

## **Nuclear Self-Assessment as a High Reliability Organization (HRO) Tool**

Raymond J. Riha, Ph.D.  
Northrop Grumman Shipbuilding  
4101 Washington Avenue  
Newport News, VA 23607  
raymond.riha@ngc.com

### **OBJECTIVES**

The organizational self-assessment process was borne out of the Total Quality Management (TQM) movement. The first self-assessments, known as self-appraisals, were performed as one of the criteria for the Malcolm Baldrige National Quality Award (MBNQA). One objective of this research study is to test the supposition that the self-assessments performed by the nuclear power industry differ from other industries. Recent scholarly literature indicates that the existing models for conducting self-assessment for continuous improvement are outdated. In addition, the literature indicates that each industry or organization should develop their own models or adapt the existing TQM model to optimize the benefits of self-assessments. A further supposition of this research is that there are no standard attributes for the performance of self-assessments in the nuclear industry. This research attempts to identify those attributes of the nuclear power industry so a standard model may be constructed to optimize the investments made by the nuclear power industry in the use of self-assessments. In addition, this research will determine the relationships, if any, between survey characteristics (e.g., participant level in the organization, those that believe that self-assessment improves performance, the purpose of self-assessment, etc.).

### **METHODS**

The data that is utilized for this research was collected via the use of a survey instrument. The survey was sent to three separate people at each operating commercial nuclear plant in this country. The site vice president, the plant manager, and the quality manager were the recipients of the mailed surveys. In addition, the quality manager was asked to select two other individuals at the plant that are

involved in the self-assessment process to participate in the survey. There are several types of questions contained in the survey. Some are nothing more than simple selection, while others ask for a rating. The survey was constructed with brevity in mind in an attempt to improve the response rate. The survey generated a 39% response rate, which is considered acceptable.

Each question was analyzed individually utilizing descriptive statistics. This provides valuable insight into the minds of utility managers that are involved with the self-assessment process. The review of these descriptive statistics provides insight into the state of knowledge regarding this process in the nuclear industry. Further, these statistics are used to help identify the major attributes that are important for nuclear industry self-assessments.

In addition to an evaluation of the individual descriptive statistics, there were analyses conducted between survey questions. Analysis of Variance and Correlation Analysis are used to determine relationships between responses.

### **RESULTS**

Clearly, the three levels of management (executive, senior, middle) surveyed in nuclear power management levels have a sophisticated understanding of the true purpose of this process (continuous improvement). This indicates that the process is similar to other industries. However, differences exist in perceptions of the purpose of the process at the three levels of management surveyed. In general, all three levels believe the purpose of self-assessment is continuous improvement. Yet, the senior level managers are strongest in this belief. Coincidentally, the executive level and the middle level managers maintain the same level of understanding of this purpose. Further, the industry believes that the process improves

performance. In fact, the nuclear industry feels stronger about this than do other industries.

## CONCLUSIONS

This research identified the top five attributes that the industry considers important during the conduct of self-assessments. These attributes are shown below and coincide well the principles of HRO.

1. Human error prevention
2. Personnel training and qualification
3. Emergency response organization performance
4. Unplanned reactor shutdowns
5. Regulatory findings

These attributes clearly translate to other safety-significant industries with the exception of the fourth attribute.

## REFERENCES

1. R. WILLIAMS, A. BERTSCH, A. VAN DER WIELE, J. VAN IWAARDEN, B. DALE. 2006. Self-Assessment Against Business Excellence Models: A Critique and Perspective. *Total Quality Management* 17 (10):14.
2. M. W. FORD, J.R. EVANS, C.H. MATTHEWS. 2004. Linking Self-Assessment to the External Environment. *International Journal of Operations and Production Management* 24 (11):13.
3. A. BROWN, T. VAN DERWIELE, R. MILLEN. 1999. Self-assessment and quality awards: a formula for making quality strategic? *Strategic Change* 8 (2):7.
4. T. VAN DER WIELE, A. BROWN, R.MILLEN, D.WHELAN. 2000. Improvement in Organizational Performance and Self-Assessment Practices by Selected American Firms. *Quality Management Journal* 7 (4):15.
5. G.C. MACKENNON, R. MASSON, M. MCGLYNN, 2003. Self assessment: use at operational level to promote continuous improvement. *Production Planning and Control* 14 (1):8.
6. A. BECKMERHAGEN, H.P. BERG, S.V. KARAPETROVIC, W.O. WILLBORN. 2003. Self-Assessment for Improving Performance in the Nuclear Industry. *Quality Assurance Journal* 7:11.
7. F. B. BENAVENT. 2006. TQM Application Through Self-Assessment and Learning; Some Experiences from Two EQA Applicants. *The Quality Management Journal* 13 (1):19.
8. D. LONGBOTTOM, 1998. Self-assessment: Game over? *Total Quality Management* 4 (5):4.
9. M. SAUNDERS, R. MANN. 2005. Self-assessment in a multi-organisational network. *The International Journal of Quality and Reliability Management* 22 (6):18.
10. K. W. GADD. 1995. Business Self Assessment, A Strategic Tool for Building Process Robustness and Achieving Integrated Management. *Business Process Re-engineering and Management Journal* 1 (3):20.
11. A.M. AHMED, J.B. YANG, B.G. DALE. 2003. Self-Assessment Methodology: The Route to Business Excellence. *The Quality Management Journal* 10 (1):15.
12. K. SHERGOLD, D. M. REED. 1996. Striving for Excellence: How Self-Assessment Using the Business Excellence Model Can Result in Step Improvements in All Areas of Business Activities. *The TQM Magazine* 8 (6):5.
13. P. L. ALRECK, R.B. SETTLE, 1995. The Survey Research Handbook. Edited by J. Gilbert A. Churchill. Second ed, The Irwin Series in Marketing. Chicago, Bogoti, Boston, Buenos Aires, Caracas, London, Madrid, Mexico City, Sydney, Toronto: Irwin Publishing. Original edition, 1985.