

Independent Evaluation of the Reactor Oversight and Incident Response Program

December 31, 2008

This report was prepared by FocalPoint Consulting Group based in part on information provided by the NRC, constituents and stakeholders of the NRC, and others with relevant knowledge. The information was evaluated but not independently verified by FocalPoint. The assessment contained in this report was developed independent of the individuals that provided the information.

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Executive Summary

Background

In August 2008, the Nuclear Regulatory Commission (NRC) hired FocalPoint Consulting Group, a management consulting firm, to perform an independent evaluation of the NRC's Reactor Oversight and Incident Response (RO-IR) Program (the Program). This report presents the results of that evaluation effort. The Program plays a key role in fulfilling the NRC's mission of ensuring adequate protection of public health, safety and security, and protection of the environment. The Program's activities are authorized under the Atomic Energy Act of 1954, as Amended, and the Energy Reorganization Act of 1974. The Program's overarching objectives, as set out in the legislation, include oversight of the nation's commercial nuclear power plants and other regulated licensees and coordination of the federal government's response to radiological incidents occurring in licensed facilities, in order to maintain adequate protection of public health and safety.

Key activities in support of those objectives include inspections, performance assessments, event assessments, and response related to incidents occurring in licensed facilities. The Program also initiates enforcement actions under certain conditions when licensees are not conforming to the applicable regulations.

In carrying out its mission, the Program faces broad ranging expectations from a number of stakeholders and constituents. These stakeholders and constituents include the public, the Administration, the Congress, nuclear power plants, industry and advocacy groups, and international nuclear organizations. The general public desires high safety standards but also wants electricity available at a reasonable cost. While there is public interest in increased openness and access to information, the NRC may best serve the public interest by not publicly releasing some secure information that may pose a threat to safety. The Administration and Congress have expectations of high safety standards, but also require that regulatory burdens take into consideration cost-benefit analyses and that views of all affected parties are taken into account when regulations are developed. Industry groups and public interest advocacy groups may differ on views of what level of oversight leads to an appropriate standard for safety.

In setting standards for the oversight and incident response activities for which the Program has legal authority, the NRC develops regulations. The authorizing legislation contains broad language with phrases like "adequate protection of public health and safety" and "no undue risk to common defense and security." The Program's primary mechanism for defining standards and processes under its authority is through Title 10 of the Code of Federal Regulation. The standards are developed through a rulemaking process in which input from all stakeholder groups is solicited and evaluated.

Project Objectives and Approach

The objective of this project was to perform an independent evaluation of the Program and develop recommendations to strengthen program performance. The scope of the study included issues relevant to how the Program contributes to the NRC's goals of safety and security, including program purpose and design, strategic planning, program management, and program results and accountability. To address this scope, FocalPoint reviewed eight evaluation areas including contribution to safety, budget performance integration, internal evaluation and improvement, public communications, interaction with other agencies, financial management, enforcement and allegations, and staff development.

The evaluation included quantitative and qualitative input from a variety of sources. Semi-structured, confidential interviews were conducted with 46 employees and stakeholders of the NRC. Given the range of expectations and objectives of various stakeholders discussed above, our goal was to develop standards that reflect a balance of all such views. Accordingly, interviewees included representatives from industry, public advocacy, trade publications, and NRC staff and management. We studied best practices from relevant public and private sector organizations. We examined current program processes and policies including oversight framework, incident response documentation, planning, budgeting, financial management, operations, communications, and staff development. We also conducted a review of the literature relevant to the eight evaluation areas.

Summary of Findings

A summary of key findings and recommendations from this evaluation are outlined below. Overall, we found the Program is effective in accomplishing its mission of providing reactor oversight and incident response. The details of these and other findings and recommendations are provided in the body of the report.

Contribution to Safety. Overall, FocalPoint found the Program to be effective in contributing to the NRC's goals of safety and security. The Program has met the strategic goal of zero radiological events in the industry. The industry trends data, which provide broad indicators of industry-wide reactor safety as tracked by the NRC, have shown improvement. The Program has a robust framework and the activities that comprise that framework are executed in a timely and effective fashion. The Program also effectively responds to licensee events and prepares for emergency response through exercises, drills, and other activities.

We did find areas that need improvement. The Program has had some challenges resolving long-standing problems associated with fire protection. The Program also needs to continue efforts to improve monitoring of safety culture within the licensee organizations. We believe the Program's post-exercise evaluations would benefit from increased standardization to help track progress in readiness for an emergency. Also, the performance indicators, as currently

established, provide limited visibility to variations in plant performance. There are alternate interpretations of this lack of variation, as described in Section 2 of the report. The Program should ensure that the lack of variation in the reported indicators does not undermine their utility as an indicator of declining performance.

Budget Performance Integration. Based our review, we found the Program is effective in some aspects of its performance budgeting process but needs improvement in other areas. It has an effective top-down budget formulation process that is informed by the agency's strategic direction, influenced by Program considerations and priorities, and coordinated with Program support offices. The Program is effective in providing justification for requested resources and in basing its budget estimates on reasonable assumptions about factors affecting program costs and resources. However, improvement is needed to define the linkage between outputs and outcomes, demonstrate the impact of funding on performance, and ensure accurate accounting for both the direct and indirect costs needed to meet performance targets and achieve program goals. The Program is working with the Office of the Chief Financial Officer (OCFO) to improve budget performance integration and transparency in these areas.

Internal Evaluation and Improvement. The Program is effective in conducting internal self-assessments of efficiency and effectiveness and in using the results of those and other independent evaluations to modify strategic, operational, and financial plans. In some areas, we noted that program guidance and operations documentation have not been kept up-to-date. Improvements in timeliness and clarity in some of the operations documentation may improve understanding of roles and responsibilities among Program staff.

Public Communications. The Program is effective in disseminating information to stakeholders in most areas while balancing the need for security with openness and accountability. The Program provides information such as stakeholder feedback, policy and procedures, industry trends, performance indicators, licensee inspection performance, and assessment results, related to the reactor oversight function. For the most part, information is complete and up-to-date.

Interaction with Other Agencies. In most cases, roles and responsibilities for working with other federal agencies and State and local government have been established but some gaps remain. In 2007, an Inspector General (IG) audit identified recurring coordination problems with States in preparing for, executing, and evaluating incident response exercises. For example, the IG found the Program has not clearly defined or communicated its coordination role. In interviews, we also found some program staff had different characterizations of the role of NRC

as compared to other agencies in response to an incident. The Program is taking steps to address these issues.

Financial Management. We found the Program has strong financial management practices. Funds are obligated consistently with the overall program plan and a limited amount of unobligated funds remains at the end of the year. Adequate procedures exist for reporting actual expenditures, comparing them against the intended use, and taking timely and appropriate action to correct single audit findings when funds are not spent as intended. Procedures are in place to ensure that payments are made properly for the intended purpose to minimize erroneous payments. The Program is not in violation of the Anti-Deficiency Act. As reported by the auditors, the Program received a clean audit opinion and is free of material internal control weaknesses. The Program's financial management systems meet statutory requirements with the exception of one non-compliance that is agency-wide and not program-specific.

Enforcement and Allegations. The Program is effective in resolving enforcement actions and allegations in a timely manner. The Program has had some challenges in establishing a transparent regulatory context for enforcement of fire protection rules. Concerns regarding non-compliance in this area have been expressed by stakeholders. The NRC has modified its fire protection regulations to allow licensees to adopt, on a voluntary basis, a risk-informed approach, in lieu of their existing fire protection licensing basis. The NRC recently clarified procedures for transitioning to the new rule.

Staff Development. The Program has met its overall staffing objectives, including maintaining a stable, experienced resident inspector base, but a recent increase in inspector turnover is resulting in coverage challenges. While not as severe as the high level of inspector turnover, the Agency, as a whole, is experiencing increased turnover as its staff size increases. This has contributed to staff and managers with less tenure in their positions. In an effort to maintain quality staff, the NRC has several recruiting initiatives, has effectively launched knowledge management initiatives, and continues to deliver high quality training.

Summary of Recommendations

To address areas that need improvement, we have developed a set of recommendations that are put forward in this report. A summary of key recommendations is provided below.

Contribution to Safety

Train regional staff as subject-matter experts for safety culture assessment.

The evaluation of safety culture is an important part of the assessment process, but based on input from interviewees and internal stakeholders, we believe the uniqueness and subjectivity of safety culture assessments are challenging and time consuming for inspection staff. The Program should recruit and train a group of individuals to have specialized knowledge in the area of safety culture. These individuals would be a resource for inspectors making safety culture assessments and could facilitate knowledge sharing and consistency.

Conduct a lessons learned study to assess the history of and causes for the fire protection issues.

Fire protection is an important part of safety in nuclear reactors. At the time the fire protection rules were established back in 1980, there were a significant number of exemptions approved for certain vintage plants. Approval of the exemptions established compliance for those licensees. However, today there is still significant reliance among licensees on interim measures, enforcement discretion, and there is non-compliance among some licensees. The Program should conduct a lessons learned study to assess the history of and evaluate the reasons for the problems with fire protection. Such a study may help to identify ways to avoid similar problems in the future. It should be noted that the Program has already established a plan to conduct a lessons learned study in calendar year 2009. We concur with this plan and encourage that lessons learned be applied where appropriate to other aspects of the Program's regulations.

Enhance exercise evaluations through improved standardization; incorporate a post-exercise survey of respondents and input from participating government agencies.

To ensure that post-exercise evaluations are consistently performed, provide opportunity for and documented evidence of participant (including State, local, Federal organizations) feedback, and ensure that clear documentation of the process is evident, the post-exercise/event critique process should be clearly described in incident response procedures.

Continue to focus on assessing the reasons for lack of variation in performance indicators in order to ensure that this does not continue to undermine their utility as indicators of potential problems.

The performance indicators provide limited visibility to variations in plant performance. As such, it is more difficult to confirm their utility as indicators of potential problems. The Program should continue to assess the reasons for lack of variation in the performance indicators.

Budget Performance Integration

Establish published crosswalk of the Program's budget to demonstrate alignment of costs to Program outputs and annual and long-term outcomes.

The program budget request lacks transparency in that it does not clearly define the relationship between resources and annual and long-term performance goals. The Program should coordinate with OCFO to present the Program's budget in a more transparent manner in the NRC Performance Budget. This may include aligning the program budget with the Agency's strategic goals, safety and security, and linking the Program's strategic outcomes, performance measures, and output measures.

Develop logic model or performance framework that clarifies linkage between outputs and outcomes.

The Program's complexity may make it difficult for some individuals to understand the relationship between its outputs and outcomes. A logic model or redesigned framework might facilitate understanding of the linkage between outputs and outcomes (e.g., oversight activity and safety). The Program may consider developing a logic model or revising the ROP performance framework to clarify the linkage between the oversight activities and program outcomes.

Develop marginal cost model to conduct sensitivity analyses.

Under the current budget process, the Program cannot answer the question, "If funding were increased/decreased by X, this program would be able to achieve Y more/less outcomes." Given the Program's goal of zero nuclear accidents and the public's intolerance for a nuclear incident, developing a programmatically relevant marginal cost model represents a challenge. The Program may consider developing a marginal cost analysis to demonstrate the impact of funding on output (vs. outcome) performance and extrapolating these results to provide a qualitative explanation of the impact on annual and long-term outcomes.

Internal Evaluation and Improvement

Complete the process of updating and maintaining current key program documentation.

Documentation was up-to-date in most areas, but there were gaps in some areas. Standardization and consistency of procedures documentation promotes consistent understanding and supports measurement for continuous improvement and achievement of excellence. The Program should continue efforts underway to update documentation.

Enforcement and Allegations

Address issues and uncertainties regarding compliance with the fire safety requirements.

There has been uncertainty among some stakeholders regarding some aspects of enforcement of fire safety rules. The NRC has made recent clarifications, which should address at least some of the questions. The Program should continue to clarify licensee requirements to help establish a transparent regulatory context for enforcement of fire protection rules, where it is clear when licensees are not in compliance, thus making it easier to enforce.

Staff Development

Analyze root causes of increased inspection turnover and take actions to address this issue.

High turnover among resident inspectors is making it difficult to meet site staffing objectives. Turnover has been high overall within the NRC and this also affects the Program. The Program should further analyze the root cause of the increased turnover. Based on this analysis, the Program should make appropriate changes to address causes.

1. Introduction

1.1. Objectives and Approach

In August 2008, the Nuclear Regulatory Commission (NRC) hired FocalPoint Consulting Group, a management consulting firm, to perform an independent evaluation of the NRC's Reactor Oversight and Incident Response (RO-IR) Program (the Program). This report presents the results of that evaluation effort. The Program plays a key role in fulfilling the NRC's mission of ensuring adequate protection of public health, safety and security, and protection of the environment.

The Program's activities are authorized under the Atomic Energy Act of 1954, as Amended, and the Energy Reorganization Act of 1974. The Program's major objectives, as set out in the legislation, include oversight of the nation's commercial nuclear power plants and other regulated licensees and coordination of the federal government's response to radiological incidents occurring in licensed facilities, in order to maintain adequate protection of public health and safety. The overarching goal is to ensure that licensees operate with no undue risk to common defense and security.

Key activities in support of those objectives include inspections, performance assessments, event assessments, and response to incidents occurring in licensed facilities. The Program also initiates enforcement actions under certain conditions when licensees are not conforming to the applicable regulations.

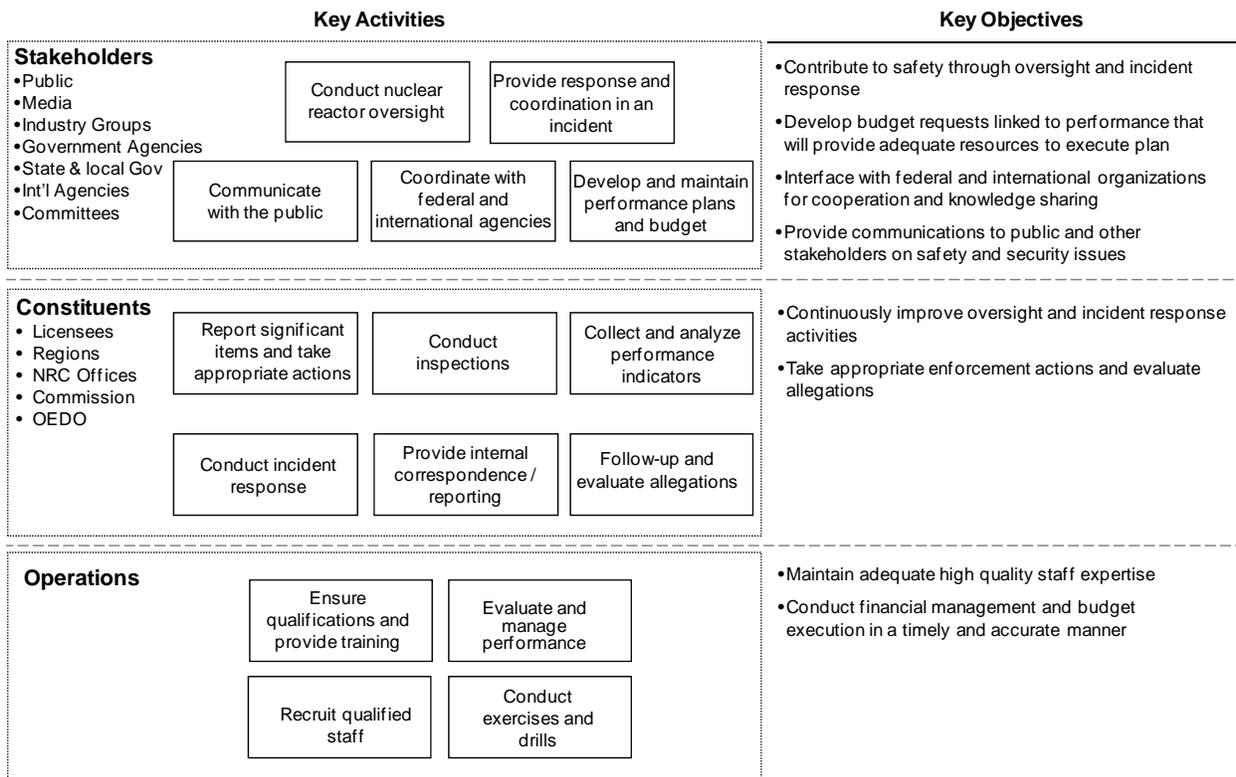
Project Objectives

The objective of this project was to perform an independent evaluation of the Program, and develop recommendations to strengthen program performance. The scope of the study included issues relevant to how the Program contributes to the NRC's goals of safety and security, including program purpose and design, strategic planning, program management, and program results and accountability.

Project Approach

To develop the approach for the study, we conducted an initial review of program activities and objectives. This initial review included a preliminary review of program documentation, authorizing legislation, and relevant regulations. We also conducted a set of preliminary interviews with program staff and stakeholders. The purpose of this initial review was to identify key categories of program performance based on the Program's legislative mandate, the NRC's rules and regulations, and the expectations and objectives important to the Program's stakeholders, constituents, and program staff. From this initial review, we identified the key activities and objectives for the Program. These are summarized in the figure below.

Figure 1 – Key Program Activities and Objectives



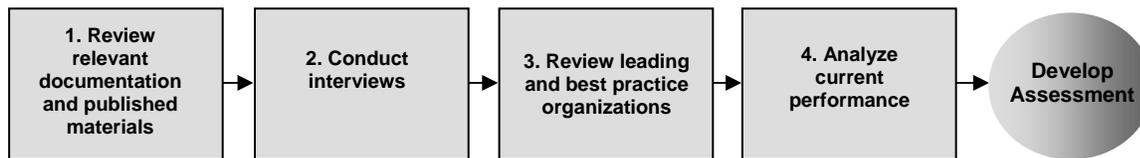
Source: FocalPoint

Based on the key objectives we identified, we developed eight evaluation areas that defined the scope of the study:

- Contribution to safety;
- Budget performance integration;
- Internal evaluation and improvement;
- Public communications;
- Interaction with other agencies;
- Financial management;
- Enforcement and allegations; and
- Staff development.

The evaluation included quantitative and qualitative input from a variety of sources. We conducted semi-structured, confidential interviews with 46 employees and stakeholders of the NRC. Given the range of expectations and objectives of various stakeholders, our goal was to develop standards that reflect a balance of all views. Accordingly, interviewees included representatives from industry, public advocacy, trade publications, and NRC staff and management. We examined best practices from relevant public and private sector organizations.

We studied current program processes and policies including oversight framework, incident response documentation, planning, budgeting, financial management, operations, communications, and staff development. We conducted a review of the literature relevant to the eight evaluation areas. The overall approach for assessing each evaluation area consisted of four key components as set out in the chart below:



1. Review relevant documentation and published material. We studied internal program documentation and conducted a brief literature review of published material related to nuclear safety, regulatory oversight, evaluation of regulatory programs, safety evaluation, emergency preparedness and response, and other program management functions (e.g., budget formulation, financial management, communications, staff development). A list of documents reviewed is contained in Appendix A.

2. Conduct interviews. We conducted interviews with stakeholders, constituents, and program staff. We developed interview guides and conducted semi-structured, confidential interviews to obtain information related to the evaluation areas. Interviews included program staff in the Office of Nuclear Reactor Regulation (NRR), the Office of Nuclear Safety and Incident Response (NSIR), the Regions, the Office of Enforcement (OE), the Office of the Executive Director for Operations (OEDO), and the Office of the Chief Financial Officer (OCFO). We also interviewed external stakeholders from advocacy groups, industry, and publications.

3. Review leading organizations and their best practices. We identified leading organizations and reviewed their best practices. To identify organizations, we used a combination of FocalPoint databases and literature and Web searches. We reviewed regulatory-based programs that have demonstrated success in the evaluation areas.

4. Analyze current performance. Based on the interviews, literature review, and analysis, we established standards on which we based our assessment. The standards are based on program goals as set forth in the authorizing legislation, NRC rules and regulations, and expectations of key stakeholders and constituents. In carrying out its mission, the Program faces broad ranging and high priority expectations from a number of stakeholders and constituents. These stakeholders and constituents include the public, the Administration, the Congress, nuclear power plants, industry and advocacy groups, and international nuclear organizations. The general public desires high safety standards but also wants electricity available at a reasonable cost. While there is public interest in increased openness and access to information, the NRC may best serve the public interest by not publicly releasing some secure information that may

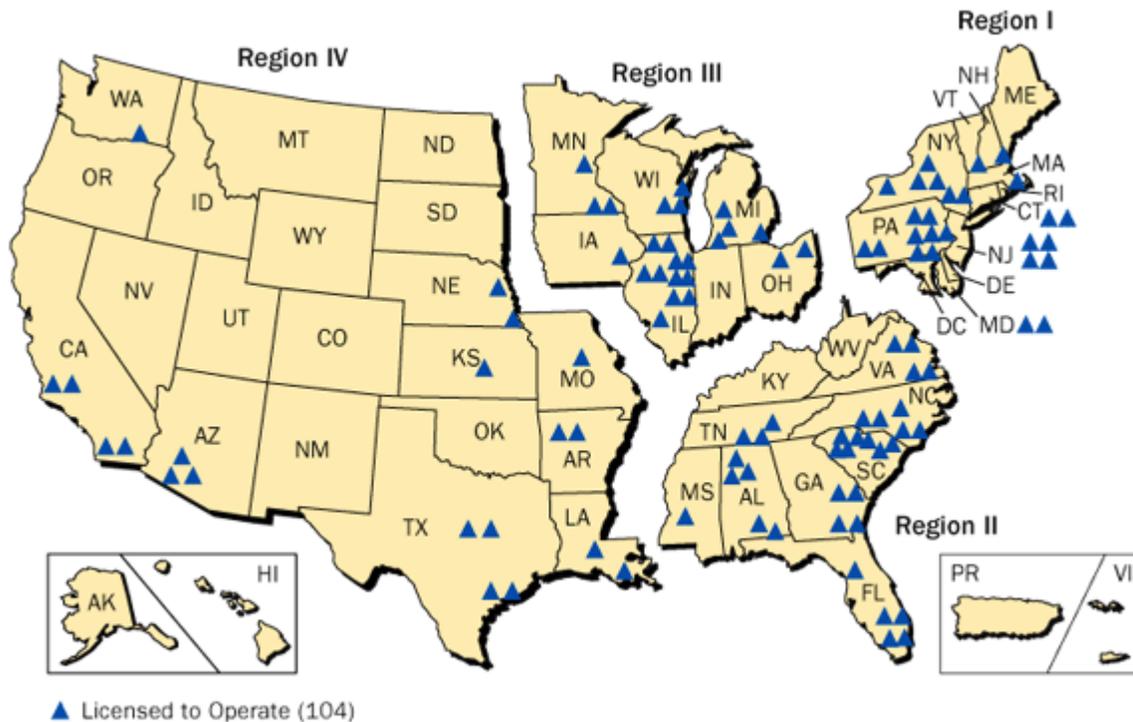
pose a threat to safety. The Administration and Congress have expectations of high safety standards, but also require that regulatory burdens take into consideration cost-benefit analysis and that views of all affected parties are taken into account when regulations are developed. Industry groups and public interest advocacy groups may differ on views of which level of oversight leads to appropriate standards for safety. Given the range of expectations and objectives of various stakeholders, our goal was to develop standards that reflect a balance of those views. To analyze current performance with respect to those standards, we assessed internal processes, evaluated program performance, and compared the Program's current performance against goals and stakeholder expectations.

1.2. Program Overview

The Program is responsible for oversight of the 104 commercial nuclear power plants in the United States and response to radiological incidents. The Program focuses on the oversight, enforcement, and incident response activities of the U.S. commercial nuclear power industry. Through these activities, the Program ensures that licensees are conforming to the applicable regulations and the conditions of their licenses. The Program also ensures that licensees provide timely and appropriate event assessment and response. The Program is authorized under the Atomic Energy Act of 1954, as Amended, and the Energy Reorganization Act of 1974.

The U.S. produces the most nuclear energy of any country, with 806 billion megawatt hours (MWh) produced at 104 plants in 2007. Today, nuclear power provides 20% of the electricity the U.S. consumes (NEI).

Figure 2 - Locations of Commercial Operating Reactors



Source: NRC

Of the 104 reactors, 69 are pressurized water reactors (PWRs) and 35 are boiling water reactors (BWRs). The PWRs maintain pressure in the reactor vessel at approximately 2,200 pounds per square inch (psi) so the coolant water does not boil and exits at a temperature of approximately 310° Celsius. The PWRs have a primary loop and a secondary loop. The heat from the primary (radioactive) loop is transferred to the secondary loop in a steam generator, which is inside the containment building. The secondary loop, which now contains steam, goes outside containment to drive the turbines, which produce electricity. The secondary water then returns to the steam generator to be turned back into steam. In a BWR, the pressure is significantly lower (approximately 1,000 psi), so the coolant water boils. Above the core are a steam separator and dryer; the separated and dried steam goes outside containment to the turbine before returning to the reactor as condensed water to again cool the reactor.

Components of a plant's safety systems (e.g., pumps, backup water supplies) all require electricity. If offsite power is lost, diesel generators are turned on to supply the necessary electricity to power the equipment needed to cool the core. The most serious type of accident is one that results in a loss of coolant to the core which can lead to a core meltdown. Part of the NRC's oversight task is to ensure that rules and regulations are followed such that no single mishap can cause a serious accident. The NRC accomplishes this task by establishing rules and regulations and conducting assessments of reactors to determine if the rules and regulations are

being followed. In the event of an incident, the NRC has rules and regulations that govern their response to make sure that the incident is managed appropriately to minimize risk to the public.

The Reactor Oversight and Incident Response Program is the program through which NRC provides oversight for commercial operating reactors. The safety performance of each licensed plant is monitored through inspections performed by the Program and performance indicators provided by the licensee. Any findings of deficiency are evaluated to determine a level of significance, based on safety consequences, whether the deficiency was willful, and other considerations. Based on this assessment, the deficiency can be handled either through the reactor oversight significance determination process (SDP) or enforcement.

The Program also coordinates the overall NRC incident response to radiological incidents and emergency events involving licensees. Through its incident response function, the Program maintains NRC readiness for response to incidents by planning and preparedness activities such as plan and procedure maintenance, training, exercises, interagency liaison/coordination, stakeholder outreach, and program assessments. Additionally, the Program conducts inspections and performance-based emergency preparedness evaluations with licensees, in coordination with offsite (State/local/Tribal) preparedness program inspections and evaluations performed by FEMA, ensuring that regulatory compliance is maintained and programs demonstrate acceptable performance capabilities.

The Program's FY 2009 annual budget is approximately \$280M with 1,165 full-time equivalent (FTE) staff operating both at headquarters and in the Regions. The oversight function maintains centralized oversight management and has resident inspectors located at each licensee in the Regions. The incident response function provides central oversight of the Program and regional response programs including response activities from the NRC Operations Center.

Regulatory Framework

In order of hierarchy, the regulatory framework consists of the authorizing legislation, regulations in Title 10 of the Code of Federal Regulation, associated regulatory guides, NRC policies and procedures, and program documentation and guidance. The authorizing legislations contain broad language with phrases like "adequate protection of public health and safety" and "no undue risk to common defense and security." This gives the Program some latitude in defining the other parts of the framework (Kamabi). This, in part, has enabled the Program to implement the ROP, which is a more risk-informed approach, replacing the earlier, Systematic Assessment of Licensee Performance (SALP). The objective of implementing a more risk-informed approach is to more closely align activities with areas of assessment that pose greater risk. This approach can potentially reduce costs and gives licensees more options in meeting safety goals.

In addition, the nuclear power industry has itself formed an organization, the Institute of Nuclear Power Operations (INPO), whose mission is to "promote the highest levels of safety and

reliability, and to promote excellence in the operation of nuclear electric generating plants.” INPO provides a system of personnel training and qualification for all key positions at nuclear power plants; workers undergo both periodic training and assessment. INPO also conducts periodic evaluations of operating plants, focusing on plant safety and reliability, in the areas of operations, maintenance, engineering, radiological protection, chemistry, and training.

2. Contribution to Safety

2.1. Objectives / Key Activities

Reactor Oversight

A key goal of reactor oversight is to contribute to the NRC's safety mission in three strategic performance areas: reactor safety, radiation safety, and safeguards. To this end, the Program provides oversight of commercial operating reactors. The safety performance of each licensed plant is monitored through inspections performed by the NRC inspectors and performance indicators provided by the licensee. The findings of deficiency are evaluated to determine a level of significance, based on safety consequences, whether the deficiency was willful, and other considerations. Based on this assessment, the deficiency can be handled either through the reactor oversight significance determination process (SDP), or through the enforcement process. This section provides an evaluation of the Program's contribution to safety through the reactor oversight process. Section 8 provides an evaluation of the enforcement process.

When any of the oversight activities (e.g., inspections, review of performance indicators) yields a finding of safety significance, SDP is used to assess the safety impact and assign a color code that indicates the risk significance of the finding. Green findings indicate low risk significance, while White, Yellow, and Red findings indicate higher risk.

Incident Response

The incident response function coordinates the NRC's planning and preparation for, response to, and recovery from radiological incidents and/or emergency events involving licensees. The Program encompasses all incidents for which the NRC has a response role. Specific responsibilities include developing and maintaining program documentation; staffing, operating and maintaining the Headquarters Operations Center (HOC); coordinating the staffing of response teams; conducting training, drills, and exercises; and carrying out a process of agency-wide continuing improvement for incident management. Each of the four regional offices manages and administers similar functions at a regional level.

The HOC and the regional incident response centers are equipped with communications, information display, and analysis systems. Communications systems provide direct linkages, including secure telephone lines with licensees and connections with government entities. The Emergency Response Data System (ERDS) displays real-time plant parameters and safety system data from all nuclear power reactor plants. Radiological analysis and consequence assessment processes provide the capability for predicting radiological consequences to the public and/or the environment.

The NRC is an integral part of the Federal incident management community and actively participates in interagency policy and planning and preparedness activities with the Homeland

Security Council (HSC), Department of Homeland Security (DHS), FEMA, and other departments/agencies.

In the event of an incident, NRC activates the response function at its HOC and one of its four Regional Incident Response Centers (Region I in King of Prussia, PA; Region II in Atlanta, GA; Region III in Lisle, IL; and Region IV in Arlington, TX). During an incident, NRC conducts an independent assessment of the reactor plant's condition, operator response, and protective action recommendations. If necessary, the NRC Chairman can direct licensee actions to ensure public health and safety and protection of the environment. The NRC also provides expert consultation, support, and assistance to the State and local public safety officials responding to the event.

As the Coordinating Agency, NRC has technical leadership for the Federal government's response to the event. If the severity of an event rises to the level of an Incident of National Significance DHS will take on the role of coordinating the overall Federal response to the event, while NRC would retain a technical leadership role. The Secretary of Homeland Security, in consultation with other departments and agencies as appropriate, will determine when it will take a lead coordination role in an accident. Based on the Program's experience with tabletop and full-scale exercises this will most likely occur at the General Emergency level for a technical emergency and Alert level for a terrorist event.

2.2. Approach

The approach for assessing this evaluation area consisted of three key components as explained below.

1. Review of relevant documentation and published material. We examined internal program documentation and conducted a brief literature review of published material related to nuclear safety, regulatory oversight, evaluation of regulatory programs, safety evaluation, and emergency preparedness and response. The following documents were reviewed:

- Inspection Reports
- Inspection Findings Summaries
- Performance Indicator Summaries
- CY 2007 Annual ROP Self-Assessment Report
- FY 2007 Annual Industry Trends Report
- CY 2007 Consolidated Response to ROP Feedback
- IMC 0307 ROP Self-Assessment Program
- IMC 0305 Operating Reactor Assessment Program
- IMC 2515 Inspection Program
- IMC 0608 Performance Indicator Program
- IMC 0609 Significance Determination Process

- MD 8.13 Reactor Oversight Process
- Reactor Oversight Process (ROP) Homepage
- Incident Response Homepage
- OIG Audit of the Incident Response Program
- GAO Report: NRC: Oversight of Nuclear Power Plant Safety Has Improved, but Refinements Are Needed
- Davis-Besse Lessons Learned Task Force (DBLLTF) Report
- DBLLTF Final Status Of Recommendations
- Public Version of Palo Verde Lessons Learned
- Lochbaum: How Palo Verde Made the NRC's Naughty List
- Gunter, Warren, & Lochbaum: Fire When Not Ready
- Bureau of Labor Statistics: Employment Cost Index – September 2008
- Kadambi: Performance-Based (Risk Informed) Regulation: A Regulatory Perspective
- Klien, Brandenburg, Atas, & Maher: The Use of Trained Observers as an Evaluation Tool for a Multi-Hospital Bioterrorism Exercise
- Feinstein: The Safety Regulation of U.S. Nuclear Power Plants: Violations, Inspection, and Abnormal Occurrences
- Marks & Potter: Drilling for Results: The Quest for Objective Exercise Evaluations
- Sorensen: Safety Culture: A Survey of the State-of-the-Art
- Kadak & Matsuo: The nuclear industries transition to risk-informed regulation and operation in the United States
- Ford & Schmidt: Emergency response training: Strategies for Enhancing Real-World Performance

2. Conduct staff interviews. We conducted interviews with stakeholders, constituents and program staff. We developed interview guides and conducted semi-structured, confidential interviews to obtain information related to contribution to safety. This process included program staff in NRR, NSIR, and the Regions. We also interviewed external stakeholders from advocacy groups, industry, and publications.

3. Analyze current performance. Based on the interviews, literature review, and research, we established standards or performance metrics on which we based our analysis. To analyze current performance with respect to those standards, we assessed internal processes, evaluated program performance, compared the Program's current performance against goals and stakeholder expectations, and analyzed causes for gaps.

To evaluate the Program's contribution to safety, we assessed the Program on the following standards:

- Ensures that an appropriate level of safety is being maintained by licensees;
- Takes appropriate actions to prevent degradation of safety and to promote safety improvements; and
- Performs oversight and incident response activities in cost-effective manner.

2.3. Findings

Standard 1: Ensures that an appropriate level of safety is being maintained by licensees

For this standard, we assessed whether the Program was ensuring that the appropriate level of safety was being maintained by the licensees. A number of factors must be considered in setting a threshold for “appropriate” level of safety. These factors include, but are not limited to:

- Requirements set out by the authorizing legislation;
- The Program’s stated strategic mission and goals;
- Stakeholder (e.g., public, OMB, GAO) expectations; and
- Constituent (e.g., licensee, industry groups) expectations.

As discussed in Section 1.2, the authorizing legislation contains broad language with phrases like “adequate protection of public health and safety” and “no undue risk to common defense and security.” The Program has established a set of overall targets. Some stakeholder groups and some constituent groups would disagree on what “appropriate” level of safety the NRC should work to ensure, versus what level of safety should be the industry’s responsibility to ensure. To evaluate performance with regard to this standard, we considered all of the above.

Finding: The Program’s strategic outcome targets (e.g. mission and goals) are being adequately met

An indirect measure of the effectiveness of the Program’s regulatory activities is the extent to which the ultimate outcome targets are achieved. While these measures are only part of the picture as they do not measure the direct impact of program activities, nor do they always provide visibility to variations in safety levels over time, they do focus on the ultimate goals of the Program. The Program has a range of safety targets that are outcome measures in its budget, strategic planning, and operations planning processes. These measures and the associated targets are set out in the table below. As the table shows, the Program has met its own targets 100% of the time for these measures over the past five years.

Table 1 - Program Strategic Outcome Targets

Performance Measure	Target	% Met (2003-2007)
No nuclear reactor accidents	0	100%
No inadvertent criticality event	0	100%
No acute radiation exposures resulting in fatalities	0	100%
No releases of radioactive materials that result in significant radiation exposures	0	100%
No releases of radioactive materials that cause significant adverse environment impacts	0	100%
No instances where licensed radioactive materials are used domestically in a manner hostile to the security of the United States	0	100%
No significant licensing or regulatory impediments to the safe and beneficial uses of radioactive materials	0	100%
Number of new conditions evaluated as Red by the Reactor Oversight Process (ROP)	<=3	100%
Number of significant accident sequence precursors (ASPs) of a nuclear reactor accident	0	100%
Number of operating reactors whose integrated performance entered the Inspection Manual Chapter 0350 process, the multiple/repetitive degraded cornerstone column, or the unacceptable performance column of the ROP Action Matrix	<=3	100%
Number of significant adverse trends in industry safety performance	<=1	100%
Number of events with radiation exposures to the public or occupational workers from reactors that exceed A.O. Criteria 1.A	0	100%
Number of radiological releases to the environment that exceed applicable regulatory limits	0	100%
Unrecovered losses or thefts of risk-significant radioactive sources	0	100%
Number of significant unauthorized disclosures of classified and/or safeguards information	0	100%
Number of security events and incidents that exceed the Abnormal Occurrence Criteria I.C 2-4	<=4	100%
No more than one instance per program where licensing or regulatory activities unnecessarily impede the safe and beneficial uses of radioactive materials (Annual Target)	0	100%

Source: NRC

We also reviewed the data, from the past five years, from the Program’s Industry Trends initiative. The Program tracks long-term trends using a 10-year rolling time period. We examined the last five years to focus on more recent trends. The table below shows the compound average growth rate (CAGR) for the 13 indicators. A declining trend (i.e., negative

growth rate) translates to improved performance for the first 10 indicators. For the last three indicators, an increasing trend indicates improved performance.

Table 2 - Industry Trends Indicators

Indicator	CAGR (2003 - 2007)
Automatic Scrams While Critical	-11% ↓
Safety System Actuations	-12% ↓
Significant Events	-27% ↓
Safety System Failures	-9% ↓
Forced Outage Rate (%)	-17% ↓
Equipment Forced Outages / 1,000 Commercial Critical Hours	-9% ↓
Collective Radiation Exposure	-3% ↓
Unplanned Power Changes	-6% ↓
Reactor Coolant System Activity	1% ↑
Reactor Coolant System Leakage	-3% ↓
Drill / Exercise Performance	0.1% ↑
ERO Drill Participation	0% ↔
Alert and Notification System Reliability	1% ↑

Source: NRC and FocalPoint analysis

Of the 13 industry indicators, 11 show improvement between 2003 and 2007. One indicator, Emergency Response Organization (ERO) drill participation, is unchanged. One indicator, Reactor Coolant System Activity, showed a 1% increase. This indicator measures maximum monthly reactor coolant system activity expressed as a percentage of the technical specification limit. The indicator increased from only 0.41% of technical limit, to only 0.43% technical limit from 2003 to 2007. In addition, there have been no safety significant indicators as reported by licensees during this timeframe. As such, this increase is not safety significant.

Finding: The ROP framework is an effective approach for guiding the Program’s oversight activities

The purpose of our review of the design of the ROP framework was to assess the extent to which the inspections and performance indicators collectively covered the areas important to safety and generally identified performance deficiencies needed to maintain an appropriate level of safety.

In the late 1990s, NRC made the decision to incorporate risk-informed elements into the oversight process, where appropriate. The NRC defines risk-informed as an approach in which risk insights, engineering analysis and judgment, and performance history are used to focus attention on the most important activities. These activities include establishing objective criteria based on risk insights for evaluated performance, developing measurable parameters for

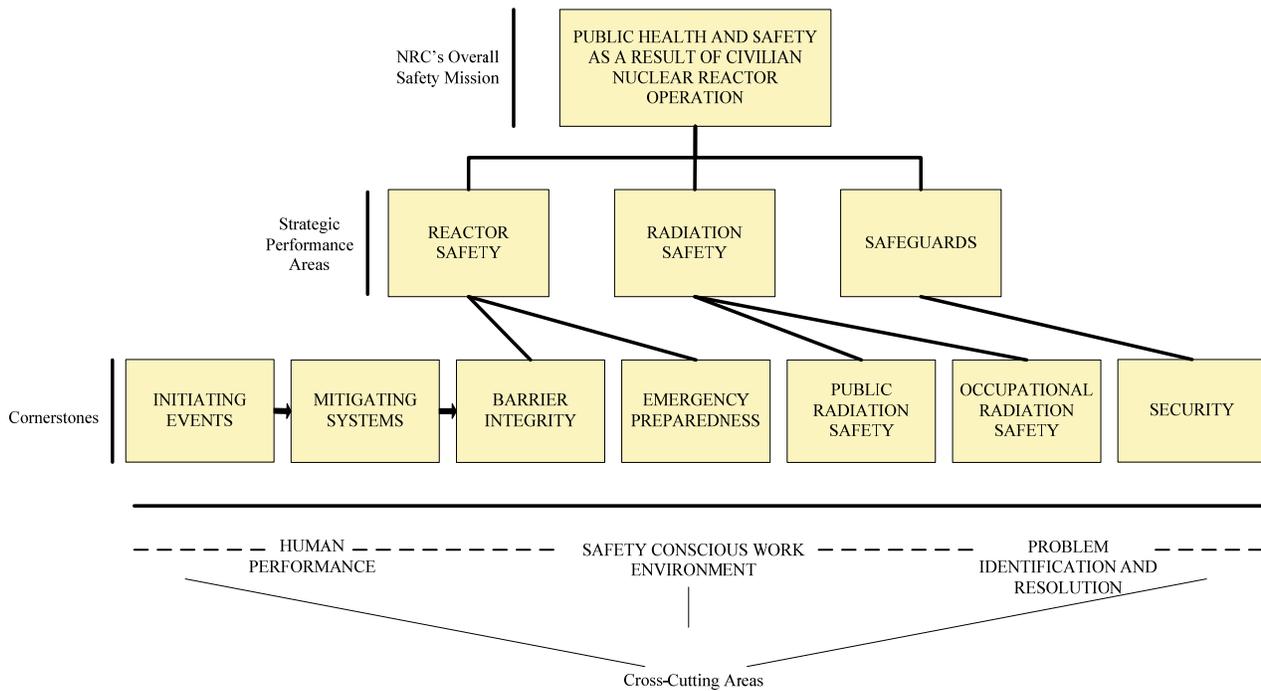
monitoring systems and licensee performance, and focusing on results as the primary basis of regulatory decision-making (SECY-98-144). This decision led to implementation of the ROP. Prior to the ROP, the oversight process was based on the Systematic Assessment of Licensee Performance (SALP).

The ROP provides a number of improvements over SALP. For example, the ROP incorporated risk-informed assessment, which gives the licensee more opportunity to innovate to find more efficient or effective ways of meeting safety goals. SALP evaluations were held less frequently, which meant the safety issues were more likely to go uncorrected for a longer period of time. ROP uses more objective assessments, which enables more consistent assessment of risk. In addition, SALP had been criticized by stakeholders and constituents for its lack of clear guidelines for reacting to deficiencies and inconsistent implementation.

The ROP makes use of both inspection information and monitored performance indicators (PIs). The risk significance of the findings from the indicators and inspections is evaluated using the SDP, which, where appropriate, uses probabilistic risk assessment (PRA) methods to evaluate the impact of a finding. If the aggregate risk exceeds predetermined thresholds, the NRC subjects the licensee to increased oversight. In areas where PRA methods are used, the NRC went from prescribing operational requirements and instead began evaluating the risk associated with potential faults or failures, and taking action when the risk threshold was exceeded. In addition, ROP increased the scope of the assessment to respond to new security objectives. After the 9/11 terrorist attacks for example, assessments were added to the physical protection (also called, security) cornerstone to provide for additional safeguards.

The Program's framework for its reactor oversight function is shown in the figure below. At the foundation of this framework are seven cornerstones that reflect the safety aspects of facility operation. The cornerstones contain both risk-informed and prescriptive elements. Satisfactory licensee performance in the cornerstones is intended to provide reasonable assurance of appropriately safe facility operation.

Figure 3 - Reactor Oversight Framework



Source: NRC

Within this framework, the Program: collects information about licensee performance; assesses the information for its safety significance; and provides for appropriate licensee and NRC response.

There are more than 30 baseline inspection procedures and 16 performance indicators across the seven cornerstones. The inspections are conducted by the resident inspector(s) assigned to the facility and regional specialists. The performance indicators are collected to provide a broad spectrum of data that is also used to assess the licensee’s performance. Collectively, these are not intended to cover every aspect of plant design and operation, so it is important that the elements of the assessment cover the optimal number of risk-significant aspects without undue overlap. Excessive overlap would reduce the number of aspects of operation evaluated at a given cost, which would make the oversight process less cost effective.

When there are findings of safety significance, the SDP is used to assess the safety impact and assign a color code that indicates the risk significance of the finding. Green findings indicate low risk significance, while White, Yellow, and Red findings indicate higher risk. Depending on the number and significance of the findings, the plant may be subject to additional oversight. The amount of oversight is determined by the ROP Action Matrix, which provides the basis for NRC oversight action to be taken in the event of findings from the oversight processes. The responses are set forth in the ROP Action Matrix, which calls for a response on the basis of increased risk as implied by the finding.

An example of additional oversight that might be conducted in accordance with the ROP Action Matrix is supplemental inspections. Some supplemental inspections are conducted by a multidisciplinary team of regional inspectors and may take place over several months. The ROP Action Matrix is summarized in the figure below.

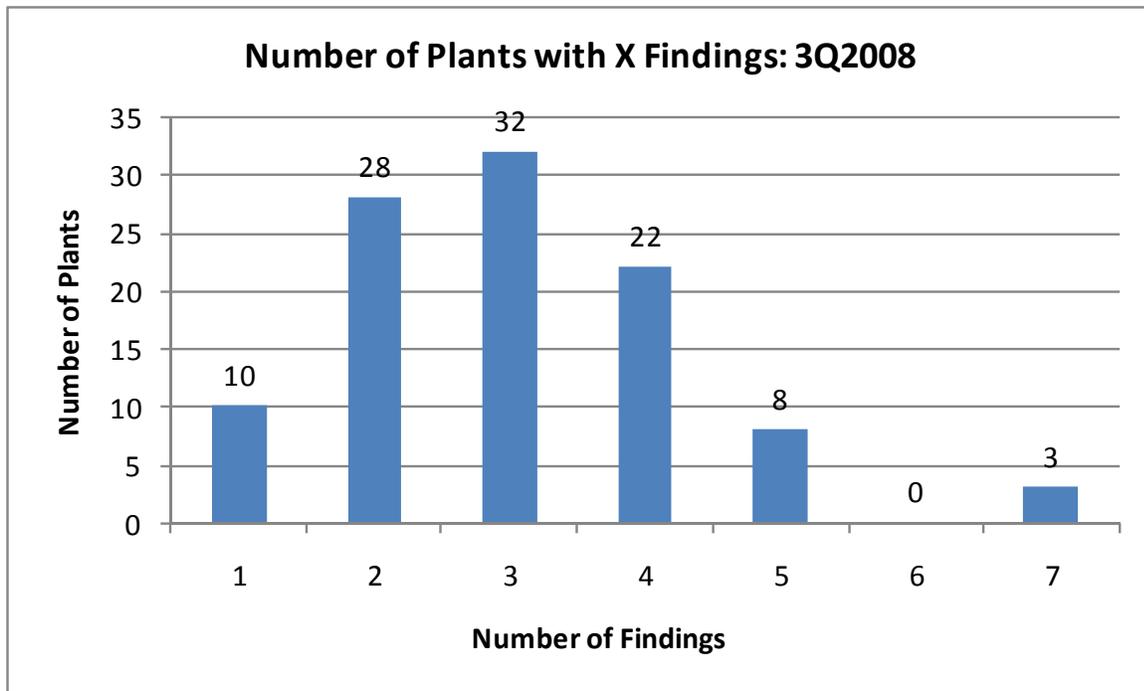
Table 3 - ROP Action Matrix Summary

NRC Response Plan or "Action Matrix"	
Assessment of Plant Performance (in order of increasing safety significance)	NRC Response
I. All performance indicators and cornerstone inspection findings GREEN <ul style="list-style-type: none"> • Cornerstone objectives fully met. 	<ul style="list-style-type: none"> • Routine inspector and staff interaction • Baseline inspection program • Annual assessment public meeting
II. No more than two WHITE inputs in different cornerstones <ul style="list-style-type: none"> • Cornerstone objectives fully met. 	Response at Regional level <ul style="list-style-type: none"> • Staff to hold public meeting with utility management • Utility corrective action to address WHITE inputs • NRC inspection followup on WHITE inputs and corrective action
III. One degraded cornerstone (two WHITE inputs or one YELLOW input or three WHITE inputs in any strategic area) <ul style="list-style-type: none"> • Cornerstone objectives met with minimal reduction in safety margin 	Response at Regional level <ul style="list-style-type: none"> • Senior regional management to hold public meeting with utility management • Utility to conduct self-assessment with NRC oversight • Additional inspections focused on cause of degraded performance
IV. Repetitive degraded cornerstone, multiple degraded cornerstones, or multiple YELLOW inputs, or one RED input <ul style="list-style-type: none"> • Cornerstone objectives met with longstanding issues or significant reduction in safety margin 	Response at Agency level <ul style="list-style-type: none"> • Executive Director for Operations to hold public meeting with senior utility management • Utility develops performance improvement plan with NRC oversight • NRC team inspection focused on cause of degraded performance • Demand for Information, Confirmatory Action Letter, or Order
V. Unacceptable Performance <ul style="list-style-type: none"> • Unacceptable reduction in safety margin 	Response at Agency level <ul style="list-style-type: none"> • Plant not permitted to operate • Commission meeting with senior utility management • Order to modify, suspend, or revoke license

Source: NRC

In reviewing the inspection data from the past 4 years, we looked to see if there was enough variation in the inspection findings to provide visibility to differences in performance among plants. The figure below shows the number of plants with a given number of inspection findings. The number is adjusted to reflect severity of findings. Green findings are consolidated within the finding's cornerstone as a single finding. White findings count as two, Yellow as three, and Red findings count as four.

Figure 4 - Number of Inspection Findings per Plant

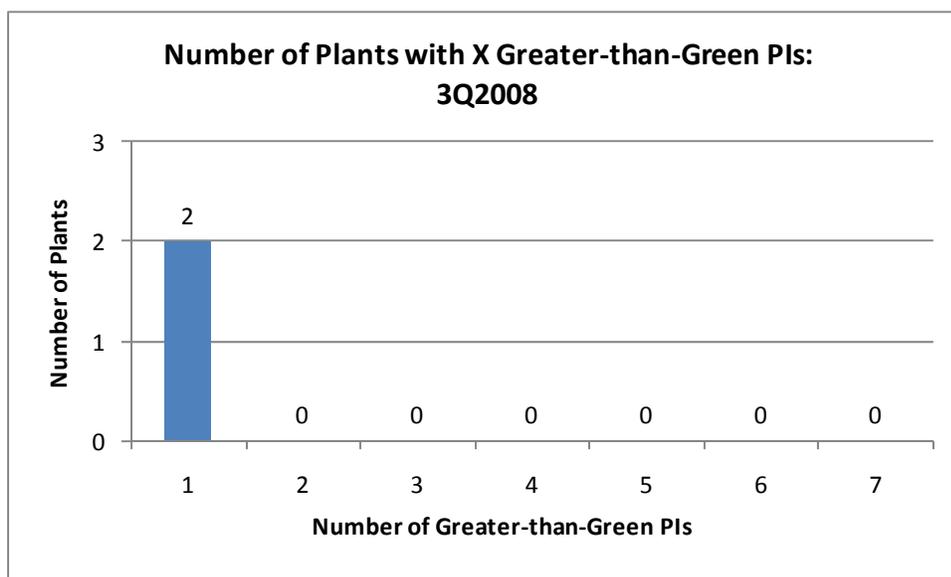


Source: NRC and FocalPoint analysis

As the chart above shows, there is enough variation in the number of findings per plant to provide some visibility to differences in performance. In addition, the inspections continuously result in findings that were not identified by the licensees. External and internal stakeholders were mostly positive about the effectiveness of the inspection program. However, many external and internal stakeholders who expressed positive views regarding the inspection program also expressed caveats. The Program has demonstrated a commitment to learning from feedback and experience gained. Based on our review, our finding is that the inspection program is generally effective at covering all of the safety-related areas and identifying degrading performance.

The figure below shows the number of plants with a given number of performance indicators greater than Green. There is little visibility to variation in performance. It should be noted that all of these plants are operating within columns 1-4 of the ROP Action Matrix and are therefore considered to be safe by the NRC.

Figure 5 - Number of PI Findings per Plant



Source: NRC and FocalPoint analysis

Unlike the inspection findings, the performance indicators show very little visibility to differences in performance among plants. In 3Q2008 only 2 plants had a greater-than-green performance indicator. In total, less than 0.1% of the performance indicators are greater than Green. As a result they provide little discrimination. There are a number of potential explanations for the lower number of greater-than-Green performance indicators (compared to the number of safety-significant inspection findings). For example: licensees may be closely monitoring the areas covered by the performance indicators and therefore operating more safely in those areas, than the areas covered by inspections. In such cases, the indicators would be contributing to and reflecting good performance by licensees. However, possible alternative explanations include: the thresholds between Green and White may be too high; there may be issues with data collection and analysis of the indicators; or there may be some fatigue in the indicators as licensees have learned how to obtain Green indicators.

The Program continues to focus its efforts to improve the performance indicators. Recent efforts such as replacing the Unplanned Scrams with Loss of Normal Heat Removal (USwLONHR) PI with the Unplanned Scrams with Complications (USwC) PI and review of MSPI indicators are examples of such efforts. Making such changes have been beneficial, but are also necessarily a time-consuming and expensive process for both the NRC and licensees. However, we believe the Program's improvement efforts should continue to focus on assessing the reasons for lack of variation in the PIs and ensuring that this does not undermine their utility as indicators of potential problems.

The SDP, described above, has been the subject of concern among some NRC staff and external stakeholders. Concerns expressed were difficulty in application; issues with timeliness and

determinations that were sometimes subjective and prescriptive, rather than risk-informed; and undue influence by licensees.

The Program has made recent improvements in the SDP. For example, in early 2008, the Program reviewed the SDP with stakeholders and received feedback on various aspects of the SDP to improve its effectiveness and efficiency. The scope of the review consisted of an evaluation of:

- The current criteria for a White finding to ensure consistency with risk-informed goals of the ROP;
- The entry conditions into the radioactive effluent release program branch of the SDP flowchart for spills and leaks; and
- The extent to which the SDP reflects the NRC Organizational Excellence objective.

Such improvement efforts demonstrate the Program's commitment to self-evaluation and improvement.

Overall, our finding is that the ROP framework and its components are effective. Issues such as the PIs can be tweaked within the framework; ongoing internal evaluation and improvement activities demonstrate the Program's commitment to continuous improvement.

Finding: Assessment-related activities are completed in accordance with the planned schedule

As discussed above, we believe the inspections, combined with the Program's improvement efforts (such as the ROP realignment) are effective in identifying problems and addressing the areas of safety significance. In order for the Program to ensure an appropriate level of safety, it must execute that framework in accordance with the planned schedule. The Program maintains a set of self-assessment metrics that present the extent to which various aspects of the licensee oversight activities are completed in accordance with the Program's plan. We reviewed data from the past 2 years on performance of assessment-related activities including inspections, timely PI data reporting and dissemination, completion of temporary instructions, final significance determinations, and assessment program results.

For each of these areas, we reviewed the metrics tracked, whether the targets were sufficiently ambitious, and whether or not the targets were met. In addition, in cases involving subjective metrics, we reviewed the underlying data and indicated whether we agreed or disagreed with the Program's self-assessment. Overall, we concur with the results of the Program's self-assessment. The table below sets out the key metrics that track the extent to which planned assessment-related activities are completed in accordance with the planned schedule.

Table 4 - Selected Annual ROP Self-Assessment Performance Metrics

Metric (Target)	Target Sufficiently Ambitious	Performed in Accordance with Plan	Concur with Assessment / Methodology
Documenting inspection finding in accordance with requirements (stable or improving trend)	Yes	Yes	Yes
Completion of inspection reports on a timely basis (90% or inspection reports issued on time)	Yes	Yes	Yes
Temporary Instructions are completed on a timely basis (All TI completed on time)	Yes	Yes	Yes
Public availability of inspection information is timely (stable or declining trend)	Yes	Yes	Yes
Inspection reports are relevant useful and written in plain language (trend average level of agreement)	Yes, but target should be clarified	Yes	Yes, but there were an insufficient number of external respondents
Final significance determinations are timely (90% processed in 90 days)	Yes	Yes	Yes

Source: NRC and FocalPoint analysis

Finding: Emergency exercises are planned and carried out effectively

The Program conducts exercises or drills throughout the year to practice mock scenarios that would be faced in a real incident. The objectives of these exercises include increasing preparedness and the ability to respond effectively to an incident in a way that assists in mitigating consequences to the public and the environment, and helping to provide assurances that the Program could apply the necessary resources to respond.

In general, there are three key challenges that organizations face in training for emergencies through drills or exercises that are not factors in training for routine operations.

- The first challenge is **retention of training knowledge and skills over time**, given limited opportunities to perform emergency response skills during normal operations.
- The second is **effective generalization of skills learned in training** and ability to transfer that knowledge to the significantly different demands that could arise in an actual emergency.
- The third challenge is **effective assimilation of individual efforts into a coordinated emergency response** (Ford and Schmidt, 2000).

To assess the Program in these areas, we interviewed program staff and external stakeholders, reviewed program documents, toured the Headquarters operation center, and observed a licensee exercise.

With regard to the first challenge, retention of training knowledge and skills over time, we reviewed the frequency of the drills/exercises and the extent to which the format of the exercise facilitated learning by the participants. The Program conducts four or five licensee exercises in

which NRC headquarters participates, along with NRC Regions, and licensees. In addition, each region participates in two to four exercises with licensees each year. This provides a sufficient number of drills/exercises since each of the approximately 300 responders is involved in a drill/exercise at least once a year, and the Agency routinely participates in Federal Agency exercises involving various aspects of Homeland Security-related areas of focus. In addition to the exercises, a variety of other training is conducted. These efforts include classroom training, read-and-sign training, and Web-based training. In addition to the incidence response drills conducted by Headquarters, licensees are evaluated in an exercise every two years and routinely in licensee-specific drills, actual events, and planned baseline inspections as part the emergency preparedness cornerstone in the reactor oversight framework. The NRC's incidence response performance-based training activities are aligned with selected licensee emergency preparedness exercise evaluations.

We found that the exercise we observed involved a well-developed scenario that addressed with sufficient realism the range of challenges that would be faced in a radiological emergency, plus additional challenges associated with response to a hostile action. The structure of the exercise included features such as handling responsibility broader than what responders would typically face, fixing problems created by others, developing new directions for the team, and managing pressures from external stakeholders. These types of challenges enhance learning (McCauley, Ruderman, Ohlott, and Morrow, 1994). Accordingly, we believe the Program addresses the first challenge effectively. The Program should also consider conducting post-exercise surveys of responders to obtain additional insight to knowledge gain and likelihood of retention.

To assess whether the second challenge was addressed, we reviewed the extent to which the drill forced responders to explore the situation to perform diagnostics and understand underlying issues. Drills that develop problem-solving skills improve the ability of learners to generalize what they have learned (McDaniel and Schlager, 1990). We found the drill effectively used techniques like providing updates to the problem without giving solutions, unexpected developments, and mitigation of problems when correct measures were taken.

Finally, with regard to the third challenge, effective assimilation of individual efforts into a coordinated emergency response, we reviewed the interaction of the teams (executive team, reactor safety team, protective measures team, safeguards team, liaison team, public affairs team, base team, site team and other federal agencies participating). As an observer, it was difficult to monitor the content of all communications. For the most part, there was good fidelity in communication between teams. The Program use of team chronologies, for example, which other teams could access, facilitated this communication. However, in a 2007 report, the Inspector General (IG) found weakness in NRC's coordination with State and local government authorities. The IG stated:

NRC has repeatedly demonstrated problems coordinating and communicating with State authorities during EP exercises. This weakness recurs because (1) NRC has not

clearly defined and communicated its coordination role to State and local authorities, and (2) has not followed a consistent approach for working with the States during these exercises. Inadequate coordination and communication adversely affects NRC's emergency operations with State agencies and could diminish the public's confidence in NRC.

The Program is taking steps to address this although we did not detect this weakness in the exercise we observed. We did find however, that the approach for evaluating exercises did not provide a good basis for documenting and communicating improvements in emergency preparedness resulting from exercises. Additional standardization in the evaluation process would help ensure consistency in evaluation, which could provide insights to overall trends in preparedness.

Finding: The Program works with licensees to complete performance indicators as planned

As described above, the performance indicators are part of the assessment process that uses indicators based on data collected from licensees and analyzed by NRC. As such, the overall assessments are integrated with licensees. We reviewed the Program's data on timeliness of performance indicator data reporting and dissemination. The Program has a goal of publishing the PI data within 5 weeks of the end of each calendar quarter, which is a reasonable goal. There were no late postings in the 24-month period that we reviewed.

Finding: Program documents are published in a timely fashion and are generally comprehensive and clear

We reviewed inspection and event notification reports, conducted interviews, and reviewed comments collected by the Program from internal and external stakeholders. We found the inspection reports were published in a timely fashion, well-written, and comprehensive. We believe the inspection reports would be reasonably clear to a reader with knowledge of the reactor oversight program. We believe a reader without working knowledge of the ROP would have difficulty understanding the inspection reports. That said, we found the "ROP Inspection Finding Summary" information that is available on the Web site to contain similar information and would be understandable to most readers even without knowledge of the ROP. Stakeholders providing comments to the Program regarding inspection reports noted some areas where improvements could be made. In particular, there were comments regarding the need for more detail on why a finding had risk significance. The Program is working to improve consistency in documentation of inspection findings, which should enable improved discussion of findings in the reports. We reviewed the log of event notification reports that document events reported by licensees. We found the event notification reports to be sufficiently comprehensive for the initial recording of events.

Standard 2: Takes appropriate actions to prevent degradation of safety and to promote safety improvements

For this standard, we evaluated the extent to which the Program was effective in taking action to prevent degradation of safety when plant performance declines and to promote improvements to safety. As with Standard 1, we evaluated standard 2 in the context of the Program's stated goals, authorizing legislation and stakeholder and constituent expectations.

Finding: The Program is effective in finding safety deficiencies, and issues are corrected, but there have been challenges resolving a long-standing issue related to fire protection

As discussed earlier, our finding is that the inspection process is effective at identifying safety deficiencies. We also examined the inspection findings data to identify the findings that were corrected (corrected being defined as not recurring within 1 year of the initial finding) as a percentage of total findings that occurred. On that basis, for the sample we examined, over 99% of the findings were corrected.

There have been some concerns expressed by some stakeholders about the amount of time some plants have remained in columns 3 and 4 of the ROP Action Matrix. We examined inspection findings for plants placed in column 4 of the ROP Action Matrix over the past five years to assess effectiveness in resolving safety issues identified at those plants. There were five such plants: Palo Verde 3, Perry 1, Point Beach 1, Point Beach 2, and Cooper. On average, these plants remained in column 4 for 9.6 quarters. We examined the inspection findings data to assess the extent to which the long period of time reflected challenges in getting deficiencies resolved, or instead reflected a conservative approach by the Program of keeping the findings open and maintaining increased oversight associated with column 4 until sufficient assurances could be made that issues have been resolved. Based on our review, we conclude the latter is the case. Take the case of Palo Verde 3, for example.

Palo Verde 3 was placed in column 4 in the fourth quarter of 2006 because of one Yellow finding in the Mitigating Systems cornerstone originating in the fourth quarter of 2004, and one White finding in the same cornerstone originating in the fourth quarter of 2006. There have been no new findings in this cornerstone in the last two quarters. In the most recent quarter there are no findings in any of the cornerstones. The Program keeps the original findings open and therefore the plant remains in column 4, in accordance with IMC 0305, which states:

Due to the depth and/or breadth of performance issues reflected by a plant being in the Multiple/Repetitive Degraded Cornerstone column of the Action Matrix, it is prudent to ensure that actual performance improvements (which typically take longer than several quarters to achieve) have been made prior to closing out the inspection findings and exiting the Multiple/Repetitive Degraded Cornerstone column of the Action Matrix.

In order to continuously monitor the rate at which deficiencies are corrected, the Program should consider a metric that presents correction rate. This would be the percentage of findings that do not recur within one year of the initial finding.

While there has been overall success in the resolution of safety deficiencies, there has been a long-standing issue associated with fire protection. Fires pose a significant risk to operating reactors. According to the NRC, approximately one-half of core damage risk results from accident sequences that initiate with fire events. The fire protection rules allow for manual actions or interim compensatory measures when the fire protection features in place do not meet requirements. The manual actions must be approved and in some cases interim measures have been in use for extended periods. While the NRC's regulatory positions on these issues are set out in Regulatory Issue Summaries 2006-10 and 2005-7, the NRC has not resolved several long-standing issues that have led to insufficient transparency in the regulatory context with respect to fire protection. In addition, the NRC lacks a comprehensive database on the status of compliance. The regulations are intended to provide prevention, suppression, and protection of plant shutdown capability. Non-compliance can affect this defense-depth-sequence. Issues that remain unresolved include:

- Licensees' use manual actions to ensure fire safety rather than fire protection features in place, such as fire barriers and automatic fire detection and suppression;
- Licensees' use of interim compensatory measures for extended periods of time, rather than making repairs;
- Uncertainty regarding the effectiveness of fire wraps as barriers; and
- Mitigating the impacts of short circuits that can cause simultaneous, malfunctions of safety-related equipment and complicate the safe shutdown.

In the near term, the impact of these issues could be mitigated through a centralized database on the use of exemptions from regulations, manual actions, or compensatory measures. This would facilitate tracking compliance trends. Issues such as these and others have also led to a lack of transparency in the regulatory context that has made it more difficult to enforce the fire protection rules (see Section 8). Given that the fire protection rules were established in 1980 and there is still significant reliance among licensees on interim measures and enforcement discretion, and there is non-compliance among some licensees, the Program plans to establish a lessons learned task force in calendar year 2009. We concur with this plan and encourage that lessons learned be applied where appropriate to other aspects of the Program's regulations.

Finding: The Program effectively records, analyzes, and responds to licensee incidents

The overall response to an incident is under the direction of the NRC Chairman or his/her designee. In an incident, response personnel are organized into teams, including an executive team, reactor safety team, protective action team, liaison team, safeguards team, base team, site team and public affairs team. The response to an event is tailored to the nature of the event. Upon receiving a notification of an incident, the HOC authenticates the source and screens the

incident. A record of the event is entered into a log. Information entered includes data such as the licensee, location, event time, person reporting event, emergency class, status of reactor operation, and description of the event. We reviewed this log and found the entries provided were clear and concise and provided a good base for initial analysis of the incident. The Headquarters Operations Officer (HOO) and the Headquarters Emergency Response Officer (HERO) notify designated regional and headquarters decision makers and a decision is then made on the level of response to address the incident. The response modes include:

- Monitoring mode: Initial level in which the responsible region leads the NRC's response;
- Activation mode: A higher level of escalation, in which NRC headquarters leads the response; and
- Expanded activation mode: A higher level of escalation involving deployment of a NRC site team to the licensee and delegation of specific authorities to a NRC site team director.

Based on our interviews of program staff and management, review of program documentation, tour of the HOC, and observations of activities of program staff responsible for recording licensee events, we believe the Program is effective in ensuring prompt and accurate recording of licensee events, developing a decision on whether to escalate, and maintaining an accurate and timely database of licensee events.

Finding: The Program needs to continue efforts to improve monitoring of safety culture within licensee organizations

In a risk-informed regulatory context, the NRC and licensees must adopt a role in which risk is managed in the overall context of safe plant operation. This requires a safety culture in which the emphasis shifts from only assuring compliance with rules to operating with an appropriate level of risk. This requires an open culture of communication and willingness to raise concerns about practices even if they are within the operating envelope of the technical specifications. With the use of risk-informed initiatives that provide more flexibility, there is more responsibility in assuring that the plant actions are well controlled and monitored (Kadat).

Although an accident in a plant may be the result of an action or inaction by an individual, many accidents are a result of conditions in the organization. The NRC evaluates whether a safety culture-related issue, which the Program calls substantive cross-cutting issue (SCCI), exists at each operating reactor twice a year. Among the substantive cross-cutting areas are human performance, safety-conscious work environment (which includes environment for raising concerns), and problem identification and resolution. These are called cross-cutting areas because they affect all of the ROP cornerstones. Each of the cross-cutting areas contains sub-areas the Program calls cross-cutting aspects. As part of the inspection process, safety culture aspects are assigned to inspection findings. A SCCI may be indicated when there are the requisite number of inspection findings that have been assigned cross-cutting aspects, causal factors with a common theme, and the Program has a concern about the licensee's progress in addressing the deficiency.

Based on input from interviewees and internal stakeholders, the uniqueness and subjectivity of safety culture assessments are challenging for inspection staff. Consideration should be made for augmenting regional staff who have specialized knowledge in the area of safety culture. Effective partnership and cooperation with licensees is important for inspection staff to obtain the necessary information for effective safety culture assessments. We believe the Program is on the right track with its approach and the recommendations under consideration from the lessons learned with Palo Verde.

Standard 3: Performs oversight and incident response activities in cost-effective manner

Finding: Budgeted program costs per unit of output are increasing. This is in part due to increasing scope of the Program and higher staffing costs at the NRC.

We compared enacted budget figures for program support costs from the NRC Performance Budget to aggregate power output of licensed facilities as an indicator of change in program costs for 2005 through 2007. Ideally, actual costs should be used, and the Program should collect this information and track this metric. As the table shows, the budgeted cost per megawatt-hour has increased over the past 2 years. This is due in part to broad-based increases in employment costs. In the U.S., compensation costs among civilian workers increased 3.0% in 2005, 3.3% in 2006, and 3.3% in 2007 (Bureau of Labor Statistics, 2008). In addition, there has been some expansion in the scope of the Program during this time period. For example, the Program’s oversight activities include increased assessments of licensees’ safety culture and additional aspects of security. It is also a result of generally higher costs in the NRC stemming from expansion of staff and the associated recruiting, training, and turnover costs.

Table 5 - Budget Program Costs per MWh

Year	Power Generation (MWh)	Program Support Costs (M)	Cost/ MWh
2005	781,986,365	\$122.1	\$0.16
2006	787,218,636	\$142.3	\$0.18
2007	806,486,978	\$150.8	\$0.19

Source: NRC, NEI and FocalPoint analysis

2.4. Recommendations

Train regional staff as subject-matter experts for safety culture assessment

The evaluation of safety culture is an important part of the assessment process, but based on input from interviewees and internal stakeholders, we believe the uniqueness and subjectivity of safety culture assessments are challenging and time consuming for inspection staff. The

Program should recruit and train a group of individuals to have more knowledge in the area of safety culture. These individuals would be a resource for inspectors making SCCI assessments and could facilitate knowledge sharing and consistency in assessment of safety culture. In addition, they could provide guidance and standards, as needed, for the independent safety culture assessments performed by licensees in column 4 of the ROP Action Matrix. Training staff to develop specialized knowledge in the area safety culture would yield benefits including more high quality safety culture assessments and increased consistency that would lead to higher credibility with constituents and stakeholders.

Continue to focus on assessing the reasons for lack of variation in performance indicators in order to ensure that this does not continue to undermine their utility as indicators of potential problems

The performance indicators provide limited visibility to variations in plant performance. As such, it is more difficult to confirm their utility as indicators of potential problems. The Program should continue to assess the reasons for lack of variation in the performance indicators. To the extent that the lack of greater-than-Green indicators does not reflect good performance on the part of the licensee, the Program should consider options such as: reviewing and modifying thresholds for White, Yellow, and Red indicators; reviewing inspection procedures for validating licensee methodology in collecting and reporting data for the performance indicators to ensure an accurate assessment of performance; and identifying options for modifying indicators on a regular basis in order to reduce fatigue of the indicators.

Enhance exercise evaluations through improved standardization; incorporate a post-exercise survey of respondents and input from participating government agencies

To ensure that post-exercise evaluations are consistently performed, provide opportunity for and documented evidence of participant feedback and self-critique, include non-NRC response stakeholders (e.g. State, local, Federal organizations) involved in the drill/exercise/event, and ensure that clear documentation of the process is evident, the post-exercise/event evaluation process should be clearly described in IR procedures. These procedures should include:

- Preparatory actions for coordination with offsite response organizations (OROs) regarding their participation or observance;
- Post-exercise/event critique review forms used in soliciting and documenting participant comments;
- Format and timeliness schedules for post-action reports; and
- Instruction and retention guidance for evaluation materials.

Adopt performance metric to reflect safety deficiency correction rate

To track the extent to which issues identified in inspections or through PIs are corrected, the Program should consider adopting a metric that tracks safety deficiency correction rate, such as:

The percentage of findings that do not recur within 12 months of the original finding.

This metric could replace the existing metric:

Number of operating reactors whose integrated performance entered the Inspection Manual Chapter 0350 process, the multiple/repetitive degraded cornerstone column or the unacceptable performance column of the ROP Action Matrix.

OMB has criticized the existing metric as not being ambitious enough and lacking in the ability to show trends. We believe the proposed metric provides an opportunity to set a metric with an aggressive target, e.g., over 99%. The value would increase as the number of overall findings increases, and the number of findings are resolved and do not recur. In addition, since there are a large number of findings, tracking of this metric would provide visibility to trends.

Adopt metric to track program efficiencies (Program Cost per MWh)

In order to monitor the program costs, the Program should adopt efficiency metric, program cost per aggregate power output of licensed facilities.

$$\text{Program Cost per MWh} = \frac{\text{Direct program costs}}{\text{Aggregate power output of licensed facilities}}$$

This measure reflects increased benefits to the public as a result of risk-informed regulation, underlying research, and other activities supporting power uprates. To the extent that the scope of security-related assessment has increased over time, NRC may want to limit this metric to safety-related assessment and incident response cost to facilitate comparison over time.

Conduct a lessons learned study to assess the history of and causes for the fire protection issues

Given that the fire protection rules were established in 1980 and there is still significant reliance among licensees on interim measures and enforcement discretion, and there is non-compliance among some licensees, the Program plans to establish a lessons learned study in calendar year 2009. We concur with this plan and encourage that lessons learned be applied where appropriate to other aspects of the Program's regulations to help to identify ways to avoid similar problems in the future.

Implement a database to track the status of fire protection exemptions, compensatory measures, and manual actions in place at plants in order to facilitate the assessment of compliance trends

Given the reliance among licensees on interim measures, the Program should implement a central database of interim compensatory measures being used in place of permanent fire protection features. Such a database could help the NRC track trends of compliance to the fire protection rules. Such information could help the NRC make informed decisions as it works to resolve this long-standing issue.

3. Budget Performance Integration

3.1. Objectives / Key Activities

For over a decade, the NRC has evolved its Planning, Budgeting, and Performance Management (PBPM) process, which integrates the agency's strategic planning, budgeting, and performance management processes. The NRC created the PBPM process in the fall of 1997 in response to the enactment of the Government Performance and Results Act (GPRA), which provided for the establishment of strategic planning and performance measurement in the Federal Government as well as an increased emphasis on accountability and results. Since that time, the NRC has evolved its PBPM process to meet internal agency requirements as well as changing mandates from the Congress, the executive branch, and other external stakeholders.

Under the current administration, improving the integration of budget and performance is one of the high-priority initiatives in the President's Management Agenda (PMA). A part of this initiative is the Office of Management and Budget's (OMB) diagnostic tool, the Program Performance Assessment Rating Tool (PART), which is designed to provide a consistent approach to reviewing program design, planning, and goals development as well as program management and results. Other significant legislation that is pertinent to budget performance integration includes the CFO Act of 1990, which provides for long-range planning, requires audited financial statements and modern financial systems, and strengthens accountability reporting. Title 31 of the *United States Code* provides the legal foundation for the federal budget process in the executive branch; OMB Circular No. A-11, "Preparing and Submitting Budget Estimates," is the guidance issued to agencies by OMB to ensure compliance with these budget laws and to obtain information needed to formulate the President's Budget.

In support of its efforts to be open and transparent, the NRC communicates to the Congress, OMB, NRC staff, and other stakeholders its strategic direction, required resources and activities, and performance measures through the Strategic Plan, Performance Budget, and the Performance and Accountability Report (PAR). Some recent accomplishments of the Agency in this area include receiving the Certificate of Excellence in Accountability Reporting (CEAR) award for the seventh straight year from the Association of Government Accountants (AGA) for the FY 2007 PAR. This PAR was also ranked fourth out of 24 agencies by the Mercatus Center, which rates Federal agency PARs according to how well they inform the public. The GAO also recently recognized the NRC for the improvements in recent survey results regarding the agency's use of performance information; and the CFO was invited to provide Senate testimony on how the NRC is using performance information to improve management of NRC programs in late July 2008.

The budget performance integration efforts of the Program support the agency's organizational excellence objectives of openness, effectiveness, and operational excellence as identified in NRC's current Strategic Plan for FY 2008-2013. Each year, the Office of the Chief Financial

Officer (OCFO), in coordination with the Office of the Executive Director of Operations (OEDO), issue guidance to the program and support offices for developing the performance budget. NRR is the lead program office for the Reactor Oversight program budget and NSIR is the lead program office for the Incident Response program budget. The Budget Formulation Team within PMDA of NRR and NSIR are responsible for coordinating the budget process for the RO and IR program, respectively, and interacting with the OCFO throughout the PBPM process. In the FY 2009 Performance Budget, the budget request for the Program totaled \$279.0 million, including 1,165 FTE. The table below provides additional detail on the program budget for Reactor Oversight and Incident Response from the NRC Performance Budget for FY 2009:

Table 6 - Reactor Oversight and Incident Response Program Budget Authority and FTE

	FY 2007		FY 2008 Enacted		FY 2009 Request		FY07-FY08 % Change		FY08-FY09 % Change	
	\$M	FTE	\$M	FTE	\$M	FTE	\$M	FTE	\$M	FTE
	RO Program Support	\$139.0	847	\$139.5	838	\$148.6	848	0.4%	-1.1%	6.5%
RO Infrastructure and Support	\$95.4	241	\$99.8	238	\$106.8	247	4.6%	-1.2%	7.0%	3.8%
Subtotal RO	\$234.4	1,087	\$239.3	1,076	\$255.4	1,094	2.1%	-1.0%	6.7%	1.7%
IR Program Support	\$11.8	50	\$12.9	56	\$16.0	53	9.3%	12.0%	24.0%	-5.4%
IR Infrastructure and Support	\$5.6	12	\$6.7	16	\$7.6	18	19.6%	33.3%	13.4%	12.5%
Subtotal IR	\$17.4	62	\$19.6	72	\$23.6	71	12.6%	16.1%	20.4%	-1.4%
Total RO-IR Program Support	\$150.8	897	\$152.4	894	\$164.6	901	1.1%	-0.3%	8.0%	0.8%
Total RO-IR Infrastructure and Support	\$101.0	253	\$106.5	254	\$114.4	265	5.4%	0.4%	7.4%	4.3%
Total RO-IR	\$251.8	1,150	\$258.9	1,148	\$279.0	1,165	2.8%	-0.2%	7.8%	1.5%

Source: NRC Performance Budget for FY 2009 and FocalPoint analysis

The key components of the PBPM process are: 1) setting the strategic direction; 2) determining the planned accomplishments and budgeting resources; 3) executing the budget and monitoring performance; and 4) assessing the performance and providing feedback for adjusting strategy and the budget. Our assessment of this evaluation area touches on all four components of the PBPM process; however, our primary focus was on the second and third components related to budget formulation and performance management.

3.2. Approach

The approach for assessing this evaluation area consisted of four key components as outlined below.

1. Review of relevant documentation and published material. We reviewed both internal program documentation and conducted a brief literature review of published documentation related to budget performance integration. The following internal documents were reviewed:

- FY 2008 - FY 2013 Strategic Plan
- FY 2004 - FY 2009 Strategic Plan

- Components of FY 2010 Performance Budget
- FY 2009 Performance Budget
- FY 2008 Performance Budget
- FY 2007 Performance Budget
- FY 2007 PAR
- 2003 OMB PART Assessment of Reactor Inspection and Performance Assessment
- 2007 OMB PART Assessment of Decommissioning and Low Level Waste
- 2007 OMB PART Assessment of High-Level Waste Repository
- MD 4.2 Administrative Control of Funds (2008)
- MD 4.3 Financial Management Systems (2005)
- MD 4.7 Policy and Practices Governing NRC Long-Range Planning, Budget Formulation, and Resource Management (1989)
- OCFO Budget Call Guidance for FY 2010 PBPM
- OCFO Budget Call Guidance for FY 2009 PBPM
- OCFO Budget Call Guidance for FY 2008 PBPM
- Components of FY 2010 Office budget submissions
- FY 2009 Office budget submissions
- FY 2008 Office budget submissions
- Office operating plans
- Office performance monitoring reports
- Office operating reports
- Advice of Allowances and Financial Plans
- Office instructions and guidance
- PBPM process documentation from OCFO
- CY 2007 Annual ROP Self-Assessment Report
- ROP Budget History – Significant Events Impacting ROP Budgets
- U.S. Nuclear Regulatory Commission Charter for the Performance Improvement Panel Reactor Oversight Process Initial Implementation Evaluation Panel Final Report (2001)
- OIG, Audit of the Budget Formulation Process (2005)

We also reviewed the following documents:

- Government Accounting Office (GAO) results-oriented budget practices in federal agencies and other GAO studies related to budget performance integration and performance improvement
- OMB PART Guidance 2008
- President’s Management Agenda (PMA) criteria for getting to green on Budget Performance Integration
- Federal Deposit Insurance Corporation Strategic Plan, Budget, PAR, OMB PART and other organizational documents
- Department of Interior Budget Request, PAR and OMB PART for Office of Surface Mining – Federal Managed Regulation of Surface Coal Mining and Abandoned Mine Land Reclamation
- International Federation of Accountants: Costing to Drive Organizational Performance
- Mihm: Implementing GPRA: Progress and Challenges
- Skelly: Improving Integration of Performance Information in Congressional Budget Justifications
- Hoge & Martin: Linking Accounting and Budget Data
- Beck & Davis: President’s Management Agenda: Performance Improvement Initiative

From the literature review, we identified a set of best practices and criteria to be used as standards for the assessment.

2. Conduct staff interviews. We conducted interviews with stakeholders, constituents and program staff. We developed interview guides and conducted semi-structured, confidential interviews to obtain information related to program planning, budgeting, and performance management.

3. Review organizations successful at budget performance integration. We identified two organizations that we deemed exhibited relevant best or leading practices. To identify organizations, we used a combination of FocalPoint databases and literature and Web searches. We reviewed regulatory-based programs that have demonstrated success in the area of budget performance integration, including:

- Department of the Interior – Office of Surface Mining, Federal Managed Regulation of Surface Coal Mining and Abandoned Mine Land Reclamation; and
- Federal Deposit Insurance Corporation – Regulation and Examination Program.

4. Analyze current performance. Based on the standards established from our literature review and examination of successful organizations, we performed financial and operational analysis to compare the Program’s current performance against these criteria.

To evaluate the Program's budget performance integration, we assessed the Program on the following standards:

- Performance informs budget formulation;
- Reliable estimates of costs and resources are produced; and
- Program can relate performance, budget, spending, and workforce information.

3.3. Findings

Standard 1: Performance informs budget formulation

For this first evaluation standard, we based our assessment on a combination of GAO's framework for results-oriented budget practices, OMB Circular A-11 guidance, and OMB PART criteria. We performed our evaluation by reviewing program documentation, conducting interviews with program officials, and assessing the extent to which the Program meets the specific criteria for this standard. These criteria include:

- Receives general guidance on agency goals, performance issues, and resource constraints for budget formulation;
- Considers relative priorities, performance issues, and other factors to weigh competing needs and decide funding levels;
- Coordinates with other entities to achieve common goals and avoid duplication;
- Defines the relationship between resources and annual and long-term performance goals;
- Demonstrates the impact of funding on expected performance; and
- Provides justification that the requested resources enable the program to achieve its performance goals.

At the end of August 2007 after the FY 2009 PBPM process was completed, the Commission directed the CFO to provide options for improving the budget formulation process. As a result, the budget formulation process changed for the FY 2010 budget and more changes are planned for the FY 2011 budget. Although we reviewed both past and current documentation related to the PBPM process, when assessing the performance budgeting process, our review primarily focused on the current process used for the FY 2010 budget since the FY 2011 process was still in the early development stages. To evaluate the presentation and transparency of the program budget to stakeholders, we reviewed the FY 2009 and FY 2008 Performance Budgets. When assessing budget versus actual results, we reviewed financial and operating performance information for FY 2006 through FY 2008 depending on data availability.

Based on our assessment, we found the Program has an effective budget process that is informed by the agency's strategic direction, influenced by program considerations and priorities, and coordinated with program support offices. However, improvement is needed to define the

linkage between outputs and outcomes and demonstrate the impact of funding on performance. Below are our detailed findings for this evaluation standard.

Finding: The Program's budget process has effective top-down strategic direction and guidance for budget formulation; program considerations and priorities to weigh competing needs and decide funding levels; and coordination with other entities to achieve common goals and avoid duplication

Using the Strategic Plan, actual expenditures from prior years and current estimated resource needs, the Program develops an annual budget, identifying the planned activities and resources necessary for accomplishment. The Commission provides high-level planning objectives for budget development and prioritization of planned activities. Using these planning objectives from the Commission and financial data from OCFO, the lead program offices coordinate with all of the offices that support the Program to develop the budget proposal.

As described in the budget formulation process documentation and the budget call guidance, the budget process begins with the request from the CFO and EDO to lead program offices to develop planning assumptions, a workload analysis, and out-year workload trends for the program budget. These planning products identify the key cost drivers, external factors, and internal influences affecting program activities and support development of the program budget request. Offices are then asked to prioritize the most significant planning assumptions while OCFO develops the financial considerations, which may include expected OMB cuts based on historical data and an assessment of unobligated and unliquidated funds. The CFO and EDO then brief the Chairman on financial and program considerations and priorities. The Chairman then develops planning objectives and shares these with fellow Commissioners, resulting in a Staff Requirements Memo (SRM) that provides Commission planning guidance to the program staff.

The CFO issues budget guidance to the lead program offices and communicates the planning objectives and priorities issued by the Chairman in consultation with the Commission. The program offices use the planning objectives and priorities to develop their budget proposals. Additional program direction is provided by the Deputy EDO (DEDO), including specific guidance for the Program and workload expectations for planned activities, to ensure the budget developed by the offices is aligned with a top-down strategic direction to achieve common goals and avoid duplication. Based on the guidance, the lead program offices coordinate with all of the offices that support the Program to develop workload and resource estimates, as well as performance and output measures for the program budget. Program support staff expressed concerns regarding how 'major drivers' (i.e., that level in the budget structure between the planned activity and subprogram levels) were defined by OCFO for the FY 2010 budget cycle. Staff suggested increased communication and coordination between the program offices and OCFO in defining major drivers that best reflect significant program activities. Program support staff also identified the need to better define roles and responsibilities of all parties involved in the budget process, which include OEDO, OCFO, lead offices and supporting offices. While the

changes to the FY 2010 budget process were regarded as positive improvements, the staff felt that clearly established roles and responsibilities would support improved coordination and collaboration among the offices resulting in the development of a robust budget proposal for the Program.

Finding: Improvement is needed in defining the relationship between resources and annual and long-term performance goals

The program budget as presented in the FY 2009 Performance Budget as well as the internal program budget submission does not define the relationship between annual and long-term performance goals and resources for the Program. The presentation of the program budget request is linked to a limited number of output measures but the funding request is not tied to the Program's performance measures, strategic outcomes, or strategic goals. There is a separate section on performance measures that aligns the agency's two main programs with its two strategic goals; however, there is no breakdown of the RO-IR program budget request between the safety and security strategic goals to demonstrate the Program's contribution. Also, there is a crosswalk in the appendix that shows which programs contribute to each strategic goal and performance measure, but there is no linkage to resources.

The program offices that support the RO-IR program have reporting that provides some insight to the budget performance linkage but these reports are limited to each individual office and do not provide a transparent and comprehensive account of the Program. For example, NRR, the lead office for RO, has a Performance Monitoring Report (PMR) that links a portion of the office's budget to some of the Program's annual performance goals; however, this report does not account for all of the office's program resources and it does not tie resources to long-term performance goals. NSIR, the lead office for IR, has the Division of Preparedness and Response (DPR) OPS Plan Performance Indicators Report that ties each annual performance goal to a long-term goal of safety or security or an organizational excellence objective; however, there are no linkages to resources in this report.

From an analysis of the Program's budget structure and the operating plans for the program support offices, it appears that the program budget request could be broken down by strategic goals, safety and security, based on the planned activity code; however, the Program would need to coordinate with OCFO, who leads the budget formulation process and development of the annual performance budget to present the program budget in this way. In addition, the Program needs to define the relationship of all program resources to annual performance goals to improve the transparency of the annual performance budget.

Finding: The Program provides justification that the requested resources enable the Program to accomplish its planned activities and output targets but needs improvement in demonstrating the impact of funding on annual and long-term outcomes

The Program's funding request goes through various levels of internal and external review that requires the Program to provide adequate budget justification prior to approval. These levels of

review and approval include CFO/EDO, Chairman, Commission, OMB, and the Congress. In addition, the agency's budget process includes a Scenario Planning component, which requires the Program to explain the impact of a reduction in resources and benefits of additional resources. However, the explanation provided by the Program primarily demonstrates the impact on outputs rather than outcomes. In some instances, the Program provides details of the impact on a specific activity, or references an improvement or reduction in the agency's goals for safety or security, but the explanations are limited in demonstrating the quantitative and qualitative impact on annual and long-term outcomes. The Program does not perform rigorous marginal cost analysis to accurately estimate the marginal cost (e.g., +/- 10%) of changing performance goals.

Although the Program is able to provide justification for resource estimates based on historical performance and risk-informed assessment of emerging needs, the program budget request does not answer the question, "If funding were increased/decreased by X, this program would be able to achieve Y more/less outcomes." With the Program's goal of zero nuclear accidents and the public's intolerance for a nuclear incident, developing a programmatically relevant marginal cost model represents a challenge to the Program. The Program may consider developing a marginal cost analysis to demonstrate the impact of funding on output performance and extrapolating these results to provide a qualitative explanation of the impact on annual and long-term outcomes.

Standard 2: Reliable estimates of costs and resources are produced

For this second evaluation standard, we based our assessment on a combination of GAO's framework for results-oriented budget practices and OMB Circular A-11 guidance. We performed our evaluation by reviewing program documentation, analyzing office and program budget submissions, reviewing financial and operating performance reports, and conducting interviews with program officials. Based on our review and analysis, we assessed the extent to which the Program meets the specific criteria for this standard, including:

- Bases its budget estimates on reasonable assumptions about factors affecting program costs or budgetary resources; and
- Looks back to assess the accuracy of previous estimates and makes appropriate adjustments to estimating methods.

Because of the changing program budget structure and process in recent years and limited availability of data we were unable to perform a budget vs. actual assessment for the entire program budget on this standard. As an alternative approach, we evaluated the budget estimation methodology of the Reactor Oversight Process (ROP) which accounts for more than half of the RO program budget. We also reviewed the performance and budget planning products and budget requests submitted by NRR and NSIR for the RO and IR program, which included the Environmental Scan, Methodology for Determining Resources, Budget Resource Worksheet,

Budget Request by Program, and Scenario Planning. Below are our findings for this evaluation standard.

Based on our assessment for this standard, we found the Program produces reliable estimates of costs and resources for the ROP. Below are our detailed findings for this evaluation standard.

Finding: The Program bases its budget estimates on reasonable assumptions about factors affecting program costs and resources, and looks back to assess the accuracy of previous estimates, and makes appropriate adjustments to estimating methods

Each year, as a part of the annual ROP self-assessment, the Program reviews the inspection procedures and resources expended for the ROP to better understand the reasons for regional variations and differences in resources required to complete a procedure at different sites. This review also helps to determine if adjustments to the frequency and scope of individual procedures were appropriate and resulted in an accurate and realistic resource estimate for the ROP. The results of this analysis are used to make any necessary adjustments to the ROP Resource Model, which is used to formulate future ROP resource requirements. This annual assessment ensures the ROP resource model produces reliable estimates for ROP resource requirements. In 2007, RO also implemented a Biennial Inspection Process Review to streamline inspection procedures and focus resources on highest value efforts. The reallocation of resources to highest value activities based on risk-informed assessment through the Annual ROP Self-Assessment and the Biennial Inspection Process Review demonstrates how the Program uses actual operating performance to produce reliable cost estimates.

In addition, as a part of the budget formulation process each year, the Program is required to document key planning assumptions and develop a preliminary assessment of workload strategy and out-year workload trends. Key planning assumptions are the external factors and internal influences that significantly affect the Program's work activities and resource requirements. The Program is also required to provide an explanation of the budget estimation methodology in the Methodology for Determining Resources attachment that accompanies the Budget Request by Program submission. NSIR also prepares Background/Issue Papers for some key line items in the IR budget request, which provide additional justification for IR budget estimates.¹ OCFO performs an independent financial analysis of the budget submissions while OEDO conducts programmatic analysis on the integrated budget.

Standard 3: Program can relate performance, budget, spending, and workforce information

For this evaluation standard, we based our assessment on a combination of GAO's framework for results-oriented budget practices, OMB Circular A-11 guidance, and OMB PART criteria. We performed our evaluation by reviewing program documentation, analyzing office and program budget submissions, reviewing financial and operating performance reports, and

¹ Background/Issue Papers were developed by NSIR but are not required for the FY 2010 budget process and are not likely to be required for the FY 2011 process.

conducting interviews with program officials. We assessed the extent to which the Program meets the specific criteria for this standard, including:

- Relates budget, workforce, accounting, and performance information; and
- Accounts for both the direct and indirect costs needed to meet performance targets and achieve program goals.

Based on our review and analysis, the Program needs improvement in relating performance, budget, spending, and workforce information. Below are our detailed findings for this evaluation standard.

Finding: The Program needs improvement in relating budget, workforce, accounting, and performance information.

As part of the budget development, the program staff identifies measures and targets that supplement those in the annual performance budget to track expected performance in the areas of quantity, cost, quality, and timeliness of planned activity products. These measures are included in the Operating Plans of the program offices. During the budget execution year, performance is monitored and reported to various levels of agency management. For example, in NRR, the lead office for the RO program, senior management meets monthly to review the Performance Monitoring Report, which reports the office performance on its annual Operating Plan. This monthly report relates a portion of the budget and FTE allocations to actual obligations and FTE utilization as well as to performance targets and results. On a quarterly basis, offices are required to submit performance reports to OEDO via the SharePoint site, which serves as a data collection and reporting system. Then, office directors meet with the respective DEDOs to review office performance in meeting program goals and objectives each quarter. In NSIR, the lead office for IR, there is the DPR OPS Plan Performance Indicators Report that tracks the performance of the IR program against the operating plan. Both NRR and NSIR have financial reports, such as the Financial Plan tracking spreadsheet and FTE utilization reports in NSIR and the Budget Execution Status Report in NRR, which track budget vs. actual financial performance. The Funds Control Team in OCFO also issues the monthly and quarterly Budget Execution Report (BER) that relates budget, workforce, accounting, and performance information for the agency overall and allowance holders.

While there are budget execution reports at the agency, allowance holder, and office levels and other financial and performance reporting at the office level, there is no comprehensive monitoring and reporting at the program level that provides a complete account of performance for resources budgeted vs. expended, which are tied to outputs/outcomes targeted vs. achieved with those resources. As noted in the first standard above, the Program needs improvement in relating budget to performance. In addition, the agency needs to improve its information systems to allow for efficient and timely data collection, analysis, and reporting of this information at the program level and must also assign responsibility for financial and performance management at the program level.

Finding: The Program accounts for both the direct and indirect costs needed to meet performance targets and achieve program goals but further assessment is recommended to ensure that the full cost budget allocation for infrastructure and support is accurate

The program budget as presented in the NRC Performance Budget for FY 2009 accounts for both direct and indirect costs of the Program. As explained in Appendix III, Explanation of the Full Cost Budget Allocation, of the Performance Budget, the indirect costs, (also referred to as infrastructure and support costs) for the agency were identified and distributed to programs as a portion of the total program cost consistent with the allocation methodology used for preparing the agency's financial statements. The agency's infrastructure and support involve centrally managed activities that are necessary for the staff and agency programs to achieve their goals. These activities include rent and facilities management, approved space acquisition, physical and personnel security, administrative support services, acquisition of goods and services, human resources management, training and development, matters involving small and disadvantaged businesses and civil rights, information technology, information resources management, planning and budget analysis, accounting and finance, and policy support services to the Commission and program area staff in performing regulatory mission activities and achieving their performance goals. From our interviews with program and support office staff, we found some concerns regarding the allocation methodology and that the indirect cost allocation to the Program may be inaccurate.

In response to our interview findings, we conducted a direct vs. indirect cost analysis of the Nuclear Reactor Safety Program (NRS) and compared RO and IR percentages with the other subprograms. Direct costs are the Program Support costs and indirect costs are the Infrastructure and Support costs from the NRC Performance Budget for FY 2009. We found that the indirect portion of total RO funding was significantly higher by 10 percentage points on average when compared with other subprograms in NRS. The table below shows the indirect percentage for RO in FY 2009 is almost 42% versus 32% for NRS overall. The IR program is consistent with NRS at 32%. We also calculated the indirect cost percentage for the Nuclear Materials and Waste Program, which was lower at 29%. We recognized that the total FTE for RO is relatively higher; however, when we applied a pro-rata share of RO indirect costs based on RO FTE, we came up with an indirect cost percentage of 36%. We attempted to meet with the manager responsible for the full-costing allocation to better understand the variance but because of timing constraints, we were unable to further investigate and provide an explanation for this report. There may be a reasonable programmatic explanation for this difference, but because we have limited information, we included a recommendation for the Program to assess the full-costing allocation methodology to ensure the infrastructure and support costs that are allocated to the RO-IR program are indeed accurate.

Table 7 - Direct vs. Indirect Cost Analysis of Nuclear Reactor Safety Program Budget

Nuclear Reactor Safety (NRS)	FY 2007		Enacted FY 2008		Request FY 2009		% Direct					
	\$M	FTE	\$M	FTE	\$M	FTE	FY 2007		FY 2008		FY 2009	
							\$M	FTE	\$M	FTE	\$M	FTE
Program Support (Direct)												
New Reactors	\$93.2	355	\$178.9	667	\$175.0	668	75.2%	79.2%	76.3%	83.5%	73.7%	82.3%
Reactor Licensing Tasks	146.6	645	150.5	642	162.5	648	71.3%	81.3%	70.5%	81.1%	72.1%	81.7%
Reactor Oversight	139.0	847	139.5	838	148.6	848	59.3%	77.8%	58.3%	77.9%	58.2%	77.4%
Reactor License Renewal	19.4	93	14.3	88	23.8	108	71.1%	81.6%	63.6%	81.5%	71.5%	83.1%
Incident Response	11.8	50	12.9	56	16.0	53	67.8%	80.6%	65.8%	77.8%	67.8%	74.6%
International Activities	5.9	32	8.2	31	8.3	30	68.6%	82.1%	72.6%	81.6%	73.5%	81.1%
Subtotal Program Support	\$415.9	2,022	\$504.3	2,322	\$534.2	2,355	67.4%	79.5%	68.1%	80.5%	67.9%	80.2%
Infrastructure & Support (Indirect)												
New Reactors	\$30.8	93	\$55.5	132	\$62.5	144	24.8%	20.8%	23.7%	16.5%	26.3%	17.7%
Reactor Licensing Tasks	59.0	148	63.0	150	63.0	145	28.7%	18.7%	29.5%	18.9%	27.9%	18.3%
Reactor Oversight	95.4	241	99.8	238	106.8	247	40.7%	22.2%	41.7%	22.1%	41.8%	22.6%
Reactor License Renewal	7.9	21	8.2	20	9.5	22	28.9%	18.4%	36.4%	18.5%	28.5%	16.9%
Incident Response	5.6	12	6.7	16	7.6	18	32.2%	19.4%	34.2%	22.2%	32.2%	25.4%
International Activities	2.7	7	3.1	7	3.0	7	31.4%	17.9%	27.4%	18.4%	26.5%	18.9%
Subtotal Infrastructure & Support	\$201.4	522	\$236.3	563	\$252.4	583	32.6%	20.5%	31.9%	19.5%	32.1%	19.8%
Total NRS Program	\$617.3	2,544	\$740.6	2,885	\$786.6	2,938						

Note: Numbers may not add due to rounding.

Source: NRC Performance Budget for FY 2009 and FocalPoint analysis

3.4. Recommendations

Establish published crosswalk of the program budget to demonstrate alignment of costs to program outputs and annual and long-term outcomes

The program budget request lacks transparency in that it does not clearly define the relationship between resources and annual and long-term performance goals. In order to demonstrate that performance informs budget formulation and resource allocation decisions reflect desired performance levels, the Program should coordinate with OCFO, who leads the PBPM process and development of the annual Performance Budget and Performance and Accountability Report, to present the RO and IR program budget in a more transparent manner. This may include aligning the program budget with the agency’s strategic goals, safety and security, and linking the Program’s strategic outcomes, performance measures, and output measures. For example, the Program may consider presenting its budget request as shown in the table below with resources linked to strategic goals and long-term outcomes and then also providing an illustration of the performance management framework (see recommendation below) that links the program outputs and annual outcomes to these long-term outcomes:

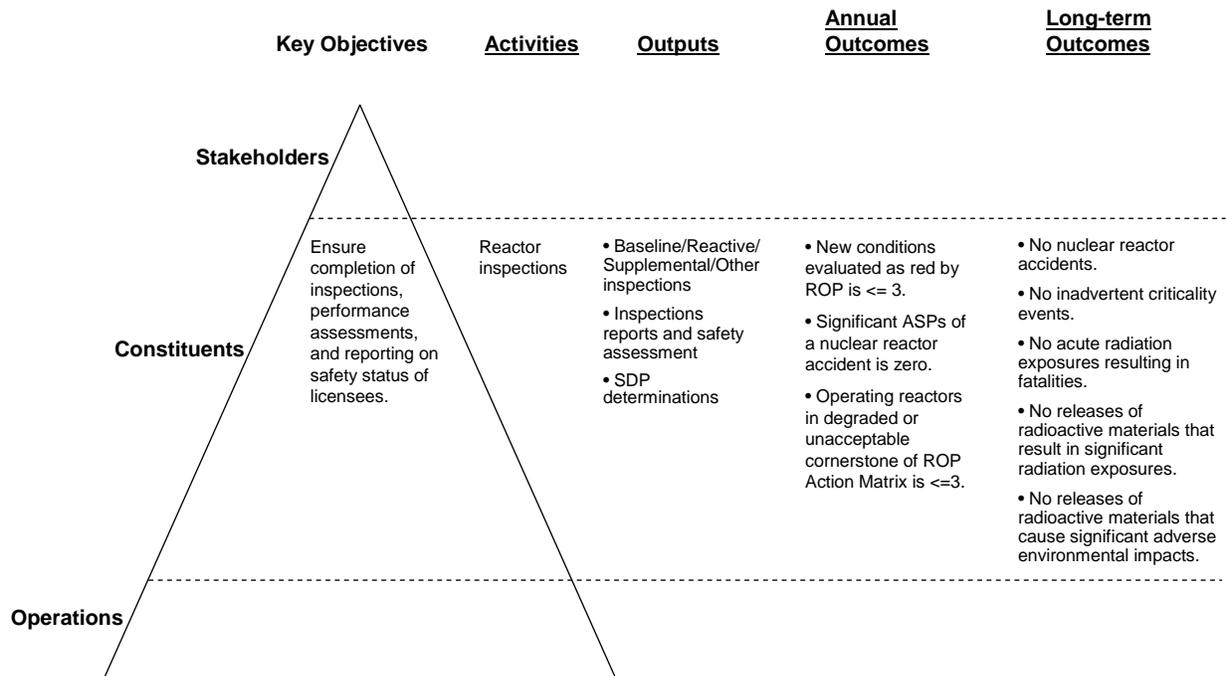
Table 8 - Example of Crosswalk of Program Budget

	Safety						Security		Total
	Ensure adequate protection of public health and safety and the environment.	Prevent the occurrence of any nuclear accidents.	Prevent the occurrence of any inadvertent criticality events.	Prevent the occurrence of any acute radiation exposure resulting in fatalities.	Prevent the occurrence of any releases of radioactive materials that result in significant radiation exposures.	Prevent the occurrence of any releases of radioactive materials that cause significant adverse environmental impacts.	Ensure adequate protection in the secure use and management of radioactive materials.	Prevent any instances where licensed radioactive materials are used domestically in a manner hostile to the security of the United States.	
Reactor Oversight	\$233.2						\$22.2		\$255.4
Incident Response	\$23.6								\$23.6
Total	\$256.8						\$22.2		\$279.0

Develop logic model or performance framework that clarifies linkage between outputs and outcomes

The relationship between resources and annual and long-term performance goals is not clearly defined. The Program is complex for the uninitiated reader and a logic model or redesign framework might facilitate understanding of the linkage between outputs and outcomes (e.g., oversight activity and safety). The Program may consider developing a logic model or revising the ROP performance framework to clarify the linkage between the oversight activities and program outcomes for someone who is not indoctrinated in the NRC mission. The logic model development will be an opportunity to add/retain a limited number of measures that are appropriate, meaningful, and reflective of desired program outcomes, and provide comprehensive and quality measurement. This will also present an opportunity to eliminate any measures that do not meet the criteria. Below is a sample illustration of a performance framework that links program objective, activity, outputs, and annual and long-term outcomes. This illustration is for demonstration purposes only and is not an actual representation of the Program.

Figure 6 - Sample Illustration of Performance Framework



Develop marginal cost model to conduct sensitivity analyses

The Program needs improvement in demonstrating the impact of funding on annual and long-term outcomes. The Program may consider developing a model that analyzes the impact of reducing and increasing funding by a given percentage on annual and long-term outcomes. With the Program’s goal of zero nuclear accidents and the public’s intolerance for a nuclear incident, developing a programmatically relevant marginal cost model represents a challenge to the Program. The Program may consider developing a marginal cost analysis to demonstrate the impact of funding on output performance and extrapolating these results to provide a qualitative explanation of the impact on annual and long-term outcomes.

Assess the full costing methodology to ensure accurate representation of full program costs

Our analysis of direct vs. indirect costs for the Program found a relatively higher indirect cost percentage for the RO program than the other programs under the Nuclear Reactor Safety Program. There may be a reasonable programmatic explanation for the higher indirect costs, but due to our inability to obtain an explanation of the full costing methodology and how it was applied to the RO program, we recommend the Program assess the full costing allocation methodology to ensure the infrastructure and support costs that are allocated to the Program are accurate and representative of its full program costs.

Improve performance reporting to provide integrated and comprehensive monitoring of financial and operating results against plan in a timely manner

The Program needs improvement in relating budget, workforce, accounting, and performance information. Improved performance reporting that provides a complete and timely account of program resources budgeted vs. expended which are tied to outputs/outcomes targeted vs. achieved enables management to monitor ongoing performance and to ensure program targets are achieved. The annual results of this report can be used to develop the Performance Budget and the Performance and Accountability Report as well as reporting to OMB's expectmore.gov site each year. Implementation of this recommendation requires system enhancements to support efficient and timely data collection, analysis, and reporting. In addition, responsibility should also be assigned for financial and performance monitoring and reporting at the program level.

Our assessment does not include a separate recommendation for systems improvements since the Agency already has a number of initiatives underway. Currently, NRC is implementing a new core financial management system that combines the functionality of the core accounting, license fee billing, cost accounting, allotment/allowance financial plan, and the capitalized property systems. Some key benefits sought from this new system include improved access, timeliness, efficiency, and overall quality in financial and performance reporting. The agency's time and labor system is also undergoing a major upgrade which is expected to improve the Program's capability to collect information for fee billing, and cost accounting and provide a wider range of management reports.

4. Internal Evaluation and Improvement

4.1. Objectives / Key Activities

There are several mechanisms through which the Program evaluates itself and seeks continuous improvement. These include a variety of self-assessments and support for independent assessments. The Program's objectives in these efforts are to evaluate its performance, solicit input from stakeholders and constituents, and improve effectiveness and efficiency. The table below lists some of the Program's evaluation efforts, past and present.

Table 9 - Selected Evaluation Efforts

Self-Assessments	<ul style="list-style-type: none"> • ROP Self-Assessment (annual) • Inspection Procedure Review (every 2 years) • Lessons Learned Task Forces (ad hoc, situation specific) • Internal staff surveys (biennial) • IR Self Assessment Process (IRMC 0210) • Corrective Action Process (IRMC 0220) • After Action Reports
Independent Assessments	<ul style="list-style-type: none"> • The Pilot Program Evaluation Panel (1999) • The Initial Implementation Evaluation Panel (2001) • External Stakeholder Survey (biennial) • OIG Audits of specific RO elements (2002, 2005, 2005) • OMB PART Assessment (2003) • GAO Report on Nuclear Reactor Oversight (2006) • Acton Burnell Organizational Assessment (2004) • FEMA review of IR continuity plans • OIG Audit of NRC's Incident Response Program (2004) • OIG Audit of NRC's Office of Nuclear Security and Incident Response (2006) • OIG Audit of Emergency Preparedness (2007) • Advisory Committee on Reactor Safeguards (ACRS) (2003)

4.2. Approach

The approach for assessing this evaluation area consisted of three key components as outlined below.

1. Review of relevant documentation and published material. We reviewed both internal program documentation and conducted a brief literature review of published documentation related to program evaluation and performance improvement.

The following internal documents were reviewed:

- IMC 0307 ROP Self-Assessment Program
- Annual ROP Self-Assessment Reports
- IRMC 0210 IR Self Assessment Procedure
- IRMC 0220 Corrective Action Procedure
- MD 8.2 NRC Incident Response Program
- The NRC Incident Response Plan (IRP), NUREG-0728, Revision 4
- Davis-Besse Lessons Learned Task Force (DBLLTF) Report
- DBLLTF Final Status Of Recommendations
- Public Version Of Palo Verde Lessons Learned
- ROP Budget History – Significant Events Impacting ROP Budgets
- Pilot Program Evaluation Final Report (1999)
- U.S. Nuclear Regulatory Commission Charter for the Performance Improvement Panel Reactor Oversight Process Initial Implementation Evaluation Panel Final Report (2001)
- SECY-03-0104 Organizational Effectiveness Assessment for the Office of Nuclear Security and Incident Response (2003)
- OIG: Audit of the Significance Determination Process (2002)
- OIG: Audit of the Baseline Inspection Program (2004)
- OIG: Audit Nuclear Regulation: NRC Needs to More Aggressively and Comprehensively Resolve Issues Related to the Davis-Besse Nuclear Power Plant's Shutdown (2004)
- OIG: Audit of NRC's Incident Response Program (2004)
- OIG: Audit of the Reactor Program System (2005)
- OIG: Audit of NRC's Office of Nuclear Security and Incident Response (2006)
- OIGL Audit of NRC's Emergency Preparedness Program (2007)
- GAO: NRC: Oversight of Nuclear Power Plant Safety Has Improved, but Refinements are Needed (2006)

- Marks, & Potter: “Drilling for Results: The quest for objective exercise evaluations,” Homeland First Response, July/August 2004.
- Power & Martin: “Using Evaluation Criteria to Organize the Planning, Conduct, and Oversight of Readiness Assurance Activities,” DOE.
- American Nuclear Society: Criteria for Planning, Development, Conduct, and Evaluation of Drills and Exercises for Emergency Preparedness, American Nuclear Society. ANS-3.8.7-1998
- U.S. DHS: Corrective Action Program System Overview
- Homeland Security Exercise and Evaluation Program, Volume III: Exercise Evaluation and Improvement Planning, Department of Homeland Security, 2007.
- Ford & Schmidt: “Emergency Response Training: Strategies For Enhancing Real-World Performance,” Journal of Hazardous Materials 75_2000.195–215
- An Analysis of the Office of Management and Budget’s Program Assessment Rating Tool (PART) for Fiscal Year 2008, Mercatus Center.

From the literature review, we identified a set of best practices and criteria to be used as standards for the assessment.

2. Conduct staff interviews. We conducted interviews with stakeholders and Program staff. We developed interview guides and conducted semi-structured, confidential interviews to obtain information related to program evaluation and performance improvement.

3. Analyze current performance. Based on our literature review, interviews, and study of successful organizations, we established standards or performance metrics on which we based our analysis. We performed operational analysis to compare the Program’s current performance against these criteria, including assessment of internal procedure documentation, application of processes, use of performance metrics, tracking of recommendations, development and recommendation of action plans, and internal and external stakeholder feedback. To evaluate the Program’s internal assessment and improvement, we assessed the Program on the following standards:

- Conducts internal assessments of efficiency and effectiveness that are used to modify strategic, operational and financial plans;
- Uses independent evaluations to modify strategic, operational and financial plans; and
- Applies system for making improvements within appropriate timeframes.

4.3. Findings

Standard 1: Conducts internal assessments of efficiency and effectiveness that are used to modify strategic, operational and financial plans

For this standard, we evaluated the extent to which the Program has processes in place to evaluate its progress in achieving goals. We reviewed documentation on the Program's self-assessment processes including the methodologies used and the performance reporting. The criteria used were a combination of OMB PART, best practices garnered from our literature review, and staff and stakeholder interviews. We assessed the extent to which the Program meets criteria such as:

- Collects high quality performance data on critical aspects of its operation;
- Performance information is used to adjust strategic, operational and financial plans; and
- Meaningful performance targets are established based on adequate baseline data.

Finding: The Program is effective in conducting periodic internal self-assessments

The Program has processes and measures in place for self-assessments (IMC 0307). The self-assessment process for the reactor oversight was first published in 2002 and has since been revised five times to reflect changing safety and security objectives and streamlining. The historical data provides an adequate baseline that enables the Program to set meaningful targets. The self-assessment process includes 49 performance measures with targets that cover key program areas. As part of this process, the Program also consolidates feedback from internal staff and external stakeholders.

The Program also uses incident response performance measures in the operating plan that tracks the Program's performance in preparing for, executing, and evaluating exercises and drills. These measures cover performance in exercises, response times, center operations and systems, and staffing levels, skills, training, and participation. The Program also provides a summary Emergency Response Performance Index as part of the annual Performance Budget submission. In 2005, the Program documented its incident response self-assessment procedures under Incident Response Manual Chapter but not all appendixes were included until 2008. In 2008, the Program is documenting its process to manage identified recommendations and track the completion of associated corrective actions (IMC 0220) for implementation in early January 2009.

In addition, Lessons Learned Task Forces have been applied to risk-significant inspection findings to identify scope, cause, and corrective actions. Identified actions are incorporated into the annual ROP self-assessment process for implementation and tracking. Examples of such efforts include taskforces for Davis-Besse, Palo Verde, mitigating systems performance index, and safety culture evaluation. After Action reports from incident response are used for all exercises, drills, and incidents to document lessons learned and prioritize opportunities for improvement.

Finding: The Program is effective in applying lessons learned from internal assessments to improve strategic, operational and financial plans

The Program applies findings from self-assessments to adjust its activities. For example, the Program performs its reactor oversight assessment annually (ROP Annual Self- Assessments) and reviews performance against specified targets. It reviews how effectively it executes its key program areas (e.g., performance indicators, inspection, significance determination process, assessment). It then determines the allocation of resources based on historical performance to ensure resources are adequately aligned to highest value efforts. The Program has regularly performed procedure reviews to align procedures with changing safety and security objectives. For example, the Program conducts a biennial realignment process to streamline baseline inspection efforts and focus them on the highest value procedures. Every 2 years, this process reviews existing baseline inspection procedures to identify areas where depth, scope, and frequency of each of the inspection procedures should be modified. This has allowed the Program to streamline procedures and focus inspection resources on areas with higher safety risk. In addition, the Program periodically reviews and refines its incident response procedures (NUREG-0728) to meet internally identified issues.

Standard 2: Uses independent evaluations to modify strategic, operational and financial plans

For this standard, we assessed the extent to which the Program uses the results of independent evaluations to adjust its strategic, operational and financial plans. We reviewed previous evaluations and the Program’s improvement activities. The criteria used for this standard were a combination of OMB PART, best practices from our literature review, and staff and stakeholder interviews. The primary criteria were:

- Evaluations were of sufficient quality and scope; and
- Extent to which the Program had addressed the findings in the evaluations.

Finding: Independent evaluations to modify strategic, operational and financial plans are used effectively

The Program has used the results of independent evaluations, such as those conducted by the Government Accountability Office (GAO), Inspector General (IG), OMB, and others, to guide implementation of program improvements. For example, implementation of recommendations from IG assessments have led to improvements in areas such as the Significance Determination Process (2002), the Baseline Inspection Program (2004), the Incident Response Program (2004), the Reactor Program System (2005), and NRC’s Emergency Preparedness Program (2007). The Program tracks implementation of IG recommendations and reports quarterly to the Office of the Executive Director of Operations. Examples of implemented incident response improvements include establishment of a formal emergency response organization qualification program, improved use of technology and consideration of human factors to improve communications and

facility infrastructure, and inclusion of additional performance-based training opportunities for response teams.

The Program has also made improvements based on GAO evaluations. For example, in 2004, the GAO reviewed the Davis-Besse nuclear power plant shutdown. In 2006, it undertook an assessment of the oversight of nuclear power plant safety. The latter found that “NRC has improved its oversight process in various areas, but it has been slow to act on needed improvements, particularly in improving the agency’s ability to identify and address early indications of declining safety performance.” In response to this feedback, the Program has developed action plans to address these recommendations and tracks the timeliness of completion.

The Program has had several other independent evaluations performed. Oversight reviews were conducted by advisory committees, including the Advisory Committee on Reactor Safeguards (ACRS). Specific panels were established, by charter under the rules of the Federal Advisory Committees Act, to evaluate ROP effectiveness independently. In 2003, one year after the creation of the incident response Program within NSIR, Acton Burnell, a consulting firm, performed an independent assessment that developed performance measures and made recommendations for NSIR’s organizational effectiveness, public relations policy, internal processes and procedures, and overall effectiveness of internal and external communications. However, per an OIG report in 2006, many of these recommendations have not yet been sufficiently evaluated, in part because of the large level of emergent work arising from 9/11. Also, FEMA performed an assessment of the operational continuity of the Program’s Headquarters Operations Center, in which the Center was highly rated.

Standard 3: Is systematic in making program improvements within appropriate timeframes

For this standard, we assessed the extent to which the Program is systematic in making improvements when weaknesses are identified. We reviewed the Program’s consistency and success in implementing improvements. The criteria used for this standard were a combination of OMB PART and best practices identified from our literature review. The primary criteria were:

- Extent to which identified improvement plans were consistently implemented;
- Extent to which there were processes in place to implement improvement plans; and
- Program uses clear and consistent program documentation to improve processes.

Finding: The Program has effectively and consistently refocused its efforts in response to changing safety and security objectives

After the 9/11, terrorist attacks, the scope of the Program expanded to address additional security objectives. Working with licensees, NRC supplemented its Design Basis Threat (DBT) in 2003

and 2006 to incorporate additional security requirements. In addition to mandatory directives and advisories issued after the 2001 attacks, the Program required nuclear power plants to implement security-related enhancements into their emergency preparedness programs in 2005. Among these enhancements were trained and armed security officers, equipment and structure intrusion detection and surveillance systems, and access controls.

In addition to its core nuclear power plant operational risk assessments, the Program has incorporated these additional security elements into its risk-informed oversight and emergency preparedness plans. The Program has also expanded its coordination of threat information and response efforts with other federal agencies, including DHS, FBI, intelligence agencies, the departments of Defense and Energy, States, and local law enforcement. The Program increased annual security inspection hours at reactor facilities from 1,600 hours to over 8,000 hours between 2001 and 2006. Force-on-force annual inspection activity increased from 2,000 to 7,700 hours between 2001 and 2006.

The Program has also increased its focus on safety culture. The Davis-Besse Lessons Learned Task Force reemphasized the importance of safety culture. Especially in a risk-informed regulatory context, staff at nuclear facilities must be encouraged to raise safety concerns without fear of retaliation by licensee management or the NRC. The Program enhanced ROP treatment of cross-cutting issues to identify safety culture problems. The Program modified its inspection manual chapters, inspection procedures, and inspector training.

Finding: The Program is effective in using a systematic approach for implementing program improvement but completeness and timeliness of some documentation needs improvement

The Program applies the documented procedures to consolidate and take action on recommendations in a timely manner. Recommendations from all internal and external assessments are integrated into improvement plans through either the annual ROP Self-Assessment Program or the draft IR Corrective Action procedure. The Program uses performance metrics in the operating plan with a target of timely completion of OEDO ticketed items of 95 percent. The Program has achieved its target for all fiscal year 2008 quarters. In 2008, the Program implemented two new performance measures to track the timely completion of priority-1 and priority-2 incident response action items.

Prior to 2007, the annual ROP Self-Assessment Report contained an enclosure that listed recommendations and status of implementation plans to address each identified gap. The Program is improving its execution of its incident response improvement plans. Upon implementation in early January 2009, the IR Corrective Action procedure, consistent with the DHHS Corrective Action Program System, will support integrated tracking of recommendations and implementation plans. Recommendations from After Action Reports, OIG audits, other audits, self-assessments, and issues documented on Problem Identification Forms will be consolidated and prioritized in one database and assigned to action plans for implementation.

The new procedure calls for each corrective action to be tracked for extensions, completion timeliness, and effectiveness of implementation.

Based on our review, we found some of the documentation for the incident response function was not current, incomplete, or inconsistent. For example, the published NUREG 0728, Rev. 4 is stamped as “interim release mode” since its April 15, 2005 issue date and is pending Rev. 5 in 2009. We also found that regions and headquarters have different documented procedures for exercise coordination. These procedures would benefit from more consistent maintenance, increased alignment between regions and headquarters organizations, and increased level of detail to ensure consistent response actions. The main documents for IRMC 0410 Drill and Exercise Standards, 0420 Drill and Development Coordination, and 0810 Outreach Programs are not available from the IRMC published Web site although Appendix A of each was available. The Program has taken steps to address these issues. For example, the Program has performed regional reviews to identify and adopt best practices between regions. It has standardized its manual chapter formatting. Also, it has updated its program improvement and corrective action procedures.

4.4. Recommendations

Complete, implement, and maintain timeliness of procedure documentation

In some areas, the procedure documentation was out of date. The main documents for IRMC 0410 Drill and Exercise Standards, 0420 Drill and Development Coordination, and 0810 Outreach Programs are not available from the IRMC published Web site although Appendix A of each was available. In some cases, regions and headquarters have different documented procedures for exercise coordination. The published NUREG 0728, Rev. 4 is stamped as “interim release mode” since its April 15, 2005 issue date and is pending Rev. 5 in 2009. IRMC 0210 would benefit from greater specificity of procedures. Going forward, the Program should focus on more consistent document maintenance, increased alignment between regions and headquarters organizations, and increased level of detail to ensure consistent response actions.

Identify and document objectives from implementation actions in terms of outcome improvements, timeliness, process and/or cost efficiencies

While improvements are tied to specific recommendations, clear objectives and their impacts are not always developed. The Program should identify objectives of each action plan as it is developed and approved and then confirm the impact of improvement actions. The objectives should identify the problems or issues being addressed, expected benefits, and criteria for success.

5. Public Communications

5.1. Objectives / Key Activities

The objective of the Program's public communications activities is to support the NRC's organizational excellence objectives of openness and transparency. With regard to reactor oversight, the Program performs a number of communications activities. It provides background information as well as detailed procedure and outcome information on the NRC public Web site. It provides public forums with key stakeholders through its monthly ROP Working Group meetings, annual end-of-cycle regional meetings, and annual assessment meetings with each licensee. The Program also monitors and provides periodic announcements to media channels. To gather feedback, it performs an annual ROP external survey, which is incorporated into its annual ROP self-assessment.

With regard to incident response, the Program also provides information through the NRC public Web site. In order to gather public and stakeholder input into its procedures, the Program publishes draft documents in the Federal Register and uses public meetings focused on specific topics.

5.2. Approach

The approach for assessing this evaluation area consisted of three key components as explained below.

1. Review of relevant documentation and published material. We reviewed internal program documentation and conducted a brief literature review of published documentation related to public communications.

The following internal documents were reviewed:

- ROP Homepage
- ROP Program Evaluations and Feedback (independent evaluations, internal and external surveys, annual self-assessments, etc)
- Consolidated Response to ROP External Surveys
- ROP Program Documents
- NRC Emergency Preparedness Web site
- Management Directive 8.2 NRC Incident Response Program
- The NRC Incident Response Plan (IRP), NUREG-0728, Revision 4
- Incident Response Public Meetings Web site
- OIG: Audit of NRC's Emergency Preparedness Program (2007)

- OIG: Audit of NRC's Office of Nuclear Security and Incident Response (2006)
- OIG: Inspector General's Assessment of the Most Serious Management Challenges Facing NRC (2008)
- NRC Management Directive 3.14 U.S. Nuclear Regulatory Commission Public Web Site, 2008
- SECY-03-0104 Organizational Effectiveness Assessment for the Office of Nuclear Security and Incident Response (2003)
- SECY-02-0036 Formation of NSIR and Communications Mandate from Commission (2002)

From the internal documentation and literature review, we identified a set of leading practices and criteria to be used as standards for the assessment.

2. Conduct staff interviews. We conducted interviews with the media, stakeholders, and program staff. We developed interview guides and conducted semi-structured, confidential interviews to obtain information related to public communications.

3. Analyze current performance. Based on the interviews, literature review, and research, we established standards or performance metrics on which we based our analysis. We performed analysis to assess the Program's provision of program information to all affected parties including federal, state, and local entities and the general public, as well as its solicitation of feedback to these stakeholders. We then analyzed the program's current performance against these criteria.

To evaluate the Program's performance in the area of public communications, we assessed the program on the following standards:

- Provides program information to and solicits the views of all appropriate stakeholders; and
- Adequately reviews and incorporates received suggestions and comments and provides feedback on actions taken.

5.3. Key Findings

Standard 1: Provides program information to and solicits the views of all appropriate stakeholders

For this standard, we assessed the extent to which the Program has established two-way communication with its stakeholders. We interviewed NRC staff and stakeholders, and reviewed data from the Program's stakeholder surveys. The criteria used were based on NRC policy, OIG reports, best practices from our literature review, and stakeholder and staff interviews. NRC Management Directive 3.14 defines the objectives of communications as contributing to openness and public confidence by enhancing the public's understanding of NRC's mission, goals, programs, and activities and enhancing the ability of stakeholders to participate effectively in the regulatory process. At the end of FY 2008, the IG's Assessment of the Most Serious

Management and Performance Challenges Facing NRC identified as NRC-wide challenge #2, “Managing information to balance security with openness and accountability.” As stated in the report, the three specific issues related to this challenge include: 1) Manage information in accordance with new Federal Government policies for designating, marking, safeguarding, and disseminating controlled unclassified information (CUI); 2) Ensure that sensitive information is handled in accordance with agency policies and procedures for public disclosure; and 3) Provide external stakeholders with clear and accurate information about regulatory programs, and facilitate public participation in the regulatory process.

Finding: The Program provides significant information to all affected parties but needs to increase the information provided in some areas while balancing the need for security with openness and accountability

The Program successfully uses the Internet and public meetings to provide the public with information, but there are gaps. There is a broad set of documents related to reactor oversight on the NRC public Web site. This includes policy and direction, procedures, industry trends, performance indicators, licensee inspection performance, and assessment results. For the most part, the information is complete and up-to-date.

As described in Section 2, the Program is effective in creating and disseminating incident information in the event log. The log entries are clear and concise and provide a good base for initial analysis of the incident. The IG found weaknesses in other aspects of the Program’s communications in this area. With regard to incident response, per an OIG audit in 2006, “weaknesses exist in NSIR’s process for interacting with internal and external stakeholders and the office has performed limited assessments of the success of its communications” and “NSIR’s ability to share sensitive or classified information is limited to those who have a need to know, as well as by NRC policy, however their unclassified communication needs to be increased to enhance public confidence.” Since then, Emergency Preparedness has held a number of public meetings with stakeholders. While the current Emergency Preparedness section of the NRC Web site includes information on incident response objectives, roles and activities, the information could be expanded to increase stakeholder confidence in and understanding of the incident response function..

After the 9/11 terrorist attacks, NRC revised its information dissemination policy to limit information available to the public on regulatory decisions or actions involving security inspections, assessment, exercises, and enforcement. In mid-2006, NRC began making summary results of its security inspection program for nuclear power plants available to the public and has held three public meetings in 2008 to gather external stakeholder and the public comments on the appropriate level of openness and transparency of information associated with NRC security and performance assessments of NRC licensees. The objective is to allow the exchange of information with external stakeholders and the public without disseminating information that could pose a threat. The NRC has also started providing summary information on security

allegations. Additional changes to increase openness without risking security are currently under assessment by the Commission, with expected release of a revised policy in 2009.

Finding: The Program should improve efforts to solicit information from stakeholders in some areas

The Program uses public meetings to facilitate public access and comment, including monthly ROP Working Group Meetings and regional public meetings. Actions to facilitate stakeholder participation at public meetings have been and are being implemented. The Program has further facilitated participation by extending meeting access through conference call bridges and pre-distributing meeting materials. The regional offices conduct quarterly meetings to disseminate periodic assessment information for each licensee. The Program is providing more detailed agendas for reactor oversight meeting announcements and modifying RO Category 2 meeting processes to permit public comments at the end of each topic. However, some interviewees noted logistics problems with meetings including difficulty getting through security to attend meetings, insufficient handouts and seating for attendees, and the need for a microphone for speakers. We attended a public meeting and had difficulty getting through security.

Since the start of 2005, the Program has been presented at over 20 public meetings on the topic of emergency preparedness/incident response. These have been used to communicate information to stakeholders as well as solicit input on open issues such as appropriate disclosure of secure information.

The Program performs a biennial external survey related to its oversight function via Federal Register notice to collect comments and suggestions on its performance. The survey requests stakeholder input on a variety of program areas. This input is incorporated into the annual ROP self-assessment process. All received comments are included in an integrated report with the Program's feedback and response to each received comment. In 2007, 700 external stakeholders from state, local, tribal, university, and public groups were solicited. One issue is the declining level of participation. In 2007, there were only 7 responses (down from 21 in 2004). A related issue is that some stakeholders who do not respond indicated they are skeptical that their input will be considered fairly and acted upon given their previous historical experience. Although we noted that the Program addresses all comments in its response.

Standard 2: Adequately reviews and incorporates received suggestions and comments and provides feedback on actions taken

For this standard, we interviewed NRC staff and stakeholders, and review data from the Program's stakeholder surveys. The criteria used were from best practices from our literature review. We assessed the extent to which the Program met criteria such as:

- Thoroughly evaluates the concerns and suggestions raised by stakeholders; and
- Incorporates suggestions by stakeholders, where appropriate into program plans.

Finding: The program is effective in reviewing and incorporating received suggestions and comments and providing feedback on actions taken

The Annual ROP Self-Assessment Report provides survey feedback to stakeholders, which includes discussion of and proposed actions for every received comment. This annual report also provides a consolidated response to comments received to its biennial external survey in which it publishes the received comments as well as provides feedback on if and how the ROP is incorporating the comments in its efforts. Stakeholder input has resulted in several program enhancements that are incorporated into the annual ROP self-assessment. It should be noted that the Program is perceived as discounting input received by some stakeholders. Although, we did note that the Program systematically addressed all comments in its responses. The Program also publishes the results of its incident response public meetings and participation at other industry meetings on the NRC public site.

5.4. Recommendations

Improve logistics of public meetings

Interviewees and respondents from the biennial external survey mention some shortfalls in the logistics of public meetings. The Program has made improvements, including providing more detailed agendas in reactor oversight meeting announcements and modifying Category 2 meeting processes to permit public comments at the end of each topic. Several participants at Working Group meetings also noted some logistical problems. The Program should ensure participants have access through security up until the time of the meeting, sufficient handouts and chairs are provided, and a microphone for speakers is available.

Evaluate external survey program and include incident response activities in the survey

One issue is the declining level of the reactor oversight survey participation. In 2007 there were only 7 responses (similar to 2006 levels). Another issue is that some stakeholders who do not respond are skeptical that their input will be considered fairly and acted upon by the Program. The Program should consider options to increase responsiveness and encourage greater participation in the external survey. The Program should also evaluate reasons for the decrease in responses through outreach to previous responders. Given findings, options to increase participation should be evaluated including modifying the survey instrument, increasing outreach, working with an organization like INPO, or other outreach campaigns. Also, the Program should solicit stakeholder input on incident response activities in the survey.

Increase publicly available Web-based information on incident response function and security cornerstone

The Program should provide more information on the progress of its incident response efforts. As discussed above, the Program is assessing its approach for the dissemination of non-sensitive and unclassified security information and should continue to do so to enhance confidence with regard to activities associated with the security cornerstone. While the current Emergency Preparedness section of the NRC Web site includes information on incident response objectives, roles and activities, the information should be expanded to increase stakeholder understanding of and confidence in the incident response function. For example, information on incident response public meetings should include a post-meeting summary of received comments and feedback/actions taken. Also a periodic update on activities and improvement actions related to incident response would demonstrate progress.

6. Interaction with Other Agencies

6.1. Objectives / Key Activities

Success in many aspects of the Program requires interaction with other agencies. These include state and local, federal, and international organizations. The Program works with such organizations for purposes that include sharing of resources and expertise, knowledge sharing, and conducting joint operations. The Program coordinates emergency response support with other Federal agencies, including DHS/FEMA, DOE, FBI, and others. For example, collaboration for incident response takes place through several key coordinating/working groups. The Federal Radiological Preparedness Coordinating Committee (FRPCC) is an interagency body consisting of the Program and other Federal programs, chaired by DHS/FEMA. The FRPCC coordinates planning and validating requirements of each agency; reviewing integration requirements; and incorporating agency-specific plans, procedures, and equipment, into the response system to ensure minimum duplication and maximum benefits. NRC staff members are assigned to the Domestic Nuclear Detection Office, the National Counterterrorism Center, and the DHS Infrastructure Protection Office to enhance inter-organizational communication and support the integrated assessment of security-related information. Within NRC, the Program's emergency preparedness function specifies intra-NRC roles and responsibilities for safety and security inspections of licensee emergency preparedness plans and running exercises.

The Program shares inspection assessment results with state and local agencies through quarterly meetings and phone calls conducted by the regional offices. The nature of the communications varies between Regions, in response to the level of interest from region-specific state and local governments. The Program also coordinates with nuclear organizations in other countries for knowledge sharing. In this area, the Program works with the NRC's Division of Policy and Rulemaking to interact and establish bilateral agreements with organizations in other countries.

6.2. Approach

The approach for assessing this evaluation area consisted of three key components as outlined below.

1. Review of relevant documentation and published material. We reviewed internal program documentation and conducted a brief literature review of published material related to emergency response, implementation of Federal mandates and inter-agency coordination and communication.

The following documents were reviewed:

- Management Directive 8.2 NRC Incident Response Program
- The NRC Incident Response Plan (IRP), NUREG-0728, Revision 4

- OIG: Audit of NRC’s Emergency Preparedness Program (2007)
- International Atomic Energy Agency programs: IAEA meetings, Convention on Nuclear Safety and Integrated Regulatory Review Service
- U.S. DHS: the National Response Framework
- U.S. DHS: National Incident Management System
- U.S. DHS: Target Capabilities List: A companion to the National Preparedness Guidelines (2007)
- National Fire Protection Association: “NFPA 1600: Standard on Disaster/Emergency Management and Business Continuity Programs” (2007)
- American Nuclear Society: Criteria for Planning, Development, Conduct, and Evaluation of Drills and Exercises for Emergency Preparedness, American Nuclear Society. ANS-3.8.7-1998

2. Conduct staff interviews. We conducted interviews with stakeholders and program staff. We developed interview guides and conducted semi-structured, confidential interviews to obtain information related to exercise and drill coordination within NRC and with stakeholders and implementation of Federal mandates.

3. Analyze current performance. Based on the standards established from our literature review and research on best and leading practices, we assessed internal documentation on roles, responsibilities, and processes, federal emergency response requirements and guidance, and outcomes from working relationships with stakeholders.

To evaluate the Program’s interaction with other agencies, we assessed the Program on the following standards:

- Has clearly defined roles, responsibilities, and procedures for working across agency boundaries; and
- Tracks outcomes and performance of working relationships.

6.3. Key Findings

Standard 1: Has clearly defined roles, responsibilities and procedures for working across agency boundaries

For this standard, we evaluated the extent to which the roles and responsibilities for other relevant agencies was established and documented. We based the assessment on a combination of standards from OMB, National Incident Management System (NIMS), best practices review, and staff and stakeholder interviews.

Finding: Clearly defined roles, responsibilities, and procedures for working with federal agencies have been established effectively

The Program works extensively with other Federal agencies (e.g. DHS, DOE, EPA, USDA, DOT, and DOJ) and state and local entities in incident response efforts. The scope and responsibilities for these incident response interworking relationships are defined in published procedures and memoranda of understanding between agencies. The Program was a contributor to DHS's NIMS and the National Response Framework (NRF). Individual memoranda of agreement/understanding have been established with other Federal agencies. Management Directive 8.2 and NUREG-0728 define NRC's Incident Response Plan. The Program reviews and modifies its internal procedures to ensure conformance with evolving procedures of its partners (e.g., DHS). NRC participates in 5 of 15 DHS planning scenarios. NRC processes are documented in NUREG 0728. However, roles and responsibilities are less detailed for the intermediate and ingestion phase of an incident than they are for the emergency/plume phase. Additional detail and clarity would improve preparedness for such a situation.

Each year, the Program successfully conducts a number of incident response exercises with licensees and federal, state, and local partners to apply these procedures, as described in Section 2.

Finding: The Program has effectively established international agreements to support its activities

The Program works with international regulatory programs to bring about knowledge sharing to support the Program's activities. The Program participates through multiple programs of the International Atomic Energy Agency (IAEA) and through OECD's Nuclear Energy Agency. Each IAEA program defines specific roles and procedures to enable interworking. As well, NRC has a number of bilateral agreements with other countries' nuclear regulatory agencies. There are 10-12 bilateral agreement meetings per year organized around jointly developed topics. NRC raises topics based on technical issues itemized in NRC's Task Action Plans that address U.S. technical safety and procedure issues (for the investigation or confirmation of NRC plans).

Standard 2: Tracks outcomes and performance of working relationships

For this standard, we assessed the extent to which the Program evaluates the effectiveness of its working relationships. We based the assessment on a combination of standards from OMB, National Incident Management System (NIMS), and others from our best practices review.

Finding: Outcomes and performance of Federal working relationships are tracked effectively

The Program has implemented a number of incident response performance measures to track its participation in interworking efforts with other agencies. It manages its coordination with other agencies through a number of forums (e.g. the Quarterly NRC/DHS Steering Committee meetings, the FEMA Working Group, and the FEMA/NRC Exercise Taskforce). NRC staff members are assigned to the Domestic Nuclear Detection Office, the National Counterterrorism Center, and the DHS Infrastructure Protection Office to enhance inter-organizational communication and support the integrated assessment of security-related information.

Finding: The Program is improving the effectiveness of its working relationship with State stakeholders

Under the Nuclear/Radiological Incident Annex and for incidents below the threshold of an Incident of National Significance, NRC is assigned the coordinating role with other Federal, state, and local stakeholders. A major emphasis in the NRC incident response is providing offsite authorities with an evaluation of license protective action recommendations. A 2007 OIG audit of emergency preparedness identified recurring coordination problems with States in preparing for, executing, and evaluating incident response exercises. Per the report,

The weakness in NRC's coordination with State authorities recurs because (1) NRC has not followed a consistent approach for working with the States during these exercises and (2) has not clearly defined or communicated its coordination role.... In January 2006, NSIR proposed tentative plans for updating internal guidance, conducting tabletop exercises, and hosting regional conferences designed to help NRC, Federal, and State government officials better understand mutual EP roles and responsibilities.

The Program is taking steps to address issues with exercise communication with State stakeholders. NSIR has implemented plans for updating internal guidance, inviting State participants to observe exercises prior to an upcoming scheduled exercise, conducting tabletop exercises, and hosting regional conferences. We did not detect this weakness in the exercise we observed, however, the Program should enhance its exercise evaluations as described in Section 2 to confirm the effectiveness of these efforts.

6.4. Recommendations

Clarify procedures for coordination and handoff after the emergency/plume phase of an incident

The incidence response documents are clear and fairly detailed with regard to roles and responsibilities during the emergency and plume phase of an incident. However, they are less specific about what happens during the intermediate and ingestion phase. Additional detail and clarity would improve preparedness for such a situation. The Program should raise this topic through working group meetings with partners, update documentation, and test and evaluate these procedures through tabletop discussions or drills.

7. Financial Management

7.1. Objectives / Key Activities

To ensure proper stewardship of Federal resources, the NRC has policies and procedures to comply with federal financial management legislation, including the Federal Managers' Financial Integrity Act (FMFIA), CFO Act, GPRA, Government Management Reform Act, Federal Financial Management Improvement Act, Clinger-Cohen Act, Anti-Deficiency Act, and Improper Payments Information Act. These policies and procedures are documented in NRC Management Directives (MD), Volume 4 – Financial Management, which cover such areas as accounting, administrative control of funds, financial systems, management controls, license fees, lapsed appropriation periods, strategic planning, and budget formulation.

NRC management is responsible for establishing and maintaining effective internal controls and financial management systems that are compliant with these laws and regulations and meet their objectives. A key piece of legislation is the FMFIA, which requires the agency to establish controls that ensure (1) obligations and costs comply with applicable law; (2) assets are safeguarded against waste, loss, unauthorized use, or misappropriation; and (3) revenues and expenditures are properly recorded and accounted for.

NRC also has goals to address the PMA initiative for improved financial management including providing information that is reliable, transparent, useful, and timely to stakeholders and management for making decisions; maintaining adequate controls; and implementing integrated and flexible systems to meet the agency's reporting needs.

The key financial management activities performed by the program offices include budget execution, funds control, internal controls, resource management, and contracts management. NRR is the lead program office for the reactor oversight function and NSIR leads the incident response function. The program support offices include: NRR, NSIR, FSME, HR, OE, OGC, OI, FSME, REG I, REG II, REG III, REG IV, and RES.

7.2. Approach

The approach for assessing this evaluation area consisted of three key components as explained below.

1. Review of relevant documentation and published material. We reviewed internal program documentation and conducted a brief literature review of published material related to financial management. The following internal documents were reviewed:

- FY 2007 PAR
- FY 2008 Performance Budget
- FY 2007 Performance Budget
- FY 2008 Budget Execution Report (as of September 30, 2008)

- FY 2007 Budget Execution Report (as of September 30, 2007)
- FY 2006 Budget Execution Report (as of September 30, 2006)
- RPS Funds Report (as of September 30, 2008)
- RPS Funds Technical Assistance Report (as of September 30, 2008)
- Advice of Allowances and Financial Plans
- Office monthly budget execution reports
- Office contract management reports
- Advanced Procurement Plan User Guide and office submission
- MD 4.1 Accounting Policy and Practices (September 9, 2005)
- MD 4.2 Administrative Control of Funds (April 11, 2008)
- MD 4.3 Financial Management Systems (July 7, 2005)
- MD 4.4 Management Controls (May 18, 2004)
- MD 4.6 License Fee Management Program (August 13, 2002)
- MD 4.7 Policy and Practices Governing NRC Long-Range Planning, Budget Formulation, and Resource Management (October 1, 1989)
- 2003 OMB PART Assessment of Reactor Inspection and Performance Assessment
- 2007 OMB PART Assessment of Decommissioning and Low Level Waste
- 2007 OMB PART Assessment of High-Level Waste Repository
- FY 2008 Office budget submissions
- Office operating plans
- Office performance monitoring reports
- Office operating-level reports
- Office instructions, guidance and process documentation
- FY 2008 - FY 2013 Strategic Plan
- FY 2004 - FY 2009 Strategic Plan

From the literature search, we identified a set of best practices and criteria to be used as standards for the assessment by reviewing published material, including:

- GAO studies on financial management;
- OMB PART Guidance 2008;
- PMA initiative for improving financial management performance; and
- U.S. Chief Financial Officers Council and metric tracking system financial management indicators.

2. Conduct staff interviews. We conducted interviews with stakeholders, constituents and program staff. We developed interview guides and conducted semi-structured, confidential interviews to obtain information related to financial management, including budget execution, funds control, internal controls, resource management, and contracts management.

3. Analyze current performance. Based on the standards established from our literature review and research on best and leading practices, we assessed internal processes, performed financial analysis, and reviewed financial management indicators to compare the Program's current performance against these criteria.

To evaluate the Program's financial management, we assessed the Program on the following standards:

- Funds are obligated in a timely manner, spent for the intended purpose, and accurately reported; and
- Program uses strong financial management practices.

7.3. Key Findings

Standard 1: Funds are obligated in a timely manner, spent for the intended purpose, and accurately reported

For this first evaluation standard, we based our assessment on OMB PART criteria which are supported by GAO studies, PMA criteria, and CFO Council standards. We performed our evaluation by reviewing program documentation, reviewing operating and financial plans, analyzing office budget execution reports, analyzing financial and operating performance reports, and conducting interviews with program officials. We assessed the extent to which the Program meets the specific criteria for this standard, including:

- Funds are obligated consistently with the overall program plan and schedule of resource requirements;
- Limited amount of unobligated funds remain at the end of the year;
- Adequate procedures exist for reporting actual expenditures, comparing them against the intended use, and taking timely and appropriate action to correct single audit findings when funds are not spent as intended; and
- Program awards are reported promptly and accurately.

Based on our review and analysis, we found the Program is effective in obligating funds consistently with the financial and operating plans and achieving a limited amount of unobligated funds that remain at the end of the year. Below are our detailed findings for this evaluation standard.

Finding: Funds are obligated consistently with the overall program plan and schedule of resource requirements

Program support offices, Division of Contracts in the Office of Administration, and OCFO have a role in obligating funds for the Program and ensuring obligations are consistent with the overall program plan. Once budget authority is received and the funds are apportioned by OMB, OCFO issues the Advice of Allowances and Financial Plan (AAFP), which provides authority to Allowance Holders to incur commitments and obligations. The AAFP enables the CFO to assign accountability to Allowance Holders, such as the Office Director of NRR and NSIR, to ensure that obligations and unobligated commitments incurred do not exceed an appropriation, apportionment, allowance, financial plan, footnote, or any other administrative subdivision. Any restrictions to the use of resources are noted in the footnotes of the AAFP and monitored by both financial management staff in PMDA as well as OCFO. Changes to the AAFP are tracked by OCFO in the AAFP Monthly Status Report as well as by the program office financial management staff. OCFO also monitors commitments, obligations, and expenditures for the agency and allowance holders on a monthly basis and reports the results in the Budget Execution Report (BER) each month and quarter. The BER is a tool that senior management and offices use to monitor, manage, and communicate financial performance against established goals and objectives. An example of how program offices track spending against plan is the monthly NRR Budget Execution Status Report. In NSIR, the PMDA staff manages the NSIR Financial Plan report that tracks commitments and obligations against plan.

To ensure the schedule of obligations is consistent with the resource needs of the program plan, funds are incrementally obligated throughout the year, typically on a quarterly basis, when program requirements are better established. Obligations are informed by the Advanced Procurement Plan, which identifies the purpose, budget amount, and expected expenditure rate per quarter for each procurement action. Any reprogramming of funds that exceed established thresholds requires the approval of the Leadership Team prior to submitting an AAFP change request to OCFO.

Finding: Limited amount of unobligated funds remain at the end of the year

To ensure that a limited amount of funds remain unobligated at the end of the fiscal year, the OCFO tracks financial performance on a number of financial management measures, including utilization of funds; commitments, obligations, and expenditures as a percentage of total financial plan; and number of months funding available. As reported in the year-end FY 2008 BER, NRR and NSIR, the lead program offices for the RO and IR program, had obligated 100% and 92%, respectively, of their financial plan. Collectively, 98% of the financial plan for these two allowance holders was obligated at the end of FY 2008.

Upon further review of the budget execution reports from OCFO and the program offices, we also found that some of the program support offices, including NRR and NSIR, did not meet the FY 2008 carryover target of 4 months, which is the number of months of available funding that remains at the end of the fiscal year for contract support and travel. Due to the extended period of the continuing resolution in recent years, the CFO has established a carryover target for FY 2009 and beyond of no more than 6 months. Office operating plan measures will be adjusted to

reflect the 6-month standard. According to NRR's FY 2008 Budget Execution Status Report, NRR/DIRS had 5.6 months of funding remaining at the end of the fiscal year. Program support staff explained that the remaining funds were necessary to fund inspections scheduled for November. For NSIR/DPR, the year-end carryover figure had not yet been reported by the office but it was expected to exceed the target. Although the BER for year-end FY 2008 reported 11 months of funding available for NSIR overall, this may not be representative of DPR's performance which is responsible for the IR program. The program staff in NSIR reported that efforts are underway to work with OCFO to improve performance in this area as well as other financial management measures.

Finding: Adequate procedures exist for reporting actual expenditures, comparing them against the intended use, and taking timely and appropriate action to correct single audit findings when funds are not spent as intended

Agency policy and procedures are documented in NRC Management Directive Volume 4 – Financial Management. Program support offices also have process documentation for program staff responsible for budget execution and funds control to ensure compliance with reporting and intended use requirements. Agency procedures include assignment of funds control duties to a sufficient number of adequately trained program staff who are designated in writing. The staff responsible for fund certification is different from staff responsible for fund commitment and obligation, ensuring an appropriate check and balance in fund management.

OCFO as well as the program offices monitor commitments, obligations, and expenditures on a monthly basis and reports results in budget execution reports. An example of how program support offices track actual spending against plan is NRR's monthly Budget Execution Status Report and NSIR's Financial Plan report that tracks commitments and obligations against plan. Also, in NRR, the Contracts Management Team (CMT) provides monitoring and reporting of commitments, obligations, and expenditures against budget as well as the Advanced Procurement Plan for each NRR contract. CMT staff also review invoices prior to payment to ensure services are provided as intended pursuant to the contract.

Each year, to ensure the agency's compliance with FMFIA, the program offices are required to certify that internal controls are achieving their intended results, resources are being used consistently with the agency mission and applicable laws and regulations, and resources are protected from waste, fraud, and abuse. In the event that funds are not spent as intended resulting in an audit finding, OCFO leads the effort to work with the Program on corrective action. As reported in the most recent PAR and interviews with the financial management staff of the program office, the Program has not been subject to any single audit findings regarding funds not spent as intended.

Finding: Program awards are reported promptly and accurately

Based on interviews with the contracts management staff of the program office, we found that program awards are reported promptly and accurately. For example, the Contracts Management

Team in NRR, the lead office for RO, reports Department of Energy awards within 30-45 days from initial receipt of requirement from program staff. Division of Contracts in the Office of Administration is responsible for commercial contract awards.

Standard 2: Program uses strong financial management practices

For this evaluation standard, we based our assessment on OMB PART criteria which are supported by GAO studies, PMA criteria, and CFO Council standards. We performed our evaluation by reviewing program documentation, reviewing operating and financial plans, analyzing office budget execution reports, analyzing financial and operating performance reports, and conducting interviews with program officials. We assessed the extent to which the Program meets the specific criteria for this standard, including:

- Procedures are in place to ensure that payments are made properly for the intended purpose to minimize erroneous payments;
- Compliance with the Anti-Deficiency Act;
- Clean audit opinion and no material internal control weaknesses reported by auditors; and
- Financial management systems meet statutory requirements.

The agency's strong financial management practices are evidenced by its high performance on the Financial Management Indicators reported in the Metric Tracking System (MTS) established by the CFO Council. The MTS is a performance measurement system that captures key financial management indicators across the federal government. From May to July 2008, the agency achieved a Green rating on all 9 metrics that are tracked. Less than half of the 25 agencies tracked in MTS achieved all Green ratings.

Based on our review and analysis, we found the Program is effective in its financial management practices. Below are our detailed findings for this evaluation standard.

Finding: Procedures are in place to ensure that payments are made properly for the intended purpose to minimize erroneous payments

According to the FY 2007 PAR, improper payments continue to be at low risk for the Agency. NRC continues to evaluate its internal controls to guard against improper payments and monitors and reports on improper payments within its programs. Based on the results of the annual risk assessment conducted in FY 2007, the number of and amount of improper payments fell below what is considered to be a significant risk by OMB and subject to the external reporting requirement, which is 2.5% of program payments and \$10 million for high risk.

Financial and contract management training is provided to appropriate staff based on their responsibilities. Staff responsible for the Program's contract and project management activities must attend acquisition training. Also, on a semi-annual basis, the Agency conducts a financial management seminar that provides an overview of the Federal and agency budget process, financial management policies and procedures, and applicable laws and regulations.

Finding: The Program is not in violation of the Anti-Deficiency Act

As reported in the most recent PAR and interviews with the financial management staff of the program office, the Program is not and has not been in violation of the Anti-Deficiency Act.

Finding: The Program received a clean audit opinion and is free of material internal control weaknesses as reported by the auditors

NRC received a clean audit opinion on its FY 2007 financial statements and the auditors did not identify any material internal control weakness affecting the Program specifically. The auditors found that the Agency had effective internal control over financial reporting and was compliant with laws and regulations; the only exception was one material weakness related to information systems security controls, which also represents a substantial noncompliance with the Federal financial management system requirements under FFMIA. This material weakness is further explained in the next finding below.

In FY 2007 as required by the FMFIA, the Agency provided a qualified statement of assurance that the internal controls were operating effectively and compliant with applicable laws and regulations in accordance with OMB Circular A-123, Management's Responsibility for Internal Control. No material weaknesses were found in the design or operation of the internal controls, except for the one material weakness explained below.

Finding: Financial management systems meet statutory requirements with the exception of one non-compliance that is agency-wide and not program specific

The Agency reported in the FY 2007 PAR and in the FMFIA qualified statement of assurance that NRC is in compliance with the FMFIA with the exception of one material weakness, which pertains to the agency's overall information systems security controls related to NRC's implementation of the Federal Information Security Management Act (FISMA). The FISMA report identified two significant deficiencies related to a lack of contingency plan testing for information security systems, and a lack of certification and accreditation for most of the agency's major information systems. The Agency has an initiative underway to coordinate with the Office of Information Services and the EDO to address this material weakness by ensuring that the security vulnerabilities of the general support systems and the financial management systems are resolved.

The Agency is also in the process of integrating and modernizing its financial systems to enhance further controls, reporting, and decision-making. As explained in section 4, Budget Performance Integration, NRC is implementing a new core financial management system that combines the functionality of the core accounting, license fee billing, cost accounting, allotment/allowance financial plan and the capitalized property systems. Some key benefits sought from this new system include improved access, timeliness, efficiency, and overall quality in financial and performance reporting. The agency's time and labor system is also undergoing a

major upgrade which is expected to improve the Program's capability to collect information for fee billing and cost accounting, and provide a wider range of management reports.

7.4. Recommendations

Improve program performance on corporate measures related to financial management, specifically carryover target

Over the past year, the Agency has made significant efforts to improve and standardize the corporate performance measures, which include measures for financial management. The OEDO tracks office performance on these corporate measures on a quarterly basis. Some of the program support offices for the Program are not meeting the Green targets for the measures related to financial management. Program support offices need to improve their performance for the measures that are out of standard, especially the carryover measure, which has a target of no more than 6 months starting in FY 2009 and beyond. Other out-of-standard measures include: Time and Labor (T&L) certification timeliness, T&L correction rate, purchase order/purchase card invoice certification timeliness, contract funding commitment timeliness, and contract invoice timeliness. For any corporate performance measure that does not have an appropriate target for Red/Yellow/Green status, the program support office should coordinate with the OCFO and/or OEDO to revise the targets so that they are meaningful and representative of the desired performance levels.

As discussed above under the financial management systems criteria, our assessment does not include a separate recommendation for systems improvements since the Agency already has a number of initiatives underway.

8. Enforcement and Allegations

8.1. Objective / Key Activities

The enforcement process begins when potential violations meeting certain conditions are identified in the inspection process. Most deficiencies identified in the inspection process are handled through the reactor oversight process (ROP). Depending on the nature of the deficiency, for example, if the deficiency was willful, the deficiency may be handled through enforcement instead of the ROP. Enforcement is used with violations that may impact the NRC's ability for oversight such as those associated with deliberate misconduct. Violations are designated a severity level (I-IV). These correspond roughly to Red, Yellow, White, and Green findings used with the ROP.

The NRC considers many factors when deciding whether or not to issue a civil penalty to a licensee and the appropriate amount of the civil penalty. As documented in the NRC Enforcement Policy, these factors include the licensees' enforcement history, whether or not the licensee identified the violation, and what corrective actions the licensee has taken. Regulatory tools such as the risk of agency intervention, ensuing stakeholder visibility, and civil penalties serve as deterrents.

The NRC has an allegation handling process in place with timeliness metrics and administrative mechanisms to gauge performance including audits via the Agency Allegations Advisor (AAA), involvement through an Allegations Coordinator (AC), and monthly calls involving HQ and the regional offices. When an allegation is submitted, the process is activated absent of definitional threshold. In other words, all allegations are immediately considered for processing and closure regardless of significance or criticality.

Furthermore, the allegation process accommodates sources originating from licensees including employees, vendors, contractors, and external stakeholders (public, etc.) but also routes allegations as necessary to other agencies (e.g., FEMA, OSHA). Wrongdoing allegations identified by NRC employees and contractors are also routed through a separate channel (e.g., OIG, DOJ).

8.2. Approach

The approach for assessing this evaluation area consisted of three key components as explained below.

1. Review of relevant documentation and published material. We reviewed internal program documentation and conducted a brief literature review of published material related to enforcement and risk management. The following documents were reviewed:

- Enforcement Program Annual Reports
- Enforcement Manual, Sept 28, 2006 Revision #5

- Enforcement Guidance Memoranda
- Enforcement Policy, January 14, 2005
- MD 8.8 Management of Allegations (February 4, 1999)
- MD 9.19 O/F, Office of Enforcement (May 9, 1989)
- NUREG 0800, NRC Standard Review Plan
- NUREG/BR0240, Rev. 3, Reporting Safety Concerns to the NRC, April 2005 brochure
- FY 2007 PAR Highlights
- OIG-08-A-17, Audit of NRC's Enforcement Program, September 26, 2008
- OIG, NRC's Response to Security-Related Concerns at Peach Bottom Atomic Power Plant, August 22, 2008
- OIG: 96-01S, Office of the Inspector General Event Inquiry: Implementation of Recommendations to Improve NRC's Program for Protecting Allegers against Retaliation
- Backgrounder – Allegation Process
- Allegation Program – 2007 Annual Performance Report, September 29, 2008
- Technical Quality of Incident and Allegation Activities, June 13, 2007
- Reviewing the Common Performance Indicator, Technical Quality of Incident and Allegation Activities Appendix B Allegation Casework Review Summary Sheet
- NEI: 04-02, Guidance for Implementing a Risk-Informed, Performance-Based Fire Protection Program Under 10 CFR 50.48(c)
- National Fire Protection Agency: (NFPA) 805, Performance-Based Standard for Fire Protection for Light Water Reactor Electric Generating Plants (2006)
- Professional Reactor Operator Society Web site
- Atomic Energy Act of 1954, Chapter 18 Enforcement
- CRS Report September 17, 2004
- Federal Register/Volume 73, No.176, Wednesday, September 10, 2008, Notices 52705
- GAO Reports October 3, 2007; March 10, 2003, September, 2003, respectively
- Buehler & Freeman: The Risk Revolution – Owning the Right Risks, September, 2008

2. Conduct staff interviews. We conducted interviews with customers, stakeholders, and program staff. We developed interview guides and conducted semi-structured, confidential interviews to obtain information related to enforcement and allegations.

3. Analyze current performance. Based on the standards established from our literature review and research on best and leading practices, we assessed internal processes and performed operational analysis to compare the Program's current performance against these criteria.

To evaluate the Program’s enforcement and allegations function, we assessed the Program on the following standards:

- Resolves enforcement actions in a timely manner;
- Resolves allegations in a timely manner; and
- Ensures quality and consistency in its resolution of enforcement.

8.3. Findings

Standard 1: Resolves enforcement actions in a timely manner

To evaluate this standard we interviewed program staff and reviewed relevant program and other internal documentation.

Finding: The Program is effective in resolving enforcement actions in a timely manner

The Program sets targets for non-investigation and investigation cases. The table below sets out the Program’s statistics in meeting its timeliness objectives for calendar years 2004 - 2007. For calendar year 2007, the Program missed its goal for investigations due to the complexity of several cases and the difficulty of the issues involved in the reactor and materials areas. In addition alternative dispute resolution (ADR) was used to settle some disputes.

Table 10 - Timeliness of Resolving Enforcement Actions

	Initial escalated enforcement action	Initial escalated enforcement action	Administrative goals	Administrative goals
Year	Non-investigation cases within 180 calendar days	Investigation cases are made within 360 process days	Non-investigation cases within avg. 120 calendar days	Investigation cases within avg. 180 process days
2007	100%	100%	100%	Not met
2006	100%	100%	100%	100%
2005	100%	100%	100%	100%
2004	100%	100%	100%	100%

Source: Enforcement Program Annual Reports

Standard 2: Resolves allegations in a timely manner

To evaluate this standard we interviewed program staff and reviewed relevant documentation including the Enforcement Annual Report (CY 2007).

Finding: Allegations are processed and closed on a timely basis

The Program requires an initial Allegation Review Board (ARB) to be held within 30 days of the receipt of an allegation in 100 percent of the cases. 568 of the 569 initial ARBs held agency-wide in CY 2007 met this goal. With regard to closing allegations that have technical concerns, but do not have wrongdoing, the Program met all those targets. The following table contains statistics on timeliness of allegation resolution for NRR, NSIR, and the four Regions. Given the actual performance relative to the targets, the targets do not seem sufficiently ambitious. The Program should consider also tracking average closure time and track trends over time.

Table 11 - Timeliness of Allegations Resolution

Time to Close	150 days	180 days	360 days
Target Closure	70%	90%	100%
Actual Closure	96%	100%	100%

Source: 2007 Allegation Program Annual Performance Report

Standard 3: Ensures quality and consistency in its resolution of enforcement

To evaluate this standard we interviewed program staff and reviewed relevant documentation including the Enforcement Annual Report (CY 2007) and the OIG Audit of NRC’s Enforcement Program.

Finding: The Program needs improvement in resolving enforcement with quality and consistency

The OIG report states that the enforcement program lacks clear and comprehensive guidance needed to ensure consistent program implementation. As a result, there were inconsistencies in the way enforcement was carried out among the four Regions. In addition, the OIG report states that enforcement decisions may not be based on complete and reliable data. The OIG report indicated that “In general, Agency officials agreed with the Report’s findings.” We reviewed the methodology used in the OIG study, reviewed program documentation, and interviewed program staff. We did not audit the underlying information sources, but based on our review, we agree with its findings. In addition, we make two observations:

- The OIG study was agency-wide and therefore was broader in scope than the reactor oversight and incident response program. The finding regarding incomplete and unreliable data was in part due to lack of a standardized enforcement tracking system. However, the Reactor Program System (RPS) is used to support enforcement related to reactors in the Regions, so this finding may apply less to reactor oversight-related enforcement.
- The OIG report findings applied primarily to non-escalated enforcement.

Enforcement standards for fire protection are an area of concern expressed by some stakeholders. The NRC has modified its fire protection regulations to allow licensees to adopt, on a voluntary basis, National Fire Protection Association (NFPA) Standard 805, Performance-Based Standard for Fire Protection for Light-Water Reactor Electric Generating Plants (NFPA 805), in lieu of their existing prescriptive fire protection licensing basis. This initiative is part of a broader NRC effort to incorporate risk information within regulations to enhance safety. Forty-seven licensees have indicated they intend to make the transition. Others have begun developing the requisite fire probabilistic risk assessments (PRAs).

The NRC recently revised the “Interim Enforcement Policy Regarding Enforcement Discretion for Certain Fire Protection Issues” which will allow a licensee the option to request an extended enforcement discretion period if they are pursuing transition to NFPA 805. The Program also recently clarified some related stakeholder concerns, including one regarding whether the enforcement discretion period would end if an amendment request was rejected if the licensee had sufficient corrective action in place. Some stakeholders in the past have indicated concerns that additional enforcement discretion will further delay getting licensees into compliance. The recent clarification provides additional specificity on the window for enforcement discretion. Some stakeholders have expressed concerns that the revised policy is problematic because there are limited industry resources that will make it difficult to complete license amendment requests in an orderly fashion.

8.4. Recommendations

Add additional level of review in non-escalated enforcement actions to review outcomes and procedures to help ensure that standardized procedures are used

The IG found that the enforcement program lacks clear and comprehensive guidance needed to ensure consistent program implementation. As a result, there were inconsistencies in the way enforcement was carried out among the Regions. The Office of Enforcement is considering calling for adding an additional level of review, e.g., review by a Branch Chief before enforcement actions are submitted. We agree with this approach. In addition, we recommend clarifying the guidance with additional examples and adding additional training for Branch Chiefs on standard criteria to apply in enforcement decisions. We also recommend that a Community of Practice be established in the Agency’s Knowledge Management System for staff involved in enforcement to make use of this system as a way of sharing practices.

Standardize procedures for tracking of enforcement cases

The IG report states that enforcement decisions may not be based on complete and reliable data. This study was agency-wide and therefore was broader in scope than the reactor oversight and incident response program. The finding regarding incomplete and unreliable data was in part due to lack of a standardized enforcement tracking system. However, since the RPS is used to

support enforcement related to reactors in the Regions, this finding may apply less to reactor oversight-related enforcement. We recommend that guidance be updated with additional examples to clarify requirements and data quality standards for information to be used in enforcement cases.

9. Staff Development

9.1. Objectives / Key Activities

In recent years the NRC has gone through a significant transition. There have been increasing retirements, mid-career transfers, and hiring of younger staff. NRC projects that its workforce size will need to grow from about 3,100 employees in early fiscal year 2006 to nearly 4,000 employees by 2010 to accommodate workload demands associated with new nuclear reactors. An aging workforce in the Agency has meant increasing retirements, and a rise in mid-career transfers. To replace retiring employees and expand its workforce, NRC must hire 300 to 400 new employees per year through at least 2010.²

A related challenge the Agency is facing is the number of staff changing jobs internally. In 2008, approximately 930 staff changed jobs. Some of this is the result of realignment to support new reactors. The result is many staff members have been in their current positions for a short period of time.

These trends pose significant challenges to the Program. Last year, turnover of resident inspectors, a key component of the Program's staff, was 46%, up from 20% in 2006. A significant portion of the headquarters management staff we interviewed had been in their positions for less than one year.

To address these challenges, the agency stepped up its recruiting process, increased training, and launched a knowledge management initiative. There have been successes on these fronts. Over the last two years, the Agency has exceeded its recruiting goals. This has been aided by the NRC's reputation as a good place to work. In addition the NRC has staff development initiatives in place. Among these are the Nuclear Safety Professional Development Program (NSPDP), a program that involves recent graduates at the undergraduate or graduate level and strong academic records in health physics, earth sciences, or engineering. New employees in this program participate in on-the-job training, formal classroom training, and rotational assignments. There is also the Student Career Experience Program. In this program, college students pursuing degrees in science, engineering, and other disciplines related to the NRC mission have the opportunity to alternate periods of academic study and work experience, or perform the two in parallel.

NRC has been cited as the government agency with the highest employee satisfaction ratings in a study conducted by the Office of Personnel Management (OPM). In addition, in recent years there has been an increase in enrollment in nuclear engineering programs. The training initiatives have been important and NRC staff indicates high levels of satisfaction with training programs. In 2006, the Agency launched a knowledge management initiative to help address the impact of knowledge loss resulting from the transition the Agency is undergoing.

² Human Capital Retirements and Anticipated New Reactor Applications Will Challenge NRC's Workforce, GAO, January 2007

9.2. Approach

To evaluate the Program's ability to maintain a quality workforce, our review consisted of assessing whether the Program is meeting the following standards:

- Maintains the appropriate staffing levels to execute plan; and
- Delivers staff training effectively.

9.3. Findings

Standard 1: The Program maintains the appropriate staffing levels to execute plan

For this standard, we evaluated the Program's ability to maintain adequate numbers of experienced resident inspectors. We conducted staff interviews, reviewed internal survey information, and reviewed resident inspector demographic data.

Finding: The Program is maintaining a stable, experienced resident inspector base, but recent turnover is resulting in coverage challenges

A key objective is to maintain a stable and experienced base of resident inspectors. A recommendation developed after the Davis-Bessie incident was to establish a site staffing metric. The Davis-Bessie plant was shut down in 2002 after it was discovered that boric acid had nearly eaten through a 6 ½-inch reactor pressure vessel head. The site staffing metric reflects the percentage of days a site is staffed by an inspector who meets certain requirements. The criteria defining inspectors who meet requirements are set out in IMC 0307, ROP Self-Assessment:

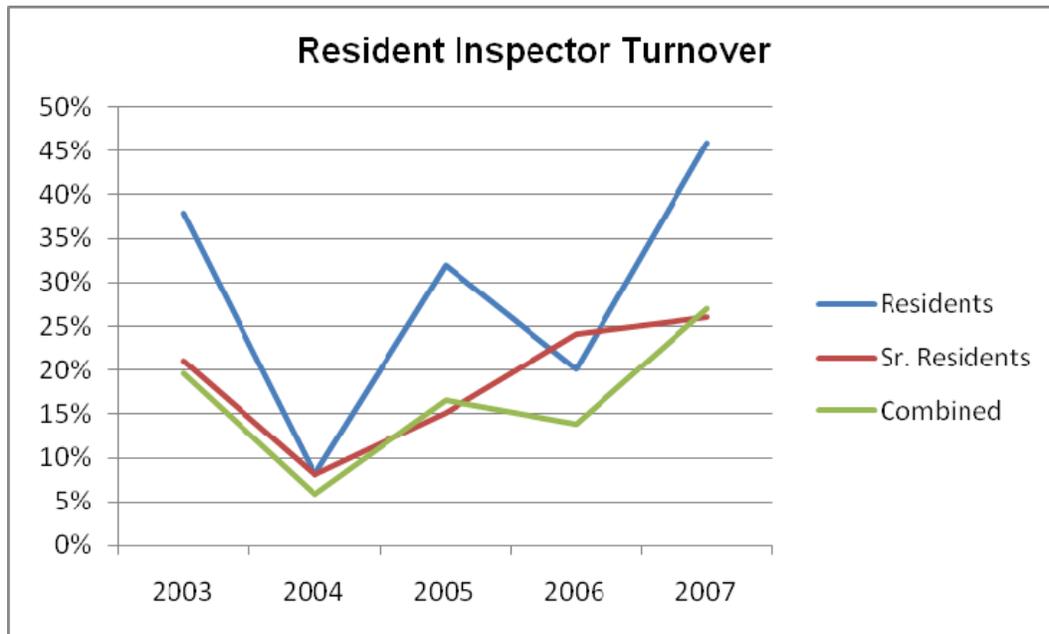
NOTE: Inspectors assigned to the site permanently or through a rotation with a minimum duration of 6 weeks shall be counted. Inspectors on 6 week or longer rotational assignments will be identified as such. Inspectors assigned to the site for less than 6 weeks will not be counted, but should be indicated as such. Additionally, the regions shall indicate sites where permanently assigned resident or senior resident inspectors are away from the site for an extended period of time (one continuous time period which is greater than 6 weeks). Only inspectors, who have attained at least a basic inspector certification status, as defined by Appendix A to Inspection Manual Chapter 1245, shall be counted. Data will indicate the number of days a qualified resident and senior resident inspector are permanently assigned to the site during the

year divided by the number of days in the year. Number of days spent on training; meetings away from the site; participation in team inspections; leave; or other temporary duties (e.g. acting for branch chiefs in his/her absence) will not be counted against the metric unless the absence exceeds 6 continuous weeks.

In 2007, nine sites were below the 90% target in part due to turnover. The lowest site was 74%, but the overall average was 96% (Resident Inspector Demographics, 2007). Inspector turnover was a significant contributor to the site staffing challenges. It was also noted in 2007 that the turnover rates for both resident inspectors (RI) and senior resident inspectors (SRI) had been increasing over the past few years. Even though a significant portion (40 percent) of the RIs were promoted to an SRI position, an equal share of the RIs were either promoted or reassigned outside the RI program, as indicated by the “combined” line in the figure 7 below. “Combined” is RI turnover plus SRI turnover, less RIs promoted to SRIs.

This turnover has resulted in decreases in the median number of years an inspector has been either a resident or senior resident. Similarly the median time at a current site has decreased slightly. The national median value for total resident time decreased 20 percent from 2006 to 2007. However, despite the fact that total resident time has gone down, overall relevant experience remains stable. The national data from 2003 to 2007 shows that the resident inspectors have maintained an average of 10 years relevant non-NRC experience and 4 years of NRC experience. This demonstrates stability in the overall level of experience despite the high turnover rates in recent years. The high turnover, however, has presented challenges in maintaining continuity of oversight.

Figure 7 - Resident Inspector Turnover



Source: NRC and FocalPoint analysis

Filling the gaps required extra management and staff time and resulted in some sites having lower staffing levels than the ideal. While the shortages were covered, they put some strain on staff and management.

Standard 2: Delivers training to staff effectively

Finding: The Program has launched knowledge management initiatives effectively

As discussed above, the Agency is undergoing a transition, including increasing retirement, mid-career transfers, and recruitment of a new, younger workforce, which is resulting in a loss of knowledge. The loss in knowledge has the potential for decreases in efficiency, increased risk of errors, slower delivery of work products, and overall decrease in effectiveness. Several managers we interviewed acknowledged that this transition was having an impact on efficiency and effectiveness.

As part of its effort to address these rising challenges, the Agency began a knowledge management (KM) initiative in 2006. In our review of the knowledge sharing effort we assessed the extent to which:

- There was a clear plan established and is being implemented;
- Senior management support is visible;
- There is effective management/coordination of knowledge sharing function; and
- Information and knowledge are valuable commodities.

When the initiative was launched, a plan was established to provide staff tools in four categories of interest, including:

- **Human resources, processes, policies, and procedures:** including succession planning, strategic workforce planning, hiring incentives, double encumbering, retention incentives, and rehired annuitants.
- **Knowledge sharing practices:** including documentation, mentoring communities of practice, brown bag lunch discussions, employee-led seminars, and videotaping of seminars and subject-matter interviews.
- **Knowledge recovery practices:** including guest lecturers, reemployed annuitants, effectiveness reviews, and procedures and documentation.
- **Information technology applications:** including collaborative workflow software, e-training, videoconference, updating and enhancing ADAMS, and NRC knowledge center.

The Agency has a clear plan and is implementing accordingly. A steering committee is active in identifying ongoing office- and regional-level efforts to capture knowledge in each of these areas.

With regard to management support, for knowledge management efforts to succeed, senior management must lead by example. Based on interviews conducted, we found that program senior management has been visible and active supporters of the initiative.

The Program is also demonstrating effective management and coordination of the KM function. The Program produces a quarterly KM update that provides information on activities in each of the four categories. For each activity it lists successes, challenges, other comments, and a point of contact. We also reviewed the knowledge center application. It contains a set of forums, called “Communities of Practice.” The number of postings shows the system is being used, with postings in over 600 topics being discussed overall.

The final criterion applies to the importance of information and knowledge. Based on our observations, we found that knowledge and information are valued commodities given the nature of the Program’s work. Some interviewees expressed concerns about a cultural shift in the NRC. The concern expressed was that in the past there was a deeper commitment to professional development to obtain deep expertise in a given functional area. This meant the NRC could bring significant subject-matter expertise to solving tough problems. Those experts were also a source of knowledge sharing for other staff. The concern was that newer staff seemed less motivated to develop that same deep expertise, preferring instead to gain a broader range of experience in different areas.

Overall, we believe the knowledge management effort is on track and with continued effort and outreach will help the Program deal with the transition challenges.

Finding: The Program delivers high quality training, but the nature of its challenges requires improvements in evaluating the effectiveness of training

The critical nature of the NRC's work and the high turnover means the Program has a particularly high need for quality training for new staff. In addition, as the Program makes improvements or changes policies and procedures, it requires high quality training for those employees. All resident inspectors, for example, go through initial training as set out in IMC 1245, Appendix A and B. Additional initial training is set out in Appendix C and varies by specialty. Over the last 2 years, training was developed to teach staff about new inspection procedures, such as the recently implemented safety culture assessment and the new Unplanned Scrams with Complication performance indicator. The Program has a number of efforts in place to evaluate its training programs. Among these are:

- Feedback loops;
- Internal surveys (every 2 years); and
- Self-assessments.

While training at the NRC is considered to be the best in the federal government according to a recent OPM study, there are requirements for more effective training in some specialized areas, such as safety culture and the significance determination process, according to feedback provided in an internal survey. The OIG initiated a review of the NRC's Training and Development Program. Although their findings applied to the entire Agency, not just the Program, one finding was that access to training is difficult and there was insufficient ability to measure the effectiveness of training in supporting the wide range of skills needed for the programs currently in place.

Currently post-class surveys are conducted immediately after the class, but they are not conducted systematically after a period of time when the employee can better assess the impact on his or her job performance. There should be follow-up surveys sent to attendees immediately after a class and then again 3 months later. The Federal Aviation Administration (FAA) for example also sends surveys to inspectors and their supervisors 90 to 180 days after course completion to obtain their perspectives on whether the course was needed and the extent to which the inspector is applying new skills and knowledge to the job. FAA reports that since the inception of post-course surveys, the return rate from inspectors and supervisors has ranged from 49 to 50 percent. The FAA post-course survey results from the six most-highly-attended technical courses in the last 2 years reflected generally positive responses (GAO 2005).

9.4. Recommendations

Analyze root cause of increased turnover and take actions to address

High turnover is making it difficult to meet site staffing objectives. The Program should analyze the root cause of the increased turnover by conducting exit interviews of staff leaving,

conducting a market study on salaries and benefits, and conducting an employee satisfaction survey. While some of the turnover is structural, in sympathy with the overall challenges the Agency is having with turnover, the results of this analysis should be applied to make the work context changes available to the Program.

Conduct follow-up surveys three months after training

Currently post-class surveys are conducted immediately after the class, but they are not conducted systematically after a period of time when the employee can better assess the impact on his or her job performance. The Program should also conduct follow-up surveys three months after the course is taken. Other agencies have used such follow-up surveys in similar contexts and have had good results. For example, the FAA also sends surveys to inspectors and their supervisors 90 to 180 days after course completion to obtain their perspectives on whether the course was needed and the extent to which the inspector is applying new skills and knowledge to the job.

Appendix

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