdowns will be observed. Human factors or inherent failure modes (common manufacturer, similar technology, equal aging or wear) will not be considered a part of the systems review.

3.1.3.3 <u>Structures that House the AFW System</u>

Many safety-related plant structures such as the containment, auxiliary and diesel generator buildings, and the intake structure support the functioning of the AFW system or its support systems. The overall criteria and commitments applicable to the design of these safety related structures will be reviewed and evaluated. Selected features and design areas from one or more of these structures will be isolated for a more in-depth review in the following topics.

3.1.3.3.1 Seismic Design/Input to Equipment - Topic III.1-1

This activity will include the review of commitments, implementing documents, calculations, drawings, and specifications related to the development of seismic design input for a portion of the AFW system and components in the auxiliary building. Included will be a review of seismic input parameters such as seismic design spectra, damping, material properties, and boundary conditions, including soil-structure interaction. The methodology utilized for the location of the mass points and the computation of masses and equivalent member properties will be reviewed. Parameter variation studies will also be reviewed to verify that the variance of important input parameters and modeling assumptions has been appropriately considered. The scope of this activity will include the review of the dynamic analysis of the building, the time history analysis and the generation of floor response spectra for both horizontal directions and the vertical direction. The utilization of proper floor response spectra for the specification of selected AFW system components and the selected portion of the AFW system will be verified.

3.1.3.3.2 Wind and Tornado Design/Missile Protection - Topic III.2-1

Criteria and commitments for wind loading, tornado effects, and missile protection will be reviewed to verify the proper basis is established for the design process. Included will be the review of the criteria associated with wind pressure loading, tornado wind loading, tornado depressurization effects, tornado missiles, and other related requirements. Loading combinations, methodologies of analysis, associated allowable stresses or conditions, and other specified criteria will be included in this review activity. The results of this review will be considered in evaluation of Topic III.7-1, Concrete and Steel Design.

3.1.3.3.3 Flood Protection - Topic III.3-1

This activity will include the review of criteria and commitments related to establishing the basis for flood protection from sources both external and internal to the plant. The criteria associated with the specification of the design flood level and the methods to be utilized to provide the necessary flood protection will be reviewed. Included will be the review of the criteria associated with the determination of postulated pipe break locations, the methodologies to be utilized in determining flow rates and resulting water levels, loading combinations, allowable stresses or conditions, and other related criteria. The results of this review will be considered in evaluation of Topic III.7-1, Concrete and Steel Design.

3.1.3.3.4 HELBA Loads - Topic III.4-1

Criteria and commitments for high energy line break accident loads will be reviewed to verify that the proper basis is established for the design process. Included will be the review of the criteria for jet impingement and pipe whip loading on structures and components related to the AFW system. The review will address loading combinations, methodologies of analysis, associated allowable stresses or conditions, and other related criteria. The results of this review will be considered in evaluation of Topic III.7-1, Concrete and Steel Design.

3.1.3.3.5 Civil/Structural Design Considerations - Topic III.5-1

Civil/structural design criteria and associated commitments related to the AFW system will be reviewed, and the establishment of the proper basis for the associated design process will be confirmed. Included will be the review of design parameters and the methodologies utilized in the design process for structures and affected systems and components associated with the AFW system.

3.1.3.3.6 Foundations - Topic III.6-1

Included in this activity will be the review of criteria, implementing documents, and calculations associated with the design of selected foundations associated with structures housing the AFW system. The review will address design criteria, methodologies of analysis and calculations associated with each type of foundation loading including dead, live, tornado and seismic loadings.

3.1.3.3.7 Concrete and Steel Design - Topic III.7-1

This activity will include the review of criteria, implementing documents, calculations, drawings, and specifications associated with the reinforced concrete and structural steel design of selected structural elements associated with the AFW system. Structural elements, including a major load bearing shear wall and a floor diaphram will be selected that require consideration of a broad spectrum of loadings such as dead, live, wind, tornado, seismic, flood, and HELBA loads. The review will address design criteria, methodologies of analysis and calculations associated with each type of loading with emphasis on a verification that these items have been considered in a realistic manner. Loading combinations, allowable stresses or conditions, and other applicable criteria will be reviewed. Drawings and specifications for the selected structural elements will be reviewed against design calculations for consistency.

3.1.4 DEFINITION OF REVIEW SCOPE FOR THE STANDBY ELECTRIC POWER SYSTEM

The categories of review identified in section 3.1.1 are also applicable to the review of the Standby Electric Power (SEP) system. Similarly, the criteria discussed in sections 1.3 and 3.1.2 were incorporated to develop the initial design verification matrix shown on Figures 1.2-4a and 1.2-4b. The design areas (or topics) of the IDV review matrix for the SEP system are somewhat different from those for the AFW system, consistent with the differences in the functions and physical configuration of these systems. The review philosophy, matrix concepts and organization remain the same. The design areas for the SEP system review matrix are divided into three major divisions: SEP System Performance Requirements, SEP System Protection Features, and Structures that House the SEP System. The design areas addressed within each of these major divisions are discussed in sections 3.1.4.1, 3.1.4.2 and 3.1.4.3 of this Plan, respectively. As previously mentioned, the identified initial review scope is subject to change depending upon whether the criteria documented in section 3.1.2 have been met.

Because the SEP system sample selection interfaces with other systems, it is necessary to define boundaries for items within the scope of the IDCV.

The SEP system as defined in the IDCV program includes four major elements: the diesel generator (DG) and its support systems; the power distribution system (PDS); the preferred 120V ac power system (AC) and the 125V dc power system (DC). Continuity with the AFW system review is emphasized by drawing the boundaries of evaluation for the PDS and the two low voltage AC and DC systems as they service the AFW system. The PDS boundaries are drawn at breakers interfacing with the 480 V buses. The DG and all of its support systems are included within the sample selection boundaries of the SEP system.

Specific interface points are as follows:

STANDBY ELECTRIC POWER SYSTEM
SAMPLE SELECTION BOUNDARIES

Interfacing System	Interfacing Point
Station Power and Offsite Power	Breakers connecting 4160 V Class IE and non-IE buses: 2305 1200A 2405 1200A
Non-Class IE 4160 Volt Bus Loads	Breakers at 4160 V Class IE Buses: 2599 1200A 2A0612 1200A
Class IE Electrical Distribution	Includes distribution system from 4160 V buses to the breaker at the 480 V buses: 2766 1600A 2866 1600A and distribution to loads fed directly at 4160 volts.
Aux. Feedwater System (AFW)	Include all portions of the Class IE power supply which feed essential components in the AFW, including the 480 Vac, 120 Vac, and 125 Vdc loads.
Diesel Generator	Include all portions of the Class IE power supply which feed essential components for the diesel generator and supporting systems discussed below, including the 480 Vac, 120 Vac, and 125 Vdc loads.
Control Room HVAC System (CR-HVAC)	Include all portions of the Class IE power supply which feed essential components for the CR-HVAC including the 480 Vac, 120 Vac and 125 Vdc loads.

Interfacing System	Interfacing Point
Class IE Loads	For loads other than AFW, DG, and CR-HVAC, the review will be limited to confirming that all Class IE loads have been included in establishing the system design electrical loads.
DG Fuel Oil Storage and Transfer System	System (FSAR Figure 9.5-25) is included. Interface with Demineralized Water Supply is at DeLavel interface.
DG Cooling Water System	System integral to diesel is included (FSAR Figure 9.5-26). Service Water boundary is at DeLavel interface.
DG Starting System	System (FSAR Figure 9.5-27) is included.
DG Lubrication System	System (FSAR Figure 9.5-28) is included.
DG Combustion Air Intake and Exhaust System	System (FSAR Figure 1.2-27) is included.
Structures	DG building and foundations, and foundation for fuel oil storage tank.

The following sections discuss the initial scope of review for each of the design areas.

3.1.4.1 SEP System Performance Requirements

The SEP system will be reviewed to assess its capability to perform as required by the design criteria and commitments. Included in the scope of this portion of review are design areas such as system operating requirements, single failure, component functional requirements, diesel electrical load sequencing/shedding, diesel starting mechanism, independence, cable sizing, routing and separation.

3.1.4.1.1 System Operating Limits (DG) - Topic 1.1-2

The objective of this topic is to assemble and review the salient operating parameters of the total diesel/generator "system". This will include: the fuel system; the cooling system; the building heating, ventilation, and air conditioning system; the starting system; the lubrication system; and the combustion air intake and exhaust system.

Each of the parameters will be "tracked" through the design chain to assure consistency. Applicable calculations and evaluations will be reviewed to determine whether important parameters can be kept within limits.

The key components and applicable parameters determined from this review will in turn be reviewed in greater depth in other topics related to the mechanical and electrical components.

3.1.4.1.2 Accident Analysis Considerations (DG, AC, DC) - Topic 1.2-2

FSAR Safety Analyses will be reviewed to determine accident and post-accident operability requirements. This will include such DG features as the various trippping devices and the automatic reset to 4.16 kV on LOCA start. The DG building HVAC system also will be reviewed to determine the effect of its failure on the DG.

As part of the review, the potential for DG, AC, and DC systems' failures to exacerbate accident conditions will be examined.

3.1.4.1.3 Single Failure (DG, PDS, AC, DC) - Topic 1.3-2

A confirmatory evaluation of a portion of the SEP system will be conducted to determine its ability to perform required functions, during both normal and accident conditions, in the event of a single failure. This review will also include, but not necessarily be limited to, an evaluation of the FSAR single failure analyses and supporting documentation.

3.1.4.1.4 Technical Specifications (DG, DC) - Topic 1.4-2

The Technical Specifications will be reviewed against existing regulatory criteria to assure that important operating limits are appropriately and accurately specified. An effort will also be made to assess whether additional specifications might be necessary, based upon knowledge gained from the detailed review of the DG and DC systems.

3.1.4.1.5 Local Operation (DG) - Topic 1.6-2

The local operability of the various DG system components, including the diesel, the generator, the lube oil system, starting mechanism and air supply system, and HVAC system, will be reviewed to determine the capability for local operation and the ability of the system to properly start and operate if controls are left in the local or manual position.

3.1.4.1.6 System Interlocks (DG) - Topic 1.7-2

The substantial number of interlocks of the DG system will be reviewed to determine their adequacy in implementing system performance requirements.

This will include an evaluation of protective devices to prevent placing the DGs in parallel and of several devices associated with system components such as the fuel oil transfer pumps and the jacket water cooler.

3.1.4.1.7 Component Functional Requirements (DG, PDS, AC, DC) -Topic 1.9-2

Selected mechanical, electrical, instrumentation, and control (EI&C) components specified and used in the SEP system will be reviewed for compliance with their functional requirements. The development of the functional requirements will be traced from the system design criteria as dictated by licensing commitments, industry codes and standards, plant environmental conditions, and system performance requirements for the intended operating modes. The design criteria and commitments used for the system will be checked to ensure the inclusion of all required design inputs. Component functional requirement criteria for support systems include factors such as engine starting time, pump flow rate, allowable pressure drops, NPSH, and similar characteristics. The electrical system functional requirements are both steady state and transient limits on electrical parameters, such as voltage, AC frequency, impedance, etc. In reviewing the development of functional requirements, operating plant experience will be assessed to evaluate the adequacy of system design criteria.

3.1.4.1.8 Cooling/Heating Requirements (DG) - Topic 1.12-2

Cooling requirements for the diesel-generator will be checked and a determination made that the design interface with the cooling water system is adequate to handle the heat load. Heat exchangers in the cooling system will be reviewed for proper sizing and other design considerations such as fouling. Any heating requirements for the engine during its standby mode will be determined and supporting calculations checked.

3.1.4.1.9 Preservice Testing and Capability for Operational Testing (DG) - Topic 1.14-2

A review will be made of the criteria and commitments and implementing documents which exist for preservice testing and the capability for operational testing for a selected diesel generator. Included will be the review of associated evaluations to ensure adequate provision for preservice and operational testing of the equipment.

3.1.4.1.10 Electrical Characteristics (DG, PDS, AC, DC) - Topic 1.16-2

Design criteria and commitments will be surveyed relative to system electrical characteristics including voltage profiles for 4160 V and 48 Vac, and 125 Vdc buses, short circuit currents on the same buses and terminal voltage available to power components from these buses. Voltage profile calculations for the 4160 V and 480 Vac buses will be reviewed. An independent determination will be made of terminal voltage available to power selected components from the 4160 V and 480 Vac buses. Short circuit calculations to determine the momentary and interrupting currents on the 4160 V system will also be reviewed.

3.1.4.1.11 Protective Devices/Settings (DG, PDS) - Topic 1.17-2

The design criteria and commitments, and implementing documentation for protective devices/settings will be reviewed for the diesel generator and power distribution system (4160 and 480 Vac buses). The protective devices intended to meet the identified design criteria will be checked on system schematics. Device setting criteria will be reviewed to ensure coordination of overcurrent devices associated with the 4160V and 480V buses. The interrupting rating of 4160V and 480V circuit breakers will be reviewed against the short circuit currents reviewed under Topic 1.16-2 Electrical Characteristics.

3.1.4.1.12 instrumentation (DG, AC, DC) - Topic 1.18-2

The adequacy of the instrumentation provided for monitoring and alarm functions associated with the diesel generator, 120V ac preferred power system and 125 Vdc systems will be evaluated by reviewing design criteria and commitments, implementing documents, schematic diagrams and one line diagrams. Design input will be taken from industry codes and standards, regulatory requirements and guidance, and NSSS vendor input. Monitoring requirements for operational status information and surveillance instrumentation will be checked. Selected calculations of instrument setpoints will be reviewed against regulatory requirements.

3.1.4.1.13 Control Systems (DG) - Topic 1.19-2

Design criteria and commitments, implementing documents, check of evaluations and drawings will be made to review the adequacy of the diesel generator control systems for automatic and manual operation. In addition, the controls associated with diesel generator support systems will be reviewed. The support systems include diesel fuel, cooling water and lube oil.

The design criteria compilation will include a consideration of codes and standards, regulatory requirements, NSSS vendor input and industry experience. Control system logic diagrams and schematic diagrams will be reviewed to ensure that design requirements are met in issued design drawings.

3.1.4.1.14 Actuation Systems (DG) - Topic 1.20-2

The diesel generator actuation system and hardware is part of the Engineered Safety Feature Actuation System (ESFAS) which is partially reviewed during the AFW Actuation System (AFWAS) review. The actuation system design, including inputs, logic and actuation devices, will be reviewed against IEEE Standard-279 and Regulatory Guide 1.9 criteria. Actuation system logic diagrams and applicable schematic diagrams will be reviewed against design commitments. The ESFAS procurement specification will be reviewed for compliance with design commitments.

3.1.4.1.15 Failure Modes and Effects (DG, PDS, AC, DC) - Topic 1.23-2

The various modes of failure, and the effects of such failures, will be reviewed, using as a basis the analyses presented in summary form in the FSAR. The basis of this review will be to determine if there is any potential failure that has been previously unanalyzed or that might be common-mode, thus affecting both trains of emergency power. It is presently envisioned that the review will stop at the component level and will not entail a review of failure modes and effects of subcomponents (e.g. resistors, switches, etc. that make up specific electrical devices).

3.1.4.1.16 Electrical Load Capacity (DG, PDS, AC, DC) - Topic 1.24-2

Diesel generator, 4160 Vac bus, 120 Vac preferred power and 125 vdc battery loads will be independently tabulated for design basis conditions to determine steady state and transient SEP system loads. The loads will be reviewed against design criteria and commitments. The diesel generator loading will reflect the load sequence information from Topic 1.25-2. The battery load cycle will be determined for loss of offsite power and station blackout conditions. The resulting battery capacity requirements will be reviewed against regulatory sizing criteria. Diesel generator 4160 and 120 Vac bus loads will be compared ro design ratings and preoperational test data (Topic 1.14-2) to determine the suitability of the selected hardware.

3.1.4.1.17 Electrical Load Sequencing (DG, PDS) - Topic 1.25-2

A review of design criteria and commitments will be performed for electrical load sequencing provisions for the diesel generator and its associated 4160 Vac bus. Sequence logic will be reviewed against design commitments as will the schematic diagrams implementing sequencing logic. The verified loading sequence will be used as input to the load capacity review (Topic 1.24-2) and the preservice testing review (Topic 1.14-2).

3.1.4.1.18 Electrical Load Shedding (DG, PDS) - Topic 1.26-2

Electrical load shedding design criteria and commitments, implementing documents and logic diagrams will be reviewed against regulatory requirements and industry codes and standards. The review will be performed for the 4160 Vac bus and will include those design provisions for load shedding coordination with load sequencing (Topic I.25-2) and interlocks/permissives (Topic I.7-2) associated with load shedding.

3.1.4.1.19 Fuel Oil System (DG) - Topic I.27-2

The Fuel Oil System provides storage and transfer for 7 days of Engineered Safety Feature (ESF) load. Criteria for system design will be reviewed against industry standards, FSAR commitments, and sound engineering practice based on operating plant experience. The review will further examine the documents which implement the criteria, including a review of portions of calculations which implement the criteria. Technical areas to be evaluated include: pump performance, fuel consumption vs. tank capacity, control logic, buried tank flooding, piping design (including vibration considerations), and unique fire protection considerations.

3.1.4.1.20 Lube Oil System (DG) - Topic I.28-2

The performance criteria and implementation for lubrication and lubrication oil cooling will be reviewed with particular attention to the interface requirements established by the engine manufacturer. The key issue is to examine the design and maintenance requirements necessitated by engine design, and to review the documents used to implement such requirements.

3.1.4.1.21 Starting Mechanism and Air Supply System (DG) - Topic I.29-2

The starting system includes both the pressurized air supply and distribution system, and the electric automatic start provisions. Criteria for the design will be reviewed against industry standards, FSAR commitments, and typical design practice in response to operating experience. Implementation will be examined by reviewing technical specifications for system components, logic diagrams, piping and instrument drawings, and calculations. Interface with engine design requirements will receive particular attention. Technical areas under review include: diesel engine starting air specifications, pneumatic design and compressor sizing, control logic, moisture entrainment, air filter clogging, and automatic start power supply and field flashing.

3.1.4.1.22 Combustion Air Supply (DG) - Topic 1.30-2

Combustion air supply and engine exhaust for the diesel engine will be reviewed from criteria to implementation, including a check of selected design calculations. The criteria will be reviewed against FSAR commitments, e.g., seismic criteria and interface requirements of the engine design. Specific areas of technical review include: tornado, missile and debris considerations, seismic design, exhaust back pressure, intake flow rate, exhaust recycle, and effects of offsite gas release.

3.1.4.1.23 Independence (DG, PDS, AC, DC) - Topic 1.31-2

Diesel generator, power distribution system, 120 Vac preferred power and 125 Vdc battery systems will be reviewed for compliance with design criteria governing electrical independence. This review will include a survey of design criteria and commitments, implementing documents and a check of plant single-line drawings, selected schematic diagrams and circuit schedules.

3.1.4.1.24 Cable Sizing/Routing/Separation (PDS) - Topic I.32-2

This activity will include the review of criteria, implementing documents, calculations, drawings and specifications associated with SEP system cable sizing, routing and separation. The review will include a check of the sizing calculations applicable to the 4160 V cable, as well as other selected cable sizes. The specified routing of these cables will be reviewed for compliance with requirements, including separation criteria. In addition, an independent calculational check will be made of selected cable sizes and the results reviewed against the output of the design process.

3.1.4.2 SEP System Protection Features

In addition to the review of the capability of the SEP system to perform its required functions, a review will be made of external factors which could affect the capability of the system to achieve these functions. Included in the scope of this portion of the review are factors such as seismic design, high energy line break accidents (HELBA), environmental protection, fire protection, missile protection, and systems interaction. The following sections address these and other design areas related to system protection.

3.1.4.2.1 Seismic Design - Topic II.1-2

The seismic design criteria and associated commitments related to the SEP system will be reviewed to ensure that an adequate basis for the design process is established. The review will include seismic design parameters and methodologies specified for the design of structures, systems and components associated with the SEP system.

3.1.4.2.2 Seismic Design — Pressure Boundary (DG) - Topic II.2-2

This activity will include a review of the commitments, implementing documents, calculations, drawings and specifications associated with seismic design of a selected portion of the diesel generator fuel oil piping system. The utilization of the proper design input, such as response spectra, piping and component weights, and other piping characteristics, will be verified. The ASME code evaluations will be reviewed to verify that pertinent acceptance criteria are met. Drawings and specifications will be reviewed for consistency with design calculations.

3.1.4.2.3 Seismic Design — Pipe/Equipment Support (DG, PDS) - Topic II.3-2

A review of a selected portion of the diesel generator fuel oil system will be conducted to verify that selected supports have been designed and specified in accordance with criteria and commitments. Included will be the review of design loads, load combinations, and the methods of analysis utilized. The associated design drawings and specifications will be reviewed for consistency. Several support types will then be sampled, and an independent confirmatory analysis will be made to verify the capability of the original design organization to properly design and size these supports given the design loads. In addition, the design calculations, drawings and specifications associated with the anchorage and support of a diesel generator and selected other SEP system equipment will be reviewed for conformance to requirements.

3.1.4.2.4 Seismic Design -- Equipment Qualification (DG, PDS) - Topic II.4-2

This activity will include the review of commitments, implementing documents, calculations, drawings, and specifications associated with the seismic qualification of selected equipment. Qualification requirements including response spectra, load combinations, and equipment functional criteria will be reviewed. The review will include the following types of equipment of representative complexity such as: diesel generator, motor control center, electrical panel, fuel oil pump, motor-operated valve and heat exchanger.

3.1.4.2.5 High Energy Line Break Accidents - Topic II.5-2

Criteria for postulation and evaluation of high energy line breaks will be reviewed to the extent that there are aspects unique to the SEP system which were not incorporated in the AFW review.

3.1.4.2.6 HELBA/Pipe Whip (PDS, AC, DC) - Topic II.6-2

Pipe whip evaluation criteria will be reviewed with an emphasis on interactions with electrical equipment, cable, controls, etc.

3.1.4.2.7 HELBA/Jet Impingement (PDS, AC, DC) - Topic II.7-2

Jet impingement evaluation criteria will be reviewed to assess the manner in which an interaction within the SEP system has been addressed.

3.1.4.2.8 Environmental Protection - Topic II.8-2

The criteria review conducted for the AFW system will be extended to include considerations unique to the SEP system. Particular emphasis will be given to electrical circuit components, e.g., breakers.

3.1.4.2.9 Environmental Envelopes (DG, PDS) - Topic II.9-2

The criteria review conducted for the AFW system will form a basis for the review of the SEP system. Concerns unique to this system will be included in the review. A check will be made to ensure that the system is included in the scope of the criteria.

3.1.4.2.10 Environmental/Equipment Qualification (DG, PDS) - Topic II.10-2

Equipment qualification requirements will be reviewed to determine whether the correct environmental envelopes were specified and, given these envelopes, whether the qualification methods specified were adequate to demonstrate that the component would meet its functional requirements. The review will include the following types of equipment of representative complexity: electrical insulation, connectors, transmitters, and circuit breakers. Documents reviewed include technical specifications which are part of the procurement package, and vendor qualification reports or test reports.

3.1.4.2.11 HVAC Design (DG) - Topic II.11-2

Requirements imposed upon specific portions of the HVAC systems that limit environmental conditions for the SEP system equipment will be reviewed. This will be achieved by a verification of the design interface between the two systems.

3.1.4.2.12 Fire Protection (DG) - Topic II.12-2

The unique fire protection concerns associated with diesel fuel will be addressed in a review of the Diesel Generator Building and underground storage area. The extent of that review will include criteria development to a check of calculations. In particular, malfunctions which result in spillage of fuel or lube oil will be reviewed for potential to cause loss of redundant power generation. The function of detection and suppression capabilities under most severe incidents will be reviewed. Included in the review will be adequacy of fire barriers separating redundant diesel-generator units, potential effects on the diesel reliability due to fire protection systems, and potential interactions between diesel-generator rooms in a fire.

3.1.4.2.13 Missile Protection (DG) - Topic II.13-2

The criteria for postulating events which result in internal missile generation will be reviewed against current licensing practice and operating experience. Criteria for assessing damage due to postulated missiles will be reviewed as an extension of the AFW review.

3.1.4.2.14 Systems Interaction (DG, PDS, AC, DC) - Topic II.14-2

The potential for systems interaction and means for prevention thereof will be reviewed. The review will include an examination of criteria utilized to analyze potential physical or spatial interactions. The procedures and results for the Midland systems interaction walkdowns will be reviewed and, if possible, ongoing walkdowns will be observed.

3.1.4.3 Structures that House the SEP Systems

Many safety-related plant structures support the functioning of the SEP system or its support systems. The overall criteria and commitments applicable to the design of these safety related structures will be reviewed and evaluated. Selected features and design areas of the diesel generator building structure will be isolated for a more in-depth review in the following topics.

3.1.4.3.1 Seismic Design/Input to Equipment (DGB) - Topic III.1-2

This activity will include the review of commitments, implementing documents, calculations, drawings, and specifications related to the development of seismic design input for a portion of the SEP system and associated components in the diesel generator building. Included will be a review of seismic input parameters such as seismic design spectra, damping, material properties, and boundary conditions, including soil-structure interaction. The methodology utilized for the location of the mass points and the computation of masses and equivalent member properties will be reviewed. Parameter variation studies will also be reviewed to verify that the variance of important input parameters and modeling assumptions has been appropriately considered. The scope of this activity will include the review of the dynamic analysis of the diesel generator building, the time history analysis and the generation of floor response spectra for both horizontal directions and the vertical direction. The utiliziation of proper floor response spectra for the specification of selected SEP system components will be verified.

3.1.4.3.2 Wind and Tornado Design/Missile Protection (DGB) - Topic III.2-2

Criteria and commitments, implementing documents, and calculations for a portion of the diesel generator building will be reviewed to verify proper incorporation into the design. Included will be the review of wind pressure loading, tornado wind loading, tornado depressurization effects, tornado missile, and other related requirements. Loading combinations, methodologies of analysis, associated allowable stresses or conditions, and other specified criteria will be included in this review activity. In addition, drawings and specifications associated with the selected portion of the diesel generator building will be reviewed for consistency with criteria and calculations.

3.1.4.3.3 Flood Protection (DGB) - Topic III.3-2

This activity will include the review of criteria, implementing documents and calculations related to flood protection from sources both external and internal to the diesel generator building. The specification of the design flood level and the methods utilized to provide the necessary flood protection will be reviewed. Included will be the review of the calculations associated with the determination of postulated pipe break locations and the methodologies utilized in determining flow rates and resulting water levels. The results of this review will be considered in the evaluation of Topic III.7-2, Concrete and Steel Design of the diesel generator building.

3.1.4.3.4 HELBA Loads (DGB) - Topic III.4-2

Criteria and commitments for high energy line break accident loads in the diesel generator building will be reviewed to verify that the proper basis is established for the design process. Included will be the review of the criteria for jet impingement and pipe whip loading on structures and components related to the SEP system. The review will address loading combinations, methodologies of analysis, associated allowable stresses or conditions, and other related criteria. The results of this review will be considered in evaluation of Topic III.7-2, Concrete and Steel Design.

3.1.4.3.5 Civil/Structural Design Considerations - Topic III.5-2

Civil/structural design criteria and associated commitments related to the diesel generator building will be reviewed, and the establishment of the proper basis for the associated design process will be confirmed. Included will be the review of design parameters and the methodologies utilized in the design process for structures and affected systems and components associated with the SEP system.

3.1.4.3.6 Foundations (DGB) - Topic III.6-2

Included in this activity will be the review of criteria, implementing documents, and calculations associated with the design of selected foundations of the diesel generator building. The review will address design criteria, methodologies of analysis and calculations associated with each type of foundation loading including dead, live, wind and seismic loadings.

3.1.4.3.7 Concrete and Steel Design (DGB) - Topic III.7-2

This activity will include the review of criteria, implementing documents, calculations, drawings, and specifications associated with the reinforced concrete and structural steel design of selected structural elements associated with the diesel generator building. Structural elements, including a major load bearing shear wall and a flood diaphragm will be selected that require consideration of a broad spectrum of loadings such as dead, live, wind, tornado, seismic, flood and HELBA loads. The review will address design criteria, methodologies of analysis and calculations associated with each type of loading with emphasis on a verification that these items have been considered in a realistic manner. Loading combinations, allowable stresses or conditions, and other applicable criteria will be reviewed. Drawings and specifications for the selected structural elements will be reviewed against design calculations for consistency.

3.1.4.3.8 Tanks - Topic III.8-2

This activity will include the review of criteria, implementing documents, and calculations associated with the design of a selected tank associated with the diesel generator. A review of the calculations for the underground emergency diesel oil storage tank and foundation will be made. All applicable loadings will be reviewed, such as dead, live, wind, tornado, seismic (including fluid dynamics effects and flooding, as applicable. The review will address tank design criteria and methodologies of analysis, and will include loading combinations, allowable stresses or conditions, and other applicable criteria. Drawings and specifications will be checked for consistency with calculations. In addition, an independent confirmatory analysis of the diesel oil storage day tank integrity including its support system will be conducted and the results compared with the output of the design process.

3.1.5 DEFINITION OF REVIEW SCOPE FOR THE CONTROL ROOM HVAC SYSTEM

The categories of review identified in section 3.1.1 are also applicable to the review of the Control Room HVAC (CR-HVAC) system. Similarly, the criteria discussed in section 1.3 and 3.1.2 were incorporated to develop the initial design verification matrix shown on Figures 1.2-6a and 1.2-6b. The design areas (or topics) of the IDV review matrix for the CR-HVAC system are somewhat different from those for the AFW or SEP systems, consistent with the differences in the functions and physical configuration of these systems. The review philosophy, matrix concepts and organization remain the same. The design areas for the CR-HVAC system review matrix are divided into three major divisions: CR-HVAC System Performance Requirements, CR-HVAC System Protection Features and Structures that House the CR-HVAC System. The design areas addressed within each of these major divisions are discussed in sections 3.1.5.1, 3.1.5.2 and 3.1.5.3 of this Plan, respectively. As previously mentioned, the identified initial review scope is subject to change depending upon whether the criteria documented in section 3.1.2 have been met.

Because the CR-HVAC system sample selection interfaces with other systems, it is necessary to define boundaries for items within the scope of the IDCV. In general the CR-HVAC system sample selection boundaries include the Control Room Area Ventilation System (CRAVS), its support systems and components important to control room isolation and habitability during accident conditions; either radiological or chemical.

Specific interface points are as follows:

CONTROL ROOM HVAC SYSTEM SAMPLE SELECTION BOUNDARIES

Interfacing System	Interfacing Point
ac/dc Power System	All portions of Class IE electric system serving the CR HVAC are included in the Standby Electric Power (SEP) System review (see Section 3.1.4 for SEP sample selection boundaries).
Plant HVAC	Portion of the Control Room Area Ventilation System (CRAVS) (FSAR Figures 9.4-1 and 9.4-2) up to and including: Valves OMO 6545A, OMO 6545B, OMO 6543A, OMO 6543B, OMO 6554, OM 6557, OM 6549, OM 6547A, OM 6547B
Equip. & Piping Supports	Includes all supports incorporated in the seismic qualification of the Control Room portion of the CRAVS as defined above.
ESFAS	Includes Control Room Isolation System (CRIS) subsystem, FSAR Figure 7.3-5.
Accident Monitoring Inst.	Portions essential for isolation of Control Room and operation of CRAVS, e.g. - intake duct radioactivity - charcoal filter temperature - hazardous gas concentration See FSAR Tables 7.5-1 and 7.5-3.
Plant I&C	Portions essential for isolation of Control Room and CRAVS operation.
Control Room Structure	Portions required for pressure boundary including penetrations and doors.

The following sections discuss the initial scope of review for each of the design areas.

3.1.5.1 CR-HVAC System Performance Requirements

The CR-HVAC system will be reviewed to assess its capability to perform as required by the design criteria and commitments. Included in the scope of this portion of review are design areas such as system operating requirements, single failure, component functional requirements, instrumentation, detection, failure modes and effects, filtration, and ventilation.

3.1.5.1.1 System Operating Limits - Topic I.1-13

This topic will involve review of available documentation to extract various system parameters and their values. These will include temperature to be maintained, assumed leakage rates, system flow rates, required control room pressure, etc. Results of this review involving key components and their parameters will be reviewed further in related mechanical and electrical topics.

Ancillary systems such as Safeguards Chilled Water and Essential Service Water will be reviewed only from the standpoint of ascertaining that parameters dependent on their operability can indeed be met.

3.1.5.1.2 Accident Analysis Considerations - Topic I.2-3

FSAR Safety Analyses will be reviewed to determine accident and post-accident operability requirements involving the control room HVAC system (smoke from an external fire, chemical release, radiological accident, and main steam line break). This will include a review of detection systems and assumptions regarding their capabilities.

3.1.5.1.3 Single Failure - Topic 1.3-3

Single-failure-proof design aspects of the system will be reviewed, commencing with information in the FSAR and proceeding to a check of calculations and evaluations, if available.

3.1.5.1.4 Technical Specifications - Topic 1.4-3

The Technical Specifications will be reviewed against existing regulatory criteria to assure that important operating limits are appropriately and accurately specified. An effort will also be made to assess whether additional specifications might be necessary, based upon knowledge gained from the detailed review of the system.

3.1.5.1.5 System Alignment/Switchover - Topic 1.5-3

This review will encompass such diverse topics as the local handswitches for the various fans, the interlocks associated with these switches and fans, the required actions of the Control Room Isolation System (CRIS), the requirements for post-accident operation resulting from the various external initiating events, and any assumptions regarding required manual operation of the system.

3.1.5.1.6 System Isolation/Interlocks - Topic 1.7-3

The interlocks of the control room HVAC system will be reviewed to determine their adequacy in implementing system performance requirements. This will include any interlocks associated with CRIS, fan and isolation damper interlocks, pressurization system interlocks, etc.

3.1.5.1.7 Component Functional Requirements - Topic I.9-3

Functional requirements for selected components will be reviewed against requirements imposed directly by licensing commitments and industry codes and standards. Additionally, system design imposes performance requirements. The development of such requirements will be traced from their source to statement in system design criteria, and the validated component functional requirements will be compared to technical specifications in the procurement documents. Component functional requirements include fan curve data, valve/damper leak rates, load rating, instrument sensor detection threshold, and similar characteristics. Equipment seismic and environmental qualifications will be considered separately.

3.1.5.1.8 System Pneumatic Design - Topic II.10-3

The calculations of system pressure drop through ducts, dampers, filters, etc., for safety-related modes will be checked against design criteria. A confirmatory calculation for a critical system alignment will be performed to establish functional requirements which will be compared to those specified.

3.1.5.1.9 Cooling/Heating Requirements - Topic I.12-3

System heating and cooling loads for the control room will be reviewed if they are safety related. The review will examine stability of control room temperature in an acceptable range under isolated conditions.

3.1.5.1.10 Preservice Testing and Capability for Operational Testing - Topic 1.14-3

A review will be made of the criteria and commitments and implementing documents which exist for preservice testing and the capability for operational testing of a selected portion of the CR-HVAC system.

3.1.5.1.11 Power Supplies - Topic 1.15-3

Design criteria and commitments will be reviewed for control room HVAC power supplies. The aspects to be reviewed include power supply separation, redundancy and diversity. The FSAR commitments regarding power supply design features will be compared to applicable design criteria.

3.1.5.1.12 Instrumentation/Detection - Topic 1.18-3

Control Room HVAC instrumentation will be reviewed for its adequacy to monitor the operational status of the system and to detect adverse environmental conditions. The design basis, drawings and specifications for make-up air radiation and toxic gas detectors will be reviewed. The review will include a review of the basis for selected gas concentration limits and setpoints for the Hazardous Gas Monitoring System (HGMS).

3.1.5.1.13 Control Systems - Topic 1.19-3

Design criteria and commitments will be reviewed against FSAR commitments regarding control systems associated with CR-HVAC system. The criteria and

FSAR commitments will be reviewed against system logic diagrams and schematic diagrams or applicable loop diagrams to verify implementation of the design criteria.

3.1.5.1.14 Actuation Systems - Topic 1.20-3

The CR-HVAC actuation system will be reviewed against criteria governing the design of protection systems for nuclear power plants (IEEE Standard-279). The review will cover design criteria and commitments, a review of implementing documents and a check of evaluations and drawings governing or documenting actuation system design and implementation. The review will include a check of schematic diagrams for actuation system input and a check of the actuation system procurement specification for compliance to the design criteria.

3.1.5.1.15 Nondestructive Examination Commitments - Topic 1.21-3

A determination will be made of the design criteria and commitments which exist for NDE for the CR-HVAC system components. Included will be the review of associated evaluations to ensure adequate provision for NDE. The results of this determination will be used in the ICV portion of the IDCV, which will verify that the system has been constructed such that it can function in accordance with its design criteria and commitments.

3.1.5.1.16 Materials Selection - Topic 1.22-3

This activity will include the review of criteria implementing documents and evaluations related to establishing the bases for the material specification process of selected components and elements of the CR-HVAC system. Specifications will be reviewed to verify that these are in compliance with design engineering requirements.

3.1.5.1.17 Failure Modes and Effects - Topic 1.23-3

The various modes of failure, and the effects of such failure will be reviewed, using as a basis any analyses presented in the FSAR. This review will determine if there is any potential failure that has not been previously analyzed.

3.1.5.1.18 Filtration - Topic 1.33-3

Licensing commitments will form the basis for reviewing the filtering capability for airborne radioactive materials and toxic gases. Calculation of airborne dose rates will be checked. Specifications of critical filter parameters will be checked, and interface requirements between system design and filter performance will be reviewed.

3.1.5.1.19 Pressurization - Topic 1.34-3

Control room pressurization to ensure exfiltration under post-accident and offsite hazardous gas releases will be reviewed. The basis for establishing quantitative values for leakage area will be checked. System flow characteristics validated in the pneumatic design review and the fan curves will be used to check global pressure differential. Local effects and relevant meteorological assumptions will be reviewed. The calculations for sizing of the bottled air supply will be checked. Analyses considering the capability of the self-contained breathing apparatus will be evaluated.

3.1.5.1.20 Ventilation - Topic I.35-3

The overall HVAC ventilation system design will be reviewed to determine its capability to maintain control room habitability parameters, i.e., temperature, oxygen content, toxic gas levels, and airborne radiation. Criteria for acceptable levels will be checked against licensing commitments and industry standards for both survival and minimal conditions under which reasonable decision making is expected. Calculations to predict equilibrium temperature, oxygen level, and airborne contamination will be checked in critical modes. Synergistic effects of toxic gases will also be considered. A confirmatory calculation of control room habitability parameters will be performed for one critical mode of operation.

3.1.5.2 <u>CR-HVAC System Protection Features</u>

In addition to the review of the capability of the CR-HVAC system to perform its required functions, a review will be made of external factors which could affect the capability of the system to achieve these functions. Included in the scope of this portion of the review are factors such as seismic design, high energy line break accidents (HELBA), environmental protection, fire protection, missile protection, and systems interaction. The following sections address these and other design areas related to system protection.

3.1.5.2.1 Seismic Design - Topic II.1-3

The seismic design criteria and associated commitments related to the CR-HVAC system will be reviewed to ensure that an adequate basis for the design process is established. The review will include seismic design parameters and methodologies specified for the design of ductwork and supports, equipment and components associated with the CR-HVAC system.

3.1.5.2.2 Seismic Design -- Pressure Boundary - Topic II.2-3

This activity will include a review of the commitments, implementing documents, calculations and evaluations associated with seismic design of the pressure boundary of a selected portion of the CR-HVAC system. The utilization of the proper design input, such as response spectra, ductwork and component weights, and other ductwork characteristics, will be verified. The calculations and evaluations will be reviewed to verify that pertinent acceptance criteria are met.

3.1.5.2.3 Seismic Design -- Duct/Pipe/Equipment Support - Topic II.3-3

A review of a selected portion of the CR-HVAC system will be conducted to verify that selected supports have been designed and specified in accordance with criteria and commitments. Included will be the review of design loads, load combinations, and the methods of analysis utilized. The associated design drawings and specifications will be reviewed for consistency. The review will encompass representative duct and pipe supports associated with the selected portion of the system. In addition, the design calculations, drawings and specifications associated with the anchorage and support of selected CR-HVAC system equipment will be reviewed for conformance to requirements.

3.1.5.2.4 Seismic Design — Equipment Qualification - Topic II.4-3

This activity will include the review of commitments, implementing documents, calculations, drawings, and specifications associated with the seismic qualification of selected CR-HVAC equipment. Qualification requirements including response spectra, load combinations, and equipment functional criteria will be reviewed. The review will include various types of HVAC equipment of representative complexity such as: fans, motors, coolers, dampers, filters and associated instrumentation.

3.1.5.2.5 High Energy Line Break Accidents - Topic II.5-3

Criteria for postulation and evaluation of high energy line breaks will be reviewed to the extent that there are aspects unique to the CR-HVAC system which were not incorporated in the AFW review.

3.1.5.2.6 HELBA/Pipe Whip - Topic II.6-3

A review will be made to determine the criteria applicable to high energy lines routed near the control room. To the extent that the CR-HVAC system is subject to criteria for HELBA/Pipe Whip which differ from those applicable to the AFW system, those criteria will be evaluated.

3.1.5.2.7 HELBA/Jet Impingement

A review will be made to determine the criteria applicable to preventive protective measures taken to assure acceptable consequences due to postulated jets that may impact CR-HVAC components important to the functioning of this system. This topic will be reviewed in conjunction with Topic II.6-3, Pipe Whip.

3.1.5.2.8 Environmental Protection - Topic II.8-3

The criteria review conducted for the AFW and SEP systems will be extended to include considerations unique to the CR-HVAC system.

3.1.5.2.9 Environmental Envelopes - Topic II.9-3

All major equipment and representative electrical components in the system will be reviewed to verify that they can perform their required function under the most severe conditions resulting from the pipe breaks postulated in accordance with the HELBA criteria. Implementation of criteria to select break locations will be reviewed. The calculations to determine sub-compartment temperatures and pressures will be reviewed to trace the application of criteria and the validity of the technical approach. Validated conditions will be compared with the specifications in procurement documents for the equipment. One environmental envelope applicable to the CR-HVAC system will be subject to a confirmatory calculation, provided that the envelope used to qualify the HVAC equipment is different from that used to qualify AFW components.

3.1.5.2.10 Environmental Equipment Qualification - Topic II.10-3

Based on the environmental envelope review, equipment and components will be selected to examine their qualification for the most severe environment. Various types of equipment will be reviewed including valve operators, dampers, instrumentation, and fan motors. The review will focus on two separate aspects: the vendor calculations and testing, and CPC's program for technically confirming vendor compliance to procurement specifications. The depth of review for vendor calculations will be determine based on an assessment of the comprehensiveness of the CPC's program.

3.1.5.2.11 Fire Protection - Topic II.12-3

The CR-HVAC system will be reviewed to determine its ability to control smoke due to small fires in the control room, smoke from fires outside the building, and smoke from fires in areas adjacent to the control room. This review includes an evaluation of criteria and implementing documents. The potential for interaction between the control room and the remote shutdown panel area with regard to smoke control and fire suppression will be reviewed.

3.1.5.2.12 Missile Protection - Topic II.13-3

The criteria for postulating events which result in internal missile generation will be reviewed against current licensing practice and operating experience. Criteria for assessing damage due to postulated missiles will be reviewed as an extension of the AFW and SEP review.

3.1.5.2.13 Systems Interaction - Topic II.14-3

The potential for systems interaction and means for prevention thereof will be reviewed. The review will include an examination of criteria utilized to analyze potential physical or spatial interactions. The procedures for, and results of, the Midland systems interaction walkdowns will be reviewed and, if possible, ongoing walkdowns will be observed.

3.1.5.3 Structures that House the CR-HVAC System

The auxiliary/control building structure supports the functioning of the CR-HVAC system. The overall criteria and commitments applicable to the design of this structure will be reviewed and evaluated in conjunction and as an extension of the AFW system evaluation. Selected additional features from this structure will be isolated for more in-depth review in the following topics.

3.1.5.3.1 Seismic Design/Input to Equipment - Topic III.1-3

This activity will include the review of commitments, implementing documents, calculations and evaluations related to the development of seismic design input for the CR-HVAC system and associated components in the auxiliary building. Included will be a review of seismic input parameters such as seismic design spectra, damping, material properties, and boundary conditions, including soil-structure interaction. The methodology utilized for the location of the mass points and the computation of masses and equivalent member properties will be reviewed. Parameter variation studies will also be reviewed to verify that the variance of important input parameters and modeling assumptions has been appropriately considered. The scope of this activity will include the review of the dynamic analysis of the auxiliary building, the time history analysis and the generation of floor response spectra for both horizontal directions and the vertical direction. The utilization of proper floor response spectra for the specification of the selected CR-HVAC system components will be verified.

3.1.5.3.2 Civil/Structural Design Considerations - Topic III.5-3

Civil/structural design criteria and associated commitments related to the CR-HVAC system will be reviewed, and the establishment of the proper basis for the associated design process will be confirmed. Included will be the review of design parameters and the methodologies utilized in the design process for structures and affected systems and components associated with the system.

3.1.5.3.3 Concrete and Steel Design - Topic III.7-3

This activity will include the review of criteria and implementing documents associated with the reinforced concrete and structural steel design of selected structural elements associated with the CR-HVAC system. The review will address design criteria and specified methodologies of analysis associated with each type of loading with emphasis on a verification that these items are considered in a realistic manner. Loading combinations, allowable stresses or conditions, and other applicable criteria will be reviewed.

3.1.5.3.4 Leak Tightness - Topic III.9-3

This activity will include the review of criteria, implementing documents and calculations associated with the leak tightness of the control room. The review will address the provision for component specifications required to ensure control room leak tightness criteria are met.

3.1.6 DEVELOPMENT OF IDV PROGRAM CHECKLISTS

Generic checklists exist for each of the review scope categories discussed in section 3.1.1, utilizing guidance contained in ANSI N45.2.11. These checklists have been developed to assist in documenting engineering evaluations, and providing uniformity of review from topic to topic and between reviewers. For each of the design areas within the scope shown in Figures 1.2-2a and 2b, 1.2-4a and 4b and 1.2-6a and 6b, the reviewer may utilize the generic checklists or develop a specific checklist incorporating portions of the generic checklists as appropriate. In most cases, the specific checklist will be derived from the generic checklist by the addition of specific requirements applicable to the design area being reviewed. In some cases, it may be appropriate to use only a portion of the generic checklist or to develop a unique checklist. The specific instructions for the use of design verification checklists are contained in Project Instruction PI-3201-006, Use of Design Verification Checklists.

In each case that a generic checklist has been modified, the checklist prepared by the reviewer will be checked by the Lead Technical Reviewer (LTR) for the area. (Note that if the LTR prepares a checklist, it is permissible for him to both originate and check the contents of the checklist). During their review process, the LTRs examine the checklist for interfaces with other IDV areas and perform a general review of the completeness and adequacy of the proposed checklist. The LTR's review is to be coordinated with the Project Manager as necessary to resolve questions which cut across discipline lines. In the event that the Project Manager or the LTR has comments on the checklist, the checklist preparer and those having comments will discuss the comments and reach an appropriate resolution. After reaching concurrence in the adequacy of the checklist, the LTR will indicate his approval and the checklist will be available for use by the reviewer.

The reviewer, having an approved checklist, can then proceed into the review process for this specified area, in accordance with Project Instruction PI-3201-001, Engineering Evaluation Preparation and Control. In performing the engineering evaluation, the reviewer will document the information which he used in order to complete the checklist. Such information will include the data or revision number of the document, the document number, an indication of the source of the document (e.g., whether the document was obtained from an individual, a file, or the records center).

3.1.6.1 Development of Checklists for Review of Design Criteria and Commitments

The generic checklist for review of design criteria and commitments was developed considering questions such as:

- What are the design inputs for the design area under review?
- Do any of these design inputs affect other design areas?
- Do any of these design inputs affect interfacing systems outside the scope of AFW or vice versa?

- Are the design inputs for this design area complete?

- Are the identified design inputs for this design area consistent?

- Are the design inputs adequately defined to allow implementation for the design area?

For each design area the lead technical reviewer will supplement the generic checklist with appropriate additional questions.

3.1.6.2 Development of Checklists for Reviews of Implementing Documents

The generic checklist for reviews of implementing documents was developed considering questions such as:

- What is the identity of the implementing document being reviewed? (List document identification such as title, revision number, date, etc.)

- For the design inputs being reviewed, is the document complete and internally consistent?

- Are design interface requirements specified?

- Have the design inputs been correctly interpreted and incorporated in this implementing document?

- Is this implementing document consistent with other implementing documents being reviewed for this area?

- Are assumptions and limitations on the use of the document adequately defined?

- Where appropriate, are quality assurance requirements specified?

For each design area the lead technical reviewer will supplement the generic checklist with appropriate additional questions for each implementing document.

3.1.6.3 <u>Development of Checklists for Checks of Calculations and Evaluations</u>

The generic checklist for checks of calculations and evaluations was developed considering questions such as:

- What is the identity of the calculation or evaluation being checked?
- What is the purpose of the calculation or evaluation?
- Are the data sources identified?
- Are the assumptions listed?
- Are the assumptions reasonable and valid?
- Was the calculation or evaluation checked and approved within the originating organization?
- Are the equations and methods specified?
- Are the equations and methods appropriate for the intended purpose?
- If computer programs were used, were such programs verified?
- Are the calculation or evaluation results reasonable?
- Have design outputs been compared to the acceptance criteria to allow verification that design requirements have been satisfactorily accomplished?

For each design area the lead technical reviewer will supplement the generic checklist with appropriate questions for each calculation or evaluation checked.

3.1.6.4 Development of Checklists for Checks of Drawings and Specifications

The generic checklists for checks of drawings and specifications were developed considering questions such as:

- What is the identity of the drawing or specification (e.g. number, revision number, date)?
- Does the drawing or specification reflect the selected design inputs?
- Is the drawing or specification consistent with related calculations or evaluations?
- Has this drawing or specification been checked by the originating organization?
- Is the drawing or specification complete with regard to the selected design inputs?
- Where appropriate, have adequate handling, storage cleaning, and shipping requirements been specified in the specification?
- Where appropriate, has adequate allowance been made for inservice inspection, maintenance, repair, and testing?

For each design area, the lead technical reviewer will supplement the generic checklist with appropriate questions for each drawing or specification being reviewed.

3.1.7 PLAN FOR ADDITIONAL SAMPLING AND VERIFICATION

Additional sampling or verification within the scope of the IDV or outside the scope into other systems will be conducted if discrepancies are found. The level of additional sampling or verification will be based upon the nature of the discrepancy. In all cases when discrepancies are found, an introspective evaluation will follow to identify the extent and root cause. The root cause may either be random or systematic (generic). The additional review will attempt to verify whether the discrepancy is restricted to the specific system, component, or structure under review; restricted to work by a specific design organization; or if the discrepancy cuts across many interfaces and applies to similarly designed systems, components, and structures. As a rule, mathematical errors will not precipitate additional sampling and verification unless these are found in significant numbers, leading to significant deficiencies or a compounding of errors. Judgement in making this assessment will be required on case-by-case basis.

As necessary, additional sampling or verification within the scope of the system sample selection boundaries identified in sections 3.1.3, 3.1.4 and 3.1.5 of this Plan will be undertaken by TERA and approved internally. All such actions will be documented in the Monthly Status Report. Additional sampling outside this scope is considered a substantive issue and will be discussed between TERA, CPC and NRC prior to initiation.

3.2 INDEPENDENT CONSTRUCTION VERIFICATION METHODOLOGY

The Independent Construction Verification (ICV) Program will consist of a review and evaluation of the quality of construction of selected components and structures associated with the AFW, SEP and CR-HVAC systems. The construction activities to be reviewed include the major activities of the construction chain. These include the fabrication, storage, maintenance, installation or construction, and verification activities associated with the acceptance of the system or component, as further defined in Section 3.2.1 herein. The emphasis will be on making a determination of the overall quality of construction and an assessment of its compliance with licensing commitments. The review will be conducted to varying stages of construction completion depending upon the specific system, component, or structure under review. The methodology will include diverse approaches such as checking of records, hands-on inspection of hardware, and confirmatory testing. The basis for the sample selection is presented in Section 3.2.2. The definition of the scope of review is provided in the following sections:

System	Section
AFW	3.2.3
SEP	3.2.4
CR-HVAC	3.2.5

In many instances, a complete verification of the as-built configuration against design documents and other applicable requirements will be included. Where possible, systems and components selected for the Independent Design Verification Program will be utilized for review in the ICV Program, thereby providing verification of the complete chain from criteria and commitments through to the constructed and verified product.

The ICV Program will be conducted utilizing detailed checklists described in Section 3.2.6. Additional sampling, verification, and testing activities that may be conducted as a result of the ICV Program are discussed in Section 3.2.7.

3.2.1 CATEGORIES OF REVIEW: THE CONSTRUCTION CHAIN

The categories of review include the major construction activities identified in the construction chain. The ICV review categories included are:

- Review of supplier documentation
- Review of storage and maintenance documentation
- Review of construction/installation documentation
- Review of selected verification activities
- Verification of physical configuration

It is necessary to reemphasize that the ICV review will be conducted to varying stages of construction completion depending upon the specific system, component or structure under review. As such, the ICV review categories will, as a minimum, include a detailed review of a static situation, or one which verifies the results of a completed activity, in addition to observations and reviews of a more dynamic environment where the construction activity being reviewed is actually in progress or has not been completed. The results of these types of reviews will be integrated with an assessment of selected, on-going over-inspection activities and the Construction Completion Program (see section 3.2.1.4). Proceeding in this manner allows an even-handed, objective appraisal of not only the quality of construction for completed items, but also permits an evaluation of the outputs from on-going site activities undertaken to verify and confirm the quality of construction.

Each of these review categories is described in further detail in the following sections.

3.2.1.1 Review of Supplier Documentation

For those components requiring fabrication or manufacture, selected supplier documentation and other associated information including shop inspection documentation will be reviewed against design output documents to ensure conformance with requirements. Supplier documentation will include such items as drawings, calculations, test reports, certified material property reports, storage and installation requirements, operations and maintenance requirements, and other major supplier documentation and data applicable to the component. For selected components, the review of supplier seismic and environmental qualification documentation against requirements defined in the design process will be included.

3.2.1.2 Review of Storage and Maintenance Documentation

A review of site documentation will be performed to verify that requirements related to storage, including both in-storage and in-place maintenance have been met. Included will be the review of receipt inspection documentation. Requirements to be reviewed will include such parameters as temperature and humidity, cleanliness, lubrication, shaft rotation, energization, etc. Where possible, existing warehousing and maintenance documentation will be reviewed and associated activities (e.g. system layup associated with Construction Completion Program) observed to provide additional verification that components have been properly stored and maintained during the construction process.

3.2.1.3 Review of Construction/Installation Documentation

A major factor in the evaluation of the quality of construction is the review of those items constructed or installed on site. The review of documentation associated with the construction/installation process will be conducted to verify that the applicable requirements have been met (e.g. conformance to construction specifications will be verified). Included in this review will be verification of the utilization of proper documents in the process such as design output requirements, construction specifications, erection specifications, installation requirements, construction procedures and other specified construction codes and standards, as applicable. Design changes, field modifications, and other input related to final as-built drawings will be reviewed. Included will be the review of documentation associated with such items as concrete materials, concrete, the welding process, bolting activities, NDE, etc. Inspection requirements, including personnel qualification and training, reports, and associated documentation will also be included in the review. Where possible, selected on-going construction/installation activities will be observed to provide additional information for the evaluation of this process.

3.2.1.4 Review of Selected Verification Activities

Verification activities conducted subsequent to the construction/installation/inspection activity will be reviewed and evaluated. Included will be over-inspection activities associated with cable separation verification, bolt hardness testing verification, the pipe support reinspection program, the Construction

Completion Program; as well as routine cold hydro testing, functional and preoperational testing, other specified preservice system and component testing programs and system walkdowns associated with turn-over. Associated requirements, plans, test reports, etc. will be reviewed and, where possible, these verification activities will be observed in order to provide additional information and data to support evaluations.

3.2.1.5 Verification of Physical Configuration

Field verification of the as-built configuration of selected components of a portion of the systems under the scope of the ICV will be conducted to ensure conformance with requirements. Verification will address such aspects as identification, approximate physical dimensions, location, orientation, name plate data, grounding, use of proper materials, insulation, weld quality, and other features of the configuration as applicable to the component or system. Configuration verification will range from the review of general features for some components or systems to a 100% detailed dimensional verification of other selected components or systems, as defined further in subsequent sections herein.

3.2.2 BASES FOR SAMPLE SELECTION

The selection of a sample for the ICV will generally follow the criteria discussed in Section 3.1.2 of this Plan for the IDV, with the exception that certain ICV activities may utilize statistical methods. These methods may be applied in establishing sample sizes and statistical levels of confidence for the assessment of repetitive production activities such as concrete and steel properties or welding records. The efficacy of using these approaches will be determined. The decision to utilize or not utilize statistical techniques, including the basis for this decision will be appropriately documented.

The primary means of sample selection will be engineering judgment of the ICV reviewers. As with the IDV, the initial sample will be biased towards problems that have previously arisen in the industry. This sample will be refined by incorporating specific Midland project information to verify that the ICV encompasses previous problem areas and, thereby, serve as a verification that associated problems have been or are in the process of being adequately addressed and that they do not exist elsewhere in the same or similar form.

The ultimate sample selection program that is utilized, engineering judgement and/or statistics, will be clearly defined and differentiated in the case of a combined program.

3.2.3 DEFINITION OF REVIEW SCOPE FOR THE AFW SYSTEM

The ICV review categories corresponding to the major activities of the construction chain were defined in Section 3.2.1. Presented in this section is an identification of the selected components and the associated level of construction completion of each to be reviewed. For the AFW system the scope of review is defined in the matrix in Figure 1.2-3, where the "X" designates the review scope applicable to each component. The criteria discussed in Sections 1.2 and 3.2.2 of the Plan were utilized to develop this initial matrix. The review areas (or topics) of the ICV are divided into major divisions by component type: mechanical, electrical, instrumentation and control, HVAC and structural.

Another major element of the ICV is the NDE/Materials Testing Program. This program is discussed in section 3.2.3.6. The initial scope of review of each component within these major divisions is discussed in the sections that follow. The identified initial review scope as documented in Revisions 0 and 1 of this Plan has been modified based upon meeting one or more of the criteria documented in section 3.1.2. This change has been indicated on Figure 1.2-3 by the symbol "*" for items added to scope.

3.2.3.1 Mechanical Systems and Components

An evaluation of the quality of construction of selected mechanical systems and components will be conducted. Included in the scope of this portion of the review are selected mechanical equipment, piping and pipe supports associated with the AFW system.

3.2.3.1.1 Mechanical Equipment - Topic 1.1-1c

A review of the complete construction chain including verification of the physical configuration will be conducted for the major mechanical components selected for detailed review in the IDV. The fabrication documentation review will encompass major supplier documentation, including functional requirement and environmental and seismic qualification documents.. Included will be the review of the stresses in equipment and supports, including anchorages, as applicable. Storage/maintenance and construction/installation documentation will be reviewed and, where possible, selected associated activities will be observed. Verification documentation associated with major preservice equipment and related system testing programs will be reviewed and where possible verification activities including actual tests will be observed. The physical configuration review will include verification of equipment identity, principal features, name plate data, location, orientation, and support characteristics, as applicable. Conformance with design documents (including P&ID's, isometrics and equipment location drawings), supplier documents and associated installation requirements will be verified.

3.2.3.1.2 Piping - Topic 1.2-Ic

This activity will include the review of major piping fabrication documentation associated with the portion of the AFW piping system selected for review in the IDV. Vendor drawings, material certification, shop welding and NDE documentation, as applicable will be reviewed. Major construction/installation documentation will be reviewed including installation specifications, welding and NDE documentation and all associated inspection reports. Verification documentation related to preservice testing programs will be reviewed and where possible associated activities will be observed. A field survey of the physical configuration of the selected portion of the AFW system will be conducted to verify routing, location (to tape measure accuracy), piping diameter, cleanliness and other major piping characteristics. Conformance with the applicable design, supplier and other installation requirements will be confirmed.

3.2.3.1.3 Pipe Supports - Topic 1.3-Ic

A review of the quality of construction will be conducted for the pipe supports associated with the portion of the AFW piping system selected for detailed review in the IDV. For those supports selected for review in the IDV, fabrication and installation documentation will be reviewed. Verification documentation including that associated with the pipe support reinspection program will be reviewed and where possible these activities will be observed. Verification documentation associated with major preservice system testing will also be reviewed and will be observed where possible. Physical verification will include a 100% verification of the identity, location, and orientation of all pipe supports within the selected portion of the AFW piping system. In addition, complete dimensional verification of design details will be made for those supports selected for detailed review in the IDV. Dimensional verification will encompass weld size, quality and location, base plate size and thickness, anchor bolt size and location, and other principal features, as applicable.

3.2.3.2 Electrical Systems and Components

An evaluation of the quality of construction of selected electrical systems and components will be conducted. Included in the scope of this review are selected electrical equipment, cable trays and supports, conduits and supports, and electrical cable associated with the AFW system.

3.2.3.2.1 Electrical Equipment - Topic II.I-Ic

A review of the complete construction chain including verification of the physical configuration will be conducted for the major electrical components (e.g. motor control center, motor operated valve, electrical panel) and cable selected for detailed review in the IDV. The fabrication documentation review will encompass major supplier documentation, including functional requirement and environmental and seismic qualification documents. Included will be the review of the stresses in equipment and supports, including anchorages, as applicable. Storage/maintenance and construction/installation documentation will be reviewed and, where possible, selected associated activities will be observed. Verification documentation associated with major preservice equipment and related system testing programs will be reviewed and, where possible, verification activities including actual tests will be observed. The physical configuration review will include verification of equipment identity, principal features, name plate data, location, orientation, and support characteristics, as applicable. Conformance with design documents (including single line diagrams, P&ID's, and equipment location drawings), supplier documents and associated installation requirements will be verified.

3.2.3.2.2 Cable Trays and Supports - Topic II.2-Ic

This activity will include a review of major fabrication and installation documentation, selected overinspection activities and physical verification of a selected portion of a cable tray and support system associated with a major AFW electrical system. Layout and installation drawings, material cerifications, and other applicable documentation will be reviewed to verify utilization of the most current and correct design and procedural requirements. A field survey of the selected portion will be conducted to verify location (to tape measure accuracy) routing, tray characteristics, and support location and configuration. Conformance with applicable design, supplier and other installation requirements will be confirmed. Proper cable assignment to trays, tray cleanliness and tray fill will be selectively verified. This verification will be supplemented with a detailed review of selected outputs and findings resulting from the ongoing cable separation overinspection program.

3.2.3.2.3 Conduits and Supports - Topic II.3-Ic

This activity will include a review of major fabrication and installation documentation, selected overinspection activities, and a field verification of the physical configuration of a selected portion of a conduit and support system associated with a major AFW electrical system. The scope of review will be similar to that of the electrical tray and support review discussed in the preceding section. The conduit size and fill will be selectively verified.

3.2.3.2.4 Cable - Topic II.4-Ic

A review will be conducted of major supplier documentation associated with the cable of a selected portion of a major AFW electrical system. Overinspection activities associated with cable separation verification of selected cables in AFW electrical systems will be reviewed and evaluated. The supplier documentation review will encompass cable material certifications, insulation certifications, stranding and color coding characteristics and other applicable documentation. The physical configuration of a selected portion of the system will be verified including identification, visual inspection, routing, separation, tiedown, terminations and other principal characteristics as applicable. The cable terminations will be reviewed for proper lugging and lugging tool documentation. Cable pull documentation will be reviewed to verify compliance with pull tension limits. Cable megger and continuity checks will be reviewed to verify installed cable integrity. Conformance with applicable design, supplier and other installation requirements will be confirmed.

3.2.3.3 Instrumentation and Control Systems and Components

A review of the quality of construction of selected instrumentation and control (I & C) systems and components will be conducted. This review will include selected instruments, piping and tubing, and wiring associated with the AFW system.

3.2.3.3.1 Instruments - Topic III.1-1c

A complete review of the construction chain including verification of the physical configuration will be conducted for selected instruments of a major AFW I&C system. Major documentation will be reviewed including that received from the supplier, storage/maintenance (including calibration) and installation instructions. In addition, the verification documentation associated with preservice I&C system testing programs (e.g. calibration, response time, circuit continuity, trip set points, etc.) will be reviewed and activities observed where possible. The physical configuration will be verified including instrument identity, name plate data, location, mounting conditions, and other principal characteristics, as applicable. Conformance with design documents and specifications, supplier requirements and installation requirements will be verified.

3.2.3.3.2 Piping/Tubing - Topic III.2-1c

This activity will include a review of major fabrication documentation and a physical configuration verification of piping and tubing associated with a selected portion of a major AFW I&C system. Material certifications and other applicable documentation will be reviewed against design requirements. A field survey of the selected portion will be conducted to verify routing, supports, size, slope and valve types. Conformance with applicable design, supplier and other installation requirements will be verified. Preservice hydro test results will be reviewed.

3.2.3.3.3 Cable - Topic III.3-Ic

A review will be conducted of major supplier and installation documentation associated with the cable of a selected portion of a major AFW I&C system. Overinspection activities associated with cable separation verification of selected cables in the AFW instrumentation systems will be reviewed and evaluated. The supplier documentation review will encompass cable material certifications, insulation certifications, stranding and color coding characteristics and other applicable documentation. The physical configuration of the selected portion of the system will be verified including routing and terminations (correct tools for lugging, proper crimp and lug size), visual inspection, tie down, and cable pull documentation review. Conformance with applicable design, supplier and other installation requirements will be confirmed. Continuity test results will be reviewed to verify circuit integrity.

3.2.3.4 <u>HVAC Systems and Components</u>

An evaluation of the quality of construction of selected HVAC systems and components will be conducted. Included in the scope of this portion of the review are selected HVAC equipment, ducts and supports associated with the AFW system.

3.2.3.4.1 HVAC Equipment - Topic IV.1-1c

A review of the complete construction chain including verification of the physical configuration will be conducted for a major HVAC component. The fabrication documentation review will encompass major supplier documentation, including functional requirement and environmental and seismic qualification documents. Included will be the review of the stresses in equipment and supports, including anchorages, as applicable. Storage/maintenance and construction/installation documentation will be reviewed and, where possible, selected associated activities will be observed. Verification documentation associated with major preservice equipment and related system testing programs will be reviewed and, where possible, verification activities including actual tests will be observed. The physical configuration review will include verification of equipment identity, principal features, name plate data, location, orientation, and support characteristics, as applicable. Conformance with design documents (including P&ID's and equipment location drawings), supplier documents and associated installation requirements will be verified.

3.2.3.4.2 HVAC Ducts and Supports - Topic IV.2-1c

This activity will include a review of major fabrication documentation and the physical configuration of a selected portion of a duct and support system associated with a major AFW HVAC system. Vendor drawings, material cerifications, and other applicable documentation will be reviewed. A field survey of the selected portion will be conducted to verify (to tape measure accuracy) routing, duct characteristics, and support location and configuration. Conformance with applicable design, supplier and other installation requirements will be confirmed.

3.2.3.5 Structural Components

The quality of construction of plant structures will be evaluated based upon a review of selected structural components. Included in the scope of this portion of the review are selected foundations, concrete structural elements and structural steel components of the structures which house the AFW system.

3.2.3.5.1 Foundations - Topic V.1-1c

This activity will include the review of fabrication and construction/installation documentation associated with building foundations selected for detailed review in the IDV. The fabrication documentation review will encompass major supplier documentation including material certifications, rebar placement drawings, and other applicable documentation. Construction/installation documentation to be reviewed will include concrete materials documentation, concrete cylinder test results, inspection reports and other applicable documentation. Conformance with design documents, supplier requirements and associated construction/installation requirements will be verified.

3.2.3.5.2 Concrete Components - Topic V.2-1c

A review of fabrication and construction/installation documentation will be conducted and the as-built configuration will be verified for major concrete structural elements selected for detailed review in the IDV. The documentation review will encompass major supplier and construction/installation documentation associated with reinforcing steel, inserts and penetrations, and concrete documentation of a selected portion of each component. A field survey will be conducted to verify overall element dimensions (including thickness), location and size of major openings and selected penetrations, and principal characteristics of selected inserts. Conformance with applicable design, supplier and other installation requirements will be confirmed.

3.2.3.5.3 Structural Steel Components - Topic V.3-Ic

This activity will include the review of major fabrication and construction/installation documentation and a physical configuration verification of the structural steel components selected for detailed review in the IDV. The fabrication documentation review will encompass shop detail drawings, material certifications, welding documentation, and other major supplier documentation. Construction/installation documentation will address field welding, bolting (torque) and other applicable documentation. A field survey will be conducted to verify, where possible, major element characteristics including member size, plate thickness, weld size, and bolt pattern and size for a selected connection of each member. Conformance with applicable design, fabricator and other installation requirements will be confirmed.

3.2.3.6 <u>NDE/Materials Testing Program - Topic VI.I-Ic</u>

As part of the review of supplier documentation for AFW system components, a review will be conducted to ascertain and verify conformance of vendor welding, NDE, and materials testing to applicable codes, standards, and procurement specification requirements. The intent of the NDE/Material Testing Program is to supplement the review of construction/installation documentation of welding, NDE, and material testing activities by establishing a program for the performance of NDE and material testing on selected material, components, and structures of the AFW system. The program will be conducted as an integral part of the ICV and will include over-inspection and testing of selected shop-fabricated/vendor-supplied components in addition to the over-inspection and testing of on-site welding, weld repair, NDE and other site-material related testing and inspection programs. Results of the testing performed as part of the NDE/Materials Testing Program will be documented, reviewed, and compared against vendor supplied and site-generated material testing and NDE test data and against applicable codes and standards.

The direction and degree of testing performed as a part of the NDE/Materials Testing Program will be initiated and influenced by the results of the construction/installation documentation review as described in sections 3.2.3.1 through 3.2.3.5. The results of the documentation review will be integrated with the consideration of a statistical sampling approach and sound engineering judgment to arrive at the quantity and types of components and structures to be tested and the type of testing to be employed.

An intermediate output of the NDE/Materials Testing Program will be a listing defining the components/structures to be tested and the corresponding test to be performed. Rationale for component/structure selection will also be provided to enable reviewers to easily discern the derivation of the sample and the sample size. The NDE/Materials Testing Program will be documented in a Project Instruction to be issued prior to intiation of the program.

3.2.4 DEFINITION OF REVIEW SCOPE FOR THE STANDBY ELECTRIC POWER SYSTEM

The scope of ICV review for the SEP system and for the CR-HVAC system (section 3.2.5) has been structured to enable a consistent methodology across all systems, components, and structures subject to ICV review. In other words, the methodology described in the previous sections and applied to the ICV review of the AFW system will also, to the extent practical, be applied to the SEP system and CR-HVAC system.

Consistency in application of the review methodology in the area of construction verification is as important as the scope of the review itself. By providing a consistent reference against which to gauge the construction process, a clear and precise picture of trends, discrepancies, and efficiencies in the Midland construction process will be made more easily discernible. Thus, to establish the necessary common reference, the ICV review categories (section 3.2.1) and scope of review for the AFW system (section 3.2.3) will also be applicable to the review conducted of the SEP system. Modifications to the scope of review have been deemed necessary to accommodate unique component or structural considerations pertinent to the SEP system. These unique considerations are provided in the following discussions and serve to supplement and modify the scope of activities previously described in sections 3.2.3.1 through 3.2.3.6. The scope of review for the SEP system is defined as follows and in the matrix provided in Figure 1.2-5.

3.2.4.1 Mechanical Systems and Components

Included in the scope of this portion of the review are the diesel generator and selected mechanical equipment, piping and pipe supports associated with the diesel generator cooling water, starting, lubrication and fuel oil systems.

3.2.4.1.1 Mechanical Equipment - Topic 1.1-2c

The diesel generator and selected mechanical components of the cooling water, starting, lubrication and fuel oil systems will be subject to the review methodology as defined in section 3.2.3.1.1. Similar to the methodology applied and described for the AFW system, the selection of the components in the cooling water, starting, lubrication, and fuel oil systems will be performed to ensure that components subject to IDV review will also be reviewed as part of the construction verification review.

3.2.4.1.2 Piping - Topic 1.2-2c

This activity will include the review of fabrication documentation submitted for piping associated with the diesel generator cooling water, starting, lubrication, and fuel oil systems selected for review in the IDV. Vendor drawings, material certification, shop welding and NDE documentation, as applicable, will be reviewed. Major construction/installation documentation will be reviewed, including installation specifications, welding and NDE documentation and associated inspection reports. A field survey of the physical configuration of the selected piping system will be conducted to verify routing, location, piping diameter, cleanliness and other piping characteristics.

3.2.4.1.3 Pipe Supports - Topic I.3-2c

A review will be conducted for the pipe supports associated with the piping system selected for detailed review in the SEP system IDV. For those supports selected for review in the IDV, fabrication and installation documentation will be reviewed. The physical configuration of selected pipe supports will also be verified. These activities will include verification of the identity, location, and orientation of selected pipe supports in addition to verification of design details and weld size, base plate size and thickness, anchor bolt size and location and other principal design features.

3.2.4.2 <u>Electrical Systems and Components</u>

The sample selection boundary for the SEP system is provided in section 3.1.4 and defines the electrical systems subject to the IDV and ICV review process. Within the boundaries are power distribution systems and control systems of various classifications (IE and non IE) and voltages. The ICV electrical review will address the quality of construction of selected electrical and control systems which comprise the SEP system and, within the systems, selected electrical equipment, cable trays and supports, conduits and supports, and electrical cable.

3.2.4.2.1 Electrical Equipment - Topic II.1-2c

A review of the complete construction process, as defined and described in section 3.2.3.2.1 for AFW system electrical components, will be conducted for selected components and cable of the SEP system. To ensure a consistent application of the review methodology, the components selected for detailed review as part of the IDV will also comprise the nucleus of items subject to ICV review.

3.2.4.2.2 Cable Trays/Conduits and Supports - Topics II.2-2c & II.3-2c

The scope of activities described and defined in Sections 3.2.3.2.2 and 3.2.3.2.3 will be performed for a selected portion of the cable trays/conduits and supports utilized to route power distribution and control cables in the systems within the SEP system sample selection boundaries.

3.2.4.2.3 Cable - Topic II.4-2c

The scope of activities described and defined in Section 3.2.3.2.4 will be performed for a selected portion of power distribution cables within the SEP system sample selection boundaries.

3.2.4.3 <u>Instrumentation and Control Systems and Components</u>

Instrumentation and control (I&C) systems associated with the Standby Electric Power System are segregated into two distinct categories. The first category of I&C systems are comprised of controls, instruments, and alarms associated with the diesel generator cooling water, starting, lubrication and fuel oil systems. The second category of I&C systems relates to those instruments and controls which monitor and control the loading and distribution of power within the electrical sample selection boundaries of the SEP system (Section 3.1.4). The classification of instruments into two categories does not alter or affect the ICV review methodology. Rather, the distinction is made to highlight the fact that fluid process systems reside within the sample boundaries of the SEP system and as such the instruments and controls associated with the process systems are subject to the same review and selection as instruments and controls which monitor and control the loading and distribution of standby electric power.

3.2.4.3.1 Instruments - Topic III.1-2c

Selected instruments from each of the previously defined categories of instruments will be subject to a detailed ICV review. The selection of instruments will be keyed to the IDV sample to enable a consistent and continuous evaluation of instruments utilized within the sample selection boundaries of the SEP system from design, through and including construction processes. The scope of ICV review activities to be undertaken for SEP system instruments are as indicated on Figure 1.2-5 and described in section 3.2.3.3.1.

3.2.4.3.2 Piping/Tubing - Topic III.2-2c

Category IE instruments, and other instruments which monitor, control and alarm parameters in the diesel generator fluid process systems, comprise the sample boundaries for the selection of piping/tubing to be subject to ICV review. The scope of activities described and defined in section 3.2.3.3.2 will be performed for a selected portion of the piping and tubing associated with instruments in the SEP system, specifically including piping and tubing utilized in the diesel generator cooling water, starting, lubrication and/or fuel oil systems. The activities defined in section 3.2.3.3.2 will be supplemented to verify utilization of the most current and correct design, construction, and installation documentation and to include design changes and field modifications.

3.2.4.3.3 Cable - Topic III.3-2c

The scope of activities described and defined in section 3.2.3.3.3 will be performed for a selected portion of the instrumentation cabling and wiring utilized within the sample selection boundaries of the SEP system. Additionally, a review will be conducted to ascertain and verify that the cabling utilized was properly stored and, once installed, was adequately and correctly handled and maintained.

3.2.4.4 <u>HVAC Systems and Components</u>

An evaluation of the quality of construction of selected diesel generator building HVAC systems and components will be conducted. Selected fans, coolers, dampers and HVAC ducts and supports located in, and associated with, the diesel generator building will be subject to ICV review as described and defined as follows.

3.2.4.4.1 HVAC Equipment - Topic IV.1-2c

The documentation associated with the manufacture of selected fans, coolers, and dampers located in the diesel generator building will be reviewed. The review will seek to verify that correct and adequate design and documentation requirements are transmitted to vendors for the diesel generator HVAC equipment and to ascertain and verify that the vendor's documentation submittals are complete, correct, and responsive to the procurement documentation requirements.

Once having characterized and identified selected HVAC equipment by means of the above supplier documentation review, the physical configuration of the installed equipment within the diesel generator building will be verified. The as-built configuration of selected HVAC equipment will be checked and verified against vendor-supplied documentation and against installation requirements as derived from applicable codes, industry standards, and pertinent installation/erection documentation.

3.2.4.4.2 HVAC Ducts and Supports - Topic IV.2-2c

The ICV review activities to be undertaken to verify the quality of construction for selected HVAC ducts and supports in the diesel generator building are defined and described in section 3.2.3.4.2 and are similar to the scope of review activities to be conducted for HVAC ducts and supports associated with the AFW system.

3.2.4.5 Structural Components

The quality of construction of the diesel generator building and foundations will be evaluated based upon a review of selected structural components. Selected foundations, concrete, and structural steel used in the erection of the diesel generator building, and major component foundations within the diesel generator building, will be reviewed.

3.2.4.5.1 Foundations - Topic V.1-2c

This activity will include the review of fabrication and construction/installation documentation associated with the diesel generator building and major equipment foundations selected for detailed review in the IDV. The description and definition of activities to be undertaken are provided in Section 3.2.3.5.1.

3.2.4.5.2 Concrete Components - Topic V.2-2c

A review of fabrication and construction/installation documentation will be conducted for major concrete structural elements of the diesel generator building selected for detailed review in the IDV. The documentation review will encompass major supplier and construction/installation documentation associated with reinforcing steel, inserts and penetrations, and concrete documentation of a selected portion of each structure subject to ICV review.

3.2.4.5.3 Structural Steel Components - Topic V.3-2c

The scope of review to be applied to the structural steel components of the diesel generator building will be similar to the scope of activities to be undertaken in verifying diesel generator building concrete components as defined in the previous section. Emphasis will be placed upon the review of shop detail drawings, material certifications, shop and field welding documentation, bolting and other applicable vendor-supplied and site-generated documentation.

3.2.5 DEFINITION OF REVIEW SCOPE FOR THE CONTROL ROOM HVAC SYSTEM

To establish and maintain a common reference against which to gauge the quality of construction, the scope of ICV review for the CR-HVAC system has been developed to be similar to the scope of ICV review previously defined for the AFW and SEP systems. Additionally, the ICV review methodology defined and described in previous sections of this program plan (Sections 3.2.1 through 3.2.3) will be retained and applied to components and structures of the CR-HVAC system. Modifications to the scope of review will be made as necessary to accommodate unique component or structural considerations of the CR-HVAC system. These unique considerations are provided in the following discussions and serve to supplement and modify the scope of activities previously described in Sections 3.2.3.1 through 3.2.3.6. The scope of review for the CR-HVAC system is defined as follows and in the matrix provided in Figure 1.2-7.

3.2.5.1 Mechanical Systems and Components

Included in the scope of this portion of the review are selected mechanical equipment, piping, and pipe supports included within the sample selection boundaries of the CR-HVAC system (see section 3.1.5). Selected components such as fans, coolers, dampers, filters, cooling water piping and pipe supports comprise the items to be subject to the ICV review of CR-HVAC mechanical systems and components.

3.2.5.1.1 Mechanical Equipment - Topic 1.1-3c

A review of the complete construction chain including verification of the physical configuration will be conducted for fans, coolers, dampers, and filters selected for detailed review in the IDV. The selected CR-HVAC system mechanical equipment will be subject to the review methodology and scope of review activities as previously defined in Section 3.2.3.1.1.

3.2.5.1.2 Piping - Topic 1.2-3c

Selected piping, exclusive of ductwork, within the CR-HVAC system will be subject to a review of fabrication and installation documentation and a verification of the physical configuration. Vendor drawings, material certification, shop welding and NDE documentation, as applicable, will be reviewed. Major construction/installation documentation will be reviewed including installation specifications, welding and NDE documentation and associated inspection reports. A field survey of the physical configuration of the selected piping system will be conducted to verify routing, location, piping diameter, cleanliness, and other piping characteristics.

3.2.5.1.3 Pipe Supports - Topic 1.3-3c

A review will be conducted of the pipe supports associated with the piping system selected for review under Topic 1.2-3c. For those supports selected fabrication and installation documentation will be reviewed and the physical configuration will be verified. The physical configuration verification of selected pipe supports will include verification of design details, weld, size, base plate size and thickness, anchor bolt size and location, and other principal design features.

3.2.5.2 <u>Electrical Systems and Components</u>

A detailed review to verify the quality of construction will be conducted for selected electrical equipment, trays/conduits and supports and cables within the sample selection boundaries of the CR-HVAC system. In addition to reviews of vendor supplied documentation and documentation utilizied to record the implementation of installation activities, a verification of the physical configuration will be conducted for selected trays, conduits, equipment and supports.

3.2.5.2.1 Electrical Equipment - Topic II.1-3c

Electrical equipment, such as fan motors, switchgear, and motor control centers, selected as part of the IDV review will be subject to a detailed ICV review. The review will comprise a verification of fabrication- and installation-related documentation and a verification of the physical configuration of selected electrical equipment. Activities will include review of vendor-supplied drawings, calculations, test reports, certified material property reports and other major supplier documentation. Documentation utilizied to record the performance of construction installation activities will be reviewed in addition to a verification of physical dimensions, location, orientation, name plate data and grounding of the installed and as-built electrical equipment selected for review. Preoperational and other specified preservice component and system testing and test programs will be reviewed. This review will be conducted to verify that associated test requirements, plans, reports, etc. provide adequate assurance of electrical component operation in accordance with system design requirements.

3.2.5.2.2 Trays/Conduit and Supports - Topics II.2-3c and II.3-3c

This activity will include a review of major fabrication and installation documentation of cable trays/conduit and supports associated with the electrical system selected for IDV review. Layout and installation drawings, material certifications, and other applicable documentation will be reviewed. A field survey will also be conducted to verify location, routing and routing characteristics, and support location and configuration. Proper cable assignment to trays and conduit will be selectively verified in addition to cleanliness and cable fill.

3.2.5.2.3 Cable - Topic II.4-3c

An ICV review will be conducted of major fabrication and installation documentation associated with the CR-HVAC electrical cable selected as part of the IDV review. Overinspection activities associated with cable separation verification of selected cables in the CR-HVAC electrical system will be reviewed, evaluated and factored into the ICV review. The physical configuration of a selected portion of the cable network will be verified including identification, visual inspection, routing, tiedown, terminations, and other principal characteristics as appropriate and applicable. Conformance with applicable design, supplier, and other installation requirements will be confirmed.

3.2.5.3 Instrumentation and Control Systems and Components

Selected instrumentation and controls essential for isolation of the control room and operation of the CR-HVAC system will be subject to the ICV review activities described in the following sections. Similar to the review of the AFW and SEP systems, this review will include selected instrument, piping and tubing, and wiring associated with the CR-HVAC system.

3.2.5.3.1 Instruments - Topic III.1-3c

A complete review of the construction chain including verification of the physical configuration will be conducted for selected instruments essential for isolation and habitability of the control room. The scope of activities which comprise this review will be as defined and described in Section 3.2.3.2.4.

3.2.5.3.2 Piping and Tubing - Topic III.2-3c

The ICV review to be conducted for selected piping and tubing within the Control Room HVAC instrumentation and control systems will include those activities as described and defined in Section 3.2.3.3.2. The scope of review activities enumerated in the aforementioned section will be supplemented with a review of documentation utilized to record, document, and control the installation of the instrumentation- and control-related piping and tubing. Included in this review will be verification of the utilization of proper documents in the installation process such as design output requirements, erection specifications, installation requirements, and other specified construction codes and standards as applicable.

3.2.5.3.3 Cable - Topic III.3-3c

The activities to be undertaken to verify the quality of construction of instrumentation cables will be as described and defined in Section 3.2.5.2.3 for the CR-HVAC electrical system cables.

3.2.5.4 HVAC

Included in the scope of this portion of the ICV review of the Control Room HVAC system are selected ducts and supports which channel air to, from, and within the control room under normal and accident conditions.

3.2.5.4.1 HVAC Ducts and Supports - Topic IV.2-3c

This activity will include a review of major fabrication and installation documentation and a physical configuration verification of a selected portion of the ducts and supports of the CR-HVAC System. The scope of activities to be undertaken as part of this review are as described and defined in Section 3.2.3.4.2 for the AFW system. The scope of review activities enumerated in the aforementioned section will be supplemented with a review of storage and maintenance documentation and documentation utilized to record and control the installation of selected ducts and supports. These supplemental reviews will be performed to verify that requirements related to storage, including both in-storage and in-place maintenance have been, and are being, met and that design and procedural requirements controlling the installation and erection of the ducts and supports were correctly implemented and utilized.

3.2.5.5 Structural Components

The focus of ICV review activities will be upon those portions of the control room structure which form the control room pressure boundary including penetrations and doors. Also included in the scope of this portion of the review are selected concrete structural elements and structural steel components of the structures which form the control room pressure boundary.

3.2.5.5.1 Concrete Components - Topic V.2-3c

The scope of activities described and defined in Section 3.2.3.5.2 will be performed for a selected portion of the concrete components which comprise the control room pressure boundary.

3.2.5.5.2 Structural Steel Components - Topic V.3-3c

The cope of activities described and defined in Section 3.2.3.5.3 will be performed for a selected portion of the structural steel components, including penetrations and doors, which comprise the control room pressure boundary.

3.2.5.6 NDE/Material Testing Program - Topic VI.1-3c

The methodology and scope of activities to be undertaken in executing the methodology for the NDE/Material Testing Program is as described and defined in Section 3.2.3.6. The methodology and activities will be applied to selected components, structures, and duct work within the sample selection boundaries of the CR-HVAC system. Similarly, the NDE/Materials Testing Program for the CR-HVAC system will be documented in a Project Instruction which will be issued prior to initiation of the program.

3.2.6 DEVELOPMENT OF ICV PROGRAM CHECKLISTS

Generic checklists exist for each of the review scope categories discussed in section 3.2.1, utilizing guidance contained in applicable ANSI documents, the construction review program guidelines published by INPO and other industry standards. Similarly to the IDV, these checklists have been developed to assist in documenting engineering evaluations, and providing uniformity of review from topic to topic and between reviewers. For each of the construction review scope areas within the scope shown in Figures 1.2-3, 1.2-5 and 1.2-7, the reviewer may utilize the generic checklists or develop a specific checklist incorporating portions of the generic checklists as appropriate. In most cases, the specific checklist will be derived from the generic checklist by the addition of specific requirements applicable to the construction area being reviewed. In some cases, it may be appropriate to use only a portion of the generic checklist or to develop a unique checklist. The specific instructions for the use of construction verification checklists are contained in Project Instruction, PI-3201-007, Use of Construction Verification Checklists.

In each case that a generic checklist has been modified, the checklist prepared by the reviewer will be checked by the Lead Technical Reviewer for the area. (Note that if the LTR prepares a checklist, it is permissible for him to both originate and check the contents of the checklist). During their review process, the LTRs examine the checklist for interfaces with other ICV areas and perform a general review of the completeness and adequacy of the proposed checklist. The LTR's review is to be coordinated with the Project Manager as necessary to resolve questions which cut across discipline lines. In the event that the Project Manager or the LTR has comments on the checklist, the checklist preparer and those having comments will discuss the comments and reach an appropriate resolution. After reaching concurrence in the adequacy of the checklist, the LTR will indicate his approval and the checklist will be available for use by the reviewer.

The reviewer, having an approved checklist, can then proceed with the review process for this specified area, in accordance with Project Instruction PI-3201-001, Engineering Evaluation Preparation and Control. In performing the evaluation, the reviewer will document the information which he used in order to complete the checklist. Such information will include component identification, the date or revision number of the associated documents, the document number, and an indication of the source of the information (i.e., where data and any associated documents were obtained).

3.2.6.1 Development of Checklists for Review of Supplier Documentation

The generic checklist for review of supplier documentation was developed considering questions such as:

- What is the identity of the supplier documentation being reviewed (including P.O. number, supplier name, component name and identification number)?
- Has the documentation been reviewed and accepted by the appropriate organization?
- Is the documentation complete?
- Does the documentation comply with purchase specification requirements?
- Where appropriate, does seismic and environmental qualification documentation comply with purchase specification requirements?
- Have the necessary shipping, handling, storage, installation, and maintenance requirements been specified by the supplier and are these consistent with purchase specification requirements?

For each type of system, component or structural element the lead technical reviewer will supplement the generic checklist with appropriate additional questions, as applicable.

3.2.6.2 Development of Checklists for Review of Storage and Maintenance Documentation

The generic checklist for review of storage and maintenance documentation was developed considering questions such as:

- What is the identity of the storage and maintenance documentation being reviewed, including document type (receipt inspection, in-storage/in-place maintenance records, etc.) and document identification (document title, revision, date)?
- What is the identity of the component being reviewed (name, identification number)?
- Does the documentation for the receiving process include component review against purchase specification requirements?
- Are nonconforming items properly identified, processed and closed out?
- Does the maintenance program meet the necessary requirements specified for the component relative to humidity, cleanliness, lubrication, shaft rotation, energization, etc., as applicable?

For each type of system, component or structural element the lead technical reviewer will supplement the generic checklist with appropriate additional questions, as applicable.

3.2.6.3 Development of Checklists for Review of Construction and Installation Documentation

The generic checklist for review of construction and installation documentation was developed considering questions such as:

- What is the identity of the construction/installation documentation being reviewed, including type (concrete, welding, bolting, NDE, etc.) and identification (title, revision, date)?
- What is the identity of the system, component or element and its physical location in the plant?
- Are all appropriate construction/installation procedures and instructions identified?
- Are the current revisions of drawings, specifications and other requirements utilized in the work including those specified in Field Change Requests?
- Does the documentation include verification that the work has been performed by properly qualified personnel?
- For those activities observed, do the construction/installation activities conform to requirements?
- Have the necessary inspections been performed?
- Has the work been performed utilizing the proper tools/equipment? Have such tools/equipment been properly calibrated in accordance with procedures?
- Have rework activities including Field Change Requests been performed in accordance with requirements and appropriately closed-out?
- Have deviations from design/supplier requirements been properly documented, processed and closed out?

For each type of system, component or structural element the lead technical reviewer will supplement the generic checklist with appropriate additional questions, as applicable.

3.2.6.4 Development of Checklists for Review of Selected Verification Activities

The generic checklist for review of selected verification activities was developed considering questions such as:

- What is the identity of the verification activity being reviewed (cable separation verification, pipe support reinspection, bolting study, pre-service test, including type, etc.)?
- What is the identity of the system, component or element(s) included in the verification activity under review?
- What is the identity of the verification activity documentation being reviewed (program plan, procedures, instructions, etc.)?
- What is the quality-related objective of the verification activity and does the activity as specified/documented meet the objective?
- Where verification activities are observed, do the activities comply with requirements and are they properly documented?
- Are nonconformances properly identified, processed and closed out?

For each type of system, component or structural element the lead technical reviewer will supplement the generic checklist with appropriate additional questions, as applicable.

3.2.6.5 Development of Checklists for Review of Verification of Physical Configuration

The generic checklist for review of verification of physical configuration was developed considering questions such as:

- What is the identity of the system, component or structural element being reviewed (name, identification number, location in plant, reference design documents)?
- Has the system, component or element been properly tagged/marked for identification in accordance with requirements?
- On the basis of visual inspection, has the component been properly constructed/installed and has it been maintained and protected during the construction process in accordance with requirements?
- Does the configuration comply with design requirements, including physical dimensions, location, orientation, name plate data, grounding, use of proper materials, insulation, routing, etc., as applicable?
- Have deviations from design requirements been properly identified, processed and closed out?

For each type of system, component or structural element the lead technical reviewer will supplement the generic checklist with appropriate additional questions, as applicable.

3.2.7 PLAN FOR ADDITIONAL SAMPLING, VERIFICATION, AND TESTING

The initial sampling and verification within the scope of the ICV is primarily based upon an evaluation of project generated documentation and data to verify the quality of both inaccessible (e.g. rebar placement) and accessible systems, components and structures. The only exception to this is the incorporation of the NDE/Materials Testing Program (reference sections 3.2.3.6 and 3.2.5.6) into the ICV scope. Under this program, data are collected by TERA as a confirmatory check. The quality of accessible items will be further verified by visual inspection or measurement as appropriate.

Additional sampling or verification within the scope of the ICV systems or outside the scope into other systems will be conducted if discrepancies are found. As indicated in section 3.1.7, additional sampling or verification within the scope of the system sample selection boundaries identified in sections 3.1.3, 3.1.4 and 3.1.5 of this Plan will be undertaken by TERA, approved internally and documented in the Monthly Status Report. Additional sampling outside this scope is considered a substantive issue and will be discussed between TERA, CPC and NRC prior to initiation. The level of additional sampling or verification will be based upon the nature of the discrepancy. In all cases when discrepancies are found, an introspective evaluation will follow to identify the extent and root cause. The root cause may either be random or systematic (generic). The additional review will attempt to verify whether the discrepancy is restricted to the specific system, component, or structure under review; restricted to work by a specific construction organization; or if the discrepancy cuts across many interfaces and applies to similarly constructed systems, components, and structures.

At first, the additional sampling and verification will be directed at an evaluation of additional documentation; however, if this documentation is incomplete or insufficient to identify the extent and root cause of discrepancies, further inspection or testing will be considered, as appropriate. If required to supplement internal resources, TERA may consider subcontracting a portion of any required inspection or testing services (e.g. non-destructive examination, materials testing, etc.) to a qualified organization that meets the independence requirements of Section 1.4 of this Plan.

4.0 DOCUMENTATION

Auditable records must be maintained to document substantive elements of the IDCV review and evaluation process, to document technical conclusions including the status of disposition of items associated with the review process leading to Findings, to document the revision of records, and to establish quality assurance measures necessary to provide adequate confidence and assurance of the quality of services. The following sections establish documentation requirements for engineering evaluations, calculations, field verification, and external communications. Section 5.0 of this Plan establishes the requirements for reporting documentation. Section 6.0 of this Plan establishes the QA documentation requirements.

4.1 DOCUMENTATION OF ENGINEERING EVALUATIONS, CALCULATIONS, AND FIELD VERIFICATION RESULTS

Engineering evaluations, calculations, and field verification results provide the bases for all substantive conclusions reached in the IDCV. These items provide the "trail" of information which supports IDCV conclusions, both positive and negative, as the case may be. While the reporting mechanism established in Section 5.0 of this Plan addresses the documentation of reporting requirements which are generally applicable to negative conclusions, it is equally vital that positive conclusions are documented in an auditable form as well.

The requirements for preparation and control of engineering evaluation documentation required for the Midland IDCV are contained in Project Instruction

PI-3201-001, Engineering Evaluation Preparation and Control. Engineering evaluations are required for tasks such as design criteria evaluation, commitment compliance evaluation, design evaluation, construction records evaluation, and field verification.

The requirements for preparation and control of calculation documentation, including computer analyses documentation, required for the Midland IDCV are contained in Engineering Control Procedure ECP-5.2, Calculation Preparation and Control. Calculations are prepared as required to verify designs, design parameters, design criteria, performance parameters, evaluate data, and otherwise provide quantitative information in accordance with accepted analytical and mathematical methods. Calculations are intended to assist IDCV reviewers in reaching necessary conclusions relative to the quality of the Midland plant design.

4.2 DOCUMENTATION AND PROTOCOL FOR EXTERNAL COMMUNICATIONS

The requirements for the preparation and control of documentation for external communications including the protocol for communications are contained in Project Instruction PI-3201-010, External Communications, Protocol and the Preparation of Contact Log Sheets. Under prescribed circumstances, oral communications and meetings that include discussions with parties external to the IDCV review organization must be documented to provide an auditable record of information which may have an impact on IDCV conclusions and the preservation of an independent process in reaching these conclusions. Accordingly, all oral communications, meetings and exchanges of written documents with parties external to the IDCV review organization that include discussion of any subjects material to the scope of the Midland IDCV Program, Status reporting, Findings and Findings resolution, including recommendations, evaluations, correspondence, interim and final reporting are documented and controlled consistent with the provisions of PI-3201-010.

The protocol governing communications between CPC and TERA is in accordance with the provisions documented in a letter from James G. Ke[illegible]ler, Administrator, NRC Region III to James W. Cook, Vice President, CPC, dated March 28, 1983.

5.0 PROGRAM REPORTING

5.1 TYPES OF REPORTS

The following types of reports will be prepared in the IDCV:

- Open, Confirmed, and Resolved (OCR) Item Reports
- Observations
- Finding Reports
- Finding Resolution Reports
- Draft and Final Reports
- Interim Technical Reports
- Monthly Status Reports

OCR reports document the disposition of the IDCV review process leading to either Findings or the resolution of items which have surfaced during the review, but have been resolved after considering additional information. Observations are deficiencies that are not sufficiently serious to warrant classification as OCRs or Findings, yet cannot be dismissed directly as Resolved Items, but should be reviewed and corrected by CPC during the completion of the Midland project.

Finding Reports document verified deviations in the implementation of design criteria, design, or construction commitments and design or construction procedures in areas such as: quality assurance, design or construction control, analysis, design, engineering evaluation, specification, design or construction implementation or field installation. Findings may fall into two categories: those affecting the ability of systems, components, or structures to meet their intended safety function and those without an impact on safety functions.

Finding Resolution Reports document the conclusions of the review process which has been undertaken to resolve Findings and completely close out any concern about the Findings. Finding resolution may require additional analysis, design, or construction changes or procedural changes. Full resolution requires the identification of root cause and extent and a plan for corrective action if required.

The IDCV Final Report documents all substantive conclusions reached in the IDCV, including the process leading to these conclusions. Both positive and negative conclusions will be identified to provide a balanced perspective and to document a complete record. While the overall IDCV objective is to verify the quality of the Midland project design and construction efforts identifying any deficiencies, it is necessary to have a record which documents items that have been dismissed (i.e., positive conclusions) because the bases for these conclusions are equally important.

Interim Technical Reports may be written from time to time, as appropriate to document details of review and conclusions reached on specific technical issues (e.g. seismic design) or potentially to document the conclusion of the review for any of the three systems within the IDCV scope. Monthly Status Reports provide outside parties up-to-date information relative to program progress and important issues identified during the reporting period. The following items are included:

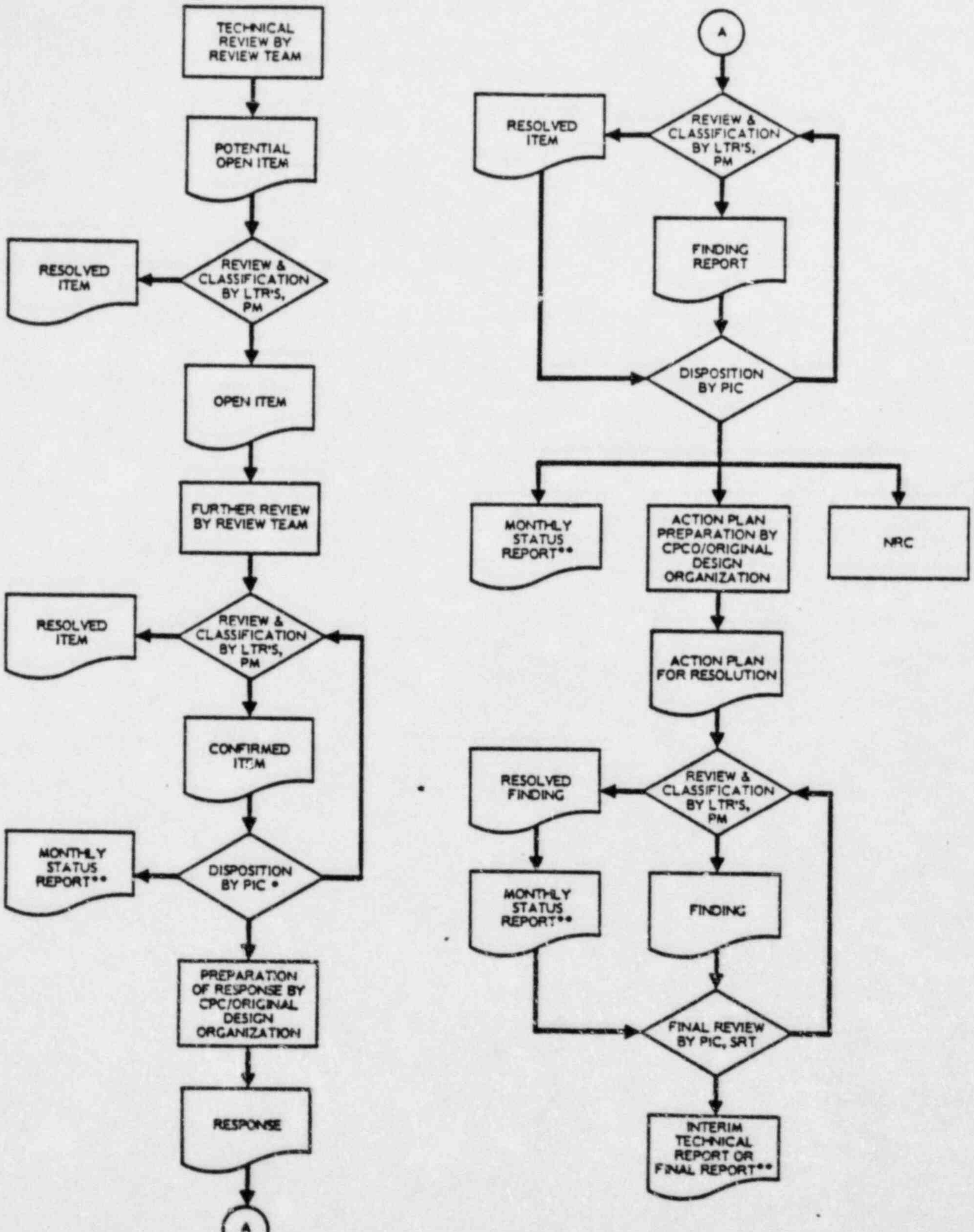
- Tracking System Summary for OCRs, Finding Reports and Finding Resolution Reports
- Current Confirmed Item Reports
- IDCV Program Status Summary
- Financial Report (CPC only)

5.2 REPORTING PROCESS

5.2.1 REPORTING SYSTEM

The system for IDCV reporting is shown graphically in Figure 5.2-1. This figure provides a diagram or flow chart of the report generation process and a summary of the sequence.

Upon initial technical review, Potential Open Items may be identified by an IDCV reviewer. This determination will be based upon his judgment that a potential deviation exists in implementation of design criteria, design or construction commitments, and design or construction procedures, thus requiring additional investigation or confirmatory analysis by the IDCV review team.



KEY: PM - PROJECT MANAGER
LTR - LEAD TECHNICAL REVIEWER
PIC - PRINCIPAL-IN-CHARGE
SRT - SENIOR REVIEW TEAM
CPC - CONSUMERS POWER COMPANY

NOTE: * PIC TO DETERMINE IF SRT REVIEW AND CONCURRENCE IS REQUIRED
** DISTRIBUTED TO IDCV SERVICE LIST

FIGURE 5.2-1

REPORT FLOW CHART
MIDLAND INDEPENDENT DESIGN AND CONSTRUCTION
VERIFICATION PROGRAM

Upon documenting his determination, the IDCV reviewer forwards a preliminary OCR Report or Potential Open Item Report to his Lead Technical Reviewer (LTR) who reviews it with the project team (Project Manager and all LTRs). If the project team concurs with the reviewer's determination, the Potential Open Item becomes an Open Item which is formally controlled. The project team may resolve the Potential Open Item, thus requiring reclassification of the item as a Resolved Item and modification of the OCR Report reflecting this change. Both the Resolved Item Report and superceded Potential Open Item Report are then formally controlled. Alternatively, the LTR or project team may judge the identified deficiency as not being sufficiently serious to warrant classification as an OCR, yet it must be documented and corrected by CPC during the completion of the Midland Project. Accordingly, the item will be classified as an Observation and processed in accordance Project Instruction PI-3201-005, Documentation of Observations.

Open Items will be reviewed further by the review team until such a point that available information has been depleted. At this time, the IDCV reviewer will prepare a Resolved Item Report or a Confirmed Item Report which documents his determination after further review. A Confirmed Item is judged to be an apparent finding by the review team and requires further action to provide documentation that may not have been available to the IDCV review team. His recommendation is forwarded to his LTR who reviews the classification and makes a recommendation to the project team. The project team may agree with the LTR's recommendation at which point the Resolved Item Report or Confirmed Item Report becomes final. Alternatively, the project team may review the classification and require further work by the IDCV reviewers. All final OCR Reports are forwarded to the Principal-in-Charge (PIC) for his concurrence, disposition, and determination whether a formal review is required by the Senior Review Team (SRT). In all cases, the SRT receives a copy of the OCR Report irrespective of whether they are requested to undertake a formal review and at the descretion of the Chairman of the SRT, the SRT may independently undertake a review.

The PIC may agree with the project team's classification and recommend that the Project Manager forward Confirmed Item Reports to CPC, NRC and other outside parties on the IDCV program service list as part of the monthly status report, with copies to the appropriate design or construction organizations; or he may request a review by the SRT to assist him in making his determination. Alternatively, or in parallel, he may request that the project team or review team conduct further review.

Additional information will be solicited from CPC/original design or construction organization at which point the LTRs and IDCV reviewers will then review any information received and make a determination whether the Confirmed Item becomes a Resolved Item or a Finding. The LTRs will make the recommendation to the project team who will review the classification. The project team may agree with the LTR's recommendation, at which point the Resolved Item Report or Finding Report becomes final. Alternatively, the project team may review the classification and require further work by the IDCV reviewers. Upon completion of this process, the OCR Report or Finding Report is forwarded to the PIC by the Project Manager for a similar review process as has been previously described. After his review and any required review by the SRT, the PIC will direct the Project Manager to forward Finding Reports to CPC, NRC and outside parties on the IDCV program service list as part of the Monthly Status Report.

CPC/original design or construction organization will respond with an action plan for resolution of the issues identified. The project team will review the response and determine whether the issue has been resolved. If so, a Finding Resolution Report will be issued by the project team for review by the PIC in a similar fashion as has been previously described. Alternatively, the Finding may not be resolved, at which point it will remain open and be documented in the Final Report. It must be noted that this eventuality is not anticipated since closure must be sought by the involved organizations. Finding Resolution Reports will also be forwarded as part of the Monthly Status Reports. The Final Report will document all IDCV conclusions as discussed previously.

5.2.2 REPORT PREPARATION AND DISTRIBUTION

The preparation and control of OCR Reports, Finding Reports, and Finding Resolution Reports is addressed in Project Instruction PI-3201-008, Preparation and Control of Open, Confirmed, and Resolved Item Reports, Finding Reports, and Finding Resolution Reports. Section 3.0 of PI-3201-008 provides instructions for report preparation, Section 4.0 identifies the review and approval chain and Section 6.0 addresses the distribution of these reports.

The Final Report will include documentation of all conclusions, including references to applicable documents that support these conclusions. A draft Final Report will be transmitted to CPC and NRC for their review. Resolution of their comments will be documented in an auditable manner. A copy of the draft Final Report will be sent to outside parties on the IDCV service list. It should be noted that CPC and NRC comments are intended to be of a clarification nature or to correct misinformation. Upon TERA resolution of the comments, the Final

Report will be issued and distributed to CPC, NRC, and outside parties on the IDCV service list.

5.2.3 INTERCHANGE OF INFORMATION

The requirements of Section 4.2 are not intended to prohibit the informal interchange of information between IDCV personnel and external parties. These communications are essential to the IDCV review process. However, the items in Section 4.2 require documentation for the reasons cited. Furthermore, to preserve the independence of the IDCV review process, it is important that IDCV personnel maintain discretion in the dissemination of information bearing on findings to outside parties until such a time that this information is final. This procedure will prevent confusion and foster credibility to the IDCV review process.

5.3 IDENTIFICATION AND EVALUATION OF DESIGN/CONSTRUCTION PROBLEMS

It is the duty of each IDCV team member to identify any deficiency known to him that may be significant to the public health and safety. He shall be permitted to conduct all reasonable evaluations necessary to make a determination of the significance of suspected items. IDCV personnel are responsible for presenting their conclusions in a manner that other technically qualified personnel may understand and independently verify. Furthermore, it is the responsibility of IDCV personnel to assess the significance of their conclusions and attempt to understand the extent and root cause of findings. Any deviation from the above should be brought to the attention of the Project Manager.

6.0 QUALITY ASSURANCE

6.1 APPLICABLE REQUIREMENTS

The Midland IDCV shall be performed in accordance with applicable quality assurance requirements of the NRC's regulation 10 CFR 50, Appendix B. Furthermore, the IDCV will comply with:

- NRC Regulatory Guide 1.28 (6/7/72) including Sections 1, 2, 3, 5, 7, 17, and 18 of ANSI N45.2-1971
- NRC Regulatory Guide 1.64 (Revision 1, 2/75) including Sections 1, 2, and 6 of ANSI N45.2.11-1974

These requirements are implemented by the TERA Corporate Quality Assurance Plan (QAP), Revision 3 (January 1, 1980) and the Midland IDCV Project Quality Assurance Plan (PQAP), Revision 0 (November 11, 1982).

6.2 VERIFICATION OF COMPUTER CODES

All computer codes utilized by IDCV analysts shall be verified as follows:

- Program Verification - The quality of the code should be determined from a comparison of the code generated solutions with known solutions of selected problems.
- Facility Verification - Given that the generic quality of the code has been determined, the capability to reproduce known results utilizing hardware and software available to TERA must be determined.

Program verification may be completed by external parties; however, facility verification is the responsibility of TERA and must be so demonstrated.

6.3 AUDITS

Quality assurance audits of project operations are conducted in accordance with ECP-5.6, "Quality Assurance Audits". For the Midland IDCV program, audits will be performed at least every 90 days of active project work.

TERA

BERKELEY · DALLAS · BETHESDA · BATON ROUGE · DEL MAR · NEW YORK · SAN ANTONIO · DENVER · LOS ANGELES

May 27, 1983

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Re: Docket Nos. 50-329 OM, OL and 50-330 OM, OL
Midland Nuclear Plant - Units 1 and 2
Independent Design and Construction Verification (IDCV) Program
First Monthly Status Report

Attached is our first Monthly Status Report covering the period from project inception through May 27, 1983. Included in this report are:

- General background information on the Midland IDCV program and details related to Monthly Status Reports
  - Introduction and Purpose - Section 1.0
  - Midland IDCV Program Background - Section 2.0
  - Scope - Section 3.0
  - Reporting Period and Issuance - Section 4.0
- IDCV Program Status Summary - Section 5.0
  - Project Chronology - Attachment 1

MAY 31 1983

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ATTACHMENT 2

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- Tracking System Summary for Open, Confirmed and Resolved (OCR) Item Reports, Finding Reports and Finding Resolution Reports - Section 6.0 and Attachment 2
- Current Confirmed Item Reports - Attachment 3
- Financial Status Report (CPC only) - Attachment 4

Sincerely,

Howard A. Levin

Howard A. Levin
Project Manager
Midland IDCV Program

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IDCV Service List

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NRR Service List for Midland Independent Design
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MIDLAND INDEPENDENT DESIGN AND CONSTRUCTION VERIFICATION PROGRAM

MONTHLY STATUS REPORT

NUMBER 1

PERIOD INCEPTION THROUGH MAY 27, 1983

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Donald Tulodieski

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Project Manager

Approved by: John W. Buel

Principal-in-charge

MIDLAND INDEPENDENT DESIGN AND CONSTRUCTION
VERIFICATION PROGRAM (IDCV)
MONTHLY STATUS REPORT
NUMBER 1
PERIOD INCEPTION THROUGH MAY 27, 1983

1.0 Introduction and Purpose

Monthly Status Reports have been instituted by agreement between the Consumers Power Company (CPC), the Nuclear Regulatory Commission (NRC) and TERA to provide parties external to TERA's IDCV project team with up-to-date information relative to program progress and any important issues identified during the reporting period. This initial report covers the period from project inception through May 27, 1983. A description of the scope, reporting periods and report issuance dates for Monthly Status Reports, as well as a summary of the background of the IDCV program are presented in this initial report. Subsequent reports will include only those items discussed in section 3.0.

2.0 Midland IDCV Program Background

The Nuclear Regulatory Commission (NRC) issued a letter on July 9, 1982 which requested that Consumers Power Company (CPC) provide for an independent assessment of the design adequacy of the Midland plant. CPC responded to this request on October 5, 1982 by submitting an outline of the scope of a proposed independent review program. A public meeting was held on October 25, 1982 at the NRC's Bethesda, Maryland offices to discuss details of the proposed program, the scope of which included an evaluation of the Midland Unit 2 Auxiliary Feedwater (AFW) system. During this meeting, the NRC requested that the scope of the independent design assessment program be expanded, including an assessment of the quality of construction. The NRC requested that CPC identify three candidate systems for scope expansion based upon their contribution to plant risk, from which one system would be selected.

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CPC responded to NRC by a letter dated December 3, 1982 which identified the Standby Electric Power system (diesel generator), Safeguards Chilled Water system and Containment Isolation system as candidate systems. A public meeting was held on February 8, 1983 at Midland, Michigan to discuss details of the program related to the evaluation of the AFW system and to provide status.

On March 22, 1983 the NRC selected the Standby Electric Power system and the Control Room HVAC system for scope expansion. Proposed elements of the scope of evaluation for these systems as well as the AFW system were discussed at another public meeting held on April 13, 1983 at the NRC's Bethesda, Maryland offices.

TERA Corporation has been selected by CPC to scope, manage, and implement the Midland Independent Design and Construction Verification (IDCV) Program. By a letter dated May 3, 1983, the NRC approved the selection of TERA. The selection is based upon the firm's technical qualifications, experience, and independence from the Midland project. Such independence includes all individuals who may contribute to the IDCV Program.

The Engineering Program Plan (EPP), Revision 2, dated May 18, 1983, has been established to outline the scope, philosophy of review, methodology, independence requirements, organization, control, documentation, reporting, and quality assurance requirements for the Midland IDCV Program. The Project Quality Assurance Plan (PQAP), Revision 3, dated May 18, 1983, has been established to define the documented, auditable, control measures necessary to ensure the quality of services provided by TERA.

3.0 Scope

The following items are included in Monthly Status Reports:

- IDCV Program Status Summary
- Tracking System Summary for Open, Confirmed and Resolved (OCR) Item Reports, Finding Reports and Finding Resolution Reports

- Current Confirmed Item Reports, Finding Reports and Finding Resolution Reports

- Financial Status Report (CPC only)

4.0 Reporting Period and Issuance Dates

The reporting period shall generally be on a calendar month basis with issuance of the corresponding Monthly Status Report around mid-month of the month following the end of the reporting period. The reporting period for this initial Monthly Status Report is from project inception through May 27, 1983, the date of this report. The second Monthly Status Report will be issued in mid-July, covering the period from May 27, 1983 through June 30, 1983.

5.0 IDCV Program Status Summary

5.1 Programmatic Activities

Attachment I provides the chronology for major project milestones during the reporting period. This chronology will be maintained up-to-date and included in future reports.

Several milestones warrant special highlight. On March 22, 1983, the NRC selected the Standby Electric Power (SEP) system and the Control Room HVAC (CR-HVAC) system for inclusion within the IDCV program scope. This selection along with the previously identified Auxiliary Feedwater (AFW) system completes the scope identification process for the IDCV program. A public meeting was held on April 13, 1983 to discuss details of TERA's AFW system review and conceptual plans for the SEP system and CR-HVAC system reviews. Comments were assimulated from CPC, NRC and interested members of the public. TERA responded to this direction by further development of the existing program to incorporate the revised scope. On May 18, 1983, TERA issued Revision 2 of the Engineering Program Plan and Revision 3 of the Project Quality Assurance Plan, reflecting the full scope of the IDCV program.

During the period of March-April, TERA transmitted information to the NRC relative to corporate and individual independence and professional qualifications. The NRC reviewed this information and on May 3, 1983 documented their formal acceptance of TERA to conduct the IDCV program and acceptance of the scope of the AFW system review. The NRC is currently reviewing TERA's proposed scope of review for the SEP system and CR-HVAC system as defined in Revision 2 of the Engineering Program Plan.

5.2 Design Verification Activities

5.2.1 Introduction and Background

Independent Design Verification (IDV) review activities during the reporting period of this status report focused upon the development and establishment of resources, programs, and organizational interfaces necessary to execute the IDV review methodology and making substantial progress in the IDV review for the AFW system. The methodology, as described in the IDCV Engineering Program Plan, strives to establish a consistent set of review activities applicable to systems, components, structures, and materials subject to IDV review. These review activities have been categorized into five areas as follows:

- Review of Design Criteria and Commitments
- Review of Implementing Documents
- Check of Calculations or Evaluations
- Confirmatory Calculation or Evaluation
- Check of Drawings and Specifications

The intent of this portion of the status report is to present and summarize important IDV activities undertaken during the reporting period relative to review progress made in the above five categories for each of the 45 design topics within the scope of the AFW system review. Future reports will be limited to significant activities on topics which have been completed during the month or on which substantial progress has been made.

The programatic development was completed for the Standby Electric Power (SEP) system and the Control Room HVAC (CR-HVAC) system during the reporting period. Preliminary review activities were also initiated and will be reported in the next Monthly Status Report.

It is estimated that the AFW system IDV review is 60-75% complete relative to the initial scope defined in Revision 0 of the Engineering Program Plan. This estimate does not include any efforts required to resolve existing issues identified in section 6.0.

5.2.2 IDV Topic Summaries

The IDV Topics and summaries of the scope for the AFW system are presented in section 3.1.3 of Revision 2 of the Engineering Program Plan. The corresponding Initial Sample Review Matrices are presented in Figure 1 for convenience. The following sections provide a topic-by-topic summary of progress:

1.1-1 SYSTEM OPERATING LIMITS

Applicable operating limits for various components of the AFW system have been extracted from documents such as the FSAR and the Babcock and Wilcox (B&W) Balance-of-Plant Criteria Document. The review includes a check for completeness of specified parameters and bounding values and a check for consistency from document to document.

A check of appropriate calculations and evaluations is being conducted to verify that the specified limits are either capable of being met or are used correctly as input to assure proper system or component operation.

The limits identified in this review are being utilized in the review of other topics related specifically to component operability.

INITIAL SAMPLE REVIEW MATRIX FOR THE AUXILIARY FEEDWATER SYSTEM MIDLAND INDEPENDENT DESIGN VERIFICATION PROGRAM[1]

TOPIC NUMBER	DESIGN AREA	SCOPE OF REVIEW: REVIEW OF DESIGN CRITERIA AND COMMITMENTS	REVIEW OF IMPLEMENTING DOCUMENTS	CHECK OF CALCULATIONS AND EVALUATIONS	CONFIRMATORY CALCULATION OR EVALUATION	CHECK OF DRAWINGS AND SPECIFICATIONS
	AFW SYSTEM PERFORMANCE REQUIREMENTS					
1.1-1	SYSTEM OPERATING LIMITS	X	X	X		
1.2-1	ACCIDENT ANALYSIS CONSIDERATIONS	X	•			
1.3-1	SINGLE FAILURE	X	X	X	•	
1.4-1	TECHNICAL SPECIFICATIONS	X	X			
1.5-1	SYSTEM ALIGNMENT/SWITCHOVER	X	X			
1.6-1	REMOTE OPERATION AND SHUTDOWN	X				
1.7-1	SYSTEM ISOLATION/INTERLOCKS	X	X			
1.8-1	OVERPRESSURE PROTECTION	X	•	•	•	
1.9-1	COMPONENT FUNCTIONAL REQUIREMENTS	X	X	X		X
1.10-1	SYSTEM HYDRAULIC DESIGN	X	X	X	•	
1.11-1	SYSTEM HEAT REMOVAL CAPABILITY	X	X	X	•	
1.12-1	COOLING REQUIREMENTS	X				
1.13-1	WATER SUPPLIES	X	X			
1.14-1	PRESERVICE TESTING/CAPABILITY FOR OPERATIONAL TESTING	X	•	•		
1.15-1	POWER SUPPLIES	X	X			•
1.16-1	ELECTRICAL CHARACTERISTICS	X	•	•		
1.17-1	PROTECTIVE DEVICES/SETTINGS	X	X			X
1.18-1	INSTRUMENTATION	X	X	X		X
1.19-1	CONTROL SYSTEMS	X	X	X		•
1.20-1	ACTUATION SYSTEMS	X				•
1.21-1	NDE COMMITMENTS	X	•			•
1.22-1	MATERIALS SELECTION	X	X			
1.23-1	FAILURE MODES AND EFFECTS	•	•		•	

KEY

X - INITIAL SCOPE OF REVIEW

(X) - DELETED SCOPE OF REVIEW

• - ADDED SCOPE OF REVIEW

NOTE

1. INITIAL SAMPLE DOCUMENTED IN REV. 0 AND 1 OF THIS PLAN HAS BEEN MODIFIED EFFECTIVE 4/13/83

FIGURE 1

INITIAL SAMPLE REVIEW MATRIX FOR THE AUXILIARY FEEDWATER SYSTEM
MIDLAND INDEPENDENT DESIGN VERIFICATION PROGRAM (CONTINUED)[1]

		SCOPE OF REVIEW				
TOPIC NUMBER	DESIGN AREA	REVIEW OF DESIGN CRITERIA AND COMMITMENTS	REVIEW OF IMPLEMENTING DOCUMENTS	CHECK OF CALCULATIONS AND EVALUATIONS	CONFIRMATORY CALCULATION OR EVALUATION	CHECK OF DRAWINGS AND SPECIFICATIONS
	AFW SYSTEM PROTECTION FEATURES					
II.1-1	SEISMIC DESIGN	X				
II.2-1	• PRESSURE BOUNDARY	X	X	X	X	X
II.3-1	• PIPE/EQUIPMENT SUPPORT	X	X	X	X	X
II.4-1	• EQUIPMENT QUALIFICATION	X	X	X		X
II.5-1	HIGH ENERGY LINE BREAK ACCIDENTS	X				
II.6-1	• PIPE WHIP	X	X	X		X
II.7-1	• JET IMPINGEMENT	X				
II.8-1	ENVIRONMENTAL PROTECTION	X				
II.9-1	• ENVIRONMENTAL ENVELOPES	X	X	X	X	X
II.10-1	• EQUIPMENT QUALIFICATION	X	X	X		X
II.11-1	• HVAC DESIGN	X				
II.12-1	FIRE PROTECTION	X	X	X		
II.13-1	MISSILE PROTECTION	X				
II.14-1	SYSTEMS INTERACTION	X	X	X		
	STRUCTURES THAT HOUSE THE AFW SYSTEM					
III.1-1	SEISMIC DESIGN/INPUT TO EQUIPMENT	X	X	X		X
III.2-1	WIND & TORNADO DESIGN/MISSILE PROTECTION	X				
III.3-1	FLOOD PROTECTION	X				
III.4-1	HELBA LOADS	X				
III.5-1	CIVIL/STRUCTURAL DESIGN CONSIDERATIONS	X				
III.6-1	• FOUNDATIONS	X	X	X		
III.7-1	• CONCRETE/STEEL DESIGN	X	X	X		X
III.8-1	• TANKS	X	X	X		

KEY
X - INITIAL SCOPE OF REVIEW
X - DELETED SCOPE OF REVIEW
* - ADDED SCOPE OF REVIEW

NOTE
1. INITIAL SAMPLE DOCUMENTED IN REV. 0 AND 1 OF THIS PLAN HAS BEEN MODIFIED EFFECTIVE 4/13/83

FIGURE 1

1.2-1 ACCIDENT ANALYSIS CONSIDERATIONS

The FSAR has been reviewed to determine those events for which the AFW system would be expected to play a role either in mitigation or recovery. The system was also reviewed to determine if there were any plausible means by which it could cause an accident or exacerbate an existing accident.

A meeting was held with Babcock and Wilcox to gather information related to the design requirements for the auxiliary feedwater system. Further review of CPC/Bechtel actions in response to the B&W-developed Anticipated Transient Operation Guidelines document has been deemed necessary and will be accomplished.

The review scope also was expanded somewhat to review calculations regarding the required system heat removal capability under accident conditions. This subject is being considered further under Topic 1.11-1, System Heat Removal Capability.

1.3-1 SINGLE FAILURE

Applicable criteria have been extracted from the FSAR, NRC Regulations, and the B&W Balance-of-Plant Criteria document. Applicable documents such as piping and instrumentation diagrams and electrical schematics have been reviewed to determine whether the system can meet these criteria.

It has been determined that two complementary actions are necessary to verify the design relative to the capability of the AFW system to withstand a single failure. First, a confirmatory evaluation of the system is being conducted to verify the design from a single-failure-proof standpoint, especially regarding power supplies. This effort will concentrate mainly on the portions of the system comprising the pumps' suction and the steam discharge to the steam-driven turbine.

Concurrently, a Failure Modes and Effects Analysis will be performed, as documented under Topic I.23-I.

I.4-I TECHNICAL SPECIFICATIONS

The draft Midland Technical Specifications contained in the FSAR have been reviewed as they relate to the AFW system. The finalization of these specifications is on-going as well as the NRC's review. TERA is monitoring this process and when complete, the IDCV review will verify that the specifications are complete, consistent with NRC Standard Technical Specifications, and reflect commitments made in the FSAR.

I.5-I SYSTEM ALIGNMENT/SWITCHOVER

Applicable criteria have been drawn from such sources as the NRC Regulations, FSAR, B&W Balance-of-Plant Criteria document and the NRC Standard Review Plan and applicable Branch Technical Position.

The pertinent Piping and Instrumentation Diagram was reviewed to ascertain whether the criteria had been implemented. In addition, a CPC letter regarding specific switchover design capabilities, and the process by which they were derived, was reviewed. Finally, available procedures were reviewed to determine what guidance will be available to operators regarding alignment and switchover. These procedures are in draft form; further review will be undertaken later in the IDCV process.

The switchover of AFW control from the main control room to the auxiliary shutdown panel is under review as part of the control systems topic and also will be covered as part of the fire protection review.

I.6-I REMOTE OPERATION AND SHUTDOWN

Applicable criteria are included in the NRC Regulations, the FSAR, and the B&W Balance-of-Plant Criteria document. These criteria have been reviewed to determine their completeness and consistency. Results of the review also included several systems capabilities requiring further review under other topics. For example, the capability to control the system and shut down the plant from the auxiliary shutdown panel, and the regulatory guidance for manual actuation and control, are under review as part of the applicable electrical, instrumentation and control topics.

I.7-I SYSTEM ISOLATION/INTERLOCKS

Criteria for this topic are contained in the NRC Regulations, the FSAR, the B&W Balance-of-Plant Criteria document, and the NRC Standard Review Plan. The applicable piping and instrumentation diagram was reviewed to determine whether the criteria had been implemented into the design.

Further review is being devoted to specific aspects of the design process, including a Design Change Approval Request relating to AFW pump low suction pressure trips.

I.8-I OVERPRESSURE PROTECTION

The criteria for this topic review were drawn from the FSAR and applicable codes and standards. Independent confirmatory calculations were performed for selected sections of piping to determine whether overpressure protection devices were needed. Attention was given to resolution of Management Corrective Action Report 65 and its related updates and submittals to the NRC. These deal with a potential AFW system suction piping overpressure problem discovered at an operating plant and applicable to the Midland design. The IDCV team will continue to follow the corrective action taken.

Site-requested changes to piping design pressure ratings are under review. This is an active review topic.

I.9-I COMPONENT FUNCTIONAL REQUIREMENTS

The component functional requirements review is progressing in parallel with reviews in several other topics as AFW system design criteria are translated into corresponding component specifications for parameters such as flow rates, allowable pressure drops, NPSH, voltage, device settings and similar characteristics. The review has also included IDV confirmation of functional requirement parameters. For example, the functional requirements for the AFW pumps are being independently confirmed as confirmatory calculations related to the topic reviews of System Hydraulic Design and System Heat Removal are completed. Reviews of test data are also in progress to confirm that specific components can meet their specified functional requirements. The components shown in Table I have been initially selected for this review. Because of its dependency on many topic reviews, this topic will be among the last to be completed.

I.10-I SYSTEM HYDRAULIC DESIGN

Significant progress has been made in the System Hydraulic Design review area. The identification of design criteria and confirmatory calculations which are part of this review are essentially complete. Several Bechtel calculations have received preliminary reviews to date. Completion of the reviews of these calculations and selection of those calculations to complete the sample is currently in progress. An initial identification of implementing documents to be reviewed has been made.

I.11-I SYSTEM HEAT REMOVAL CAPABILITY

Progress in the System Heat Removal Capability review area parallels that of the System Hydraulic Design review area. Identification of design criteria and development of confirmatory calculations is essentially complete. A B&W calculation concerning heat removal requirements has been reviewed. An initial identification of implementing documents to be reviewed has been made.

I.12-I COOLING REQUIREMENTS

The criteria for cooling requirements have been identified and reviewed. This review has provided input to the selection of calculations and other documents to

TABLE I

MIDLAND IDCV
SUPPLIER DOCUMENTATION REVIEW
March 8, 1983

Item No.	Component ID Type	ID No.	P.O. No.	Gen Cmpl	Dwgs	Fnct Reqs	EQ	SQRT	Weld NDE QA	Mat Props	Misc	Comments
1.	Pump	2P-005A	M-14	X	X	X		X	X	X	X	
2.	Motor	2P-005A	M-14	X	X	X		X	X	X	X	
3.	Pump	2P-005B	M-14	X	X	X		X	X	X	X	
4.	Turbine	2G-005B	M-14	X	X	X			X	X	X	
5.	Valve	2LV-3975A1V	J-255	X	X	X	X	X	X	X	X	
6.	Operator	2LV-3975A1	J-255	X	X	X	X	X			X	
7.	Valve	2MO-3965AV	M-117	X	X	X	X		X	X	X	
8.	Operator	2MO-3965A	M-117	X	X	X	X				X	
9.	Valve	2MO-3993A2V	M-398		X	X		X				
10.	Operator	2MO-3993A2	M-398		X	X		X				
11.	Valve	2XV-3989	M-118	X	X	X						
12.	Operator	2XV-3989A1	M-118		X	X						
13.	Valve	2SV-3969A	J-256	X	X	X			X	X	X	
14.	Valve	2MO-3226V	M-117		X	X	X					
15.	Operator	2MO-3226	M-117		X	X	X					
16.	Valve	2MO-3277AV	M-117		X	X	X	X	X			
17.	Operator	2MO-3277A	M-117		X	X	X	X				
18.	Heat-X	2E-105A	M-14		X	X		X				

TABLE I (CONTINUED)

Item No.	Component ID Type	ID No.	P.O. No.	Gen Cmpl	Dwgs	Fncl Reqs	EQ	SQRT	Weld NDE QA	Mat Props	Misc	Comments
19.	Panel	2C-114	J-202		X	X		X				
20.	MCC	2BP-03	E-45		X	X	X	X				
21.	SwGear	2A-05	E-205	X	X	X		X			X	
22.	Cable		E-26A		X	X	X				X	600V
23.	Transmitter	2PT39000B1	J-245		X	X	X					
24.	Transmitter	2FT3969A	J-245	X	X	X					X	
25.	Transmitter	2FT3975AB	J-245		X	X	X	X				
26.	Transmitter	2LT3298	J-245		X	X						
27.	Transmitter	2LT3975AA2	J-245	X	X	X	X	X			X	
28.	Indicator	2LIK3975AA2	J-204		X	X						
29.	Switch	2ZS3975A1	J-255X	X	X	X		X			X	
30.	Cable		E-60		X	X	X					Instru.
31.	Air Cooler	2VM-54A	M-149	X	X	X		X			X	
32.	Elec. Penet.		E-20A				X					
33.	Piping				X				X	X		
34.	Pipe supports				X				X	X		
35.	Cable Tray				X					X		
36.	Tray Supports				X					X		
37.	Conduit				X							

TABLE I (CONTINUED)

Item No.	Component ID Type	ID No.	P.O. No.	Gen Cmpl	Dwgs	Fnct Reqs	EQ	SQRT	Weld NDE QA	Mat Props	Misc	Comments
38.	Conduit Supports				X					X		
39.	Instru. Piping									X		
40.	HVAC Ducts (later)											
41.	HVAC Supports (later)											
42.	Rebar									X		
43.	Str. Steel								X	X		
44.	Inserts								X	X		

be reviewed in the Equipment Qualification and Component Functional Requirements review areas.

1.13-1 WATER SUPPLIES

The criteria for the AFW water supplies have been identified and reviewed. This review has provided input to the selection of calculations and other documents to be reviewed in the System Hydraulic Design and Component Functional Requirements review areas. For example, the criteria for switchover from condensate storage to service water have been used as an input to reviewing calculations in the System Hydraulic Design area. Implementing documents for review of the Water Supply area have been identified.

1.14-1 PRESERVICE TESTING/CAPABILITY FOR OPERATIONAL TESTING

Criteria for the review of preservice testing requirements and operational testing capability are being identified in conjunction with other review areas, including the Technical Specification Review Area. The scope of review in this area has been expanded to include a review of implementing documents and engineering evaluations supporting test programs. This will serve as input to the ICV review. This expansion is based upon the desire to further verify system conformance with design criteria and commitments through an evaluation of tests that serve to establish the adequacy of the design and the capability of the system to function as planned.

1.15-1 POWER SUPPLIES

The applicable design criteria for AFW power supplies have been identified from NSSS vendor, regulatory and industry requirements. The Midland FSAR is the primary implementing document design which has been checked to verify the proper consideration of the design criteria determined from the criteria review. The AFW system logic and schematic diagrams have been reviewed to ensure that requirements relative to the quality of power supplies (diversity and redundancy) are met. In particular the review included the assurance that the AFW system is operable in the event of loss of offsite power and station blackout.

I.16-1 ELECTRICAL CHARACTERISTICS

Design criteria relevant to the electrical characteristics of cable physical separation, system electrical separation, cable and raceway sizing and terminal voltage on power circuits have been identified. The Midland FSAR sections implementing these criteria have been reviewed to verify that the criteria have been considered in the design process. Cable sizing calculations have been reviewed as applied to seven power circuits in the AFW system. The cable routing design process is being reviewed to ensure consideration of cable separation criteria in that process.

I.17-1 PROTECTIVE DEVICES/SETTINGS

Design criteria relevant to this topic have been identified. The Midland FSAR has been reviewed to ensure that the criteria have been documented and that commitments have been made to meet the criteria. The schematic diagrams for all motor-operated valves in the AFW system have been reviewed to ensure incorporation of thermal overload and opening torque swtich bypass features. The AFW pump motor schematic is being reviewed against the committed design criteria. The evaluation of the electrical penetration assembly protection scheme are under review to ensure compliance with design criteria.

I.18-1 INSTRUMENTATION

The instrumentation and alarms required to operate, monitor and protect the AFW system, as determined by design criteria, commitments and expected plant operations, have been reviewed against those specified for the AFW system to verify the adequacy of the instrumentation. Selected instrument accuracies under applicable plant operating conditions have been reviewed and evaluated. Instrument loop diagrams for steam generator water level indication have been reviewed for proper circuit electrical design. The calculation for steam generator low water level setpoint has been reviewed for compliance with design criteria. Major instrument package procurement specifications have been reviewed to verify that the design criteria have been considered in the purchase of the instrument hardware.

1.19-1 CONTROL SYSTEMS

Design criteria and commitments governing the steam generator water level and AFW turbine control systems have been checked to verify the inclusion of necessary regulatory, industry, and system performance requirements. The Midland FSAR has been reviewed to verify that the necessary requirements were used as input to the control system design. An evaluation of control system characteristics such as time response, component characteristics, and separation from actuation systems has been performed. A very limited FMEA review has been made (See Topic 1.23-1, Failure Mode and Effects). Control system circuitry design (voltages, currents, polarity) has been reviewed to verify that selected components will function as intended in the steam generator water level control system. The circuitry design review has included instrument loop diagrams, logic diagrams, and valve and motor schematic diagrams.

1.20-1 ACTUATION SYSTEMS

The auxiliary feedwater actuation system (AFWAS - which includes FOGG, "Feed Only Good Generator") design criteria and commitments have been reviewed to verify the proper consideration of regulatory requirements, industry codes and standards, and plant operational requirements. AFW system logic diagrams and schematic diagrams for all motor operated valves and the AFW pump motor have been reviewed against the design commitments. In addition, the AFWAS procurement specification is being reviewed against the design criteria and commitments.

1.21-1 NDE COMMITMENTS

Design criteria, commitments and implementing documents related to nondestructive examination have been identified and are under review against applicable industry codes and standards. A detailed checklist has been developed to assist in this activity. As commitments and proper translation into specifications and field procedures are verified, this input is being factored directly into the ICV review process to verify that these have been properly implemented. The review of implementing documents and specifications was added to the scope of the IDV to support the expanded NDE/Material Testing program documented in section 5.3.1 of this report.

1.22-1 MATERIAL SELECTION

This topic will be initiated in June, 1983 and will be reported upon in future status reports.

1.23-1 FAILURE MODES AND EFFECTS

This topic has been added to the scope of the IDV to verify conclusions reached about system and component failure modes and effects under various operating conditions.

The topic review will be initiated by continuing where the FSAR evaluation ended. It is intended, at the present time, that emphasis will be placed on components of the electrical, instrumentation and control systems. Criteria from other review areas will be consolidated as an initial step in preparing the planned confirmatory evaluation.

II.1-1 SEISMIC DESIGN

The seismic design chain, criteria and commitments applicable to the design of the Midland plant were identified and reviewed with particular emphasis on specific aspects of the criteria applicable to AFW components and systems and structures that house these components and systems. In view of several major perturbations during the design process, a significant portion of time was devoted to the identification and understanding of the seismic design chronology for the plant. The knowledge gained from this activity was utilized to assist IDV reviewers in the selection of issues and methodologies on which to concentrate the review. The selection of specific structural elements/features, components and systems was also influenced by this activity.

II.2-1 SEISMIC DESIGN — PRESSURE BOUNDARY

Progress on this topic has been made in two principal areas. A confirmatory seismic stress analysis is nearing completion for a portion (i.e. one piping problem) of AFW piping and supports on the "B" train inside the Unit 2 containment building. The line evaluated runs from the containment penetration to the first anchor which is approximately midway along the "B" train line on its paths from the containment penetration to the steam generator ring header for the AFW discharge. IDV analysts will soon be in the process of comparing the results of their analyses with Bechtel's analyses to independently confirm the adequacy of implementation of the design methodology and results. The comparison includes the contribution of seismic stress at critical locations, predicted support loads for all supports along the line and a design verification for representative support types. The model was developed by the IDV analysts without prior benefit or knowledge of Bechtel's methodology and in particular, specific modeling assumptions. The IDV analysts utilized the dimensional as-built data that was independently compiled through the ICV field verification program related to the program activity, Verification of Physical Configuration (see sections 5.3.1 and 5.3.6 of this report). In a separate activity, IDV reviewers identified and initiated a review of pertinent criteria, implementing documents, calculations and specifications applicable to ASME Code considerations associated with the pressure boundary integrity of a portion of the AFW discharge piping located in the auxiliary building. Future activities will include a review of Bechtel's recent configuration changes associated with the AFW piping and supports inside containment as well as a review of field engineering for small bore piping.

II.3-1 SEISMIC DESIGN — PIPE/EQUIPMENT SUPPORT

This topic closely parallels that of Topic II.2-1 which is associated with pressure boundary integrity and ASME Code considerations. As discussed, piping supports are chosen for evaluation consistent with the selection of piping lines to permit an integrated evaluation of the seismic design capabilities of the total system. Progress to date has been discussed for piping supports. The anchorage and support for AFW equipment is under evaluation as part of Topic II.4-I. For components selected for evaluation under this topic (see Table I), selected calculations, drawings and specifications are being checked to verify adequate seismic capability in accordance with seismic design criteria and commitments.

II.4-I SEISMIC DESIGN — EQUIPMENT QUALIFICATION

In addition to a review of seismic equipment qualification design criteria and commitments and implementing documents, the principal progress on this topic has been to select a sample of components for review (see Table I) and to acquire existing SQRT qualification "packages" from Bechtel. Progress has been slowed because Bechtel's seismic equipment qualification process is in early stages of completion. Complete SQRT packages are being reviewed along with the process for completing additional packages.

II.5-I (Including II.6-I and II.7-I) HELB/PIPE WHIP/JET IMPINGEMENT

Criteria for this group of review area have been identified and preliminary reviews conducted. Implementing documents, calculations, and drawings will be reviewed upon completion of the confirmatory calculation in the Seismic Design review area.

II.8-I (Including II.9-I, II.10-I & II.11-I) ENVIRONMENTAL PROTECTION/ENVIRONMENTAL ENVELOPES/EQUIPMENT QUALIFICATION/HVAC DESIGN

The criteria and commitments for this group of review areas have been identified and reviewed. A sample of equipment for the review of calculations and evaluations, primarily associated with the Equipment Qualification Report, has been made as shown in Table I. Reviews of the selected equipment qualification packages have been initiated. A confirmatory calculation in the environmental envelopes review area has been initiated. HVAC design criteria have been identified.

II.12-1 FIRE PROTECTION

Steps have been completed to organize the review of fire protection for the AFW system into subtopics. These topics are:

- Safe shutdown analyses
- Associated circuits analyses
- Fire hazards analyses
- Remote shutdown transfer switches/isolation devices
- Fire barriers
- Fire detection systems
- Suppression systems
- Emergency lighting

FSAR commitments, documentation of the fire protection program, and CPC submittals to NRC related to a comparison to 10CFR50 Appendix R and to BTP CMEB 9.5-1 have been reviewed. Interactions with Bechtel personnel have taken place to identify and collect design documentation pertaining to the AFW fire protection features, and to discuss fire protection program status and approaches in key areas. Detailed design and analysis information has been received. Verifications and reviews were initiated for two of the eight fire protection subtopics, namely fire barriers and emergency lighting. It is expected that these two subtopics and the remaining six will be completed in the next reporting period.

II.13-1 MISSILE PROTECTION

The review scope for the Missile Protection review area consists of a review of criteria and commitments. This review is currently in progress.

II.14-I SYSTEMS INTERACTION

Criteria for this review are defined in the Bechtel/CPC program for determination and resolution of potential systems interactions. This program was obtained for review after discussion with key Bechtel personnel involved in the program.

The program will be reviewed for completeness and consistency. System walkdowns in selected areas will be observed, and selected data sheets and recommendations will be reviewed.

III.1-I SEISMIC DESIGN/INPUT TO EQUIPMENT

In parallel with discussions and reviews associated with the seismic design chronology, substantial progress has been made relative to the understanding and review of modeling procedures and techniques utilized to generate in-structure seismic input (e.g. floor response spectra). This activity has taken more effort than anticipated to identify the complex history associated with the seismic design chain and verify that the various perturbations were adequately handled by the project designers and analysts. Particular attention has been focused on the acquisition and review of information related to the effects of floor flexibility on predicted floor response spectra. Emphasis is being placed on the proper specification, use, and transfer of floor response spectra between interfacing groups both internal and external to Bechtel.

III.2-I WIND AND TORNADO/MISSILE PROTECTION

III.3-I FLOOR PROTECTION

III.4-I HELBA LOADS

The criteria and commitments associated with these topics have been identified and the review commenced. Progress will be reported in future reports.

III.5-I CIVIL-STRUCTURAL DESIGN CONSIDERATIONS

Progress has been made on this topic in two principal areas. First efforts to identify design criteria such as that incorporated within Bechtel's

Civil/Structural Design Criteria document and the FSAR have been completed and the review is continuing. Secondly, efforts are continuing in a review of project experience within the civil/structural discipline to identify important issues that have surfaced during the project, review how these have been resolved and verify that these do not exist in the same or similar form elsewhere.

III.6-1 FOUNDATIONS

The concentration of this topic is on structural aspects of foundation design verses soil mechanics aspects. Accordingly, a portion of the auxiliary building foundation has been selected for detailed structural review. Efforts to date have focused on an identification of foundation design criteria, a review of project experience to understand the design chronology and important loading conditions and the collection of pertinent calculations. The detailed structural review is just being initiated and will be reported upon in future reports.

III.7-1 CONCRETE/STEEL DESIGN

Specific structural elements (e.g. shear walls, floor diaphram) have been selected for detailed review and evaluation. Emphasis is being placed upon an evaluation of the project's capability to transfer loading information both internally and externally from one organization (e.g. analytical groups) to another (e.g. design groups) and on the proper identification and interpretation of this information. Input from other IDV topics is important relative to information gained in the review of the various loading conditions that affect structural elements. The specific use and implementation of this information is being verified through a review of design calculations. These calculations are being reviewed to verify the design organization's capability to properly size and detail concrete and steel structural elements.

5.3 Construction Verification Activities

5.3.1 Introduction and Background

Independent Construction Verification (ICV) review acitvities during the reporting period of this status report focused upon the development and establishment of resources, programs, and organizational interfaces necessary to execute the ICV review methodology and initiation of the ICV review. The methodology, as described in the IDCV Engineering Program Plan, strives to establish a consistent set of review activities applicable to systems, components, structures, and materials subject to ICV review. These review activities have been categorized into five areas as follows:

- Review of Supplier Documentation
- Review of Storage and Maintenance Documentation
- Review of Construction/Installation Documentation
- Review of Selected Verification Activities
- Verification of Physical Configuration

The intent of this portion of the status report is to present and summarize important ICV activities undertaken during the reporting period and to categorize these activities using the above five review categories. Sections 5.3.2 through 5.3.6 address each of these review categories respectively. The ICV review categories and Topics for the AFW System are presented in section 3.2.3 of Revision 2 of the Engineering Program Plan. The corresponding Initial Sample Review Matrix is presented in Figure 2 for convenience.

Events external to the ICV review program have had significant impact on the program. Accordingly, the following discussion summarizes the background of events which have had an influence on where the ICV review is today and where it is to be directed in the future.

In a letter to the NRC dated October 5, 1982, CPC outlined a proposed scope for the planned Midland independent design review program. In addition to a design

INITIAL SAMPLE REVIEW MATRIX FOR THE AUXILIARY FEEDWATER SYSTEM MIDLAND INDEPENDENT CONSTRUCTION VERIFICATION PROGRAM[1]

TOPIC NUMBER	SYSTEM/COMPONENT	SCOPE OF REVIEW: REVIEW OF SUPPLIER DOCUMENTATION	REVIEW OF STORAGE AND MAINTENANCE DOCUMENTATION	REVIEW OF CONSTRUCTION/ INSTALLATION DOCUMENTATION	REVIEW OF SELECTED VERIFICATION ACTIVITIES	VERIFICATION OF PHYSICAL CONFIGURATION
	MECHANICAL					
I.1-1c	• EQUIPMENT	X	X	X	X	X
I.2-1c	• PIPING	X		X	X	X
I.3-1c	• PIPE SUPPORTS	X		X	X	X
	ELECTRICAL					
II.1-1c	• EQUIPMENT	X	X	X	X	X
II.2-1c	• TRAYS AND SUPPORTS	X		•	•	X
II.3-1c	• CONDUIT AND SUPPORTS	X		•	•	X
II.4-1c	• CABLE	X	X	X	X	X
	INSTRUMENTATION AND CONTROL					
III.1-1c	• INSTRUMENTS	X	X	X	X	X
III.2-1c	• PIPING/TUBING	X				X
III.3-1c	• CABLE	X		•	•	X
	HVAC					
IV.1-1c	• EQUIPMENT	X	X	X	X	X
IV.2-1c	• DUCTS AND SUPPORTS	X				X
	STRUCTURAL					
V.1-1c	• FOUNDATIONS	X		X		
V.2-1c	• CONCRETE	X		X		X
V.3-1c	• STRUCTURAL STEEL	X		X		X
VI.1-1c	NDE/MATERIAL TESTING PROGRAM					•

KEY

X - INITIAL SCOPE OF REVIEW

(X) - DELETED SCOPE OF REVIEW

• - ADDED SCOPE OF REVIEW

NOTE

1. INITIAL SAMPLE DOCUMENTED IN REV. 0 AND 1 OF THIS PLAN HAS BEEN MODIFIED EFFECTIVE 4/13/83

FIGURE 2

verification component, this program included a verification of physical configuration of selected structures and components for the AFW system. A public meeting was held on October 25, 1982 at NRC's Bethesda, Maryland offices where the details of this program were discussed. The NRC indicated that they would like the proposed program to be expanded to include a review of an additional system with increased emphasis on the verification of the quality of construction including additional verification of physical configuration.

TERA responded to NRC and CPC direction by developing an expanded Independent Construction Verification (ICV) program centered around the five previously discussed review categories. The scope of this revised program was documented in Revision 0 of the EPP dated November 29, 1982. Details of the ICV and IDV were discussed at public meetings held on February 8, 1983 at Midland, Michigan and April 13, 1983 at NRC's Bethesda, Maryland offices.

TERA's initial field verification activities were initiated the week of November 29, 1982 with a physical configuration verification of the AFW system piping and supports inside containment. In early December 1982, CPC instituted their Construction Completion Program (CCP). Under direction from NRC and CPC, TERA was asked to hold certain portions (in particular, physical configuration verification) of the ICV review in obeyance pending resolution of critical interfaces with the CCP and other on-going construction related programs. Accordingly, only reviews of supplier documentation, storage and maintenance documentation and selected verification activities proceeded.

On March 22, 1983, the NRC selected the Standby Electric Power system and the HVAC system assuring control room habitability as additional systems for IDCV review. Revision 2 of the EPP dated May 18, 1983 incorporates these systems into the scope of the ICV as well as the IDV.

During the April 13, 1983 public meeting, the NRC, CPC and TERA agreed that the scope of ICV activities within the prescribed sample selection boundaries could proceed irrespective of the stage of construction completion. This direction enables the ICV review to obtain better insight into the quality of:

- Completed construction activities

- On-going construction processes from the standpoint of how these will impact future completed construction products

- Remedial and corrective actions taken in response to on-going construction review efforts such as the CCP

At the current time, the ICV scope has been fully defined and the review process is gearing up to full speed, consistent with critical interfaces with on-going construction related programs.

The events described above have enabled the initiation of all planned ICV review activities which are described below and in the following sections.

- The sample selection boundaries for the ICV review of the AFW system were firmly established and implemented into the ICV review program. Development of the AFW System sample selection boundaries was performed through the joint efforts of IDV and ICV reviewers. Additional, detailed discussions were undertaken by Lead IDV and ICV personnel to identify which components, structures, and material within the sample selection boundaries would be subject to detailed ICV review. The selection process employed the sample selection criteria as defined in the EPP and resulted in the designation of the items shown in Table I as being subject to initial ICV review.

- The ICV review activities associated with the AFW System were expanded in scope. The additional review activities and the reason these activities were factored into the ICV review program are as follows:

System/Component	Scope of Review Added	Reason(s)
- Electrical Cable Trays & Supports Conduit & Supports I&C Cable	- Review of Construction/Installation Documentation & Review of Selected Verification Activities	- Project experience - Monitor the outputs of the on-going over inspection program for cable separation as directed by NRC
- NDE/Material Testing Program	- Verification of Physical Configuration	- Project experience - NRC direction

- As a result of adding the NDE/Material Testing Program as an integral part of the AFW system ICV review, Lead ICV personnel commenced the development of this program. Program execution will involve first the selection of the sample and sample size, selection of the specific components and material to be tested, determination of the type(s) of testing to be performed, testing, and evaluation and documentation of the test results. To assist in executing the NDE/Material Testing Program, Lead ICV program personnel initiated the solicitation and review of proposals from material testing firms who have exhibited the capability to accomplish required testing in a professional, objective manner. Selection of a material testing firm has not been completed; review of proposals and identification of material testing firm capabilities continues.

- Important interfaces between the Lead ICV program personnel and reviewers and IDV personnel have been tested and utilized to ensure their effectiveness and efficacy. Additionally, critical interfaces with site-construction personnel have evolved to the point where ICV reviewers can acquire needed information and are afforded the flexibility and latitude necessary to be effective in the ICV review program.

5.3.2 Review of Supplier Documentation

The overwhelming majority of resources expended in executing the ICV review activities has been devoted to defining the detailed steps of the Supplier Documentation Review and performing the review steps. These activities are of substantial importance to the remaining portions of the ICV review, because they establish the documented resource which is used as initial input to evaluating remaining construction activities. Additionally issues and trends determined as a result of performing the review of supplier documentation have alerted, and will continue to alert, ICV reviewers to outputs in the construction process which require a greater degree of scrutiny. In essence, the results of the review of supplier documentation establishes the reference for the effective continuance of the ICV review process.

During the period of this status report the following important activities have been undertaken as part of the review of supplier documentation.

- Detailed review matrices for components within the AFW system sample selection boundary were developed as a joint effort with IDV reviewers and serve to direct the activities of the ICV reviewers performing the review of supplier documentation. The review of supplier documentation has been broken down into discrete review categories as follows:

  - General Completion - Overall review of documentation to ensure that the supplier package is generally complete for Document Categories required by specification for the component.

  - Drawings - Review of supplier drawings for conformance to specification requirements for the component, subcomponent or part.

  - Functional Requirements - Review of supplier documentation for conformance of major functional requirements to specifications.

  - Environmental Qualification - Review of supplier documentation for conformance to specification requirements.

  - Seismic Qualification - Review of supplier documentation for conformance to specification requirements.

  - Welding, NDE, QA - Review of supplier documentation for conformance to specification requirements for the component, subcomponent or part.

  - Material Properties - Review of supplier certified material property reports for conformance to specification requirements for the component, subcomponent or part.

  - Miscellaneous - Review of instruction manuals, cleaning and coating procedures, storage and handling instructions and shipping procedures for conformance to specification requirements for the component, subcomponent or part.

  In practice, an ICV or IDV reviewer is assigned one or more of these review categories for a specific component or group of components identified for ICV review.

  As of the writing of this report, the majority of the activities necessary to perform the following documentation reviews for the AFW system have been completed:

- General Completion
- Drawings
- Functional Requirements
- Miscellaneous

As a result of conducting the above reviews, approximately 1,000 documents have been reviewed for applicability, catalogued, and categorized as to the type of document - i.e., drawing, welding procedure, seismic qualification report, etc.

The "Environmental" and "Seismic Qualification" reviews are tied closely to the IDV review process and have progressed to the stage of completion identified for selected components in the IDV review portion of this status report.

The "Welding, NDE, QA" documentation review has focused upon identifying the derivation of the requirements, the completeness and consistency of the requirements and the cataloguing of vendor-supplied documentation which satisfies the requirements for welding, NDE, and QA aspects of selected fabricated components. Further, more detailed review of the vendor-supplied documentation has not been aggressively pursued pending finalization of the degree of involvement of an outside material testing firm (see Section 5.3.1 of this status report) in the ICV review program.

The review necessary to verify the adequacy of Material Properties by reviewing certified material property reports has most recently been initiated and, as a result, not much progress has been made toward completing this review during the current reporting period.

- To ensure that a consistent method and set of data are used and collected during the review of supplier documentation, detailed checklists were prepared and implemented. The checklists, and associated implementing Project Instruction (PI-3201-007), direct the ICV reviewer to sources of information and direct the recording of required information onto a standardized form. As of the writing of this report, five checklists have been prepared and used to conduct the review of vendor supplied documentation. The title and a brief description of each checklist used in this protion of the ICV review are as follows:

  - Documentation Verification Form (DVF)

Checkoff list utilized to record those requirements imposed upon suppliers and vendors which define the specific documents to be submitted to fulfill and satsify procurement and specification requirements;

- Documentation Availability Checklist (DAC)

The DAC is used to document the process and sources of information used to complete the Documentation Verification Form and to provide a consistent, standard format for documenting the results of evaluating the completeness of vendor documentation submittals;

- Supplier Documentation Functional Review (SDFR) Form

The SDFR provides the format and directs the recording of data relevant to the following of specific categories of vendor-supplied documentation:

a) Instructions (operating, maintenance, etc.)
b) Cleaning & Coating Procedures
c) Certified Material Reports
d) Supplier Shipping Procedures;

- Supplier Documentation Adequacy (SDA) Verification Form

This form is used in conjunction with the SDFR to evaluate the adequacy of the vendor's documentation submittal; and

- Time-Base Evaluation (TBE) Form for Vendor Documentation Submittals

This form provides the format for establishing a method to evaluate the timeliness of certain vendor documentation submittals associated with a specific component. Vendor documentation submittals are compared on a time-base against two key events in the construction process:

a) Date component is received at the site

b) Date component is withdrawn from storage for installation.

- Commencement of the supplier documentation review required a greater-than-anticipated scope of task initiation activities. These activities were necessary to develop an understanding of the following:

- Relationship of site vendor files to vendor files retained in Ann Arbor;

- Distinctions made between supplier documentation included as part of a QA data package and that documentation included as part of the vendor document control system;

- Location of different document control centers and their principal file holdings and scope of responsibilities;

- Information required to access needed documents and records; and

- Location and operation of systems utilized to index needed information.

• As of the writing of this report, activities undertaken with regard to supplier documentation reviews, have been focused upon the collection and assimilation of vendor-supplied information. Current and near term activities of the ICV reviewers are and will be directed toward a thorough evaluation and assessment of the significance of findings resulting from the review of supplier documentation.

5.3.3 Review of Storage and Maintenance Documentation

This review is intended to ascertain the stored and as-installed condition of selected components of the systems selected as part of the IDCV program. Discrete activities which constitute this review include the following:

- Documentation Review and Observation of Receipt Inspections;

- Documentation Review and Observation of Warehouse Storage Practices;

- Documentation Review and Observation of In-place Maintenance Practices; and

- Visual Inspection of Installed/Stored Components.

The progress made to date in conducting this review has all been associated with the components selected in the AFW System. Activities undertaken to date include the following:

- Checklists have been prepared and implemented which direct the acquisition and recording of information and data which characterize the receipt inspection, storage and maintenance activities. Detailed Project Instructions (PI-3201-007) have been prepared which provide ICV reviewers with an explanation in the use of the following checklists:

  - Receipt Inspection Checklist; and

  - Storage and Maintenance Checklist.

- Data required by the checklists have been collected and completed for the components selected with the AFW System sample selection boundaries. The components selected for this review are shown in Table I.

  Current and near-term activities involve the evaluation of the collected data and an assessment and recording of the significance of any issues resulting from the evaluation.

- ICV reviewers, in a joint effort with the IDV reviewers, prepared the review matrices for the Control Room HVAC and Standby Electric Power Systems. The matrices require a review of storage and maintenance documentation applicable to the following categories of components within the sample boundaries of the indicated systems.

  Standby Electric Power System

  - Mechanical Equipment
  - Electrical Equipment and Cable
  - Instruments and Instrument Cable

  Control Room HVAC System

  - Mechanical Equipment
  - Instruments
  - HVAC Ducts & Supports

  Specific components within each of the above categories are currently being identified.

5.3.4 Review of Construction/Installation Documentation

As of the writing of this report, no resources have been expended in performing the actual review of construction/installation documentation. Activities undertaken to date have been directed toward the selection of specific components within the AFW System sample selection boundaries which will be subject to this review.

5.3.5 Review of Selected Verification Activities

During this reporting period ICV reviewers commenced the review of selected outputs from the cable separation and pipe support over-inspection program which relate directly to cables and pipe supports within the ICV review sample selection boundaries of the AFW System. These activities were conducted at the site and focused upon the collection of required documentation, including procedures and drawings, and the evaluation of the procedures to discern the methodology employed by the over-inspection programs. This evaluation is necessary to identify those outputs of the program which are most representative of the final products of the over-inspection process and therefore those products which should be subject to ICV review. Evaluation of selected outputs was initiated and continues. Near term activities relate to continued detailed evaluation of selected outputs from the program that relate to the AFW system and the extension of these evaluations to include the Control Room HVAC and Standby Electric Power Systems.

5.3.6 Verification of Physical Configuration

As a first and important review associated with the verification of the physical configuration of selected components within the sample selection boundaries of the AFW system, ICV reviewers conducted a review of selected AFW System pipe, hangers, and supports. This review involved not only the careful selection of those pipes, hangers and supports to ensure a comparative basis for other, similar reviews and extrapolation to similar items, but also extensive field verification and measurement.

The review involved the field measurement of pipe, hangers, and supports of the "B" Auxiliary Feedwater train, inside the Midland Unit 2 containment building. Subsequent to acquisition of field measurements and verification of identity and orientation, the collected data were compared against design documentation and documentation used as input to representative stress and seismic design calculations. The results of these efforts have been summarized into an engineering evaluation report which highlights the salient findings of the review and evaluation and documents the methodology utilized in conducting the physical configuration verification.

Near term activities relate to completing the review of issues arising from the physical configuration verification of selected AFW System pipe, hangers, and supports and selecting similar samples associated with the Control Room HVAC and Standby Electric Power systems.

6.0 Summary of Open, Confirmed and Resolved (OCR) Item Reports, Finding Reports and Finding Resolution Reports

Attachment 2 provides TERA's Tracking System Summary for Open, Confirmed and Resolved (OCR) Item Reports, Finding Reports and Finding Resolution Reports. This tool assists TERA in tracking the disposition of issues as they progress through the review process. Attachment 3 provides re-typed copies of all existing Confirmed Item Reports. To date no items have progressed to the Findings stage of the reporting process which is documented in Project Instruction PI-3201-008 and can be found as part of Appendix B of the Project Quality Assurance Plan.

A meeting will be held on June 3, 1983 at Bechtel's Ann Arbor, Michigan offices to obtain additional information reltaive to the Confirmed Items presented in Attachment 3.

ATTACHMENT I

PROJECT CHRONOLOGY

MIDLAND INDEPENDENT DESIGN AND CONSTRUCTION VERIFICATION PROGRAM
TERA PROJECT 3201
THROUGH 5/27/83

Date	Milestone
September 2, 1982	TERA proposal to CPC for Midland Independent Design Verification (IDV) Program
September 20, 1982	CPC letter of intent to use TERA for Midland IDV
September 24, 1982	TERA identification of IDV goals, objectives, system selection criteria, methodology, tasks, and schedule (outline presented to CPC on 9/28/82)
September 28, 1982	Meeting of CPC, TERA, and MAC in Jackson to develop submittal to NRC addressing IDV and INPO evaluation programs. TERA selects candidate system for IDV program
September 30, 1982	TERA submittal of corporate Quality Assurance Plan to CPC for their review and acceptance
October 5, 1982	CPC submittal of Midland Independent Review Program to NRC
October 12, 1982	CPC approval of TERA corporate Quality Assurance Plan
October 25, 1982	Presentation on Midland IDV and INPO programs to NRC at NRC's Bethesda offices
October 27, 1982	TERA conceptual development of IDV program modifications to further address the quality of construction (telecopy to CPC)
October 28, 1982	CPC decision to separate IDV and INPO evaluation programs

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Date	Milestone
November 2, 1982	Introductory meeting at the Midland site to initiate IDV and INPO programs
November 3, 1982	Midland site tour and walkdown of the AFW system
November 4, 1982	TERA project team meetings in Jackson to review Midland project experience (e.g., 50.55e reports, NRC inspection reports, etc.); identification of information needs
November 5, 1982	Meeting of TERA, CPC and Bechtel management in Ann Arbor to discuss programmatic details of the IDV program, logistics for TERA-Bechtel interaction on the IDV; review of Bechtel organization, interfaces, etc.; identification of information needs
November 11, 1982	NRC issues meeting summary for October 25, 1982 meeting
November 15, 1982	TERA issues Revision 0 of the Midland Independent Design and Construction Verification (IDCV) Project Quality Assurance Plan
November 23, 1982	CPC approval of TERA Project Quality Assurance Plan
November 29, 1982	TERA issues draft Engineering Program Plan for interim use and comments
November 29 - December 3, 1982	TERA field verification team is on-site conducting physical configuration verification of AFW system piping and supports inside containment
December 3, 1982	CPC submittal to NRC of response to NRC comments during October 25, 1982 meeting; CPC commits to separate IDV and INPO evaluation, identifies candidate systems for adding an additional system to the IDV scope, expansion of IDV program to include a verification of the quality of construction of the IDV systems; details of IDV interactions and INPO reporting

ATTACHMENT I

Date	Milestone
December 6, 1982	TERA project team meets individually with Bechtel group supervisors and group leaders to give a programmatic overview of the expanded IDCV; identify elements of the design process, interfaces, logistics for conducting the IDCV review; identify information, etc.
December 8-15, 1982	Lead technical reviewers interview Bechtel personnel as part of the IDCV review process; identification of information needs
December 10, 1982	Agreement reached with Bechtel on proprietary information
December 16, 1982	TERA completes Engineering Program Plan
January 17-21, 1983	TERA design review team in Ann Arbor
January 24, 1983	TERA begins ICV program -- review of supplier documentation, storage, and maintenance documentation
January 24-26, 1983	TERA construction review team on-site reviewing supplier documentation and storage and maintenance documentation
January 25-27, 1983	TERA design review team in Ann Arbor
February 7-11, 1983	TERA construction review team on-site
February 8, 1983	Public meeting on Midland Construction Completion Program and Independent Design and Construction Verification Program
February 9, 1983	TERA transmits Engineering Program Plan (EPP) and Project Quality Assurance Plan (PQAP) to the NRC
February 17, 1983	TERA issues Revision 1 of the EPP and Revision 2 of PQAP

ATTACHMENT 1

Date	Milestone
February 28 - March 4, 1983	TERA construction review team on-site and design review team at Ann Arbor
February 28, 1983	TERA meeting with B&W in Lynchburg
March 1, 1983	TERA meets with Bechtel management in Ann Arbor to clarify requests for information
March 2, 1983	Project team meeting, Ann Arbor
March 11, 1983	Project quality assurance audit conducted by the Project Quality Assurance Engineer
March 18, 1983	TERA transmits information to NRC regarding corporate and individual independence, professional qualifications, scope of review, reporting and auditability, and program status
March 21-25, 1983	TERA construction review team on-site and TERA design review team at Ann Arbor
March 22, 1983	NRC selects Standby Electric Power System as the second system and the HVAC system assuring control room habitability as the third system for the IDCV program
March 24, 1983	NRC provides TERA with a service list for Midland IDCV program
March 28, 1983	NRC issues the protocol for the Midland IDCV program
March 30, 1983	TERA transmits supplemental information to NRC regarding affidavits of independence and professional qualifications, including additional affidavits by individuals previously employed by NRC

Date	Milestone
April 8, 1983	Project quality assurance audit report issued by the Project Quality Assurance Engineer
April 9, 1983	Senior Review Team meets to review project status, review OCRs, and develop recommendations for the project team
April 13, 1983	Meeting at NRC, Bethesda, including TERA, CPC, GAP, and NRC. TERA presents synopsis of progress to date of AFW system review, plus discussion of topics to be reviewed for the two additional systems (Standby Electric Power; Control Room HVAC) selected by NRC. All parties discuss protocol for Midland IDCV Program
April 21, 1983	TERA transmits supplemental information to NRC regarding affidavits of independence for individuals previously employed by NRC
May 3, 1983	NRC letter, Novak to Cook (CPC) stating acceptance of TERA Corporation to conduct IDCV Program and acceptance of Engineering Program Plan for the Auxiliary Feedwater System
May 18, 1983	TERA issues general Revision 2 of the EPP and Revision 3 of the PQAP to incorporate the addition of the Standby Electric Power System and Control Room HVAC System to the IDCV scope, update personnel qualifications, add project instructions and reference new protocol for communications
May 18, 1983	TERA meets with NRC, I&E HQ management to discuss consideration of the Midland IDCV program within NRC's response to the Ford Amendment legislation.
May 27, 1983	TERA issues first Monthly Status Report.

Attachment 2

OCR, FINDING REPORT, AND FINDING RESOLUTION REPORT TRACKING SYSTEM

MIDLAND INDEPENDENT DESIGN AND CONSTRUCTION VERIFICATION PROGRAM

OCR No.	Resp. LTR	Potential Open Item	Open Item	Confirmed Item	Resolved Item	Finding Report	Finding Resolution Report	Topic		Comments
001	RPS	12/21/83	3/4/83	3/4/83				I.4-1	Tech Specs	
002	RPS	12/21/83	3/4/83	3/4/83				I.4-1	Tech Specs	
003	RPS	1/3/83	3/4/83		3/4/83			I.8-1	Overpressure Protection	
004	RPS	1/3/83	3/4/83		3/4/83			I.8-1	Overpressure Protection	
005	RPS	1/4/83	3/4/83	3/4/83				I.1-1	System Operating Limits	
006	RPS	1/12/83	3/4/83		3/4/83			I.2-1	Accident Analysis Considerations	
007	RPS	1/12/83	3/4/83		3/4/83			I.2-1	Accident Analysis Considerations	
008	LB	1/19/83	3/4/83					I.19-1	Control Systems	
009	CS	1/20/83	3/4/83		3/4/83			II.1-1	Seismic Design	
010	FAD	1/20/83	3/4/83	4/14/83				I.10-1	Hydraulic Design	
011	LB	1/27/83	3/4/83	3/4/83				I.19-1	Control Systems	
012	LB	2/7/83	3/4/83	3/4/83				I.15-1	Power Supplies	
013	RPS	2/8/83	3/4/83					I.5-1	Syst. Align./Switchover	

OCR, FINDING REPORT, AND FINDING RESOLUTION REPORT TRACKING SYSTEM

MIDLAND INDEPENDENT DESIGN AND CONSTRUCTION VERIFICATION PROGRAM

(Continued)

OCR No.	Resp. LTR	Potential Open Item	Open Item	Confirmed Item	Resolved Item	Finding Report	Finding Resolution Report	Topic		Comments
014	RPS	2/8/83	3/4/83					I.5-I	Syst. Align./Switchover	
015	CS	2/10/83	3/4/83					III.I-I	Seismic Design/Input to Equipment	
016	CS	2/10/83	3/4/83					III.5-I	Civil/Stu Design Consid.	
017	FAD	2/17/83	3/4/83	3/4/83				I.II-I	Heat Removal Cap	
								I.10-I	Hydraulic Design	
018	FAD	2/17/83	3/4/83	3/4/83				I.II-I	Heat Removal Cap.	
019	LB	2/21/83	3/4/83					I.18-I	Instrumentation	
020	FAD	2/24/83	3/4/83	3/4/83				I.II-I	Heat Removal Cap.	
								I.9-I	Comp. Func. Req.	
021	FAD	2/24/83	3/4/83					II.10-I	Eq. Qual.	Rev. I, 4/14/83
022	LB	2/24/83	3/4/83					I.19-I	Control Syst.	
023	LB	2/28/83	3/4/83					I.18-I	Instrumentation	
								I.19-I	Control	

OCR, FINDING REPORT, AND FINDING RESOLUTION REPORT TRACKING SYSTEM

MIDLAND INDEPENDENT DESIGN AND CONSTRUCTION VERIFICATION PROGRAM

(Continued)

OCR No.	Resp. LTR	Potential Open Item	Open Item	Confirmed Item	Resolved Item	Finding Report	Finding Resolution Report	Topic		Comments
024	RPS	3/1/83	3/4/83					I.2-I	Acc. Anal. Consid.	
025	RPS	3/1/83	3/4/83	3/4/83				I.2-I	Acc. Anal. Consid.	
026	RPS	3/1/83	3/4/83					I.8-I	Overpress. Prot.	
027	FAD	3/1/83	3/4/83	3/4/83				I.9-I	Comp. Func. Req.	
								II.9-I	Env. Eng.	
028	FAD	3/2/83	3/4/83	4/14/83				I.9-I	Comp. Func. Req.	
029	LB	2/22/83	3/4/83		3/4/83			I.18-I	Instrumentation	
								I.19-I	Control System	
030	LB	1/19/83	3/4/83		3/4/83			I.19-I	Control System	
031	CS	2/11/83	3/4/83	3/4/83				I.3-Ic	Pipe Supports	
032	CS	2/11/83	3/4/83	3/4/83				I.3-Ic	Pipe Supports	

OCR, FINDING REPORT, AND FINDING RESOLUTION REPORT TRACKING SYSTEM

MIDLAND INDEPENDENT DESIGN AND CONSTRUCTION VERIFICATION PROGRAM

(Continued)

OCR No.	Resp. LTR	Potential Open Item	Open Item	Confirmed Item	Resolved Item	Finding Report	Finding Resolution Report	Topic		Comments
033	CS	2/11/83	3/4/83	3/4/83				I.3-Ic	Pipe Supports	
034	CS	2/11/83	3/4/83	3/4/83				I.3-Ic	Pipe Supports	
035	CS	2/11/83	3/4/83	3/4/83				I.3-Ic	Pipe Supports	Rev. 1, 5/25/83
036	CS	2/11/83	3/4/83	3/4/83				II.2-1	Pressure Boundary	Rev. 1, 5/25/83
037	CS	1/20/83	3/4/83	3/4/83				III.1-1	Seismic Design/Input to Equipment	
038	LB	3/1/83	3/4/83	3/4/83				I.15-1	Power Supplies	
039	LB	3/30/83	4/14/83					II.10-1	Env. Eq. Qual.	
040	LB	3/8/83	4/14/83					I.16-1	Elec. Characteristics	
041	LB	3/25/83	4/14/83					I.15-1	Power Supplies	
042	LB	3/31/83	4/14/83					I.10-1	Env. Eq. Qual.	
043	FAD	3/15/83	4/14/83					I.10-1	System Hydraulic Design	
044	FAD	3/15/83	4/14/83					II.10-1	Env. Eq. Qual.	
045	Tulo	3/17/83	4/14/83	5/25/83				II.1-1C	Electrical Equipment/ Storage & Maintenance	
046	Tulo	3/17/83	4/14/83	5/25/83				I.1-1C	Mechanical Equipment/ Storage & Maintenance	

ATTACHMENT 3

CURRENT CONFIRMED ITEM REPORTS

MIDLAND INDEPENDENT DESIGN AND CONSTRUCTION VERIFICATION
OPEN, CONFIRMED AND RESOLVED (OCR) ITEM REPORT

TYPE OF REPORT: OPEN ________ CONFIRMED X RESOLVED ________ ITEM

FILE NO. 3201-008
DOC NO. 3201-008-C-001
REV. NO. 0

DATES REPORTED TO: LTR 3/3/83 SRT ________ PRINCIPAL-IN-CHARGE 3/7/83 PROJECT TEAM/PROJECT MGR. 3/3/83 CPC/DESIGN ORG. ________

STRUCTURE(S), SYSTEM(S), OR COMPONENT(S) INVOLVED:

AFW system operability and surveillance requirements in Technical Specifications

IDCV PROGRAM AREA OR TASK (IF APPLICABLE):

Topic I.4-1, Technical Specifications

DESCRIPTION OF CONCERN:

A commitment made in response to NRC requests has not been incorporated into the Midland Technical Specifications. That commitment involved NUREG-0611, Appendix III, recommendation GS-6 regarding verification of proper AFW system valve lineup. It is not clear that the Technical Specifications do incorporate the means to assure dual valve lineup after maintenance. Also, the associated draft procedure does not incorporate a requirement for valve lineup verification (See OCR-014).

SIGNIFICANCE OF CONCERN:

Valve lineup after maintenance or testing may not be correct.

RECOMMENDATION X OR RESOLUTION ________:

Process in accordance with Project Quality Assurance Plan.

COMMENTS BY SRT (IF REQUIRED):

REFERENCES (INCL. RELATED OCR ITEM REPORT NO.):

FSAR, REV. 47

SIGNATURE(S):

RPS	RPS	HAL	JWB	N/A JWB
OCR ITEM REPORT ORIGINATOR	LTR	PROJECT MANAGER FOR PROJECT TEAM	PRINCIPAL-IN-CHARGE	SRT (IF REQUIRED)
3/3/83	3/3/83	3/4/83	3/14/83	
DATE	DATE	DATE	DATE	DATE

MIDLAND INDEPENDENT DESIGN AND CONSTRUCTION VERIFICATION
OPEN, CONFIRMED AND RESOLVED (OCR) ITEM REPORT

TYPE OF REPORT: OPEN ______ CONFIRMED X RESOLVED ______ ITEM

FILE NO. 3201-008
DOC NO. 3201-008-C.002
REV. NO. 0

DATES REPORTED TO: LTR 3/3/83 SRT ______ PROJECT TEAM/PROJECT MGR. 3/3/83
PRINCIPAL-IN-CHARGE 3/7/83 CPC/DESIGN ORG. ______

STRUCTURE(S), SYSTEM(S), OR COMPONENT(S) INVOLVED:

AFW system operability and surveillance requirements in Technical Specifications.

IDCV PROGRAM AREA OR TASK (IF APPLICABLE):

Topic I.4-1, Technical Specifications

DESCRIPTION OF CONCERN:

Midland Technical Specifications do not meet NRC B&W Standard Technical Specifications in that:

An action statement is needed to require immediate action if both AFW systems are inoperable.

SIGNIFICANCE OF CONCERN:

Lack of action statement may result in inadequate plant protection.

RECOMMENDATION X OR RESOLUTION ______:

Process in accordance with Project Quality Assurance Plan.

COMMENTS BY SRT (IF REQUIRED):

REFERENCES (INCL. RELATED OCR ITEM REPORT NO.):

Midland Technical Specifications (Rev.33) in FSAR; NUREG-0103, REV. 4, FALL 1980

SIGNATURE(S):

RPS	RPS	HAL	JWB	N/A JWB
OCR ITEM REPORT ORIGINATOR	LTR	PROJECT MANAGER FOR PROJECT TEAM	PRINCIPAL-IN-CHARGE	SRT (IF REQUIRED)
3/3/83	3/3/83	3/4/83	3/14/83	
DATE	DATE	DATE	DATE	DATE

MIDLAND INDEPENDENT DESIGN AND CONSTRUCTION VERIFICATION
OPEN, CONFIRMED AND RESOLVED (OCR) ITEM REPORT

TYPE OF REPORT: OPEN ______ CONFIRMED X
RESOLVED ______ ITEM

FILE NO. 3201-008
DOC NO. 3201-008-C - 005
REV. NO. 0

DATES REPORTED TO: LTR 3/3/83 SRT ______ PROJECT TEAM/PROJECT MGR. 3/3/83
PRINCIPAL-IN-CHARGE 3/7/83 CPC/DESIGN ORG. ______

STRUCTURE(S), SYSTEM(S), OR COMPONENT(S) INVOLVED:

Entire AFW system

IDCV PROGRAM AREA OR TASK (IF APPLICABLE):

Topic I.1-1, System Operating Limits

DESCRIPTION OF CONCERN:

Balance of plant criteria are inconsistent with regard to AFW system flowrate requirements and other design parameters. OCRs C-017, C-018, C-020, C-027 and O-028 also apply.

SIGNIFICANCE OF CONCERN:

Nuclear steam supply system performance requirements for the AFW system may not be adequately or consistently reflected in the balance of plant design.

RECOMMENDATION X OR RESOLUTION ______:

Process in accordance with Project Quality Assurance Plan.

COMMENTS BY SRT (IF REQUIRED):

REFERENCES (INCL. RELATED OCR ITEM REPORT NO.):

FSAR, REV. 47; B&W BOP Criteria Document 36-1004477, REV. 01 (6/25/82)
OCRS

SIGNATURE(S):

RPS	RPS	HAL	JWB	N/A JWB
OCR ITEM REPORT ORIGINATOR	LTR	PROJECT MANAGER FOR PROJECT TEAM	PRINCIPAL-IN-CHARGE	SRT (IF REQUIRED)
3/3/83	3/3/83	3/4/83	3/14/83	
DATE	DATE	DATE	DATE	DATE

MIDLAND INDEPENDENT DESIGN AND CONSTRUCTION VERIFICATION
OPEN, CONFIRMED AND RESOLVED (OCR) ITEM REPORT

TYPE OF REPORT: OPEN ________ CONFIRMED X RESOLVED ________ ITEM

FILE NO. 3201-008
DOC NO. 3201-008-C.010
REV. NO.

DATES REPORTED TO: LTR 3/29/83 SRT ________ PRINCIPAL-IN-CHARGE 4/18/83 PROJECT TEAM/PROJECT MGR. 3/31/83 CPC/DESIGN ORG. ________

STRUCTURE(S), SYSTEM(S), OR COMPONENT(S) INVOLVED:

AFW - piping and valves

IDCV PROGRAM AREA OR TASK (IF APPLICABLE):

Hydraulic Design (I.10-1)

DESCRIPTION OF CONCERN:

In calculation of the volume of water available during the transfer from the condensate storage to service water suction source it was assumed that all Category I piping was full of water. However, the water might leak out prior to the service water becoming available because of the lack of Category I check valves.

The recommendation of OCR-3201-008-0-010 was implemented. It was determined that the AFW pumps could have a loss of suction during switchover to service water.

SIGNIFICANCE OF CONCERN:

Although unstated, except by inference in calculations, the AFW design criteria call for prevention of any occurrance of the pump running dry. Under some sequences of events it may be possible for the AFW pump to lose suction.

The AFW pumps could be damaged by running dry.

RECOMMENDATION X OR RESOLUTION ________:

1. Process per PQAP.
2. Review seismic analysis of suction piping to evaluate assumption in Bechtel's analysis of the switchover to service water that credit can be taken for piping upstream of Category I/non-Category I interface.

COMMENTS BY SRT (IF REQUIRED):

REFERENCES (INCL. RELATED OCR ITEM REPORT NO.):

SIGNATURE(S):

FAD	FAD	HJR	J. Buck	
OCR ITEM REPORT ORIGINATOR	LTR	PROJECT MANAGER FOR PROJECT TEAM	PRINCIPAL-IN-CHARGE	SRT (IF REQUIRED)
3/29/83	3/29/83	4/14/83	5/10/83	
DATE	DATE	DATE	DATE	DATE

MIDLAND INDEPENDENT DESIGN AND CONSTRUCTION VERIFICATION
OPEN, CONFIRMED AND RESOLVED (OCR) ITEM REPORT

TYPE OF REPORT: OPEN ________ CONFIRMED X RESOLVED ________ ITEM

FILE NO. 3201-008
DOC NO. 3201-008-C-011
REV. NO. 0

DATES REPORTED TO: LTR 3/4/83 SRT ________ PROJECT TEAM/PROJECT MGR. 3/4/83
PRINCIPAL-IN-CHARGE 3/7/83 CPC/DESIGN ORG. ________

STRUCTURE(S), SYSTEM(S), OR COMPONENT(S) INVOLVED:

AFW "Feed Only Good Generator" (FOGG) Control

IDCV PROGRAM AREA OR TASK (IF APPLICABLE):

Topic I.19-1, Control Systems

DESCRIPTION OF CONCERN:

The B&W BOP criteria document (36-1004477-01- Draft) section 3.12 requires that control for FOGG be available at both the MCR and the Auxiliary Shutdown Panel. The FOGG interlocks are controllable (invertable) from the MCR but are not controllable from the Auxiliary Shutdown Panel.

SIGNIFICANCE OF CONCERN:

B&W BOP criteria regarding control of FOGG from Auxiliary Shutdown Panel are not met.

RECOMMENDATION X OR RESOLUTION ________:

Project team confirms concern and has determined that design interface between B&W and Bechtel should be reviewed further.

COMMENTS BY SRT (IF REQUIRED):

REFERENCES (INCL. RELATED OCR ITEM REPORT NO.):

SIGNATURE(S):

RPS	RPS	HAL	JWB	N/A JWB
OCR ITEM REPORT ORIGINATOR	LTR	PROJECT MANAGER FOR PROJECT TEAM	PRINCIPAL-IN-CHARGE	SRT (IF REQUIRED)
3/4/83	3/4/83	3/4/83	3/14/83	
DATE	DATE	DATE	DATE	DATE

MIDLAND INDEPENDENT DESIGN AND CONSTRUCTION VERIFICATION
OPEN, CONFIRMED AND RESOLVED (OCR) ITEM REPORT

TYPE OF REPORT: OPEN ________ CONFIRMED X
RESOLVED ________ ITEM

FILE NO. 3201-008
DOC NO. 3201-008-C-012
REV. NO. 0

DATES REPORTED TO: LTR 2/7/83 SRT ________ PROJECT TEAM/PROJECT MGR. 3/3/83
PRINCIPAL-IN-CHARGE 3/7/83 CPC/DESIGN ORG. ________

STRUCTURE(S), SYSTEM(S), OR COMPONENT(S) INVOLVED:

FOGG Interlock

IDCV PROGRAM AREA OR TASK (IF APPLICABLE):

Topic I.15-1, Power Supplies

DESCRIPTION OF CONCERN:

The Midland FSAR and the B&W balance of plant criteria document (36-1004477-01) require that the AFW system be capable of operating for two hours in a station blackout condition (loss of all AC). The FOGG interlock relays for channel AA and BA are powered from Class 1E AC (lost during blackout). This would cause valves 2MO-3277A and B to shut, cutting off steam to the AFW turbine and causing loss of AFW function during blackout.

SIGNIFICANCE OF CONCERN:

The AFW system may not be functional during station blackout conditions.

RECOMMENDATION X OR RESOLUTION ________:

Although limited Failure Modes Effects Analyses (FMEAs) have been performed on AFW, a systematic analysis should be done which considers all applicable plant conditions.

COMMENTS BY SRT (IF REQUIRED):

REFERENCES (INCL. RELATED OCR ITEM REPORT NO.):

OCR 3201-008-0-038 & C-038
Drawings E-158Q SH41, 42, 24, 25

SIGNATURE(S):

LB	LB	HAL	JWB	N/A JWB
OCR ITEM REPORT ORIGINATOR	LTR	PROJECT MANAGER FOR PROJECT TEAM	PRINCIPAL-IN-CHARGE	SRT (IF REQUIRED)
2/7/83	2/9/83	3/4/83	3/14/83	
DATE	DATE	DATE	DATE	DATE

MIDLAND INDEPENDENT DESIGN AND CONSTRUCTION VERIFICATION
OPEN, CONFIRMED AND RESOLVED (OCR) ITEM REPORT

TYPE OF REPORT: OPEN ________ CONFIRMED X
RESOLVED ________ ITEM

FILE NO. 3201-008
DOC NO. 3201-008C - 017
REV. NO. 0

DATES REPORTED TO: LTR 3/3/83 SRT ________ PROJECT TEAM/PROJECT MGR. 3/3/83
PRINCIPAL-IN-CHARGE 3/7/83 CPC/DESIGN ORG. ________

STRUCTURE(S), SYSTEM(S), OR COMPONENT(S) INVOLVED:
AFW Pumps

IDCV PROGRAM AREA OR TASK (IF APPLICABLE):
Component Functional Requirements (I.9-1) System Hydraulic Design (I.10-1)
System Heat Removal Capability (I.11-1) (Criteria & Commitments/Review of Calcs)

DESCRIPTION OF CONCERN:
There are inconsistencies in the minimum required AFW flow. B&W document BAW 1612, Rev. 1, (Ref. 1) lists values of 500 gpm and 720 gpm. The B&W BOP Criteria Document (Ref. 2) requires 850 gpm and a B&W calculation (Ref. 3) is consistent with this value, although (as reported in other OCRs) this calculation may not be consistent with appropriate design parameters. The 850 gpm figure may not provide enough water to remove the heat being generated at the time specified in the B&W Criteria Document (i.e. 30 sec after reactor trip).

SIGNIFICANCE OF CONCERN:
This would result in a temperature increase in the primary system until the decay heat rate falls to the point where 850 gpm is adequate.

RECOMMENDATION X OR RESOLUTION ________:
Process per Project Quality Assurance Plan.

COMMENTS BY SRT (IF REQUIRED):

REFERENCES (INCL. RELATED OCR ITEM REPORT NO.): (1) Conceptual Design Study for Auxiliary Feedwater System Feed Rate Control for B&W 177-Fuel Assembly Plant, BAW 1612, Rev. 1. (2) BOP Criteria - Aux Feedwater Sys (36-1004477, Rev.1). (3) B&W AFW Calculation 32-0525, Rev. 00.

SIGNATURE(S):

OCR ITEM REPORT ORIGINATOR	LTR	PROJECT MANAGER FOR PROJECT TEAM	PRINCIPAL-IN-CHARGE	SRT (IF REQUIRED)
FD	FD	HAL	JWB	N/A JWB
3/3/83	3/3/83	3/4/83	3/14/83	
DATE	DATE	DATE	DATE	DATE

MIDLAND INDEPENDENT DESIGN AND CONSTRUCTION VERIFICATION
OPEN, CONFIRMED AND RESOLVED (OCR) ITEM REPORT

TYPE OF REPORT: OPEN ________ CONFIRMED X ________
RESOLVED ________ ITEM

FILE NO. 3201-008
DOC NO. 3201-008-C 018
REV. NO. 0

DATES REPORTED TO: LTR 3/3/83 SRT ________ PROJECT TEAM/PROJECT MGR. 3/3/83
PRINCIPAL-IN-CHARGE 3/7/83 CPC/DESIGN ORG. ________

STRUCTURE(S), SYSTEM(S), OR COMPONENT(S) INVOLVED:

AFW System (general)

IDCV PROGRAM AREA OR TASK (IF APPLICABLE):

System heat removal capability (I.11-1)

DESCRIPTION OF CONCERN:

There are inconsistencies in the information presented in the listed references concerning the decay heat curve used to determine the heat load which the AFW must be capable of removing. The AFW calculation performed by B&W (Ref. 1) uses a B&W decay heat curve. FSAR page 10A-17 item (e) states that 1.0 x ANS 5.1 (Ref. 2) heat curve whereas FSAR page 10.4-37 states that the design is in conformance with the method of the NRC's Branch Technical Position APCSB 9.2 (Ref. 3). B&W Document BAW 1612 (Ref. 4) uses the ANS curve plus 20% which is consistent with Reference 3. Ref. 3 requires a 20% margin to be added to the ANS curve. The actual design basis is not clearly identified.

SIGNIFICANCE OF CONCERN:

If the heat load used for analysis is less than the ANS curve (Ref. 2) plus 20% the calculated heat removal requirement will be too low and could consequently result in undersizing the AFW pumps.

RECOMMENDATION X OR RESOLUTION ________:

Process per Project Quality Assurance Plan

COMMENTS BY SRT (IF REQUIRED):

REFERENCES (INCL. RELATED OCR ITEM REPORT NO.): (1) B&W Calculation for AFW 32-0525, Rev.00. (2) American Nuclear Society Standard 5.1-1979. (3) NRC Branch Technical Position APCSB 9.2. (4) B&W 1612(Rev. 1), Conceptual Design Study.

SIGNATURE(S):

FAD	FAD	HAL	JWB	N/A JWB
OCR ITEM REPORT ORIGINATOR	LTR	PROJECT MANAGER FOR PROJECT TEAM	PRINCIPAL-IN-CHARGE	SRT (IF REQUIRED)
3/3/83	3/3/83	3/4/83	3/14/83	
DATE	DATE	DATE	DATE	DATE

MIDLAND INDEPENDENT DESIGN AND CONSTRUCTION VERIFICATION
OPEN, CONFIRMED AND RESOLVED (OCR) ITEM REPORT

TYPE OF REPORT: OPEN ________ CONFIRMED X RESOLVED ________ ITEM

FILE NO. 3201-008
DOC NO. 3201-008-C-020
REV. NO. 0

DATES REPORTED TO: LTR 3/3/83 SRT ________ PROJECT TEAM/PROJECT MGR. 3/3/83
PRINCIPAL-IN-CHARGE 3/7/83 CPC/DESIGN ORG. ________

STRUCTURE(S), SYSTEM(S), OR COMPONENT(S) INVOLVED:

AFW System (general)

IDCV PROGRAM AREA OR TASK (IF APPLICABLE):

System Heat Removal Capability (I.11-1)
Component Functional Requirements (I.9-1)
System Hydraulic Design (I.10-1)

DESCRIPTION OF CONCERN: There are inconsistencies in inlet water temperatures used in AFW analyses. The B&W criteria* (section 2.14) require the use of 90°F inlet water temperature for AFW system design. B&W's "Specific Design Criteria for Safety Grade AFW Control System" document (4100) describes 90°F as "typical". BAW 1612, Rev. 1 (section 2.1) makes use of a 100°F value in calculating minimum flow requirements. The FSAR contains analyses indicating a maximum service water temperature of 105°F. Bechtel calculation FM 4117-28 uses a max. SW temperature of 108°F.

*(Document #36-1004477, Rev. 1)

SIGNIFICANCE OF CONCERN:

Use of a 90°F temperature when 105°F can occur results in an underestimate of the quantity of water required to remove the heat being generated in the primary system. This in turn affects the AFW system heat removal capability, its hydraulic design basis and the sizing of components.

RECOMMENDATION X OR RESOLUTION ________:

Process per Project Quality Assurance Plan

COMMENTS BY SRT (IF REQUIRED):

REFERENCES (INCL. RELATED OCR ITEM REPORT NO.): (1) Bechtel Calculation FM4117-28 (Rev.0). (2) B&W Balance of Plant Criteria for AFW (36-1004477,Rev.01). (3) B&W Conceptual Design Study (BAW-1612,Rev.1). (4) B&W Specific Design Criteria for Safety Grade AFW Control System (86-1119130, dated 4/80).

SIGNATURE(S):

FAD	FAD	HAL	JWB	N/A JWB
OCR ITEM REPORT ORIGINATOR	LTR	PROJECT MANAGER FOR PROJECT TEAM	PRINCIPAL-IN-CHARGE	SRT (IF REQUIRED)
3/3/83	3/3/83	3/4/83	3/14/83	
DATE	DATE	DATE	DATE	DATE

MIDLAND INDEPENDENT DESIGN AND CONSTRUCTION VERIFICATION
OPEN, CONFIRMED AND RESOLVED (OCR) ITEM REPORT

TYPE OF REPORT: OPEN ________ CONFIRMED X
RESOLVED ________ ITEM

FILE NO. 3201-008
DOC NO. 3201-008-C-025
REV. NO. 0

DATES REPORTED TO: LTR 3/3/83 SRT ________ PROJECT TEAM/PROJECT MGR. 3/3/83
PRINCIPAL-IN-CHARGE 3/7/83 CPC/DESIGN ORG. ________

STRUCTURE(S), SYSTEM(S), OR COMPONENT(S) INVOLVED:

AFW system operability under postulated accident conditions - "FOGG" system may function in detrimental manner

IDCV PROGRAM AREA OR TASK (IF APPLICABLE):

Topic I.2-1, Accident Analysis Considerations

DESCRIPTION OF CONCERN: The "Feed Only Good Generator" system may perform in a detrimental manner under conditions of steam generator tube failure followed by loss of offsite power. Its design would force it to direct feed to the "bad" steam generator only because FOGG logic directs feed to the steam generator with the higher pressure based upon a delta pressure measurement between thw two SGs. Without prompt operator action, the steam-driven pump could be flooded and rendered inoperable as a result of leaking primary coolant. The FSAR analysis assumes operator action (no time delay mentioned) to "invert" FOGG and send flow to good generator such that the SG tube rupture is recognized & mitigated in sufficient time. The basis for this assumption is not clear. With a single failure of the motor driven AFW pump, all AFW may be rendered inoperable.

SIGNIFICANCE OF CONCERN:

Failure of operator to take action quickly could result in total loss of AFW (taking into account single failure).

RECOMMENDATION X OR RESOLUTION ________:

Process in accordance with Project Quality Assurance Plan.

COMMENTS BY SRT (IF REQUIRED):

REFERENCES (INCL. RELATED OCR ITEM REPORT NO.):
Topic 1.2-1 Engineering Evaluation; FSAR Revision 47.

SIGNATURE(S):

RPS	RPS	HAL	JWB	N/A JWB
OCR ITEM REPORT ORIGINATOR	LTR	PROJECT MANAGER FOR PROJECT TEAM	PRINCIPAL-IN-CHARGE	SRT (IF REQUIRED)
3/3/83	3/3/83	3/4/83	3/14/83	
DATE	DATE	DATE	DATE	DATE

MIDLAND INDEPENDENT DESIGN AND CONSTRUCTION VERIFICATION
OPEN, CONFIRMED AND RESOLVED (OCR) ITEM REPORT

TYPE OF REPORT: OPEN ______ CONFIRMED X
RESOLVED ______ ITEM

FILE NO. 3201-008
DOC NO. 3201-008-C-027
REV. NO. 0

DATES REPORTED TO: LTR 3/3/83 SRT ______ PROJECT TEAM/PROJECT MGR. 3/3/83
PRINCIPAL-IN-CHARGE 3/7/83 CPC/DESIGN ORG. ______

STRUCTURE(S), SYSTEM(S), OR COMPONENT(S) INVOLVED:
AFW (general)

IDCV PROGRAM AREA OR TASK (IF APPLICABLE):
Component Functional Requirements (I.9-1)
Environmental Envelopes (II.9-1)

DESCRIPTION OF CONCERN: The FSAR contains references to the following power levels: (a) 2452 MWt - license power level, (b) 2552 MWt - power level for calculation of core inventories for accident analyses, (c) 2603 MWt - power level for containment analysis.

The 2552 MWt power was used in the B&W AFW calculation (Ref. 1). The 2603 MWt is 102% of 2552. FSAR page 10A-17 (Item a) states that 102% of maximum power level is used for AFW analysis. Thus the power level for AFW analysis should be 2603 MWt.

SIGNIFICANCE OF CONCERN:
If 2552 MWt was used, the heat load which must be removed by the AFW will be underestimated compared to the heat load associated with operation at 2603 MWt resulting in undersizing of AFW components. Furthermore, other analyses may need to be performed at 2603 MWt.

RECOMMENDATION X OR RESOLUTION ______:

Process per Project Quality Assurance Plan.

PIC

COMMENTS BY ~~SRT~~ (IF REQUIRED):
Before doing any confirmatory AFW flow requirements analyses, determine the rationale for the use of 2552 MWt by B&W, and discuss core power level to be used with project manager and PIC.

JWB

REFERENCES (INCL. RELATED OCR ITEM REPORT NO.):
Ref 1: B&W AFW Calculation 32-0525, Rev. 00

SIGNATURE(S):

OCR ITEM REPORT ORIGINATOR	LTR	PROJECT MANAGER FOR PROJECT TEAM	PRINCIPAL-IN-CHARGE	SRT (IF REQUIRED)
FAD	FAD	HAL	JWB	N/A JWB
3/3/83	3/3/83	3/4/83	3/14/83	
DATE	DATE	DATE	DATE	DATE

MIDLAND INDEPENDENT DESIGN AND CONSTRUCTION VERIFICATION
OPEN, CONFIRMED AND RESOLVED (OCR) ITEM REPORT

TYPE OF REPORT: OPEN ________ CONFIRMED X
RESOLVED ________ ITEM

FILE NO. 3201-008
DOC NO. 3201-008- C 028
REV. NO.

DATES REPORTED TO: LTR 3/29/83 SRT ________
PRINCIPAL-IN-CHARGE 4/18/83
PROJECT TEAM/PROJECT MGR. 3/31/83
CPC/DESIGN ORG. ________

STRUCTURE(S), SYSTEM(S), OR COMPONENT(S) INVOLVED:

AFW System

IDCV PROGRAM AREA OR TASK (IF APPLICABLE):
Component Functional Requirements (I.9-1)
(Review of Criteria and Commitments)

DESCRIPTION OF CONCERN:

The AFW system design may not meet a B&W interface requirement that auxiliary feedwater temperature be at least 40°F. B&W's BOP criteria for AFW (Ref. 1) requires a 40°F minimum AFW temperature. This criterion is consistent with the B&W document for reactor coolant system analysis (Ref. 2) which is used in analysis of reactor coolant system components. Bechtel calcluation FM-4117-28 (Ref. 3) uses a 32°F temperature as a worst case winter temperature. The recommendation contained in the original was implemented, but no addition analyses were identified.

SIGNIFICANCE OF CONCERN:

If the interface requirement is not met, analyses of the reactor coolant system components could become invalid.

RECOMMENDATION X OR RESOLUTION ________:

Process per PQAP.

COMMENTS BY SRT (IF REQUIRED):

REFERENCES (INCL. RELATED OCR ITEM REPORT NO.):
(1) B&W Criteria for AFW (36-1004477, Rev. 1)
(2) B&W Functional Contract Specification for Reactor Coolant System (18-1092000012-04)
(3) Bechtel Calculation FM-4117-28

SIGNATURE(S):

FAD	FAD	[signature]	[signature]	
OCR ITEM REPORT ORIGINATOR	LTR	PROJECT MANAGER FOR PROJECT TEAM	PRINCIPAL-IN-CHARGE	SRT (IF REQUIRED)
3/29/83	3/29/83	4/14/83	5/10/83	
DATE	DATE	DATE	DATE	DATE

MIDLAND INDEPENDENT DESIGN AND CONSTRUCTION VERIFICATION
OPEN, CONFIRMED AND RESOLVED (OCR) ITEM REPORT

TYPE OF REPORT: OPEN ________ CONFIRMED X ________ RESOLVED ________ ITEM

FILE NO. 3201-008
DOC NO. 3201-008-C 031
REV. NO. 0

DATES REPORTED TO: LTR 3/3/83 SRT ________ PRINCIPAL-IN-CHARGE 3/7/83 PROJECT TEAM/PROJECT MGR. 3/3/83 CPC/DESIGN ORG. ________

STRUCTURE(S), SYSTEM(S), OR COMPONENT(S) INVOLVED:
AFW System Pipe Supports

IDCV PROGRAM AREA OR TASK (IF APPLICABLE):
Topic I.3.1c - Pipe Supports
Verification of Physical Configuration

DESCRIPTION OF CONCERN:
Refer to OCR's C-32 thru 35, same program area as above, for description of four hangers field measured by TERA to be out of installation tolerance limits.

SIGNIFICANCE OF CONCERN:
The construction deviation control process is not functional.

RECOMMENDATION X OR RESOLUTION ________:

1. Review further the construction deviation control process to determine extent of breakdown.

2. Process per Project Quality Assurance Plan.

COMMENTS BY SRT (IF REQUIRED):

REFERENCES (INCL. RELATED OCR ITEM REPORT NO.):
Dwg 7220-H-639 SH 14 (Q), Rev 11
Spec 7220-M-326 (Q) Rev 8 "Install., Inspect. & Doc. of Pipe Supports"

SIGNATURE(S):

CS	CS	HAL	JWB	N/A JWB
OCR ITEM REPORT ORIGINATOR	LTR	PROJECT MANAGER FOR PROJECT TEAM	PRINCIPAL-IN-CHARGE	SRT (IF REQUIRED)
3/3/83	3/3/83	3/4/83	3/14/83	
DATE	DATE	DATE	DATE	DATE

MIDLAND INDEPENDENT DESIGN AND CONSTRUCTION VERIFICATION
OPEN, CONFIRMED AND RESOLVED (OCR) ITEM REPORT

TYPE OF REPORT: OPEN ________ CONFIRMED X
RESOLVED ________ ITEM

FILE NO. 3201-008
DOC NO. 3201-008-C-032
REV. NO. 0

DATES REPORTED TO: LTR 3/3/83 SRT ________ PROJECT TEAM/PROJECT MGR. 3/3/83
PRINCIPAL-IN-CHARGE 3/7/83 CPC/DESIGN ORG. ________

STRUCTURE(S), SYSTEM(S), OR COMPONENT(S) INVOLVED:

AFW System Pipe Supports

IDCV PROGRAM AREA OR TASK (IF APPLICABLE):

Topic I.3-1c - Pipe Supports
Verification of Physical Configuration

DESCRIPTION OF CONCERN:

Hanger H-10, a horizontal snubber, was field measured by TERA to be about 3'-0" from its design location (along the direction of the pipe axis) which exceeds the allowable tolerance for snubbers of 0'-6". Construction deviation information was not forwarded for approval and processing by engineering as required by procedures.

SIGNIFICANCE OF CONCERN:

1. The piping analysis for this portion of the system may be affected as a result of this change leading to higher support loads and piping stresses than calculated.
2. The construction deviation control process does not appear to be functioning for this case (refer to separate OCR for recommendation).

RECOMMENDATION X OR RESOLUTION ________:

1. Input this information to the TERA confirmatory piping analysis for further evaluation.
2. Process per Project Quality Assurance Plan

COMMENTS BY SRT (IF REQUIRED):

REFERENCES (INCL. RELATED OCR ITEM REPORT NO.):

Dwg 7220-H-639 SH 14 (Q), Rev. 11
Spec 7220-M-326 (Q), Rev. 8 "Install., Inspect. & Doc. of Pipe Supports"

SIGNATURE(S):

CS	CS	HAL	JWB	N/A JWB
OCR ITEM REPORT ORIGINATOR	LTR	PROJECT MANAGER FOR PROJECT TEAM	PRINCIPAL-IN-CHARGE	SRT (IF REQUIRED)
3/3/83	3/3/83	3/4/83	3/14/83	
DATE	DATE	DATE	DATE	DATE

MIDLAND INDEPENDENT DESIGN AND CONSTRUCTION VERIFICATION
OPEN, CONFIRMED AND RESOLVED (OCR) ITEM REPORT

TYPE OF REPORT: OPEN ________ CONFIRMED X RESOLVED ________ ITEM

FILE NO. 3201-008
DOC NO. 3201-008-C-033
REV. NO. 0

DATES REPORTED TO: LTR 3/3/83 SRT ________ PRINCIPAL-IN-CHARGE 3/7/83
PROJECT TEAM/PROJECT MGR. 3/3/83
CPC/DESIGN ORG. ________

STRUCTURE(S), SYSTEM(S), OR COMPONENT(S) INVOLVED:
AFW System Pipe Supports

IDCV PROGRAM AREA OR TASK (IF APPLICABLE):
Topic I.3-1c Pipe Supports
Verification of Physical Configuration

DESCRIPTION OF CONCERN:
Hanger H-7, a vertical rigid hanger, was field measured by TERA to be about 3'-0" from its design location (along the direction of the pipe axis) which exceeds the allowable tolerance of 1'-0". Construction deviation information was not forwarded for approval and processing by engineering as required by procedures.

SIGNIFICANCE OF CONCERN:
1. The piping analysis for this portion of the system may be affected as a result of this change leading to higher support loads and piping stresses than calculated.
2. The construction deviation control process does not appear to be functioning for this case (refer to separate OCR for recommendation).

RECOMMENDATION X OR RESOLUTION ________:
1. Input to TERA confirmatory piping analysis for further evaluation.
2. Process per Project Quality Assurance Plan.

COMMENTS BY SRT (IF REQUIRED):

REFERENCES (INCL. RELATED OCR ITEM REPORT NO.):
Dwg 7220-H-639 SH 14 (Q), Rev. 11
Spec 7220-M-326 (Q), Rev. 8 "Install., Inspect. & Doc. of Pipe Supports..."

SIGNATURE(S):

OCR ITEM REPORT ORIGINATOR	LTR	PROJECT MANAGER FOR PROJECT TEAM	PRINCIPAL-IN-CHARGE	SRT (IF REQUIRED)
CS	CS	HAL	JWB	N/A JWB
3/3/83	3/3/83	3/4/83	3/14/83	
DATE	DATE	DATE	DATE	DATE

MIDLAND INDEPENDENT DESIGN AND CONSTRUCTION VERIFICATION
OPEN, CONFIRMED AND RESOLVED (OCR) ITEM REPORT

TYPE OF REPORT: OPEN ________ CONFIRMED X
RESOLVED ________ ITEM

FILE NO. 3201-008
DOC NO. 3201-008-C-034
REV. NO. 0

DATES REPORTED TO: LTR 3/3/83 SRT ________
PRINCIPAL-IN-CHARGE 3/7/83
PROJECT TEAM/PROJECT MGR. 3/3/83
CPC/DESIGN ORG. ________

STRUCTURE(S), SYSTEM(S), OR COMPONENT(S) INVOLVED:

AFW System Pipe Supports

IDCV PROGRAM AREA OR TASK (IF APPLICABLE):
Topic I.3-1 - Pipe Supports
Verification of Physical Configuration

DESCRIPTION OF CONCERN:

Hanger H-4, a vertical spring hanger, was field measured by TERA to be located on the opposite side of a 90° elbow (along the axis of the pipe) which exceeds the allowable tolerance. Construction deviation information was not forwarded for approval and processing by engineering as required by procedures.

SIGNIFICANCE OF CONCERN:

1. The piping analysis for this portion of the system may be affected as a result of this change leading to a higher support loads and piping stresses than calculated.
2. The construction deviation control process does not appear to be functioning for this case (refer to separate OCR for recommendation).

RECOMMENDATION X OR RESOLUTION ________:

1. Input to TERA confirmatory piping analysis for further evaluation.
2. Process per Project Quality Assurance Plan.

COMMENTS BY SRT (IF REQUIRED):

REFERENCES (INCL. RELATED OCR ITEM REPORT NO.):
Dwg 7220-M-639 SH 14 (Q), Rev 11
Spec 7220-M-326 (Q), Rev 8 "Install., Inspect., & Doc. of Pipe Supports..."

SIGNATURE(S):

CS	CS	HAL	JWB	JWB N/A
OCR ITEM REPORT ORIGINATOR	LTR	PROJECT MANAGER FOR PROJECT TEAM	PRINCIPAL-IN-CHARGE	SRT (IF REQUIRED)
3/3/83	3/3/83	3/4/83	3/14/83	
DATE	DATE	DATE	DATE	DATE

MIDLAND INDEPENDENT DESIGN AND CONSTRUCTION VERIFICATION
OPEN, CONFIRMED AND RESOLVED (OCR) ITEM REPORT

TYPE OF REPORT: OPEN ________ CONFIRMED X
RESOLVED ________ ITEM

FILE NO. 3201-008
DOC NO. 3201-008-C-035
REV. NO. (1) One

DATES REPORTED TO: LTR 5/10/83 SRT ________ PROJECT TEAM/PROJECT MGR. 5/20/83
PRINCIPAL-IN-CHARGE 5/26/83 CPC/DESIGN ORG. ________

STRUCTURE(S), SYSTEM(S), OR COMPONENT(S) INVOLVED:

AFW System Pipe Supports

IDCV PROGRAM AREA OR TASK (IF APPLICABLE):

Topic 1.3-1c Pipe Supports
Verification of Physical Configuration

DESCRIPTION OF CONCERN:

Hanger H-11, a vertical rigid hanger was field measured by TERA to be at the proper elevation but mis-located by 1'-3" according to drawing dimensions from DP-260. Further measurements show DP-260 at proper elevation, but dimensions do not match elevations shown for DP-260 or 265. Steel locations and penetration locations support elevations as measured.

SIGNIFICANCE OF CONCERN:

1. Drawing errors of this nature are not consistent with pipe analysis and may indicate the probability of other drawing errors that would develope loading higher than design levels.
2. The construction deviation control process and drawing checking process does not appear to be functioning.

RECOMMENDATION X OR RESOLUTION ________:

1. Investigate quality paperwork to determine effectiveness of acceptance procedures and feed back of results of design group for determination of acceptance resolution.
2. Investigate shop drawing approval and establish feed back to design and drawing of dimension/elevation nonconformance.

COMMENTS BY SRT (IF REQUIRED):

REFERENCES (INCL. RELATED OCR ITEM REPORT NO.):

Drawing 7220-H639 Sh. 14(Q), Rev. 11 & Engineering Evaluation 3201-001-001, Pgs 7 & 8

SIGNATURE(S):

OCR ITEM REPORT ORIGINATOR	LTR	PROJECT MANAGER FOR PROJECT TEAM	PRINCIPAL-IN-CHARGE	SRT (IF REQUIRED)
RCS	DBT	HAL	JB	
5/10/83	5/20/83	5/25/83	5/27/83	
DATE	DATE	DATE	DATE	DATE

MIDLAND INDEPENDENT DESIGN AND CONSTRUCTION VERIFICATION
OPEN, CONFIRMED AND RESOLVED (OCR) ITEM REPORT

TYPE OF REPORT: OPEN ______ CONFIRMED X ______ RESOLVED ______ ITEM

FILE NO. 3201-008
DOC NO. 3201-008-C-036
REV. NO. (1) One

DATES REPORTED TO: LTR 5/11/83 SRT ______ PRINCIPAL-IN-CHARGE 5/26/83 PROJECT TEAM/PROJECT MGR. 5/20/83 CPC/DESIGN ORG. ______

STRUCTURE(S), SYSTEM(S), OR COMPONENT(S) INVOLVED:

AFW System Piping

IDCV PROGRAM AREA OR TASK (IF APPLICABLE):

Topic II.2-1 Pressure Boundary
Drawing Review

DESCRIPTION OF CONCERN:

The offset dimensions to the reactor centerline are not consistent with dimensions given along pipe centerline as follows. Distances between DP 270 and 280, 280 and 285, 300 and 306. Differences range from 5/16 and 7/16. Drawings that have been signed have not been adequately checked.

SIGNIFICANCE OF CONCERN:

Inconsistencies in design drawings could lead to deviation of constructed structures, systems and components from design assumptions.

RECOMMENDATION X OR RESOLUTION ______:

1. Investigate shop drawing approval system to establish method of resolution and feed back to design and drafting.

COMMENTS BY SRT (IF REQUIRED):

REFERENCES (INCL. RELATED OCR ITEM REPORT NO.):

Drawing 7220-H-639 (Q), Sh. 14, Rev. 11 & Eng. Eval. 3201-001-001, page 9

SIGNATURE(S):

RCS	DBT	HAL	JB	
OCR ITEM REPORT ORIGINATOR	LTR	PROJECT MANAGER FOR PROJECT TEAM	PRINCIPAL-IN-CHARGE	SRT (IF REQUIRED)
5/10/83	5/20/83	5/25/83	5/27/83	
DATE	DATE	DATE	DATE	DATE

MIDLAND INDEPENDENT DESIGN AND CONSTRUCTION VERIFICATION
OPEN, CONFIRMED AND RESOLVED (OCR) ITEM REPORT

TYPE OF REPORT: OPEN ________ CONFIRMED X
RESOLVED ________ ITEM

FILE NO. 3201-008
DOC NO. 3201-008-C-037
REV. NO. 0

DATES REPORTED TO: LTR 3/3/83 SRT ________ PROJECT TEAM/PROJECT MGR. 3/3/83
PRINCIPAL-IN-CHARGE 3/7/83 CPC/DESIGN ORG. ________

STRUCTURE(S), SYSTEM(S), OR COMPONENT(S) INVOLVED:

AFW System - All

IDCV PROGRAM AREA OR TASK (IF APPLICABLE):

Topic III.1-1 - Seismic Design
Review of Design Criteria

DESCRIPTION OF CONCERN:

FSAR Figures 3.7-2 through 3.7-53 are not current as they are not consistent with FSAR text nor the models and response spectra for the containment and auxiliary building. The FSAR updating process is not consistent nor timely.

SIGNIFICANCE OF CONCERN:

FSAR errors could lead to the utilization of improper input to the design process.

RECOMMENDATION X OR RESOLUTION ________:

1. Review further information regarding the FSAR updating process.
2. Process per Project Quality Assurance Plan.

COMMENTS BY SRT (IF REQUIRED):

REFERENCES (INCL. RELATED OCR ITEM REPORT NO.):

FSAR, Rev. 46, Section 3.7
Spec. 7220-G-6, Rev. 7 and G-7, Rev. 9, Containment & Aux. Bldg. Response Spectra

SIGNATURE(S):

CS	CS	HAL	JWB	N/A JWB
OCR ITEM REPORT ORIGINATOR	LTR	PROJECT MANAGER FOR PROJECT TEAM	PRINCIPAL-IN-CHARGE	SRT (IF REQUIRED)
3/3/83	3/3/83	3/4/83	3/14/83	
DATE	DATE	DATE	DATE	DATE

MIDLAND INDEPENDENT DESIGN AND CONSTRUCTION VERIFICATION
OPEN, CONFIRMED AND RESOLVED (OCR) ITEM REPORT

TYPE OF REPORT: OPEN ______ CONFIRMED X
RESOLVED ______ ITEM

FILE NO. 3201-008
DOC NO. 3201-008-C-038
REV. NO. 0

DATES REPORTED TO: LTR 3/1/83 SRT ______ PROJECT TEAM/PROJECT MGR. 3/3/83
PRINCIPAL-IN-CHARGE 3/7/83 CPC/DESIGN ORG. ______

STRUCTURE(S), SYSTEM(S), OR COMPONENT(S) INVOLVED:

AFW Pump Turbine Minimum Flow Valve

IDCV PROGRAM AREA OR TASK (IF APPLICABLE):

Topic I.15-1, Control/Power Supplies

DESCRIPTION OF CONCERN:

Under condition of loss of all AC (station blackout), the AFW pump minimum flow valve 2SV-3969B would not be operable because it is powered from Class 1E AC power. The Midland FSAR and B&W BOP criteria document (36-1004477) both require that AFW be operable for two hours under station blackout. During this period of time flow through the minimum flow line may be necessary to prevent damage to the pump.

SIGNIFICANCE OF CONCERN:

Failure to provide minimum flow would cause consequential damage to the AFW turbine driven pump during station blackout.

RECOMMENDATION X OR RESOLUTION ______

Process per Project Quality Assurance Plan.

COMMENTS BY SRT (IF REQUIRED):

REFERENCES (INCL. RELATED OCR ITEM REPORT NO.):

OCR 3201-008-0-012 & C-012 ; Drawing E-158(Q) SH 29, 29A, 29B, 29C

SIGNATURE(S):

OCR ITEM REPORT ORIGINATOR	LTR	PROJECT MANAGER FOR PROJECT TEAM	PRINCIPAL-IN-CHARGE	SRT (IF REQUIRED)
LB	LB	HAL	JWB	N/A JWB
3/1/83	3/1/83	3/4/83	3/14/83	
DATE	DATE	DATE	DATE	DATE

MIDLAND INDEPENDENT DESIGN AND CONSTRUCTION VERIFICATION
OPEN, CONFIRMED AND RESOLVED (OCR) ITEM REPORT

TYPE OF REPORT: OPEN ______ CONFIRMED X ______
RESOLVED ______ ITEM

FILE NO. 3201-008
DOC NO. 3201-008- C 045
REV. NO. ______

DATES REPORTED TO: LTR 3/17/83 SRT ______ PRINCIPAL-IN-CHARGE 5/26/83
PROJECT TEAM/PROJECT MGR. 5/20/83
CPC/DESIGN ORG. ______

STRUCTURE(S), SYSTEM(S), OR COMPONENT(S) INVOLVED:

Auxiliary Feedwater System: AFW Pump Motor 2P005A

IDCV PROGRAM AREA OR TASK (IF APPLICABLE):

ICV: Review of Storage and Maintenance Documentation

DESCRIPTION OF CONCERN:

1. Manufacturer's recommended storage instructions require motor shaft rotation every two weeks while motor is in storage (Ref: Vendor Doc. No. 7220-M14-68).
2. Bechtel procedure governing in-place maintenance (F-10-247) requires rotation of motor shaft every 90 days, exceeding the maximum duration between shaft rotations, as recommended by the vendor, by a factor of 6.

SIGNIFICANCE OF CONCERN:

- Failure to comply with manufacturer's recommended shaft rotation schedule for the motor may have a deleterious effort upon the shaft bearing surfaces, shaft bearings, and rotating elements of the motor.

RECOMMENDATION X OR RESOLUTION ______:

- Recommend motor inspection by manufacturer's rep. and ICV reviewer of motor bearing surfaces.

COMMENTS BY SRT (IF REQUIRED):

REFERENCES (INCL. RELATED OCR ITEM REPORT NO.):

Bechtel Storage Procedure F-10-247
Vendor Document No. 7220-M14-68

SIGNATURE(S):

OCR ITEM REPORT ORIGINATOR	LTR	PROJECT MANAGER FOR PROJECT TEAM	PRINCIPAL-IN-CHARGE	SRT (IF REQUIRED)
MBJ	DBT	HAL	JB	
DATE 3/17/83	DATE 5/20/83	DATE 5/25/83	DATE 5/27/83	DATE

MIDLAND INDEPENDENT DESIGN AND CONSTRUCTION VERIFICATION
OPEN, CONFIRMED AND RESOLVED (OCR) ITEM REPORT

TYPE OF REPORT: OPEN ________ CONFIRMED X RESOLVED ________ ITEM

FILE NO. 3201-008
DOC NO. 3201-008-C-046
REV. NO. ________

DATES REPORTED TO: LTR 3/17/83 SRT ________ PRINCIPAL-IN-CHARGE 5/26/83 PROJECT TEAM/PROJECT MGR. 5/20/83 CPC/DESIGN ORG. ________

STRUCTURE(S), SYSTEM(S), OR COMPONENT(S) INVOLVED:

Auxiliary Feedwater Pumps = 2P005A & 2P005B

IDCV PROGRAM AREA OR TASK (IF APPLICABLE):

ICV: Review of Storage & Maintenance Documentation

DESCRIPTION OF CONCERN:

1. Pump manufacturer's recommended storage instructions require pump to be stored under vacuum with VPI crystals (dessicant) to maintain Relative Humidity at less than 50%.
2. Bechtel Procedure for storage of pumps, Proc. #F-10-118, does not require vacuum nor humidity check per item #1 above.
3. Further to concern, review of records indicates pump have been open, subject to flooding & other damage, & several NCR's remain open against the AFW pump turbine indicating maintenance problems which have not been addressed nor closed out.

SIGNIFICANCE OF CONCERN:

Failure to comply with the vendor's recommended storage instructions coupled with the long time (since 1978) the pumps and turbine have been in storage (both in the warehouse and in place) raise concerns as to the existence of internal damage to the pumps and turbine resulting from rust, corrosion, and foreign materials.

RECOMMENDATION X OR RESOLUTION ________:

- Recommend pumps and turbine disassembly and inspection.
- Disassembly and inspection should be witnessed by manufacturer's rep. and ICV reviewer.

COMMENTS BY SRT (IF REQUIRED):

REFERENCES (INCL. RELATED OCR ITEM REPORT NO.):

Bechtel Procedure F-10-118 and Storage and Maintenance Checklist GN-3-118

SIGNATURE(S):

MBJ	DBT	HAL	JB	
OCR ITEM REPORT ORIGINATOR	LTR	PROJECT MANAGER FOR PROJECT TEAM	PRINCIPAL-IN-CHARGE	SRT (IF REQUIRED)
3/17/83	5/20/83	5/25/83	5/27/83	
DATE	DATE	DATE	DATE	DATE

F03 026583

LONE TREE COUNCIL

P. O. Box 421

Essexville, Michigan 48732

May 31, 1983

PRINCIPAL STAFF			
RA		ENF	
D/RA		SGS	
A/RA		PAO	
DPRP		SLO	
DRMA		RC	✓
DRMSP			
DE			
ML			
OL		FILE	

James Keppler
U.S. Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Dear Mr. Keppler,

Thank you for the prompt reply regarding an independent audit of the planned Midland Nuclear Power Plant. Unfortunately, we are disturbed by your ending paragraph in which you imply that letting Consumers Power Company reinspect its own work does not make a mockery of the NRC's commitment to ensuring safe construction. You add, "particularly in view of third party inspections and other actions being taken under the Construction Completion Plan."

Let us look at these "third party" inspections and the CCP. As we understand it, an audit is an examination for the purpose of verification--in this case a safely constructed nuclear plant. Our understanding, and please correct us if we are wrong, is that Consumers Power selects what TERA Corporation will inspect (with NRC approval). To use an analogy, if we are audited by the Internal Revenue Service we get to choose those parts of our finances we would like disclosed. Of course, this is ludicrous. Yet Consumers seemingly has that power. In addition, it has selected, and the NRC has approved, the Auxiliary Feedwater System, which has been reviewed and approved recently.

An audit is usually thought to be complete and very thorough. While it is reassuring that the heating, ventilation, and air conditioning system, and the emergency power system might be reviewed, it appears that TERA will be focusing mainly on the design of these systems rather than the construction--a very distinct difference.

Concerning the CCP, your letter disguises the fact that there would probably be no CCP had it not been forcibly suggested by the NRC. The plan was not a result of the utility's initiative. This does not create a feeling of confidence in the utility's commitment to do the job properly. In a related matter, Consumers Power announced that, unless told otherwise by the NRC, they would begin their Construction Implementation Overview (CIO) on April 18, 1983. Publicly, the NRC has remained silent.

Regarding the selection of outside firms as third party inspectors and citizen input, you have previously stated that the public will not have a vote in this since you "don't believe in the shared process of decision making." (Midland Daily News, May 4, 1983) We find it ironic that the licensee has chosen the areas for re-inspection as well as the inspectors, and obviously is able to share in this process, yet citizens are denied it.

In summary, there are several questions that are raised:

1. What new light will be shed by a re-evaluation of the Auxiliary Feedwater System?
2. Would you explain the extent to which TERA Corporation will examine construction as well as design?
3. Regarding the CIO--
   a. Did it begin April 18, 1983, as announced by Consumers?
   b. If so, have you approved of the plan?
   c. Has Stone and Webster, therefore, been approved?
   d. If so, will it include a 100% review as promised by Consumers in December, 1982?

We have different ideas on what a third party audit should encompass. It does not seem unreasonable that a truly independent audit should:

1. Include a full scope overview of completed construction done by the third party rather that the utility.
2. Consist of a thorough inspection of as-is construction, as well as the design of the plant.
3. Be selected solely by the NRC (or allow the public the same voice as the utility)

It would seem that this approach would totally assure our community that the plant has been constructed safely. Would you explain why this method is not possible?

Mr. Keppler, we know that the Midland plants have become an albatross for you. You have indicated several times that your role is that of regulator, not builder. We understand your position, but one cannot ignore the many quality assurance breakdowns and poor construction record of Consumers Power. To use your own words, "You wonder after so many screw-ups whether the utility is capable of doing the job right." (Interview, WXYZ-TV, Fall, 1982)

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
799 ROOSEVELT ROAD
GLEN ELLYN, ILLINOIS 60137

~~DRELL~~
(2) File

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OCT 1 8 1983

Docket No. 50-329
Docket No. 50-330

Lone Tree Council
ATTN: Mr. Leo R. Romo
Corresponding Secretary
P. O. Box 421
Essexville, Michigan 48732

Dear Mr. Romo:

This is in reply to your September 25, 1983, letter to Mr. James Keppler demanding that an investigation of Stone and Webster be conducted and that the Construction Completion Program not be approved pending such investigation.

The NRC has reviewed Consumers Power Company's (CPCo) proposal to have Stone and Webster perform the third party independent overview of the Construction Completion Program (CCP). We recognize that A-E's have job sites that are relatively problem free while they have other job sites that have problems. In our evaluation we considered the qualifications of both the S&W organization and the individuals proposed as team members to conduct the Construction Implementation Overview (CIO) of Consumers' CCP. We reviewed S&W's experience in assessing nuclear construction projects, particularly its performance in independent reviews of design, construction, and quality assurance undertaken for utilities as input to the NRC's operating license reviews. We also reviewed the qualifications of the key persons proposed for the project. We verified their experience and competence by reference checks and/or discussions with NRC staff members familiar with them.

Based on our review of the documentation submitted by CPCo and S&W, followup checks, and consideration of comments by members of the public, we concluded that S&W meets the independence and competence criteria for third party reviewers and that S&W's proposed CIO program is adequate to provide for an assessment of the CCP. In my letter to CPCo dated September 29, 1983, I approved S&W to perform the CIO. A copy of the approval letter and the staff's evaluation of CPCo's proposal to use S&W are enclosed. A further investigation of S&W is not planned.

I have enclosed a copy of the NRC's October 6, 1983 response to the letter dated June 13, 1983, from Billie Pirner Garde of the Government Accountability Project on behalf of the Lone Tree Council and others. In addition I have enclosed a copy of the NRC's Confirmatory Order dated October 6, 1983, to CPCo approving the CCP.

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If I can be of further assistance, let me know.

Sincerely,
Original signed by
James G. Keppler

James G. Keppler
Regional Administrator

Enclosures:
1. Letter from J. G. Keppler to CPCo dated September 29, 1983, approving S&W to perform CIO w/encl
2. NRC letter to Billie P. Garde dated October 6, 1983
3. NRC Confirmatory Order dated October 6, 1983

cc w/ltr dtd 9/25/83:
DMB/Document Control Desk (RIDS)
Mr. James W. Cook, Vice President
  Midland Project
Resident Inspector, RIII
The Honorable Charles Bechhoefer, ASLB
The Honorable Jerry Harbour, ASLB
The Honorable Frederick P. Cowan, ASLB
The Honorable Ralph S. Decker, ASLB
William Paton, ELD
Michael Miller
Ronald Callen, Michigan
  Public Service Commission
Myron M. Cherry
Barbara Stamiris
Mary Sinclair
Wendell Marshall
Colonel Steve J. Gadler (P.E.)
Howard Levin (TERA)
Billie P. Garde, Government
  Accountability Project
Lynne Bernabei, Government
  Accountability Project

RIII	RIII	RIII	RIII	RIII
Harrison/ls	RFW Warnick	Lewis's comments incorporated RFW Lewis	Keppler	Davis
09/29/83	10/14		10/17/83	10/17

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
799 ROOSEVELT ROAD
GLEN ELLYN, ILLINOIS 60137

SEP 2 9 1983

Docket No. 50-329
Docket No. 50-330

Consumers Power Company
ATTN: Mr. James W. Cook
Vice President
Midland Project
1945 West Parnall Road
Jackson, MI 49201

Gentlemen:

We have reviewed your proposal to have the Stone and Webster Corporation (S&W) perform the third party independent overview of the Construction Completion Program (CCP). Our evaluation is enclosed.

The staff has considered the qualifications of both the S&W organization and the individuals proposed as team members to conduct the Construction Implementation Overview (CIO) of Consumers Power Company's (CPCo) Construction Completion Program. Inputs to this review included the information supplied by S&W, as set forth in the April 6, 1983, April 11, 1983, and May 19, 1983 submittals, the staff's existing knowledge of S&W performance at other nuclear power plants, and information as to S&W personnel competence.

The CIO program described by S&W in the August 30, 1983, and September 9, 1983, submittals and at the August 25, 1983, meeting has been reviewed by the NRC staff and found to constitute an acceptable third party overview program. The NRC staff has reviewed the CIO activities performed to date and has found this overview to have been adequate.

Based on NRC review of the documentation submitted by CPCo and S&W, followup checks, and consideration of comments by members of the public, we conclude that S&W meets the independence and competence criteria for third party reviewers and that S&W's proposed CIO program is adequate to provide for an assessment of the Construction Completion Program (CCP).

This letter constitutes NRC approval of S&W to perform the CIO.

~~831005034~~

Should you have any questions regarding this letter please contact Mr. R. F. Warnick of my staff.

Sincerely,

Original signed by
James G. Keppler

James G. Keppler
Regional Administrator

Enclosure: As stated

cc w/encl:
DMB/Document Control Desk (RIDS)
Resident Inspector, RIII
The Honorable Charles Bechhoefer, ASLB
The Honorable Jerry Harbour, ASLB
The Honorable Frederick P. Cowan, ASLB
The Honorable Ralph S. Decker, ASLB
William Paton, ELD
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Ronald Callen, Michigan
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Colonel Steve J. Gadler (P.E.)
Howard Levin (TERA)
Billie P. Garde, Government
  Accountability Project
Lynne Bernabei, Government
  Accountability Project

RIII	RIII	RIII	RIII	RIII	RIII	NRR	IE	ELD
Gardner/ls	Harrison	Warnick	Lewis	Davis	Keppler			
09/27/83	9/28/83	9/27/83	9/28	9/29	9/29/83	9-28-83	9/28/83	9/28/83

STAFF EVALUATION OF CONSUMERS POWER COMPANY
PROPOSAL TO USE STONE AND WEBSTER MICHIGAN, INC.
TO CONDUCT THE THIRD PARTY
CONSTRUCTION IMPLEMENTATION OVERVIEW OF THE
MIDLAND NUCLEAR PLANT

Purpose and Background

The purpose of this document is to provide an evaluation of the Consumers Power Company's (CPCo) proposal to use Stone and Webster (S&W), Michigan, Inc. to conduct the third party overview of the Construction Completion Program at Midland. Consumers' proposal is documented in their letter of April 6, 1983, in response to the NRC's March 28, 1983, request for additional information. The CPCo commitment to provide for an independent third party Construction Implementation Overview (CIO) has been reviewed and found acceptable. This evaluation provides the basis of the NRC's acceptance of Consumers proposal.

The purpose of the CIO is to provide an independent overview of the Construction Completion Program (CCP) to assure the program is adequate and will be properly implemented. This is to ensure that the construction of the facility can be completed in conformance with the Commission's regulations and the construction permits.

The S&W overview of the CCP will be independent from and supplemental to the normal NRC inspection program. As part of their inspection program, the NRC inspectors will monitor and review the S&W CIO.

The use of S&W as the third party overviewer will provide additional assurance of proper implementation of the quality program. In addition, it will function as a mechanism to allow members of the public and the NRC to regain confidence in the program.

The results of the overview program will be submitted to the Regional Administrator in a weekly report of CCP activities overviewed and any problems identified.

The NRC has required communications between CPCo and S&W to follow a protocol to assure S&W's independence is being maintained and to assure public and NRC knowledge of S&W activities and correspondence. It should be noted that the protocol provides for a monthly meeting, open to the public for observation, to review S&W activities for the month and to discuss problems identified by the overview.

CPCo's Proposed Third Party Reviewer

CPCo has proposed that Stone and Webster perform an independent overview of the Midland project CCP. The NRC staff has considered CPCo's submittal of April 6, 1983, and responses to Region III questions, public comments, and the clarification of submitted comments and additional comments received at public meetings held in Midland, Michigan on February 8, 1983, and August 11, 1983. In addition, the staff conducted numerous meetings and telephone conversations with representatives of the Government Accountability Project (GAP) and the intervenors. In considering CPCo's proposal, the staff has used as guidance the letter of February 1, 1982, from Chairman Palladino to Congressmen Ottinger and Dingell, (attached) which sets forth the "competence and independence" standards that have been applied by the Commission in determining the acceptability of proposed third-party reviewers.

S&W Competence

The staff has considered the qualifications of both the S&W organization and the individuals proposed as team members to conduct the independent overview of the Midland project. Input to the staff's review included the information supplied in CPCo's submittal, the responses to the staff's inquiries, the S&W submittals, and the staff's existing knowledge of S&W performance at other nuclear power plants.

The staff has reviewed S&W's experience in assessing nuclear construction projects, particularly its performance in independent reviews of design, construction, and quality assurance undertaken for utilities as input to the NRC's operating license reviews.[1]

The staff has also reviewed the qualifications of the key persons proposed for the project, as set forth in the April 6, 1983, April 11, 1983, and May 19, 1983, submittals, and has concluded that the team has significant stated experience in QA/QC matters, nuclear plant construction, and management systems. These are the skills which we find necessary to carry out the third party overview. Through reference checks and/or discussions with NRC staff members familiar with the key personnel, we have verified their experience and competence in these areas.

Based upon its review, the staff concludes that the S&W organization and the individual overview team members are competent to conduct the Construction Implementation Overview and meet the technical competence standards set forth in the Ottinger/Dingell letter.

S&W Independence

The staff believes that for an organization to be acceptable to conduct this program the organization must be independent of the utility which owns Midland and independent of contractors whose work will be subject to the third party overview. Independence has been defined by the Commission as being the ability "... to provide an objective, dispassionate technical judgement, provided solely on the basis of technical merit...." (Page 1 of Response to Questions, attached to Ottinger/Dingell letter.) The Commission further defined the term by stating that the company approved to conduct an independent review must be one "...not previously involved with the activities...that they will now be reviewing..." Id.

[1]Reference Secy 82-414, "Diablo Canyon Design Verification Program Phase II Recommendations"

The staff has reviewed the information provided by CPCo and S&W regarding previous work performed by S&W for the Midland site and the principal contractors for the Midland project. Previous work at Midland consisted of limited activities (one person) in the planning phase of providing interface controls going from construction/preoperation testing into operations and is not considered to violate the independence criteria.

To the best of our knowledge, all the professional personnel assigned to work on the Midland Construction Implementation Overview have provided the NRC with sworn statements regarding their independence. S&W has stated that none of the staff expected to be assigned to the Midland review has any prior work experience with CPCo or on Midland.

Based on this information and the assessment of S&W to perform work as defined in Secy 82-414, the staff has no basis to believe that S&W is not sufficiently independent of CPCo.

The staff concludes that S&W and the key personnel who have been identified for the conduct of the review meet the standards of independence outlined in the Ottinger/Dingell letter.

S&W's Overview Program

The purpose of the independent third party overview is to provide additional assurance that the CCP is adequate and will be properly implemented. This overview requirement was necessitated by the loss of NRC staff confidence in CPCo to implement successfully the Quality Assurance Program. The CIO will remain in place at the Midland site until the necessary confidence level has been restored to the satisfaction of the NRC staff. CPCo also has the option to continue the CIO as an additional system of checks and balances, beyond any period of time required by the staff.

The written CIO program is controlled by site originated program documents and by S&W corporate program documents as follows:

A. The documents written expressly for the CIO include:

- CIO Program Document dated April 1, 1983
- CIO Quality Assurance Plan
- Third Party CIO Plan
- CIO Assessment Procedure, 10.01
- Nonconformance Identification and Reporting Procedure, 15.01
- A detailed attribute checklist for each CPCo Project Quality Control Instruction (PQCI)

- A detailed checklist to review generic types of requirements (for non-PQCI activities); e.g., QA Audits and Surveillances

- Additional Quality Control Instructions as needed to provide adequate overview control

B. The following S&W corporate master program documents will also be utilized for the CIO, as required:

- QA Topical Report SWSQAP 1-74A, S&W Standard Nuclear Quality Assurance Program

- S&W Quality Standards; e.g., for quality sampling

- S&W Quality Assurance Directives

The NRC met with S&W on August 25, 1983, to gain additional insight into the total S&W program. This meeting was held in Midland, Michigan and was open to the public. Questioning by the public on the CIO was permitted at the end of the meeting. Subsequent to this meeting, S&W submitted on August 30, 1983, to the NRC copies of the material presented at the August 25, 1983, public meeting and on September 9, 1983, submitted a summary of the program presented at that same meeting.

The program described by S&W in the above documents and at the August 25, 1983, meeting has been reviewed by the NRC staff and found to constitute an acceptable third party overview program. The CIO program will be audited independently by the S&W corporate QA staff from Boston and on a routine inspection effort by the NRC.

S&W personnel onsite for the CIO will vary with the demand of the work activities to be overviewed. S&W's CIO staffing plan currently has nine people assigned at the Midland site and there are currently planned increases to 32 people as work activities dictate. These numbers, however, are only estimates and S&W will commit whatever personnel is necessary to conduct the CIO. The number of personnel used is not subject to limitation by CPCO.

The S&W overview activities of the CCP to date have been somewhat limited, since the CCP has not yet been approved and work in progress is therefore limited. Activities being overviewed were pre-Phase I. The activities being overviewed have included the following CCP and non-CCP activities:

- Program and procedure review

- Review of MPQAD QA/QC personnel training and certification

- Review of general training of CPCo and Bechtel personnel, including construction craftspersons

- Review of CCP Management Reviews

- Review of System Interaction Walkdowns

- Review of Design Documents

The above reviews have identified various concerns and one nonconformance that required CPCo actions to resolve. The NRC staff has reviewed the CIO activities performed to date and has found this overview, including actions taken by CPCo, to have been adequate.

Summary and Conclusion

Based on NRC review of the documentation submitted by CPCo and S&W, followup checks, and consideration of comments by members of the public, we conclude that S&W meets the independence and competence criteria for third party reviewers and that S&W's proposed CIO program is adequate to provide for an assessment of the Construction Completion Program (CCP).

Should you have any questions regarding this letter please contact Mr. R. F. Warnick of my staff.

Sincerely,

James G. Keppler

James G. Keppler
Regional Administrator

Enclosure: As stated

cc w/encl:
DMB/Document Control Desk (RIDS)
Resident Inspector, RIII
The Honorable Charles Bechhoefer, ASLB
The Honorable Jerry Harbour, ASLB
The Honorable Frederick P. Cowan, ASLB
The Honorable Ralph S. Decker, ASLB
William Paton, ELD
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Howard Levin (TERA)
Billie P. Garde, Government
Accountability Project
Lynne Bernabei, Government
Accountability Project

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

OCT 06 1983

Docket Nos. 50-329
50-330

(10 CFR 2.206)

Ms. Billie Pirner Garde
Government Accountability Project
Institute for Policy Studies
1091 Que Street, N.W.
Washington, D.C. 20009

Dear Ms. Garde:

This is in response to your letter of June 13, 1983 on behalf of the Lone Tree Council and others, requesting that the Commission take a number of actions with respect to the Midland Plant. Your letter was treated as a request for action under 10 CFR 2.206 of the Commission's regulations.

For the reasons set forth in the enclosed "Director's Decision" under 10 CFR 2.206, your request has been granted in part and denied in part. A copy of the decision will be referred to the Secretary for the Commission's review in accordance with 10 CFR 2.206. For your information, I have also enclosed a copy of the notice filed with the Office of the Federal Register for publication.

Sincerely,

R.C. DeYoung

Richard C. DeYoung, Director
Office of Inspection and Enforcement

Enclosures: as stated

cc w/encl.:
Consumers Power Company
Michael Miller, Esq.

Dupe of

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

OFFICE OF INSPECTION AND ENFORCEMENT
Richard C. DeYoung, Director

In the Matter of	)	
CONSUMERS POWER COMPANY	)	Docket Nos. 50-329 50-330
(Midland Nuclear Power Plant, Units 1 and 2)	)	(10 CFR 2.206)

DIRECTOR'S DECISION UNDER 10 CFR 2.206

Introduction

By letter to the Nuclear Regulatory Commission (NRC) dated June 13, 1983, Billie Pirner Garde of the Government Accountability Project, on behalf of the Lone Tree Council and others (hereinafter referred to as the petitioners), requested that, among other relief, the NRC take immediate action with regard to the Midland project. The letter was referred to the Director of the Office of Inspection and Enforcement for treatment as a request for action pursuant to 10 CFR 2.206 of the Commission's regulations.

On July 22, 1983, Edward L. Jordan, Acting Director of the Office of Inspection and Enforcement, acknowledged receipt of the petition and informed the petitioners that their request for immediate action was denied. Mr. Jordan noted that safety-related work at the Midland site had been stopped, with the exception of certain specified activities, and that the NRC staff was closely

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following the current activities at the Midland site. Mr. Jordan further noted that Consumers Power Company had agreed not to proceed with implementation of a construction completion program until such a program had been reviewed by the NRC. The staff expected to be able to complete its evaluation of the request before final action was taken on that program. Consequently, Mr. Jordan concluded that "continuation of currently authorized activities at Midland should not affect the staff's ability to grant the requested relief." Letter from Edward L. Jordan, Acting Director, Office of Inspection and Enforcement to Billie Pirner Garde (July 22, 1983). The staff has now completed its evaluation of the petition, and for the reasons stated herein, the request is granted in part and denied in part.

Issues Raised

Petitioners requested that the following six actions be taken by the Commission:

> Modify the Construction Permit (Midland Nuclear Power Plant, Units 1 and 2) to include mandatory "hold points" on the balance-of-plant (BOP) work and incorporate the current Atomic Safety and Licensing Board (ASLB or Board) ordered "hold points" on the soils remedial work into the Midland Construction permit (sic).
>
> Require a management audit of Consumers Power Company (CPCo) by an independent, competent management auditing firm that will determine the causes of the management failures that have resulted in the soils settlement disaster and the recently discovered Quality Assurance breakdown.
>
> Reject the Construction Completion Plan (CCP) as currently proposed, including a rejection of Stone and Webster to conduct the third party audit of the plant. Instead a truly independent, competent, and credible third party auditor should be selected with public participation in the process.

Remove the Quality Assurance/Quality Control function from the Midland Project Quality Assurance Department (MPQAD) and replace them with an independent team of QA/QC personnel that reports simultaneously to the NRC and CPCo management.

Increase the assignment of NRC personnel to include additional technical and inspection personnel as requested by the Midland Section of the Office of Special Cases.

Require a detailed review of the soils settlement resolution as outlined in the Supplemental Safety Evaluation Report, incorporating a technical analysis of the implementation of the underpinning project at the current stage of completion.

Petition at 1. The fifth issue relates to a matter of internal Commission organization and staffing, namely the allocation of staff to inspection of facilities. The staff is expecting to augment inspection personnel available to work on Midland. However, the creation of positions within the Office of Special Cases is a matter that will be determined by the Commission budget process. For these reasons, the staff is not considering this aspect of the request in this decision.

Background

The Consumers Power Company (CPCo or licensee) holds Construction Permits No. CPPR-81 (Unit 1) and No. CPPR-82 (Unit 2), issued by the Atomic Energy Commission in 1972, which authorized construction of the Midland Plant. The Midland nuclear plant is located in Midland, Michigan, and consists of two pressurized water reactors of Babcock and Wilcox design and related facilities for use in the commercial generation of electric power.

Since the start of construction, Midland has experienced significant construction problems attributable to deficiencies in implementation of its quality assurance (QA) program. [1] Following the identification of these problems, the licensee took action to identify the cause and correct each problem. Steps were also taken to upgrade the Midland QA program. Nevertheless, the licensee continued to experience problems in the implementation of its quality assurance program.

In 1980, the licensee reorganized its QA department so as to increase the involvement of high level CPCo management in onsite QA activities. Among its other tasks, the reorganized QA department, called the Midland Project Quality Assurance Department (MPQAD), was given the responsibility for quality control (QC) of heating, ventilation and air conditioning (HVAC) work in place of the HVAC contractor, Zack Company.

In May 1981, the NRC conducted a special, in-depth team inspection of the Midland site to examine the status of implementation and effectiveness of the QA program. Based on this inspection, Region III concluded that the newly

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1/ Significant construction problems identified to date include:

1973 - cadweld splicing deficiencies
1976 - rebar omissions
1977 - bulge in the Unit 2 Containment Liner Plate
1977 - tendon sheath location errors
1978 - discovery of soil settlement problem
1980 - Zack Company heating, ventilation, and air conditioning deficiencies
1980 - reactor pressure vessel anchor stud failures
1981 - piping suspension system installation deficiencies
1982 - electrical cable misinstallations

Several of these deficiencies resulted in the Commission taking escalated enforcement action.

organized QA program was acceptable. _See_ Inspection Reports 50-329/81-12; 50-330/81-12. The special team did, however, identify deficiencies in previous QC inspections of piping supports and restraints, and electrical cable installations.[2/] QC functions were further reorganized by the licensee's integration of the QC organization of its architect-engineer, Bechtel Power Corporation, into MPQAD in September 1982. This reorganization reflected the recommendations of the NRC staff. As part of this change, the licensee also undertook to retrain and recertify all previously certified Bechtel QC inspectors.

Nevertheless, construction difficulties continued to be identified at the Midland site. An inspection conducted during the period of October 1982 through January 1983 found significant problems with equipment in the diesel generator building. The subsequent identification of similar findings by CPCo in other portions of the plant prompted the licensee to halt the majority of the safety related work activities in December 1982. In view of the history of QA problems at the Midland plant and the lack of effectiveness of corrective actions to implement an adequate quality assurance program, the NRC indicated to the licensee that it was necessary to develop a comprehensive program to verify the adequacy of previous construction activities and to assure the adequacy of future construction. In view of the licensee's performance history, such an

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2/ As a result of staff discussions about the seriousness of such findings and of similar indications of deficiencies as identified in the Systematic Assessment of Licensee Performance Report issued in April 1982, a special Midland Section in Region III was formed in July 1982. The Midland Section devoted increased attention to inspection of the Midland facility, including upgrading the QC program of the project's constructor, the Bechtel Power Corporation.

effort was necessary to restore staff's confidence in CPCo's ability to properly construct the Midland plants.

Consequently, CPCo discussed with the NRC the concept of a construction completion program which would address the concerns raised by the staff. These discussions were followed by a formal submittal of the Midland Construction Completion Program (CCP).

The CCP is the licensee's program for the planning and management of the construction and quality activities necessary for its completion of the construction of the Midland facility. An important aspect of the CCP is the third party overview, which is designed to provide additional assurance as to the effectiveness of the CCP. In response to comments from the NRC and members of the public, the CCP underwent several revisions. As revised and submitted by the licensee on August 26, 1983,[4/] the CCP includes: (1) NRC hold points; (2) the requirement for 100% reinspection of accessible installations; (3) the integration of Bechtel's QC program with MPQAD; (4) the retraining and recertification of QC inspectors; (5) the general training of licensee and contractor personnel in quality requirements for nuclear work, requirements of the CCP, safety orientation and inspection, and work procedures; (6) the revision, as necessary, of Project Quality Control Instructions (PQCI's); (7) CCP team training; and (8) an independent third party overview of CCP activities.

4/ The Petition was apparently based upon the June 3, 1983 version of the CCP. Subsequent versions of the CCP, as described in this decision, address a number of issues raised by petitioners.

The CCP is divided into two phases. Phase 1 consists of a systematic review of the safety-related systems and areas of the plant. This review will be conducted on an area-by-area basis and will be done by teams with responsibility for particular systems. Phase 1 is intended to provide a clear identification of remaining installation work, including any necessary rework and an up-to-date inspection to verify the quality of existing work.

Phase 2 will take the results of the Phase 1 review and complete any necessary work or rework, thereby bringing the project to completion. The teams organized for Phase 1 activities will continue as the responsible organizational units to complete the work in Phase 2.

It should be noted that the CCP does not include the remedial soils program, nuclear steam supply system installation, HVAC installation, and the reinspection of pipe hangers and electrical cable. The remedial soils activities are being closely inspected under the conditions of the construction permits which implement the Atomic Safety and Licensing Board's April 30, 1982, order and under a work authorization procedure. Therefore, the staff does not consider it necessary to require the remedial soils activities to be included in the CCP. Controls over the soils work have been implemented under a separate program. Similarly, reinspection of the pipe hangers and electrical cable were not included in Phase I of the CCP because that reinspection is being done under a separate commitment to the NRC. See letters from James G. Keppler, Regional Administrator, NRC Region III to James W. Cook, Consumers Power Company (August 30, September 2, 1982). Nuclear Steam Supply System installation and HVAC installation were not drawn into question by the diesel generator building inspection.

The staff has not developed facts to indicate that installation of these systems should be included in the CCP. However, these activities will be included in the construction implementation overview to be conducted by the third party overviewer.

The CCP is designed to address the generic applicability of the problems identified by the NRC's inspection of the diesel generator building. The objective of the CCP is to look at the plant hardware and equipment, identify existing problems, correct these problems and complete construction of the plant.

Consideration of Issues Raised

1. Modification of Midland Construction Permits

Petitioners request that the Commission modify the Midland construction permits in two respects: 1) require "hold points" at various stages of the construction completion process; and, 2) incorporate those hold points concerning remedial soils work previously authorized by the Atomic Safety and Licensing Board panel with jurisdiction over the Midland proceeding.

The hold points are fundamental elements of the Midland CCP. As used by both the staff and petitioners, hold points refer to predetermined stages beyond which activities cannot proceed until authorized. Only when such prior work is found to be satisfactory will new work be authorized under the CCP. In this regard, the petitioners requested that three specific hold points be incorporated into the CCP to require NRC or third party review prior to continuation of work.

Based on their review of an early version of the CCP, petitioners asserted that the Midland project had been detrimentally affected by the lack of organizational freedom for its QA staff. See Petition at 13. Accordingly, the petitioners requested that a hold point be incorporated into the CCP whereby the success of the proposed program for the retraining and recertification of QA/QC personnel would be evaluated before any actual work was authorized under Phase 1 of the CCP. Id. at 13, 15. Subsequent to its initial discussions with the staff concerning development of a comprehensive construction completion program,[5/] the licensee began preliminary work, such as team training and recertification of QC inspectors in preparation for its anticipated Phase 1 activities, quality verification program and status assessments. The NRC was informed when training and recertification of QA/QC personnel and CCP team training would begin, and conducted a review of the licensee's actions. The staff suggested that the licensee undertake additional work before proceeding with some of its training effort. Consequently, the retraining hold point requested by petitioners has already been satisfied by the staff.

5/ On December 2, 1982, when CPCo first discussed a construction completion plan with the NRC staff, CPCo was informed by Region III staff that it would be necessary to incorporate NRC hold points. The staff identified four points at which it would require NRC inspectors to review completed work before the next activity could be undertaken. These hold points were identified as:

1. Review and approval of training and recertification of QC inspectors before beginning Phase 1;
2. Review and approval of CCP team training before beginning Phase 1;
3. Review and approval of the Quality Verification Program (QVP) and status assessments before beginning Phase 1;
4. Review and approval of the program for rework or systems completion work before beginning Phase 2.

The petitioners also viewed the proposed CCP as lacking in comprehensiveness. To remedy this deficiency, petitioners proposed that "either a third party or NRC 'hold point' be contained in the reinspection Phase I activities [of the CCP] to determine the adequacy of the 'accessible systems' approach."[6/] Petition at 13.

As described in section three, infra, a third party will be conducting an extensive overview of the CCP and other construction completion activities. The fact that the third party overviewer will also have hold point controls over the licensee should provide additional assurance that construction is proceeding in accordance with all applicable requirements. See Consumers Power Company, Construction Completion Program (August 26, 1983) at 34. The NRC and the third party will monitor the reinspection activities. The staff believes that these monitoring activities will provide the control sought by the petitioners in their request to establish a hold point during Phase 1 reinspection to determine the adequacy of the accessible systems approach.

The third hold point requested by petitioners derives from another criticism of the proposed CCP - the failure of that plan to specify inspection procedures and evaluation criteria. See Petition at 10-11. Accordingly, petitioners request a systematic and thorough review of the construction and quality work packages which will be completed as a prerequisite to initiation of new construction work under Phase 2 of the CCP. Id. at 11.

6/ The accessible systems approach refers to the extent of reinspection under the CCP. Inaccessible areas of the plant will be reinspected by utilizing a records review and destructive and non-destructive testing as required. See Consumers Power Company, Construction Completion Program (August 26, 1983) at 22-23.

The CCP requires that representative construction and quality work packages be reviewed to assure that any completed work is consistent with statements made by the licensee in both its Final Safety Analysis Report and Quality Assurance Topical Report. In addition, the third party overviewer will be using sampling techniques and reviewing selected work and quality packages prior to and during Phase II. Should the results of this sampling approach identify inadequate work packages, the sampling size will be increased as necessary to provide the needed assurance that work packages are adequately reviewed. Moreover, the NRC staff, in performing its inspection activities, will overview this entire process, including reviewing selected quality and work packages.

In summary, the staff believes that those hold points it has incorporated into the CCP, when viewed in the aggregate, substantially satisfy the hold points requested by petitioners. The licensee is required to adhere to these hold points as part of the CCP in conformance with the Confirmatory Order for Modification of Construction Permits (Effective Immediately).

With respect to the second aspect of the requested relief, incorporation of NRC hold points authorized by the Licensing Board's April 30, 1982, Memorandum and Order, the petitioners' request has been satisfied by previous action of the Commission. By amendment dated May 26, 1982, the hold points ordered by the Board were incorporated into the construction permits. See 47 Fed. Reg. 23999 (June 2, 1982). Accordingly, the construction permits already prohibit CPCo from performing the following activities without "explicit prior approval" from the staff:

(a) any placing, compacting, excavating, or drilling soil materials around safety-related structures and systems;

(b) physical implementation of remedial action for correction of soil-related problems under and around safety-related structures and systems, including but not limited to:

(i) dewatering systems

(ii) underpinning of service water building

(iii) removal and replacement of fill beneath the feedwater isolation valve pit areas, auxiliary building electrical penetration areas and control tower, and beneath the turbine building

(iv) placing of underpinning supports beneath any of the structures listed in (iii) above

(v) compaction and loading activities;

(c) construction work in soil materials under or around safety-related structures and systems such as field installation, or rebedding, of conduits and piping.

Construction Permits No. CPPR-81 and CPPR-82, Amendment No. 3 (May 26, 1982).

2. Management audit of CPCo

The petitioners request that the NRC require a management audit of CPCo's performance on the Midland project. The staff does not believe that a management audit is necessary at this time as a condition for going forward with the CCP. The staff expects that the CCP, with its built-in hold points and third party overview, should provide an effective process to satisfactorily complete construction at Midland, without the previous quality assurance problems. The third party overview together with the planned staff inspection activities should provide information to determine the adequacy of the licensee's implementation of the CCP. Nevertheless, the staff will continue to review information concerning the licensee's performance in other areas to determine whether an audit is required.

3. <u>Rejection of Construction Completion Program and Third Party Overview Organization</u>

In requesting that the Commission reject the Midland construction completion plan, petitioners based their position on the unacceptability of the Stone and Webster Engineering Corporation (S&W) to conduct the third party overview of the CCP. Petitioners raised three objections to the selection of S&W: the failure of S&W to meet the Commission's criteria for the independence required of a third party see Petition at 19; the failure of S&W to submit a minimally adequate audit proposal, id. at 18-19; and the lack of public participation in the selection of S&W as the third party review organization for the Midland project. Id. at 19-20.

In support of its argument that S&W is not sufficiently independent to monitor implementation of the CCP, the petitioners asserted that "under both a literal and realistic reading of the Commission's primary financial criteria, ...the third party not have any direct previous involvement with the Company." Petition at 19. In order to evaluate whether an audit organization is sufficiently independent to conduct a third party review, the Commission generally utilizes the guidance originally set forth in a letter from Chairman Palladino to Representatives Ottinger and Dingell. The Commission's standard does not require that a proposed third party reviewer have had no previous involvement with the utility whose program it will be reviewing. Rather, the criteria require that the audit organization, including those employees who will be participating in the third party review, will not be reviewing specific activities in which they were previously involved. See Letter from Chairman Palladino to Representatives Ottinger and Dingell (Feb. 1, 1982), Attachment 1, at 1. Petitioners stated that S&W's role as the overviewer of remedial soils work at Midland prohibits that organization from serving in the same capacity for the CCP. The staff disagrees. Since the remedial soils activities are outside the scope of the CCP, S&W will not be called upon to review its own work. Consequently, the staff does not agree that S&W's overview activities will conflict with the established independence criteria.7/

7/ The petitioners questioned why TERA was disqualified from consideration as the overviewer under the CCP while S&W was not disqualified on the ground of independence. See Petition at 19. TERA's disqualification was based on the potential for conflict that could be raised by TERA overview under the CCP of determinations that TERA had previously made under the Independent Design and Construction Verification Program (IDCVP) of the adequacy of the construction of the Auxiliary Feedwater System, the onsite emergency AC power supplies and the HVAC system for the control room. Since TERA has been approved by the NRC to perform the IDCVP, the staff determined that TERA would not satisfy the Commission independence criteria for the third party overview of the CCP. See letter from James G. Keppler, Regional Administrator, Region III to James W. Cook, Consumers Power Company (March 28, 1983) at 3.

The written program documents being utilized to directly control and implement the Construction Implementation Overview (CIO) program[8/] and the applicable S&W corporate master program documents[9/] have been reviewed by the staff. These documents are representative of the scope and depth of the S&W overview. The NRC staff also met with S&W on August 25, 1983, in Midland, Michigan in order to gain additional insight into the total S&W program. Based upon its document review and discussions with S&W at the August 25, 1983, meeting, the staff has found the S&W proposal to constitute an acceptable third party overview program. To provide additional assurance that the third party audit is being properly implemented, the CIO program will also be audited independently by the S&W corporate quality assurance staff. NRC inspectors will also monitor the adequacy of the CIO program.

8/ The documents written expressly for the CIO include:

1. CIO Program Document dated April 1, 1983.
2. CIO Quality Assurance Plan.
3. Third Party CIO Plan.
4. CIO Assessment Procedure, 10.01.
5. Nonconformance Identification and Reporting Procedure, 15.01.
6. A detailed attribute checklist for each CPCo Project Quality Control Instruction (PQCI).
7. A detailed checklist to review generic types of requirements (for non-PQCI activities); e.g., QA Audits and Surveillances.
8. Additional Quality Control Instruction as needed to provide adequate overview control.

9/ The following S&W corporate master program documents will also be utilized for the CIO, as required:

1. QA Topical Report SWSQAP 1-74A, S&W Standard Nuclear Quality Assurance Program.
2. S&W Quality Standards; e.g., for quality sampling.
3. S&W Quality Assurance Directives.

Of particular concern to the petitioners was the number of personnel which S&W had assigned to the Midland overview. See Petition at 18. The number of qualified people will vary with the demand of the work activities to be overviewed. S&W's CIO staffing plan currently has nine people assigned at the Midland site and there are planned increases to 32 people as work activities progress. These numbers, however, are only estimates and S&W has represented that it will commit whatever personnel are necessary to conduct the CIO. Furthermore, the number of personnel utilized by S&W is not subject to limitation by CPCo.

S&W has already begun to review preliminary activities of the licensee in preparation for initiation of the CCP.[10/] This effort has identified various concerns and one nonconformance that required CPCo action to resolve. The NRC staff has reviewed the CIO activities performed to date and has found this overview, including actions taken by CPCo, to be of the quality expected of a third party overview.

10/ The activities being overviewed have included the following CCP and non-CCP activities:

- Program and procedure reviews.
- Review of PQCI's.
- Review of MPQAD QA/QC personnel training and certification.
- Review of general training of CPCo and Bechtel personnel, including construction craftspersons.
- Review of CCP Management Reviews.
- Review of System Interaction Walkdowns.
- Review of Design Documents.

The purpose of the independent third party overview is to provide additional assurance that the CCP is adequate and will be properly implemented. This overview requirement was necessitated by the loss of NRC staff confidence in CPCo to successfully implement a quality assurance program for the Midland project. The CIO will remain in place at the Midland site until the necessary level of confidence in the ability of the licensee to construct the Midland project has been restored to the satisfaction of the NRC staff.11/ Given that the third party overview is expected to continue until NRC confidence in the Midland project is restored, petitioners' criticism that the CIO is of insufficient duration appears unfounded.

Opportunity has been provided to the public to participate in the selection of S&W as the third party overviewer, and to comment on the CCP itself. A meeting was held on February 8, 1983, between CPCo and the staff to discuss the CCP. On August 11, 1983, the staff met with the intervernors, representatives of the Government Accountability Project (GAP) and the Lone Tree Council to discuss the CCP and the CIO. Subsequently, on August 25, 1983, the staff met with S&W to discuss the CIO. These meetings were conducted in Midland, Michigan and were open to public observation. Evening sessions to receive public comments regarding the CCP were held on February 8, and August 11, 1983. Similarly, public comments were received following the August 11 and August 25, 1983, meetings. Several additional meetings between the staff, intervenors and a representative of GAP to discuss the CCP and CIO have also been held.

11/ The staff anticipates that the third party overview will be a long term effort.

The petitioners' reference in its request to "closed door" meetings appears to refer to working level meetings that have been held principally between the Midland section of the Region III staff and CPCo site personnel, and, in some cases, S&W onsite personnel. See Petition at 19. Such meetings continue to be necessary to enable the NRC staff to achieve a full understanding of the CCP, including the CIO, and to discharge its inspection duties.

For the reasons set forth above, petitioners' request to reject the selection of S&W to conduct the CIO, and to reject the CCP, is denied. 12/

4. Removal of the Licensee from Primary Responsibility for the Midland Quality Assurance Program

The petitioners request that MPQAD be relieved of responsibility for the QA/QC function at the Midland plant and that an independent team of QA/QC personnel be created which would report simultaneously to the NRC staff and CPCo. In support of their request, petitioners cite much of the same history of QA/QC deficiencies that the staff summarized in the background section of this decision. See Petition at 20.

12/ The staff has approved S&W to conduct the CIO. See Staff Evaluation of Consumers Power Company Proposal to Use Stone and Webster Michigan, Inc. to Conduct the Third Party Construction Implementation Overview of the Midland Nuclear Plant (Sept. 29, 1983).

The changes that CPCo has most recently instituted through development of the CCP should improve its capability to discharge its responsibility under applicable Commission regulations, such as 10 CFR 50.34(a)(7) and Appendix B to 10 CFR Part 50, which require the establishment and execution of a QA/QC program. While Criterion I of Appendix B permits a construction permit holder to delegate to other organizations the detailed execution of the QA/QC program, the history of the Midland project makes it clear that the licensee has retained too little control over the QA/QC program. CPCo seems to be proceeding in a positive direction by integrating the implementation of the QC function formerly under the control of Bechtel into the MPQAD. This consolidation of quality control and quality assurance functions should reinforce the separation between the QC function, which will be assumed by MPQAD, and the construction function, which will remain with Bechtel.

While it might be permissible under Appendix B to 10 CFR Part 50 for CPCo to retain an independent organization to execute the QA/QC program, the licensee remains ultimately responsible for the establishment and execution of the program. As stated above, the staff considers the strengthening of MPQAD to be a positive step in improving CPCo's capability to assure the quality of construction of the Midland facility. In view of the relatively short existence of the MPQAD, there does not currently exist any justification for requiring CPCo to retain an outside organization to execute the QA/QC program. Therefore, this aspect of petitioners' request is denied.

Petitioners also requested that the independent QA/QC team report simultaneously to the NRC and to CPCo management. The petitioners apparently intended that the NRC would be involved in making management decisions regarding construction of the facility based upon the reports of the independent QA/QC team. There appears to be no basis for this extraordinary departure from the NRC's regulatory function. Accordingly, this aspect of the petition is denied.

5. Detailed Review of Soils Settlement Resolution

The petitioners requested that the staff conduct a detailed review of the resolution of the soils settlement problems, including a technical analysis of the implementation of the underpinning project at the current stage of completion. Petition at 23. In its supporting discussion, the petition focused upon the questionable structural integrity of the diesel generator building.

A detailed review of the program for resolution of the soils settlement problem has previously been conducted by the NRC staff and its consultants. In 1979 the U.S. Army Corps of Engineers was contracted to assist the staff in the safety review of the Midland project in the field of geotechnical engineering. After the soils problem became known, additional assistance to the staff in specialized engineering fields (structural, mechanical, and underpinning) was obtained from the U.S. Naval Surface Weapons Center, Harstead Engineering Associates, Geotechnical Engineers, Inc., and Energy Technology Engineering Center. These consultants assisted in the review of technical studies, participated in design audits, visited the site, provided input to the Safety Evaluation Report, and provided expert testimony before the Atomic Safety and

Licensing Board. Thus, the approach to the resolution of the soils settlement issue has been thoroughly studied by the staff and its consultants.

The implementation of the remedial soils activities is being closely followed as part of the NRC's inspection program. This inspection effort includes ongoing technical review of the remedial soils program and its implementation by a Region III soils specialist. Technical expertise to evaluate implementation is also provided by the NRC's Office of Nuclear Reactor Regulation. Additionally, the NRC is utilizing Geotechnical Engineers Inc. in assessing aspects of the remedial soils and underpinning activities. In addition, the soils settlement question has been in litigation for over two years before an Atomic Safety and Licensing Board. Consequently, the relief requested with regard to the soils settlement issue has been substantially satisfied by prior action of the Commission.

Along with review of the soils settlement issue, petitioners requested that another study of the seismic design deficiencies of the Midland plant, with emphasis on the diesel generator building, be conducted. The petitioners further requested that this review would be conducted by a "non-nuclear construction consultant." See Petition at 23.

The NRC staff has initiated a task force study by consultants from Brookhaven National Laboratory (BNL) and NRC structural engineers to evaluate concerns about the structural integrity of the diesel generator building raised by a NRC Region III inspector in testimony before the Subcommittee on Energy and the Environment of the House Committee on Interior and Insular Affairs. Following their review, a report will be issued addressing the concerns raised by the inspector. Decisions on whether further actions are required will be made based upon that report. Additional details on the task force were provided to the Government Accountability Project by letter dated August 10, 1983, and in Board Notifications 83-109 and 83-142, which were transmitted to GAP on July 27 and September 22, 1983, respectively.

As to the request that a review of the diesel generator building be conducted by a "non-nuclear construction consultant", BNL has established an expert team to resolve the concerns raised by the Region III inspector. Expertise rather than the label "non nuclear construction consultant" should be the governing criteria. The staff has reviewed the qualifications of the team members and is satisifed with their experience. The task force study currently in progress substantially satisfies this aspect of the petition.

The petition also appears to be requesting an additional review of the seismic design of structures other than the diesel generator building. Petitioners have not, however, stated any basis why additional reviews beyond those reflected in the Safety Evaluation Report and Supplements are necessary. The staff does not believe that an additional review by an outside organization of the facility's seismic design is required at this time.

Conclusion

Based upon the foregoing discussion, I have granted the petition in part and denied it in part.

A copy of this decision will be filed with the Office of the Secretary of the Commission for the Commission's review in accordance with 10 CFR 2.206(c) of the Commission's regulations. This decision will become the final action of the Commission twenty-five days after date of issuance unless the Commission, on its own motion, institutes a review of the decision within that time.

RC DeYoung

Richard C. DeYoung, Director
Office of Inspection and Enforcement

Dated at Bethesda, Maryland,
this 6th day of October 1983

[7590-01]

NUCLEAR REGULATORY COMMISSION

[Docket Nos. 50-329 and 50-330]

CONSUMERS POWER COMPANY

(Midland Plant, Units 1 and 2)

ISSUANCE OF DIRECTOR'S DECISION UNDER 10 CFR 2.206

Notice is hereby given that the Director, Office of Inspection and Enforcement, has issued a decision concerning a petition dated June 13, 1983, filed by Billie Pirner Garde of the Government Accountability Project on behalf of the Lone Tree Council and others. The petitioners had requested that the Commission take a number of actions with respect to the Midland Plant. The Director, Office of Inspection and Enforcement, has decided to grant in part and deny in part the petitioners' request.

The reasons for this decision are explained in a "Director's Decision" under 10 CFR 2.206 (DD-83-16), which is available for public inspection in the Commission's Public Document Room, 1717 H Street, N.W., Washington, D.C. 20555, and in the Local Public Document Room for the Midland Plant, located at the Grace Dow Memorial Library, 1910 W. St. Andrews Road, Midland, Michigan, 48640.

Dated at Bethesda, Maryland this 6th day of October, 1983.

FOR THE NUCLEAR REGULATORY COMMISSION

RC DeYoung

Richard C. DeYoung, Director
Office of Inspection and Enforcement

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UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

OCTOBER 6 1983

Docket No. 50-329
50-330

Mr. James W. Cook
Vice President
Consumers Power Company
1945 West Parnall Road
Jackson, Michigan 49201

Dear Mr. Cook:

Enclosed please find a Confirmatory Order for Modification of Construction Permits (Effective Immediately) for the Midland Plant issued this day. In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, Code of Federal Regulations, a copy of this letter and the enclosure will be placed in the NRC's Public Document Room.

Sincerely,

R C DeYoung

Richard C. DeYoung, Director
Office of Inspection and Enforcement

Enclosure: Confirmatory Order

cc: Michael Miller, Esq.
Billie Pirner Garde,
Government Accountability Project

8310200375

UNITED STATES
NUCLEAR REGULATORY COMMISSION

In the Matter of)
)
CONSUMERS POWER COMPANY)
(Midland Plant Units 1 and 2))

Docket No. 50-329
50-330
EA-83-109

CONFIRMATORY ORDER FOR MODIFICATION OF CONSTRUCTION PERMITS (EFFECTIVE IMMEDIATELY)

I

Consumers Power Company (the "licensee") is the holder of construction permits CPPR-81 and CPPR-82 issued by the Atomic Energy Commission (now the Nuclear Regulatory Commission, hereafter "Commission"), which authorize the construction of the Midland Plant, Units 1 and 2 (the "facility"). The facility is under construction in Midland, Michigan.

II

Since the start of construction, the facility has experienced significant quality assurance ("QA") problems. Although the licensee took corrective actions in each case, problems continued to be experienced in the implementation of its QA program.

An NRC Region III inspection, commenced in October 1982 and completed in January 1983, identified significant problems with the QA inspection process and with the conformance to design documents of installed components in the Diesel Generator Building ("DGB"). These findings were identified to the licensee in an exit meeting following the inspection in November 1982. The licensee subsequently made similar findings in other areas of the facility. In view of 1) the widespread nature of the problems identified, 2) the history of QA problems at the facility,

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and 3) the ineffectiveness of past corrective actions to resolve these problems, the NRC staff requested the licensee to develop a comprehensive program to verify the adequacy of previous construction and to assure the adequacy of future construction. On December 2, 1982, the licensee directed that the majority of safety related work at the site be halted and presented to the staff the outlines of a Construction Completion Program ("CCP"). By letter dated December 30, 1982, the NRC confirmed the licensee's stopping work and other commitments undertaken by the licensee. In accordance with those commitments, the CCP was formally submitted to the staff on January 10, 1983.

The CCP is a program to provide guidance in the planning and management of the construction and QA activities necessary for completion of the facility in accordance with Commission regulations. The CCP has undergone revisions in response to questions and comments raised by the staff and by members of the public and was submitted in final form on August 26, 1983.

Part of the CCP is a Construction Implementation Overview ("CIO") to be conducted by an independent third party. The CIO effort is described in the CCP and documents provided to NRC on April 6 and 11, May 19, August 30 and September 9, 1983.

The CIO was necessitated by the NRC staff's loss of confidence in the licensee alone to implement an effective QA program. In response to this concern, the licensee has committed to keep the CIO in effect until the licensee has demonstrated to the NRC staff that a third party overview is no longer necessary to provide reasonable assurance that the facility can be constructed in compliance with the Commission's QA criteria (10 CFR Part 50, Appendix B). The licensee has proposed and the staff has approved, by letter dated September 29, 1983, Stone and Webster Engineering Corporation to perform the CIO.

III

The NRC staff has conducted a review of the CCP and has concluded that it constitutes a program which provides reasonable assurance that the facility can be satisfactorily completed in accordance with Commission requirements. I have concluded that the activities halted by the licensee on December 2, 1982, may resume provided they are conducted in accordance with the CCP. I, therefore, find that the public health, safety and interest requires that any continuation of construction be in accordance with the CCP and that the CCP be confirmed by order made immediately effective.

IV

Accordingly, pursuant to Sections 103 and 161i of the Atomic Energy Act of 1954, as amended, and the Commission's regulations in 10 CFR Parts 2 and 50, Construction Permits CPPR-81 and CPPR-82 are hereby modified to include the following provisions:

a. The licensee shall adhere to the Construction Completion Program, dated August 26, 1983, for the duration of construction of the facility.

b. The licensee shall maintain in effect the Construction Implementation Overview provision of the Construction Completion Program with the Stone and Webster Engineering Corporation as the third party overviewer until the Regional Administrator, NRC Region III, finds in writing that the third party overview is no longer necessary to provide reasonable assurance that the facility can be constructed in compliance with 10 CFR Part 50.

c. The licensee may make changes to the Construction Completion Program provided such changes (1) do not decrease its effectiveness, (2) are submitted to the Regional Administrator with appropriate justification, and (3) are approved in writing by the Regional Administrator prior to their implementation.

V

The licensee may request a hearing on this Order within 25 days of the date of this Order. Any request for hearing shall be submitted to the Director, Office of Inspection and Enforcement, U.S. Nuclear Regulatory

Commission, Washington, D.C. 20555. A copy of the request shall also be sent to the Executive Legal Director at the same address and to the Regional Administrator, NRC Region III, 799 Roosevelt Road, Glen Ellyn, Illinois 60137. A REQUEST FOR HEARING SHALL NOT STAY THE IMMEDIATE EFFECTIVENESS OF SECTION IV OF THIS ORDER.

If a hearing is to be held concerning this Order, the Commission will issue an order designating the time and place of hearing. If a hearing is held, the issue to be considered at such hearing shall be whether this Order should be sustained.

FOR THE NUCLEAR REGULATORY COMMISSION

R C DeYoung

Richard C. DeYoung, Director
Office of Inspection and Enforcement

Dated at Bethesda, Maryland,
this 6th day of October, 1983

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

OFFICE OF INSPECTION AND ENFORCEMENT
Richard C. DeYoung, Director

In the Matter of	)	
CONSUMERS POWER COMPANY	)	Docket Nos. 50-329 50-330
(Midland Nuclear Power Plant, Units 1 and 2)	)	(10 CFR 2.206)

DIRECTOR'S DECISION UNDER 10 CFR 2.206

Introduction

By letter to the Nuclear Regulatory Commission (NRC) dated June 13, 1983, Billie Pirner Garde of the Government Accountability Project, on behalf of the Lone Tree Council and others (hereinafter referred to as the petitioners), requested that, among other relief, the NRC take immediate action with regard to the Midland project. The letter was referred to the Director of the Office of Inspection and Enforcement for treatment as a request for action pursuant to 10 CFR 2.206 of the Commission's regulations.

On July 22, 1983, Edward L. Jordan, Acting Director of the Office of Inspection and Enforcement, acknowledged receipt of the petition and informed the petitioners that their request for immediate action was denied. Mr. Jordan noted that safety-related work at the Midland site had been stopped, with the exception of certain specified activities, and that the NRC staff was closely following the current activities at the Midland site. Mr. Jordan further noted that Consumers Power Company had agreed not to proceed with implementation of a construction completion program until such a program had been reviewed by the NRC. The staff expected to be able to complete its evaluation of the request before final action was taken on that program. Consequently, Mr. Jordan concluded that "continuation of currently authorized activities at Midland should not affect the staff's ability to grant the requested relief." Letter from Edward L. Jordan, Acting Director, Office of Inspection and Enforcement to Billie Pirner Garde (July 22, 1983). The staff has now completed its evaluation of the petition, and for the reasons stated herein, the request is granted in part and denied in part.

Issues Raised

Petitioners requested that the following six actions be taken by the Commission:

> Modify the Construction Permit (Midland Nuclear Power Plant, Units 1 and 2) to include mandatory "hold points" on the balance-of-plant (BOP) work and incorporate the current Atomic Safety and Licensing Board (ASLB or Board) ordered "hold points" on the soils remedial work into the Midland Construction permit (sic).
>
> Require a management audit of Consumers Power Company (CPCo) by an independent, competent management auditing firm that will determine the causes of the management failures that have resulted in the soils settlement disaster and the recently discovered Quality Assurance breakdown.
>
> Reject the Construction Completion Plan (CCP) as currently proposed, including a rejection of Stone and Webster to conduct the third party audit of the plant. Instead a truly independent, competent, and credible third party auditor should be selected with public participation in the process.

Remove the Quality Assurance/Quality Control function from the Midland Project Quality Assurance Department (MPQAD) and replace them with an independent team of QA/QC personnel that reports simultaneously to the NRC and CPCo management.

Increase the assignment of NRC personnel to include additional technical and inspection personnel as requested by the Midland Section of the Office of Special Cases.

Require a detailed review of the soils settlement resolution as outlined r the Supplemental Safety Evaluation Report, incorporating a technical analysis of the implementation of the underpinning project at the current stage of completion.

Petition at 1. The fifth issue relates to a matter of internal Commission organization and staffing, namely the allocation of staff to inspection of facilities. The staff is expecting to augment inspection personnel available to work on Midland. However, the creation of positions within the Office of Special Cases is a matter that will be determined by the Commission budget process. For these reasons, the staff is not considering this aspect of the request in this decision.

Background

The Consumers Power Company (CPCo or licensee) holds Construction Permits No. CPPR-81 (Unit 1) and No. CPPR-82 (Unit 2), issued by the Atomic Energy Commission in 1972, which authorized construction of the Midland Plant. The Midland nuclear plant is located in Midland, Michigan, and consists of two pressurized water reactors of Babcock and Wilcox design and related facilities for use in the commercial generation of electric power.

Since the start of construction, Midland has experienced significant construction problems attributable to deficiencies in implementation of its quality assurance (QA) program. 1/ Following the identification of these problems, the licensee took action to identify the cause and correct each problem. Steps were also taken to upgrade the Midland QA program. Nevertheless, the licensee continued to experience problems in the implementation of its quality assurance program.

In 1980, the licensee reorganized its QA department so as to increase the involvement of high level CPCo management in onsite QA activities. Among its other tasks, the reorganized QA department, called the Midland Project Quality Assurance Department (MPQAD), was given the responsibility for quality control (QC) of heating, ventilation and air conditioning (HVAC) work in place of the HVAC contractor, Zack Company.

In May 1981, the NRC conducted a special, in-depth team inspection of the Midland site to examine the status of implementation and effectiveness of the QA program. Based on this inspection, Region III concluded that the newly

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1/ Significant construction problems identified to date include:

1973 - cadweld splicing deficiencies
1976 - rebar omissions
1977 - bulge in the Unit 2 Containment Liner Plate
1977 - tendon sheath location errors
1978 - discovery of soil settlement problem
1980 - Zack Company heating, ventilation, and air conditioning deficiencies
1980 - reactor pressure vessel anchor stud failures
1981 - piping suspension system installation deficiencies
1982 - electrical cable misinstallations

Several of these deficiencies resulted in the Commission taking escalated enforcement action.

organized QA program was acceptable. See Inspection Reports 50-329/81-12; 50-330/81-12. The special team did, however, identify deficiencies in previous QC inspections of piping supports and restraints, and electrical cable installations.[2/] QC functions were further reorganized by the licensee's integration of the QC organization of its architect-engineer, Bechtel Power Corporation, into MPQAD in September 1982. This reorganization reflected the recommendations of the NRC staff. As part of this change, the licensee also undertook to retrain and recertify all previously certified Bechtel QC inspectors.

Nevertheless, construction difficulties continued to be identified at the Midland site. An inspection conducted during the period of October 1982 through January 1983 found significant problems with equipment in the diesel generator building. The subsequent identification of similar findings by CPCo in other portions of the plant prompted the licensee to halt the majority of the safety related work activities in December 1982. In view of the history of QA problems at the Midland plant and the lack of effectiveness of corrective actions to implement an adequate quality assurance program, the NRC indicated to the licensee that it was necessary to develop a comprehensive program to verify the adequacy of previous construction activities and to assure the adequacy of future construction. In view of the licensee's performance history, such an

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2/ As a result of staff discussions about the seriousness of such findings and of similar indications of deficiencies as identified in the Systematic Assessment of Licensee Performance Report issued in April 1982, a special Midland Section in Region III was formed in July 1982. The Midland Section devoted increased attention to inspection of the Midland facility, including upgrading the QC program of the project's constructor, the Bechtel Power Corporation.

effort was necessary to restore staff's confidence in CPCo's ability to properly construct the Midland plants.

Consequently, CPCo discussed with the NRC the concept of a construction completion program which would address the concerns raised by the staff. These discussions were followed by a formal submittal of the Midland Construction Completion Program (CCP).

The CCP is the licensee's program for the planning and management of the construction and quality activities necessary for its completion of the construction of the Midland facility. An important aspect of the CCP is the third party overview, which is designed to provide additional assurance as to the effectiveness of the CCP. In response to comments from the NRC and members of the public, the CCP underwent several revisions. As revised and submitted by the licensee on August 26, 1983,[4/] the CCP includes: (1) NRC hold points; (2) the requirement for 100% reinspection of accessible installations; (3) the integration of Bechtel's QC program with MPQAD; (4) the retraining and recertification of QC inspectors; (5) the general training of licensee and contractor personnel in quality requirements for nuclear work, requirements of the CCP, safety orientation and inspection, and work procedures; (6) the revision, as necessary, of Project Quality Control Instructions (PQCI's); (7) CCP team training; and (8) an independent third party overview of CCP activities.

4/ The Petition was apparently based upon the June 3, 1983 version of the CCP. Subsequent versions of the CCP, as described in this decision, address a number of issues raised by petitioners.

The CCP is divided into two phases. Phase 1 consists of a systematic review of the safety-related systems and areas of the plant. This review will be conducted on an area-by-area basis and will be done by teams with responsibility for particular systems. Phase 1 is intended to provide a clear identification of remaining installation work, including any necessary rework and an up-to-date inspection to verify the quality of existing work.

Phase 2 will take the results of the Phase 1 review and complete any necessary work or rework, thereby bringing the project to completion. The teams organized for Phase 1 activities will continue as the responsible organizational units to complete the work in Phase 2.

It should be noted that the CCP does not include the remedial soils program, nuclear steam supply system installation, HVAC installation, and the reinspection of pipe hangers and electrical cable. The remedial soils activities are being closely inspected under the conditions of the construction permits which implement the Atomic Safety and Licensing Board's April 30, 1982, order and under a work authorization procedure. Therefore, the staff does not consider it necessary to require the remedial soils activities to be included in the CCP. Controls over the soils work have been implemented under a separate program. Similarly, reinspection of the pipe hangers and electrical cable were not included in Phase I of the CCP because that reinspection is being done under a separate commitment to the NRC. *See* letters from James G. Keppler, Regional Administrator, NRC Region III to James W. Cook, Consumers Power Company (August 30, September 2, 1982). Nuclear Steam Supply System installation and HVAC installation were not drawn into question by the diesel generator building inspection.

The staff has not developed facts to indicate that installation of these systems should be included in the CCP. However, these activities will be included in the construction implementation overview to be conducted by the third party overviewer.

The CCP is designed to address the generic applicability of the problems identified by the NRC's inspection of the diesel generator building. The objective of the CCP is to look at the plant hardware and equipment, identify existing problems, correct these problems and complete construction of the plant.

Consideration of Issues Raised

1. Modification of Midland Construction Permits

Petitioners request that the Commission modify the Midland construction permits in two respects: 1) require "hold points" at various stages of the construction completion process; and, 2) incorporate those hold points concerning remedial soils work previously authorized by the Atomic Safety and Licensing Board panel with jurisdiction over the Midland proceeding.

The hold points are fundamental elements of the Midland CCP. As used by both the staff and petitioners, hold points refer to predetermined stages beyond which activities cannot proceed until authorized. Only when such prior work is found to be satisfactory will new work be authorized under the CCP. In this regard, the petitioners requested that three specific hold points be incorporated into the CCP to require NRC or third party review prior to continuation of work.

Based on their review of an early version of the CCP, petitioners asserted that the Midland project had been detrimentally affected by the lack of organizational freedom for its QA staff. See Petition at 13. Accordingly, the petitioners requested that a hold point be incorporated into the CCP whereby the success of the proposed program for the retraining and recertification of QA/QC personnel would be evaluated before any actual work was authorized under Phase 1 of the CCP. Id. at 13, 15. Subsequent to its initial discussions with the staff concerning development of a comprehensive construction completion program,[5/] the licensee began preliminary work, such as team training and recertification of QC inspectors in preparation for its anticipated Phase 1 activities, quality verification program and status assessments. The NRC was informed when training and recertification of QA/QC personnel and CCP team training would begin, and conducted a review of the licensee's actions. The staff suggested that the licensee undertake additional work before proceeding with some of its training effort. Consequently, the retraining hold point requested by petitioners has already been satisfied by the staff.

5/ On December 2, 1982, when CPCo first discussed a construction completion plan with the NRC staff, CPCo was informed by Region III staff that it would be necessary to incorporate NRC hold points. The staff identified four points at which it would require NRC inspectors to review completed work before the next activity could be undertaken. These hold points were identified as:

1. Review and approval of training and recertification of QC inspectors before beginning Phase 1;
2. Review and approval of CCP team training before beginning Phase 1;
3. Review and approval of the Quality Verification Program (QVP) and status assessments before beginning Phase 1;
4. Review and approval of the program for rework or systems completion work before beginning Phase 2.

The petitioners also viewed the proposed CCP as lacking in comprehensiveness. To remedy this deficiency, petitioners proposed that "either a third party or NRC 'hold point' be contained in the reinspection Phase I activities [of the CCP] to determine the adequacy of the 'accessible systems' approach."[6/] Petition at 13.

As described in section three, infra, a third party will be conducting an extensive overview of the CCP and other construction completion activities. The fact that the third party overviewer will also have hold point controls over the licensee should provide additional assurance that construction is proceeding in accordance with all applicable requirements. See Consumers Power Company, Construction Completion Program (August 26, 1983) at 34. The NRC and the third party will monitor the reinspection activities. The staff believes that these monitoring activities will provide the control sought by the petitioners in their request to establish a hold point during Phase 1 reinspection to determine the adequacy of the accessible systems approach.

The third hold point requested by petitioners derives from another criticism of the proposed CCP - the failure of that plan to specify inspection procedures and evaluation criteria. See Petition at 10-11. Accordingly, petitioners request a systematic and thorough review of the construction and quality work packages which will be completed as a prerequisite to initiation of new construction work under Phase 2 of the CCP. Id. at 11.

6/ The accessible systems approach refers to the extent of reinspection under the CCP. Inaccessible areas of the plant will be reinspected by utilizing a records review and destructive and non-destructive testing as required. See Consumers Power Company, Construction Completion Program (August 26, 1983) at 22-23.

The CCP requires that representative construction and quality work packages be reviewed to assure that any completed work is consistent with statements made by the licensee in both its Final Safety Analysis Report and Quality Assurance Topical Report. In addition, the third party overviewer will be using sampling techniques and reviewing selected work and quality packages prior to and during Phase II. Should the results of this sampling approach identify inadequate work packages, the sampling size will be increased as necessary to provide the needed assurance that work packages are adequately reviewed. Moreover, the NRC staff, in performing its inspection activities, will overview this entire process, including reviewing selected quality and work packages.

In summary, the staff believes that those hold points it has incorporated into the CCP, when viewed in the aggregate, substantially satisfy the hold points requested by petitioners. The licensee is required to adhere to these hold points as part of the CCP in conformance with the Confirmatory Order for Modification of Construction Permits (Effective Immediately).

With respect to the second aspect of the requested relief, incorporation of NRC hold points authorized by the Licensing Board's April 30, 1982, Memorandum and Order, the petitioners' request has been satisfied by previous action of the Commission. By amendment dated May 26, 1982, the hold points ordered by the Board were incorporated into the construction permits. See 47 Fed. Reg. 23999 (June 2, 1982). Accordingly, the construction permits already prohibit CPCo from performing the following activities without "explicit prior approval" from the staff:

(a) any placing, compacting, excavating, or drilling soil materials around safety-related structures and systems;

(b) physical implementation of remedial action for correction of soil-related problems under and around safety-related structures and systems, including but not limited to:

(i) dewatering systems

(ii) underpinning of service water building

(iii) removal and replacement of fill beneath the feedwater isolation valve pit areas, auxiliary building electrical penetration areas and control tower, and beneath the turbine building

(iv) placing of underpinning supports beneath any of the structures listed in (iii) above

(v) compaction and loading activities;

(c) construction work in soil materials under or around safety-related structures and systems such as field installation, or rebedding, of conduits and piping.

Construction Permits No. CPPR-81 and CPPR-82, Amendment No. 3 (May 26, 1982).

2. Management audit of CPCo

The petitioners request that the NRC require a management audit of CPCo's performance on the Midland project. The staff does not believe that a management audit is necessary at this time as a condition for going forward with the CCP. The staff expects that the CCP, with its built-in hold points and third party overview, should provide an effective process to satisfactorily complete construction at Midland, without the previous quality assurance problems. The third party overview together with the planned staff inspection activities should provide information to determine the adequacy of the licensee's implementation of the CCP. Nevertheless, the staff will continue to review information concerning the licensee's performance in other areas to determine whether an audit is required.

3. Rejection of Construction Completion Program and Third Party Overview Organization

In requesting that the Commission reject the Midland construction completion plan, petitioners based their position on the unecceptability of the Stone and Webster Engineering Corporation (S&W) to conduct the third party overview of the CCP. Petitioners raised three objections to the selection of S&W: the failure of S&W to meet the Commission's criteria for the independence required of a third party, see Petition at 19; the failure of S&W to submit a minimally adequate audit proposal, id. at 18-19; and the lack of public participation in the selection of S&W as the third party review organization for the Midland project. Id. at 19-20.

In support of its argument that S&W is not sufficiently independent to monitor implementation of the CCP, the petitioners asserted that "under both a literal and realistic reading of the Commission's primary financial criteria, ...the third party not have any direct previous involvement with the Company." Petition at 19. In order to evaluate whether an audit organization is sufficiently independent to conduct a third party review, the Commission generally utilizes the guidance originally set forth in a letter from Chairman Palladino to Representatives Ottinger and Dingell. The Commission's standard does not require that a proposed third party reviewer have had no previous involvement with the utility whose program it will be reviewing. Rather, the criteria require that the audit organization, including those employees who will be participating in the third party review, will not be reviewing specific activities in which they were previously involved. See Letter from Chairman Palladino to Representatives Ottinger and Dingell (Feb. 1, 1982), Attachment 1, at 1. Petitioners stated that S&W's role as the overviewer of remedial soils work at Midland prohibits that organization from serving in the same capacity for the CCP. The staff disagrees. Since the remedial soils activities are outside the scope of the CCP, S&W will not be called upon to review its own work. Consequently, the staff does not agree that S&W's overview activities will conflict with the established independence criteria.7/

7/ The petitioners questioned why TERA was disqualified from consideration as the overviewer under the CCP while S&W was not disqualified on the ground of independence. See Petition at 19. TERA's disqualification was based on the potential for conflict that could be raised by TERA overview under the CCP of determinations that TERA had previously made under the Independent Design and Construction Verification Program (IDCVP) of the adequacy of the construction of the Auxiliary Feedwater System, the onsite emergency AC power supplies and the HVAC system for the control room. Since TERA has been approved by the NRC to perform the IDCVP, the staff determined that TERA would not satisfy the Commission independence criteria for the third party overview of the CCP. See letter from James G. Keppler, Regional Administrator, Region III to James W. Cook, Consumers Power Company (March 28, 1983) at 3.

The written program documents being utilized to directly control and implement the Construction Implementation Overview (CIO) program[8] and the applicable S&W corporate master program documents[9] have been reviewed by the staff. These documents are representative of the scope and depth of the S&W overview. The NRC staff also met with S&W on August 25, 1983, in Midland, Michigan in order to gain additional insight into the total S&W program. Based upon its document review and discussions with S&W at the August 25, 1983, meeting, the staff has found the S&W proposal to constitute an acceptable third party overview program. To provide additional assurance that the third party audit is being properly implemented, the CIO program will also be audited independently by the S&W corporate quality assurance staff. NRC inspectors will also monitor the adequacy of the CIO program.

8/ The documents written expressly for the CIO include:

1. CIO Program Document dated April 1, 1983.
2. CIO Quality Assurance Plan.
3. Third Party CIO Plan.
4. CIO Assessment Procedure, 10.01.
5. Nonconformance Identification and Reporting Procedure, 15.01.
6. A detailed attribute checklist for each CPCo Project Quality Control Instruction (PQCI).
7. A detailed checklist to review generic types of requirements (for non-PQCI activities); e.g., QA Audits and Surveillances.
8. Additional Quality Control Instruction as needed to provide adequate overview control.

9/ The following S&W corporate master program documents will also be utilized for the CIO, as required:

1. QA Topical Report SWSQAP 1-74A, S&W Standard Nuclear Quality Assurance Program.
2. S&W Quality Standards; e.g., for quality sampling.
3. S&W Quality Assurance Directives.

Of particular concern to the petitioners was the number of personnel which S&W had assigned to the Midland overview. See Petition at 18. The number of qualified people will vary with the demand of the work activities to be overviewed. S&W's CIO staffing plan currently has nine people assigned at the Midland site and there are planned increases to 32 people as work activities progress. These numbers, however, are only estimates and S&W has represented that it will commit whatever personnel are necessary to conduct the CIO. Furthermore, the number of personnel utilized by S&W is not subject to limitation by CPCo.

S&W has already begun to review preliminary activities of the licensee in preparation for initiation of the CCP.[10/] This effort has identified various concerns and one nonconformance that required CPCo action to resolve. The NRC staff has reviewed the CIO activities performed to date and has found this overview, including actions taken by CPCo, to be of the quality expected of a third party overview.

10/ The activities being overviewed have included the following CCP and non-CCP activities:

- Program and procedure reviews.
- Review of PQCI's.
- Review of MPQAD QA/QC personnel training and certification.
- Review of general training of CPCo and Bechtel personnel, including construction craftspersons.
- Review of CCP Management Reviews.
- Review of System Interaction Walkdowns.
- Review of Design Documents.

The purpose of the independent third party overview is to provide additional assurance that the CCP is adequate and will be properly implemented. This overview requirement was necessitated by the loss of NRC staff confidence in CPCo to successfully implement a quality assurance program for the Midland project. The CIO will remain in place at the Midland site until the necessary level of confidence in the ability of the licensee to construct the Midland project has been restored to the satisfaction of the NRC staff.[11] Given that the third party overview is expected to continue until NRC confidence in the Midland project is restored, petitioners' criticism that the CIO is of insufficient duration appears unfounded.

Opportunity has been provided to the public to participate in the selection of S&W as the third party overviewer, and to comment on the CCP itself. A meeting was held on February 8, 1983, between CPCo and the staff to discuss the CCP. On August 11, 1983, the staff met with the intervernors, representatives of the Government Accountability Project (GAP) and the Lone Tree Council to discuss the CCP and the CIO. Subsequently, on August 25, 1983, the staff met with S&W to discuss the CIO. These meetings were conducted in Midland, Michigan and were open to public observation. Evening sessions to receive public comments regarding the CCP were held on February 8, and August 11, 1983. Similarly, public comments were received following the August 11 and August 25, 1983, meetings. Several additional meetings between the staff, intervenors and a representative of GAP to discuss the CCP and CIO have also been held.

11/ The staff anticipates that the third party overview will be a long term effort.

The petitioners' reference in its request to "closed door" meetings appears to refer to working level meetings that have been held principally between the Midland section of the Region III staff and CPCo site personnel, and, in some cases, S&W onsite personnel. See Petition at 19. Such meetings continue to be necessary to enable the NRC staff to achieve a full understanding of the CCP, including the CIO, and to discharge its inspection duties.

For the reasons set forth above, petitioners' request to reject the selection of S&W to conduct the CIO, and to reject the CCP, is denied. 12/

4. Removal of the Licensee from Primary Responsibility for the Midland Quality Assurance Program

The petitioners request that MPQAD be relieved of responsibility for the QA/QC function at the Midland plant and that an independent team of QA/QC personnel be created which would report simultaneously to the NRC staff and CPCo. In support of their request, petitioners cite much of the same history of QA/QC deficiencies that the staff summarized in the background section of this decision. See Petition at 20.

12/ The staff has approved S&W to conduct the CIO. See Staff Evaluation of Consumers Power Company Proposal to Use Stone and Webster Michigan, Inc. to Conduct the Third Party Construction Implementation Overview of the Midland Nuclear Plant (Sept. 29, 1983).

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12/ The staff has approved S&W to conduct the CIO. See Staff Evaluation of Consumers Power Company Proposal to Use Stone and Webster Michigan, Inc. to Conduct the Third Party Construction Implementation Overview of the Midland Nuclear Plant (Sept. 29, 1983).

The changes that CPCo has most recently instituted through development of the CCP should improve its capability to discharge its responsibility under applicable Commission regulations, such as 10 CFR 50.34(a)(7) and Appendix B to 10 CFR Part 50, which require the establishment and execution of a QA/QC program. While Criterion I of Appendix B permits a construction permit holder to delegate to other organizations the detailed execution of the QA/QC program, the history of the Midland project makes it clear that the licensee has retained too little control over the QA/QC program. CPCo seems to be proceeding in a positive direction by integrating the implementation of the QC function formerly under the control of Bechtel into the MPQAD. This consolidation of quality control and quality assurance functions should reinforce the separation between the QC function, which will be assumed by MPQAD, and the construction function, which will remain with Bechtel.

While it might be permissible under Appendix B to 10 CFR Part 50 for CPCo to retain an independent organization to execute the QA/QC program, the licensee remains ultimately responsible for the establishment and execution of the program. As stated above, the staff considers the strengthening of MPQAD to be a positive step in improving CPCo's capability to assure the quality of construction of the Midland facility. In view of the relatively short existence of the MPQAD, there does not currently exist any justification for requiring CPCo to retain an outside organization to execute the QA/QC program. Therefore, this aspect of petitioners' request is denied.

Petitioners also requested that the independent QA/QC team report simultaneously to the NRC and to CPCo management. The petitioners apparently intended that the NRC would be involved in making management decisions regarding construction of the facility based upon the reports of the independent QA/QC team. There appears to be no basis for this extraordinary departure from the NRC's regulatory function. Accordingly, this aspect of the petition is denied.

5. Detailed Review of Soils Settlement Resolution

The petitioners requested that the staff conduct a detailed review of the resolution of the soils settlement problems, including a technical analysis of the implementation of the underpinning project at the current stage of completion. Petition at 23. In its supporting discussion, the petition focused upon the questionable structural integrity of the diesel generator building.

A detailed review of the program for resolution of the soils settlement problem has previously been conducted by the NRC staff and its consultants. In 1979 the U.S. Army Corps of Engineers was contracted to assist the staff in the safety review of the Midland project in the field of geotechnical engineering. After the soils problem became known, additional assistance to the staff in specialized engineering fields (structural, mechanical, and underpinning) was obtained from the U.S. Naval Surface Weapons Center, Harstead Engineering Associates, Geotechnical Engineers, Inc., and Energy Technology Engineering Center. These consultants assisted in the review of technical studies, participated in design audits, visited the site, provided input to the Safety Evaluation Report, and provided expert testimony before the Atomic Safety and

Licensing Board. Thus, the approach to the resolution of the soils settlement issue has been thoroughly studied by the staff and its consultants.

The implementation of the remedial soils activities is being closely followed as part of the NRC's inspection program. This inspection effort includes ongoing technical review of the remedial soils program and its implementation by a Region III soils specialist. Technical expertise to evaluate implementation is also provided by the NRC's Office of Nuclear Reactor Regulation. Additionally, the NRC is utilizing Geotechnical Engineers Inc. in assessing aspects of the remedial soils and underpinning activities. In addition, the soils settlement question has been in litigation for over two years before an Atomic Safety and Licensing Board. Consequently, the relief requested with regard to the soils settlement issue has been substantially satisfied by prior action of the Commission.

Along with review of the soils settlement issue, petitioners requested that another study of the seismic design deficiencies of the Midland plant, with emphasis on the diesel generator building, be conducted. The petitioners further requested that this review would be conducted by a "non-nuclear construction consultant." <u>See</u> Petition at 23.

The NRC staff has initiated a task force study by consultants from Brookhaven National Laboratory (BNL) and NRC structural engineers to evaluate concerns about the structural integrity of the diesel generator building raised by a NRC Region III inspector in testimony before the Subcommittee on Energy and the Environment of the House Committee on Interior and Insular Affairs. Following their review, a report will be issued addressing the concerns raised by the inspector. Decisions on whether further actions are required will be made based upon that report. Additional details on the task force were provided to the Government Accountability Project by letter dated August 10, 1983, and in Board Notifications 83-109 and 83-142, which were transmitted to GAP on July 27 and September 22, 1983, respectively.

As to the request that a review of the diesel generator building be conducted by a "non-nuclear construction consultant", BNL has established an expert team to resolve the concerns raised by the Region III inspector. Expertise rather than the label "non nuclear construction consultant" should be the governing criteria. The staff has reviewed the qualifications of the team members and is satisifed with their experience. The task force study currently in progress substantially satisfies this aspect of the petition.

The petition also appears to be requesting an additional review of the seismic design of structures other than the diesel generator building. Petitioners have not, however, stated any basis why additional reviews beyond those reflected in the Safety Evaluation Report and Supplements are necessary. The staff does not believe that an additional review by an outside organization of the facility's seismic design is required at this time.

Conclusion

Based upon the foregoing discussion, I have granted the petition in part and denied it in part.

A copy of this decision will be filed with the Office of the Secretary of the Commission for the Commission's review in accordance with 10 CFR 2.206(c) of the Commission's regulations. This decision will become the final action of the Commission twenty-five days after date of issuance unless the Commission, on its own motion, institutes a review of the decision within that time.

Richard C. DeYoung, Director
Office of Inspection and Enforcement

Dated at Bethesda, Maryland,
this 6th day of October 1983

[7590-01]

NUCLEAR REGULATORY COMMISSION

[Docket Nos. 50-329 and 50-330]

CONSUMERS POWER COMPANY

(Midland Plant, Units 1 and 2)

ISSUANCE OF DIRECTOR'S DECISION UNDER 10 CFR 2.206

Notice is hereby given that the Director, Office of Inspection and Enforcement, has issued a decision concerning a petition dated June 13, 1983, filed by Billie Pirner Garde of the Government Accountability Project on behalf of the Lone Tree Council and others. The petitioners had requested that the Commission take a number of actions with respect to the Midland Plant. The Director, Office of Inspection and Enforcement, has decided to grant in part and deny in part the petitioners' request.

The reasons for this decision are explained in a "Director's Decision" under 10 CFR 2.206 (DD-83-16), which is available for public inspection in the Commission's Public Document Room, 1717 H Street, N.W., Washington, D.C. 20555, and in the Local Public Document Room for the Midland Plant, located at the Grace Dow Memorial Library, 1910 W. St. Andrews Road, Midland, Michigan, 48640.

Dated at Bethesda, Maryland this 6th day of October, 1983.

FOR THE NUCLEAR REGULATORY COMMISSION

RC DeYoung

Richard C. DeYoung, Director
Office of Inspection and Enforcement

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file
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Lone Tree Council

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
799 ROOSEVELT ROAD
GLEN ELLYN, ILLINOIS 60137

MAY 1 3 1983

Lone Tree Council
ATTN: Mr. Leo R. Romo
Corresponding Secretary
P. O. Box 421
Essexville, MI 48732

Dear Mr. Romo:

This is in response to the Lone Tree Council's letters of April 21, 1983 to Chairman Palladino, D. G. Eisenhut, and me regarding reinspections and independent audits to identify problems at the Midland Nuclear Power Plant.

During the public meeting in Midland on February 8, 1983, between the NRC and Consumers Power Company, the licensee described its proposed Construction Completion Program which is designed to identify and correct past deficiencies at the plant while establishing a program for future construction. The Construction Completion Program will include two independent third-party firms. On May 3, 1983, the NRC staff approved TERA Corporation to perform an independent review of the design and construction of the Auxiliary Feedwater System. The NRC is still reviewing Consumers Power Company's proposal to have TERA review the design and construction of part of the emergency power system and part of the heating, ventilation, and air conditioning system. The second independent third-party will overview the Construction Completion Program, including the licensee's reinspections. Consumers Power Company has proposed Stone and Webster Engineering Company to conduct this overview and the NRC is currently reviewing the acceptability of this proposal.

Although separate from the Construction Completion Program, Consumers Power has also employed Stone and Webster to overview the remedial work on the soil settlement problems at Midland. The NRC has approved Stone and Webster for this overview.

We believe that the plans for these third party inspections are appropriate and sufficient at this time.

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As a point of clarification, the NRC has not ordered a reinspection at Midland. That is a voluntary commitment made by the licensee as part of their Construction Completion Program.

We disagree with your position that letting Consumers Power Company reinspect their own work makes a mockery of the NRC's commitment to ensuring safe construction, particularly in view of the third party inspections and other actions being taken under the CCP to improve performance. Furthermore, the NRC will be inspecting this effort.

I trust that this has been responsive to your comments. If you have any further comments or questions, please do not hesitate to contact me.

Original signed by
James G. Keppler

James G. Keppler
Regional Administrator

cc: V. Stello, EDO
H. Denton, IE
R. DeYoung, NRR
D. Eisenhut, NRR
DMB/Document Control Desk (RIDS)
Resident Inspector, RIII
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The Honorable Jerry Harbour, ASLB
The Honorable Frederick P. Cowan, ASLB
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OFFICE	RIII		NRR				
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DATE	5/11/83	5/11/83	5/12/83	5/12/83	5/12/83	5/12	5/13/83