

ORGANIZATION: NES MANUFACTURING  
GREENSBORO, NORTH CAROLINA

REPORT NO.: 99901018/85-01	INSPECTION 6/10-15/85 DATE(S): 6/24-28/85	INSPECTION ON-SITE HOURS: 146
CORRESPONDENCE ADDRESS: Nuclear Energy Services Manufacturing ATTN: Mr. Frank Sugar General Manager 101 Swing Road Greensboro, North Carolina 27409  ORGANIZATIONAL CONTACT: Mr. Lon Ludwig, QA Manager TELEPHONE NUMBER: (919) 852-3400		
PRINCIPAL PRODUCT: Pressure Vessels.  NUCLEAR INDUSTRY ACTIVITY: Fuel storage racks and shipping and storage canisters.		
ASSIGNED INSPECTOR: <u>R. L. Cilimberg</u> R. L. Cilimberg, Special Projects Inspection Section (SPIS)		<u>7/26/85</u> Date
OTHER INSPECTOR(S): J. Conway, Reactive Inspection Section (RIS) O. Gormley, Program Coordination Section (PCS) J. Holm, EG&G		
APPROVED BY: <u>John W. Craig</u> John W. Craig, Chief, SPIS, VPB		<u>7/26/85</u> Date
INSPECTION BASES AND SCOPE:  A. <u>BASES</u> : 10 CFR Part 21 and 10 CFR Part 50, Appendix B.  B. <u>SCOPE</u> : Verify the implementation of the NES QA program during the fabrication of defueling canisters for TMI-2. These QA requirements were specified in Bechtel purchase order TC-016172, Rev. 0 dated December 4, 1984, and Bechtel Technical Specification 15737-2-M-101A(Q), Rev. 1 dated November 30, 1984.		
PLANT SITE APPLICABILITY: TMI-2 (50-320)		

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A. VIOLATIONS:

Contrary to Section 21.31 of 10 CFR Part 21, a review of 50 purchase orders (PO), 35 for materials and 15 for services, pertaining to the Three Mile Island Unit 2 (TMI) defueling canisters indicated that while 10 CFR Part 21 was imposed upon NES by Bechtel (ref. PO TC-016172 dated December 4, 1984), NES POs to 23 vendors (11 material - POs 4010, 4009, 3998, 4008, 4012, 4011, 4292A, 4292, 4356, 4293, and 4291; 12 service - POs 4297, 4664, 4657, 4642, 4639, 4632, 4608, 4607, 4337, 4681, 4467, and 4359) did not specify that 10 CFR Part 21 requirements would apply.

B. NONCONFORMANCES:

1. Contrary to Criterion V of Appendix B to 10 CFR Part 50, Sections 2.1.2 and 5.5.2 of Bechtel Specification 15737-2-M-101A, Section 4.3 of NES Procedure N-10, and Section 3.2.10 of NES Procedure Q-12, receipt inspection was not performed on the following items purchased by Bechtel and shipped directly to the NES facility in Greensboro, North Carolina: neutron poison shrouds, lower and upper closure heads, bulkheads, filter bundles, recombiner catalyst, and DEOXO-D catalyst.
2. Contrary to Criterion V of Appendix B to 10 CFR Part 50, Section 3.2.1 of NES Procedure Q-13, and Section 4.4 of NES Procedure N-15: a) approximately 10 pieces of 14" diameter nonconforming pipe were not segregated from acceptable pipe in a storage area, and the nonconforming pipe was not marked with a red tag, and b) nonconforming poison tubes were segregated from acceptable tubes on carts in a storage area without tagging the nonconforming items.
3. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and welding procedure WFS-001, voltage was not maintained within the specification limits (10-18 volts) at the lower head welding station for the filter canister subassembly on five different occasions when a calibrated voltmeter on welding machine S/N 12RT-73449 was reading 8 volts.
4. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 3.4.3 of NES Procedure No. MC-03 a review of 50 POs, 35 for materials and 15 for services, and the Qualified Source List (QSL) indicated that orders were placed with 18 vendors who were not on the QSL: 13 material vendors and 5 service vendors.

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5. Contrary to Section 6.5 of Bechtel Specification 15737-2-M-101A, items such as boral shrouds, stainless steel, and canisters were observed in outside storage areas without protection from corrosion and damage.
6. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 4.1.4 of NES Procedure N-7, a review of 50 POs indicated that orders were placed with 22 material vendors and 10 service vendors, but an audit was not performed on 18 of these 32 vendors (12 material - A-Jay Metal Supply, Cambridge Wire Cloth, Southern Spring and Stamping, Automotive Fasteners, Charlotte Valve and Fittings, Dixie Bearing, ENSCO, B&W-Advanced Ceramics, Engineered Plastics, B&B Hose and Rubber, Air Products and Advanced Products and 6 service vendors - Wallace Manufacturing, Custom Industries, SAC Tool and Die Shop, K&C Machine, Machinex, and Conam Inspection).
7. Contrary to Criterion V of Appendix B to 10 CFR Part 50, Section 7.2 of Bechtel Specification 15737-2-M-101A, Section 5 of ANSI N45.2, and Section 4.7 of Procedure N-4 of the NES QAM, a review of 50 POs, thirty-five (35) for material and fifteen (15) for services related to the defueling canister fabrication program, revealed that none of the POs required the vendor (i.e., contractor/subcontractor) to have a QA program consistent with ANSI N45.2 or Appendix B of 10 CFR Part 50.
8. Contrary to Criterion V of Appendix B to 10 CFR Part 50, Section 4.3.2 of Bechtel Technical Specification 15737-2-M-101A, and Section 11.1.1 of Bechtel Specification 15737-G-300, unapproved welding procedure WPS-002 "GMAW-Short Circuiting Transfer" was used on joint No. 4 of the filter canister subassembly for Traveler S/N 4104.
9. Contrary to Section 4.3.1.5 of Bechtel Specification 15737-2-M-101A, recombiner elements installed in a number of lower heads were exposed to dirt and grinding particles on the floor of the shop next to the head closure welding operation.
10. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Sections 3.3, 4.5, 4.7, and 4.9 of NES Procedure MC-04, material was not properly identified, stored, or accounted for as evidenced by:
  - a) Tags or other identifying means were not properly used such that the heat numbers and other identification were not maintained.

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- b) Integrity of "lots" identified by single tags or other means of identification was not properly maintained in that similar material from different heats was mixed together.
  - c) Heat numbers were obliterated in the manufacturing processes without the installation and maintenance of effective compensating identification measures.
  - d) Quantities of materials stated on tags and travelers did not match the quantities in the given lots.
11. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 6.1 of Bechtel Specification 13587-G-400, the tape currently in use in the fabrication area was not certified as meeting the limits for halogens and sulfur.
12. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 4.5.2 of NES Procedure Q-10:
- a) One Work Order Change Notice issued a drawing revision for use without specifying that the obsolete drawing should be recalled.
  - b) Eight obsolete drawings were found in the Master Work Order drawing file without the required "obsolete" stamp.
13. Contrary to Section 3.1 of NES Procedure N-8, identification numbers etched on the outside diameters of some poison tubes did not relate to applicable documents while other tubes did not contain etched identification.
14. Contrary to Criterion V of Appendix B to 10 CFR Part 50, Sections 5.5 and 5.7 of NES Procedure N-7, Section 4.3 of NES Procedure N-10, and Section 3.2.6 of NES Procedure Q-12, there was inadequate documentation to show that receipt inspection was performed on certain items and drawings could not be located to determine whether or not a dimensional check was performed by NES on items machined or formed by vendors (POs 4297, 4657, 4639, 4607, and 4467); SQHLs were missing for two material vendors (POs 4404, 4356), and one service vendor (PO 4467).

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15. Contrary to Criterion V of Appendix B to 10 CFR Part 50, Section 5.5 of NES Procedure N-7, Section 4.1 of NES Procedure N-10, and Section 4.1 of NES Procedure N-17, a review of Supplier Quality History Logs (SQHL) for receipt inspection activities of material and services purchased by NES indicated that none of the SQHLs described the type of observation, identified the inspector, or documented the results of the inspection.
16. Contrary to Criterion V of Appendix B to 10 CFR Part 50, Section 3.2.9 of NES Procedure Q-12, and Section 5.2 of NES Procedure N-17, a review of QA records indicated that CMTRs and/or CCs from material suppliers/manufacturers were missing for items on POs 4302, 4298, 4639, 5103, and 4467.
17. Contrary to Section 3.3 of NES Procedure N-5, a note was attached to Traveler SN 004096 which had not been approved by the NES QA Department and which provided instructions for identifying Poison Tube Assemblies with poison lot and tray numbers.
18. Contrary to Criterion I of Appendix B to 10 CFR Part 50, the NES QAM, Revision 0 dated April 1984 does not in all cases contain the current information with respect to the authority and duties of persons performing activities affecting quality. The QAM does not reflect the current organization at NES.
19. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 3.1 of NES Procedure N-6, "Document Control," of the NES Quality Assurance Manual (QAM), it was noted that NES Policy/Procedure Q-10, "Documental Control," dated March 30, 1984 did not contain measures to assure that current procedures are retained in manuals as evidenced by a review of the "Bechtel Canister Program Procedures - 84091" manual. A review of copies of this manual in two fabrication areas revealed that a copy of Procedure No. 15737-2-M101A-00031-02, "Packaging and Shipping," dated January 2, 1985 was missing; and superseded copies of weld procedure WPS-001 "GTAW" dated December 15, 1981, and February 7, 1985 were in both manuals.
20. Contrary to Criterion V of Appendix B to 10 CFR Part 50, Section 5.1.1 of Bechtel Specification 15737-2-M-101A, Section 5.6 of NES Procedure N-2, Section 9.5 of SNT-TC-1A, and Section 3.2.5.4 of NES Procedure Q-11, there was no documented evidence that NES had copies of the written practices of Conam Inspection (CI) or Pittsburgh Testing Laboratory (PTL) for all phases of certification of NDE personnel, or that NES had approved the two written practices.



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21. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Section 3.2.5.4 of NES Procedure Q-11, there was no documented evidence that NES had approved the Level III status of a PTL employee and a Conam employee who had certified two RT-Level II examiners in April and July 1985. One Level II performed RT on weldments on four occasions from April thru June 1985, and the other performed RT on weldments on seven occasions in May 1985.
22. Contrary to Criterion V of Appendix B to 10 CFR Part 50 and Sections 2.2 and 4.5.1 of NES Procedure Q-04, it was noted that the QA Manager and four QC inspectors had passed a written examination for certification, but the certification form had not been completed.

C. OPEN ITEMS:

None.

D. OTHER FINDINGS AND COMMENTS:

1. Review of Radiographs

Radiographic films of the longitudinal welds which required repair were reviewed. These welds are in the 304 L stainless steel pipe supplied by Armco Steel, Wildwood, Florida to be used for canisters. The North Carolina state authorized inspector (AI) had previously reviewed the radiographs and written "LOF" (lack of fusion) in pencil on several reader sheets and film envelopes. The NRC inspectors questioned whether the AI had rejected the welds. The AI stated that the copy of the reader sheet was written for his information and that he had not rejected any of the Armco radiographs.

Review of the radiographs on pipe identified by S/N 28PI indicated a weld repair area between radiographic stations 12 and 13. The weld repair was exhibited on the film as a lighter area than the adjacent original automatic fusion weld. Because the repair weld was not identified on the film or the reader sheet, a visual inspection was made by the NRC inspectors (of the weld on the pipe which had been fabricated into a fuel canister) to determine if the weld had been repaired. The visual inspection indicated that no weld repair had been made in the longitudinal seam that was exhibited on the radiograph. However, there was a small 2 inch repair weld that ran diagonally across the seam weld near station 13 that was not exhibited

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by the radiograph. The absence of a radiograph that was representative of the weld seam between stations 12 and 13 is in nonconformance with Subsection UW-51(2) of Section VIII, Part UW (lethal) of the ASME Code. Visual inspection of the weld surface on the inside of the pipe was not possible because the canister was lined with concrete.

All of the Armco radiographs of longitudinal welds which had been repaired were reviewed to determine if the above finding was an isolated case. Approximately 13 weld repair areas that were noted on the radiographs were compared to the welds on the pipes and found to correlate, based upon this review the above finding was determined to be an isolated case.

Radiographs of lower head welds were not reviewed because the AI rejected the welds of the lower heads due to stepping (distortion) between the head and the shell resulting from welding.

After the NRC inspection June 10-15, 1985, Bechtel advised the NRC inspector by telephone conversation on June 18, 1985, that the weld repair between stations 12 and 13 had been made by fusion welding at Armco on the inside surface of the pipe, Bechtel stated that this was the reason why the NRC inspectors did not observe the repair on the outside surface.

The NRC inspectors concluded that if the repair was made by fusion welding on the inside surface, then the defects were not removed by mechanical means or thermal gouging which would have required the use of filler metal. The latter methods of weld repair are required by the ASME Code for pressure vessels. The method of weld repair used by Armco was not in accordance with Subsection UW-38 of Section VIII, Part UW (lethal) of the ASME Code and the canister cannot be code stamped for use as a pressure vessel without additional review of the Armco method of weld repair.

2. NES Organization

The NES Quality Assurance Manual (QAM) exhibits an organizational structure that was in effect during April 1984. The QAM has not been revised to reflect the reorganization in April 1985 (See

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Nonconformance B. 18). The purchase order for the canisters was awarded on November 30, 1984, and there have been three QA Managers since December 1984, indicating significant changes to the NES organization without a corresponding update of the QAM.

3. Poison Tube Assembly

During the setup of two inch diameter tubes for loading of B<sub>4</sub>C pellets, the NRC inspectors observed that some tubes were identified with etched numbers while some were not, and one tube exhibited a gouge on the outside surface which was filled with rust. When questioned, the NES "expediter" produced a note to explain how the tubes should be identified with poison lot and tray numbers. The note was not properly approved (See Nonconformance B.17). Documents were not available to explain identification of the tubes (See Nonconformance B.13). When the NRC inspector identified the nonconformances to the NES machine shop foreman, he stopped work on the tubes. The gouged tube was placed on a cart without properly tagging the tube (See Nonconformance B.2).

4. Recombiner Contamination

The NRC inspectors observed that recombiner elements had been installed in a number of lower heads and partially covered with plastic. The lower heads were stacked against the wall next to the automatic welder used to weld the lower heads to the shells. Large quantities of grinding particles and dirt were observed on the plastic and the plastic was not sealed to prevent the debris from sliding through the folds of the plastic and contaminating the recombiners (see Nonconformance B.9).

5. Corrosion and Damage of Stored Material

During the tour with the NES General Manager and others, the NRC inspectors observed that canisters and in process materials/components were stored outside which exposed this material to the weather, dirt, and other potential debris and damage. This was discussed with the NES General Manager and prior to the end of the inspection, end caps were installed on pipes and canisters, parts were placed on wooden skids and boxes containing boral shrouds were repaired (See Nonconformance B.5).

6. Procurement Document Control

50 POs, 35 material vendors and 15 service vendors, were reviewed to determine whether or not applicable regulatory, technical, and



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QA program requirements were included or referenced in procurement documents. Bechtel had imposed the requirements of 10 CFR Part 21 "Reporting of Defects and Noncompliance" and the QA Program Requirements in ANSI N45.2 upon NES in Technical Specification 15737-2-M-101A for fabrication of defueling canisters.

The NRC inspectors found that NES had failed to pass the requirements of 10 CFR Part 21 to 23 of 35 vendors, 11 material vendors (POs 4010, 4009, 3998, 4008, 4012, 4011, 4292A, 4292, 4356, 4293, and 4291) and 12 service vendors (POs 4297, 4664, 4657, 4642, 4639, 4632, 4608, 4607, 4337, 4681, 4467, and 4359) (See Violation A). In addition, NES failed to pass on QA program requirements to 22 material vendors and 10 service vendors for the 50 POs reviewed (See Nonconformance B.7). QA personnel had initialed all of these POs with the exception of PO 3948 dated November 16, 1984 to Carolina Steel and PO 4337 dated January 25, 1985 to K&C Machine.

7. Control of Special Processes

The NRC inspectors reviewed applicable portions of the NES QAM and three NES procedures to determine whether special processes were being conducted by qualified personnel using qualified procedures and equipment. A review of 20 travelers relating to welding (9-filter canister subassemblies and 11-fuel canister subassemblies) revealed that all individual operations were properly initialed or stamped and dated. In addition, the hold points for witnessing by the Bechtel site inspector were signed or initialed and dated. The traveler package also contained a weld map which showed a sketch of the particular joint and the weld procedure to be used. A "Welder and NDE Record Sheet" identified the welder and procedure used as well as the NDE examiner. An attached "Liquid Penetrant Inspection Report" also identified the PT procedure as well as the examiner.

For Traveler S/Ns 4111, 4110, 4113, and 4112, the inspector noted that the PT Inspection Report identified Procedure QIP-PT-V as containing the acceptance standards, but a review determined that QIP-PT-V, "Penetrant Inspection" does not contain acceptance standards. For Traveler S/N 4104, it was noted on the "Welder and NDE Record Sheet" that welder No. 20 welded joint No. 4 using WPS-002 "GMAW-Short Circuiting Transfer". WPS-002 is not an approved welding procedure for the defueling canister program (See Nonconformance B.8).

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While inspecting the plant fabrication area and witnessing various ongoing activities, the NRC inspectors observed, on five different occasions, that a lower voltage (8 volts) rather than the value specified (10-18 volts) in welding procedure WPS-001 was being used for the gas tungsten arc welding of the lower head for the filter canister subassembly (See Nonconformance B.3). The inspectors also noted that two manuals containing procedures utilized by the individuals in the shop area were not current (See Nonconformance B.19).

Qualification records for 10 welders who had worked on the defueling canisters (job No. 89071) were reviewed. With the exception of welder No. 20, nine welders were qualified to weld using procedure WPS-001 "GTAW" and/or WPS-004 "GMAW." The qualifications were signed off by a welding engineer (consultant) and the QA Manager. A Qualification Maintenance Log, updated every three months by the QA Department, documented that each welder and welding operator had welded using a process to maintain their qualification in accordance with Section IX of the ASME Code. A review of three Procedure Qualification Records (PQR) for WPS-001 and one PQR for WPS-004 and four test reports indicated that all testing had been performed as required in accordance with Section IX of the ASME Code by Law Engineering Testing Company. The disposition of welding filler metal appeared to be in compliance with procedure Q-07 "Welding Rods, Electrode and Filler Metal Control."

8. Training/Qualifications

The NRC inspectors reviewed applicable sections of the QAM, one procedure, and training records from 1983 to the present for 20 employees (1-manufacturing, 1-materials control, 5-engineering, 1-plant manager, 1-expediting, 11-QA/QC) to determine whether personnel performing and verifying activities affecting quality had received the necessary training and qualifications.

Qualification Records of four personnel who conducted audits of vendors in the capacity of a lead auditor were evaluated. The audits were performed from October 1979 thru May 1985. The review of these records indicated that all of the auditors were qualified and met the requirements of Procedure Q-02 "Qualification of Audit Personnel" which describes the requirements for the qualification of personnel conducting audits both within and outside NES.

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Training was given in various disciplines of the QAM and quality procedures. QC inspectors performing inspections, examinations and tests were required to pass a written examination and were certified as Level I, II, or III. An annual evaluation is also performed. In the case of the QA Manager and four QC inspectors, a certification form had not been completed even though it was apparent that they had passed the examination (See Nonconformance B.22).

9. Control of Purchased Material and Services

The inspector reviewed the data packages for the material purchased by Bechtel and shipped directly to the NES facility in Greensboro, North Carolina. Bechtel purchased items included the neutron poison shrouds from Brooks & Perkins, pipe from Armco, filter bundles from Pall Trinity Micro Corporation, upper and lower heads and bulkheads from Jessop Steel and Hackney Iron Works, and catalyst material from Atomic Energy of Canada and Engelhard Corporation. The data packages, which consisted of certified material test reports, (CMTRs), certificate of compliance, (CC) NDE reports, and hydrostatic test reports, where applicable, were furnished by Bechtel to NES. Bechtel performed source surveillance audits for all the items with the exception of the recombiner catalyst and the DEOXO-D catalyst.

Although NES verified the number of items received, receipt inspection was only performed on the 14 inch diameter pipe fabricated by Armco. The required receipt inspection was not performed by NES on items purchased by Bechtel and shipped directly to NES. Specifically, receipt inspection was not performed by NES on items such as neutron poison shrouds, lower and upper closure heads, bulkheads, filter bundles, recombiner catalyst, and DEOXO-D catalyst. (See Nonconformance B.1).

Activities to be performed as part of receipt inspection and identified on a Detail Traveler included (1) a dimensional check for pipe (OD, ID, straightness, and length), (2) visual examination for cracks and damage, and (3) verification of documents (e.g., CMTR, test reports). The three activities were to be verified by the Bechtel site representative. Six shipments of pipe were made to NES in November and December 1984. A review of five travelers indicated that 208 pieces of pipe had undergone a dimensional check, but there was no indication of the serial number (S/N) for the measuring equipment, and none of the travelers was initialed/stamped by either the NES inspector or the Bechtel site representative. Also, a traveler for

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the remaining 53 pieces of pipe could not be located. After these NRC findings were discussed, NES initiated Nonconformance Reports 179 (in process pipe) and 180 (raw pipe) on June 22 and June 23, 1985, respectively, noting that the pipe was not fully receipt inspected. As of June 28, 1985, NES was awaiting Bechtel's formal notification regarding the disposition of the nonconformances.

For NES purchased material and services, the NRC inspectors reviewed applicable sections of the QAM, two procedures, the Qualified Source List (QSL) and external audits of vendors to determine whether material and services were purchased from qualified vendors. A review of 50 POs indicated that orders were placed with 22 material vendors and 10 service vendors (5-machining, 1-forming, 1-calibration, and 3-testing) from November 1984 through April 1985. Four of the material vendors were ASME certificate holders. NES had audited three vendors - J. T. Ryerson in October and November 1984, Piedmont Hub in October 1979, and Carolina Steel in October 1982. Four service vendors were audited - Pittsburgh Testing and American GFM Corporation in January and May 1985 and both Gage Laboratory (GL) and Law Engineering & Test in May 1983. Thirteen of the material vendors and five service vendors had not been audited by NES, and they were not on the NES QSL (See Nonconformances B.4 and B.6).

During a review of CMTRs and CCs from material suppliers and manufacturers, the NRC inspectors determined that these documents were missing on five POs (See Nonconformance B.16). The NRC inspectors reviewed drawings and SQHLs for 11 items (POs 4297, 4280, 3936, 4664, 4657, 4639, 4607, 4404, 4356, 5103, and 4467) to determine whether receipt inspections had been performed. Six items were machined by outside vendors, but drawings to assure that a dimensional check was performed by NES were missing on five of the items. SQHLs were missing for three other items (See Nonconformance B.14). The SQHL is the document used to establish that a receipt inspection has been performed, identify the PO, quantity received, acceptance and the type of inspection performed (i.e., dimensional, cleanliness, PO requirements). It does not identify the inspector, list S/Ns of measuring equipment, or describe the type of observation and the specific results (See Nonconformance B.15). In addition, NES inspections were conducted without a checklist.

10. Control of Measuring and Test Equipment (M&TE)

The NRC inspector reviewed applicable sections of the QAM, one procedure and calibration records to determine whether M&TE was properly identified, controlled and calibrated at specified



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intervals. A review of the Tool Check Log indicated that issuance of M&TE from the gage crib is controlled.

Fifteen Gage Maintenance Cards for inspection equipment (6-micrometers calipers, and thread measuring wires); instruments (5- pressure gages, voltmeters, and ammeters); and reference standards (4-gage block set, dead weight tester, and panel meter) were reviewed. The cards identified S/Ns of the instruments, calibration date, and calibration frequency. Information contained on calibration stickers on each item was in agreement with the applicable gage card.

Internal calibration activities at NES are handled by one individual. Gage Laboratory (GL) performed calibration services on several items: 20 piece weight set, precision level, pyrometer, gage block set, panel meter, hardness tester, and dead weight tester. A review of 10 applicable certifications from GL indicated that all standards utilized were traceable to the National Bureau of Standards. The most recent audit performed by NES of GL was in May 1983.

11. Pipe

In addition to the two NES nonconformance reports for the 14 inch diameter pipe (See Section D.9), another nonconformance report was generated by NES when a crack was detected on pipe No. 103P2. The crack was in the weld between stations 11 and 12, and subsequent PT examination of the pipe's OD and ID revealed that the crack on the OD surface was not a through wall defect. This pipe was one of 10 pieces of pipe that were identified as not being stored in a segregated area by the NRC inspector during the June 10-14, 1985 inspection (See Nonconformance B.2). As of June 28, 1985, the status of the 261 pieces of pipe is as follows: 140-in storage, 8-rejected for dimensional noncompliance, 107-in process (29-filter/49-fuel/29-knock out), and 6-sent to Joseph Oat Company.

12. Nondestructive Examination (NDE)

The NRC inspector reviewed the qualification and certification records of NDE personnel from NES (9), PTL (2), and CI (1) to determine whether the individuals performing ultrasonic (UT), radiographic (RT) and/or liquid penetrant (PT) testing were certified to SNT-TC-1A.



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The NES QA Manager was certified to a Level III for visual examination (VT), RT, PT, magnetic particle examination (MT) by the General Manager, but the certification was not dated. The QA Manager had successfully passed written examinations in July 1980 for PT, RT, & MT and in March 1985 for VT. With the exception of the QC Supervisor whose certification was missing, the NDE records for the remaining seven individuals appeared to be in order.

An April 1985 memo from NES's QA Manager designated R. Dovicsak from PTL as NES's Level III examiner in MT, UT, RT and PT. PTL had certified Dovicsak in May 1984 to a Level III, but copies of his tests were not available. An eye examination dated November 1983 was in the file, and a eye examination report dated January 1985 was added to the file during the NRC inspection.

The NRC inspectors reviewed NES's written practice for all phases of certifying NDE personnel, which appears to be consistent with SNT-TC-1A. However, NES did not have copies of PTL's or CI's written practices nor had they approved the two written practices (See Nonconformance B.20).

The NES procedures for VT and PT were approved by Bechtel in December 1984 and February 1985, respectively. NES approved PTL's procedures for UT and RT in January 1985 with a stipulation that Bechtel approve them prior to use. Although Bechtel approved both procedures on June 12, 1985, Dovicsak of PTL performed UT of weldments on May 10 and 14, 1985 and June 3, 1985.

A. Morrison, a Level II from PTL, performed RT at NES on April 17 and 22, 1985 and June 6 and 8, 1985. In addition, J. Miller, a Level II from CI, performed RT on weldments using PTL's procedure on seven occasions in May 1985. A. Morrison was certified by B. Bruce and J. Miller was certified by D. Fister, but there was no documented evidence that NES had approved the Level III status of Bruce or Fister, therefore, the Level II status of Morrison and Miller was, in effect, not valid at the time they performed the tests (See Nonconformance B.21).

### 13. Drawing Control

The NRC inspectors reviewed the procedures and functioning of the drawing control process. They determined that the Master Work Order folder contained obsolete drawings related to the canister program which were not stamped "obsolete" as required (See Nonconformance

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B.12). Further, one drawing was issued for use without specifying that the obsolete drawing should be recalled. However, inspection of the Engineering Control Clerk's drawing file revealed that the obsolete revision had been removed. The inspector also noted that drawing No. 1154027 Rev. 3 had been released for fabrication by Bechtel without the required signatures in the revision block by Babcock and Wilcox who made the changes.

14. Material Control

The NRC inspectors reviewed the procedures and the functioning of the material control system and determined that, while the system relies on the use of green or yellow "accepted" tags or label markings to maintain identification and status of materials, parts and components, the actual use of such tags or labels was limited both in scope of application and in effectiveness. In addition when a single traveler or tag was used to indicate the status of a "lot" (i.e., group) of material, parts or components, the controls provided on the envelope of the "lot" were insufficient to prevent mixing of material between lots with the resulting loss of heat numbers and other identity, and loss of any indication of status which was on the traveler or tag. Finally, there was no evidence of adjustments of traveler quantities when material was removed from a "lot". This resulted in mismatches between quantities of material in given "lots" and the corresponding quantities stated on the travelers or tags when such travelers or tags were present. (See Nonconformance B.10). Examples of the failure to adequately control material, parts or components include:

1. Fifty-two eight inch and 56 fourteen inch canister skirts were in separate piles on two pallets each with a single acceptance tag. Heat number identities were not available. Neither was there effective envelope control to prevent addition or subtraction of material from the piles.
2. Fourteen knockout canister intermediate "A" support plates were stored in a box. No status tag or other identification was available. Machining had taken place which obliterated or removed sections of heat numbers.
3. Twenty knock out canister intermediate support plates were stored in and around two fiber drums and a cardboard box. The fiber drums also contained rain water. There were no tags or other accompanying identification or indication of status. The lids of the drums had heat numbers written on

ORGANIZATION: NES MANUFACTURING  
GREENSBORO, NORTH CAROLINA

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them but had become separated from the drums. Heat numbers which had been written on the plates were obliterated in whole or in part by previous machining operations. Where parts of heat numbers were still legible, the inspector determined that the contents of the two drums had been mixed.

4. Fourteen partially machined knockout canister upper heads were stored on a pallet on a gravel surface trapping spattered gravel and rain water in blind holes. There was no indication present as to the status of these components.
  5. A pallet outside the tool room door, containing 47 lower canister head assemblies, was indicated by the welder as the place where he had been instructed to obtain lower heads for assembly to canisters. There was no indication of acceptance status or other information such as a traveler on or around the pallet, although the welder said there had been a tag there at one time.
  6. Next to the fit up and weld station there were three pallets each with a tag identifying the pallet load as a "lot" of 30 canister lower head assemblies. One pallet had 34, the second had 27 and the third had 29 assemblies.
  7. Four boxes of knockout canister entrance tube components were in the assembly area in various stages of welding. The tag in the box of 11 unassembled bent tubes noted a quantity of 140 pieces. The other boxes were unmarked and without tags and contained tubes tack-welded into double and triple bends.
15. Control of Materials Used in Contact with Canisters and Sub Components
- Because of the potential for long term corrosion and malfunctioning of the catalytic recombiner catalysts, the inspector made a review of the materials used in the fabrication and testing process. CMTRs and other appropriate documentation were reviewed for marking materials, the water system, cleaning solutions, liquid penetrant,

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etc. No adequate documentation or certification could be shown for the "tuck" type tape used to fasten travelers to the canisters and subassemblies, and for other purposes in the canister program. The QA Engineer produced a certificate of compliance dated 1984 for 24 rolls of tape and stated that the tape was kept in a locked cabinet in the QA room. The cabinet contained no tape. Neither was the more-than-6-months-old certificate of compliance for 24 rolls of tape consistent with the usage of tape currently in evidence. A person using tape stated that he obtained it from the tool room. The QA Engineer later stated to the inspector they had run out of certified tape and had submitted a nonconformance report to engineering for evaluation. This nonconformance report was not reviewed during the inspection. In addition, there were no CCs for adhesive-backed accept/reject labels which were called for in the material identification and control procedure (See Nonconformance B.11).

16. Canister Cleanliness

After observing the practices in the shop and having conversations with workers, the inspectors reviewed the procedures for storage and cleaning. No requirements for storage of material during fabrication were identified. The shop practices were found to be in compliance with the approved cleaning procedure. However, the approved procedure for cleaning of material and parts, in process, and for internals of the canister assemblies does not meet usual standards for components in contact with primary coolant or for stainless steel components where extended lifetime is desired. For example, material in process is stored outside - some in a gravel surfaced area - or inside where other operations such as weld preparation and other grinding take place. There is no requirement for cleaning anything except weld areas and the external surfaces of the completed canisters (i.e., a requirement for removing grinding chips and dust, adhesive residue or other foreign material on and in internal subassemblies or other components installed inside the canisters does not exist). Similarly, there is no requirement for cleaning the internal surfaces of the canisters prior to installation of the internals. Based upon observations and discussions with NES personnel, the inspectors determined that internal surfaces were not being cleaned prior to assembly. In addition, the approved NES/Selamco cleaning procedure 84091 CP, applicable to weld areas and exterior canister surfaces, allows for 15 square inches of rust in any one foot of surface to which cleaning requirements apply.



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17. Installation of Catalytic Recombiner and Verification

Although no activities related to the installation of the catalytic recombinder were being conducted at the time of the inspection, the inspectors reviewed the procedures for installation and inspection of the recombinder and determined the status of recombinder installation. All bottom head assemblies which include recombinder installation had been completed, inspected, accepted, and stored in folded plastic in the fabrication area. Because of unrelated fabrication problems only four of the upper head assemblies had been completed.

The procedure for filling the cavities with recombinder appears to lack internal consistency. Although it calls for obtaining premixed, premeasured, and presumably carefully controlled packages of recombinder from the store room and then putting the contents of the packages into the cavities, it also calls for adding additional recombinder from an unidentified source to fill the cavity if additional material should be required. The inspector noted the Bechtel inspection rate of 1 in 5 head assemblies for verification of recombinder installation.

A future inspection will evaluate the controls applied to the activities of receipt, mixing, packaging, issue, and installation of recombiners.



GPU NUCLEAR  
SURVEILLANCE REPORT

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To: T. V. Sarma

Report No. TMI-2/1/8510074

Rev. -

Project QA Engineer

Date: April 25, 1985

Supplier: Nuclear Energy Services Site: TMI-2

Address: 101 Swing Road

Greensboro, NC 27409 P.O. No. TC-016072

C/O No. 0

Spec No. -

Rev. No.

Fabricated at: Same as Above.

Address:

PQA No. -

B/A No. 220060

Date of Visit: April 18-19, 1985

Vendor No. 26106-001

Activity Items:

Defueling Canisters

Personnel Contacted:

A. E. Smith - Bechtel Sr. Quality Rep.

R. C. Himmelsbach - Bechtel Area Supv.

T. Harmon - NES Project Engineer

Purpose of Visit:

Perform interim surveillance activities on Defueling Canisters with Bechtel QA Representative.

Summary of Visit:

This surveillance visit revealed numerous QA related problems in fabrication, NDE, welding, and procedures. See body of report for details.

Results of surveillance were \_\_\_ Satisfactory X Unsatisfactory

Action Required:

By NES... - Develop a plan for the successful NDE of the Fuel Canister Shell to bulkhead circumferential seam which will meet contract and code requirements.

By Bechtel... - Formally evaluate the need for a procedure for installation and inspection of the fuel canister cement type lining. Provide an explanation for the inordinately high number of SDDR's thirty-two (32) issued to date.

No. of Nonconformance Reports Issued None

Final Report Prepared by:

QA Surveillance Rep.

4-25-85

Date

Reviewed by:

D. M. Kierma

GPUN - Supv. Surveillance & Controls

4/25/85

Date

J. B. Bahsch

Concurrence:

Manufacturing Assurance Manager

4/26/85

Date

for C. J. Paczolt

Distribution: See attached.

For GPUN use only

Rev. 0

Date

Location All Plants

Rec. No.

RecType 002.03

Form No. 7207.UT 3-1

Retention- Lifetime

0247N/71

DISTRIBUTION - TMI-2

B. W. Alatary - QA Engineering Manager, Corp.  
J. E. Kunkel - Director, Procurement Section  
L. H. Lilien - Manager, TMI Contracts  
J. F. Marsden - QA Engineering Manager  
C. T. Schrock - Manager, HQ Procurement Office  
J. C. Solakiewicz - QA Engineering & Systems Mgr., OC  
J. E. Tietjen - QA Program Receiving Supervisor  
Vendor File - For Data Entry/CARIRS-HQ  
R. P. Warren - Plant Engineering Director, Acting  
D. M. Kierpa - QAE

The writer visited Nuclear Energy Services (NES), Greensboro, North Carolina on April 18-19, 1985. The purpose of this visit was to observe various interim surveillance activities on the defueling canisters for Three Mile Island, Unit Two in conjunction with Bechtel's QA representative, Mr. A. Smith. Bechtel has the prime responsibility for surveillance for this procurement.

Upon arrival at NES, the writer met with Mr. A. Smith, Bechtel QAR. Mr. Smith has been in residency at NES throughout fabrication and testing completed thusfar, for a time period of approximately four months. The major items on this order are, seventy-seven (77) fuel canisters, thirty-nine (39) filter canisters, and one hundred and thirty-four (134) knock down canisters. Mr. Smith maintains complete surveillance files for this order, containing all available documents, reports, welding procedures, NDE procedures and certifications, and drawing and procedure approvals. The required surveillance activities applicable to this order are outlined in Bechtel Q.S. Plan #15737-2M -101A(Q).

Based on discussions with Mr. Smith and the writer's own observations and reviews, the following QA related problems were identified.

1. For the first five (5) fuel canisters, preliminary "information only" radiographs of the shell to bulkhead circumferential seam welds revealed incomplete penetration and lack of fusion, with these welds to be completely ground out and rewelded in their entirety. Also, on one of these canisters, radiography of the shell to/lower head circumferential seam weld revealed a temporary fixture plate had been inadvertantly left in the vessel by NES. This circumferential seam weld will be ground out, with the plate removed, and the seam rewelded.
2. At the present time, there is no firm plan in effect by NES for the successful NDE of the fuel canister shell to bulkhead circumferential seam. It appears that complete coverage of this seam using radiographic examination is impossible due to internal configuration and cement lining. Also, ultrasonic examination of this seam will be extremely difficult due to the same reasons.
3. There is no NES procedure in effect for the installation and inspection of the cement type lining for the fuel canisters. For the first five (5) canisters, it appears that no environmental parameters were checked or recorded during cement pouring. Also, there are no provisions for inspection of the lining for voids or cracks.

4. To date, Mr. Smith has issued thirty-two (32) Supplier Deviation Disposition Requests (SDDR's) on this contract. Considering that fabrication on this contract is less than 30% complete, this seems to be an inordinately high number.

At the conclusion of this surveillance visit, a brief meeting was held with Mr. Smith and Mr. R. Himmelspace, Bechtel's Area Supervisor, to discuss these aforementioned concerns. Based on this discussion, the following actions are required.

By NES... - Develop a plan for the successful NDE of the fuel canister shell to bulkhead circumferential seam which will meet contract and code requirements.

By Bechtel... - Formally evaluate the need for a procedure for installation and inspection of the fuel canister cement type lining. Provide an explanation for the inordinately high number of SDDR's, thirty-two (32) issued to date.

PERSONS CONTACTED

Company NES mtg.

Dates 6/10/85 - 6/15/85

Docket/Report No. 9990018/8501

Inspector C/CLIMBERG

6/14/85 STATUS MEETING

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PERSONS CONTACTED

Company NES Mfg.

Docket/Report No. 9901018105.02

Dates 6/24-28/95

Inspector J. CONWAY

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NAME(Please Print)

TITLE (Please Print)

ORGANIZATION(Please Print)

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INSPECTOR Jim Conway  
SCOPE \_\_\_\_\_

DOCUMENTS EXAMINED

DOCKET NO. 99901018  
REPORT NO. 85 - 01  
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ITEM NO.	TYPE OF DOCUMENT	DOCUMENT NO.	REV.	DATE	TITLE / SUBJECT
1	QAM			4-30-84	Nuclear QA Manual
2	<del>SPEC</del>	15131-2-M 101A	1	11-30-84	TECH SPEC - FABRICATION OF DEFUELING CANISTERS FOR GPU (3-Mile Island)
3	Ro				Fifty Ros to material vendors (35) and service vendors (15)
4	OTH				CTMRs/CCs from 45 vendors
5	OTH			6-25-85	Qualified <del>Source</del> List
6	PRO	Q-06		2-5-82	"Eye examination requirements & eye fatigue"
7	PRO	Q-04		10-1-81	"Qualification of Inspector, Examination & Testing Personnel"
8	PRO	Q-02	1	4-1-81	"Qualification of Audit Personnel"
9	PRO	Q-03	A	4-83	"Reporting of Defects and Non Compliance ... 10 CFR Part 21"
10	OTH				Receipt Inspection Documentation relating to Bechtel purchased items (7 items)
11	OTH				Training/Qualification Records for 20 employees (inspectors, auditors, NDE, etc.)
12	OTH				Data packages for Bechtel purchased items (7)
13	OTH			6-22/84 8-13/84	Nonconformance Reports #174 & 180 on 14 in. diam. pipe
14	PRO	Q-05	B	2-84	"Welding Performance Qualification Records"
15	PRO	Q-07	1	6-6-84	"Welding Rods, Electrode & Filler Metal Canisters"

TYPE OF DOC:

DWG - DRAWING  
SPEC - SPECIFICATION  
PRO - PROCEDURE  
QAM - QA MANUAL  
QCD - QC DOCUMENT  
P.O. - PURCHASE ORDER

LTR - LETTER  
OTH - OTHER

INSPECTOR Jim Conway  
SCOPE \_\_\_\_\_

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ITEM NO.	TYPE OF DOCUMENT	DOCUMENT NO.	REV.	DATE	TITLE / SUBJECT
16	PRO	Q-08		10-3-83	"Qualification of Welding Personnel"
17	PRO	Q-09		1-6-84	"Requirements for Storage & Maintenance of QA Records"
18	PRO	Q-11		6-6-84	"Control of Special Processes"
19	OTH				20 Travelers (9- Filter Can Sub. Ass'y & 11- Lower Ass'y Fuel Can)
20	OTH				Supplier Quality History Log
21	PRO				"Bechtel Canister Program Procedures - 84091" Manual
22	PRO	WPS-001	B	4-24-85	"GTAW"
23	PRO	WPS-004	A	2-12-85	"GMAW"
24	OTH	PQR		8/14-12/84 2/85	3 PQRs for WPS-001 (08081604/08081602/003663)
25	OTH	PQR		12-15-81	1 PQR for WPS-004 (08082602)
26	OTH				4 TEST REPORTS from Law Engineering Testing Company
27	PRO	PT-V	1	1-18-85	"Liquid Penetrant Examination"
28	PRO	QIP-VT		4-81	"Visual Examination"
29	OTH	UT-1/2/3		5/85 6/85	3 - UT Reports from Pittsburgh Testing Labs
30	PRO	PIL-QC-UT-1		2-22-80	"Ultrasonic Inspection"

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INSPECTOR Jim Conway  
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31	PRO	PIL-QC-R1-1		1-2-80	"Radiographic Examination"
32	LIR			1-3-85	NES/QA Mgt. P.L. (Lex III) re UT&RT procedures
33	OTH	P.T.-1 & 2 P.T.-3 & 4	- -	4/25/85 (2) 6/25/85 (2)	4 RT Reports from P.L.
34	OTH				6 PT Reports from Curran Inspection
35	OTH			4-29-85 4-23-85	Nonconformance Reports # 124 & 045
36	OTH				Welder qualifications for 10 welders/welder operators
37	OTH				Qualification Maintenance by the welders
38	OTH				Receipt inspection documentation for 11 purchased items
39	OTH				Nonconformance Reports # 096 & 214
40	OTH			4-18-85 5-6-85	SDORs # 32 & 44
41	OTH				Gage Maintenance Cards (15)
42	OTH				Tool Check Log
43	OTH				Calibration Certifications (10) from Gage Laboratory
44	OTH	Q-01	3	12-6-84	"Calibration of Tools, Gages, & Test Equipment"

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INSPECTOR Grandy  
SCOPE \_\_\_\_\_

DOCUMENTS EXAMINED

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REPORT NO. \_\_\_\_\_  
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ITEM NO.	TYPE OF DOCUMENT	DOCUMENT NO.	REV.	DATE	TITLE / SUBJECT
1	CHTR			1/26/94	Schwarzkopf Micro Analytical Lab Lot #157 marking pens Total halogens < 40 ppm
2	CMC	PO5-02765		2/24/94	order 6091 345 Yellow Nuclear Duct Tape Lot 5534 by Nashua Corp Total halogens < 1000 ppm
3	Test Report	NES 40126		undated	Turco Decan 4324 276.7 ppm halogens 3700 Alkalinity Guilford Labs
4	letter			7/17/94	Certifying Turco Decan 4324 190 ppm halogens No free Alkali by Turco
5	letter			7/25/94	Dilution of 3.07/gal raw Turco 4324 keeps halogens below 50 ppm limit
6	letter			9/4/94	letter City of Greensboro water has 2.0 ppm <sup>free</sup> chlorine data sheet says 7.6 - 8.4 mg/L Total chlorides
7	COFC	6091		2/25/94	Nashua to Torcoel paper yellow Nuclear Duct Tape
8					Total halogens < 1000 ppm Total Sulfur < 1000 ppm
8	letter			7/19/94	Deionized Water Treatment System meets Grade 3 quality per CAP and ASTM by Culligan
9	Procedure	94091-PT-V		11/19/95	Penetrant Inspection - NES
10	Procedure	94091-CP		11/19/94	Cleaning - NES

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LTR - LETTER

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**TYPE OF DOC:**

DWG - DRAWING  
SPEC - SPECIFICATION  
PRO - PROCEDURE  
QAM - QA MANUAL  
QCD - QC DOCUMENT

LTR - LETTER

INSPECTOR Ray C. Limberg  
SCOPE \_\_\_\_\_

**DOCUMENTS EXAMINED**

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