Thoughts on Safety Culture

Comments / Feedback on CNSC Discussion Paper

DIS-12-07

(and comments provided during public review)

1.0 Comments on feedback from the first round of public feedback

In general, in Canada, we enjoy a strong safety performance and underlying culture in the Nuclear Power Industry. All Canadian nuclear power plants submit to independent peer reviews typically once every two years. These reviews are purposely very tough and critical and probe safety performance and culture. We also have a strong federal Regulatory Body which is respected worldwide and provides strong oversight of the industry. So many things necessary to sustain a strong safety performance are in place. Perhaps the question that is at the root of much of the feedback on DIS-12-07 is `Is there a need for additional requirements, or is it of more safety benefit to apply resources to continuing strong oversight of the things that are already in place?'

After review of the DIS-12-07 discussion paper and the comments provided in the first round of public review, it seems to me the main points of feedback to the CNSC were as follows:

1. Several respondents expressed desire to have a definition that was harmonized with IAEA and WANO / INPO definitions.

I would simply like to add my support to the view expressed by those who commented that definitions should be common with INPO/WANO definition in particular. The Nuclear Power Plant industry is aligned strongly with INPO documents such as "Traits of a Strong Nuclear Safety Culture" and the series of documents titled "Principles for a Strong Nuclear safety Culture". The definitions and approach outlined in these documents have been in practice since 2004 or earlier and considerable experiential learning has been imbedded in the current definitions and approaches. Differing definitions and approaches would simply add to duplication and confusion. I believe the INPO/WANO definitions are aligned with IAEA thinking.

2. Frequency of Assessment/ Review

A number of comments were directed at the suggestion in the DIS-12-07 document that assessments should be done at a predetermined frequency. Comments seemed to indicate that there was a general desire to shape any assessment vehicle to a risk informed approach. There

seemed to be thoughts that risk profiles are different at different classes of licensees and perhaps between licensees in a given licensee class and this is certainly true. Comments by the Society, put forward the idea that perhaps the elevation of risk could be identified by some precursor conditions. Major events like Fukushima, NASA space shuttle events, Titanic and so on have been shown to have identifiable precursors that were significant contributors to major events (such as economic pressures at corporate levels, leadership changes, government intervention in corporate direction, etc.)

The concept of risk informed application of the limited resources available for Regulatory oversight has been one that the CNSC has endorsed already in many applications of its framework. It would seem that the area of safety culture would be one where the risk informed approach would be ideal. Existing CNSC inspection, audit and oversight activity could form the basis for intelligence to trigger some form of safety culture assessment based on the identification of precursor triggers rather than on a fixed periodic frequency. In doing so, Regulatory resources are deployed in a more optimum fashion and Licensees who are proactively investing in safety cultural initiatives that help contribute to superior safety performance are also able to optimize their resources to sustain their good performance. Triggers could include observable and measurable triggers such as:

- Poor conventional safety performance
- Repetitive regulatory violations
- Pattern of similar (repeat or common) events of significance
- Major corporate financial problems
- High personnel turnover
- Change of key leadership positions
- Patterns of sub-standard regulatory submissions
- Unwillingness to share and learn from others (pride)
- Lack of external review

The above are offered for illustration purposes – a list of triggers would need to be carefully developed in dialogue with stakeholders.

If we look at the work of James Reason (reference 1), and assessment of major accidents and events (such as work by H. Howlett, reference 2), we could look at prevention of significant events in the Nuclear Safety function as a set of barriers all designed to have the goal of reducing the likelihood of major events, including institutional failures that have occasionally surprised risk significant enterprises. If regulatory inspection and oversight of the barriers is robust and sufficient, then erosion in effectiveness of the barriers should be detected and corrected well in advance of serious events. Effectiveness of these barriers (strengthening of or

erosion of) is related to the culture established in an organization. Some of the barriers that seem to be significant include:

- Executive and leadership qualification and development
- Internal control and assessment (Internal Assessment, Internal `regulation')
- External independent review
- Effective Corrective Action Programming (including root cause assessment and common cause assessment)
- Effective mechanisms for dealing with differing professional opinions
- Effective competency management
- Rigor in reporting low level events

Again, the above is offered for discussion and specifics would need to be established in discussion with stakeholders. If these barriers are independently assessed as strong, then the influences (culture) at play in the organization are good and if the effectiveness is seen to be poor, equally cultural influences are likely in need of improvement. This would suggest that perhaps regulatory effort should be directed primarily at independent assurance of the presence and robustness of the barriers. Independent safety cultural review by the Regulatory Body would only be necessary on specific triggers or on observation of unacceptable weaknesses in observable barriers.

History of major events seems to indicate that major events and/or institutional failures are preceded by patterns of lesser significant events, which are preceded by observable weaknesses in barriers, which are preceded by undesirable observable behaviours, and that major events often have a stimulus from executive levels in companies or from governments. Perhaps the role of regulation is to focus on countermeasures for barrier erosion and inappropriate pressures and organizational culture should be left to businesses to manage UNLESS triggers suggest a need to adjust based on observable behaviour and/or barrier degradation not promptly corrected.

3. Assessment Method / Flexibility/Regulatory Role

A number of comments focused on a desire to enable Licensees to adopt a Safety Culture strategy and assessment method that was suitable for their specific situation. The general feel expressed indicated that the approach proposed in DIS-12-07 is too prescriptive to be suitable for all licensees.

The INPO methods that focus on observable behaviour and performance is based on an objective base that makes a lot of sense and is broadly accepted. It was developed for the nuclear power plant environment. While most elements can be directly applicable to other nuclear sectors, application would need to be `graded' in approach.

For example, survey methodology is expensive and results can be variable and hard to interpret. It may be a valuable tool for some. It may be a distraction of resources and focus for others. If we are attempting to prevent institutional failures, we should reflect on whether or not survey techniques within the Japanese Licensee or regulatory organizations would have been effective in identifying cultural precursors to the Fukushima event OR if other approaches would have been more effective. If organizations are strongly aligned on inappropriate attitudes or beliefs OR if an organization has a significant component of fear of reprisal within it, it is not likely, in my view, that survey techniques would be effective in identifying the problems.

In line with comments made earlier, perhaps licensees should be empowered to use approaches of their choice as long as results are acceptable. If results are not acceptable, CNSC methods could focus on incremental inspection of adequacy of barriers and observable behaviours.

4. Cultural Change takes a long time

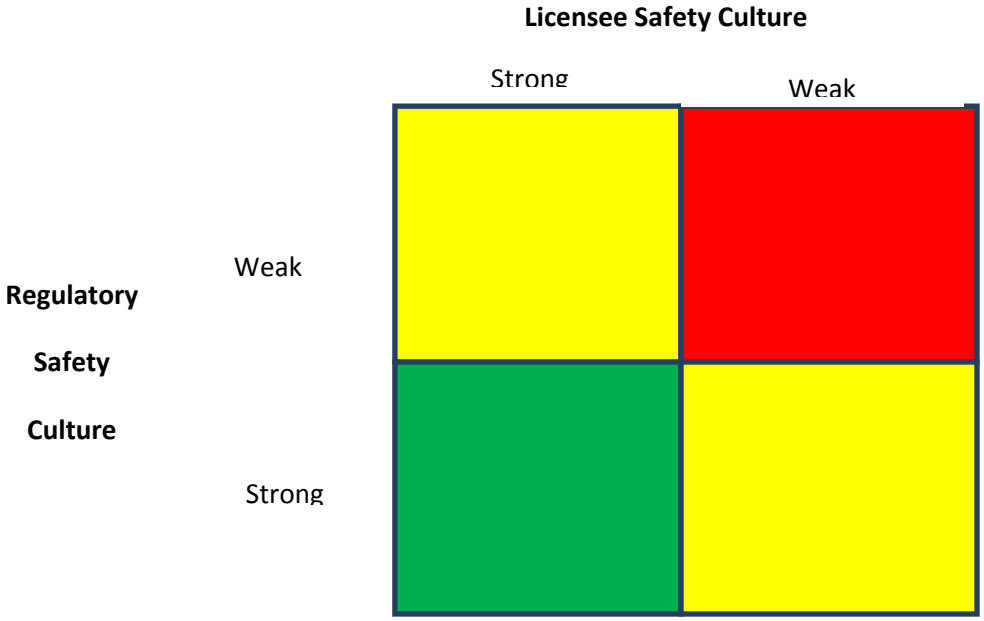
Several comments were made that frequency of assessment could be longer than the interval proposed in the discussion paper, since cultural change takes a long time. I agree that cultural change does take a long time, but also wish to point out that changes in risk profile and behaviour can change very quickly AND precede broad cultural change by a large time. This can be seen when strong stimulus to change corporate direction is at play. Underlying culture may be unchanged, but dictatorial leaders or financial crises, or change of government policy and direction can generate change in results that precede cultural change. For example, executive direction under a `good is good enough' umbrella set in motion a chain of events that resulted in deteriorating performance in nuclear in the 80's and 90's in Ontario, although strong safety culture attributes were still present in the company at that time.

Given risk profile can change in a relatively short time frame, it is my view that cultural interventions should not be cyclically based but should rather be triggered by performance or occurrence of traditional precursor conditions and events.

5. Some other thoughts – prevention of institutional failures

In James Reason's model, barriers to serious events are continually in a state of change – the holes in barriers either getting larger or smaller depending on a number of factors. We want to keep the holes small and we want to prevent alignment of holes. In our industry multiple barriers exist in both Licensees and in the Regulatory Body. A holistic look at the prevention of large accidents would look at the two in conjunction. Again in Canada, our CNSC is subjected to independent review just as industry. In concept we want to have both an industry with the right behaviour and culture and a Regulatory Body with the right behaviour and culture so that the

likelihood of precursors going unaddressed by Licensee AND by Regulatory Oversight becomes very small.



The figure shows conceptually that robustness to prevent a major event is best served by the quadrant where both elements are strong. It also illustrates that weaknesses in one are lessened by strengths in the other.

Observable desirable and undesirable behaviours can be defined in both environments. The INPO documents have gone a long way to identify these in the licensee domaine. By targeting observation and assessment work at the area of results and behaviours, precursors can be identified and corrected regardless of the contributing causes – thereby providing barrier robustness and margin to serious events.

New tools or a combination of existing?

Perhaps strengthening observational assessment processes already available and the resulting framework could in fact have a more significant role to play in event prevention, than equivalent resource investment in cultural assessment methods. Particularly where Licensees already engage in WANO activity in this area, and demonstrate sound behaviours and results, the separation of regulatory oversight to focus on observable behaviours and outcomes, avoids duplication of effort and leaves the Licensee the flexibility of actions and activities to shape the attitudes and culture in their company to sustain the trend of positive result.

Benefit of new requirements?

Generally when we establish new incremental requirements, we look to see what additional effort is required and what benefit we will gain from the new requirements. If we are primarily focused on the prevention of consequential events, we can test the proposed requirements against a criterion of whether or not the activities would have been effective in prevention of the events we have seen in the past. By applying this kind of check of effectiveness of any new requirements, we can continue to apply available resources in a manner that provides best assurance against events with significant consequences.

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References:

1.. Managing the Risks of Organizational Accidents, James Reason,1997

2.. The Industrial Operators Handbook, H. Howlett