INTEGRATED MANAGEMENT SYSTEM LAYING A FOUNDATION FOR EXCELLENCE

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Abstract

Integration in its simplest form involves seamless coordination between organizational elements such as organization structure, processes, systems and documents. This paper discusses the concept of integration in regards to managed systems and examines practical issues of marrying evolving standards to organizational design and overall governance. Bruce Power's experience in developing its Management System into a more integrated approach is described. Leadership sponsorship of an integrated programmatic approach using a Governance, Oversight, Support and Perform (GOSP) model of accountability framework within the Management System has been a critical success factor in Bruce Power's journey towards achieving operational excellence.

1. Introduction

The managed system concept is both simple in its totality and complex in being readily grasped. A standard definition of "integration" in the context of managed systems is the "*Process of attaining close and seamless coordination between several departments, groups, organizations, systems, etc*.". [1]

The term "management arrangements" approximates the concept and is used to capture the idea that the management system comprises of physical/tangible elements and intangible elements, plus the necessary documentation for the functions of the management system. In addition, the design of an organization is an essential element of the overall managed system and forms the foundation which enables the business to act with agility and provides adaptive support for ensuring robust and informed risk-based decision making across the organization for the whole enterprise and its strategic business direction. The better an organization's diverse elements are consciously integrated within its managed system model, the more effective it can be in adapting to changes in environment, business need or regulation.

This paper discusses the concept of integration in regards to managed systems and examines practical issues of marrying evolving standards to organizational design and overall governance with particular focus on the requirements, regulation, and business framework of Canada's nuclear industry and the specific experience of Bruce Power.

2. Theory of integration

With the publication of ISO 14001 in 1996, a number of papers were presented to ISO concerning "Integrated" management system standards; the flux of technical papers led to the establishment of ISO Technical Advisory Group (TAG12). The work of that group led to the key recommendation that ISO 90001 and ISO 14001 would be developed to be compatible.

Additionally, the work further produced ISO Guide 72-Guidelines for the justification and development of management system standards.

Across industries, "household name" standards such as ISO 9000 – Quality and ISO 14000-Environment, now include management standards for information security, dependability, food safety, project management and risk management terminology. Other sector-specific management documents cover automotive, software, EMS for forestry, healthcare and education. Important standards outside of the ISO family include Social Accountability (SA 8000) and Aerospace (AS 9000) standards, standardization at the national level includes PD 6668-Risk Management, PD 7500-Knowledge Management and PAS 55-Asset Management. Fields under consideration for the development of standards include examples such as Business Ethics, Sustainable Development and Organizational Responsibility. These other sources of management standards and the topics they address represent vital areas not only for their technical content but provide business insights that merit consideration by our industry.

According to the Chartered Quality Institute, *"An integrated management system (IMS) is a management system which integrates all components of a business into one coherent system so as to enable the achievement of its purpose and mission"*. [2]

The above definitions of what constitutes an IMS or simply "management system" (MS) began to be discussed and described in the Nuclear Industry with the introduction of ISO 9000 that was developed for the manufacturing sector. Within many industries, our present views on management systems integration emerged from the ongoing considerations in the period 1970 through the 1980s as quality control and quality assurance document-driven approaches embraced change and evolved into what we now refer to as Total Quality Management (TQM). In today's language these are referred to as integrated management systems, management systems and for others as integrated safety management systems. Within the nuclear sector the first safety standard issued on the subject of integration was GS-R-3: *The Management System for Facilities and Activities.* Licensed nuclear facilities in Canada are evolving from the Canadian Standards Association CSA N286.0-92 standards for the Management of Nuclear Power Plants to CSA N286-05, which represents some degree of additional integration and sets an expectation around enhanced alignment of the various aspects that make up any business. A common understanding of what is truly implied by an "integrated approach" amongst regulators and licensees alike has been slow to evolve, partly due to the requirement to change the paradigm of quality control essentially being a compliance-based activity towards true integration being a more strategic business based approach.

It is the development of N286-09 and the intended scope and timing around the implementation and adoption of that standard that provides the most insight into our industry's understanding and level of comfort with the potentially radical concept of true integration. Whilst much broader in scope, defining the requirement for a standard around an integrated management system is potentially significantly less prescriptive in approach than current standards and demands a different level of understanding of how a business works rather than relying on verifying strict compliance to prescriptive standards within a narrower business context. This change in scope, prescriptiveness, and opportunity for divergence amongst industry participants may be viewed with suspicion by nuclear operators and regulators.

3. Benefits of Integration

The drive towards integration of managed systems in the nuclear industry brings the potential for competitive advantage and is one of the enablers of operational excellence, ultimately contributing to a better positioned industry able to consistently deliver high standards of operational excellence within a healthy safety culture environment – a benefit to Canada's industry as a whole.

According to the Chartered Quality Institute, there are several good reasons for integration, including:

- reducing duplication and its associated costs – financial, resource, time to market, etc.
- reducing risks with its associated impact on increased profitability
- balancing the sometimes conflicting priorities and objectives of the organization by clarifying relationships between the parts and the whole and eliminating conflicting responsibilities and relationships
- diffusing the power system
- emphasizing achievement of desired outcomes by focusing on business goals
- formalising informal systems
- harmonising and optimising practices to gain the scale benefits of standardization
- creating consistency
- improving communication
- facilitating training and development

4. Elements of Integration

Elements that demonstrate integration reveal themselves in the form, content and structure of the management system for the organization that it is describing. Integration is demonstrated through the scope of the management system if that scope addresses the totality of the organization's processes and systems and embraces elements such as health, safety, environment, security, human resources, finance, public relations, corporate culture, and these are described as relevant to the organization's values, operations and objectives. Other elements may show that the management system has been formally defined in a uniform style and only varies where necessary to meet its purpose and broad principles, as opposed to a defined sequence of steps to be followed in a process. The management controls (standing committees, meetings, oversight of processes, etc.) used by leadership to oversee the business should also be defined and consistent within an integrated management system

Integration is not just the adoption N286.09, or IAEA GS-R-3 documents; it is combining and aligning the others standards and the demonstration of how they support each other, align, or fit together in mutual support of the business. These safety standards do provide relevant information and requirements on resource, continuous improvement, and management oversight & knowledge management aspects, etc., but for business effectiveness, organizations should never slavishly follow that of a specific management standard or item of legislation.

Additional elements or characteristics demonstrating integration would show up in a minimalist approach towards documentation and process structure – many of the concepts used in the automotive sector and developed in Japan around "lean" processes apply. In practice this means understanding and applying the principles of process mapping strategically, cross-functionally and for the key sub- processes. Mapping at the strategic level may be referred to as "relationship maps"; these show the relationship of processes in the organization to one another and whether they are primary, support or management processes. These relationship maps provide the basis for identifying what cross-functional and key sub-processes will be required to be developed for the organization. Another way for viewing these relationship maps is to see them strategically, as providing an important bridge between the management system and the organizational structure, enabled through change management principles.

5. Managing change in an integrated environment

Change management is essential when transforming performance within an organization. Effective change management has the ability to help an organization view change as an opportunity to strengthen performance, while creating and providing guidance in creating and maintaining the desirable cultural and operational adaptability and agility.

Traditional perspectives of quality assurance within our industry are based on relatively static requirements and documented structures; there is an implicit expectation that the documents establish the standards and the organization adapts within the constraints of the documented requirements.

The more forward-thinking approach to integrated management systems is that the organizing is a living organism which continuously evolves as it pursues operational excellence or associated business goals. The quality requirements should not constrain an organization from being flexible, adaptable and innovative, rather in an integrated management system approach, the imperative to evolve places a significant challenge on effective change management. Configuration management aspects of maintaining a living integrated management system must be not only established but embraced.

Change management is essential when transforming performance within an organization. Effective change management has the ability to help an organization view change as an opportunity to strengthen performance, while creating and providing guidance in creating and maintaining the desirable cultural and operational adaptability and agility. An integrated management system which includes effective change management processes supports organizational agility and enables effective implementation of continuous business improvement or more accelerated business transformation.

Change management principles typically cover sponsorship, planning, measurement, engagement and the support structure. Each of these is addressed below:

Sponsorship means that the change program has the visible support of key decision makers throughout the organization and resources are committed to the program.
Planning implies that preparation for change is conducted methodically before program

implementation and committed to writing. Plans are agreed with major stakeholders and objectives, resources, roles and risks are clarified.

Measurement requires that program objectives be stated in measurable terms and program progress is monitored and communicated to major stakeholders.

Engagement implies that stakeholders are engaged in genuine two-way dialogue in an atmosphere of openness, mutual respect and trust.

Support structures ensure that program implementation and change recipients are given the resources and supporting systems they require during and after change implementation.

The change management process plays a crucial role in the integration of the management system. The principles above are challenging to consistently put into practice but are an essential prerequisite to maintain configuration control of the integrated management system. Overall, understanding change management, its principles and the approach to accomplish changes and maintain the management system as a living system is crucial for successful integration.

6. Bruce Power's journey towards an integrated management system

Bruce Power's Management System (BPMS) has undergone significant enhancement and evolution since late 2006 when the Executive Team commissioned a high level external assessment of our management system approach. The independent review had the objective of assessing the company's management system manual and evaluating how well it would support a "Governance Oversight Support and Perform" (GOSP) model of accountability, and advising on recommended changes.

To support operational excellence, Bruce Power chose to adopt an accountability model which provided clear roles and responsibilities. The GOSP Model ensures each member of the organization clearly understand their role with Bruce Power and are accountable for their role. The GOSP principles ensure consistency through the implementation of the standardized policies, programs, processes, and industry best practices. All major program responsibilities are distinguished between ownership of programmatic standards (governance and oversight) and execution (support and perform).

6.1 Governance

The Governance function relates to the accountability to establish the programmatic guidelines and performance expectations for a given function. Governance accountabilities include the ongoing assurance that the programs and processes are "best practices" and that they are implemented consistently throughout Bruce Power by all performing organizations.

6.2 Oversight

The Oversight function relates to the accountability to critically monitor, assess and evaluate the conduct of nuclear stations to ensure that programmatic standards and expectations are met. This includes the independent (of perform organization) analysis of trends, data or performance information that provides assurance that functional outcomes are achieved and policy boundaries are being respected.

6.3 Support

The Support function relates to the accountability to provide supplemental resources to organizations doing the execution of an agreed upon basis. The specifications for timing, content, and location, etc., are established by the Perform organization accountable for ultimately delivering the functional product.

6.4 Perform

The Perform function relates to the single point accountability to execute and achieve outcomes for a given function/process in accordance with the defined methods and goals. This includes the accountability to develop plans, schedules, scope and detailed implementing procedures and to implement those plans to deliver the work products of the function. When other organizations perform support, the Perform organization remains accountable for ensuring overall results.

The independent assessment of Bruce Power's managed system arrangements considered the following:

- Does the organization structure support the accountability/GOSP model?
- Is the Management System Manual, as designed, consistent with accountability/GOSP model?
- At this stage of implementation, is the MSM on track to meet the needs of the enterprise?

The preparatory work included getting agreement on what makes an effective management system. The results focus not on a document or system that enables the company to satisfy regulatory requirements but rather address issues such as:

- Reflects management's decisions about how to run the business
- Communicates clearly to the organization and is ingrained in the culture
- Is based on accountability for results bolstered by sound processes/programs
- Ensures single owner for governance and oversight of each function and clear alignment of perform accountabilities
- If performance is centralized, ensures a clear accountability to the line organization
- Creates sustainability of results
- Is embraced by the organization
- Is sufficiently flexible to allow changes made by line management
- Is viewed as a tool that enables change, not an impediment to change
- Recognizes there is no single "ideal" model; the value is in the development and use

of the model

The findings from the independent review confirmed the Executive Team's belief in the progress that has been made toward development of the Management System and the fact that the Management System met the base regulatory requirements of meeting CSA N286.0-92, a condition of our licence. However, it also identified several areas where enhancements should be made to provide a foundation for managing our business in the future, including:

- Executive Team ownership and consistent application
- Clarity of accountability within the organization
- Usability
- Flexibility to evolve as Bruce Power evolves

Whilst radical change to the BPMS structure could undermine the organization's credibility, both internal and external, it was determined that some aspects of the BPMS should be revisited to improve value to the organization. As a result of these recommendations, the Executive Team of Bruce Power sponsored a team to review the issues identified by the assessment of the BPMS, gain agreement on approach and priority of improvement and develop an actionable plan to deliver the desired results.

The Management System Enhancement Team (MSET), spent three months fully engaged in a review of the recommendations, benchmarking external organizations, engaging stakeholders and challenging "sacred cows". The result was a plan to create a more streamlined, user-friendly and integrated management system designed to enable operational excellence through reinforcement of the GOSP model of accountability , significantly enhanced integration and a more robust change management process to ensure configuration control of the managed system overall.

Some of the activities completed since that time have included:

- The development of a new integrated pictorial view of the elements of our managed system; significant in that, previously, our manual contained dozens of separate figures describing various aspects of our managed system. The single integrated view was a first step in setting integration as a key design principle. This continues to evolve and Bruce Power is exploring the next evolution of this representation to encompass balanced scorecard or strategy map approaches. See Figure 1, Bruce Power Management System Overview.
- The creation of a set of "Nuclear Operations Fundamentals" setting out standards and expectations for workers and providing a means to link coaching and performance feedback across our entire organization.
- A significant reframing of our Management System Manual, together with more streamlined and comprehensive processes to maintain the integrity of the BPMS overall, including oversight and change management.
- The acceleration of a project to enhance the quality of our documentation
- Organizational restructuring to align with GOSP principles including the creation new accountabilities and better defined roles for those providing programmatic

governance and oversight of all of our major processes.

- The development of Program Excellence training.
- The investment in new systems and technology to benefit from enhanced integration and streamlining of processes including our work management and document management systems.

Today, the Bruce Power Management System represents the integrated management system Bruce Power uses to establish and deliver results in a controlled and sustainable manner. It defines the overall corporate governance or business framework that is employed by the Management Team to establish and deliver required business results in a sustainable manner. Figure 1 below illustrates the elements of the BPMS.

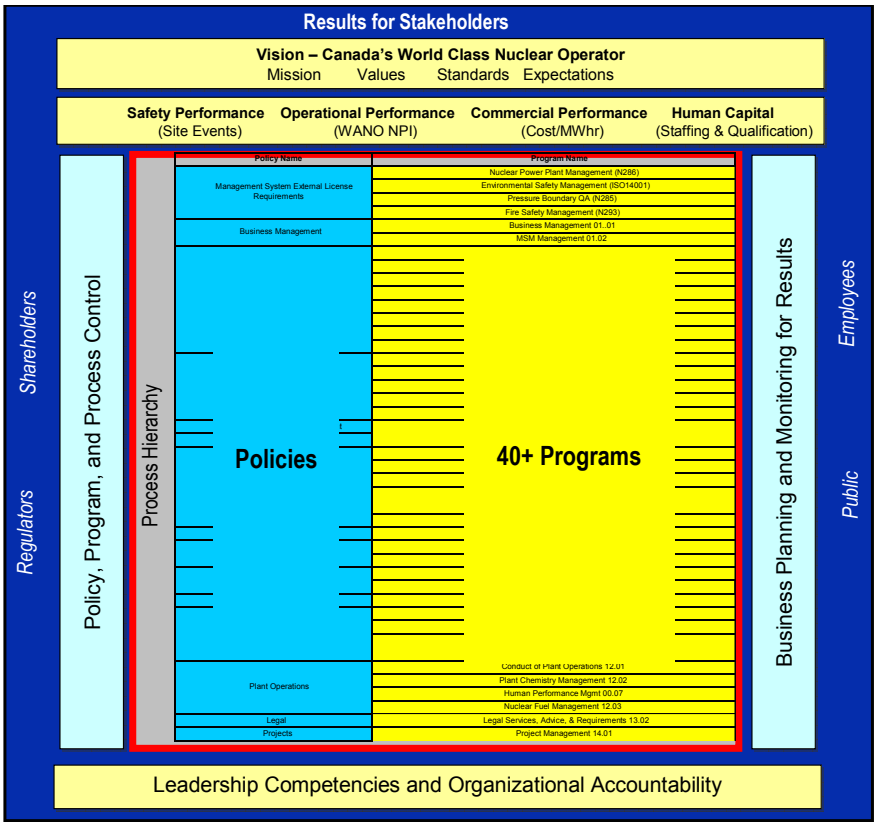

Figure 1 Bruce Power Management System Overview

The BPMS encompasses a set of leadership principles and establishes the planned and systematic pattern of actions that are essential to managing the business, delivering the expected results, and satisfying the applicable regulatory licensing requirements. The BPMS is designed first and foremost for use as a leadership tool by the Bruce Power organization. It articulates the way we manage our business. The BPMS is an integrated management system. The manual meets current standards and license requirements but has been based on the more integrated CSA N286-05. It covers five major components:

- Strategic Direction.
- Policy, Program and Process Controls.
- Process Management.
- Business Planning and Monitoring for Results.
- Leadership Competencies and Organizational Accountability.

The BPMS is allowed to evolve with time so competitive advantages are maintained. Our policies, programs, and procedures are continuously assessed to ensure corrective actions, benchmarked best practices, and all process innovations are captured. No single element of the BPMS operates independently. All parts of the management system are interconnected and interdependent and rest on a series of leadership principles. The objective of this description of the BPMS is to clarify and explain those interconnections.

The BPMS is a combination of the culture and inter-related activities we use to direct and carry out our work. It includes the way we manage and support our people to enable them to deploy the processes established within the BPMS documentation so that business objectives are achieved safely and efficiently. Our management system also describes how we establish and implement our performance objectives.

By design, the BPMS significantly contributes to the establishment of a safety culture that assures nuclear safety. It also provides the necessary guidance for making risk-based decisions that satisfy the desired balance between safety, commercial and corporate reputation performance. The BPMS embraces the need for ongoing assessment and continuous improvement of overall system effectiveness. It is expected that Bruce Power managers be familiar with the management system, understand its importance, and demonstrate a commitment to the principles and requirements established by this manual. It is also expected that managers ensure their staff understand and comply with the business requirements relevant to them.

Going forward, Bruce Power recognizes that there remain significant opportunities for further enhancement and integration. Key priorities include the review of all corporate policies, a more integrated assessment process for evaluating our managed system effectives, enhancements to documentation quality, streamlined and better integrated systems, continued benchmarking of processes to achieve operational excellence and a more robust approach to capturing the elements that enable the kind of healthy culture that, together with performance excellence, will ensure the sustainability of our company and contribute to the long term viability of the nuclear industry in Canada.

7. Conclusion

The development of standards around integrated management systems is one aspect of the broader opportunity to effectively implement integrated and standardized practices across an organization. Pursuing integration requires new thinking about the relationship of quality to the functioning of the entire organization.

Practitioners or organizational champions of integration must understand that an organization is a living organism which is more than the sum of its parts. Senior leadership require vision and commitment towards standardization, elimination of wasteful processes, practices and interfaces and a thorough understanding of the role of configuration control in supporting the maintenance of an integrated management system throughout its evolution in order to reap the benefits of integration.

The journey towards integration need not be an all or nothing approach – as demonstrated in the Bruce Power example, identifying key success factors towards integration and standardization such as the adoption of the Governance, Oversight, Support and Perform (GOSP) model of accountability, together with the enhanced role of Program Owners and the senior leadership commitment to simplifying and standardizing processes and aligning organizational accountabilities has resulted in measurable improvements justifying the investment in the changes. As an industry, we need to challenge ourselves to move forward from traditional quality assurance thinking towards a more integrated management system approach whilst maintaining the flexibility to achieve integration by means and in a timescale that supports overall business objectives.

8. References

[1] Business Dictionary Online: *Integration.* Retrieved April 29, 2009 from http://www.businessdictionary.com/definition/integration.html

[2] Chartered Quality Institute: *Integrated Management Systems.* Retrieved April 29, 2009 from http://www.thecqi.org/knowledge-hub/Resources/Factsheets/Integrated-management-systems