U. S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

REGION V

Report No. 50-528/81-20
50-529/81-15
50-530/81-15

Docket No. 50-528/529/530 License No. CPPR-141, 142, 143 Safeguards Group _____

Licensee: Arizona Public Service Company

P. O. Box 21666

Phoenix, Arizona 85036

Facility Name: Palo Verde Nuclear Generating Station - Units 1, 2, and 3

Inspection at: Palo Verde Construction Site, Wintersburg, Arizona

Inspection conducted: October 5-9 and 26-30, 1981

Inspectors: _____ 1/12/82
J. H. Eckhardt, Reactor Inspector — Date Signed

_____ 1-11-82
W. J. Wagner, Reactor Inspector — Date Signed

_____ 1-12-82
J. F. Burdoin, Reactor Inspector — Date Signed

Approved By: _____ 1/14/82
T. W. Bishop, Chief, Reactor Projects Section No. 1 — Date Signed

Summary:

Inspection on October 5-9 and 26-30, 1981 (Report Nos. 50-528/81-20, 50-529/81-15, and 50-530/81-15)

Areas Inspected: Routine, unannounced inspection by regional based inspectors of activities associated with pipe installation, structural steel installation, component installation, concrete records, pipe welding, instrumentation cables, electrical cables, and preservice examination. The inspection involved 128 inspector hours on-site by three NRC inspectors.

Results: No deviations or items of noncompliance were identified.

RV Form 219 (2)

DETAILS

1. Persons Contacted

   a. Arizona Public Service Company (APS)

   *E. E. Van Brunt, Jr., Vice President, Nuclear Projects Management
   *D. B. Fasnacht, Nuclear Construction Manager
   *W. E. Ide, Site QA Supervisor
   *B. S. Kaplan, Quality Systems Supervisor
   G. Pankonin, QA Engineer
   L. Souza, QA Engineer
   R. Forrester, QA Engineer
   D. Wittas, QA Engineer
   E. C. Sterling, Instrumentation Engineering Supervisor
   P. J. Moore, QA Engineer

   b. Bechtel Power Corporation (Bechtel)

   S. M. Nickell, Project Superintendent
   *D. R. Hawkinson, Project QA Supervisor
   *R. M. Grant, Project QC Supervisor
   V. Mallen, Lead QC Engineer, Electrical
   F. Herman, Lead Discipline Engineer, Electrical
   J. T. Hayes, Lead Field Engineer, Cable/Terminations
   W. Sturm, Test Lab Coordinator
   H. Seckinger, Preservice Examination Coordinator
   G. Stam, Welding Engineer
   R. Barton, Welding QC Engineer

   c. Combustion Engineering (CE)

   E. Presbie, Project Engineer
   G. Bloomquist, QA Engineer

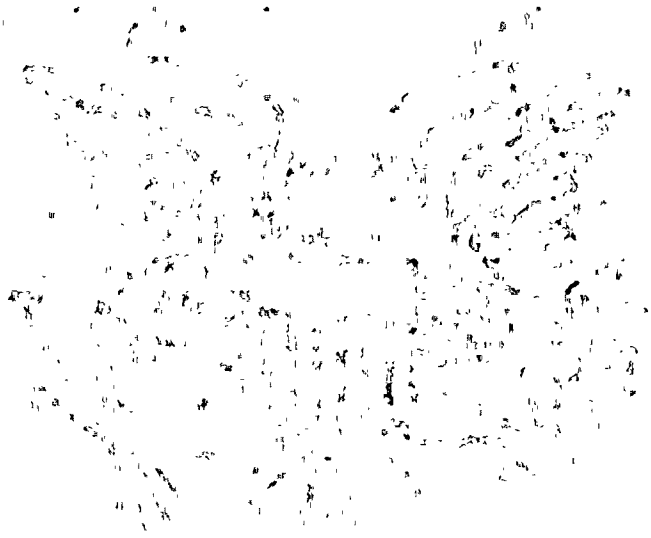
   *Denotes those attending exit meetings.

2. Pipe Installation Activities

   Piping activities were examined to ascertain compliance with applicable construction specifications and work plan procedure/quality control instructions.

   a. Observation of Activities

   The following activities were observed:



(1) Unit 1 Containment

(a) Protective covers on check valve openings for safety injection piping.

(b) Protection of piping from work being performed above piping.

(c) Grinding of attachment weld of dummy pipe to 12" safety injection piping for pipe hanger SI-220-H029.

(d) Grinding of attachment weld of dummy pipe to 14" safety injection piping for pipe hanger SI-206-H-005.

(e) Protection, condition, cleanliness, and orientation of the following installed piping:

- Pressurizer surge line 1-RC-028-BCAA-12", spool S-001.
- Pressurizer spray line 1-RC-018-BCAA-3", spool S-001.
- Pressurizer relief valve line 1-RC-001-BCAA-6", spool S-001.
- Safety injection tank 2B line 1-SI-178-GCBB-14", spool S-001.

(2) Unit 2 Control Building

(a) Pipe storage and capping of pipe openings.

(3) Unit 3 Containment

(a) 12" safety injection piping installed on temporary hangers.

(b) Safety injection piping being rigged into place.

(c) Capping of pipe openings.

b. Review of Quality Records

The following quality records for the Unit 1 piping spools listed in paragraph 2.a(1)(e) were reviewed: ASME form NPP-1 data report, quality verification documentation list, weld history records, nondestructive examination records, material physical and chemical properties data, certificate of compliance, and installation records.

No deviations or items of noncompliance were identified.

3. Structural Steel Installation

Structural steel installation activities were examined to ascertain compliance with applicable construction specifications and work plan procedure/quality control instructions. The following activities were inspected:

a. Unit 2 Containment Liner Welding

In-process welding of liner plate being installed in the Unit 2 containment construction opening was observed. The welding status on different seams included fitup, tacking, in-process welding, and completed welds. In addition to inspection of the actual in-process work, weld filler metal control and field weld checklists were examined.

b. Unit 2 Containment Interior Structural Steel

Steel structure 13-C-ZCS-597(2) being erected inside the Unit 2 containment at elevation 141-166 feet was examined. Particular attributes considered included fillet weld size and contour, control of weld filler material, use of proper weld procedure, high strength bolting, evidence of turn of the nut method for nut installation, and proper installation of washers.

c. Unit 3 Containment Interior Structural Steel

A steel structure at the 90 foot elevation in Unit 3 containment was examined for proper fillet welding and bolting.

No deviations or items of noncompliance were identified.

4. Component Installation - Unit 1

a. Examination of Installed Components

The following components installed in Unit 1 containment were examined:

(1) pressurizer spray line check valve V-244
(2) safety injection check valve V-227
(3) pressurizer spray valve V-242
(4) pressurizer relief valve V-202
(5) pressurizer
(6) steam generator number 1
(7) reactor coolant pump 1A including horizontal supports
(8) safety injection tank for loop 2A
(9) upper personnel lock

Specific items checked included component protection during construction, installed orientation, cleanliness, and component supports.

b. Review of Quality Records

The following quality records associated with the above identified components were reviewed:

(1) Installations records for pressurizer spray line check valve V-244, pressurizer spray valve V-242, and pressurizer relief valve V-202.

(2) Manufacturers data report, special construction inspection planning (CIP) for NSSS equipment (WPP/QCI-350.0), and CIP for rigging of equipment (WPP/QCI-15.0) for pressurizer.

(3) Manufacturers data report, and special CIP for NSSS equipment for steam generator number 1. This included shim stacks, sliding base plate, and stud tensioning data.

(4) Manufacturers data report for reactor coolant pump 1A including horizontal supports.

(5) Manufacturers data report, and special CIP for NSSS equipment for loop 2A safety injection tank. This including hold down bolt torquing data.

(6) CIP for containment liner penetration installation (WPP/QCI-61.0) including survey data, certification of conformance, code data report, NDE records, shop leak test, and material property records for upper personnel lock.

No deviations or items of noncompliance were identified.

5. Concrete Quality Records Review - Units 1, 2, and 3

The following concrete records were reviewed to ascertain compliance with applicable construction specification and work plan procedure/ quality control instructions:

a. Unit 1 spray pond placement no. 1Y444, placed June 19, 1981 - 33 yd.

Preplacement, placement, post-placement, cadwell rebar splice, and 28 day compressive strength records.

b. Unit 2 containment dome placement no. 2C123, placed July 10, 1981 - 1395 yd.

Preplacement, placement, post-placement, delivery tickets, sheathing installation, cadweld rebar splicing, cadwelder qualification, and 7 and 91 day compressive strength records.

c. Unit 3 primary shield wall placement no. 3C042A, placed August 12, 1981 - 847 yd.

Preplacement, placement, post-placement, delivery tickets, cadweld rebar splicing, and 7 day compressive strength records.

d. Unit 3 containment exterior wall placement no. 3C107, placed June 9, 1981 - 727 yd.

Preplacement, placement, plost-placement, delivery tickets, sheathing installation, cadweld rebar splicing, and 7 and 91 day compressive strengths.

e. Material test records for fine and coarse aggregate received October 19 - 22, 1981.

No deviations or items of noncompliance were identified.

6. Pipe Welding Activities

a. Observation of Work

In-process welding activities were observed to ascertain compliance with ASME Section III Code requirements. The following activities were examined:

(1) Unit 1 reactor coolant line RC-091 weld 0BH-C pipe to fitting weld. Weld fit-up, argon purge, and QC verification of fit-up and purge prior to releasing the joint for welding were observed.

(2) Unit 1 safety injection pipe spool SI-220-S-001 weld 005. Observed grinding of weld in preparation for NDE.

(3) Unit 2 cooling water pipe spool NC-E-135-HLBB-10" weld 004 (R-2) pipe to penetration no. 33. Examined completed weld.

(4) Unit 2 safety injection pipe spool SI-E-223-BCAA-14" weld 007. Weld was fit-up, tacked, and purge was in progress. Observed ANI inspect fit-up.

(5) Unit 2 safety injection pipe spool SI-E-223-BCAA-14" weld 006 and 008. Observed in-process welding.

(6) Unit 2 chemical and volume control pipe spool CH-563-CCBA-1½" weld 00T. Observed in-process welding.

(7) Unit 2 safety injection pipe spool SI-160-BCAA-14" weld 301. Examined weld prep area and cleanliness.

(8) Unit 2 cooling water pipe spool NC-E-137-HLBB-10" weld 004(C) pipe to penetration no. 34. This was ready for fit-up.

(9) Unit 2 containment spray piping. Lugs welded on piping for hangers SI-326-H-00B, 00C, and 00D. Examined completed lug to pipe fillet welds.

(10) Unit 3 penetration number 19 for line SI-202-12". Observed grinding of 36" flued head weld.

For the above welds, the inspector reviewed the filler metal withdrawal forms and field weld checklists. Also, the welder and QC inspection personnel qualifications for weld (1) were reviewed.

No deviations or items of noncompliance were identified.

b. Special Welding Applications

(1) Repair weld records review - Unit 1.

The inspector reviewed the repair records of three weld repairs for the Unit 1 reactor coolant system. These were for RC-034 NSSS, RC-084 (W-002) and RC-084 (W-003). The inspector is satisfied that the repairs were performed in accordance with applicable code requirements. The repair procedure included all the special requirements as specified in the original welding process, such as weld procedures and NDE requirements. The inspector reviewed the qualification records of the six welders involved in these repair activities and verified that all were qualified on the date the weld repairs were made. QC verification and ANI signoffs were evident on the field weld checklist. The radiographs taken of these weld joints indicated that the weld repairs were acceptable.

The inspector reviewed two weld procedure specifications used in the repair welding process. The weld procedures were P1 Clad 0 and P1(G2)-T-I-0(ITP). These procedures and the PQR's were reviewed to determine compliance with requirements of ASME Section IX and III.

No items of noncompliance or deviations were identified.

(2) Weld cladding - Unit 2.

Cladding of the following Unit 2 reactor coolant system welds was observed:

RC-033-NSSS-30" weld 004
RC-073-NSSS-30" weld 004

The cladding was being performed with a Dimetrics machine.

No deviations or items of noncompliance were identified.

c. Welding Material Control

The inspector examined the activities of control, issue, return and storage of weld filler materials for compliance with procedural requirements. These activities were inspected in rod room numbers 7 and 10A serving Unit 1 and rod room numbers 6, 8, and 16 serving Unit 2. The holding ovens were calibrated and operating within the required temperature range. All filler material located in holding ovens and in opened containers were correctly identified. The receiving and storage area was inspected for identification of acceptable weld material and segregation of nonconforming material.

No items of noncompliance or deviations were identified.

7. Instrumentation Cables and Terminations, Unit 1

a. Review of Quality Implementing Procedures

The quality assurance plan was reviewed to determine whether plans, instructions, and procedures have been established relative to safety-related instrument cables and terminations. The following Work Plan Procedures/Quality Control Instructions (WPP/QCIs) applicable to the installation, inspection, identification, separation, testing, termination, and handling of design changes of instrument cables were examined:

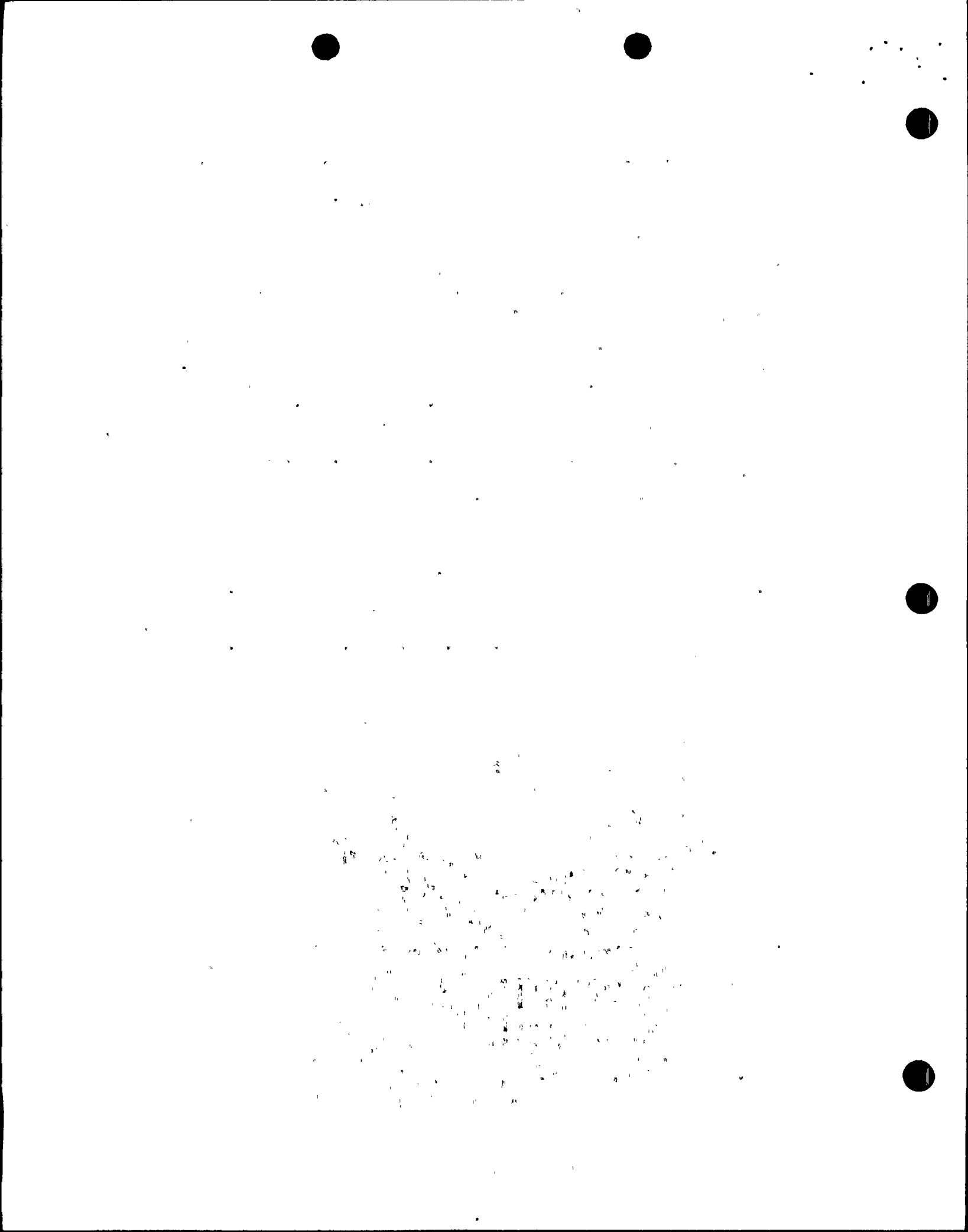
WPP/QCI 251.0 - Raceway Installation
WPP/QCI 254.0 - Cable Installation
WPP/QCI 254.2 - Copper and Aluminum Sheathed Cable Installation
WPP/QCI 254.1 - Electrical Cable Repair
WPP/QCI 255.0 - Cable Terminations
WPP/QCI 256.0 - Insulation Resistance and Hi-Pot Testing

The listed procedures were reviewed in detail and found to be acceptable in their plans, instructions, and requirements for the installation, identification, separation, testing, and termination of instrument cables.

No items of noncompliance or deviations were identified.

b. Review of Quality Records

A review of quality records of instrument cables and terminations was conducted. Eleven instrument cables were selected; three in the engineered safety features system, five in the reactor trip system, and three in the plant control system. The following instrument cable records were examined:



- Cable Installation Cards
- Cable Termination Cards
- Cable Nonconformance/Deviation Records
- QA Audits for Installation of Cable Trays/Conduit and Cables.

The above records for the selected instrument cables were examined in detail. No items of noncompliance or deviations were identified.

8. Electrical Cables and Terminations, Unit 1

a. Observation of Work Activities

The installations of ten electrical cables important to safety, five power and five control cables, were inspected and reviewed for conformance with the FSAR.

The inspection areas for cable raceway installation included location, routing, separation, grounding/bounding, supports, and raceway loading. The cable installation was inspected for size and type of cable, terminations, work performance and adherence to the following procedures:

WPP/QCI 251.0 Raceway Installation
WPP/QCI 254.0 Cable Installation
WPP/QCI 255.0 Cable Terminations

While inspecting the installation of trays and cables, the following isolated discrepancies were observed: the terminal box cover was missing from the drive motor of motor operated valve 1JSIAUV-635, three aluminum drink cans were found in a cable tray, and the cable identification was missing from the power cable at Train B LPSI pump motor. Immediate action was taken by the licensee to correct these discrepancies. No deviations or items of noncompliance were identified.

b. Review of Quality Records

A review of the installation records and quality records for the above ten electrical cables was conducted. The following electrical cable records were examined:

Cable Installation Cards
Cable Termination Cards
Cable Nonconformance Records
QA Audits for Installations of Cable Trays/Conduit and Cables

The above records for the ten electrical cables were examined in detail. No items of noncompliance or deviations were identified.

9. Preservice Inspection (Baseline)

a. Preservice Inspection Program

The inspector reviewed the licensee's preservice inspection (PSI) plans and schedules for compliance with the requirements of the

SAR and ASME Section XI, 1977 Edition through Summer 1978 Addenda. CE is the prime contractor for the nondestructive examination (NDE) portion of the program. CE subcontracts part of their NDE activities to NES. The CE preservice inspection program for Units 1, 2 and 3 is described in Document No. TR-ESS-069, Rev. 1 of 2/1/80. Volume 1 of this document describes the program plan and volume 2 contains the NDE procedures. The PSI program adequately described the number of items to be inspected, and the method and extent of the examinations. The hydrostatic tests will be performed by Bechtel in accordance with Bechtel's ASME Section III quality assurance program. PSI activities at Unit 1 is approximately 95% complete.

b. Observation of Work Activities - Unit 1

The inspector observed the following volumetric and surface examinations for compliance with the approved NDE procedures and ASME Section XI requirements:

(1) Eddy current examination of reactor pressure vessel (RPV) closure heat nuts. The approved eddy current procedure (9678-ISI-057) was available at the work location. NDE personnel appeared to be knowledgeable of the examination method and operation of the equipment. The following attributes were evaluated and found to be satisfactory by the inspector: proper equipment, sensitivity, equipment calibration, method of examination (single amplitude), recalibration frequency, and acceptance criteria.

(2) Ultrasonic examination of RPV closure heat nuts. Ultrasonic examination was performed on the closure head nuts that were previously examined by the eddy current technique. Attributes evaluated by the inspector were type of apparatus used, extent of coverage, scanning technique, calibration size and frequency of search units, beam angle, DAC current, transfer mechanisms, limits for evaluation and recording of indications, and determination of acceptance limits.

(3) Automated ultrasonic examination of steam generator stay cylinder welds. The inspector observed the calibration of the automated ultrasonic equipment. Five transducers were utilized during this examination, two with beam angles at 45^{0}, two at 60^{0} and one at 0^{0}. In addition to the attributes evaluated as described in paragraph b.(2), the inspector was satisfied that the following requirements were met: program procedure is being followed, NDE personnel were familiar with the inspection system, test equipment permitted continuous observation of scanning pattern to achieve 100% volumetric coverage, five DAC curves were generated for each of the transducers used, recording of data was continuous and meaningful, and couplant type (water).

(4) Demonstration of liquid penetrant technique and ultrasonic examination on LPSI header loop 1A. Preservice inspection activities of components and piping systems were not in process during this inspection. However, CE demonstrated to the inspector, their LP and UT technique on previously inspected LPSI header loop 1A, Weld No. 01-076-024. This demonstration was performed by NDE personnel knowledgeable and experienced in the NDE examinations and methods employed in Unit 1 PSI activities. Attributes evaluated by the inspector observing surface examination using liquid penetrant technique are as follows: examination consistent with LP procedure, penetrant materials analyzed for sulfur and halogen content, surface preparation, penetrant application, penetrant dwell time, removal of solvent, technique for evaluation of indications, and reporting of examination results. Attributes of the UT examination were as described in paragraph b(2). This demonstration revealed no reportable indications which is consistent with the PSI records the inspector reviewed.

c. NDE Personnel Qualifications

The qualifications and certifications of each of the NDE persons involved in the NDE activities observed during this inspection were reviewed by the inspector. This included the qualification records of SNT-TC-1A Levels I, II and III NDE individuals from both CE and NES. The review revealed that these people were qualified to perform NDE activities for the NDE process (UT, PT, ET) of their respective certification level. The certification statements of the certifying Level III were on file. Review of the vision test records indicated that the annual visual acuity and color vision examination are still valid.

d. Review of Preservice Inspection Procedures

The inspector reviewed the following examination procedures for conformance to the ASME Code Section XI, 1977 Edition through Summer 1978 Addenda, ASME Code Section, and licensee committments:

Procedure No.	Title
9678-ISI-057 Rev. 0 of 7/24/81	Procedure for the Preservice and Inservice Eddy Current Examination of Reactor Pressure Vessel Nuts in Accordance with Section XI of the ASME Boiler and Pressure Vessel Code
NIP 941 Rev. 1 of 6/11/80	Ultrasonic Examination Procedure for RPV Closure Head Studs and Nuts

Procedure No.	Title
NIP 949 Rev. 2 of 9/25/80	Automated Ultrasonic Examination Procedure for Steam Generator Stay Cylinder Welds
NIP 955 Rev. 5 of 6/10/80	Ultrasonic Examination Procedure for Primary Coolant Pipe Circumferential, Longitudinal and Branch Pipe Nozzle Welds
525115-ESS-093 Rev. 0 of 1/16/78	Liquid Penetrant Examination Procedure for Preservice and Inservice Inspection

e. Repairs

The inspector examined the records of three welding repairs made as a result of the preservice inspection, to ascertain that the repairs were made under the licensee's quality assurance program. The PSI indications and the resulting repair welds were dispositioned on Bechtel NCR's No. PC-2177, PC-2092 and PC-2177. The welding and NDE procedures used for the repairs were consistent with the original welding and NDE requirements. The inspector verified that the welder was qualified on the date the weld repair was made, and that subsequently NDE was performed by certified personnel. Review of the radiographic report indicated that the repaired weld quality was acceptability. Post-repair PSI data review showed no indications.

f. Data Review and Evaluation

(1) Class 1 Components

The inspector examined the UT records of three Class 1 components to ascertain whether the following documents were provided: examination results and data sheets, examination equipment data, calibration data sheets, examination evaluation data, extent of examination, disposition of findings and identification of NDE material. Records were examined from the following areas:

(a) Pressurizer

Area Designation	Area Description
01-005-003	Lower Shell Longitudinal Weld at 90^{o}

(b) Steam Generator No. 2

01-004-009	Outlet Nozzle-to-Head at 315^{o}

(c) Reactor Coolant Pump

01-SN2-004	Pump Casing Girth Weld

(2) Pressure Retaining Pipe Welds

The inspector examined the preservice inspection records of three piping systems to ascertain whether the following requirements were met: initial and final calibration show no major deviations; examination data properly reported, evaluated and documented; evaluation of data performed by a Level II or Level III examiner; procedural compliance of evaluated data; evaluation of indications in compliance with NDE procedure and ASME Section XI requirements. The following piping systems were examined:

(a) Hot Leg Steam Generator No. 1 to Reactor Vessel

Area Designation	Weld Description	Examination Method
01-006-010	Surge Nozzle-to-Safe End	UT

(b) Loop 1B - Safety Injection Line

01-024-022	12" Sch 160 Pipe-to-Elbow	UT

(c) Main Feedwater Steam Generator No. 2 Inside Containment

01-055-045	24" Sch 80 Pipe-to-Valve	UT, PT

The inspector reviewed CE's records system utilized for maintaining evidence of PSI activities. The organization, filing, maintenance and ease of retrieving these records is satisfactory.

No items of noncompliance or deviations were identified for the preservice inspection activities examined.

10. Exit Meetings

On October 9 and 30, 1981, the inspectors met with the licensee representatives identified in Paragraph 1 and summarized the scope and findings of the inspection as discussed in this report.