CONDUCT OF OPERATIONS:

ESTABLISHING OPERATIONAL FOCUS AND SETTING OPERATIONAL STANDARDS

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Introduction –

My name is Lee Lane. I am employed by Ontario Hydro as an Authorized Nuclear Operator at the Darlington Nuclear Generating Station. Today I would like to talk to you about developing Operational Standards, and Operational Focus in the Nuclear industry.

Due to the nature of our business, we have often tended to focus on the technological aspects of the nuclear industry. The focus of this paper is directed towards the importance of addressing the people skills, attitudes, and "culture" within, and surrounding, our facilities as key areas of improvement.

Within Ontario Hydro Nuclear (OHN) we have developed the terminology 'event free' operation and 'event free' culture. 'Event Free' recognizes errors as a part of human performance. 'Event Free' takes into account human weaknesses, and provides tools (such as standards) to manage, control, and mitigate errors. In essence, 'Event Free' encompasses two concepts:

1. Prevent errors from occurring
2. If an error is made, catch it ***before*** it can affect safe operation of the facility, learn from the error, and ensure that it does not happen again.

In addressing these business realities, Ontario Hydro has identified a number of key support mechanisms and corresponding performance standards that are essential for achieving operating excellence and an 'event free' business culture.

This paper will discuss two operational aspects of an 'event free' culture, the first being a set of expectations to enhance the culture, and the second an example of cultural change:

1. Operating Standards - establishing clear expectations for human performance in operating staff,

2. Operational Focus - the understanding that, as a nuclear worker, you should consider every task, activity, in fact everything you do in this business, for the potential to affect safe and reliable operation of a nuclear facility. Note that although the term 'Operational' appears in the title, this concept applies to **every individual** in the nuclear business, from the cleaner, to the Board of Directors, to the external supplier.

Background

In the business of nuclear plant operations, the industry is evolving to an 'Event Free' culture. This evolution has come about due to:

- the safety performance expectations placed on the nuclear business,
- an improved industry understanding of the potential for safety challenges and their unpredictable and diverse mechanisms of occurrence, and
- a recognition of the importance to station production economics with respect to avoidance of errors and safety challenges.

Today, analysis of past operating experience and a developing understanding of error mechanisms has allowed us to recognize potential hazards, and identify new opportunities for risk reduction and improvement. At the same time, production economics has challenged us to identify new ways of minimizing production disruptions and ongoing costs. For all of these reasons there is now an increased emphasis on achieving excellence in operations and further reducing challenges to safe operation.

Support Mechanisms for Operating Excellence – Why Standards?

Within the Operations group at Ontario Hydro, this need to achieve operating excellence and an 'event free' culture led us to re-examine the factors that are important for achieving effective and safe plant operation. From this re-examination, key support mechanisms were identified, that are required to support operations staff in operating a plant safely, and free from operational events.
These key support mechanisms include:

- *Design* - A robust, user friendly operations and maintenance design,
- *Construction* - Quality, equipment and construction techniques,
- *Design Documentation* - Quality, design documentation,
- *Operating Documentation* - Quality, operating and training documentation,
- *Staff Expectations and adherence* - Clear expectations of operating and all other station staff, and staff meeting expectations
- *Training* - Efficient and effective training, maintaining staff at a high level on the learning curve, based on highest industry standards
- *Maintenance* - Quality, effective and efficient maintenance programs,
- *Planning* - Quality job planning processes,
- *Operations Support* - A focused support organization to supply the required resources in support of plant operation,
- *Safety Culture* - A culture that naturally supports people in performing their work safely, not just for themselves, but for their fellow workers, and for the public, such that the public will allow nuclear power to co-exist in harmony with their environment.
- *Operational Focus* – which we will come back to later.

Any deviation in achieving the performance standards for these support mechanisms may present a challenge to operating excellence and safe operation of a nuclear facility.

Establishing and achieving ***performance standards*** in a number of these areas is leading us toward operating excellence and an 'Event Free' business.

Establishing Operating Standards - History and Development within OHN

In the early nineties, OHN started to take a long look at itself, and to invite others to come and look as well (e.g., INPO, WANO audits). During this time of introspection, there was also a lot of organizational change. While the need for improvement in operations became more apparent to OHN management, the organizational changes precluded coordinated operating improvement initiatives. At the same time, the authorized control room staff at OHN facilities were trying to improve support for operational problems, with limited success.

Early in 1995, Mr. Ron Lewis, the Head of the Nuclear Safety Directorate, organized a workshop that brought control room staff from all OHN facilities, as well as INPO and other Canadian facilities together for two days of discussion [1]. Out of this workshop came the understanding that:

- some of the key operating problems in OHN control rooms were common to all sites,
- many of these problems existed because expectations were inconsistent, unclear, or non-existent,
- there was a collective will to work together to solve these problems in a common way.

From this workshop, the Main Control Room Advisory Team was formed to develop and coordinate solutions for key operations improvement issues. This team comprised control room staff, management and union representatives from all OHN sites.
The team identified the development of operational standards as the area of highest priority and set about to develop standards of operating practice for:

- Communications,
- Self Checking,
- Turnovers,
- Logging,
- Panel monitoring and alarm response,
- Use of Supervised Control Panel Operators (SCPO's - non licensed panel monitors),
- Conservative decision-making.

To date the first six of these standards have been prepared, are in routine use and have been firmly supported by OHN's new management team. The process of standards development was based on determining the Best Industry Practices in the area, including our own operating experience, and is bounded by our plant designs.

OHN management have since formalized, and incorporated these Standards into a complete OHN document hierarchy [2], that goes something like this:

- *Charter* – Highest level document - Includes mission and values statements
- *Policy* – Expands Business objectives and philosophy in a single area, based on the Charter
- *Program* – Details scope, requirements, and relationships of Standards, and Procedures to support a Corporate Policy
- *Standard* – Reference level document that facilitates the control of business activities by stating behavioural expectations of individuals.
- *Procedure* – Active user level document defining Who, what, when, where, how

OHN is currently developing a full 'Conduct of Operations' Program. This program incorporates the previously mentioned standards, and develops formal standards and procedures in the following areas:

- Infrequently Performed Evolutions
- Control Room Access
- Reactivity Management
- Control of Fuelling Operations
- Pre-job and Post-job Briefings
- Required Reading
- Conservative Decision Making
- Verification Activities
- Duty Managers
- Professionalism
- Response to Upsets
- Workarounds
- Operability Testing
- Housekeeping
- Conduct of Rounds and Routines
- Nuisance Alarms
- Performance Measures
- Control Room Dress Code

In many of the areas listed, OHN facilities have had procedures and expectations in place previously. One of the goals of this program is to ensure that these expectations are consistent across all OHN facilities. Further, Programs are in place and being developed in many other areas of the OHN, such as Maintenance, Engineering, and Business.

Establishing Operating Standards – Implementation

The challenge of this ambitious program is the implementation and acceptance of these new standards. How do we implement, and reinforce these expectations on an ongoing basis?

- Involvement – User involvement in development and revision of Standards – this also naturally provides an 'Operational Focus' for Operating standards
- Training – focusing on individual standards, and incorporating Standards into existing training activities – such as simulator training and testing
- Communication – from Line management, from Peers, from communication tools such as the Conduct of Operations Pocket Handbook, and Event Free tools pocket card (see props)
- Leading by Example – Line management must demonstrate adherence to Standards, also trainers, peers, and especially authorized staff.
- Self-Assessment – OHN has developed a formal self-assessment program, currently in implementation phase at Darlington. Key to this process is the positive reinforcement, and coaching process, and ongoing assessment of activities. Self-assessment will provide trends and communication of areas for improvement, and areas we are doing well. Most importantly, it can tell us whether the Standards tools, are being utilized effectively. It is hoped that the process of self-assessment will provide a 'Constant, gentle pressure' towards the cultural changes we require.

Are we Improving?

Based on the implementation of the original six standards, I personally have seen significant improvements in the consistency and content of operating turnovers, and operating logs. Use of the phonetic alphabet and 3-way communication are a routine occurrence. In fact in the early stages of the implementation, often the field staff took the lead in 3-way communications, and the phonetic alphabet. We use the phonetic alphabet for all channelized systems activities, for refuelling operations, and wherever appropriate. The use of the Phonetic alphabet, and repeat back of information has become part of our operating culture, and has been documented to have prevented errors with safety system maintenance. The AECB expects, and audits our authorization candidates in all of these areas, and Darlington has been extremely successful in Licensing staff over the past few years. The shift supervisors have adapted to increased expectations, and perform an independent, detailed panel walk down on each unit early in the shift.

To further verify implementation and acceptance, Darlington has completed more than 950 self-assessments in operations and maintenance since the spring of 1998. This is helping with human performance improvements, as well as other areas, and has resulted in more than 100 changes in processes and procedures, etc.

Establishing Improved Operational Focus

The concept of 'Operational Focus' can be difficult for those outside direct plant operations responsibility to grasp and accept. It is, however, a naturally occurring process for the Licensed operating staff. Our job, our training, every day we live 'Operational Focus', as we are acutely aware that every task, activity, everything we do in this business has the potential to affect safe and reliable operation of a nuclear facility, thus affecting risk to the public and environment.

Many OHN staff outside of the Operations group do not always appreciate the importance that the performance of their job function can have on event-free station operations. As previously stated, this concept applies to each and every individual in the nuclear industry. If you are currently in the nuclear business, think about a path through which, either directly, or by the domino effect, you could challenge safe operation of a nuclear facility. I'm sure everyone can come up with one. If you can't, let me know, and I could probably come up with one from another perspective.

What 'Operational Focus' is really all about, is as you go about your business, you actively, and as the culture changes, naturally consider those potential paths to operational challenges, and attempt to minimize or remove them. In other words, take a step back, and apply an 'Event free' perspective to your work.

OHN management has actively started to champion this cause in the past year although success will be dependent on individual employee recognition.

How can one measure the success for the 'Operational Focus' dimension? From a control room operator's perspective, the operational focus in a nuclear facility is inversely proportional to the number of safety challenges and work process inefficiencies that the control room staff experience.

Some possible indications of a lack of Operational Focus are:

- Design Anomalies – variations in the implementation of common control logic functions across systems can impose an additional operating knowledge and training burden for control room staff, and difficulties in identifying and performing maintenance activities,
- Inadequate alarm systems – meet design intent only for full power steady state and provide minimal operational support when most needed during outages and transients,
- Over-scheduling of Activities – too ambitious operating and maintenance schedules leads to overloading of Operations and Maintenance staff, work backlogs and the need for the control room operator to schedule and re-prioritize work tasks while at the same time vigilantly monitoring the processes.
- Inadequate Maintenance Planning – lack of proper pre-planning, material availability or assessment of maintenance activities so that maintenance work can not be carried out effectively as intended.

- Procedural errors or conflicts – often demonstrate a lack of consideration of overview, or interfaces

At the same time, several improvement initiatives are indicative of a renewed Operational Focus within station staff. For example:

- Use of Authorized control room staff to support operator training and assess design changes, (example Darlington Authorization training Program, Darlington Design changes to resolve trip coverage issues –Summer 1997)
- Improved work planning and assessment - 13 week rolling cycle,
- Development of computerized logging facilities, and other plant operation-oriented and user friendly software,
- Operator interface improvements, such as displays for Critical Safety Parameters
- Emphasis by engineering staff in forming Operational Experience Groups,
- Improvements in structure of support organizations to a more operationally focussed orientation.

I will continue to do my very best to remain focussed on safe operation of my nuclear facility. I hope that next time you are performing an activity, that you consider the impact of your work on the ability of myself, my peers, and the operations staff at our facilities to ensure safe operation and maintain an 'Event Free' culture.

Conclusions

A new emphasis on operational excellence and achieving an 'Event Free' culture is being pursued within OHN. The focus of change is directed primarily towards people skills, attitudes, and the culture we work in. The initiatives we have discussed today have already led to significant changes in the way Ontario Hydro Nuclear facilities conduct their business. Self-assessment has been successful in keeping the ball rolling. OHN has been very good at developing concepts, and putting things on paper in the past. We have not, however been very good at implementation. We now have a valid implement to enhance growth in the tool called self-assessment.

Realize once again that Operating Standards are merely tools to be utilized by staff to develop an 'event free' business, whereas Operational Focus is part of the larger cultural change required to support the 'event free' business.

It is a critical time for these initiatives as we continue through the improvement phase within OHN. It is key to encourage involvement of all staff, and an overall appreciation and acceptance of these initiatives. Further, we must continuously monitor, assess, and communicate how we are doing. Only then can we ensure continued success of the CANDU program in Ontario, and around the world, as a safe and viable energy source.

References

1. Summary Report of the Control Room Operations Workshop, April 23/24, 1996. Ontario Hydro Nuclear report N-REP-22603-0136-R00, Ontario Hydro, Toronto, Ontario.
2. Requirements for Governing Documents, Ontario Hydro Nuclear standard N-STD-AS-0001-R00, Ontario Hydro, Toronto Ontario