



LONG ISLAND LIGHTING COMPANY

SHOREHAM NUCLEAR POWER STATION

P.O. BOX 618, NORTH COUNTRY ROAD • WADING RIVER, N.Y. 11792

JOHN D. LEONARD, JR.
VICE PRESIDENT - NUCLEAR OPERATIONS

MAY 27 1988

SNRC-1462

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Quality of Spent Fuel Racks Fabricated
By U.S. Tool and Die and its Predecessor
Shoreham Nuclear Power Station-Unit 1
Docket No. 50-322

Reference: NRC letter from Walter R. Butler to John D. Leonard, Jr., dated March 30, 1988.

Gentlemen:

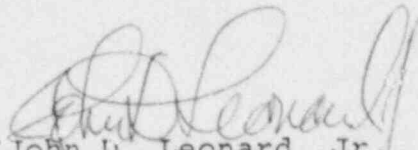
In the referenced letter LILCO was requested to provide information pertaining to the fabrication of the spent fuel racks for Shoreham by U.S. Tool and Die or its predecessor Wachter Engineering. The spent fuel racks for Shoreham were procured from Wachter Associates, Inc. (WAI), Pittsburgh, PA who subcontracted the rack fabrication to U.S. Tool and Die, Inc. (UST&D), Allison Park, PA. During performance of the contract, WAI filed for bankruptcy under Chapter 11 and the contract was assumed and completed by UST&D Design Services, Inc., Gibsonia, PA, who maintained UST&D as the rack fabricator.

The attachments provide responses to Item 1 through 5, and the results of the Quality Assurance surveys, audits and inspections performed to assure rack quality. LILCO also found fabrication deficiencies similar to those documented in NRC Inspection Report No. 87-01 of U.S. Tool and Die, Allison Park, PA. These deficiencies were documented in either survey, audit or inspection reports, and appropriate corrective actions were obtained and verified with the deficiencies closed prior to acceptance of the racks. Therefore, LILCO believes that the Shoreham racks meet the original design and regulatory requirements.

Handwritten: Add: NRR/ALPQ/QAB 4tr Enok
Aoo/ 11

Please do not hesitate to call my office or members of my staff should you require additional information or clarification regarding this matter.

Very truly yours,



John D. Leonard, Jr.
Vice President - Nuclear Operations

JB/TD:ck

Attachments: A) Response to Items 1 through 5 of the referenced letter

- 1) Surveys and Audits of WAI and UST&D
- 2) Fabrication Attributes Verified, Witnessed or Performed by SWEC PQA
- 3) SWEC Inspection Reports Verifying Each Attribute by Rack Mark Number - Phase I and II.

cc: S. Brown
W. T. Russell
F. Crescenzo

Attachment A

1. Please describe the extent of which the U.S. Tool and Die QA/QC Program was relied upon to assess rack quality.

Response

In accordance with the LILCO Quality Assurance Manual, the supplier of the Shoreham spent fuel racks was required to establish and implement a quality assurance (QA) program for manufacturing of the racks and LILCO or its agent performed surveys and audits to assess the adequacy and implementation of the QA program. The rack supplier's QA program was relied upon to provide the overall rack quality. However, LILCO or its agent, Stone and Webster Engineering Corporation (SWEC) performed a total of thirteen (13) surveys and or audits of the supplier's QA program over the rack procurement period from February 1977 to January, 1983. Attachment 1 identifies the surveys and audits performed, the organization audited and scope of each audit.

The racks for Shoreham were procured from Wachter Associates, Inc. (WAI), who provided the rack design and subcontracted the fabrication to US Tool and Die, Inc. (UST&D). Prior to awarding the spent fuel rack contract to WAI, a LILCO Project Engineer and Metallurgical Engineer visited the WAI facility. During this visit, the welding procedures and certifications were reviewed for spent fuel racks in production for another facility. Discussions were held with Mr. Wachter concerning the design and fabrication process and the actual production of spent fuel racks was witnessed. In accordance with the procurement documents, WAI established and implemented a quality assurance (QA) program in compliance with 10CFR50 Appendix B for the manufacturing of spent fuel racks. The WAI QA program implemented covered both the design and the fabrication by UST&D.

The purchase order for the racks specified a two phase fabrication schedule. The fabrication of the Phase I racks were performed under the WAI QA program. However, prior to LILCO acceptance and shipment of the Phase I racks and starting fabrication of the Phase II racks, WAI filed for bankruptcy under Chapter 11 Procedures in September 1981. On November 4, 1981, WAI was sold to UST&D and renamed UST&D Design Services, Inc. To maintain continuity in design and fabrication, UST&D Design Services assumed and maintained the WAI QA program through completion of the Phase I racks in January, 1982. For the Phase II racks, UST&D Design Services implemented their own QA program. The Phase II racks were completed in January, 1983.

As documented in Attachment 1, both the WAI and UST&D Design Services QA programs were initially surveyed and then audited at least annually to assure the quality of the racks. Although the WAI and UST&D Design Services QA programs were relied upon for overall rack quality, the continuous verification of the implementation of these QA programs by LILCO and SWEC provided reasonable assurance of the quality of the racks.

2. Please describe your in-factory and/or receipt inspection of the racks.

Response

- a. In-factory inspection of racks

The Shoreham specification for the racks required each rack to be inspected for twenty four attributes, as applicable, prior to shipment. These attributes are identified and described in Attachment 2. As indicated in the description of the attributes, an attribute was required to be either verified, witnessed or performed by an inspector. The inspectors used by LILCO were SWEC Procurement Quality Assurance (PQA) inspectors. Attachment 3 identifies in matrix form the SWEC PQA inspection reports that documented the acceptance of the attributes applicable to each rack mark number. All applicable attributes for each rack mark number were accepted prior to shipment of the racks. The surveys, and/or audits identified areas of the supplier's QA program that required upgrading and elements of 10CFR50 Appendix B that were not addressed. Each program deficiency identified was corrected by the supplier and verified during subsequent surveys, audits and/or inspections. LILCO and SWEC Project Engineers and metallurgical personnel actively participated in several of the supplier surveys and audits.

During in-process inspection of the racks, problems with material, material certifications and welding were identified. The material and the material certifications were not as specified in the rack specification. An engineering review as to the adequacy of this alternate material concluded it was acceptable for use. The welding problems identified were undercutting, weld craters not filled and weld spatter. Each problem identified by a SWEC inspector was documented in an inspection report and the corrective actions taken were verified during a subsequent inspection or prior to shipment. LILCO's project engineer, metallurgist and a number of SWEC engineers also inspected the racks and corrective action to repair the above noted deficiencies, and were found to be acceptable.

- 2b. Please describe your receipt inspection of the racks.

Response

In accordance with the MILCO Quality Assurance Program, the materials received at Shoreham were required to be receipt inspected. The receipt inspections of the racks were performed by our agent Stone & Webster Field Quality Control and the results were documented on receiving inspection reports. A review of these reports showed that the racks were all found acceptable at receipt inspection. The attributes required for inspection of the racks were identification, documentation and condition of each rack. As indicated in our response for in-factory inspections the racks were completely inspected by PQA and our engineers at the suppliers facility.

Subsequent to receipt inspection and prior to installation of the racks, the quality assurance program required that a pre-installation inspection be performed. During this inspection, the inspectors found a lower skirt plate missing on one rack, and various other racks had dents or tears on the outside surface. A Nonconformance and Disposition Report No. 4590 was prepared by inspection personnel and disposition by the engineers. The racks were reworked in accordance with disposition details and reinspected. All racks were found acceptable.

3. What findings were made during your receipt inspection?

Response

There were no findings reported as a result of receipt inspections performed on the racks.

4. If your receipt inspections found deficiencies in the rack, what corrective actions were taken. Deficiencies discovered during pre-installation inspections were corrected as discussed in response (2B) above.

Response

No corrective actions were required. There were no deficiencies found during receipt inspection.

5. Please describe any additional actions or examinations you plan to undertake to assure that your racks meet the original design and regulatory requirements.

Response

No additional actions or examinations are planned. The inspections performed indicate that the Shoreham spent fuel racks meet the original design and regulatory requirements.

Attachment 1

Surveys and Audits of WAI and UST&D

<u>Survey/Audit</u>	<u>Date(s) Performed</u>	<u>19CFR50 Appendix B Criteria Audited</u>	<u>Organization Audited</u>
Phase I			
SWEC survey	2/14 - 16/77	1,2,4,5,6,7,8,9,10 12,13,14,15 & 17	UST&D
SWEC survey	2/14 - 16/77	2,3,6,18	Wachter Associates
SWEC survey	6/6/77	2,3,6,18	Wachter Associates
LILCO audit	6/5 - 9/78	2,5,7,9,10,11,12,13, 15 & 17	UST&D
LILCO audit	8/23 - 25/78	2,5,7,9,10,11,12,13, 15 & 17	UST&D
SWEC audit	12/3 - 5/79	2,3,5,6, & 16	Wachter Associates
SWEC audit	8/4 - 6/81	1,2,3,5,6,10,16 & 17	Wachter Associates
SWEC audit	8/25/81	3,4,5,6 & 16	Wachter Associates

Attachment 1

Surveys and Audits of WAI and UST&D

<u>Survey/Audit</u>	<u>Date(s) Performed</u>	<u>10CFR50 Appendix B Criteria Audited</u>	<u>Organization Audited</u>
Phase II			
SWEC survey	1/26 - 27/82	1 through 18	UST&D Design Services
SWEC survey	6/15 - 16/82	2,3,4,5,6,7,8,10, 13,14,15,16, & 18	UST&D Design Services
SWEC survey	8/17/82	9,12 & 17	UST&D Design Services
LILCO audit	9/21/82	2,3,4,5,6, & 9	UST&D Design Services
LILCO audit	10/5/82	2,3,4,5,6, & 9	UST&D Design Services

Attachment 2

Fabrication Attributes Verified, Witnessed or performed by SWEC POA

<u>Attribute</u>	<u>Attribute Name</u>	<u>Description of Attribute</u>
1	QA Program	Verify that the Seller's QA Program covering fabrication of the racks has been reviewed and approved by the Engineers.
2	Release for Fabrication	Verify receipt by the Seller of written confirmation from the Engineers that fabrication is to be based upon the Seller's drawings and reviewed and stamped APPROVED or APPROVED AS REVISED.
3	Welding Procedures	Verify that all welding procedures to be employed have been approved by the Engineers and are being followed.
4	Welder Qualifications	Verify that all welders working on the equipment are qualified to AWS D1.1.
5	Electrode Control	Verify that weld filler metals are controlled in accordance with the specification requirements.
6	Materials Certification	Verify that all austenitic stainless steel is covered by Certified Material Test Reports.
7	Electrode Certification	Verify that all weld filler metals are covered by a certified materials test report.

Attachment 2

Fabrication Attributes Verified, Witnessed or performed by SWEC POA

<u>Attribute</u>	<u>Attribute Name</u>	<u>Description of Attribute</u>
8	Expendable Products	Verify that each batch of expendable products is covered by a certified product report.
9	NDT Procedures	Verify that no nondestructive testing (NDT) procedure is employed on work covered by the specification prior to being approved by the Engineers.
10	NDT Personnel Qualifications	Verify that all NDT personnel are qualified for each applicable NDT procedure.
11	Nondestructive Testing	Witness the Seller's initial application of each applicable NDT procedure to verify its correct application, and the correct evaluation and disposition of resultant indications. Witness sufficient subsequent NDT operations to verify continued procedural, personnel, and result conformance to the requirements of the specification.
12	NDT Reports	Verify that each application of the Seller's NDT procedures is covered by a certified test and inspection report.

Attachment 2

Fabrication Attributes Verified, Witnessed or performed by SWEC POA

<u>Attribute</u>	<u>Attribute Name</u>	<u>Description of Attribute</u>
13	Visual Examination	Perform visual examinations of the equipment throughout the course of fabrication to verify that the work is progressing in accordance with the requirements and intent of this specification through the utilization of adequate controls in the storage, handling, and fabrication of materials consistent with the desired final products.
14	Dimensional Check	Perform dimensional checks on the equipment throughout the course of fabrication to verify conformance to dimensional tolerances on the Seller's drawings as stamped APPROVED or APPROVED AS REVISED by the Engineers.
15	Cleaning Procedures	Verify that the Seller's cleaning operations are in accordance with the requirements of the specification.
16	Acid Cleaning Procedures	Verify that procedures for acid cleaning, if performed, are on file and have been approved by the Engineers.
17	Cleaning Materials Certification	Verify that cleaning materials used are in accordance with the requirements of the specification.

Attachment 2

Fabrication Attributes Verified, Witnessed or performed by SWEC PQA

<u>Attribute</u>	<u>Attribute Name</u>	<u>Description of Attribute</u>
18	Cleanliness Examination	Perform random examinations of surfaces, under good lighting conditions, to verify that cleaning has been satisfactorily performed.
19	Wall Thickness Measurements	Witness sufficient application of the Seller's wall thickness measurement operations to verify the results obtained.
20	Functional Test	Witness application of the Seller's functional tests to verify the results.
21	Packaging	Verify that packaging is as specified in the specification.
22	Shipping	Verify that shipping is as specified in the specification.
23	Records and Certifications	Verify that records and certifications are on file.
24	Documentation Audit	Perform an audit of all documentation required for the equipment to verify that the requirements are fulfilled for each storage rack assembly prior to issuance of the applicable "Shipping Release Tag."

Attachment 3

SWEC Inspection Reports Verifying Each Attribute by
Rack Mark Number - Phase I and II

Mark No.	Inspection Attributes																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1F16*RAK 22 A2	3	3	23	28	28	28	28	28	B	B	B	B	13	13	27	B	28	27	13	27	27	27	28	28
1F16*RAK 22 A3	3	3	23	28	28	28	28	28	B	B	B	B	13	13	27	B	28	27	13	27	27	27	28	28
1F16*RAK 22 A4	3	3	23	28	28	28	28	28	B	B	B	B	13	13	21	B	28	27	13	27	27	27	28	28
1F16*RAK 22 B2	3	3	21	A	21	21	21	21	B	B	B	B	12	12	21	B	21	21	12	C	22	22	22	22
1F16*RAK 22 B3	3	3	23	A	23	23	23	23	B	B	B	B	12	12	23	B	23	23	12	C	23	23	23	23
1F16*RAK 22 B4	3	3	23	A	23	23	23	23	B	B	B	B	12	12	23	B	23	23	12	C	23	23	23	23
1F16*RAK 22 C1	3	3	23	7	7	7	7	23	B	B	B	B	7	7	23	B	23	23	7	C	23	23	23	23
1F16*RAK 22 C2	3	3	23	7	7	7	7	23	B	B	B	B	7	7	23	B	23	23	7	C	23	23	23	23
1F16*RAK 22 C3	3	3	23	A	23	23	23	23	B	B	B	B	12	12	14	B	14	14	12	C	14	23	23	23
1F16*RAK 22 C4	3	3	21	A	21	21	21	21	B	B	B	B	12	12	15	B	15	15	12	C	22	22	22	22
1F16*RAK 22 D1	3	3	21	A	6	21	21	21	B	B	B	B	6	6	21	B	21	21	C	11	22	22	22	22
1F16*RAK 22 D2	3	3	21	A	6	21	21	21	B	B	B	B	6	6	21	B	21	21	C	C	22	22	22	22
1F16*RAK 22 E1	3	3	23	A	6	23	23	23	B	B	B	B	6	6	23	B	23	23	C	10	22	22	23	23
1F16*RAK 22 E2	3	3	23	A	6	23	23	23	B	B	B	B	6	6	23	B	23	23	C	C	22	22	23	23

NOTE: This table identifies in matrix form the SWEC inspection reports that documented the acceptance of the attributes applicable to each rack mark number.

Attachment 3

SWEC Inspection Reports Verifying Each Attribute by
Rack Mark Number - Phase I and II

Mark No.	Inspection Attributes																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Phase I																								
1F16*RAK 22 F1	3	3	21	A	4	21	21	21	B	B	B	B	5	4	15	B	15	C	C	21	21	21	21	
1F16*RAK 22 F2	3	3	21	21	4	21	21	21	B	B	B	B	5	4	4	B	21	21	C	C	21	21	21	21
1F16*RAK 22 G1	3	3	23	A	4	26	26	26	B	B	B	B	5	4	4	B	26	25	C	C	26	26	26	26
1F16*RAK 22 G2	3	3	23	A	4	26	26	26	B	B	B	B	5	4	4	B	26	25	C	C	26	26	26	26
1F16*RAK 23	3	3	23	A	25	25	25	25	B	B	B	B	25	25	25	B	25	25	C	C	25	25	25	25
1F16*RAK 24	3	3	23	24	24	24	24	24	B	B	B	B	16	24	24	B	24	24	24	24	24	24	24	24
SN1 Dummy Assy	3	3	NA	NA	NA	NA	NA	NA	B	B	B	B	9	9	NA	B	NA	31	NA	31	31	31	31	31
SN2 Dummy Assy	3	3	NA	NA	NA	NA	NA	NA	B	B	B	B	9	9	NA	B	NA	31	NA	31	31	31	31	31
Lifting Device	D	D	D	D	D	D	D	D	8	8	8	8	11	24	NA	B	NA	NA	NA	24	24	24	24	24

Attachment 3

SWBC Inspection Reports Verifying Each Attribute by
Rack Mark Number - Phase I and II

Mark No.	Inspection Attributes																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Phase II																								
1F16*RAK022 D3	33	35	33	34	35	39	36	39	35	35	35	B	35	36	36	B	36	38	35	38	39	39	39	39
1F16*RAK022 D4	37	34	33	34	35	39	37	39	35	35	37	B	37	37	37	B	37	39	C	39	39	39	39	39
1F16*RAK022 E3	33	35	33	34	35	39	36	39	35	35	36	B	35	36	36	B	36	39	35	38	39	39	39	39
1F16*RAK022 E4	33	39	33	34	35	39	37	39	35	35	37	B	37	37	37	B	37	39	C	39	39	39	39	39
1F16*RAK022 F3	33	41	33	34	35	41	37	41	35	35	36	B	36	36	36	B	36	41	C	38	41	41	41	41
1F16*RAK022 F4	33	41	33	34	35	40	37	40	35	35	37	B	37	37	37	B	37	40	C	39	40	40	40	40
1F16*RAK022 G3	33	41	33	34	35	41	41	41	35	35	NA	B	38	38	38	B	41	40	C	40	41	41	41	41
1F16*RAK022 G4	33	41	33	34	35	41	41	41	35	35	NA	B	39	38	38	B	41	40	C	40	41	41	41	41

Notes:

- A - Welders qualification were previously reviewed and accepted
- B - Not required by specification or vendor documents
- C - 100% inspection is not required by the specification
- D - Previously approved
- NA - these attributes did not apply to the items listed