

ORGANIZATION:

ABB ATOM AB  
VASTERAS, SWEDEN

REPORT NO.: 99901211/90-01	INSPECTION DATE: August 6-7, 1990	INSPECTION ON-SITE HOURS: 32
CORRESPONDENCE ADDRESS: Mr. Aart van Santen, Manager Quality Assurance, Fuel Division S-721 63 Vasteras, Sweden		
ORGANIZATIONAL CONTACT: Mr. Aart van Santen, Manager Quality Assurance, Fuel Division		
TELEPHONE NUMBER: +46(0)21 107582		
NUCLEAR INDUSTRY ACTIVITY: Manufactures fuel and control rod assemblies and control rod drive mechanisms.		
ASSIGNED INSPECTOR:	<u>Uldis Potapovs</u> Uldis Potapovs, Chief, Reactive Inspection Section 1, (RIS-1) Vendor Inspection Branch	11-28-90 Date
OTHER INSPECTOR(S):	E.W. Brach, Chief, Performance and Quality Evaluation Branch	
APPROVED BY:	<u>E. William Brach</u> E. William Brach, Chief, Performance and Quality Evaluation Branch	11/28/90 Date
INSPECTION BASES AND SCOPE:		
A. <u>BASES</u> : 10 CFR Part 50, 10 CFR Part 21, Topical Report BQ 89-50		
B. <u>SCOPE</u> : Review of QA program implementation in selected areas.		
PLANT SITE APPLICABILITY: Dresden, Units 2 and 3 (50-237/50-249) Hatch, Units 1 and 2 (50-321/50-366) Fermi, Unit 2 (50-341), La Crosse (50-409), La Salle, Unit 1 (50-373), Limerick, Unit 2 (50-353), Hope Creek (50-354), Millstone, Unit 1 (50-245), Peach Bottom, Unit 2 (50-277), Quad Cities Unit 1 (50-254).		

9012120004 901129  
PDR QA999 EMVASEA  
99901211 PDC

ORGANIZATION: ABB ATOM AB  
VASTEKAS, SWEDEN

REPORT  
NO.: 99901211/90-01

INSPECTION  
RESULTS:

PAGE 2 of 8

A. VIOLATIONS:

None

B. NONCONFORMANCES:

Contrary to the requirements of Criterion V of 10 CFR 50, Appendix B and ABB Atom AB Fuel Division's Quality Assurance (QA) Manual, several Deviation Reports related to the manufacturing of fuel assemblies for Washington Nuclear 2 (WNP-2) were not categorized or forwarded to the customer for approval before their disposition.

C. UNRESOLVED ITEMS:

None

D. STATUS OF PREVIOUS FINDINGS:

Not applicable. This was the first NRC inspection at ABB Atom AB.

E. INSPECTION FINDINGS AND OTHER COMMENTS

1. Background

ABB Atom AB is a subsidiary of Asea Brown Boveri AB which in turn is the fully owned subsidiary of ABB Asea Brown Boveri Ltd., Zurich, Switzerland, the Holding Company of the ABB Asea Brown Boveri Group.

The Fuel Division is one of three divisions of ABB Atom AB. The others are Reactor Division and Service Division. The Fuel Division has approximately 475 employees and manufactures pressurized water reactor (PWR) and boiling water reactor (BWR) fuel assemblies, control rod assemblies and control rod drives. It is a fully integrated fuel facility including UF<sub>6</sub> conversion, pelletizing, component machining and assembly operations. The processes including forming, machining, nondestructive examination, and inspection are highly automated.

ABB Atom AB has supplied fuel channels to Quad Cities 1 and WNP-2, control rod assemblies to Dresden 2 and 3, Hatch 1 and 2, Hope Creek, La Crosse, La Salle, Millstone, and Quad Cities 1 and lead (demonstration) fuel assemblies to WNP-2, Fermi-2, Peach Bottom 2 and Limerick 2.

2. Inspection Scope

The inspection scope included a tour of the ABB Atom AB Fuel Division manufacturing plant and examination of the Quality Assurance (QA) program implementation in selected areas applicable to ongoing work for U.S. facilities. The inspection emphasis was focused on the control of purchased material including subcontractor qualification and audits and the control and disposition of nonconforming conditions identified during the procurement and manufacturing process.

Additionally, the basis and disposition of a potential 10 CFR Part 21 report submitted by ABB Atom AB on December 20, 1989 concerning crack indications identified on three ABB Atom AB control rods installed in the Dresden-3 reactor were reviewed.

3. QA Program

ABB Atom AB has committed to meet the requirements of 10 CFR Part 50, Appendix B. The QA program is described in a Topical Report (BQ 89-50) which has been accepted by the NRC as complying with the programmatic requirements of Appendix B. This program is further defined in several subtier documents including the Quality Assurance Manual for Nuclear Fuel and Components, Fuel Division Handbook and various section and subsection handbooks. The program procedures provide for identification and notification to the QA Manager of potentially reportable 10 CFR Part 21 situations so that they can be properly evaluated.

4. Control of Purchased Materials

The NRC inspectors conducted a review of ABB Atom's control over purchased materials and the program for establishing a list of approved vendors. The controls for these activities are described in the Quality Assurance Manual, QAM-B, which was revised in April 1990. Section 7 of this document describes the program for review and approval of vendors and placement of vendors on the Approved Suppliers List (ASL) and Section 18 describes the program for conducting programmatic system audits and implementation performance audits.

a. Audits

The ABB program for conducting audits is described in QAM-B, Section 18.2, QA System Audits, and Section 18.3, External Performance Audits. Implementing procedures are contained in Procedure B66-2 for the conduct of QA system audits and B66-3 for the conduct of external performance audits. To review ABB Atom's performance in this area, the NRC inspectors selected nine vendors who had been used in the supply of safety-related products to U.S. nuclear power plants. The vendors were selected from those involved in the supply of fuel channels and lead fuel assemblies to the WNP-2 nuclear power plant and in the supply of control rods to the La Salle nuclear power plant. The vendors selected were Bohler (Austria), Teledyne (Oregon, USA), Sandvik (Sweden), Kempten (Germany), Tecphy (France), Zollern (Germany), Inco (United Kingdom), Avesta (Sweden), and Cezus (Sweden). The inspectors verified that each of these vendors were included on the AVL. Based on the review of the audit reports for the nine vendors, it appeared that the scope and depth of the audits were appropriate.

The inspectors noted during the review of the audit program that the QAM and implementing procedures specify that an audit checklist will be prepared for performing audits and that the Quality Assurance Manager will identify the scope of such audits. The inspectors observed that the checklists are presently in draft. The inspectors noted that while the checklist is not complete, the Quality Assurance Manager and the Quality Assurance Systems and Audit Manager were auditors on most of the audit reports reviewed and that the scope of all the audits reviewed appeared appropriate. Further, the manual had been only recently revised (April 1990) and ABB Atom AB was presently preparing the checklist. The inspectors commented that ABB Atom AB should proceed to promptly complete the checklist.

b. Approved Suppliers List

The NRC inspectors also reviewed the program for placing vendors on the ASL. QAM-B, Section 7.2, List of Approved Suppliers, describes the process for reviewing and approving

ORGANIZATION: ABB ATOM AB  
VASTERAS, SWEDEN

REPORT  
NO.: 99901211/90-01

INSPECTION  
RESULTS:

PAGE 5 of 8

vendors of materials and components for inclusion on the ASL. The program requires a QA system audit (a programmatic review of the vendor's QA manual and implementing procedures) and a technical evaluation of the vendor's capability to be performed by Production Engineering staff. Further QAM-B, Section 7.3, Control and Quality Surveillance of Suppliers, further specifies periodic performance audits of the implementation of the vendor's program. The inspectors reviewed the current ASL, dated January 9, 1990, and by a sample review of the nine vendor audits discussed in the previous section confirmed the adequacy of the list. However, in reviewing the list, the inspectors noted that Westinghouse, Special Metals Division was on the ASL but the last ABB Atom AB audit was in 1981. ABB Atom AB determined that no purchase orders had been issued to this Westinghouse facility since 1984. The inspectors identified that Westinghouse should be removed from the ASL in accordance with the specification of QAM-B, Section 7.2.

5. Handling of Nonconformances

Control of nonconforming materials is addressed in Quality Assurance Manual, QAM-B, Section 15.1. When a nonconforming condition is identified, the Quality Control (QC) supervisor prepares a Deviation Report (Form QAM-B1.17) unless it is obvious that the nonconforming item should be rejected in which case no Deviation Report is written, but the item is rejected. Deviation Reports are sent to Product Engineering for evaluation and disposition. The responsible Product Engineering Subsection Manager classifies the deviation as either Category 1 or Category 2 and indicates the method of disposition (accept, not accept, rework, repair). The Deviation Reports are then sent to QC for disposition. Category 1 deviations are defined as not important to product function and are evaluated internally with no customer notification required. Category 2 deviations are considered important to product function and are sent to marketing for obtaining customer approval after internal disposition has been proposed.

ORGANIZATION: ABB ATOM AB  
VASTERAS, SWEDEN

REPORT  
NO.: 99901211/90-01

INSPECTION  
RESULTS:

PAGE 6 of 8

To verify the QA Manual implementation in this area, the inspectors reviewed selected records pertaining to the manufacture of fuel assemblies for WNP-2. Seven Deviation Reports and supporting documentation were reviewed. These Deviation Reports applied to fuel assembly hardware including tie plates, handle castings, spacers and other purchased or manufactured items. The specific deficiencies related to material heat treatment, grain size, mechanical properties and dimensional variances. A review of the actions recommended and taken to resolve these deviations verified that the required evaluations had been performed and documented and provided adequate technical bases for the recommended actions. It was noted, however, that the QA Manual requirements were not followed in deviation classification and customer notification. Specifically, Deviation Reports 2873 and 3959 were not classified as either Category 1 or Category 2 and there was no record that customer approval had been obtained prior to dispositioning Deviation Report 4048 even though it had been classified as a Category 2 deviation. The failure to follow QA Manual requirements in this area was identified as a nonconformance (Nonconformance 90-01-01).

Additional reviews in this area included deviation records for recent procurements of control rod assemblies for the La Salle facility. It was noted that all deviations had been submitted to the customer for approval as required by the QA Manual. Copies of the customer-approved Deviation Reports were on file.

6. Corrective Action

The corrective action process is described in Chapter 16 of the QA Manual. The Manual states that periodic reports will be prepared regarding rejections and nonconformities including causes of deviations and corrective actions taken. The purpose of these reports is to eliminate problems and to preclude their recurrence.

The inspectors noted that the process for assessing causes of deviations did not specifically include provisions for evaluation of the potential effects of such deviations or

ORGANIZATION: ABB ATOM AB  
VASTERAS, SWEDEN

REPORT  
NO.: 99901211/9 01

INSPECTION  
RESULTS:

PAGE 7 of 8

rejections on previously shipped products so that recipients of such products could be notified as appropriate. This was considered significant since Manual Chapter 15, Control of Nonconforming Materials did not require Deviation Reports to be generated or maintained for products which are rejected during the manufacturing process. The manual does require that each QC subsection manager prepare monthly status reports regarding rejections and product nonconformities. These reports are discussed in monthly meetings of responsible managers and the meeting results are documented. Record review indicated this to be a very recently implemented system since no reports of nonconformances/rejections had been made prior to January 1990, although summarized tabular data of rejections had been discussed in the earlier meetings.

Reporting deficiencies in delivered products is specifically addressed in Chapter 15 of the QA Manual by stating that any employee who becomes aware of a deficiency in a delivered product that may constitute a safety hazard is responsible for reporting the deficiency. A written report is to be submitted to the General Manager of the Quality Department within the Reactor Division of ABB Atom AB for reportability evaluation and, if appropriate, notification to customers and authorities.

Record review indicated that five evaluations of potentially reportable conditions had been made and none were determined to be reportable. One of these, involving cracking of Dresden-3 control rods was initially verbally reported to the NRC but subsequently determined to be non-reportable. NRC was so advised by ABB Atom AB correspondence dated December 20, 1989.

7. Review of Dresden-3 Control Rod Cracking

On December 17, 1989, ABB Atom AB verbally notified NRC of a condition potentially reportable under 10 CFR Part 21. This condition involved the discovery of cracking in ABB Atom AB control rod blades at Dresden-3. Eight control rods had been inspected visually and three of these were found to contain cracks.

On December 20, 1989, ABB Atom AB notified the NRC in writing that following a technical evaluation by ABB Atom AB staff and based on a review of high resolution video tape recording, it was concluded that the cracked control rods do not create a substantial safety hazard and thus do not fall under the provision of 10 CFR Part 21.

ORGANIZATION: ABB ATOM AB  
VASTERAS, SWEDEN

REPORT  
NO.: 99901211/90-01

INSPECTION  
RESULTS:

PAGE 8 of 8

Information reviewed during this inspection supported the above conclusion. According to ABB Atom AB staff, based on previous experience, some cracking would be expected to occur in 50 percent of the blades at 50 percent depletion. Based on this criterion alone, the observed cracking could be considered somewhat premature. However, the cracking is accelerated in high energy flux locations and the rod performance was predictable when corrected for the fast/thermal flux ratio for positions in which the rods operated. It was noted that the majority of the cracking occurred at sharp corners of the blade configuration where high stress concentrations would be expected. These corners have been rounded in current generation assemblies. ABB Atom AB staff stated that they will perform a destructive/metallographic analysis of crack samples in August 1990.

8. Persons Contacted

- P. Brunzell, Vice President and General Manager,  
Fuel Division
- K. Morlin, General Manager, Quality, Fuel Division
- S. Junkarans, General Manager, Production Department,  
Fuel Division
- A. van Santen, Manager, Quality Assurance, Fuel Division
- T. Olsson, Manager, Fuel Bundle Design, Fuel Division
- E. Nordesjo, Manager, Marketing, Fuel Division
- A. Micko, Manager, Quality Assurance Systems and Audits,  
Fuel Division
- T. Brattstrom, Quality Assurance Systems and Audits,  
Fuel Division
- L. Hallstadius, Materials Development, Fuel Division
- H. Thornburg, Manager, Core Components (U.S.  
Representative)



NOV 29 1990

Mr: Aart van Santen

- 3 -

Should you have any questions concerning this inspection, we will be pleased to discuss them with you.

Sincerely,

Uldis Potapovs, Acting Chief  
Vendor Inspection Branch  
Division of Reactor Inspection  
and Safeguards  
Office of Nuclear Reactor Regulation

Enclosures:

- 1. Appendix A-Notice of Nonconformance
- 2. Appendix B- Inspection Report 99901211/90-01

cc: Harold D. Thornburg, Manager  
Core Components  
ABB Atom AB  
901 South Varfield Drive  
Mount Airy, Maryland 21771

DISTRIBTUION

VIB R/F  
DRIS R/F  
BDLiaw  
BKGrimes  
UPotapovs  
BBrach  
PDR  
*Central Files*

OFC	: VIB:DRIS	: VIB:DRIS	: DRIS:DRIS	: DRIS:DRIS	:	:
NAME	: UPotapovs	: BBrach	: BDLiaw	: BKGrimes	:	:
DATE	: 11/28/90	: 11/28/90	: 11/29/90	: 11/29/90	:	: