August 2, 2000

MEMORANDUM TO: Janice Dunn-Lee, Director
Office of International Programs

Jose A. Calvo, Chief
Electrical and Instrumentation and Controls Branch
Division of Engineering
Office of Nuclear Reactor Regulation

FROM: Donna-Marie Perez ***/RA/***
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Office of Nuclear Reactor Regulation

SUBJECT: MEETING SUMMARY - TECHNICAL INFORMATION MEETING BETWEEN NRC AND THE CZECH NUCLEAR REGULATORY AUTHORITY, APRIL 25 AND 26, 2000

On April 25 and 26, 2000, a meeting was held at the Czech Republic State Office for Nuclear Safety (SUJB) in Prague to review the Temelin instrumentation and control (I&C) system, fuel, and design basis accident (DBA) safety evaluation report. A summary of the meeting is included as Attachment 1. The primary purpose of the meeting was for NRC and its contractor, Scientech, to review the draft Temelin safety evaluation report (SER) prepared by SUJB. The SER documents the results of SUJB's review of the design of the systems based on guidance provided in NRC's SRP. A list of attendees is provided in Attachment 2.

Several months prior to the meeting, SUJB forwarded to the NRC a draft SER on I&C, reactor fuels and DBA dated December 1998. This information was reviewed by John Bickel, Scientech. Dr. Bickel briefed NRR and OIP staff on March 20-21, 2000, on the results of his review of the draft SER, focusing on both the content and style of the SER. The NRC staff reviewed the information provided by Scientech. The results of staff's review and suggested modifications to the SER were forwarded to SUJB prior to the meeting in Prague.

During the meeting, SUJB presented information on modifications that have been made to the SER, based on the information provided by the NRC. The NRC noted that many of its comments have been incorporated in Revision 2 of the SER, dated March 30, 2000. The remainder of the comments would be considered by SUJB in the final SER.

The meeting was particularly beneficial to the NRC staff because it provided the opportunity to gain experience in the use of the SRP, Chapter 7, for reviewing an integrated digital I&C system application in a nuclear power plant. Later in the year, SUJB plans to provide their feedback to NRR on the use of the guidance of SRP, Chapter 7, in the safety evaluation of the Temelin I&C system.

If you have any questions regarding the attachments, please contact Matt Chiramal at 415-2845 or Donna-Marie Perez at 415-2848.

Attachments: As stated

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Attachments: As stated

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Attachment I

MEETING ON REVIEW OF TEMELIN DIGITAL INSTRUMENTATION AND CONTROL SYSTEM, REACTOR FUEL, AND ACCIDENT ANALYSIS

On April 25 and 26, 2000, Donna-Marie Perez, OIP, Matthew Chiramal, EEIB/DE/NRR, John Bickel and Millian Stratka, Scientech, met with the staff of the Czech Republic State Office for Nuclear Safety (SUJB) to discuss the safety evaluation of the digital instrumentation and control (I&C) system, reactor fuel, and DBA for the Temelin NPP. The meeting was held at the SUJB offices in Prague, Czech Republic.

Miroslav Svab, SUJB, opened the meeting and provided the status of the Temelin project. Temelin, Unit 1, is undergoing functional tests prior to obtaining approval from SUJB for its first fuel load. The first fuel load is planned for August 31, 2000. Temelin, Unit 2, first fuel load is scheduled 18 months, after Unit 1 fuel load. SUJB has invited NRR staff participation in the forthcoming Temelin, Unit 1, I&C system functional tests.

Following the introductory discussion, Miroslav Lehmann discussed in detail the status of the Temelin I&C system design and safety evaluation report (SER). Verification of the design requirements and design implementation has been completed, and validation through factory acceptance tests of Baseline 5 and Baseline 6 versions of the system has been completed. For IV&V, except for MALPAS based static analysis, all other static analyses have been completed. Dynamic testing has also been completed. There are no Category 1 issues (issues that affect approval for fuel load) identified as a result of the completed static analyses. Six findings of dynamic testing are being addressed. Equipment qualification documents that were submitted two months ago are also being reviewed by SUJB.

The SER for Temelin has been updated considerably since the 1998 English version that NRC and Scientech reviewed. A majority of comments on the 1998 version (on format and content) have already been addressed in the current version of the SER. Presently, the SER is written only in Czech and later an English version will be issued.

A detailed discussion of the Temelin I&C design and the SER followed. Based on the discussion, NRR staff has concluded that SUJB staff have a good understanding of the Temelin I&C design, and that they have performed a comprehensive and systematic safety evaluation of the Temelin I&C system. They have effectively used the guidance of NRC's SRP, Chapter 7, in writing the SER. Based on the comments provided to SUJB for the 1998 version of the SER, and the discussion on the present version of the SER, SUJB will be considering the following items in preparing the final SER on Temelin I&C systems:

- It was suggested that section 7.1 include a discussion of the regulatory requirements and acceptance criteria (Czech and US), standards (IAEA, IEC, IEEE), regulatory guides and technical positions. The set of these criteria, regulatory requirements, and standards may be included in a tabular format similar to that contained in Table 7.1 of the SRP which shows specific systems and the criteria for those systems.

- A new SUJB regulation, No. 195/1999Sb, entitled “Requirements on Nuclear Installations for Assurance of Nuclear Safety, Radiation Protection and Emergency Preparedness,” dated August 21, 1999, will be discussed in Section 7.1 of the SER (particularly dealing with the single failure criterion). This would bring the Czech definition of single failure into alignment with international standards.

- A discussion on data communication would be included in the sections of the SER that have the review of the Primary Reactor Protection System (PRPS), Diverse Protection System (DPS), Post Accident Monitor (PAM), and control systems.

- The discussion on the Non Programmable Logic System (NPLS), a feature which is unique to the Temelin design, is planned to be in a section on its own, with a strong link to the NPLS section included in the SER sections on PRPS and DPS. The NPLS receives inputs from the PRPS and DPS and functions to resolve potential logic voting discrepancies associated with ECCS valve position signals. Important features of NPLS would be included in the sections on PRPS and DPS.

- In all the sections of the SER, a description of the key system design features and technical requirements of the system that are required to meet the regulatory requirements will be included.

Similar to the I&C Sections, the SER Chapters dealing with the Reactor (Nuclear Fuel) and Accident Analysis are about a year out of date, and the majority of open items noted in the 1998 version have been satisfactorily closed. This status is reflected in the SUJB's Licensing Issues Data Base which is more current. Based on the review of the draft SER and the discussion on the current Licensing Issues Data Base between Dr. Straka, Scientech, and Dr. Dusek, SUJB, it is clear that the SUJB staff and their contractors at UJV-Řez carried out a systematic and comprehensive review of Chapters 4 and 15 according to the NRC's Standard Review Plan. Some discrepancies were noted due to differences in NRC and SUJB regulatory criteria, particularly in the area of dose limits. SUJB has explained the rationale of their decisions on which limits to use.

Based on the discussions with the SUJB technical staff, only one remaining technical item remains which impacts both Chapters 4 and 15. This issue is the applicability of the W-3 DNBR correlation to the VVER fuel bundle.

The issue was originally raised in 1994 when the first Temelin Nuclear Fuel Topical Report was submitted for SUJB review. At issue is whether, and under what specific circumstances, a DNBR correlation, originally developed by Westinghouse for the rectangular fuel pin geometry typical of fuel bundles for US-designed PWRs, can be adapted for use in the hexagonal geometry typical of the VVER fuel bundle. Westinghouse used existing test data and data from some new hexagonal bundle laboratory tests with electrically heated rods to verify the use of W-3 in certain regions. This was done to supplement the CHF data from the Russian correlations. SUJB's contractor UJV-Řez considers that more data should be taken to reduce uncertainties. A specific scenario it impacts is the Steam Line Break Accident. Westinghouse considers that they have done all that was reasonable and practicable (given the costs involved in setting up new experiments to get further data points). There have been several technical meetings between SUJB, the licensee, and Westinghouse, to define an agreed upon solution

path to resolve this impasse - but the matter has not yet been closed out to the full satisfaction of SUJB. The issue does not appear to be a critical safety issue warranting re-evaluation of Temelin fuel.

During the discussion, SUJB noted that since the pre-operational and startup tests have not yet been submitted for an official review, it is not discussed in the current draft of the SER. SUJB noted that the new SER version reviews radiological consequences in a consistent and complete manner. Some Czech limits are lower compared to 10CFR requirements, which poses a problem in terms of exceeding (committed) dose limits when analyzing certain LOCAs in small lines outside the containment. They are considering applying less conservative assumptions. SUJB is completing the evaluation of fuel handling accidents such as cask drop, and pool boiling not present in the Fall '98 version of the SER. Discussions were held on the Western philosophy for evaluating alternative means for mitigation if a dedicated system would fail (i.e. alternate cooling path, procedures). SUJB seemed to be very appreciative of the suggestion to credit this approach.

SUJB stated that revisions to the SER will include reference to applicable (NRC) Regulations and Regulatory Guides. The style and content of the SER on Chapters 4 and 15 were also discussed.

Conclusions

On the last day of the meeting, both the Deputy Chairman, Petr Krs, and Miroslav Svab, Director of the Department for NPP Assessment, expressed their appreciation for the assistance SUJB has received from the NRC. They were pleased to note that SUJB personnel have benefitted greatly from the training provided over the last eight years.

Based on the discussion of the I&C design and its review and safety evaluation, NRR staff considers SUJB to have performed a comprehensive and systematic safety review of the Temelin I&C system based on the guidance of NRC's SRP Chapter 7, Revision 4.

Based on the discussion of the Licensing Issues Data Base, Scientech staff considers SUJB to have performed a comprehensive and systematic safety review of the Temelin DBA and Fuel.

The English version of the final SER will be issued by SUJB, which should confirm that the open items, discussed during this meeting, are addressed.

Attachment 2

Attendees at the Meeting of April 25-26, 2000 in Prague		
NAME	**TITLE & ORGANIZATION**	**E-MAIL ADDRESS**
Pavel Kovár	Director, International Co-operation Department, SUJB	pavel.kovar@sujb.cz
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