INSPECTION PLAN

FACILITY

Palo Verde Nuclear Generating Station - Unit 1 Docket No. 50-528

DATES OF PRINCIPAL INSPECTION ACTIVITY

September 6-16, 1983 - Initial site visit. September 26-30, 1983 - Second site visit. October 11-14, 1983 - Documentation, Region V.

RESOURCES

Region V Inspectors	-	6	
Region I Inspectors	-	1	
Region I NDE Van and Personnel	-	3	
Wisconsin Testing NDE Personnel		2	
NRC Consultants Electrical	-	3	
		15	

ORGANIZATION

Team Leader	-	W.	G. Albert	
Lead Inspector, Mechanical Area	-	Ρ.	P. Narbut	Ļ
Lead Inspector, Electrical Area	-	J.	F. Burdoin	
NDE Supervisor	-	Н.	Kerch + +	
Report Review and Organization	-	Τ.	Young	

OBJECTIVE

The purpose of this inspection is to provide an overall assessment of the actual as-built condition of th Palo Verde Nuclear Generating Station Unit 1 by comparing the as-built condition to design requirements.

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The inspection will concentrate on handware and is intended to assess whether the construction of Palo Verde was performed in accordance with quality requirements appropriate for the time of plant construction.

The review will start with an evaluation of whether the construction documentation gives confidence that the construction work correctly incorporates essential design features. To confirm this, samples of actual construction will be used to verify that the facilities were correctly built and that other construction requirements were met.

METHODS

The method to be used for this inspection requires the selection of a sample of Palo Verde safety-related construction for rigorous examination. The sample is to be of high safety significance and be representative of the work controls, procedures, methodology, and documentation of all safety-related work performed at Palo Verde Nuclear Generating Station. Selection and in-depth examination of a representative sample of this nature will allow some

8402140026 831220 PDR FDIA BERNABE83-598 PDR extrapolation of the Team's findings to the adequacy of all safety-related construction at Palo Verde.

In this regard, the team's approach will be to direct 70 percent of its effort on system and installation verification of the High Pressure Safety Injection System (HPSI), "A" train. This will include in-depth examination of a large number of elements related to this system, including: piping; supports; pumps; valves; welding; nondestructive examination; electrical supplies (including redundany/separation); electrical motors, cables, terminations; supporting structural steel elements; related concrete structures; and other. Within the sample special emphasis shall be directed to the areas of welding and electrical activities. Both of these areas have been the subject of multiple allegations. The Construction Inspection Matrix, (attached) reflects the emphasis on these two areas. The other 30 percent of the team's effort will be focused on inspection of other important areas (including the Reactor Coolant Systems).

The objective stated above will be met by:

- (a) Physical inspection of systems, components, and structures,
- (b) Independent NDE of welds, and structrures,
- (c) Examination of Documentation where necessary to support physical inspections,
- (d) Interviews and discussions with at least 100 craft and inspection personnel.

In each area to be inspected, the sampling results will provide the basis for conclusions regarding the QA/QC were exercised during construction.

An entrance interview will be held with Licensee personnel on the afternoon of September 6. To the maximum extent feasible, this meeting should be used by team members to assure that the Licensee is aware of needs such as:

- (a) Counterpart individuals
- (b) Documentation required
- (c) Craft services needed
- (d) Any special area access required (e.g., electrical in control room)
- (e) Saturday or off-shift assistance.

Notes will be maintained on discussions with craft people. Interview sheets will be maintained on all interviews.

A daily meeting will be held by the team toward the end of each work day. All team personnel are experiented to attend. Each individual will be expected to provide a brief summary of daily progress.

An exit meeting will be held with the Licensee on September 16 by the team leader and the lead inspectors.

The principal exit meeting will be conducted on September 29 PM or September 30 AM. All team members will participate in this meeting.

AREAS TO BE EXAMINED

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The areas to be examined are shown by "X" in the matrix of Enclosure 1. The following is the intended scope of activity in each area to be sampled:

<u>Concrete</u> - Using the Windsor probe, examine different plant areas selected by walkdown and accessibility associated with the HPSI "A" train. Determine that in-situ concrete strength reflects that to be expected from the mix design placed in the selected lifts.

- Walton Structural Steel The welding of structural steel associated with the HPSI train "A" will be examined for size of welds and any obvious defects in the welds. The qualification system for welders and records of such qualification will also be reviewed. The steel as installed will be examined for sizes and type against design requirements. Structural bolted joints will be visually examined for compliance with codes (AISC). Torque wrench testing will be performed if visual inspection reveals any anomalies indicating a need for such checks. Steel will be sampled in a manner which provides a look at steel installed at different times during plant construction.
 - EV Anchor Bolts and Embedded Plates Concrete expansion anchors, where used, and associated with the MPSI "A" train will be examined to determine that they are of the correct type, installed to the proper depth, do not have sleeves pulled against base plates, and that they withstand application of job inspection torques. This activity will require the provision of craft services to assist the NRC. A sample of embedded plates will be examined for conformance to design. Ultrasonics will be utilized to verify thickness. Thread engagement of anchor bolts for these plates will be examined.
 - <u>Penetrations (Piping)</u> Attachment to containment liner, including weldment records, qualification of welders and field observations of welds will be verified.

<u>Primary Loop Piping</u> - Primary loop weldments at PVNGS-1 were made with both machine and manual weld techniques. Procedure and welder qualification will be verified, as well as sampling the records for the welding itself. Some welds will be selected for independent radiography. Also, some welds will be "profiled" ultrasonically to assure base metal and clad thickness. Post weld heat treatment charts will be examined. Storage records for components prior to installation will be examined.

Large Bore Piping - Selected large bore pipe welds will be examined radiographically as described above for the primary loop. Installation records (travelers) will be examined and the NRC will review the records of any installation problems.

<u>Small Bore Piping</u> - Approximately ten socket and butt welds in samll bore piping will be examined by radiography to verify the presence of expansion space in the socket and satisfactory butt welds. The sample will endeavor to cover both field and pipe fabricating shop weldments.

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North + Hangers and Supports - A field walkdown to include hangers and supports associated with the HPSI "A" train will be conducted to determine that the hangers and supports meet the as-built design and that the as-built drawings conform to the original design as modified.

Narby Snubbers and Restraints - Snubbers associated with the HPSI "A" train will be examined against as-built drawings and the as-built drawings will be compared to the design as modified by any design change documents. Pipe whip restraints will be treated in a similar manner during walkdown inspections.

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<u>Pumps and Valves</u> - Pumps and valves in the HPSI "A" train will be examined for conformance to design (e.g., size, orientation, type, installation methods) during the walkdown inspection.

Penetrations (Riping) - Attachment to containment liner, including weldment records, qualification of welders and field observations of welds will be verified.

<u>Cable Trays, Conduits, Raceways and Supports</u> - Field examinations will assure conformance to design and separation criteria specified in governing IEEE codes FSAR, and PVNGS Fire Protection Plan.

<u>Motors</u> - Installation records for pump motors in the HPSI "A" train will be examined for conformance to design. Field examination will verify that care and maintenance instructions are being followed and that records of such care and maintenance are being maintained. This area will be utilized to verify an adequate interface of records for care and maintenance between construction and startup organizations.

<u>Cables</u> - Specific Class IE cables will be randomly selected and traced to verify identification, separation, termination, and routing. Cable tray fill criteria will be sampled by random observations in the field. Cables will be inspected to verify absence of splices in safety-related cables, pressure of fire barriers, absence of damage, and maintenance of cable protection.

<u>Electrical Penetrations</u> - The records for establishing inert atmosphere and seals will be examined and verified. Welding and welder qualifications will be verified. Field examination will address seals, welding and electrical connections. The environmental qualification records for the penetrations will be verified.

<u>Cabinets and Panels</u> - Inspection records for mounting will be verified and seismic qualification tests reviewed.

Diesel Generators - Installation records will be examined. Field examination will be in support of care and maintenance records only.

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ACTIVITIES NDE Review & Independent NDE Field Examination & Walkdown Environmental Qualifications Nonconforming & Chng. Cntrl. Heat Treatment (PH & PWHT) Calibration of Equipment Material Certifications Records Pkg. Completion As-Built Configuration Welder Qualifications Receiving Inspection Installation Records Inspection & Tests Care & Maintenance Welding AREAS CIVIL Concrete X Structural Steel X X X Anchor Bolts & Plates X X MFCHANICAL Piping (Primary Loop) XI X X XI XI X X XI X Piping (Large Bore) XI XI XI XI X X Piping (Small Bore) XI XI X Hangers & Supports X X X X XI Snubbers & Restraints X X X X X XI Pumps & Valves X X Penetrations X X XIX ELECTRICAL & INSTRUMENTATION Cable Trays, Conduits, Raceways X Motors X X X Cables X X X Penetrations X X XI XI X XI XI XI XI X Cabinets & Panels X X Diesel Generators XI X XI

CONSTRUCTION INSPECTION MATRIX

PVNGS-1

Enclosure (1)

Required Documentation for Preparation and General Reference

The following documentation will be required in the office space reserved for the inspection team:

- Organization charts with names for the Bechtel and APS construction and construction management organizations, including quality assurance, quality control and records organization.
- 2. General site and plant layout drawings.
- 3. Bechtel Quality Assurance Manual.
- 4. WPP/QCI procedures of Bechtel.
- 5. Construction specifications.
- 6. Bechtel WPS Manual.
- 7. Bechtel NDE Manual.

Logistical Considerations

a. Team Housing and Travel

Individual team members will be responsible for their own motel reservations and travel arrangements, including rental cars. Please have no more than three inspectors per rental car.

Motels in the town of Goodyear are recommended, since these provide the most reasonable commute time. Consider the Crossroads Best Western, telephone (602) 932-9191. There is also a Ramada Inn there. (See map.) The area of Maricopa County in Arizona is an actual expense area with limits of \$70/day for NRC personnel.

b. NRC Van

This vehicles requires:

- Level parking near reactor building.
- Continuous sanitary water via a garden hose connection.
- Two 30-amp 110V connections.
- Drainage for film processing water (no sewerage).

c. Security and Badges

Individuals will be required to have unescorted access badges issued by APS. The NRC resident inspector will make the necessary arrangements for issuance of these badges on Monday, September 6.

d. Safety Equipment

Individuals should bring their own hard hats and safety glasses, since only a limited number of hard hats with NRC designations are available at the site. Side shields for safety glasses are required at this site.

e. Office Space

Space sufficient to provide a meeting room for 15 to 16 people, plus a work area where drawings can be spread will be required for the team.



DRAFT DUTLINE (FORMAT) OF FINAL REPORT (GIVEN TO EACH INSPECTOR) 9/6/83 2497.

DRAFT OUTLINE

Licensee Letter

Conventional Format except to note Appendix A "Executive Summary; Appendix B Enforcement findings to consist of actual citations

Report

Cover sheet per WNP-2 format Table of contents page:

Inspection Scope and Objectives	I
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Inspection Scope and Objectives

I

Follow generally WNP-2 format. Note concentration on single system and hardware aspects of examinations.

II Team Organization and Methods

List team members including a sentence about their qualifications, e.g. W. G. Albert - Team Leader.

Currently Senior Resident Inspector at WNP-3. Registered professional engineer with 23 years experience in nuclear reactor construction and operations.

Under this section include a description of hardware approach and discuss the interviews with craftsmen and firstline inspectors.

III Inspection Results - Civil Structural

- 1. Concrete
 - a. Areas Examined
 - b. Findings
 - c. Conclusions

2. Structural Steel

- a. Areas Examined
- b. Findings
- c. Conclusions
- 3. Anchor Bolts and Embedded Plates
 - a. Areas Examined
 - b. Findings
 - c. Conclusions

Tables and Figures for Section to be designated as III-1, III-2 etc.

IV Inspection Results - Mechanical

1. Piping Penetrations

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- a. Areas Examined
- b. Findings
- c. Conclusions

2. Large Bore Piping

Include any Primary Loop work in this Section

- a. Areas Examined
- b. Findings
- c. Conclusions

3. Smail Bore Piping

- a. Areas Examined
- b. Findings
- c. Conclusions

4. Hangers and Supports

- a. Areas Examined
- b. Findings
- c. Conclusions

5. Snubbers and Restraints

- a. Areas Examined
- b. Findings
- c. Conclusions

6. Pumps and Valves

- a. Areas Examined
- b. Findings
- c. Conclusions

Tables and Figures for Section to be designated as IV-1,-IV-2 etc.

V Inspection Results - Nondestructive Examination (NDE)

- 1. Radiography of Pipe Weldments
 - a. Areas Examined
 - b. Findings

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- c. Conclusions
- 2. Examination of NDE Methods
 - a. Areas Examined
 - b. Findings
 - c. Conclusions
- 3. Surface NDE of Weldments
 - a. Areas Examined
 - b. Findings
 - c. Conclusions

Tables and Figures for Section to be designated as V-1, V-2 etc.

- VI Inspection Results Electrical/Instrumentation
 - 1. Cable Trays, Conduits, Raceways and Supports
 - a. Areas Examined
 - b. Findings
 - c. Conclusions
 - 2. Motors
 - a. Areas Examined
 - b. Findings
 - c. Conclusions

3. Cable

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- a. Areas Examined
- b. Findings
- c. Conclusions

4. Electrical Penetrations

- a. Areas Examined
- b. Findings
- c. Conclusions

5. Cabinets and Panels

- a. Areas Examined
- b. Findings
- c. Conclusions

6. Diesel Generators

- a. Areas Examined
- b. Findings
- c. Conclusions
- 7. Batteries and Racks
 - a. Areas Examined
 - b. Findings
 - c. Conclusions

Tables and Figures for Section to be designated VI-1, VI-2 etc.