Over the past four years, the STP Nuclear Operating Company (STPNOC) and ABS Group have developed and processed associated software for risk informed asset management (RIAM) of nuclear power plant facilities. RIAM applies probabilistic risk assessment (PRA) tools and techniques in the realm of plant physical and financial asset management. The RIAM process applies a tiered set of models and supporting performance measures (or metrics) that can ultimately be applied in supporting decisions affecting the allocation and management of plant resources (i.e., funding, staffing, scheduling, etc.). In general, the ultimate goal of the RIAM process is to continually support decision-making to maximize the target facility’s net present value, long term profitability and return on investment for its owners.

The general concept of RIAM is to develop a rigorous systematic risk-informed approach to assessing, analyzing, predicting and monitoring power plant economic performance while maintaining high confidence that pre-established safety limits are not and will not be breached.
RIAM is essentially a probabilistic cash flow or “value stream” model for a target facility or fleet of facilities. It is designed, using a systems analysis approach, to provide a consistent method and tool for continuously predicting facility risk-informed performance and monitoring associated actual performance. RIAM is used as a fundamental decision support tool for facility resource management.

Applications of the Method

While RIAM is designed to be capable of providing the full spectrum of asset management decision support performance indicators, the RIAM methodology prescribed for STPNOC focuses primarily on internal station management issues and applications, summarized as follows:

- Refueling Outage Schedule and Duration Optimization
- Specific Equipment Design Modification Case Studies
- Capital Spares Procurement Analysis and Prioritization
- Preventive Maintenance Optimization Program Development
- Major Equipment Refurbishment/Replacement Case Studies
- Unit Efficiency (i.e., heat rate) Improvement Case Studies
- Station Major Maintenance Activity Prioritization
- Plant Life Extension and License Renewal Case Studies
- Plant Power Uprate Case Studies
- Component Aging Case Studies
- Component Obsolescence Case Studies
- Operating Procedure Training Prioritization
- Maintenance Procedure Training Prioritization
- On-Line Versus Off-Line Maintenance Trade-Off Studies
- Plant Severe Accident Mitigation Alternative Issue Evaluation Case Studies
- Procurement quality Assurance Audit/Spot Check Prioritization

The focus of these RIAM applications is to continuously support development and implementation of effective and efficient station and fleet improvement investment options (i.e., those asset management decisions that support improved long term profitability and/or safety) in a prudent, cost-effective manner. To date, RIAM has been applied using projected long term average annual earnings (sometimes called profitability) as the key overriding or guiding performance indicator, with nuclear safety (and other performance indicators) used as decision “constraint” performance indicators.

Figure 2

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