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Trip Report on IAEA Training Workshop on Implementation of Integrated Management Systems for Research Reactors (T3-TR-45496)

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Abstract

From 17-21 June 2013, Sandia National Laboratories, Technical Area-V (SNL TA-V) represented the United States Department of Energy/National Nuclear Security Administration (DOE/NNSA) at the International Atomic Energy Agency (IAEA) Training Workshop (T3-TR-45486). This report gives a breakdown of the IAEA regulatory structure for those unfamiliar, and the lessons learned and observations that apply to SNL TA-V that were obtained from the workshop. The Safety Report Series, IAEA workshop final report, and SNL TA-V presentation are included as attachments.

Acknowledgments

The author would like to thank the management of SNL and TA-V, the IAEA for creating this workshop, and all of the fellow participants.

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ACRONYMS

DOE	Department of Energy
IAEA	International Atomic Energy Agency
IMS	integrated management system
IT	information technology
NNSA	National Nuclear Security Administration
PPE	personal protective equipment
QA	quality assurance
RR	research reactor
SNL	Sandia National Laboratories
TA-V	Technical Area-V
WG3	working group 3

EXECUTIVE SUMMARY

From 17-21 June 2013, Sandia National Laboratories, Technical Area-V (SNL TA-V) represented the United States Department of Energy/National Nuclear Security Administration (DOE/NNSA) at the International Atomic Energy Agency (IAEA) Training Workshop (T3-TR-45486). The purpose of this workshop was to present the new IAEA Safety Report Series 75, *Implementation of a Management System for Operating Organizations of Research Reactors,* and to provide a forum for research reactor (RR) managers across the world to share lessons learned from implementing individual management systems. This report focuses on the individual lessons learned and observations that apply to SNL TA-V. The Safety Report Series, IAEA workshop final report, and SNL TA-V presentation are included as attachments.

Of the 27 member states represented, six already implement a management system and six others were in the process of implementing a management system. Other than TA-V, all RRs used the IAEA standard for nuclear safety (GS-R-3), and those that had or were developing a management system used ISO 9001. When compared to other RRs, TA-V has a robust and mature integrated management system (IMS), in the top three in terms of maturity, but still benefited from the lessons learned of other reactors, particularly the Belgian and Canadian reactors. Three member states presented new RRs—Jordan, which began installing a 5 MW reactor in 2010; Korea, which commenced a planned 5-year RR project in 2012; and the Russian Federation, which recently completed and began operating a RR in 2011.

Figure 1 - IAEA Headquarters in Vienna

Figure 2 - Workshop Attendees

1.0 WORKSHOP OVERVIEW

The workshop lasted five days, each divided into roughly three parts. Mornings were mainly prepared safety report presentations, suggestions, and lessons learned from implementing management systems, followed by individual country presentations. Working groups met in the afternoon.

Structured presentations addressed the following topics:

- IAEA safety standards on management systems for nuclear facilities and activities
- IAEA SRS N.75 on *Implementation of a Management System for Operating Organizations of Research Reactors*
- Application of a graded approach to RRs
- Comparison of ISO-9000 and GS-R-3 frameworks and requirements
- Practical examples and lessons learned from participating member states on their management systems
- Implementation plan of the management system
- Monitoring, assessing and continuous improvement of the management system

Country presentations were nominally for each country to discuss goals and lessons learned regarding management systems. However, because the majority of the facilities had not yet begun or completed a transition to a management system, most of the presentations provided general background and roles of each facility.

Lastly, three different working groups covered the topics of a management system implementation plan, management system assessment and continuous improvement, and management systems and safety culture challenges. TA-V chaired and presented the results from the third working group, which will be covered in more detail later in this report.

2.0 IAEA STANDARDS FRAMEWORK STRUCTURE

The IAEA staff gave prepared presentations on the structure of the IAEA safety requirements and standards. There are three levels of structure to IAEA standards: fundamentals, requirements, and guides. All of these documents are available for free as downloadable PDFs or, for a nominal fee, in hardcopy.

The Safety Fundamentals document (SF series) is color-coded blue and provides ten fundamental safety requirements. This document provides the basis and rationale for safety standards at a high level to help senior government officials or regulators who might not have a technical background in nuclear operations. This document is similar to high-level U.S. policy statements.

General or specific requirements occupy the next level down and are color-coded red. General requirements provide guiding principles for broad operations such as nuclear safety, quality assurance (QA), radiation protection, etc. Conversely, specific requirements are much more narrowly focused. For example, RRs share specific requirements on *Site Evaluation for Nuclear Installations Safety Requirements*[1] with power reactors, but have their own supplemental safety guide for *Safety of Research Reactors Safety Requirements*[2]. The redundancy in the title appears to be a naming convention that requires level of document in the title. These documents are analogous to Code of Federal Regulations and DOE requirements in the U.S. nuclear complex or the more comprehensive consensus standards (such as NQA-1).

General and specific safety guidance, color-coded green, are the lowest level documents, and contain no requirements, but fill a role as consensus standards and implementation guides. For example, *Software for Computer Based Systems Important to Safety in Nuclear Power Plants Safety Guide* provides guidance on meeting the *Safety of Nuclear Power Plants: Design, Safety Standards Series* No. NS-R-1.

This workshop was to discuss a safety guide, IAEA Safety Report Series No. 75, *Implementation of a Management System for Operating Organizations of Research Reactors*.

[1] http://www-pub.iaea.org/MTCD/publications/PDF/Pub1177_web.pdf
[2] http://www-pub.iaea.org/MTCD/publications/PDF/Pub1220_web.pdf

3.0 OBSERVATIONS FROM WORKING GROUP THREE: MANAGEMENT SYSTEMS AND SAFETY CULTURE CHALLENGES

Working group three (WG3) consisted of seven member states: Vietnam, Belgium, Morocco, Algeria, Bangladesh, United States, and India, although Belgium attended only the first day. The U.S. representative (Sandia) acted as facilitator, chairman, and rapporteur. The dialogue in the group highlighted differences and similarities between organizations.

3.1 Common Challenges

Regardless of current safety culture maturity, all RR managers wanted to strengthen their existing program. This was a good indicator that, at least at the level of attendees, the goal to have a strong safety culture was in place.

The group also came to the conclusion that there was no such thing as a "safety culture," rather only an organizational workplace culture. The working group therefore focused on ensuring that the current workplace culture emphasizes safety, instead of trying to overlay an additional "culture of safety."

Most WG3 members thought the concept of "you'll know it when you see it," while true, was not very helpful. Unfortunately, most of the safety culture comments were exactly that. Much of the working group's time was spent on distilling these anecdotal events into common patterns. An analogy provided was that implementing a strong safety culture is "like climbing a fog-shrouded mountain when you are not sure which path leads up."

The common anecdotal experiences that help strengthen a safety culture are noted in the WG3 recommendations section.

3.2 Notable Differences

Every facility was at a different level of safety awareness. For example, some facilities had difficulty making workers wear proper dosimetry and personal protective equipment (PPE), while another wanted to increase use of pre-job briefs, and a third wanted to discuss the merits of two- or three-part communication.

Missions varied throughout the facilities, ranging from primarily production, to general or specific research, to a proof-of-concept power reactor; ultimately, different attitudes toward facility operations were created. For example, delaying an experiment is often low consequence, but delaying production is rarely low consequence. Not surprisingly, production facilities generally noted they had a weaker safety culture due to the pressure of production.

3.3 Working Group 3 Recommendations

The most important recommendation (and one of the most difficult) is to, at the least, recognize or reward problem reporting as a positive attribute rather than punishing people for reporting problems.

Most WG3 members highlighted positive and negative effects of senior management actions or policies (e.g., senior management being seen wearing PPE vs. senior management implicitly deemphasizing safety by making production the number one priority).

All WG3 members agreed building a strong safety culture does not happen automatically. To improve safety, they recommend designating a responsible person to manage safety issues, and scheduling specific times (it does not need to be a lot) to discuss safety and to remind workers of its importance. Designating a responsible person to manage safety issues both removes the tendency for secondary duties to sometimes slide, as well as providing a single point of contact for action.

4.0 LESSONS LEARNED

Of the three countries demonstrating the most mature management system, the same top two problems were mentioned to exist—an information technology resource bottleneck in implementing a truly integrated management system, and difficulty in convincing regulators to adopt an integrated management paradigm, especially the “further removed” the regulator was from the daily facility operations.

All of the countries that had implemented a management system agreed that it was an improvement over a stand-alone QA program or controls.

Unfortunately, only four (including the U.S.) of the 27 countries had sufficiently mature management systems to provide implementation lessons learned. Rather than informal workshops where each country is allowed a forum to discuss their facility, as was the method used at this workshop, subsequent workshops should arrange for prescreened presentations of tips and lessons learned, with more formally arranged discussion points.

Of the presenters at the workshop, the maturity of TA-V’s IMS was equaled only by two RR facilities, and surpassed only by one. This represents an excellent opportunity for TA-V to become a global example of management systems implementation.

However, outside of the U.S., ISO 9001 and IAEA safety standards are by far the preferred standards for managing RRs. If TA-V wishes to influence or leverage global developments in nuclear implementation, it would benefit from adopting a consistent internationally used standard.

The IAEA did not provide copies of the presentations until several months after the workshop. Thus, having a Sandia-issued or personal flash memory proved necessary to obtain copies of the presentations for immediate review.

5.0 RECOMMENDATIONS AND FUTURE GOALS

TA-V should continue its efforts to mature its management system. While its primary goal of transformation to provide consolidated management of diverse requirements can be considered

accomplished, discussions with other RR facilities indicate that TA-V investments in the management system will pay dividends in the form of reduced workload and more consistent and reliable results throughout the organization. In particular, refining document and condition management procedures and creating consistent record storage and procurement processes should be high on the list.

Based on the lessons learned from other facilities, TA-V should devote a larger percentage of resources to improve its information technology (IT) infrastructure, which is a critical part of a successful IMS. For example, one facility had success when it hired two additional full time IT personnel solely for QA improvements. This was beyond the staff necessary for maintenance and normal operations.

TA-V should transition from the ANSI/ANS 15.8 and ANSI/NQA-1 Subpart 2.7 standard to ISO 9001 and IAEA safety standards. This would give TA-V the foundation necessary to bid or interact with the international community, and allow TA-V to take advantage of the work the international community does in order to develop and actively maintain standards specifically designed for RRs.

Because the DOE complex primarily implements compliance- versus process-based QA, TA-V should prepare for increased regulatory scrutiny. Specifically TA-V should begin working on expectation management with regulators and prepare additional crosswalk and document flow-down of requirements to have necessary evidence of compliance.

ATTACHMENTS

All attachments are linked to provide the full document. Click the document cover to download the original file.

IAEA Workshop Official Final Report

Report of the IAEA
Training Workshop on

"Implementation of Integrated Management Systems for Research Reactors"
(T3-TR-45496)

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Rapporteurs:	Ms. Martina DEVINA STEYN Mr. Richard PRATT

TA-V Presentation

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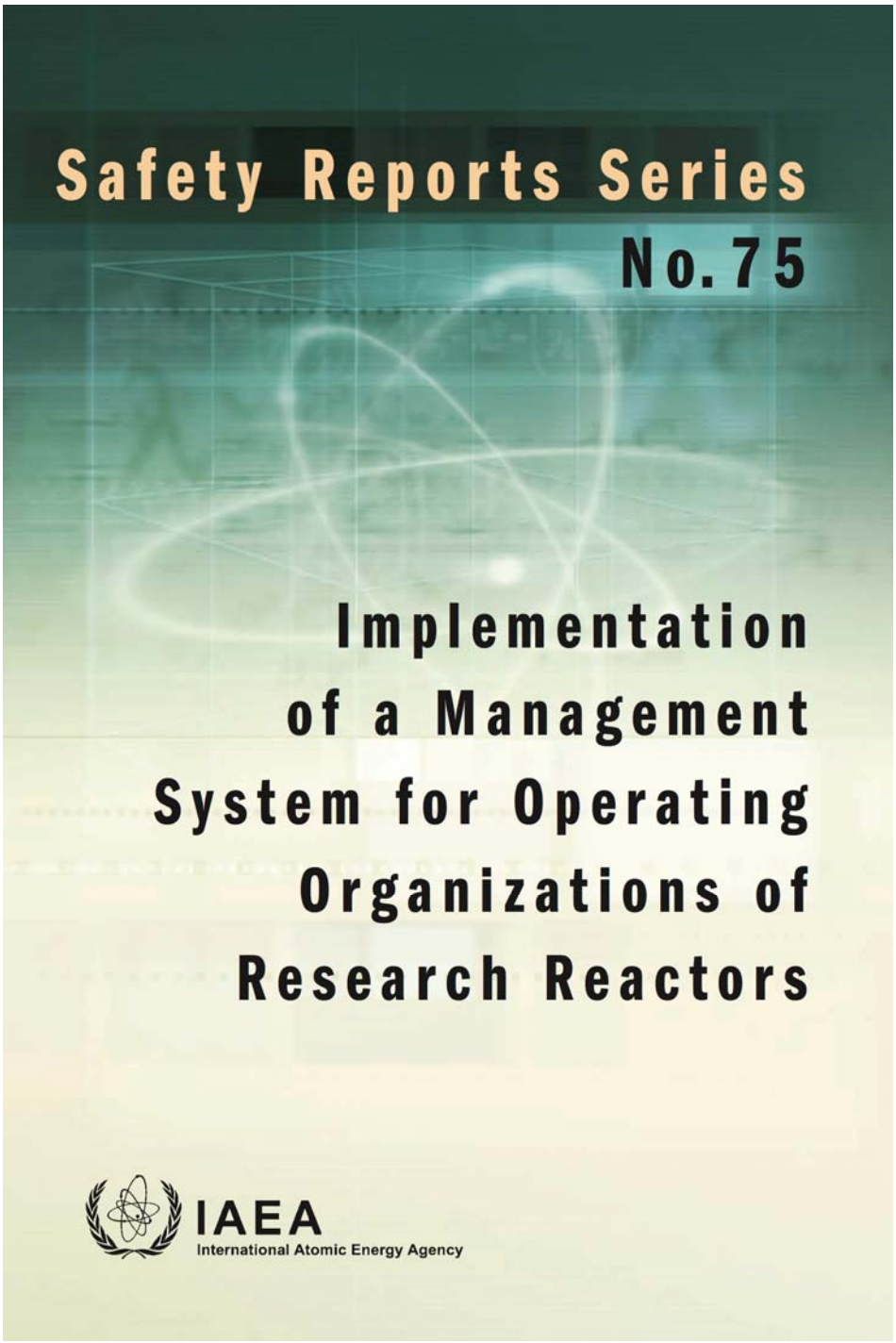
IAEA Safety Report Series No. 75, Implementation of a Management System for Operating Organizations of Research Reactors



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