

U.S. NUCLEAR REGULATORY COMMISSION
 OFFICE OF NUCLEAR REACTOR REGULATION
 DIVISION OF REACTOR INSPECTION AND LICENSEE PERFORMANCE

ORGANIZATION: Lisega GmbH
 Zeven, Germany

REPORT NO.: 99901235/93-01

CORRESPONDENCE ADDRESS: Mr. Hans Herlof Hardtke
 Geschäftsführer - President
 Lisega GmbH
 Postfach 13 57
 Industriegebiet Hochkamp
 D-2730 Zeven, Germany

ORGANIZATIONAL CONTACT: Mr. Herbert Bardenhagen
 Leiter Qualitätssicherung - Quality Assurance Manager

NUCLEAR INDUSTRY ACTIVITY: Safety-related spring hangers, constant supports, rigid struts, and hydraulic snubbers supplied as standard component supports.

INSPECTION DATES: September 28 through October 1, 1993

LEAD INSPECTOR: Steven M. Matthews 2-23-94
 Steven M. Matthews, Team Leader Date
 Reactive Inspection Section 1
 Vendor Inspection Branch

OTHER INSPECTOR: Stephen D. Alexander, Equipment Qualification & Test Engineer

APPROVED BY: Uldis Potapovs 2-24-94
 Uldis Potapovs, Chief Date
 Reactive Inspection Section 1
 Vendor Inspection Branch

INSPECTION BASES: 10 CFR Part 21, Appendix B to 10 CFR Part 50, and ASME Code Section III, Subsections NCA and NF.

INSPECTION SCOPE: To review corrective actions taken for the findings and unresolved items from previous inspections and evaluate the quality assurance program and its implementation in selected areas such as material procurement, audit of sub-suppliers, material certification, and dedication and upgrading of stock material.

APPLICABLE PLANTS: Numerous

9403080065 940302
 PDR GA999 EMVLISE/D
 99901235 PDR

1 INSPECTION SUMMARY

1.1 Violation

Contrary to the U.S. Nuclear Regulatory Commission's (NRC's) requirements in Section 21.21, "Notification of failure to comply or existence of a defect and its evaluation," of Part 21 of Title 10 of the Code of Federal Regulations, (10 CFR 21.21), the Lisega GmbH (Lisega) procedure for implementing the regulation had not been updated to include the new provisions in 10 CFR 21.21(a) that (1) limit the time for evaluating deviations or failures to comply to not more than 60 days from discovery, (2) require an interim report to the NRC within the 60 days if this evaluation cannot be completed within the 60 days, and (3) limit the time for informing a director or responsible officer of Lisega of the defects or failures to comply associated with a substantial safety hazard to 5 working days from completion of the evaluation. (93-01-01)

1.2 Nonconformance

Contrary to the requirements of Criterion III, "Design Control," of Appendix B to 10 CFR Part 50, Lisega failed to perform an adequate review for suitability of application for the hydraulic fluid used in hydraulic snubbers for Arkansas Power and Light Company's (APL's) Arkansas Nuclear One Power Station because the hydraulic fluid manufacturer's viscosity specification did not meet the licensee-specified minimum viscosity requirements for elevated temperatures. (93-01-02)

2 STATUS OF PREVIOUS INSPECTION FINDINGS

2.1 Unresolved Item 91-01-03 (CLOSED)

Lisega had not determined whether Georgia Power Company (GPC) had approved the use of specific Cases of the American Society of Mechanical Engineers (ASME), Boiler and Pressure Vessel Code (Code), Section III, "Rules for Construction of Nuclear Power Plant Components" (Section III), in the manufacture of standard component supports supplied to GPC.

During the NRC's inspection conducted on August 18 through 21, 1992, (Inspection Report (IR) 99901235/92-01 enclosed with NRC's letter to Lisega dated October 19, 1992) the team determined that the ASME Code Cases in question were authorized for use by the Bechtel design specification applicable to this procurement. However, the team also noted that Bechtel's authorization was subject to the restrictions imposed in NRC Regulatory Guide (RG) 1.85, "Materials Code Cases Acceptability, ASME Section III, Division 1." At the time of the 1992 inspection, Lisega neither had a copy of RG 1.85 nor had Lisega reviewed it for its applicability to GPC's procurement. A review of the procurement requirements for other current contracts identified similar restrictions on the use of ASME Code Cases as well as specific restrictions concerning the use of the small parts exclusion provided for in paragraph NF-2610(c) of ASME Code, Section III, Subsection NF, "Component Supports."

In its response to IR 99901235/92-01, dated November 19, 1992, Lisega replied that it had obtained RG 1.84, "Design and Fabrication Code Case Acceptability, ASME Section III, Division 1," RG 1.85, and RG 1.124, "Service Limits and Loading Combinations for Class 1 Linear-Type Component Supports." Lisega stated that it had confirmed that the materials (i.e., the American Society for Testing Materials (ASTM) specifications ASTM A-500-84, Grade B and A-668-83, Class F) used in the component supports for GPC's procurement complied with GPC's Specification SS-Z102-190, Revision 1, date August 9, 1992, and ASME Code Case N-71-10-1981, as permitted in RG 1.85.

During this inspection, the team determined that Lisega had obtained the applicable RGs and had adequately evaluated the restrictions imposed by the RGs. Lisega's evaluation of the RGs determined that it had complied with the applicable restrictions imposed by the RGs for the use of certain ASME Code Cases and ASTM materials used in the component supports supplied to GPC and other licensees. The NRC staff considers this nonconformance closed because Lisega's corrective actions reviewed during this inspection have satisfied the concerns.

2.2 Nonconformance 92-01-01 (CLOSED)

Lisega had certified certain items as meeting the requirements of ASME Code, Section III, Subsection NF, when the material and test documentation for these items did not fully support Lisega's certification. The following instances were identified in IR 99901235/92-01 and the Notice of Nonconformance dated October 19, 1992. The NRC Staff considers this nonconformance closed because Lisega's corrective actions reviewed during this inspection have satisfied the concerns, as described below.

- (1) Lisega issued its Certified Material Test Report (Zertifikat für Materialprüfung, or CMTR) 113377 for SA-479, Type 410(1) bar used for piston rods in large bore hydraulic snubbers ordered by APL for steam generator supports. Lisega purchased this material from Gustav Grimm, Edelstahl-Werk GmbH (Grimm) as SA-182, Grade F6a, Class 2 forgings. Grimm provided a CMTR for this material, including the mill heat analysis, heat treatment description, and nondestructive examination (NDE) certification on their letterhead. However, Grimm is not a holder of an ASME Quality Systems Certificate (QSC), nor did their certification to Lisega include the statement that this material had been produced under the requirements of ASME Code, Section III, Subsection NCA, "General Requirements for Division 1 and Division 2," paragraph NCA-3800, "Metallic Material Manufacturer's and Material Supplier's Quality System Program," (i.e., no evidence that Grimm had been qualified by Lisega to supply ASME Code material). A CMTR from the melting mill was not included in this documentation and there was no evidence that the mill had been qualified by either Grimm or by Lisega.

In its response to IR 99901235/92-01, dated November 19, 1992, Lisega replied that the material represented by its CMTR 113377 was supplied by Grimm and that Lisega had audited and qualified Grimm to the requirements of ASME Code NCA-3800. Grimm issued a revised CMTR, dated November 16, 1992, that included its product analysis of the forgings

and a statement that the material was manufactured in accordance with Grimm's Quality Assurance Manual (QAM), dated February 1987. Grimm's QAM was audited by Lisega on January 11, 1990, and found to meet the requirements of ASME Code NCA-3800, the order, and the material specification. Lisega issued Revision B of its CMTR 113377, dated November 19, 1992, which certified the material as ASME SA-182, Grade F6a, Class 2, tested in accordance with ASME SA-370. Lisega's revised CMTR included a statement that the material was fabricated by Grimm in accordance with Grimm's QAM, dated February 27, 1987, which was audited by Lisega on January 11, 1990, in accordance with ASME Code NCA-3800 and the requirements of Lisega's QAM.

During this inspection, the team determined that Lisega had audited and qualified Grimm to the requirements of ASME Code NCA-3800 and that the applicable CMTRs were revised, as described above. Lisega's corrective actions taken to address the issues described above and reviewed by the team during this inspection appear to have adequately satisfied these concerns.

- (2) Lisega issued its CMTR 111183 for ASTM A-668, Class C (Lisega Material Specification 122) for the material used for articulated joints in rigid struts supplied to Arizona Public Service Company (APS) for its purchase order (PO) 33801236. Lisega purchased this material from Lenhauser Hammerwerk GmbH (Lenhauser). Lenhauser provided a CMTR for this material, including the mill heat analysis, on their letterhead. Lenhauser is not an ASME QSC holder and the Lenhauser CMTR did not demonstrate that this material was produced under an ASME Code NCA-3800 program that had been approved by Lisega. A CMTR from the melting mill was not included in this documentation and there was no evidence that the mill had been qualified by either Lenhauser or by Lisega. Additionally, although Lisega Material Specification 122 restricts the chromium (Cr) content of this material to 0.30 percent, the Lisega product analysis for Cr content was marked "not applicable."

In its response to IR 99901235/92-01, dated November 19, 1992, Lisega replied that the material represented by its CMTR 111183 was supplied by Lenhauser and that Lisega had audited and qualified Lenhauser. Attached to Lenhauser's CMTR, Lenhauser provided a statement that the material had been manufactured in accordance with Lenhauser's QAM, Revision 2, that was audited and qualified by Lisega, and that the material had not been repaired by welding. Lisega issued Revision A of its CMTR 111183, dated August 28, 1992, which certified the material as ASTM A-668, Class C, tested in accordance with ASME SA-370, included the Cr content, and included a statement that the material was supplied in accordance with Lisega's ASME QSC No. 522, expiring October 1993.

During this inspection, the team determined that Lisega had procured the material from Lenhauser and had verified the melting mill's certificate during its audit of Lenhauser. A test lab, audited and qualified by Lisega, performed a product analysis on a test specimen from each heat and lot of material supplied by the mill. After forging the articulated joint, Lenhauser, acting as Lisega's qualified subcontractor, performed

testing, in accordance with ASME SA-370 as qualified by Lisega, to verify the physical and impact properties for each heat number and heat-treatment lot of material. Lisega's corrective actions taken to address the issues described above and reviewed by the team during this inspection appear to have adequately satisfied these concerns.

- (3) Lisega issued its CMTR 115217 for ASME SA-53 S, Grade A, pipe used in rigid struts supplied to APS. The ASME SA-53 material specification provides restrictions on the maximum content of each of the following elements: copper, nickel, chromium, molybdenum, and vanadium; and the maximum total content of these elements can not exceed 1.00 percent. The pipe material was procured from Benteler Aktiengesellschaft (Benteler) who certified that the pipe material complied with Deutsches Institut für Normung e.V. (DIN), standard DIN 2448-81/17175-79. However, Benteler's CMTR did not document an analysis of the trace elements. Lisega's CMTR 115217 documented only that the average combined total of the trace elements was less than 1.00 percent, and therefore, did not provide assurance that the specified amounts for each trace element was not exceeded. Lisega's CMTRs 115431, 115284, 115232, and 115243 had the same deficiency.

In its response to IR 99901235/92-01, dated November 19, 1992, Lisega replied that its CMTRs 111183, 115431, 115284, 115232, and 115243 were corrected to document the actual contents for each trace element.

During this inspection, the team determined that Lisega had revised its material specifications to include the required controls for trace elements. To enhance its assurance that all CMTRs are correct, Lisega established measures for a second level of CMTR review before certification. Lisega's corrective actions taken to address the issues described above and reviewed by the team during this inspection appear to have adequately satisfied these concerns.

- (4) Lisega issued its CMTR 115399 for ASME SA-479, Type 410(1) bar used for pin-bolts in rigid struts supplied to APS. Lisega purchased this material from Krupp Stahlag. However, neither the CMTR provided by Krupp Stahlag nor Lisega's CMTR described, as required by the material specification, the product's heat treatment and hardness. Krupp Stahlag provided this information via telefax during the 1992 NRC inspection of Lisega.

In its response to IR 99901235/92-01, dated November 19, 1992, Lisega replied that its CMTR 115399 was corrected during the 1992 NRC inspection.

During this inspection, the team determined that Lisega had revised its CMTR to describe the product's heat treatment and hardness. Lisega's corrective actions taken to address the issues described above and reviewed by the team during this inspection appear to have adequately satisfied these concerns.

2.3 Nonconformance 92-01-02 (CLOSED)

As of August 21, 1992, Lisega had not established measures in either its QAM nor the "Procedural Guidelines Quality: Quality Assurance Program" (Verfahrensbeschreibung Qualitätssicherungsprogramm, or VQSP) for dedicating items purchased as commercial grade for use in safety-related standard component supports.

In its response to IR 99901235/92-01, dated November 19, 1992, Lisega described its corrective actions taken to establish measures for the dedication of items purchased as commercial grade (as defined in 10 CFR Part 21) and used in safety-related standard component supports. And in its supplemental response to IR 99901235/92-01, dated January 13, 1993, Lisega submitted VQSP 37, "Material Procurement and Goods Receiving Control," dated January 1993, and VQSP 44, "Qualification, Certification and Admission of Lisega Sub-Contractors."

During this inspection, the team reviewed Lisega's Revision A of VQSP 37, dated April 8, 1993. The team determined that Lisega's overall program description was generally consistent with the dedication philosophy described in Electric Power Research Institute (EPRI) report NP-5652, "Guideline for the Utilization of Commercial Grade Items in Nuclear Safety Related Applications (NCIG-07)." However, the program description, including the implementing procedures documented in VQSPs 37 and 44, did not completely address the issues contained in NRC Generic Letters 89-02, "Actions to Improve the Dedication of Counterfeit and Fraudulently Marketed Products," dated March 21, 1989, and 91-05, "Licensee Commercial-Grade Procurement and Dedication Programs," dated April 9, 1991, which specified certain restrictions or conditions concerning the use of EPRI NP-5652 dedication methods to achieve compliance with Appendix B to 10 CFR Part 50. The team reviewed these issues in detail with Lisega's Quality Assurance (QA) Manager to address the NRC's expectations with regard to Lisega's commercial grade procurement and dedication program. Lisega's procurement practices include purchasing items from (1) qualified suppliers with an ASME QSC (e.g., pipe, plate, and bars), (2) qualified suppliers audited by Lisega to ASME Code NCA-3800 (e.g., pipe, plate, bars, and forgings), (3) suppliers of commercial grade items (e.g., pipe, plate, bars, and forgings) that are required by Lisega to provide Acceptance Test Certificates in accordance with standard DIN 50049, "Articles of Test Certification" (Arten von Prüfbescheinigungen), and (4) qualified suppliers of commercial grade items (e.g., seals and fluids) and services (e.g., calibration, machining, materials testing, and NDE).

The NRC staff considers this nonconformance closed because Lisega's corrective actions taken and reviewed during this inspection have satisfied the concerns raised by the nonconformance. However, with appropriate modifications to address the additional issues discussed by the team with the QA Manager, the Lisega program, if properly implemented, should provide adequate control over Lisega's commercial grade procurement and dedication process.

2.4 Nonconformance 92-01-03 (CLOSED)

Lisega purchased items from suppliers, who either held a current ASME QSC or were listed in document TÜV 1253/1, "Register of Approved Material Manufacturers," published by Technischer Überwachungs-Verein (TÜV), without performing assessments, such as implementation audits, to verify the suppliers' quality programs or testing the supplied material.

In its response to IR 99901235/92-01, dated November 19, 1992, Lisega described its corrective actions taken to establish measures to properly qualify its suppliers, in part, as described in Lisega's response to Nonconformance 92-01-02, and that VQSP 37 was revised, in part, to address this concern.

During this inspection, the team reviewed Lisega's Revision A of VQSP 37, dated April 8, 1993, and determined that, as stated above in Section 2.3 of this report, Lisega's overall commercial grade procurement and dedication program description was generally consistent with the accepted dedication philosophy. However, the program description, including the implementing procedures documented in VQSPs 37 and 44, did not completely address the issues in NRC's guidance, as published in the Generic Letters referenced above in Section 2.3 of this report. These issues were also discussed during the team's discussions with Lisega's QA Manager.

The NRC Staff considers this nonconformance closed because Lisega's corrective actions taken and reviewed during this inspection have satisfied the concerns raised by the nonconformance. However, with appropriate modifications to address the additional issues discussed by the team with the QA Manager, the Lisega program, if properly implemented, should provide adequate control over Lisega's commercial grade procurement and dedication process.

3 INSPECTION FINDINGS AND OTHER COMMENTS

3.1 Entrance and Exit Meetings

During the entrance meeting in Zeven, Germany, on September 28, 1993, the NRC's inspection team met with members of Lisega's Zeven staff and other representatives of Lisega, discussed the scope of the inspection, and established working interfaces. The team observed activities, held discussions with Lisega's staff, and reviewed certain records and procedures. The specific areas, documentation reviewed, and the team's findings are described in this report. The persons who participated in and who were contacted during the inspection are listed in Section 4 of this report. During the exit meeting on October 1, 1993, the team summarized the inspection findings, observations, and recommendations with Lisega's management and staff.

3.2 Background

The inspection resolved certain issues related to the procurement and commercial grade dedication of materials used in safety-related spring hangers (sicherheitsrelevante federhängern), constant supports (konstanthängern), rigid struts (stützen), and hydraulic snubbers (stoßbremsen) that Lisega supplied to the U.S. nuclear industry as complying with the requirements of ASME Code, Section III, Appendix B to 10 CFR Part 50, and 10 CFR Part 21. The team also reviewed Lisega's corrective actions taken to address unresolved items and nonconformances identified during previous NRC inspections and determined that Lisega's corrective actions taken were adequate to resolve the concerns.

3.3 Review of 10 CFR Part 21

The team reviewed Revision 0 of Lisega VQSP 34, "State of Product-Information and Report" (Berichtswesen über Produktverhalten), dated April 1989, adopted pursuant to 10 CFR 21.21, and found that it would not, as written, ensure proper evaluation and reporting. The procedure had not been updated to include the new provisions of the regulation required to be included in procedures adopted pursuant to the regulation in accordance with the version of 10 CFR Part 21 that became effective on October 29, 1991. Missing from Lisega's VQSP 34 were the new provisions in 10 CFR 21.21(a) that (1) limit the time for evaluating deviations or failures to comply (to determine if they could create or are associated with a substantial safety hazard) to not more than 60 days from discovery, (2) require an interim report to the NRC within the 60 days if this evaluation cannot be completed within the 60 days, and (3) limit the time (not previously specified) for informing a Lisega director or responsible officer of defects or failures to comply associated with a substantial safety hazard to 5 working days from completion of the evaluation. Although the procedure contained provisions for informing affected customers of problems affecting safety of parts and products, the time limit prescribed in 10 CFR 21.21(b) for informing affected licensees or purchasers of deviations or failures to comply that Lisega cannot or chooses not to evaluate was also not included. The procedure had also not been updated to address the means of transmission of reports to the NRC, the time limits, and the address.

On the basis of the team's review of VQSP 34, it was not clear how Lisega employees would recognize discrepancies or nonconformances, described as problems affecting safety of parts or products, as reportable to management under 10 CFR Part 21 because deviations from the technical procurement specifications or failures to comply as defined in the regulation were not clearly defined. According to Lisega's VQSP 39, "Handling of Nonconforming Supplies," Revision 0, dated June 1991, and VQSP 40, "Handling of Nonconforming Parts, Assemblies and Final Products," nonconformances were to be reported to QA on QSF-13 forms and dispositioned on QSF-10 forms. However, these procedures did not refer to 10 CFR Part 21 or VQSP 34, nor did VQSP 34 refer to VQSPs 39 and 40. Section 13, "Control of Nonconforming Products," and Section 14, "Revision and Correction Procedures," of Lisega's QAM referred to 10 CFR Part 21 and the German version of these QAM sections referred to VQSP 34 by its German title only (the English version of these QAM sections

referred to VQSP 34 by two different names, both of which were different from the English title on VQSP 34 itself). However, neither of these two sections of the QAM referred to VQSPs 39 and 40.

The team noted that Lisega had chosen to post Section 206 of the Energy Reorganization Act of 1974 and a notice that was intended to meet the requirements of 10 CFR 21.6(b). However, the notice provided for the inspectors review lacked certain items required by the regulation. Specifically, the notice: (1) described the regulation, but did not name or describe Lisega's procedures adopted pursuant to the regulation; (2) stated where translations of the regulation may be viewed, but not the procedures; and (3) did not contain the name (or title) of the person to whom employees are to make reports.

Also, on the basis of the team's review of the applicable VQSPs, it was not clear on what basis nonconformances would be evaluated for reporting or that they would be evaluated for creation of a substantial safety hazard. Finally, there was no provision for informing a Lisega director or responsible officer of defects or failures to comply associated with a substantial safety hazard at the completion of the evaluation. As a result, Violation 93-01-01 was identified during this part of the inspection.

3.4 Review of Dedication of Purchased Commercial Grade Material

As part of the team's evaluation of Lisega's process for procurement and dedication of commercial grade materials and subcomponents/parts for use as basic components in Lisega's standard component supports, the team reviewed the procurement and dedication records of selected purchased materials used in Lisega's hydraulic snubbers. During the review of records associated with hydraulic damper fluid for snubbers manufactured for APL's Arkansas Nuclear One Power Station under Entergy Operations, Incorporated (the plant's operating organization), PO 932471, Release 000, dated May 27, 1993, the team discovered that the product technical information in the catalog published by the manufacturer of the hydraulic damper fluid indicated that the fluid's viscosity (i.e., kinematic viscosity, expressed in centistokes (cSt)) at elevated temperatures was not consistent with the requirements in the specification referenced in Lisega's customer's procurement documents. The Entergy PO invoked Specification ANO-M-2455, "Procurement of Lisega Series 30 Hydraulic Snubbers." Section 6.5 of Revision 0, dated March 10, 1992, specified type AK-350 hydraulic fluid and required, in part, that the viscosity of the hydraulic fluid at the temperature specified shall be as follows:

25°C (77°F)	350 cSt (± 10 cSt)
150°C (302°F)	65 cSt (± 5 cSt)
200°C (392°F)	42 cSt (± 5 cSt)

However, the graph on page 4 of Wacker Silicone's AK type Fluids catalog, "Viscosity/Temperature Correlation of Silicone Fluids AK," showed that the viscosity of AK-350 would be as follows:

150°C (302°F) 48 cSt (< 60 cSt minimum required)
200°C (392°F) 30 cSt (< 37 cSt minimum required)

These deviations from Entergy's Specification ANO-M-2455 had not been previously identified by Lisega because, according to Lisega's staff, the fluid supplier was responsible for ensuring that the fluid complied with its own material specification. However, the team pointed out that even if the fluid itself complies with the supplier's specifications (which was also not verified under Lisega's system for product acceptance), Lisega was responsible for ensuring that the fluid manufacturer's specifications met all Lisega's customer's specifications. As a result, Nonconformance 93-01-02 was identified during this part of the inspection.

Additionally, the team, using this instance (where Lisega relied entirely upon the fluid manufacturer to verify that the fluid supplied met the manufacturer's specifications without Lisega sampling the product, or surveying or auditing the supplier, or using some other appropriate means of accepting the fluid) pointed out to Lisega's QA Manager how this instance was an example of the type of deficiency previously identified in Lisega's commercial grade procurement and dedicating program. The dedication issues raised by this instance were discussed by the team with Lisega's QA Manager, as described in Sections 2.3 and 2.4 of this report. As a result, Lisega's QA Manager committed to resolve the observed deviations, in part, by (1) evaluating the effect of reduced fluid viscosity at elevated temperatures on the performance of the snubbers and (2) changing the dedication procedures to ensure an adequate review for suitability of application including verifying that the material suppliers' specifications comply with Lisega's (and/or its customers') material specifications.

4 PERSONNEL CONTACTED

Listed below are the Lisega GmbH personnel contacted during this inspection, who also attended both the entrance meeting on September 28, 1993, and the exit meeting on October 1, 1993, and the U.S. Nuclear Regulatory Commission staff who conducted this inspection.

Lisega GmbH:

Hans Hardtke	Geschäftsführer - President and CEO
Herbert Bardenhagen	Leiter Qualitätssicherung - Quality Assurance Manager
Herbert Aberle	Area Sales Engineer
Harald Lange	International Sales Engineer
Wolf-Rüdiger Wagner	Purchasing Manager
Falk Löffler	Fabrication Control
Förg Bernet	Hanger Design
Gerhard Lüders	Production Engineer

U.S. Nuclear Regulatory Commission:

Stephen D. Alexander	Equipment Qualification & Test Engineer
Steven M. Matthews	Team Leader, Quality Assurance Engineer