U. S. NUCLEAR REGULATORY COMMISSION

REGION V

Report Nos.	50-528/83-22 50-529/83-12 50-520/83-00		
	20-220/02-03		
Docket Nos.	50-528, 50-529, 50-530	License Nos.	CPPR-141, 142, 143
Licensee:	Arizona Public Service Company P. O. Box 21666 Phoenix, Arizona 85036		
Facility Name:	Palo Verde Nuclear Ge	nerating Station	Units 1, 2, and 3
Inspection at:	Palo Verde Constructi	on Site, Wintersb	urg, Arizona
Inspection con-	ducted: May 23-27,	1983	
Inspectors:	P. P. Narbut, Reactor Insp	ector	6/16/63 Date Signed

P. P. Narbut, Reactor Inspector

J. F. Burdoin, Reactor Inspector

6-17-83 Date Signed

6-17-83 Date Signed

Approved by:

Jalbert Jourg Jr. T. Young, Chief, Reactor Projects Section No.2

Summary:

Inspection during the period of May 23-27, 1983 (Report Nos. 50-528/83-22, 50-529/83-12, and 50-530/83-09)

<u>Areas Inspected:</u> Special inspection by regional-based inspectors of allegations associated with the electrical activities and tendon prestressing activities. The inspectors also examined licensee action on previous inspection findings. The inspection involved 57 inspector-hours on site and seven inspector-hours in office by two NRC inspectors.

Results: No items of noncompliance or deviations were identified.

Persons Contacted 1.

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- Arizona Public Service Company (APS) a .
 - *E. E. Van Brunt, Jr., Vice President, Nuclear Projects Management
 - *J. A. Roedel, Corporate Quality Assurance (QA) Manager

*W. E. Ide, Site QA Supervisor

L. A. Souza, QA Engineer and Audit Supervisor

- R. Forrester, QA Engineer
- P. J. Moore, QA Engineer K. Anderson, QA Engineer
- *D. B. Fasnaught, Nuclear Construction Manager
- H. W. Reilly Jr., Nuclear Engineering Mechanical Engineer
- K. Jones, Licensing Engineer
- S. G. Pennick, QA Engineer

Bechtel Power Corporation (Bechtel) b.

- R. M. Grant, Project Quality Control (QC) Supervisor
- *D. R. Hawkinsen, Project QA Supervisor
- J. E. Pfunder, Quality Assurance Engineer
- A. Robertson, QC Engineer, Civil
- B. Churchill, QC Engineer, Electrical
- G. Pomero, Assistant Lead QC Engineer Electrical
- K. Jones, Group Supervisor, Pipe Supports and Pipe Stress
- R. Ruff, Lead QC Engineer, Electrical

Western Concrete Structures, Inc. (WCS) C .

- K. Guffey, Superintendent
- A. Stubbs, President

In addition, various other crafts, QC, and engineering personnel were contacted.

*Denotes those attending exit meeting on May 27, 1983.

Licensee Action on Previous Inspection Findings 2.

(Open) Follow-up Item (50-528/81-04-01) Prestressing Tendon а.

Record Discrepancy

The original inspection report identifying this item (81-04) described apparent deficiencies in prestressing tendon records. The tendon records in question were described in the report as those from the "Demonstration Program for Verification of Friction Factors." They were the first three tendons tensioned on Unit 1.

The licensee had agreed to:

- Provide the QC inspectors with appropriate instructions as to the necessary criteria which must be met prior to affixing a QC signature to the record.
- Provide specific instruction as to what measures the QC inspector is to take if acceptance criteria are not met.
- Provide appropriate methods for documenting the WCS engineering evaluations of tendons.
- Resolve the demonstration tendon record discrepancies.

The inspector examined the revised procedures PTP-8, Revision 6, and QCP-6, Revision 3, which require the QC inspector to compare actual elongation to that expected and write a nonconformance if the values do not agree within five percent. Engineering evaluation is provided on the nonconformance. These changes satisfactorily resolve the first three items listed above. In regards to the fourth item above, the inspector examined the discrepant records and observed that the omitted data had been provided but engineering acceptance had not.

The licensee representative provided Bechtel Letter IOM-E-10345 MOC 256798, dated May 26, 1983, which stated the tendon demonstration program results were found acceptable. However, this letter was not included with the tendon records.

The inspector examined a sampling of other completed records and noted that discrepant data was recorded as having been reported on nonconformance reports. However, the nonconformance reports were not available for review. Licensee representatives stated that an administrative decision had been made to retain all the nonconformance records in the WCS home office (in Gardena, California) since Units 2 and 3 were not complete and some of the nonconformances applied to all three units.

At the exit interview, this item was discussed with licensee management. The inspector questioned whether all the nonconformances applicable to Unit 1 had been closed or evaluated for acceptability for fuel load.

Licensee management committed to have the open nonconformances (SCCA's and SDDRs) for Unit 1 reviewed and evaluated for fuel load. Additionally, they agreed to have the demonstration program records amended to show engineering evaluation and acceptance.

This item remains open pending completion of the above commitments.

b. (Open) Follow-up Item (50-528/83-17-01) Preservice Examination Program

The item dealt with the apparent omisson of a portion of the ASME Class 2 piping welds from the preservice inspection program.

During this inspection the licensee had come to the decision that inspection of the omitted Class 2 welds was required. The licensee representatives identified areas between the Safety Injection Tanks and the first check valve, between the refueling water storage tank and the LPSI pumps and other sections of piping near the LPSI pumps, as requiring additional volumetric and surface examination.

The licensee intends to use relief request number 4 approved by Supplment 3 to NUREG 0857, which allows limiting examination to a surface examination only for weld thicknesses less than half-inch.

This item remains open pending licensee implementation.

c. (Closed) Follow-up Item (50-528/83-09-01) Craft Changes Cable Tray Supports After QC Inspection and Acceptance

Allegation

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In a statement made to the NRC investigators on June 1, 1982, the alleger stated:

"Since 1979 through Christmas 1981, there have been instances where electricians or pipefitters changed unistrut brackets supporting electrical trays and/or piping after it had been bought off by QC. This is done sometimes to make it fit their own purposes or to get even with members of management or QC inspectors. This is done on the lower elevations of the control building of Unit 2. It has been done to get even with Mr. X*, a General Foreman with Bechtel, and Mr. Y*, General Foreman for the electrical union, because the men get mad at them for firing a craftsman for such things as drinking coffee, taking too many early 'outs,' etc. They do it to get even with QC inspectors who have been giving them a bad time. In some cases, they deliberately do a bad modification on the unistrut so it will be noticed. The QC name and number is stamped on the imbed plate for the bracket and it makes it look like the inspector bought off obviously bad work, and it could result in the inspector being terminated."

*The actual names given in the statement have been deleted and "Mr. X" and "Mr. Y" substituted.

In an affidavit dated January 8, 1983, submitted before the Atomic Safety and Licensing Board and forwarded by Government Accountability Project to the NRC Office of Investigations on February 28, 1983, the alleger stated:

"I also observed Bechtel workers change brackets which hold up pipes after the former brackets had been inspected and approved by quality control inspections ('QC'). I observed this about six times. This new work was never reviewed or approved by QC inspectors. These brackets also were modified so that new pipes could be added. However, the workers who modified the brackets were careful not to disturb the inspection seal or to use the piece marked with the scal in the new bracket. Therefore, the new or modified brackets looked as flough they had been inspected in their current condition."

Background: This allegation was first examined in Inspection Report 50-528/83-09 and the report stated further information was required from the alleger. The alleger was contacted by telephone on May 4, 1983, the following clarifications were made:

- "Pipe" refers to electrical conduit and cable trays.
- "Bracket" refers to unistrut type supports (Superstut at Palo Verde).
- ^o The area in question is in the Control and Auxiliary Building in the basement by the pump motors.

NRC Finding: The allegation was not substantiated or disproved. Two instances of craft reworking an inspected and accepted support were identified and the possibility of other supports being reworked without proper authorization was not proved or disproved. However, as a result of licensee QA action on November 21, 1980, all supports installed prior to October 1, 1982, are being reinspected to identify discrepancies.

Discussion:

Physical Inspection of Cable Tray Supports

The inspector examined the Unit ? Largency Core Cooling System (ECCS) pump rooms, specifically the HPSI, LPSI, and Containment Spray pump rooms. Initially, the examination was done to identify "obviously bad work" as identified in the June 1, 1982 statement. No obviously bad work was observed, except for the unsupported electrical cables to the containment spray pumps addressed in a separate allegation by the alleger and reported in Inspection Report 50-528/83-09 as having been documented on nonconformance reports (NCRs) on June 17 and July 2, 1982. The engineering resolution of the NCR's resulted in an item of noncompliance in Inspection Report 50-528/83-18 for taking unreasonable engineering license with specification requirements but this item of noncompliance was not a direct result of the allegation. However, the nonconformance reports state that the cable trays had been modified after original completion and acceptance and, therefore, support the allegation.

The inspector then examined four cable tray supports in detail utilizing the design drawings. The supports examined were:

° Support H24 for HPSI Pump B electrical cable

- ^o Support H25 for HPSI Pump A electrical cable
- ^o Support H28 for Containment Spray Pump A electrical cable
- ^o A portion of Support IA-138 for LPSI Pump A electrical cable

The inspector specifically examined the supports to verify the support configuration was per drawing requirements including member sizes, lengths, weld details, weld quality, and bolted connection details.

The following observations were made and resolved as indicated:

- The inspector noted the connection shown in detail 8 of drawing 13-E-ZAC-043, Revision 17, for HPSI B support H24 did not show connection to a channel. The connection is shown to a wide flange beam labeled "existing steel." This was resolved since Note 12 on drawing 13-E-ZAC-055 defines "existing steel" as plate, channel, or beam.
- The inspector noted the vertical legs of the above support were 3'7" vs 4'0" as shown on drawing 13-E-ZAC-045, Revision 10. This was resolved when the tolerance of +2", -9" authorized on Field Change Request FCR 50.935E was produced by the licensee representatives.
- The inspector noted the horizontal cross pieces on support 1A-138 for LPSI Pump A were triple members versus double members shown on the applicable detail on drawing 13-E-ZAC-047. This was resolved by Note 23 on drawing 13-E-ZAC-043 which allows substituting larger unistrut members.

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The inspector noted that the cable tray (No. ATCAE) on support 1A-138 for LPSI Pump A was shown as curved in the horizontal direction on drawing 13-E-ZAC-003, Revision 21 and the actual installation was straight. This was resolved by a partial plan added by Revision 5 to drawing 13-Z-ZAC-042 applicable to Units 2 and 3 which shows the straight installation.

The following observations were made and not resolved during the inspection:

- On support H25 for HPSI Pump A and H28 for Containment Spray Pump A the welded connection of the unistrut member to the building structure is shown as a 1/8-inch fillet stitch weld (2" in 5"). Several welds were less than 2-inches in length. Two welds on H25 were 1 1/4 inches long. One weld on H28 was 1 1/4 inches long. The stitch weld connection details are shown on alternate Detail 17 on drawing 13-E-ZAC-043, Revision 17, for H25 and Detail 8 of the same drawing for H28.
- On support H25 for HPSI Pump A the connection of the superstrut member to the upper structural channel is shown

as a 1/8-inch fillet "all around" (on support type 7-1 on drawing 13-E-ZAC-045 Revision 10). The actual installed weld is a 3/16-inch fillet on two of the four possible weld legs.

At the exit interview, the inspector informed the licensee management that the above described weld discrepancies are considered an unresolved item and would be inspected further in a future inspection to verify the welds had been accepted by QC and that there are no interpretable weld configuration descriptions in the welding specifications. (Unresolved Item 50-529/83-12/01)

Overall, the physical inspection of cable tray supports in the area described by the alleger did not indicate the supports had obvious defects nor did their configuration depart radically from drawing requirements.

Interview of Mr. X and Mr. Y by the Office of Investigations

Craft Supervisors, "Mr. X" and Mr. Y," were interviewed by the NRC Ol investigators on July 13, 1982, in regards to craft changing cable tray supports after QC acceptance. "Mr. X" stated that the supports are put up one time, but there were times when mistakes were made and the installation had to be repeated. There was no problem with people changing supports after they were bought off. He is sure it has happend, but it is not a big problem. He could provide no foundation for the allegation. "Mr. Y" stated he did not know of any problem in sabotaging unistrut brackets. He has had people mad at him for disciplinary action he has taken against them. He has gotten rid of bad welders.

Previous NRC Findings in This Area

Inspection Report 50-529/82-05 described an item of noncompliance in the electrical support area. On March 31, 1982, the inspector identified that a conduit support for charging Pump B had loose nuts on the anchor bolts. The support had been inspected and accepted on June 26, 1981. The damaged paint on the nuts indicated they had been loosened after acceptance. The item of noncompliance was closed in Inspection Report 50-529/82-12 on the basis of correction of the conduit support, staff training, a procedure change and not identifying additional examples.

QC Marking on Supports

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In his June 1, 1982 statement, the alleger indicated the QC name and number is stamped on the embed plate for the bracket. The inspector did not observe any stamping on embeds. In his January 8, 1983 affidavit, he indicated inspection seals were applied to the supports. The inspector did not observe any seals on the supports.

The inspector reviewed Procedure WPP/QCI No. 251.0, Revision 17, dated September 9, 1982, entitled "Raceway Installation." The procedure requires that the QC inspectors indicate acceptance of the raceway installation including supports and welding by signing the raceway card record of inspection (reference paragraphs 9.5 and 9.5, and exhibit 251.0-2 of the procedure).

As part of the inspection requirements, the QC inspectors are required to verify and document <u>on the raceway card</u> that they have checked the torquing of bolting per a sampling plan in the procedure. They are also required by the inspection instruction to mark the superstrut bolting plates and bolted bracket angles, sampled for torque inspection, with a liquid tip marker. This marking of plates was observed by the inspector during the inspection. None of the bolts examined were visually loose.

This aspect of the allegation will be inspected further in a future inspection (Follow-up Item 50-529/83-12-02).

Licensee Actions Regarding Cable Tray Supports

On November 21, 1980, the APS Quality Assurance Department issued Quality Assurance Deficiency Report (QADR) No. 8 which stated that cable tray hangers are not installed in accordance with applicable requirements. The report noted missing braces and angles and referenced an earlier similar QA finding, SQA 63 F8 of April 14, 1980. The A/E response to the finding committed to an engineering review of raceway support drawings to provide clarifications to the drawings and a field reinspection of the supports.

Design Change Packages 1SC ZJ 083, 2CC ZJ 083, and 3CC ZJ 083 were issued on June 21, 1982, to rework the supports based on the results of an engineering walkdown. The procedure attached to the DCP requires walkdown and rework of all supports inspected prior to October 1, 1982. Quality Control reinspection is required by the procedure.

Summary:

None of the examinations performed by the inspector substantiated wide spread deliberately bad modifications of supports previously accepted by QC inspectors. Likewise, the allegations were not disproved by the inspector's actions. Further investigative action is not considered technically warranted (to prove or disprove the allegation) since the licensee's actions initiated in November 1980 will result in a total reinspection of the safety-related cable tray supports installed and inspected prior to October 1982 which includes the period of the allegations (1979-1981). Therefore, with the exception of the follow-up and unresolved items identified in

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this section of the report this allegation is considered closed.

d. (Closed) Follow-up Item (50-529/82-12-01) Bending Radius of Battery Bus Bar Jumper Cables Unit 2 Battery Room

The inspector previously had a question concerning the bend radius of jumper cables used on the Class 1E batteries in Unit 2 battery rooms. The jumper cables were supplied by the battery vendor (Exide Corporation) and were not included in the minimum radius data given in Bechtel Specification 13-EM-301; and therefore, the minimum bend radius for these cables could not be determined during that inspection.

A request was made by the licensee to the Exide Corporation for minimum bend radius requirements. The battery manufacturer's response states, "Exide Corporation cable connectors for stationary batteries have bend radii which fall naturally by standard lengths of <u>extra flexible</u> cable which was developed for smaller bends natural to this special cable. The lengths specified for a type of cell on a particular rack are selected to facilitate the least amount of stress on cable and terminal posts of the battery. There is no formula like that which may be used in forming national electric code (NEC) cable over pipe."

A procedure change has been initiated to establish and clarify the inspection method to be utilized to inspect for bend radii. Craft superintendents, field engineers, and quality control inspectors have been instructed on the new methods and approval requirements.

The response from the battery manufacturer addresses the inspector's concern on bending radius, and the action taken by the licensee to initiate a procedure change to clarify inspection method appears satisfactory. This item is considered closed.

3. Potential Problem with Core Lower Support Structure Bottom Plate to Main Beam Welds

The inspector provided the licensee with information regarding the subject welds which came to NRC's attention at WNP-3. The problem deals with backgouging and inspection of the welds which was apparently not done. The problem was first identified in the CE-Avery shop during work on the Palo Verde Unit 3 lower support structure. The licensee subsequently determined the problem was known to CE staff but CE site management and APS management had not been informed.

At the exit interview licensee management committed to resorvle the subject weld conditions for Units 1, 2, and 3 and to investigate the need for improving communications with CE. This item will be examined further in a future inspection. (Follow-up Item 50-528/83-22-01)

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Allegations Regarding Post Tensioning by Western Concrete Structures (WCS)

Allegation: There was a lack of adequate training records for the post-tensioning crew. "It was my understanding that WCS was operating in compliance with ANSI Standard 245.26 which requires the company to maintain training records for the members of the post tention crews. These records would reflect the qualifications for the work by the iron workers. WCS had a procedure, number unrecalled, covering training records and clearly stated the requirements."

"To my knowledge, the company still does not have training records."

NRC Finding: The allegation statement was substantiated in part but is not a safety concern.

Discussion: The time frame of the allegation concerns the craft training in March 1982 and prior.

Quality Assurance Standard Requirements

The standard referred to in the allegation is ANSI N45.2.6-1973, "Qualification of Nuclear Power Plant Inspection, Examination and Testing Personnel." This standard does not apply to craft personnel. The standard applies to inspection and testing personnel such as Quality Control personnel and nondestructive examination personnel who are required to be trained and qualified (certified) to perform their functions.

ANSI N45.2.-1971, "Quality Assurance Program Requirements for Nuclear Power Plants," does apply to craft training but states only:

"The program shall provide for indoctrination and training of personnel performing activities affecting quality as necessary to assure that suitable proficiency is achieved and maintained."

The standard does not specify that craft be qualified (certified) or that training records be maintained. However, it is normal practice in the nuclear industry to maintain training records.

ANSI N45.2.9-1974, "Requirements for Collection Storage and Maintenance of Quality Assurance Records for Nuclear Power Plants," does not list craft training records as a type of record recommended to be retained. The standard does list record requirements for a higher level of records, c.g., QC inspector qualification records, but even in this case QC qualification records are shown as "nonpermanent records." The standard defines "nonpermanent records," in part, as those of no significant value in demonstrating capability for safe operation.

It is clear from a review of the ANSI standard requirements that craft training records are not emphasized as an important safety issue, but it remains that it is standard practice to generate and retain craft training records.

WCS Procedure Requirements

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Separate WCS procedures are written for the different aspects of installing post tensioning tendons. Such aspects are tendon installation, button heading, shim installation, greasing, and grease cap installation. QCPs 4, 5, 6, and 7 are typical inspection procedures for tendon installation aspects and all have a similar requirement for the QC inspector to "Check to be sure crews are trained by comparing the crew lists with training records as furnished by their supervisor."

NRC Investigators Actions

Prior to this allegation being assigned to the inspector, the NRC investigation staff had accomplished extensive interviews of involved personnel and determined the following.

- Prior to March 1982, the WCS craft "training records" consisted of a letter signed by the WCS superintendent which stated that all iron workers had been trained. It did not list the iron workers by name nor did it provide any other details.
- This fact was brought to APS's QA departments attention in March of 1982 (by the alleger).
- APS initiated action with WCS to revise the training records to name the trained iron workers and identify the tasks for which he was specifically trained. These records were generated starting in April 1982.
- Six iron workers employed by WCS prior to March 1982 were interviewed and all stated they had received training which they considered adequate. They also indicated they considered the quality of work to be good.
- APS QA surveillances of WCS tendon work did not identify any deficiencies adversely reflecting on the workmanship of the craftsmen.
- NRC inspection reports dealing with tendon installation do not reflect adversely on the quality of work performed.

Review of WCS Craft Training Records Generated in April 1982 and Later

The inspector examined the craft training records generated in April 1982 and later. Per the statement of the WCS superintendent, the records were signed by him on April 21 and 22, 1982, but were dated with various dates from 1981 (eight records dated from April 10, 1981 to October 23, 1981). Per the Superintendent this was done to reflect the dates on which those iron workers had completed training and the records were generated from time sheets and similar information.

At the exit interview, the inspector discussed the records with licensee management. Licensee management committed to amend the records to reflect the fact that they were not generated and signed on the dates shown.

Review of Craft "Training Record" in use in March 1982 and Before

The inspector was unable to obtain the Superintendent's memorandum which stated all iron workers had been trained. Both WCS and APS were requested to produce the memorandum but had been unable to retrieve a copy as of June 7, 1983. Therefore, the inspector must accept the previously discussed description of the craft training memorandum (described by the responsible APS QA engineer who saw the memorandum in March 1982).

Summary.

The primary safety concern in tendon installation is the quality of the tendons and the installation itself. Proper training of crews is an essential element of proper installation coupled with thorough inspections. Records of craft training are not specifically required by applicable codes and standards but craft training records were indirectly required by certain WCS inspection procedures. The WCS Superintendent's "coverall" craft training memorandum utilized prior to April 1982 was not in keeping with normal nuclear construction practice but did not violate any codes or standards. Interviews of craft and quality assurance surveillances did not indicate inadequate craft training. The actions of the alleger in identifying the poor craft training records to APS QA personnel resulted in detailed records being generated. Therefore, this allegation is partially substantiated but is not a safety concern.

This item will be inspected further in a future inspection to verify the training records showing signature dates of 1981 have been annotated to show they were in fact generated and signed in April of 1982. (Follow-up Item 50-528/83-22-02)

5. Allegation Regarding Construction Over-Riding Quality Control in Electrical Work

Allegation

The instance relating to the improper splicing of cables to the spray pond pump not only illustrated the lack of knowledge on the part of the first four QC inspectors I contacted, but it also illustrates their submission to the desires of construction. Relating back to item 5, the QC inspector put a QC red tag on the High Pressure Safety Injection Pump located on the 40-foot elevation because it had the wrong lugs installed. The field engineer went over the Qt inspector's head on this issue to someone in Bechtel engineering, and someone in engineering went to the QC inspector and made him pull the NCR. The field engineer made the QC inspector remove the red tag.

Note: The above is the allegation statement, verbatim, with names removed and titles substituted.

NRC Finding: The allegation was not substantiated.

Dicussion: The QC inspector, upon finding a one hole motor lead terminal connector bolted to a two hole feeder cable terminal connector, wrote a Non-Conformance Report (NCR) E-A-1562 and attached the appropriate red tag (stopping work) to the power cable connection on Unit 1 high pressure safety injection Pump A at 40-foot elevation in the Auxiliary Building. This issue of the onehole terminal connectors bolted to the two-hole terminal connectors is the subject of item 5 referred to in the text of the allegation. This issue was addressed as item 2.g of Inspection Report 50-528/83-10 dated April 22, 1983. This connection is acceptable where the feeder cable is larger (greater feeder current carrying capacity) than required for the motor and the feeder cable is terminated in a two-hole connector.

The field engineer identified that writing a NCR, attaching the red tag, and stopping work on the HPSI pump connections was in error as this connection (one-hole to two-hole connector) was an acceptable electrical connection. The field engineer took the issue up with engineering and quality control. The NCR was declared invalid as for lack of a "nonconformance". The alleger evidently r sconstrued this action as construction over-riding quality control.

The NCR was examined and appears to have been processed in accordance with established procedures. The connections at the HPSI pump were inspected and were observed to have been made-up and insulated in a quality workmanship like manner. The field engineer involved in the above issue was interviewed concerning this subject. The QC inspector involved was on disability leave during the week of the inspection and was not available to be interviewed concerning this subject. Three Level II QC inspectors who had been in QC work for three and a half years or more were interviewed and specifically questioned about construction over-riding quality control in the field. The responses from these inspectors did not lend any support to the allegation.

Based on the above findings concerning the HPSI pump connection NCR and the response from the people interviewed, the allegation has not been substantiated and, therefore, is closed.

6. Allegation Regarding Chafing of Cable Insulation at Entrance to Valve Operators Connection Enclosure

Allegation

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The connection enclosure was constructed in such a way that the drilled and tapped hole that you connect to, bring your conductors through, was drilled so low in the enclosure of the motor operated valve itself that there was no way you could put a coupling in there or a bushing, no way to fully protect the cable.

(Note: The above is substantially the allegation as stated with minimum rephrasing.)

• NRC Findings The allegation was substantiated.

Discussion The valve operators (drives) at the circulating water pumps were identified by the alleger as the valves where he had experienced the sharp edges which could possibly damage the insulation of the control cables as they entered the connection enclosure. The valve connection enclosures were examined. The sharpness of edges in the different enclosures varied and some were judged to be sharp enough to damage cable insulation while others were dull and would probably not damage the cables.

^cince this equipment was not safety-related it was decided to inspect safety-related valve operators.

The electrical connection enclosures of several safety-related limitorque valve drives (sizes SMB-0 and SMB-00) were inspected. It was found that the hubs where the conduit connects to the enclosure was so low in the box that it was impossible to install a bushing to prevent the threads of the hub from chafing the cable insulation. However, the threads of the hub were not so sharp as to be able to damage the outer vinyl jacket of the cable; only where the outer vinyl jacket had been removed was there a hazard to the cable insulation which is not as "tough" as the outer vinyl jacket.

During a walkdown of the nuclear cooling water system on April 21, 1983, while inspecting containment isolation valves 2JNCBUV-0401 and 2JNCAUV-0402, the conditions described above were discovered and written-up on a QC observation report C83-52 by a licensee construction/startup team. The report has been forwarded to construction for disposition. This item was reviewed with the licensee during the exit meeting, and licensee committed to expedite action on the disposition of this issue.

The allegation was basically substantiated. Although the equipment the alleger identified was not safety-related equipment, when inspection was expanded to include safety-related valve operators (Limitorque), the same condition was found to exist. The licensee, however, had discovered and documented this same deficiency. This item will remain open pending the disposition of the QA Observation Report C 83-52 and will be reported during a future inspection. (Follow-up Item 50-528/83-22-03)

- 7. Allegation Regarding Electric Cable Bend Radii
 - Allegation: At the conclusion of an interview regarding other allegations, a worker stated that the only minor thing that he thought NRC hadn't covered in the inspections of Palo Verde Nuclear Generating Station was the violation of minimum bend radii. He said that in some cases the minimum bend radii have been violated either on Q or Non-Class Q cables.
 - NRC Findings The allegation was not substantiated.
 - Discussion Specifications numbers 13-EM-300 and 13-EM-301 for installation of electrical cables in trays (300), and in conduit and duct banks (301) at Palo Verde were examined in detail. It was found that bending radii are identified and are very explicit on these specifications as requirements to be followed when installing cables. The Lead Electrical QC engineer was questioned concerning this issue. It was learned that bend radii was one of the items identified in the training and instructing of electrical QC inspectors. Required reading of procedures and specifications by all inspectors spells-out bend radii of cables as a requirement to be followed and to be included in the QC inspection. The bend radii criteria has been included in the cable installation specifications and the QC inspector's training for some time.

The alleger was recontacted by telephone on June 7, 1983, and he was requested to be more specific and identify any particular cables where the minimum bend radii was violated. He identified the condenser circulating pump motor power cables at the cooling tower intake structure. When it was pointed out that these were not safety-related pumps, the alleger was unable to further identify any specific cables which violated the minimum radii requirements.

The allegation was not substantiated based on the review of cable installation specifications and the QC inspector's indoctrination and training which showed that the bend radii has always been a criteria in the installation and QC inspection of cables, and based on the fact that the alleger did not identify any safety-related cable.

8. Unresolved Items

Unresolved items are matters about which more information is required in order to ascertain whether they are acceptable items, items of noncompliance, or deviations. An unresolved item disclosed during this inspection is discussed in paragraph 2.c. of this report.

9. Exit Interview

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The inspectors met with the licensee representatives (denoted in paragraph 1) on May 27, 1983. The scope of the inspection and the inspectors findings as noted in this report were discussed.

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