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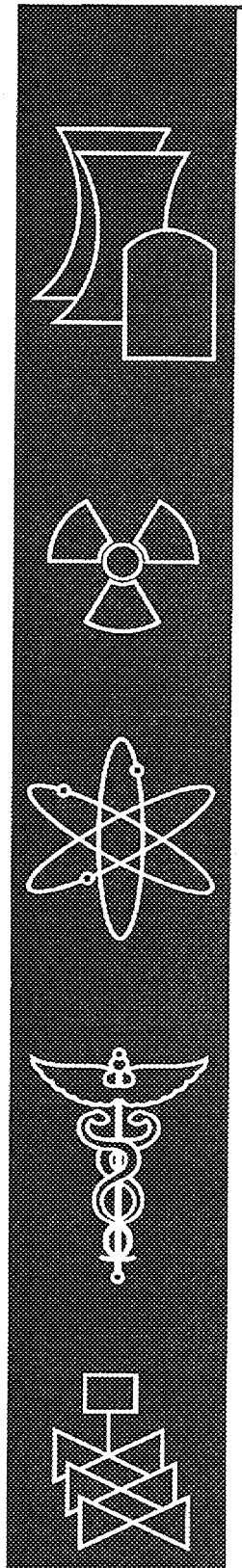
Vol. 23, No. 2



Licensee Contractor and Vendor Inspection Status Report

Quarterly Report
April – June 1999

U.S. Nuclear Regulatory Commission
Office Nuclear Reactor Regulation
Washington, DC 20555-0001

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NUREG-0040
Vol. 23, No. 2

Licensee Contractor and Vendor Inspection Status Report

Quarterly Report
April – June 1999

Manuscript Completed: October 1999
Date Published: October 1999

Division of Inspection Program Management
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

ABSTRACT

This periodical covers the results of inspections performed between April 1999 and June 1999 by the NRC's Quality Assurance, Vendor Inspection, Maintenance and Allegations Branch that have been distributed to the inspected organizations.

CONTENTS

INTRODUCTION

A fundamental premise of the U. S. Nuclear Regulatory Commission (NRC) licensing and inspection program is that licensees are responsible for the proper construction and safe and efficient operation of their nuclear power plants. The Federal government and nuclear industry have established a system for the inspection of commercial nuclear facilities to provide for multiple levels of inspection and verification. Each licensee, contractor, and vendor participates in a quality verification process in compliance with requirements prescribed by the NRC's rules and regulations (Title 10 of the *Code of Federal Regulations*). The NRC does inspections to oversee the commercial nuclear industry to determine whether its requirements are being met by licensees and their contractors, while the major inspection effort is performed by the industry within the framework of quality verification programs.

The licensee is responsible for developing and maintaining a detailed quality assurance (QA) plan with implementing procedures pursuant to 10 CFR Part 50. Through a system of planned and periodic audits and inspections, the licensee is responsible for ensuring that suppliers, contractors and vendors also have suitable and appropriate quality programs that meet NRC requirements, guides, codes, and standards.

The NRC reviews and inspects nuclear steam system suppliers (NSSSs), architect engineering (AE) firms, suppliers of products and services, independent testing laboratories performing equipment qualification tests, and holders of NRC construction permits and operating licenses in vendor-related areas. These inspections are done to ensure that the root causes of reported vendor-related problems are determined and appropriate corrective actions are developed. The inspections also review vendors to verify conformance with applicable NRC and industry quality requirements, to verify oversight of their vendors, and coordination between licensees and vendors.

The NRC does inspections to verify the quality and suitability of vendor products, licensee-vendor interface, environmental qualification of equipment, and review of equipment problems found during operation and their corrective action. When nonconformances with NRC requirements and regulations are found, the inspected organization is required to take appropriate corrective action and to institute preventive measures to preclude recurrence. When generic implications are found, NRC ensures that affected licensees are informed through vendor reporting or by NRC generic correspondence such as information notices and bulletins.

This quarterly report contains copies of all vendor inspection reports issued during the calendar quarter for which it is published. Each vendor inspection report lists the nuclear facilities inspected. This information will also alert affected regional offices to any significant problem areas that may require special attention. This report lists selected bulletins, generic letters, and information notices, and include copies of other pertinent correspondence involving vendor issues.

INSPECTION REPORTS

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

May 6, 1999

Mr. Jack Matlock, President
Basic-PSA, Inc.
124 Donald Lane
Johnstown, Pennsylvania 15904

SUBJECT: NRC INSPECTION REPORT 99901339/1999201

Dear Mr. Matlock:

This letter addresses the inspection of your facility at Johnstown, Pennsylvania, conducted by Bill Rogers of this office on April 5 through 6, 1999, and the discussions of his findings with you and other persons on your staff at the conclusion of the inspection.

Areas examined during the inspection are discussed in the enclosed report. This inspection consisted of an examination of procedures and representative records, interviews with personnel, and observations by the inspector. During the review of your quality assurance program, within the scope of this inspection, we found no instance in which Basic-PSA, Inc., failed to meet NRC requirements, however, a weakness was identified concerning the Basic-PSA, Inc., 10 CFR Part 21 procedure and its implementation.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be placed in the NRC Public Document Room (PDR).

Sincerely,

Theodore R. Quay

Theodore R. Quay, Chief
Quality Assurance, Vendor Inspection, Maintenance
and Allegations Branch
Division of Inspection Program Management
Office of Nuclear Reactor Regulation

Docket No. 99901339

Enclosure: Inspection Report 99901339/1999201

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10. SUPPLEMENTARY NOTES

11. ABSTRACT *(200 words or less)*

This periodical covers the results of inspections performed by the NRC's Quality Assurance, Vendor Inspection, Maintenance and Allegations Branch, that have been distributed to the inspected organizations during the period from April through June 1999.

12. KEY WORDS/DESCRIPTORS *(List words or phrases that will assist researchers in locating the report.)*

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U.S. NUCLEAR REGULATORY COMMISSION

OFFICE OF NUCLEAR REACTOR REGULATION

Report No:	99901339/1999201
Organization:	Basic-PSA, Inc.
Contact:	Bill Louder, Quality Assurance Manager (814) 266-8646
Nuclear Activity:	Manufactures and supplies safety-related shock arrestors to NRC Licensees
Dates:	April 5-6, 1999
Inspector:	Bill Rogers, Reactor Engineer, IQMB
Approved by:	Gregory Cwalina, Acting Chief Reliability and Maintenance Section Quality Assurance, Vendor Inspection, Maintenance and Allegations Branch Division of Inspection program Management

Enclosure

1 INSPECTION SUMMARY

On April 5-6, 1999, the U.S. Nuclear Regulatory Commission (NRC) performed an inspection at the Basic-PSA, Inc., facility in Johnstown, Pennsylvania. The inspection was conducted to review selected portions of Basic-PSA's quality assurance (QA) program, and its implementation, and the applicable programs and procedures used to supply safety-related shock arrestors to NRC licensees. Specifically, the inspector reviewed Basic-PSA's activities related to the maintenance of vendor controls and the transfer of 10 CFR Part 21 responsibilities, from Pacific Scientific to Basic-PSA, following Basic-PSA's purchase of the safety-related shock arrestor product line from Pacific Scientific in January 1997.

The inspection bases were:

- 10 CFR Part 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants."
- 10 CFR Part 21, "Reporting of Defects and Noncompliance."

2 STATUS OF PREVIOUS INSPECTION FINDINGS

This was the first inspection of Basic-PSA.

3 INSPECTION FINDINGS AND OTHER COMMENTS

3.1 Control of Suppliers

a. Inspection Scope

The inspector examined procedures and representative records, interviewed personnel, and observed activities to verify that Basic-PSA took appropriate actions to maintain the qualification of vendors which had been previously qualified by Pacific Scientific and to verify that Basic-PSA took appropriate qualification actions to place or maintain vendors on the Basic-PSA approved suppliers list for new vendors added subsequent to the shock arrestor product line purchase.

b. Observations and Findings

The inspector determined that Basic-PSA had taken actions to independently develop an Approved Vendor List (AVL) specific to Basic-PSA and had not taken possession of the Pacific Scientific AVL. As a result, Basic-PSA had not been required to maintain the qualification of any vendors previously used by Pacific Scientific.

The inspector reviewed Basic-PSA's current AVL, dated April 2, 1999, which replaced the previous revision dated January 12, 1999. The current AVL listed twenty-four vendors which supplied commercial, American Society of Mechanical Engineers (ASME) Code, or nuclear (10 CFR Part 50, Appendix B) products or services. Those vendors providing ASME or nuclear products or services had been qualified within the previous two years by Basic-PSA.

c. Conclusion

The inspector concluded that Basic-PSA had not taken possession of the Pacific Scientific AVL and had instead taken adequate actions to develop a list of qualified suppliers. The inspector did not identify any concerns in this area.

3.2 10 CFR Part 21 Procedure

a. Inspection scope

The inspector examined procedures and representative records, interviewed personnel, and observed work activities to verify that the Basic-PSA 10 CFR Part 21 implementing procedure was in accordance with the requirements of 10 CFR Part 21.

b. Observations and Findings

The inspector reviewed the Basic-PSA procedure BPI-26, "Procedure for Reporting Defects and Failures to Comply in Accordance with Regulations 10 CFR 21," dated November 21, 1997. BPI-26 was a detailed procedure which defined all pertinent references and clearly outlined the scope of related activities and the applicable responsibilities. However, the procedure did not specify the requirement that deviations be evaluated within sixty days of discovery or if the deviation cannot be evaluated within sixty days of discovery an interim report be submitted to the NRC within sixty days of discovery. In addition, the procedure did not specify that a director or responsible officer be informed within five working days of the completion of an evaluation which determined that a defect or failure to comply exists.

c. Conclusion

The inspector concluded that a weakness was identified in the Basic-PSA 10 CFR Part 21 implementing procedure which did not specify the applicable timeliness requirements for evaluating deviations, providing interim notification to the NRC, or informing responsible officer of defects of failure to comply. Basic-PSA indicated to the inspector that the Basic-PSA 10 CFR Part 21 implementing procedure would be revised to include the discussed timeliness requirements.

3.3 10 CFR Part 21 Evaluations

a. Inspection scope

The inspector examined procedures and representative records, interviewed personnel, and observed work activities to verify that Basic-PSA's 10 CFR Part 21 evaluations or notifications were in accordance with the requirements of 10 CFR Part 21 and the requirements of the Basic-PSA 10 CFR Part 21 implementing procedure.

b. Observations and Findings

Identification of the Deviation

Review of the Basic-PSA 10 CFR Part 21 records indicated that there were no 10 CFR Part 21 records, maintained in accordance with BPI-26, indicating that no deviations had been identified, or evaluations performed, since the 1997 purchase of the safety-related shock arrestor product line from Pacific Scientific. However, during discussions with Basic-PSA personnel and review of Basic-PSA's records related to vendor qualifications, the inspector determined that Basic-PSA had reviewed a technical issue concerning an indication that a sub-supplier did not have documentation to support that activities had been accomplished in accordance with the purchase order.

Basic-PSA had determined that All Metals Processing had provided a service to Pacific Scientific in the 1996 time period, which was prior to Basic-PSA's purchase of the safety-related shock arrestor line. All Metals Processing had been contracted by Pacific Scientific to coat several metal parts with a manganese phosphate coating which had been used in safety-related shock arrestors supplied to NRC licensees. However, Basic-PSA had indication that All Metals Processing did not have documentation that the manganese coatings had actually been applied and that potentially a zinc phosphate coating had been applied in lieu of the manganese phosphate coating.

Purchase Order and Manufacturing Requirements

Basic-PSA had contacted Pacific Scientific to determine the nature of the purchase orders from Pacific Scientific to All Metals Processing and the corresponding certifications and had retrieved the available manufacturing documentation from Basic-PSA's onsite records.

At Basic-PSA's request, Pacific Scientific had reviewed its electronic files, which contained the information which Pacific Scientific had included to in its purchase orders to All Metals Processing and the corresponding information which had been included in the certifications from All Metals Processing to Pacific Scientific, and provided this information to Basic-PSA. Based on a discussion with Pacific Scientific concerning the purchase order and certification information, Basic-PSA had

determined that the documentation had not specified the requirements of 10 CFR Part 50, Appendix B or 10 CFR Part 21 which indicated that All Metals Processing had been a commercial grade supplier to Pacific Scientific.

The inspector reviewed the applicable Pacific Scientific manufacturing and assembly outlines and procedures which Basic-PSA had maintained onsite and had used in the review of the coating issue. The review included Pacific Scientific Manufacturing/Assembly Outline, Shop order 1-1930-1414040 dated June 14, 1996, which applied to a capstan, part no. 1801421-01, one of the affected components. Operation No. 70 of the Manufacturing/Assembly Outline stated to "Coat the entire part in accordance with the PSCo [Pacific Scientific Methods and Process Standard] No. 02.72, Type 4: Coat with Manganese Phosphate Per MIL-P-16232, Type M" and it was noted that this had been accomplished with the Pacific Scientific Purchase Order K141404070 to All Metals Processing.

The applicable Pacific Scientific procedure, PSCo 02.72, "Corrosion Protection for Ferrous Alloys," revision M, dated August 3, 1994, specified the Type 4 as "Phosphate with Supplementary Treatment," which required that the component be coated with Manganese Phosphate per MIL-P-16232, Type M, Class 1. In addition, the component was to have received a supplementary treatment by applying a heat cured solid film lubricant per MIL-L-8937. (The supplementary solid film lubricant (dry lubricant) was applied by Electrofilm Corporation.) The corresponding certification from All Metals Processing to Pacific Scientific for the capstan coating procedure, Invoice no. 83413A, dated July 18, 1996, specified that a manganese phosphate coating was applied in accordance with PSCo 02.72, revision M, Type 4.

Evaluation of the Deviation

Basic-PSA had performed and documented a review of the manganese coating issue when it had first been identified in December 1998, prior to the NRC inspection. Basic-PSA had determined that a manganese phosphate coating had been required on several components including an inertia mass, capstan, and torque carriers and that these components had been installed in safety-related shock arrestors which had been supplied to NRC licensees.

Basic-PSA noted that although the manganese phosphate coating was required for corrosion protection there was no expectation of an increased susceptibility to corrosion, if a zinc phosphate coating had been applied in lieu of a manganese phosphate coating, for the following reasons:

- Zinc phosphate was nearly equivalent to manganese phosphate in corrosion protection in this application.

- Additional corrosion protection was provided by the solid film lubricant applied per MIL-L-8937.

- The parts affected were internal to the shock arrestor, isolated from the environment and experienced low stress (no rubbing to reduce coating effectiveness).

Basic-PSA concluded that with the addition of the dry lubricant (the MIL-L-8937 film) there would be essentially no difference between the manganese phosphate or the zinc phosphate coatings in regard to corrosion protection. As a result, Basic-PSA anticipated that there would be no differences experienced by the user when the shock arrestor was installed and operated.

Although Basic-PSA had performed the technical evaluation and had concluded that the deviation would not constitute a substantial safety hazard if it occurred, and had documented the evaluation in several records, these activities had not been accomplished in accordance with the requirements of BPI-26, "Procedure for Reporting Defects and Failures to Comply in Accordance with Regulations 10 CFR 21." BPI-26 required that the deviation be documented on a Nonconformance Notice and that the evaluation and disposition documented and approved by the Quality Assurance Manager. Basic-PSA provided the appropriate Nonconformance Notice 103, dated April 7, 1999, which documented the deviation, evaluation, and disposition of the deviation, to the inspector subsequent to the completion of the inspection.

c. Conclusion

The inspector concluded that Basic-PSA had performed an adequate technical evaluation of the deviation in accordance with the requirements of 10 CFR Part 21, had determined that the deviation would not constitute a substantial safety hazard if it occurred, and had determined that no additional reporting was required. However, the inspector also concluded that Basic-PSA had not adequately documented the technical evaluation in accordance with the Basic-PSA 10 CFR Part 21 procedure and identified the inadequate documentation as a weakness in implementation of the Basic-PSA Quality Assurance program.

4 PERSONS CONTACTED

Jack Matlock, President
William Louder, Quality Assurance Manager
Alejo Comacho, Product Engineer, P.E.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

April 21, 1999

Mr. Craig P. Kipp
General Manager Nuclear Fuel
GE Nuclear Energy
Nuclear Energy Production
P.O. Box 780
Wilmington, NC 28402-0780

SUBJECT: NRC INSPECTION REPORT NO. 99900003/1999201

Dear Mr. Kipp:

This refers to the inspection conducted by Robert Pettis, Jr. and Dr. Shih-Liang Wu of this office on March 22-25, 1999. The purpose of the inspection was to review the implementation of selected portions of the General Electric Nuclear Energy (GE-NE) Quality Assurance Program Description (NEDO-11209), including 10 CFR Part 21, as it relates to the activities performed in the Chemet laboratory. The team reviewed technical documentation, procedures, representative records, and also interviewed GE-NE personnel. At the conclusion of the inspection, the findings were discussed with members of your staff.

On the basis of this inspection, the team determined that certain of your activities appeared to be in violation of NRC requirements, as specified in the enclosed Notice of Violation (Notice). Specifically, the NRC inspection team identified a potential deviation in which a laboratory analyst failed to perform over 20 required weekly calibrations of the LECO hydrogen analyzer over the past three years. The analyzer is used to perform hydrogen tests for both zirconium fuel cladding and ceramic fuel pellets. Preliminary evaluation results performed by GE-NE during the inspection identified several fuel pellets which appear to exceed the GE-NE specification limit for hydrogen of 1 part per million.

A similar issue regarding a different analyst was raised internally to GE-NE by an employee in late 1998. That review, evaluated only as an employee integrity issue, concluded that no integrity problem existed since only one calibration had been performed by the analyst in the six months preceding the date of the concern. However, the review did not trigger a parallel review for applicability under 10 CFR 50, Appendix B, and 10 CFR Part 21 which was required to evaluate the possibility that other laboratory analysts may have performed inadequate calibrations over the years possibly resulting in the shipment of nonconforming material to operating nuclear plants. At the conclusion of the inspection on March 25, 1999, GE-NE initiated Potential Safety Concern 9907 and Corrective Action Request 2170 to evaluate the condition under the reportability requirements of 10 CFR Part 21. The violation is of specific concern to the NRC since it has the potential to affect fuel performance for the affected plants.

The report also includes an unresolved item for which the team needs additional information to reach its conclusions. GE-NE is requested to submit a written response to this item, which is discussed in Section 3.4 of the enclosed report, within 30 days from the date of this letter.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. In your response, you should document the specific actions taken and any additional actions you plan to prevent recurrence. Your response may reference or include previous docketed correspondence, if the correspondence adequately

specific actions taken and any additional actions you plan to prevent recurrence. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. After reviewing your response to this Notice, including your proposed corrective actions, the NRC will determine whether further NRC enforcement action is necessary to ensure compliance with NRC regulatory requirements.

In accordance with 10 CFR Part 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and your response will be placed in the NRC's Public Document Room (PDR). To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be placed in the PDR without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.790(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

The responses requested by this letter and the enclosed Notice are not subject to the clearance procedures of the Office of Management and Budget as required by the Paperwork Reduction Act of 1980, Pub. L. No. 96-511. Should you have any questions concerning this inspection, we will be pleased to discuss them with you.

Sincerely,

Theodore R. Quay

Theodore R. Quay, Chief
Quality Assurance, Vendor Inspection,
Maintenance and Allegations Branch
Division of Inspection Program Management
Office of Nuclear Reactor Regulation

Enclosures:

1. Notice of Violation
2. Inspection Report No. 99900003/1999201

NOTICE OF VIOLATION

GE Nuclear Energy
Docket No. 99900003

During an NRC inspection conducted March 22-25, 1999, a violation of an NRC requirement was identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," NUREG-1600, the violation is listed below:

Section 21.21, "Notification of failure to comply or existence of a defect and its evaluation," of 10 CFR Part 21, requires, in part, that each individual, corporation, partnership, dedicating entity, or other entity subject to the regulation adopt appropriate procedures to evaluate deviations and failures to comply to identify defects and failures to comply associated with substantial safety hazards as soon as practicable, and, except as provided in paragraph §21.21(a)(2) of 10 CFR Part 21, in all cases within 60 days of discovery, in order to identify a reportable defect or failure to comply that could create a substantial safety hazard, were it to remain uncorrected.

Section 3.1, "Identification of a Potential Safety Concern," of GE Nuclear Energy Procedure 70-42, "Reporting of Defects and Noncompliance Under 10 CFR Part 21," (NEDE-31746) issued January 1997, states that any employee who becomes aware of a condition that may represent either a departure from technical requirements or a failure to comply with the Atomic Energy Act or any applicable NRC rule, regulation, order or license shall advise the SEP Project Manager in writing if (a) the condition is associated with, or could have implications for, a facility or activity subject to NRC regulations or a safety related product or service supplied to such facility or activity, and (b) there is a concern that the condition may have the potential to create a substantial safety hazard or contribute to the exceeding of a technical specification safety limit.

Contrary to the above, GE Nuclear Energy (GE-NE) failed to identify and evaluate a potential deviation related to a laboratory analyst who failed to perform over 20 required weekly calibrations of the LECO hydrogen analyzer during the period April 1996 through March 1999. The analyzer is used to perform hydrogen tests for both zirconium fuel cladding and ceramic fuel pellets. The results are compared to GE-NE and customer specification limits.

A similar issue regarding a different analyst was raised internally to GE-NE by an employee in late 1998. The review, evaluated only as an employee integrity issue, concluded that no integrity problem existed since only one calibration had been performed by the employee during the six month period preceding the date of the concern. However, the review did not trigger a parallel review for applicability under 10 CFR 50, Appendix B, and 10 CFR Part 21 which was required to evaluate the possibility that other laboratory analysts may have performed inadequate calibrations over the years possibly resulting in the shipment of nonconforming material to operating nuclear plants. This issue has ben identified as Violation 99900003/1999201-01.

This is a Severity Level IV violation (Supplement VII).

Enclosure 1

Pursuant to the provisions of 10 CFR 2.201, GE Nuclear Energy is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555 with a copy to the Chief, Quality Assurance, Vendor Inspection, Maintenance and Allegations Branch, Division of Inspection Program Management, Office of Nuclear Reactor Regulation, within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include for each violation: (1) the reason for the violation, or, if contested, the basis for disputing the violation, (2) the corrective steps that have been taken and the results achieved, (3) the corrective steps that will be taken to avoid further violations, and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. Where good cause is shown, consideration will be given to extending the response time.

Because your response will be placed in the NRC Public Document Room (PDR), to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be placed in the PDR without redaction.

If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.790(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

Dated at Rockville, Maryland
this 21st day of April 1999

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR REACTOR REGULATION

Report No.:	99900003/1999201
Organization:	GE Nuclear Energy P.O. Box 780 Wilmington, NC
Contact:	Caroline Reda Manager, GE-NE Quality
Nuclear Activity:	Nuclear fuel assemblies and related components for BWRs.
Dates:	March 22-25, 1999
Inspection Team:	Robert L. Pettis, Jr., IQMB/DISP Dr. Shih-Liang Wu, SRXB/DSSA
Approved by:	Richard P. Correia, Chief Reliability and Maintenance Section Quality Assurance, Vendor Inspection, Maintenance and Allegations Branch Division of Inspection Program Management Office of Nuclear Reactor Regulation

Enclosure 2

1 INSPECTION SUMMARY

From March 22-25, 1999, representatives of the U.S. Nuclear Regulatory Commission (NRC) conducted a performance-based inspection of the activities at the Wilmington, North Carolina, facility of GE Nuclear Energy (GE-NE). In conducting this inspection, the team emphasized technically directed observations and evaluations of GE-NE activities related to the manufacture and testing of nuclear fuel and related components. As the technical bases for the inspection, the team relied upon the following:

- Part 21, "Notification of Failure to Comply or Existence of a Defect," as defined in Title 10 of the *Code of Federal Regulations* (10 CFR)
- 10 CFR Part 50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants and Fuel Reprocessing Plants"
- GE-NE Quality Assurance Program Description (NEBO-11209).

1.1 Violations

Violation 99900003/1999201-01 was identified during this inspection and is discussed in Section 3.2 of this report.

1.2 Nonconformances

No nonconformances were identified during this inspection.

1.3 Unresolved Items

Additional information is required to determine whether the issue discussed in Section 3.4 of this report is an acceptable item, a nonconformance, or a violation. As a result, unresolved item 99900003/1999201-02 was identified during this inspection.

2 STATUS OF PREVIOUS INSPECTION FINDINGS

No previous findings were identified during the last inspection (99900003/95-01).

3 INSPECTION FINDINGS AND OTHER COMMENTS

3.1 Background

The NRC inspection team reviewed the activities performed by laboratory analysts in the Chemet Laboratory. The Chemet Laboratory is an integral part of the in-process release of raw materials, process control, and final release of finished products and consisted of a metallurgical and wet laboratory. During the inspection, the team primarily focused its attention on the activities performed in the wet chemical laboratory.

The wet chemical laboratory performs a wide variety of chemical and physical analyses on uranium dioxide powder and pellets, and zirconium fuel cladding. The LECO hydrogen analyzer is used to measure the hydrogen release from uranium dioxide fuel pellets and zirconium fuel cladding while the Centorr furnace is used to determine fuel pellet densification.

3.2 LECO Hydrogen Analyzer

a. Inspection Scope

The inspection team reviewed the implementation and operation of the LECO hydrogen analyzer which is used to determine the hydrogen content of zirconium alloys and uranium dioxide products for compliance with GE-NE and customer specification requirements.

b. Observations and Findings

The inspection team reviewed Quality Notice (QN) QN F-Q-2006, "Qualification of LECO RH404 Hydrogen Analyzer," Revision 1, dated July 30, 1993, which documents the basis for using this equipment for hydrogen analysis. A QN is a multi-purpose quality planning document which is primarily used for qualification, evaluation, and special or project planning purposes and is part of GE-NE's quality assurance program. The analyzer is used to perform hydrogen tests for both zirconium fuel cladding and ceramic fuel pellets. The test results are then compared to GE-NE and customer specification requirements.

During the review of the LECO hydrogen analyzer, the inspection team requested a computer search of recent calibration constants (known as a 706 report) which are maintained in the Laboratory Material Control System (LMCS) for LECO analyzer No. 174, and covered the period April 23, 1996 through March 16, 1999. The team's review identified a potential deviation in which a laboratory analyst failed to perform over 20 required weekly calibrations over the three year period. This was evident since the analyst used the previous week's calibration constant instead of performing the required weekly calibration which uses several carbon steel samples of known hydrogen to calculate the calibration constant which is then input into LMCS. The LECO cannot be operated unless a calibration constant is input weekly into LMCS. The team also identified an example where the analyst used the same constant for a two and three week consecutive period. A reading of 1.08810 was used for the two week period of February 13 and February 20, 1997, and the three week period of March 7, March 14 and March 21, 1997. All of these entries into LMCS used the constant of 1.08810 which was calculated by a different analyst for the week of February 6, 1997.

Historically the calibration constant calculated by LECO ranges between 0.90000 to 1.60000 and is input by the analyst directly into LMCS for engineering analysis and quality purposes. It is nearly impossible for LECO to calculate the exact same six digit constant for a two or three consecutive week period. In addition, the team reviewed several "Pellet Hydrogen" worksheets (CL-20 R5, issued January 18, 1995) which are used by the analysts to record information obtained during the calibration and verification process. A review of worksheets for the same analyst for July 23, 1998,

August 20, 1998, and October 19, 1998, revealed no information filled-in at the top of the page under "Calibration," which confirmed the team's finding that no calibration was performed for these weeks. GE-NE Chemical, Metallurgical and Spectral (CM&S) CM&S Analytical Method 1.2.8.3, Revision 11, "Determination of Hydrogen in Zirconium, Its Alloys, Uranium Dioxide Sintered Pellets, and Pellets by Inert Gas Fusion," dated May 15, 1995, requires in Section 13.5, "Calibration and Verification" that LECO be calibrated and verified at a minimum frequency of once per week.

A similar issue regarding a different analyst was raised internally to GE-NE by an employee in late 1998. GE-NE Integrity Case 98-014 reviewed an allegation that an analyst in the wet laboratory, performing a hydrogen test for a zirconium sample using the LECO analyzer, obtained the same calibration constant as the one calculated for the previous week. GE-NE's review concluded that no employee integrity problem existed since only one calibration had been performed by the analyst in the six month period preceding the date of the concern. However, neither the allegation or the integrity review triggered a review for applicability under 10 CFR 50, Appendix B (e.g., CM&S 1.0.0.0, Revision 2, "Quality Assurance Program for Analytical and Testing Laboratories," Section 12, "Deficiencies and Corrective Actions") and 10 CFR Part 21(Part 21). Such a review is required to evaluate the possibility that other laboratory analysts may have bypassed the calibration process which may have resulted in the shipment of nonconforming material to operating nuclear plants.

At the conclusion of the inspection on March 25, 1999, GE-NE initiated Potential Safety Concern 9907 and Corrective Action Request 2170 to evaluate the condition under the reportability requirements of Part 21. Preliminary evaluation results performed by GE-NE identified several fuel pellets which exceeded the GE-NE limit for hydrogen of 1 part per million. The team identified GE-NE's failure to identify and evaluate a potential deviation as violation 99900003/1999201-01.

c. Conclusions

The GE-NE Integrity Review only went back six months prior to the date of the alleged calibration incident and did not extend beyond the timeframe or the analyst cited in the allegation. The NRC review of the 706 report, downloaded directly from LMCS, clearly identified a pattern of calibration constants copied from the previous week's calibration activity. The NRC team noted that the analyst responsible for this issue was not the same individual named as the subject of the integrity allegation.

3.3 Centorr Furnace

a. Inspection Scope

The inspection team reviewed the implementation and operation of the Centorr densification furnace. The furnace subjects production fuel pellets to a 24-hour thermal simulation of the reactor core conditions to determine densification. During the inspection, the Centorr furnace was not operable.

b. Observations and Findings

The Centorr furnace, located in the wet laboratory, is designed to perform fuel pellet densification tests. During routine fuel production activities, samples of fuel pellets from various production lots are selected and sent to the laboratory for testing. The test results are then compared to GE-NE and customer specification requirements. Before the tests are performed, fuel pellets are measured for initial length, diameter and weight using a densitometer. A group of control pellets, selected from archive inventories with known densification, are also loaded and mixed with the sample pellets in the rack. The test conditions are established by evacuating the furnace, backfilling with hydrogen, and heating to the appropriate temperature for 24-hours to simulate reactor core thermal conditions. After the test, the same set of data is measured again using the densitometer for comparison with the initial data set to establish the amount of densification. The final results are then stored in LMCS for quality control and engineering analysis.

During operation of the Centorr furnace, an accurate temperature profile is critical to the test results. The temperature profile is established using two (upper and lower) thermocouples and a few control pellets with known densification history. The temperature profile has a very tight tolerance to ensure that the pre-set test conditions are achieved and the thermocouples are required to be calibrated by a GE-NE approved vendor within one year after their initial test application. Although the thermocouples are the primary means of verifying satisfactory fuel pellet behavior, some control pellets are also used as a backup means of verification during the densification tests. GE-NE QN F-Q 1208, "Densification Furnace Set Point and Temperature Profile," Revision 29, establishes documentation of the temperature profile. Revisions to the QN to document periodic recalibration of the furnace and new set points established for the control thermocouple is required in "Chemet Laboratories Calibration and Operation Instruction, "Thermal Simulation Testing of Fuel Pellets - Furnace Operation" (No: COI #234.00, Revision 0, Reference: CM&S 1.2.20.3, Revision 8, dated October 8, 1996), Section 7.0, "Furnace Temperature Calibration."

During the summer of 1997, the Centorr furnace was under extensive repair to replace cracked thermal shields and heating elements. The repair, including the thermocouple temperature profile which was needed to re-establish the furnace operating conditions, was documented in Revision 23 of QN F-Q 1208. Revision 23 of the QN expired on June 6, 1997 and was administratively extended three months without any documentation to support the basis for the extension. During this period control pellets were included in each furnace run to assure that the densification control values remained within LMCS tolerance limits. The two existing thermocouples at the time were used to measure the furnace temperature on July 15, 1997. However, one was due for recalibration on May 31,1997, and another on July 15,1997. GE-NE documented the use of an overdue thermocouple in a Measurement and Test Equipment Evaluation Report, dated July 31, 1997. The overdue thermocouples were subsequently calibrated by JMS Southeast, Inc. with no shift observed in the calibration parameters. However, to prevent this situation from recurring, GE-NE currently maintains 5 to 6 spare thermocouples in stock. Based on the verified characteristics of the recalibrated thermocouples and the control pellets used for each run, GE-NE

concluded that the temperature profile was accurate and the densification runs for batch 3197 to 4797 were acceptable. GE-NE documented the findings in "Notice of Measurement Deviation W-97-02," dated September 10, 1997. The inspection team concluded that there were no anomalies in the fuel densification results as a result of the furnace rebuilding. However, rather than using the required QN to document the furnace temperature profile, the information was entered in the materials and purchasing system (MPAC) which is not authorized for this purpose. The MPAC system is a computer database which contains pertinent information related to the furnace operation but is not considered a quality document like a QN.

After establishment of the new temperature profile, the operation of the furnace was observed below the lower alarm set point during a run on July 17, 1997, and documented in a report titled, "Verification Standard Report Out-of-Alarm Limits," which refers to the temperature profile which had just been run with the control pellet results. GE-NE established the following 5 limits according to statistical analysis for densification runs that use control pellets: (1) upper control limit, (2) upper alarm limit, (3) nominal value, (4) lower alarm limit, and (5) lower control limit. An out-of-alarm (OOA) means the amount of densification from a control pellet falling between upper (lower) alarm limit and upper (lower) control limit, and an out-of-control (OOC) means the amount of densification from a control pellet either higher than the upper control limit or lower than the lower control limit. A control pellet densification resulting in a number between the upper and lower alarm limit is considered acceptable to guarantee an accurate temperature profile.

The NRC inspection team selected for review a July 16, 1997, report for batch run 3497 which reported the densification results of control pellets in 5 levels of the sample rack. The top level showed that the data was located between the lower alarm and lower control limits, an OOA, and the bottom level showed data higher than the upper control limit, an OOC. Only the data from the center three levels was located in the acceptable limits, although somewhat biased toward the lower alarm limit. GE-NE attributed the bias to the use of a different population of archive pellets from the usually selected population that resulted in additional variability to skew the results. In order to ensure an accurate temperature profile, GE-NE selected only the center three levels to hold the sample pellets and included at least three control pellets for each run. In doing so, GE-NE ensured that the test results were backed up by a secondary source (the control pellets).

The team also reviewed a September 2, 1997, report for batch run 4597 which reported the results of densification data for 41 production sample pellets and 3 control pellets that were within GE-NE set limits for production pellets (e.g., no data extended beyond the OOA or OOC). The team also noted that the uncertainty band of densification data from the LMCS history was drastically reduced after the introduction of the dry conversion process for uranium dioxide powder, which results in more stable fuel pellets in terms of densification behavior.

In late 1997, several issues were raised to the GE-NE Power System Ombudsperson regarding irregularities involving operation of the Centorr furnace. The ombudsperson, with support from the GE-NE staff, is responsible for determining if an allegation of misconduct exists and is responsible to form an investigative team to review the issues

raised. A formal internal investigation of the alleged concerns, similar to the integrity review performed for the LECO hydrogen analyzer, was conducted which included a concern regarding thermocouples used beyond their calibration expiration date. GE-NE concluded that the undocumented extension of the QN and the improper use of utilizing the MPAC system to document the temperature profile was a procedural violation. Corrective actions included Revision 25 to the QN, dated August 29, 1997; replacement of MPAC information with a properly updated revision; and discussions with laboratory staff emphasizing procedural adherence and improved communications.

c. Conclusions

The NRC inspection team reviewed the investigative report and noted that the uncertainty band of densification data from the LMCS history was drastically reduced after GE-NE introduced the dry conversion process for uranium dioxide powder which resulted in more stable fuel pellets in terms of densification behavior. Based on the team's review of the wet laboratory procedures and related documents, the team concluded that the Centorr furnace is acceptable for performing densification tests.

3.4 Review of GE-NE Performed Supplier Audit

a. Scope

During the NRC review of the rebuilding of the Centorr furnace in mid-1997, it was identified that one of the thermocouples had been sent out to JMS Southeast, Inc. (JMS) for calibration. JMS is listed on GE-NE's Approved Supplier List as a safety-related supplier. The team requested documentation to support the procurement for the calibration service and related documentation to support approval of the vendor in accordance with 10 CFR 50, Appendix B and GE-NE supplier quality requirements.

b. Observations and Findings

The inspection team reviewed GE-NE purchase order (PO) No. 33497066632, dated September 4, 1997, to JMS for full calibration and recertification of two Type "C" thermocouples (GE-NE identification Nos. Z010003 and Z0098534) used to determine the thermal profile of the Centorr furnace. The PO required compliance to Part 21 and required the vendor to furnish Certificates of Traceability to the National Institute of Standards and Technology at 1700 degrees centigrade.

GE-NE last audited JMS on March 26, 1997, and identified three Corrective Action Requests (CARs). This performance-based audit included a review of the QA Manual and procedures for compliance to 10 CFR 50, Appendix B, and Part 21. CAR JMS-2, dated March 26, 1997, was of particular importance to the NRC inspection team since it identified that JMS's QA program did not procedurally address Part 21or the reporting of defects to customers. Although the lead auditor classified these issues as recommendations, they were documented as CARs for response and tracking purposes within the GE-NE system. GE Wilmington Practices and Procedures No. 60-21, issued November 3, 1997, states, in part, in Exhibit 1, "Procedural Flow," that acknowledgment of the findings are to be returned by the supplier within 21 days of the initiation date.

However, a review of an April 29, 1998, GE-NE Supplier Quality Assurance Program Assessment Form, used to assess annual performance of the supplier, noted that GE-NE is still working with JMS to close the three CARs identified over a year ago. In addition, a review of the JMS Supplier Profile, dated March 25, 1999, indicated that an audit needed to be performed prior to May 1999 (almost one year earlier than the scheduled triennial audit due date of March 26, 2000). A review of the CARs identified that the lower portion of each form was blank indicating that neither JMS or GE-NE had documented any actions to resolve these issues. A March 31, 1997, note to file, prepared by the lead auditor, recommended that JMS be retained as a safety-related source of calibration services and that GE-NE needs to establish controls necessary to meet the requirements of Part 21. This statement and the issuance of CAR-2 appears to indicate that GE-NE must assume the reporting responsibility of Part 21 since JMS is not procedurally equipped to do so.

Although time was limited during this part of the inspection, GE-NE could not produce any documentation to support satisfactory resolution of the CARs, which have now been unresolved for over two years. Since the issue could not be resolved during the inspection, the NRC needs additional information to determine if the issue is an acceptable item, a nonconformance, or a violation. GE-NE is requested to submit a written response to this item as discussed in the cover letter to this report. As a result, unresolved item 99900003/1999201-02 was identified during this part of the inspection.

c. Conclusions

GE-NE could not produce documentation during the inspection to support the resolution of three open CARs identified during GE-NE' s March 26, 1997, audit of JMS Southeast, Inc. As a result, additional information is required for the inspection team to reach its conclusions. Additionally, should GE-NE accept the Part 21 reporting responsibility for items supplied by JMS, a re-review of JMS' s QA program should be performed to ensure that adequate controls exist to identify and resolve nonconforming conditions which may have an impact on calibration services supplied to GE-NE.

4 ENTRANCE AND EXIT MEETINGS

During the entrance meeting on March 22, 1999, the inspection team met with members of GE-NE management and staff and discussed the scope of the inspection. The team also reviewed its responsibilities for handling proprietary information as well as those of GE-NE. In addition, the team established contact persons within the management and staff of the applicable GE-NE organizations and discussed the results of the inspection with management and staff on March 25, 1999.

PARTIAL LIST OF PERSONS CONTACTED

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S. Fuller	Manager, Fuel & Chemet Lab Quality
W. Baker	Nuclear Quality Assurance
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J. McLeod	Quality Engineer
P. Schenck	Administrative Specialist
H. Fields	Laboratory Analyst

ITEMS OPENED, CLOSED, AND DISCUSSED

Item Number	Type	Description
Opened		
99900003/1999201-01	NOV	Failure to identify and evaluate a potential deviation related to the lack of calibration of the LECO hydrogen analyzer.
99900003/1999201-02	URI	No documentation provided to support resolution of three open CARs identified in GE-NE audit of JMS.

Selected Generic Correspondence on the Adequacy of
Vendor Audits and the Quality of Vendor Products

Identifier	Title
Information Notice 99-10	Degradation of Prestressing Tendon Systems in Prestressed Concrete Containments
Information Notice 99-13	Insights from NRC Inspections of Low- and Medium-voltage Circuit Breaker Maintenance Programs
Information Notice 99-20	Contingency Planning for the Year 2000 Computer Problem

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11. ABSTRACT *(200 words or less)*

This periodical covers the results of inspections performed by the NRC's Quality Assurance, Vendor Inspection, Maintenance and Allegations Branch, that have been distributed to the inspected organizations during the period from April through June 1999.

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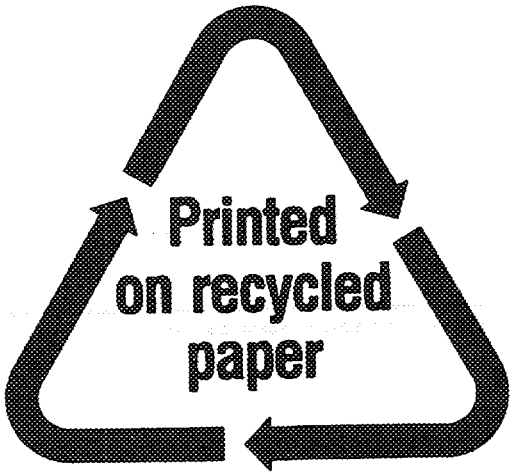

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