NRC NEWS

U.S. NUCLEAR REGULATORY COMMISSION

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No. S-05-019

IMPROVEMENTS TO THE UNITED STATES NUCLEAR REGULATORY COMMISSION'S OPERATING EXPERIENCE PROGRAM

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before the
International Conference on Operational Safety Performance
International Atomic Energy Agency
Vienna, Austria
November 30, 2005

The subject of this conference, operational safety performance, is one of fundamental importance to the U.S. Nuclear Regulatory Commission. Thus, I am especially pleased to join you for this conference.

Operational safety performance is a keystone of the NRC's regulatory framework. It has many "tentacles" extending into areas such as maintenance, engineering, and security, as well as into operations. It can also be seen as both originating from, and feeding back to, a plant's design. The importance of this area at the NRC derives from our overall Strategic Objective to:

> ***Enable the use and management of radioactive materials and nuclear fuels for beneficial civilian purposes in a manner that protects public health and safety and the environment, promotes the security of our nation, and provides for regulatory actions that are open, effective, efficient, realistic, and timely.***

To accomplish that Objective, we identified six key strategies to assure safety, one of which is to:

> ***Evaluate and utilize domestic and international operational experience and events to enhance decision making.***

This strategy not only enhances our decision-making process, but it is also a fundamental component of knowledge management – meaning the process by which the NRC is enabling transfer of knowledge and lessons learned from current regulators to a generation of newly hired regulators.

In international documents, this strategy may be expressed somewhat differently, but the underlying message is always fundamentally the same:

Learn from your experiences and those of others.

For example, the IAEA expresses it as ". . . actively promote feedback on the lessons learned from past experience ." An NEA document, adopting a prior IAEA position, adds as one aspect of regulatory effectiveness, "Strives for continuous improvements in . . . performance" and emphasizes the use of a "learning organization" model .

This learning should not be confined to lessons only from the nuclear industry. Nuclear regulatory agencies should also learn from experiences in other industries and organizations that have a strong focus on safety, such as the transportation industry and space flight programs. But the question of just how a regulatory agency can optimize the process of gathering, analyzing, and using operational experiences to help ensure nuclear safety is certainly a complex issue worthy of examination at this conference.

Although the use of operating experience has long been a part of the NRC's activities (and those of its predecessor, the Atomic Energy Commission), the agency's programs have been shaped by several past events. In the late 1970s, the NRC was primarily focused on the licensing of new plants and the inspection of plant construction and commissioning. At that time, only one headquarters division and one branch in each of the five regional offices focused on operating reactors. Such limited resources did not enable any systematic method for evaluating the growing volume of licensee-reported event information. In addition, licensees themselves did not have the resources to systematically evaluate operating experience, nor at that time was any industry group available, such as the Institute of Nuclear Power Operations (INPO) or the World Association of Nuclear Operators (WANO), to perform such a function.

Critical reviews of the NRC immediately following the Three Mile Island (TMI) accident in 1979 included NRC task forces to examine our analysis and evaluation activities. In response, NRC created the Office for Analysis & Evaluation of Operational Data, or AEOD, as an internal but independent office to collect operational data, to systematically analyze and evaluate these data, to feed back lessons to improve the safety of licensed operations, to assess the effectiveness of the agency-wide program, and to act as a focal point for interaction with outside organizations for data analysis and evaluation of operational experiences. At about the same time, U.S. industry also took action to create INPO, in part to provide an independent capability to evaluate operating experience and feed back lessons learned to licensees.

During the 1990s, further evaluations were performed, resulting in a set of recommendations aimed at eliminating unnecessary functions and duplication. In 1999, as part of its initiative to streamline NRC's infrastructure, the agency implemented a significant strategic change and dissolved AEOD, transferring its core operating experience functions to two separate offices. The Office of Nuclear Reactor Regulation, or NRR, was assigned short-term operating experience functions, and the Office of Nuclear Regulatory Research, or RES, was assigned long-term efforts. During this period, the agency continued to support evolutionary improvements to the systematic processes for collecting

and evaluating operating experience and communicating the lessons learned to the NRC staff and the regulated industry.

The 2002 Davis-Besse reactor vessel head degradation event was another significant event in the history of the NRC and forced another comprehensive re-evaluation of our key processes. An NRC inter-office task force in 2003 found substantial shortcomings in the agency's operating experience activities. Throughout the NRC, it was acknowledged that our operating experience programs needed reassessment. The shortcomings noted by the Davis-Besse task force were similar to those noted in the evaluations and reviews conducted after the TMI accident.

During 2004, the NRC staff developed a plan for implementing the task force recommendations and completed the framework and infrastructure for our new operating experience program for reactors and launched it on January 1, 2005. The program established a centralized clearinghouse to systematically collect, communicate, and evaluate operating experience information. It also makes significant use of information technology to make related information readily available to internal users and to the public.

A new database was created for managing all reported events, and a new Operating Experience Information Gateway Web site was launched that consolidates a large collection of individual databases and Web sources of information onto a single Web access page. We have also made it easier for the public to search operating experience in generic communications, event reports, and preliminary event notifications.

A new communication tool to promptly notify NRC staff members of new operating experience in their areas of expertise has been developed. This tool may also be used to examine emergent operating experience in selected areas. We have created teams of technical review groups to systematically and periodically assess operating experience in their specialized areas to identify trends and insights and to recommend actions. This program appears to be off to a good start. I'd like to share with you some recent examples where this program has been successful in capturing, evaluating, and disseminating operating experience information.

The Hope Creek BWR plant experienced circumferential cracking of the recirculation pump shaft. The new operating experience program directed an increased vigor in acting on such issues in a thorough and timely manner and as a result the staff promptly issued an Information Notice to inform industry and the public of the issue. The staff continues to interact with vendor groups to identify additional issues and further regulatory actions.

The Hatch Unit 2 BWR plant experienced safety relief valve Tee-Quencher support bolt failures. The Tee-Quenchers are the T-shaped ends of the pressure relief system that discharges reactor steam into the suppression pool when the safety relief valves are lifted. They are designed to minimize the instability associated with the large dynamic forces that occur during discharges. The staff issued a Morning Report, a very timely public information dissemination tool, and contacted General Electric and all other domestic BWR licensees to determine their Tee-Quencher configuration. Facilities with a bolted configuration performed operability determinations and determined that their systems remained operable.

The Millstone 3 PWR plant experienced a reactor trip as a result of "tin whiskers," which are fine threads of soft metal that grow on electronic circuit boards and can cause short circuits. The staff

first performed an internal Operating Experience Briefing to inform NRC management and to facilitate evaluation of the issue. The staff subsequently issued an Information Notice to inform industry of the cause of this event and related operating experience from international and non-nuclear industry sources. The NRC's Office of Nuclear Regulatory Research is currently evaluating whether tin whiskers should be identified as a new Generic Safety Issue.

Although the staff acted quickly and forcefully to this latter event, I should note my personal view that this is an issue that might well have been anticipated much sooner within the nuclear industry, before revealing itself in a plant trip. These phenomena were well known outside of the nuclear industry. We clearly must continue to make progress in our efforts to gather relevant information and must continue to improve our ability to look beyond our own industry for useful lessons.

Other recent focus areas of the NRC's operating experience program for reactors include:

Gas intrusion or voiding in safety systems continues to be a concern at some PWRs, notably the Palo Verde and Indian Point plants. We take every one of these events seriously. Development of a Generic Letter to obtain information from domestic licensees on the subject has been approved and is underway.

Significant design deficiencies in existing plants continue to appear, although they appear to be decreasing in frequency. One recent example was a degraded condition identified at the Kewaunee plant involving the potential loss of safety-related systems as a result of postulated flooding in the turbine building. This issue was preliminarily rated as Level 2 in the International Nuclear Event Scale (INES) and was reported to the IAEA. A similar condition has also been identified at the Surry plant as well, and an Information Notice has been issued.

Today, we also have a heightened sensitivity to passive component degradation. As one example, a through-wall crack and leak were recently identified in FitzPatrick's torus. A Special Inspection was conducted and the event was preliminarily rated as an INES Level 2 and reported to IAEA. As another example, the increasing amount of operating experience involving degradation of underground cables has led to development of a Generic Letter.

One other area of significance to operational safety is grid reliability. Since the August 2003 electrical grid blackout in North America, which resulted in loss of offsite power at a number of reactors, the agency has increased its attention in this area. Additional monitoring has been introduced, especially during high-power demand situations like hot summers, to ensure licensees have prompt communication mechanisms and appropriate procedures with transmission operators to minimize the impact due to any future grid disturbances. The development of a Generic Letter to obtain information from domestic licensees on the subject of grid reliability has been approved.

NRC has also been very active with external events arising from natural phenomena this year due to domestic and international operating experiences involving the Asian tsunami and the recent hurricanes named Katrina, Rita, and Wilma**.** NRC is conducting thorough followup studies to identify and act upon the lessons learned from these experiences.

These are some of the areas where events and degraded conditions of actual or potential risk significance have been recently observed. For these and other areas, the agency is increasing its

attention by applying the operating experience lessons learned, insights, and observations. Such applications include timely and effective internal and external communication of the relevant operating experience through briefings, Web postings, the development of generic communications, and other communication mechanisms depending on significance and generic applicability. Additional inspections are performed as necessary for events and degraded conditions of safety significance.

Even more broadly, an insight we gained from the Davis-Besse head degradation event was that NRC needed a better process to institutionalize significant lessons. To address this, we have started developing an agency-wide corrective action program to better capture, track, and document the significant lessons that must be institutionalized and that must remain understood and be carefully evaluated by future generations of NRC staff.

In addition, NRC's use of, and participation in, international operating experience forums is systematic and extensive. These experiences, such as those received through the Incident Reporting System, or IRS, and the INES, jointly developed by IAEA and NEA, are now a formal element of the NRC's operational experience screening process and are available on our internal Web site. NRC has been participating in the INES since 1993 and has fully participated in the initiative since 2001. All daily events are screened and rated, and those events that are rated Level 2 or higher are reported to IAEA typically within two business days.

NRC has also participated since the early 1980s in the IRS for the efficient exchange of operating experience. In addition to posting generic communications on our public Web site, NRC also submits all generic communications pertaining to reactor operating experience to IAEA on a quarterly basis.

Internally, the INES events and IRS reports from the international community are systematically screened and evaluated for applicability to U.S. plants. In 2005, a number of international events reported from these and other sources have been disseminated to appropriate NRC staff. A few of these events have been identified for detailed evaluation and potential applicability to our domestic reactors. For example, the circumferential break of the Essential Service Water pipe at Vandellos-2 (Spain) while operating at rated power and the shutdown of Kalpakam-2 (India) following the tsunami are currently under staff evaluation. NRC also exchanges operating experience with individual countries and the international community through routine interfaces, meetings, and agreements.

In addition, many operating experience sources are made available to the pubic and accessible by domestic and international stakeholders through the NRC public Web site and the agency's document management system which can be accessed through our Electronic Reading Room (www.nrc.gov/reading-rm.html).

In conclusion, NRC's management and use of operating experience have evolved over many years. We intend to maintain continued strong vigilance in collecting and using operating experience across related industries and across international borders. To further assure success, the Commission has specifically requested periodic updates from the staff on the agency's progress in developing a rigorous corrective action program to institutionalize the lessons we learn from our experience. And, as I noted at the beginning of my talk, this is one of the key strategies of the Commission for success in our mission.

Throughout our three decades of operation, the NRC has continued to learn from operating experience. However, we clearly must continue to improve in this key area. International sharing and use of operating experience continue to play a critical supporting role in the safety of nuclear power plants worldwide.