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A REVIEW OF THE NRC'S REACTOR OVERSIGHT PROCESS

HEARING

BEFORE THE

SUBCOMMITTEE ON OVERSIGHT AND INVESTIGATIONS

OF THE

COMMITTEE ON ENERGY AND COMMERCE
HOUSE OF REPRESENTATIVES

ONE HUNDRED NINTH CONGRESS

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A REVIEW OF THE NRC'S REACTOR OVERSIGHT PROCESS

MONDAY, JUNE 19, 2006

HOUSE OF REPRESENTATIVES,
COMMITTEE ON ENERGY AND COMMERCE,
SUBCOMMITTEE ON OVERSIGHT AND INVESTIGATIONS,
Washington, DC.

The subcommittee met, pursuant to notice, at 4:05 p.m., in Room 2123, Rayburn House Office Building, Hon. Ed Whitfield [Chairman] presiding.

Present: Representatives Whitfield, Burgess, Barton (Ex Officio), Schakowsky, and Inslee.

Staff Present: Dwight Cates, Professional Staff Member; Matthew Johnson, Legislative Clerk; Edith Holleman, Minority Counsel; Elizabeth Ertel, Minority Senior Staff Assistant; and Jonathan Brater, Minority Staff Assistant.

MR. WHITFIELD. If I could have your attention, it was our intent to begin this hearing at 4:00 p.m., and as you can see, it is about five after. There has been a delay in some transportation as members come back to the District, and we do expect a couple Members will be here in about 5 or 10 minutes. And when they arrive, we will get started. So I apologize for the delay, and we will get started as soon as possible. Thank you.

The hearing will come to order. It didn't take as long as I thought, Jan. Today we are going to review the status of the Nuclear Regulatory Commission's Reactor Oversight Process. Initiated in the year 2000, the Reactor Oversight Process was intended to create a risk-informed tiered approach to ensuring plant safety by focusing on three key areas: reactor safety, radiation safety for plant workers and the public, and physical security of the plant against sabotage or security threats.

The NRC developed the reactor process to apply more objective, timely, and risk-informed criteria in assessing plant performance while seeking to more effectively and efficiently regulate the industry. Given the fact that it has now been in place for almost 6 years, last spring I, along with several other members requested the GAO, the General Accountability Office, review the effectiveness of the NRC's Reactor Oversight Process.

We asked for this review in part because there have been a few very serious safety incidents that have raised questions about NRC's ability to identify and resolve significant safety issues before they occur. For

instance, in February of 2002, a very large hole was discovered on the reactor vessel head at the Davis-Besse plant in Ohio. Up until that point, NRC inspectors had given the Davis-Besse plant "green" findings for all aspects of plant performance. For those of you who are not familiar with NRC's color coding system, a "green" finding indicates that performance objectives are fully met.

Unfortunately these green findings were entirely wrong. For several years, NRC failed to identify near catastrophic boric acid corrosion so severe that less than one half of an inch of metal remained on the reactor vessel head. Clearly, the NRC's Reactor Oversight Process failed to anticipate the significant safety issue. To its credit, NRC has made significant strides in the Reactor Oversight Process in the years since the Davis-Besse incident. I understand that new revisions are about to be implemented to the Reactor Oversight Process to address safety culture issues that led to the problems at Davis-Besse.

NRC is also working closely with industry to improve selected performance indicators. These reforms are critical, particularly in light of the nuclear industry's renewed interests in the development of a new fleet of nuclear reactors. We need the nuclear industry to construct several new reactors to meet growing energy demands. However, we must also maintain the aging fleet of existing reactors. I expect that many of the 103 domestic reactors will be in operation decades beyond their initial 40-year design. Thus, NRC must continue to adapt the Reactor Oversight Process to anticipate new safety challenges presented by new reactor designs and also adapt to new safety challenges associated with the aging component issues that NRC and the nuclear industry have yet to discover.

We look forward to the testimony today of all the witnesses. And at this time, I'd like to recognize Ms. Schakowsky of Illinois for her opening statement.

[The prepared statement of Hon. Ed Whitfield follows:]

PREPARED STATEMENT OF THE HON. ED WHITFIELD, CHAIRMAN, SUBCOMMITTEE ON OVERSIGHT AND INVESTIGATIONS

This hearing will come to order. Today we will review the status of the Nuclear Regulatory Commission's Reactor Oversight Process. Initiated in the year 2000, the Reactor Oversight Process was intended to create a risk-informed, tiered approach to ensuring plant safety by focusing on three key areas - reactor safety, radiation safety for plant workers and the public, and physical security of the plant against sabotage or security threats.

The NRC developed the reactor oversight process to apply more objective, timely, and risk-informed criteria in assessing plant performance, while seeking to more effectively and efficiently regulate the industry. Given the fact that it has now been in place for almost 6 years, last Spring I along with several other Members requested the

General Accountability Office review the effectiveness of NRC's reactor oversight process.

I asked for this review, in part, because there have been a few very serious safety incidents that have raised questions about NRC's ability to identify and resolve significant safety issues before they occur.

For instance, in February of 2002, a very large hole was discovered on the reactor vessel head at the Davis Besse plant in Ohio. Up until that point, NRC inspectors had given the Davis Besse plant "green" findings for all aspects of plant performance. For those of you who are not familiar with NRC's color coding system, a "green" finding indicates that performance objectives are fully met. Unfortunately, these "green" findings were entirely wrong. For several years NRC failed to identify near-catastrophic boric acid corrosion so severe that less than one half of an inch of metal remained on the reactor vessel head. Clearly the NRC's reactor oversight process failed to anticipate this significant safety issue.

To its credit, NRC has made significant strides in the reactor oversight process in the years since the Davis Besse incident. I understand that new revisions are about to be implemented to the reactor oversight process to address safety culture issues that led to the problems at Davis Besse. NRC is also working closely with industry to improve selected performance indicators.

These reforms are critical, particularly in light of the nuclear industry's renewed interest in the development of a new fleet of nuclear reactors. We need the nuclear industry to construct several new reactors to meet growing energy demands. However, we must also maintain the aging fleet of existing reactors.

I expect many of the 103 domestic reactors will be in operation decades beyond their initial 40-year design basis. Thus, NRC must continue to adapt the reactor oversight process to anticipate new safety challenges presented by new reactor designs, and also adapt to new safety challenges associated with aging component issues NRC and the nuclear industry has have yet to discover.

I look forward to the testimony of today's witnesses, and I yield back the balance of my time.

MS. SCHAKOWSKY. Thank you, Mr. Chairman, and thank you for holding today's hearing on the Nuclear Regulatory Commission's Reactor Oversight Process, the ROP. A number of recent incidents at nuclear plants in Illinois and throughout the Nation have put in doubt whether the NRC's safety standards and inspection processes are adequate. I'm interested to know whether the NRC has learned from incidents like Davis-Besse and restructured its oversight process sufficiently to prevent their recurrence.

Since President Bush has proposed new nuclear development as a signature part of his energy policy, we must ensure that the NRC safety procedures are foolproof and that they deter future incidents. Since the Reactor Oversight Process was implemented in 2000, safety inspections found plants or employees had failed to comply with safe operating procedures in over 4,000 instances. And while many of those incidents were classified as "green" under the system, "green" doesn't mean all clear. It means that a plant or an employee failed to meet the NRC safety standards.

I look forward to hearing whether that number is an improvement over the number of incidents that occurred before the ROP was in place and whether the ROP has promoted a culture of safety and accountability in our Nation's nuclear plants.

In Illinois, which has 11 nuclear reactors, several incidents at Exelon plants has demonstrated that even after the implementation of the ROP, there have been a number of safety hazards and radioactive leaks that have threatened public health. This February, Exelon disclosed to the public that between 1996 and 2003, two Illinois plants spilled radioactive cancer-causing tritium on four occasions. Not only did this expose holes in oversight, it also highlighted the nuclear industry's failure to disclose threats to public health. One of the most immediate ways the Energy and Commerce Committee could promote nuclear safety would be to consider the Nuclear Release Notice Act, sponsored by Senator Obama and Congressman Weller, which would force the nuclear industry to notify the State, county, and public, whenever there's an unplanned release of radioactive material in excess of legal limits.

Illinois enacted legislation this year which requires nuclear plants to report leaks of radioactive material that contaminate groundwater, surface water, and the soil to regulators within 24 hours. In addition to these unannounced radioactive leaks, on February 20, there was a rare onsite emergency at Exelon's LaSalle facility involving control rods that are used to shut reactors down. The NRC has subsequently released a report that states that the side area emergency declared at LaSalle overstated the problem, but the incident raised several questions.

First, shouldn't there be Federal standards regulated by the NRC which outline what constitutes a nuclear emergency and mandates a particular Federal response? In addition, under the ROP, individual plants are inspected more or less regularly based on their individual histories. The incidents at Davis-Besse and LaSalle beg the question, aren't all of the nation's 103 nuclear plants inspected and regulated with the highest possible frequency and standards?

Mr. Chairman, the residents of a town like Seabrook, New Hampshire; Salem, New Jersey; and Braidwood, Illinois, want to know definitively things have changed since Three Mile Island. They and their families want to believe that they have nothing to fear from the nuclear plants in their towns and from the water supplies which feed the plants. Over the past several years, there have been over 4,000 unsafe incidents at the Nation's 103 nuclear plants. I ask our witnesses, is the ROP the best and safest reactor oversight system that we could possibly have? Knowing that so many plants have failed to meet the NRC's current safety standards, do we have the capacity and oversight system to safely expand the number of reactors in this country?

Today we should not only judge whether the ROP has been effective, but we should also take a broader look to determine whether the President's plan to expand nuclear development in this country is safe and warranted. Thank you.

MR. WHITFIELD. Thank you, Ms. Schakowsky. At this time, Dr. Burgess, do you have an opening statement?

MR. BURGESS. Mr. Chairman, in the interest of time, I will submit what I have for the record, and we'll go right on to the witnesses.

[Additional statements submitted for the record follows:]

PREPARED STATEMENT OF THE HON. JOE BARTON, CHAIRMAN, COMMITTEE ON ENERGY AND COMMERCE

Mr. Chairman, thank you for holding this important hearing. Nuclear power is a critical source of approximately twenty percent of the electricity we generate each year. I want that number to increase over the next decade, and many of the provisions in the Energy Policy Act we passed last year will help pave the way for the construction of a new generation of nuclear power plants. Principal among these provisions was the reauthorization of the Price Anderson Act.

The public has a strong and growing confidence in nuclear power because it is proven to be reliable, and it is proven to be safe. The nuclear industry has demonstrated a willingness to adapt quickly when new safety or design issues are discovered, and it has worked closely with the NRC to resolve these issues quickly.

The reactor oversight process at NRC continues to evolve, and I am pleased with the Commission's willingness to seek feedback from external stakeholders. All groups ranging from nuclear power supporters to environmental activists have a seat at the table when NRC seeks feedback on its reactor oversight process.

The future of nuclear power will depend on whether we can maintain the public trust that NRC and the industry have developed over the years. I feel confident that the Commission and the NRC staff are committed to this task.

With respect to licensing new power plants, there is a lot of work yet to do at NRC. The Commission will be challenged with a significant workload as new license applications arrive. It is critical that NRC maintain the public's trust by keeping a clear focus on safety.

I understand that GAO has a generally positive review of NRC's reactor oversight process. I look forward to hearing from both NRC and GAO on what we can do to further improve the process.

I thank the Chairman, and I yield back.

PREPARED STATEMENT OF THE HON. CLIFF STEARNS, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF FLORIDA

Mr. Chairman, today's hearing on the Nuclear Regulatory Commission's (NRC) gives us an opportunity to learn more about the efficiency and effectiveness of the reactor oversight process (ROP). Six years after its deployment, I am eager to see if the development of objective, risk-informed, and timely measurement criteria of the ROP has brought some improvement in safety and efficiency.

The NRC fulfills a vital role in safeguarding our health and environment. Our nation boasts the safest reactors in the world--and the nuclear industry shares our desire to keep it that way.

The ROP was developed in order to improve the performance, reduce unnecessary regulation, while improving the NRC's management of reactor safety. The ROP focuses on three key areas: reactor safety; radiation safety; and security of the plant against sabotage and other physical threats. Combining these performance indicators with NRC inspections, we end up with a color-coded rating system. Green indicates good performance, red indicates sub-par performance, yellow indicates a reduction in safety, and red indicates a serious reduction in safety. A plant earning any rating less than green triggers further inspections and reviews. Without improvement, the NRC can resort to civil orders or even the suspension of the reactor's operating license.

The color-coded system appears to offer improvements in compliance and safety, but we must be wary of simplifying regulation too far--we have no wish for a trite oversight program. Nor do we want to see a color-coding system as useless as the Department of Homeland Security's color-coded alert system.

Of course, while I share the concerns of our witness from the activist group Nuclear Information and Resource Service that the NRC vigilantly protect our nation, I do not equate the number of enforcement actions with the quality of oversight or the level of safety improvement.

Indeed, the NRC appears to be exercising greater flexibility in methods of safety improvement. For instance, following the discovery of severe corrosion on the reactor vessel head at the David Besse (pronounced BESS - EE) plant in 2002, the NRC evaluated the problem, and adapted its findings to expand the ROP performance indicators into new areas, and to tailor new recommendations for plant operators.

Mr. Chairman, we have devoted significant time and effort in this Committee to expanding America's supply of nuclear power. I hope our witnesses this afternoon will help us see how far we have some on the safety of our 103 nuclear reactors, and what factors we still must address as we seek to add many more.

MR. WHITFIELD. Thank you very much. Today we're going to have two panels of witnesses, and in the first panel--I welcome you--we have Mr. Jim Wells, who is the Director of Energy in the Natural Resources and the Environment, at the Government Accountability Office. And I certainly welcome the Honorable Edward McGaffigan, who is the Commissioner of the U.S. Nuclear Regulatory Commission. Mr. Wells, you are accompanied today by Alyssa Hundrup. Will she be testifying?

MR. WELLS. Yes, she will, Mr. Chairman.

MR. WHITFIELD. As you know, this is an Oversight and Investigations hearing, and it is our practice to take testimony under oath. Do either of the three of you have any difficulty testifying under oath? And do you intend to be represented by legal counsel today?

MR. WELLS. No.

MR. WHITFIELD. If you would stand, I will swear you in.

[Witnesses sworn.]

TESTIMONY OF JIM WELLS, DIRECTOR, ENERGY, NATURAL RESOURCES, AND THE ENVIRONMENT, GOVERNMENT ACCOUNTABILITY OFFICE; AND HON. EDWARD MCGAFFIGAN, COMMISSIONER; U.S. NUCLEAR REGULATORY COMMISSION

MR. WHITFIELD. Thank you. You are now sworn in. And Mr. Wells, we'll call upon you for your 5 minute opening statement.

MR. WELLS. Thank you, Mr. Chairman, members of the subcommittee.

MR. WHITFIELD. Be sure to turn your microphone on.

MR. WELLS. It's on, but it's not recording. Light's on. Hello. Testing, one two. Testing, one two. Okay. We've got it now.

MR. WHITFIELD. Thank you.

MR. WELLS. The safe operation of commercial nuclear power plants is a private industry responsibility. The law says that the NRC as the regulatory commission must ensure that this happens. A lot is riding on how good a job NRC is doing. Some of us remember Three Mile Island in '79, the 2000 steam pipe leak at Indian Point, and Davis-Besse in 2002. Avoiding accidents is paramount to achieving public confidence that the industry and NRC are doing a good job as we think about advancing the future of nuclear power.

Given how complex and how hard we are using these plants to produce 20 percent of our Nation's energy needs, the safety record is pretty good. Prior to 2000, NRC was criticized for doing oversight that was redundant, inefficient, overly subjective, and not always focused on the most important safety issues. GAO, the Congress, the industry, and even many in NRC were not happy with the old inspection program. NRC's new process, based on what we've been able to learn, is similar to the old in terms of physical plant inspections, but it's now more objective, predictable, and risk informed. The unexpected discovery at Davis-Besse plant as, Mr. Chairman, you mentioned the pineapple-sized hole in the reactor vessel head, I think it was a wake-up call that the ROP did not work as planned.

Some good came out of this, as NRC has changed and improved its operations, and improved oversight as a result and incorporated new things in the ROP process which we can talk about later. As mentioned, NRC has identified over 4,000 inspection findings in the 5 years of the new operation of the ROP program. About 97 percent of those findings, 3,900, were for actions or failures NRC considered it was important to correct, but they were of low significance to overall safety operation. The good news is that these findings have been corrected. In contrast, 12 of the findings that have occurred, or less than 1 percent, were the

highest level of significance to safety, that still allows continuous operation at those plants. All of these caused NRC to immediately inform the public and increase the levels of inspection in oversight. Some of these are still outstanding 3 and 4 years later, due to the significance of the finding or the time it's taken to resolve them.

Nothing has been found to date to warrant a shutdown of a nuclear power plant. This possibility, however, was debated within the Commission during the early days at Davis-Besse as the plant was experiencing problems. GAO, when it did its work at Davis-Besse, told the NRC that we thought that their procedures for knowing when to shut a plant down should be revised. Overall, the ROP process has worked to subject more than three-fourths of the Nation's 103 operating plants to some oversight level beyond the regular baseline inspection over the last 5 years.

When we issue the report later this September, it will give good marks to what appears to be good quality inspections being performed by regional and on-site inspectors, and that NRC is being responsive to independent reviews and feedback from stakeholders like GAO. The new risk process based on our assessment is better focusing its current inspections on areas that are most important to safety, and NRC is showing willingness to continuously improve.

One significant shortcoming in the ROP is that it is not as effective as it could be in identifying early indications of deteriorating safety cultures within the plant before problems develop. Clearly, safety culture attributes, such as attention to detail, adherence to procedures, and effective, corrective, and preventive actions have a significant impact on safety performance. The findings of Davis-Besse showed this.

Although somewhat slow to act, NRC is beginning to get the safety culture worked into the oversight process, even though it's somewhat controversial as we talk about it today. There is pushback from the commercial nuclear industry about its workability. Having a regulatory body, such as NRC, getting into issues that have traditionally been viewed as the purview of the licensee such as maintaining a safety-conscious work environment, human performance, and problem identification and resolution can be viewed by some as adding undue subjectivity to the NRC oversight as a regulator. On the other hand, providing NRC better tools to address safety culture to detect deteriorating safety conditions, such as existed at Davis-Besse, before an event occurs can be a positive thing. GAO's conclusion is that the evidence says that NRC needs to do safety culture reviews.

The verdict is still out as to whether they can do that or not. I will stop here and say that NRC is devoting considerable effort to its oversight activities. The current and changing process to GAO appears

logical, well structured, and rigorous. This does not mean that the NRC process is perfect. NRC's safety culture may be the most important improvement in the future ROP program. As we complete our work, we will be examining whether NRC needs to do more, and we think there are some areas of improvement in how information on how well nuclear power plants are operating safely can be presented to the public and other stakeholders in a more understandable manner, and we look forward to issuing our report in the next few months. Thank you, Mr. Chairman.

MR. WHITFIELD. Thank you, Mr. Wells.

[The prepared statement of Jim Wells follows:]

PREPARED STATEMENT OF JIM WELLS, DIRECTOR, NATURAL RESOURCES AND THE ENVIRONMENT, GOVERNMENT ACCOUNTABILITY OFFICE

United States Government Accountability Office

GAO

Testimony

Before the Subcommittee on Oversight and Investigations, Committee on Energy and Commerce, U.S. House of Representatives

For Release on Delivery
Expected at 4p.m. EDT
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NUCLEAR REGULATORY COMMISSION

Preliminary Observations on Its Process to Oversee the Safe Operation of Nuclear Power Plants

Statement of Jim Wells, Director
Natural Resources and Environment

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Highlights

Highlights of GAO-06-888T, a testimony before the Subcommittee on Oversight and Investigations, Committee on Energy and Commerce, U.S. House of Representatives

Why GAO Did This Study

The Nuclear Regulatory Commission (NRC) has the responsibility to provide oversight to ensure that the nation's 103 commercial nuclear power plants are operated safely. While the safety of these plants has always been important, since radioactive release could harm the public and the environment, NRC's oversight has become even more critical as the Congress and the nation consider the potential resurgence of nuclear power in helping to meet the nation's growing energy needs.

Prior to 2000, NRC was criticized for having a safety oversight process that was not always focused on the most important safety issues and in some cases, was overly subjective. To address these and other concerns, NRC implemented a new oversight process—the Reactor Oversight Process (ROP). NRC continues to modify the ROP to incorporate feedback from stakeholders and in response to other external events.

This testimony summarizes information on (1) how NRC oversees nuclear power plants, (2) the results of the ROP over the past several years, and (3) the aspects of the ROP that need improvement and the status of NRC's efforts to improve them. This testimony discusses preliminary results of GAO's work. GAO will report in full at a later date. GAO analyzed program-wide information, inspection results covering 5 years of ROP operations, and detailed findings from a sample of 11 plants.

www.gao.gov/cgi-bin/getrpt?GAO-06-888T.

To view the full product, including the scope and methodology, click on the link above. For more information, contact Jim Wells (202) 512-3841 or wellsj@gao.gov.

June 19, 2006

NUCLEAR REGULATORY COMMISSION

Preliminary Observations on Its Process to Oversee the Safe Operation of Nuclear Power Plants

What GAO Found

NRC uses various tools to oversee the safe operation of nuclear power plants, including physical plant inspections and quantitative measures or indicators of plant performance. To apply these tools, NRC uses a risk-informed and graded approach—that is, one considering safety significance in deciding on the equipment and operating procedures to be inspected and employing increasing levels of regulatory attention to plants based on the severity of identified performance problems. The tools include three types of inspections—baseline, supplemental, and special. All plants receive baseline inspections of plant operations almost continuously by NRC inspectors. When NRC becomes aware of a performance problem at a plant, it conducts supplemental inspections, which expand the scope of baseline inspections. NRC conducts special inspections to investigate specific safety incidents or events that are of particular interest to NRC because of their potential significance to safety. The plants also self-report on their safety performance using performance indicators for plant operations related to safety, such as the number of unplanned reactor shutdowns.

Since 2001, NRC's ROP has resulted in more than 4,000 inspection findings concerning nuclear power plant licensees' failure to comply with regulations or other safe operating procedures. About 97 percent of these findings were for actions or failures NRC considered important to correct but of low significance to overall safe operation of the plants. In contrast, 12 of the inspection findings, or less than 1 percent, were of the highest levels of significance to safety. On the basis of its findings and the performance indicators, NRC has subjected more than three-quarters of the 103 operating plants to oversight beyond the baseline inspections for varying amounts of time.

NRC has improved several key areas of the ROP, largely in response to independent reviews and feedback from stakeholders. These improvements include better focusing its inspections on those areas most important to safety, reducing the time needed to determine the risk significance of inspection findings, and modifying the way that some performance indicators are measured. NRC also recently undertook a major initiative to improve its ability to address plants' safety culture—that is, the organizational characteristics that ensure that issues affecting nuclear plant safety receive the attention their significance warrants. GAO and others have found this to be a significant shortcoming in the ROP. NRC's safety culture initiative is a clear shift in its approach to assessing plant operations and some of its actions have been controversial. NRC officials acknowledge that this effort is only a step in an incremental approach and that continual monitoring, improvements, and oversight will be needed to fully detect deteriorating safety conditions before an event occurs.

Mr. Chairman and Members of the Subcommittee:

I am pleased to be here today to discuss our ongoing review of how the Nuclear Regulatory Commission (NRC) oversees the safe operation of the nation's 103 operating commercial nuclear power plants, which provide about 20 percent of U.S. electricity. The safety of these plants, which are located at 65 sites in 31 states, has always been important, as an accident could result in the release of radioactive material and potentially harm public health and the environment. NRC is responsible for issuing regulations, licensing and overseeing plants, and requiring necessary actions to protect public health and safety, while plant operators are responsible for safely operating their plants in accordance with their licenses. NRC's oversight has become even more critical as the Congress and the nation consider the potential resurgence of nuclear power in helping to meet the nation's growing energy needs. No new orders for a plant have been placed since the 1979 accident at the Three Mile Island plant, but in the face of concerns about aging plants, energy security, global warming, and the ever increasing need for energy to fuel the nation's economy, nuclear power is resurfacing as a principal option. An accident could threaten public confidence in nuclear power just as it begins to emerge from the shadows of the Three Mile Island accident. It is critical that NRC be able to ensure that nuclear power plants are operated safely and that public confidence about their safety is high.

Prior to 2000, NRC was criticized for having a safety oversight process that was not always focused on the most important safety issues and in some cases, regulatory activities were redundant, inefficient, and overly subjective. While its new process—which NRC refers to as the Reactor Oversight Process (ROP)—is similar to its prior process in that the oversight activities largely consist of physical plant inspections, the inspections now focus on more important safety issues and the goal is to make assessments of plants' safety performance more objective, predictable, and understandable. The unexpected discovery, in March 2002, of extensive corrosion and a pineapple-size hole in the reactor vessel head—a vital barrier preventing a radioactive release—at the Davis-Besse nuclear power plant in Ohio led NRC to re-examine its safety

oversight and other regulatory processes to determine how such corrosion could be missed. Based on the lessons learned from the event, NRC made several changes to the ROP. NRC continues to annually assess the ROP by obtaining feedback from the industry and other stakeholders such as public interest groups and incorporating this feedback and other information into specific performance metrics to assess its effectiveness.

We are preparing a report to you and other Members of the Congress later this year on (1) how NRC oversees nuclear power plants to ensure that they are operated safely, (2) the results of the ROP over the past several years in terms of the number and types of inspection findings, and (3) the aspects of the ROP that need improvement and the status of NRC's efforts to improve them.[1] To examine how NRC oversees plants, we reviewed NRC's regulations, inspection manuals, and other guidance documents; interviewed NRC headquarters and regional officials and regional and on-site inspectors; visited the Salem and Hope Creek nuclear power plants; and attended several public meetings covering various nuclear power plant oversight topics. To examine the results of the ROP over the past several years, we analyzed NRC data on nuclear plant safety for 2001 through 2005, the years since implementation of the ROP for which data were available for the full year, and discussed our analysis with NRC officials. We assessed the reliability of this data and determined that the data were sufficiently reliable for the purposes of our report. To examine areas of the ROP that need improvement and the status of NRC's efforts to improve them, we reviewed NRC documents, including annual self-assessment reports; interviewed officials from NRC and outside stakeholder groups; and attended several key public meetings covering proposed changes to oversight procedures. We also reviewed various external evaluations of the ROP, including our prior reports and those of the NRC Inspector General. Additionally, we selected a nonprobability sample of 6 nuclear power sites (totaling 11 plants) that provided coverage of each of NRC's four regional offices and varying levels of plant performance and NRC oversight since 2000.

[1] Physical security, which is also covered by the ROP, is not included in this review. For information on NRC's physical security, see GAO, *Nuclear Power Plants: Efforts Made to Upgrade Security, but the Nuclear Regulatory Commission's Design Basis Threat Process Should Be Improved,* GAO-06-388 (Washington, D.C.: Mar. 14, 2006).

We reviewed relevant inspection reports and assessment documents and interviewed NRC and industry officials at each site to examine how NRC applies the ROP to identify and correct safety problems. We are conducting this work in accordance with generally accepted government auditing standards. We performed the work reflected in this testimony from July 2005 to June 2006.

To date, our work indicates the following:

- NRC uses various tools to oversee the safe operation of nuclear power plants, including physical plant inspections of equipment and records and quantitative measures or indicators of plant performance such as the number of unplanned shutdowns. NRC uses a graded and risk-informed approach—that is, one considering safety significance in deciding on the equipment or operating procedures to be inspected and employing increasing levels of regulatory attention to plants based on the severity of identified performance problems—to apply these tools. All plants receive baseline inspections, which are inspections of plant operations that are conducted almost continuously by NRC inspectors usually located at each nuclear power plant site. When NRC becomes aware of a performance problem at a plant, it conducts supplemental inspections, which expand the scope of baseline inspections. NRC conducts special inspections to investigate specific safety incidents or events that are of particular interest to NRC because of their potential significance to safety. The plants also self-report on their safety performance using performance measures or indicators in quarterly reports submitted to NRC. Plants' quarterly reports of performance indicators are verified by NRC's on-site inspectors. NRC analyzes each of its inspection findings to determine the finding's significance in terms of safety, and applies increasing levels of oversight based on the number and level of risk of the findings identified.

- Since 2001, NRC's ROP has resulted in more than 4,000 inspection findings concerning nuclear power plant licensees' failure to comply with regulations or other safe operating procedures. About 97 percent of these findings were for

actions or failures NRC considered important to correct but of very low significance to overall safe operation of the plants. For example, a finding of very low risk significance was issued at one plant after a worker failed to wear the proper radiation detector and at another plant because the operator failed to properly evaluate and approve the storage of flammable materials in the vicinity of safety-related equipment. In contrast, 12 of the inspection findings, or less than 1 percent, were of the highest levels of significance to safety. For example, NRC issued a finding of the highest risk significance at one plant after a steam generator tube failed, causing an increased risk of the release of radioactive material. Similarly, there were 156 instances, or less than 1 percent, in which data reported for individual performance indicators were outside NRC's acceptable category of performance. On the basis of its findings and the performance indicators, NRC has subjected more than three-quarters of the 103 operating plants to oversight beyond the baseline inspections for varying amounts of time. Over the past 5 years, 5 plants have been subject to the highest level of NRC oversight that still allows continued operations. According to NRC officials, the results of its oversight process at an industry or summary level serve as an indicator of overall industry performance, which to date indicates good safety performance.

- NRC has improved several key areas of the ROP, largely in response to independent reviews and feedback from stakeholders, including its regional and on-site inspectors, usually obtained during NRC's annual self-assessment of the oversight process. These improvements include better focusing its inspections on those areas most important to safety, reducing the time needed to determine the risk significance of inspection findings, and modifying the way that some performance indicators are measured. For the most part, NRC considers these efforts to be refinements rather than significant changes. One significant shortcoming in the ROP that we and others have found is that it is not as effective as it could be in identifying and addressing early indications of deteriorating safety at nuclear power plants before problems develop. In response to this

concern, NRC recently undertook a major initiative to improve its ability to address plants' safety culture—that is, the organizational characteristics that ensure that issues affecting nuclear plant safety receive the attention their significance warrants. NRC and others have long recognized that safety culture attributes, such as attention to detail, adherence to procedures, and effective corrective and preventative action, have a significant impact on a plant's safety performance. NRC is taking action to improve how it incorporates safety culture into the ROP by redefining and increasing its focus on more qualitative and cross-cutting issues or aspects of plant performance—including a safety conscious work environment, human performance, and problem identification and resolution—and developing new requirements to more directly assess safety culture at poorer performing plants. Some of its actions have been controversial. Although some industry officials have expressed concern that these changes could introduce undue subjectivity to NRC's oversight, given the difficulty in measuring these often intangible and complex concepts, other stakeholders believe this approach will provide NRC better tools to address safety culture issues at plants. NRC officials acknowledge that this effort is only a step in an incremental approach and that continual monitoring, improvements, and oversight will be needed to fully detect deteriorating safety conditions before an event occurs.

NRC is devoting considerable effort to overseeing the safe operation of the nation's commercial nuclear power plants, and its process for doing so appears logical and well-structured. This does not mean that NRC's oversight is perfect. However, NRC is also demonstrating that it is aware of this fact and is willing to make changes to improve. Its efforts to continuously obtain feedback and consider the need for improvement to the ROP are important as nuclear power plants age and the nation considers building new plants. In this regard, its safety culture initiative may be its most important improvement to the ROP. As we complete our work, we will be examining whether NRC needs a more formal mechanism to assess the effectiveness of this initiative, including incorporating stakeholder feedback and developing specific measures to assess its performance. It has

been more than 4 years since Davis-Besse, and it appears that NRC is now taking concrete actions to begin incorporating safety culture into the ROP.

I would also like to point out that the ROP is a very open process in that NRC provides the public and its other stakeholders with considerable specific and detailed information on its activities and findings with regard to safety at individual plants. However, to ensure or foster even greater public confidence in safety oversight, as we complete our work, we will be examining whether NRC can make this information more meaningful by providing industry-wide or summary data for key components of its oversight process. This information may provide a useful measure of overall industry performance and allow for comparisons between the safety performance of a specific plant to that of the industry as a whole.

Background

NRC is an independent agency of over 3,200 employees established by the Energy Reorganization Act of 1974 to regulate civilian—that is, commercial, industrial, academic, and medical—use of nuclear materials. NRC is headed by a five-member Commission. The President appoints the Commission members, who are confirmed by the Senate, and designates one of them to serve as Chairman and official spokesperson. The Commission as a whole formulates policies and regulations governing nuclear reactor and materials safety, issues orders to licensees, and adjudicates legal matters brought before it.

NRC and the licensees of nuclear power plants share the responsibility for ensuring that commercial nuclear power reactors are operated safely. NRC is responsible for issuing regulations, licensing and inspecting plants, and requiring action, as necessary, to protect public health and safety. Plant licensees have the primary responsibility for safely operating their plants in accordance with their licenses and NRC regulations. NRC has the authority to take actions, up to and including shutting down a plant, if licensing

conditions are not being met and the plant poses an undue risk to public health and safety.

Nuclear power plants have many physical structures, systems, and components, and licensees have numerous activities under way, 24-hours a day, to ensure that plants operate safely. NRC relies on, among other things, its on-site resident inspectors to assess plant conditions and the licensees' quality assurance programs such as those required for maintenance and problem identification and resolution. With its current resources, NRC can inspect only a relatively small sample of the numerous activities going on during complex plant operations. According to NRC, its focus on the more safety significant activities is made possible by the fact that safety performance at plants has improved as a result of more than 25 years of operating experience.

Commercial nuclear power plants are designed according to a "defense in depth" philosophy revolving around redundant, diverse, and reliable safety systems. For example, two or more key components are put in place so that if one fails, there is another to back it up. Plants have numerous built-in sensors to monitor important indicators such as water temperature and pressure. Plants also have physical barriers to contain the radiation and provide emergency protection. For example, the nuclear fuel is contained in a ceramic pellet to lock in the radioactive byproducts and then the fuel pellets are sealed inside rods made of special material designed to contain fission products, and the fuel rods are placed in reactors housed in containment buildings made of several feet of concrete and steel.

Furthermore, the nuclear power industry formed an organization, the Institute of Nuclear Power Operations (INPO) with the mission to "promote the highest levels of safety and reliability-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 and workers undergo both periodic training and assessment. INPO also conducts periodic evaluations of operating nuclear plants, focusing on plant safety and reliability, in the areas of operations, maintenance, engineering, radiological

protection, chemistry, and training. Licensees make these evaluations available to the NRC for review, and the NRC staff uses the evaluations as a means to determine whether its oversight process has missed any performance issues.

NRC Uses Various Tools and Takes a Graded and Risk-Informed Approach to Ensuring the Safety of Nuclear Power Plants

NRC uses various tools to oversee the safe operation of nuclear power plants, generally consisting of physical plant inspections of equipment and records and objective indicators of plant performance. These tools are risk-informed in that they are focused on the issues considered most important to plant safety. Based on the results of the information it collects through these efforts, NRC takes a graded approach to its oversight, increasing the level of regulatory attention to plants based on the severity of identified performance issues. NRC bases its regulatory oversight process on the principle and requirement that plant licensees routinely identify and address performance issues without NRC's direct involvement. An important aspect of NRC's inspections is ensuring the effectiveness of licensee quality assurance programs. NRC assesses overall plant performance and communicates these results to licensees on a semi-annual basis.

During fiscal year 2005, NRC inspectors spent a total of 411,490 hours on plant inspection activities (an average of 77 hours per week at each plant). The majority of these inspection efforts were spent on baseline inspections, which all plants receive on an almost continuous basis. Baseline inspections, which are mostly conducted by the two to three NRC inspectors located at each nuclear power plant site, evaluate the safety performance of plant operations and review plant effectiveness at identifying and resolving its safety problems.[2] There are more than 30 baseline inspection procedures, conducted at varying intervals, ranging from quarterly to triennially, and involving both physical observation of plant activities and reviews of plant reports and data. The

[2] Certain baseline inspections may also be done by regional staff because of their expertise in particular aspects of plant operations.

inspection procedures are risk-informed to focus inspectors' efforts on the most important areas of plant safety in four ways: 1) areas of inspection are included in the set of baseline procedures based on, in part, their risk importance, 2) risk information is used to help determine the frequency and scope of inspections, 3) the selection of activities to inspect within each procedure is informed with plant-specific risk information, and 4) the inspectors are trained in the use of risk information in planning their inspections.

For inspection findings found to be more than minor,[3] NRC uses its significance determination process (SDP) to assign each finding one of four colors to reflect its risk significance.[4] Green findings equate to very low risk significance, while white, yellow, and red colors represent increasing levels of risk, respectively. Throughout its application of the SDP, NRC incorporates information from the licensee, and the licensee has the opportunity to formally appeal the final determination that is made.

In addition to assigning each finding a color based on its risk significance, all findings are evaluated to determine if certain aspects of plant performance, referred to as cross-cutting issues, were a contributing cause to the performance problem. The cross-cutting issues are comprised of (1) problem identification and resolution, (2) human performance, and (3) safety consciousness in the work environment. To illustrate, in analyzing the failure of a valve to operate properly, NRC inspectors determined that the plant licensee had not followed the correct procedures when performing maintenance on the valve, and thus NRC concluded the finding was associated with the human performance cross-cutting area. If NRC determines that there are multiple findings during the 12-month assessment period with documented cross-cutting aspects, more than three findings with the same causal theme, and NRC has a concern about the licensee's progress in addressing these areas, it may determine that the licensee has a "substantive" cross-cutting issue. Opening a substantive cross-cutting issue serves as a

[3] Minor issues are defined by NRC as those that have little actual safety consequences, little or no potential to impact safety, little impact on the regulatory process, and no willfulness.
[4] The SDP essentially evaluates how an inspection finding impacts the margin of safety of a plant. The impact is largely evaluated through the use of information on operating experience and risk estimates calculated using probabilistic risk assessment (PRA).

way for NRC to notify the plant licensee that problems have been identified in one of the areas and that NRC will focus its inspection efforts in the cross-cutting area of concern.

When NRC becomes aware of one or more performance problems at a plant that are assigned a risk color greater-than-green (white, yellow, or red), it conducts supplemental inspections. Supplemental inspections, which are performed by regional staff, expand the scope beyond baseline inspection procedures and are designed to focus on diagnosing the cause of the specific performance deficiency. NRC increases the scope of its supplemental inspection procedures based on the number of greater-than-green findings identified, the area where the performance problem was identified, and the risk color assigned. For example, if one white finding is identified, NRC conducts a follow-up inspection directed at assessing the licensee's corrective actions to ensure they were sufficient in both correcting the specific problem identified and identifying and addressing the root and contributing causes to prevent recurrence of a similar problem. If multiple yellow findings or a single red finding is identified, NRC conducts a much more comprehensive inspection which includes obtaining information to determine whether continued operation of the plant is acceptable and whether additional regulatory actions are necessary to address declining plant performance. This type of more extensive inspection is usually conducted by a multi-disciplinary team of NRC inspectors and may take place over a period of several months. NRC inspectors assess the adequacy of the licensee's programs and processes such as those for identifying, evaluating, and correcting performance issues and the overall root and contributing causes of identified performance deficiencies.

NRC conducts special inspections when specific events occur at plants that are of particular interest to NRC because of their potential safety significance. Special inspections are conducted to determine the cause of the event and assess the licensee's response. For special inspections, a team of experts is formed and an inspection charter issued that describes the scope of the inspection efforts. At one plant we reviewed, for example, a special inspection was conducted to investigate the circumstances

surrounding the discovery of leakage from a spent fuel storage pool. Among the objectives of this inspection were to assess the adequacy of the plant licensee's determination of the source and cause of the leak, the risk significance of the leakage, and the proposed strategies to mitigate leakage that had already occurred and repair the problem to prevent further leakage.

In addition to its various inspections, NRC also collects plant performance information through a performance indicator program, which it maintains in cooperation with the nuclear power industry. On a quarterly basis, each plant submits data for 15 separate performance indicators. These objective numeric measures of plant operations are designed to measure plant performance related to safety in various aspects of plant operations. For example, one indicator measures the number of unplanned reactor shutdowns during the previous four quarters while another measures the capability of alert and notification system sirens, which notify residents living near the plant in the event of an accident. Working with the nuclear power industry, NRC established specific criteria for acceptable performance with thresholds set and assigned colors to reflect increasing risk according to established safety margins for each of the indicators. Green indicators reflect performance within the acceptable range while white, yellow, and red colors represent decreasing plant performance, respectively. NRC inspectors review and verify the data submitted for each performance indicator annually through the baseline inspection process. If questions arise about how to calculate a particular indicator or what the correct value should be, there is a formal feedback process in place to resolve the issue. When performance indicator thresholds are exceeded, NRC responds in a graded fashion by performing supplemental inspections that range in scope depending on the significance of the performance issue.

Under the ROP, NRC places each plant into a performance category on the agency's action matrix, which corresponds to increasing levels of oversight based on the number and risk significance of inspection findings and performance indicators. The action matrix is NRC's formal method of determining what additional oversight procedures—

mostly supplemental inspections—are required.[5] Greater-than-green inspection findings are included in the action matrix for a minimum of four quarters to allow sufficient time for additional findings to accumulate that may indicate more pervasive performance problems requiring additional NRC oversight. If a licensee fails to correct the performance problems within the initial four quarters, the finding may be held open and considered for additional oversight for more than the minimum four quarters.

At the end of each 6-month period, NRC issues an assessment letter to each plant licensee. This letter describes what level of oversight the plant will receive according to its placement in the action matrix performance categories, what actions NRC is expecting the plant licensee to take as a result of the performance issues identified, and any documented substantive cross-cutting issues. NRC also holds an annual public meeting at or near each plant site to review performance and address questions about the plant's performance from members of the public and other interested stakeholders. Most inspection reports, assessment letters and other materials related to NRC's oversight processes are made publicly available through a NRC website devoted to the ROP. The website also includes plant-specific quarterly summaries of green or greater inspection findings and all the performance indicators.

NRC Has Continually Identified Problems at Nuclear Power Plants but Few Have Been Considered Significant to Safe Operation of the Plants

The ROP has identified numerous performance deficiencies as inspection findings at nuclear power plants since it was first implemented, but most of these were considered to be of very low risk to safe plant operations. Similarly, there have been very few instances in which performance indicator data exceeded acceptable standards. As a result, few plants have been subjected to high levels of oversight.

[5] NRC officials can also increase or decrease oversight in ways not in accordance with those specified by the action matrix by requesting a deviation. This provision is intended for rare instances when the oversight levels dictated by the action matrix are not appropriate to address a particular performance problem and a more tailored approach is required.

Of more than 4,000 inspection findings identified between 2001 and 2005, 97 percent were green. While green findings are considered to be of "very low" safety significance, they represent a performance deficiency on the part of the plant licensee and thus are important to correct. Green findings consist of such things as finding that a worker failed to wear the proper radiation detector or finding that a licensee did not properly evaluate and approve the storage of flammable materials in the vicinity of safety-related equipment. NRC does not follow-up on the corrective action taken for every green finding identified; rather, it relies on the licensee to address and track their resolution through the plant's corrective action program. NRC does, however, periodically follow-up on some of the actions taken by the licensee to address green findings through an inspection specifically designed to evaluate the effectiveness of the licensee's corrective action program. NRC officials stated that green findings provide useful information on plant performance and NRC inspectors use the findings to identify performance trends in certain areas and help inform their selection of areas to focus on during future inspections. In contrast to the many green findings, NRC has identified 12 findings of the highest risk significance (7 yellow and 5 red), accounting for less than 1 percent of the findings since 2001. For example, one plant was issued a red finding—the highest risk significance—after a steam generator tube failed, causing an increased risk in the release of radioactive material.

Similar to the inspection findings, most performance indicator reports have shown the indicators to be within the acceptable levels of performance. Only 156, or less than one percent of over 30,000 indicator reports from 2001 to 2005, exceeded the acceptable performance threshold. Four of the 15 performance indicators have always been reported to be within acceptable performance levels. In addition, 46 plants have never had a performance indicator fall outside of the acceptable level and only three plants reported having a yellow indicator for one performance measure; no red indicators have ever been reported.

On the basis of its inspection findings and performance indicators, NRC has subjected more than three quarters of the 103 operating plants to at least some level of increased

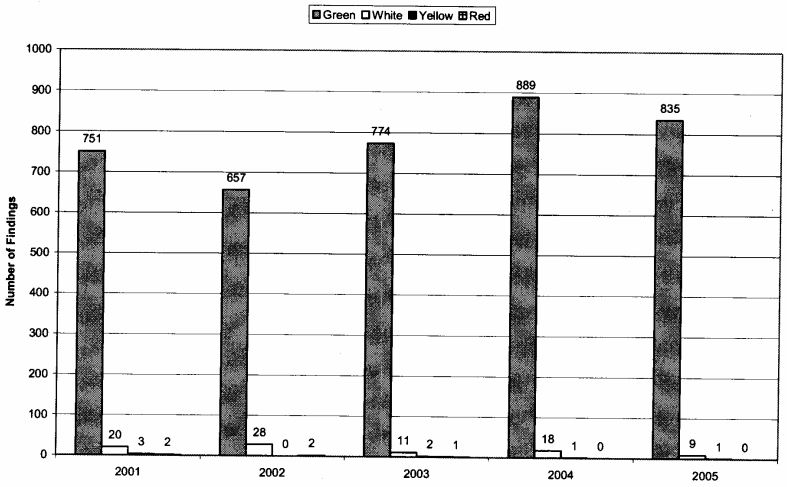
oversight (beyond the baseline inspections) for varying amounts of time. Most of these plants received the lowest level of increased oversight, consisting of a supplemental inspection, to follow-up on the identification of one or two white inspection findings or performance indicators. Five plants have received the highest level of plant oversight for which NRC allows plants to continue operations, due to the identification of multiple white or yellow findings and/or the identification of a red finding.[6] One plant received this level of oversight because NRC determined that the licensee failed to address the common causes of two white findings and held them open for more than four quarters. One of these findings involved the recurrent failure of a service water pump because the licensee failed to take adequate corrective action after the first failure.

NRC inspectors at the plants we reviewed indicated that, when plant performance declines, it is often the result of ineffective corrective action programs, problems related to human performance, or complacent management, which often results in deficiencies in one or more of the cross-cutting areas. In assessing the results of the ROP data, we found that all plants subjected to NRC's highest level of oversight also had a substantive cross-cutting issue open either prior to or during the time that it was subjected to increased oversight inspections.

Overall, NRC's oversight process shows mostly consistent results from 2001 to 2005. For example, the total number of green findings at all plants ranged from 657 to 889 per year and the total number of other findings ranged from 10 to 30 per year with no strong trend (see fig. 1).

[6] NRC has one additional oversight category for plants with unacceptable performance. Plants placed into this category are not permitted to operate.

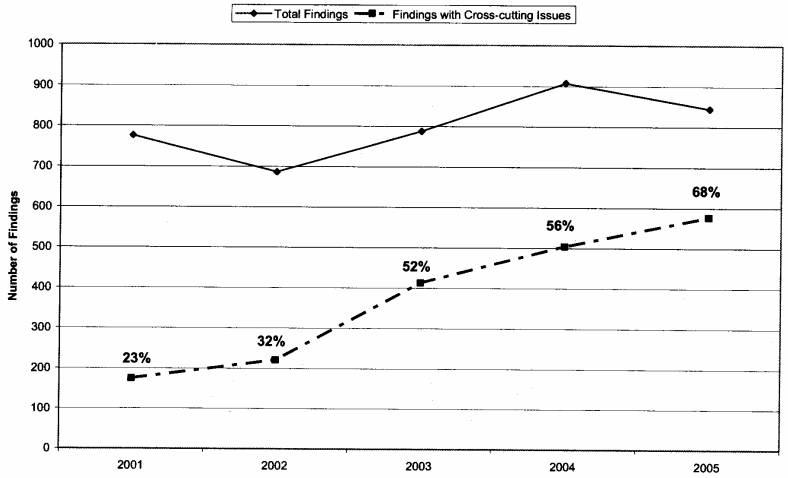
Figure 1: ROP Inspection Findings by Year



Source: GAO analysis of NRC data.

Only in the area of cross-cutting issues—or inspection findings for which one or more cross-cutting issues was associated—is an increasing trend evident (see fig. 2). According to NRC, the reason for this increase is due in part to the development of guidance on the identification and documentation of cross-cutting issues and its increased emphasis in more recent years.

Figure 2: Trend of ROP Findings with Cross-Cutting Issues



Source: GAO analysis of NRC data.

According to NRC officials, the results of its oversight process at an industry or summary level serve as an indicator of industry performance, which to date indicates good safety performance. On an annual basis, NRC analyzes the overall results of its inspection and performance indicator programs and compares them with industry level performance metrics to ensure all metrics are consistent and takes action if adverse trends are identified. While NRC communicates the results of its oversight process on a plant-specific basis to plant managers, members of the public, and other government agencies through annual public meetings held at or near each site and an internet Web site, it does not publicly summarize the overall results of its oversight process, such as the total number and types of inspection findings and performance indicators falling outside of acceptable performance categories, on a regular basis.

NRC Continues to Make Improvements to its Reactor Oversight Process in Key Areas

NRC has taken a proactive approach to improving its reactor oversight process. It has several mechanisms in place to incorporate feedback from both external and internal stakeholders and is currently working on improvements in key areas of the process, including better focusing inspections on areas most important to safety, improving its timeliness in determining the risk significance of its inspection findings, and modifying the way that it measures some performance indicators. NRC is also working to address what we believe is a significant shortcoming in its oversight process by improving its ability to address plants' safety culture, allowing it to better identify and address early indications of deteriorating safety at plants before performance problems develop.

According to NRC officials, the ROP was implemented with the understanding that it would be an evolving process and improvements would be made as lessons-learned were identified. Each fall NRC solicits feedback from external stakeholders, including industry organizations, public interest groups, and state and local officials, through a survey published in the *Federal Register*. NRC also conducts an internal survey of its site, regional, and headquarters program and management staff every other year to obtain their opinions on the effectiveness of the ROP. Additionally, NRC has in place a formal feedback mechanism whereby NRC staff can submit recommendations for improving various oversight components and NRC staff meet with industry officials on a monthly basis—in addition to various meetings, workshops, and conferences—to discuss oversight implementation issues and concerns. NRC staff also incorporates direction provided by the NRC Commissioners and recommendations from independent evaluations such as from GAO and the NRC Inspector General. The results of these efforts are pulled together in the form of an annual self-assessment report, which outlines the overall results of its outreach and the changes it intends to make in the year ahead.

According to NRC officials, the changes made to the ROP since its implementation in 2000—including those made in response to the Davis-Besse incident—have generally been refinements to the existing process rather than significant changes to how it conducts its oversight. In the case of Davis-Besse, NRC formed a task force to review the agency's regulatory processes. The task force's report, issued in September 2002, contained more than 50 recommendations, many associated with the ROP. Among the more significant ROP-related recommendations were those to enhance the performance indicator that monitors unidentified leakage to be more accurate, develop specific guidance to inspect boric acid control programs and vessel head penetration nozzles, modify the inspection program to provide for better follow-up of longstanding issues, and enhance the guidance for managing plants that are in an extended shutdown condition as a result of significant performance problems. NRC program officials told us that the task force's most significant recommendations were in areas outside of the ROP, such as improving the agency's operating experience program. According to NRC, it has implemented almost all of the task force's recommendations.

Other modifications that NRC has recently made or is in the process of making include the following:

- NRC recently revised seven of its baseline inspection procedures to better focus the level and scope of its inspection efforts on those areas most important to safety. These revisions resulted from a detailed analysis in 2005 of its more than 30 baseline inspection procedures. The effort involved analyzing the number of findings resulting from each of its inspection procedures and the time spent directly observing plant activities or reviewing licensee paperwork, among other things.

- NRC has efforts underway to improve what it refers to as its significance determination process (SDP). An audit by the NRC Inspector General, a review by a special task group formed by NRC, and feedback from other stakeholders have pointed to several significant weaknesses with the SDP. For example,

internal and external stakeholders raised concerns about the amount of time, level of effort, and knowledge and resources required to determine the risk significance of some findings. Industry officials commented that because most inspection findings are green, one white finding at a plant can place it in the "bottom quartile" of plants from a performance perspective. Therefore, industry officials explained, licensees try to avoid this placement and will expend a great deal of effort and resources to provide additional data to NRC to ensure the risk level of a finding is appropriately characterized. This can add significant time to the process because different technical tools may be used that then must be incorporated with NRC's tools and processes. The delay in assigning a color to a finding while the new information is being considered could also affect a plant's placement on NRC's action matrix, essentially delaying the increased oversight called for if the finding is determined to be greater-than-green. NRC developed a SDP Improvement Plan in order to address these and other concerns and track its progress in implementing key changes. For example, NRC introduced a new process aimed at improving timeliness by engaging decision-makers earlier in the process to more quickly identify the scope of the evaluation, the resources needed, and the schedule to complete the evaluation.

- NRC is also taking actions to improve its performance indicators. These actions are partly to address concerns that the indicators have not contributed to the early identification of poorly performing plants to the degree originally envisioned as they are almost always within acceptable performance levels (green). There have been several cases where plants reported an acceptable performance indicator and performance problems were subsequently identified. For example, NRC inspectors at one plant noted that while performance indicator data related to its alert and notification system in place for emergency preparedness had always been reported green, the system had not always been verified to be functioning properly. On the other hand, industry officials believe that the high percentage of indicators that are green is indicative of plants' good performance. Several plant managers told us that they closely monitor and manage to the

acceptable performance thresholds established for each indicator, and will often take action to address performance issues well before the indicator crosses the acceptable performance threshold. Because NRC inspectors verify indicator data once a year, a potential disagreement over the data might not surface for up to a year after it is reported, and it may take even longer to resolve the disagreement with the licensee. Similar to delays with the SDP, a delay in assigning a color while the disagreement is resolved could affect a plant's placement on NRC's action matrix, and delay the increased oversight called for if the indicator is determined to be greater-than-green. NRC plans to work with the industry to review selected indicator definitions to make interpretation more concise and reduce the number of discrepancies. To date, NRC has focused significant effort on developing a key indicator to address known problems with the performance indicators measuring the unavailability of safety systems. NRC is also in the process of changing the definition for several other indicators, in addition to considering the feasibility of new indicators.

I would now like to discuss what we believe is one of NRC's most important efforts to improve its oversight process by increasing its ability to identify and address deteriorating safety culture at plants. NRC and others have long recognized that safety culture and the attributes that make up safety culture, such as attention to detail, adherence to procedures, and effective corrective and preventative action, have a significant impact on a plant's performance. Despite this recognition and several external groups' recommendations to better incorporate safety culture aspects into its oversight process, it did not include specific measures to explicitly address plant safety culture when it developed the ROP in 2000. The 2002 Davis-Besse reactor vessel head incident highlighted that this was a significant weakness in the ROP. In investigating this event, we and others found that NRC did not have an effective means to identify and address early indications of deteriorating safety at plants before performance problems

develop.[7] Largely as a result of this event, in August 2004, the NRC Commission directed the NRC staff to enhance the ROP by more fully addressing safety culture.

In response to the Commission's directive, the NRC staff formed a safety culture working group in early 2005. The working group incorporated the input of its stakeholders through a series of public meetings held in late 2005 and early 2006. In February 2006, NRC issued its proposed approach to better incorporate safety culture into the ROP. NRC officials expect to fully implement all changes effective in July 2006.

NRC's proposed safety culture changes largely consist of two main approaches: first, clarifying the identification and treatment of cross-cutting issues in its inspection processes and second, developing a structured way for NRC to determine the need for a safety culture evaluation of plants. NRC has developed new definitions for each of its cross-cutting issues to more fully address safety culture aspects and additional guidance on their treatment once they are identified. For example, the problem identification and resolution cross-cutting area is now comprised of several components—corrective action program, self and independent assessments, and operating experience. NRC inspectors are to assess every inspection finding to determine if it is associated with one or more of the components that make up each of the cross-cutting areas. Inspectors then determine, on a semi-annual basis, if a substantive cross-cutting issue exists on the basis of the number and areas of cross-cutting components identified. If the same substantive cross-cutting issue is identified in three consecutive assessment periods, NRC may request that the licensee perform an assessment of its safety culture. The intent is to provide an opportunity to diagnose a potentially declining safety culture before significant safety performance problems occur.

Under its approach, NRC would expect the licensees of plants with more than one white color finding or one yellow finding to evaluate whether the performance issues were in any way caused by any safety culture components, and NRC might request the licensee

[7] GAO, *Nuclear Regulation: NRC Needs to More Aggressively and Comprehensively Resolve Issues Related to the Davis-Besse Nuclear Power Plant's Shutdown*, GAO-04-415 (Washington, D.C.: May 17, 2004).

to complete an independent assessment of its safety culture, if the licensee did not identify an important safety culture component. For plants where more significant or multiple findings have been identified, the NRC would not only independently evaluate the adequacy of the independent assessment of the licensee's safety culture, but it might also conduct its own independent assessment of the licensee's safety culture.

Some of NRC's proposed actions regarding safety culture have been controversial, and not all stakeholders completely agree with the agency's approach. For example, the nuclear power industry has expressed concern that the changes could introduce undue subjectivity to NRC's oversight, given the qualitative nature of the issues and the difficulty in measuring these often intangible and complex concepts. Several of the nuclear power plant managers at the sites we reviewed said that it is not always clear why a cross-cutting issue was associated with finding, or what it will take to clear themselves once they've been identified as having a substantive cross-cutting issue open. Some industry officials worry that this initiative will further increase the number of findings that have cross-cutting elements associated with them and if all of the findings have them they will lose their value. Industry officials also warn that if it is not implemented carefully, it could divert resources away from other important safety issues. Other external stakeholders, on the other hand, suggest that this effort is an important step in improving NRC's ability to identify performance issues at plants before they result in performance problems. Importantly, there will be additional tools in place for NRC to use when it identifies potential safety culture concerns. NRC officials view this effort as the beginning step in an incremental approach and acknowledge that continual monitoring, improvements, and oversight will be needed in order to better allow inspectors to detect deteriorating safety conditions at plants before events occur. NRC plans to evaluate stakeholder feedback and make changes based on lessons learned from its initial implementation of its changes as part of its annual self-assessment process for calendar year 2007.

Mr. Chairman, this completes my prepared statement, I would be happy to respond to any questions you or the other Members of the Subcommittee may have at this time.

GAO Contact and Staff Acknowledgments

For further information about this testimony, please contact me at (202) 512-3841 (or at wellsj@gao.gov). Raymond H. Smith, Jr. (Assistant Director), Alyssa M. Hundrup, Alison O'Neill, and Dave Stikkers made key contributions to this testimony.

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MR. WHITFIELD. At this time, Mr. McGaffigan, you are recognized for your 5 minutes.

MR. MCGAFFIGAN. Thank you, Mr. Chairman. It is a pleasure to appear before you today on behalf of the Nuclear Regulatory Commission to discuss the Reactor Oversight Process. I should say at the outset, I find myself in almost total agreement with almost everything that Mr. Wells said. So you won't see a lot of disagreement today.

When Chairman Diaz and I came to the NRC in 1996, our Reactor Oversight Process needed serious attention. It was not as transparent or

risk informed as it could be, and the watch list of problem plants, which I think grew to as many as 13 plants, did not integrate the results of performance indicators, although we had performance indicators. The process was criticized by the public, by the industry, and as Mr. Wells just added, by the Commission itself.

Therefore, the Commission unanimously decided to develop a new process that would be better than the one the staff was using, and we decided to involve the industry and other stakeholders in the development of the process from its very beginning. The new process was piloted in 1999 and was fully implemented in April of 2000. Since implementation, we have continued to improve the process by incorporating lessons learned from our experiences. We know we're not perfect, and we know we have a long way to go to achieve an even better product. The Commission believes that the Reactor Oversight Process is one of the NRC's most important achievements over the last 10 years.

I have a few view graphs up there, and they're in my testimony. There are five columns in an Action Matrix. That's the viewgraph on the left. We have no plants in the far right, or unacceptable performance column, at the current time. We have 89 of 103 plants in the far left licensee response column. Every quarter we produce an updated summary that is two clicks away from our home page for every plant in America. We happen to have the Seabrook plant up there. I guess we thought Congressman Bass might be attending. And you can see the performance indicators and the inspection findings for that plant and for all 103 plants are at our Web page, and you can click on that and understand what the inspection findings were for that plant during that quarter, and you could also go back to previous quarters.

So we have constructed a program that we're very proud of in terms of its transparency. I would contrast it to, say, the FAA's program. Mr. Stupak's plane, he probably could have gotten on time-data from FAA if he had clicked on their Web page for whatever airlines he was taking back here today. He would not have any data about the maintenance on that plane. This industry is unique in having data on maintenance and every aspect of these plants, other than security, very publicly available, and we're very proud of that.

The performance indicators and inspection findings determine what level of oversight a plant receives. You receive more oversight as you move down the columns. Very, very infrequently, we'll make a deviation from the so-called Action Matrix and do more or less inspections at that plant. But most of the time, it's to do more. Seven out of nine times during the 6 years, we've made numerous improvements to the Reactor Oversight Process. The three most important recent ones are the safety culture change that's going to be

implemented on July 1 that Mr. Wells referred to, a Mitigating Systems Performance Indicator that is going to give us deep insight into the performance of mitigating systems at these plants, and we're going to have several white findings in the first quarter.

That's implemented this quarter, and the data will become available in July. And the third is a very robust change to our engineering inspection program that was advocated by Chairman Diaz and that we believe is providing very good insights into the engineering aspects of the plant. The Reactor Oversight Process will continue to improve and evolve. It is our intention to take criticism from wherever it comes, Government Accountability Office, our Inspector General, the industry, the public, and try to make improvements based on that criticism.

As I say, we're going to continue to improve as we go forward. We do not set ourselves a perfection standard, but we set ourselves a very high standard, and we know that the process that we have today is far, far better than the process that Chairman Diaz and I inherited when we joined the Commission in 1996.

If I could just, for one moment, just say one thing, Mr. Chairman, about Chairman Diaz. He couldn't be here today. He's in his last 11 days as Chairman of the NRC. I happen to be a Democrat. He happens to be a Republican. But he has done an absolutely outstanding job during his 10 years working for the American people, and he deserves all the credit that he's going to get in these last 11 days in office, probably far more than he wants to get. And it's been an honor serving with him. Thank you, Mr. Chairman.

[The prepared statement of Hon. Edward McGaffigan follows:]

PREPARED STATEMENT OF HON. EDWARD MCGAFFIGAN, JR., COMMISSIONER, U.S. NUCLEAR REGULATORY COMMISSION

Mr. Chairman and Members of the Subcommittee, it is a pleasure to appear before you on behalf of the U.S. Nuclear Regulatory Commission (NRC) to discuss our Reactor Oversight Process (ROP). When Chairman Diaz and I came to the NRC in 1996, the reactor oversight process needed serious attention. It was not as transparent or risk informed as it could be, and the watch list of problem plants did not integrate the results of performance indicators (PIs). The process was criticized by the public and the industry. Therefore, the Commission unanimously decided to develop a new process that would be better than the one the staff was using and to involve the industry and other stakeholders in its development. The new process was piloted in 1999 and fully implemented in April 2000. Since implementation, we have continued to improve the process by incorporating lessons learned from our experience. The Commission believes that the Reactor Oversight Process is one of NRC's most important achievements in the past 10 years.

The ROP is a risk-informed process that focuses inspections on activities or areas that are most important to plant safety based on each plant's design and that increases the level of regulatory oversight as a licensee's performance declines. The ROP requires that inspections be performed by NRC inspectors in seven fundamental areas that we call

cornerstones, to measure plant performance and maintain safe plant operation. These inspections routinely evaluate plant design, modifications, maintenance, and operations. The ROP also uses PIs which are reported to the NRC each quarter by the licensees. The NRC uses a four color system to characterize inspection findings and performance indicators. The color of an inspection finding or PI is determined by a defined significance determination process. Green inspection findings or PIs indicate very low risk significance and therefore have little or no impact on safety. White, yellow, or red inspection findings or PIs represent increasing degrees of safety significance.

The performance indicators and inspection findings determine what level of oversight a plant receives. For example, the NRC determines if a plant should be in a column requiring greater scrutiny of its performance. If so, it receives more inspections. A plant is assigned a column based on its performance as indicated by the inspection findings and PIs. Therefore, the licensee's performance ultimately determines the column in which a plant is placed, it is not based on a subjective determination by NRC managers. Currently 85 of the 103 operating reactors are in the lowest, or licensee response, risk column of the Action Matrix and are receiving the baseline inspections. Eleven plants are in the second column, while 4 plants are in the third column, and 3 are in the fourth column; all of these 18 plants are receiving additional oversight. No plants are in the fifth or unacceptable shutdown performance column.

The NRC has focused on improving the transparency of the ROP to the public from its inception through stakeholder involvement and open communications. The staff has used a variety of communication methods to ensure that stakeholders have access to ROP information and results, and have an opportunity to participate in the process and provide feedback. The ROP web page provides the public with easy access to PIs and the latest plant assessment results and other useful information about the ROP. For example, these posters, which reflect the information posted on our web site, provide the latest information for the Seabrook plant in New Hampshire, including PIs and inspection findings, with links to the plant's inspection reports, assessment letters, and other ROP-related information. The ROP has allowed us to provide the public better and more current information on the safety of the nuclear plants than is provided to the public for other elements of the infrastructure. I should also add that the NRC staff conducts an annual meeting near each reactor to share the staff's assessment with the public.

Very infrequently the NRC staff decides to modify the amount of oversight that is prescribed by the Action Matrix. This has happened nine times in five years, and in seven of the nine cases, the staff has decided to do more than prescribed. Any deviation from the ROP is first proposed by one of our four regional Administrators, and a public and well documented process is used to decide on the deviation. Deviations from the ROP must be approved by the Executive Director for Operations, and the Commission is informed. An example of a current deviation involves an increase in NRC oversight for the Salem and Hope Creek plants in the area of safety conscious work environment. The staff reviews each deviation to determine if changes to the ROP program are needed. Deviations are described and their significance is explained during a public Commission meeting held annually.

The NRC has made numerous improvements to the ROP since its initial implementation, many as a result of independent program evaluations and feedback from internal and external stakeholders. The inspection program and associated resources have been adjusted to better focus on risk-significant issues, with significant enhancements in the areas of problem identification and resolution, fire protection, safety culture, design engineering, and in-service inspections of safety-related components. Some of these changes were based on lessons learned from the agency's experience with the Davis-Besse reactor vessel head degradation. The timeliness and consistency of determining the significance of inspection findings have notably improved over the past several years due to program enhancements and an increased management focus. The plant assessment

process has been modified to improve its predictability, particularly in the treatment of cross-cutting issues such as human performance, old design issues, and plants with significant performance deficiencies.

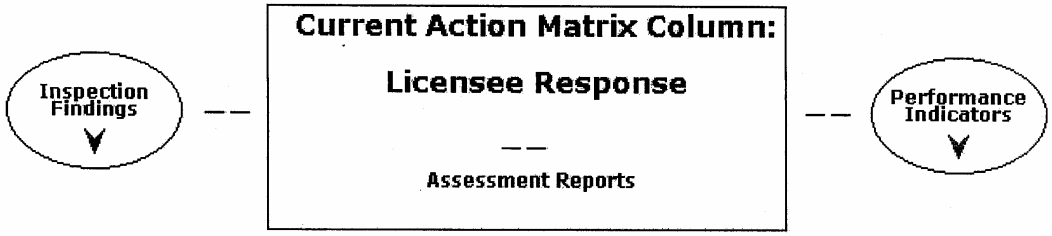
Three recent improvements to the ROP are the use of a new performance indicator, a greater focus on licensee safety culture, and a strengthened engineering inspection. This quarter, we have implemented the Mitigating System Performance Index (MSPI), a risk-informed performance indicator that combines component reliability and availability with plant-specific probabilistic risk assessment (PRA) information to arrive at a single performance index for five important systems. This performance indicator is complex, but it will give us real insights into key systems for mitigating accidents. Most importantly, it has brought the entire industry to a needed level of quality for so-called Level 1, internal initiating event probabilistic risk assessments. The MSPI replaced the safety system unavailability PIs, and licensees are scheduled to submit their initial data sets in July 2006. The NRC has also been working with internal and external stakeholders to enhance the ROP to more fully address safety culture. We have enhanced inspection procedures and developed processes to determine whether an assessment of safety culture is needed for plants with recognized performance deficiencies. The NRC staff is nearing completion of this effort and plans to fully implement the enhancements on July 1, 2006. The NRC recently undertook a substantial effort to strengthen its engineering inspection to increase the scrutiny of risk significant components and operator actions. The new component-based inspection ensures that the selected components are capable of performing their intended safety functions by verifying that the design bases have been properly implemented and maintained. The review includes evaluating the adequacy of the engineering calculations and analyses, the installed configuration, operating procedures, and testing and maintenance activities. A similar process is used to inspect risk significant operator actions.

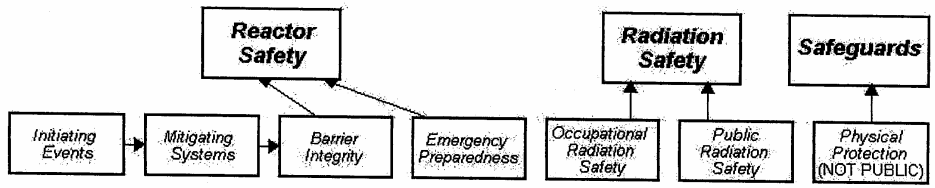
The Reactor Oversight Process continues to evolve and improve. The staff performs an annual self-assessment of the reactor oversight process to evaluate the overall effectiveness of the process. In addition to the annual ROP self-assessment program, several independent evaluations have been performed since the beginning of the ROP to analyze its effectiveness and identify improvements. The Office of the NRC Inspector General (OIG), the Office of Management and Budget (OMB), our Advisory Committee on Reactor Safeguards (ACRS), and a task force formed as a result of the Davis-Besse vessel head degradation have all performed evaluations related to the ROP. These evaluations have generally provided favorable results but have also suggested potential areas of improvement for the agency to consider. The Commission welcomes these critiques. For example, the OMB Program Assessment Rating Tool (PART) evaluation of the ROP in 2003, resulted in a score of 89 percent, which corresponds to an "Effective" rating of the management of the program. The Government Accountability Office (GAO) in its work following the Davis-Besse vessel head degradation incident has suggested areas for improvement in the ROP and is currently performing an independent evaluation of the ROP. The GAO has completed numerous staff interviews, reviewed ROP guidance documents, and performed a number of case studies over the past several months. We expect to receive a draft report of the GAO's findings in the next month or so with the final report later this year.

The NRC will continue to improve the ROP, increase its transparency and incorporate additional risk informed measures. Since I arrived at the Commission, the oversight process has become a much better system. We welcome feedback from our stakeholders and believe that such feedback will assist us as we continue to refine the process.

I appreciate the opportunity to appear before you today, and the Commission looks forward to continuing to work with the Committee. I welcome your comments and questions.

Seabrook 1
1Q/2006 Performance Summary





Performance Indicators

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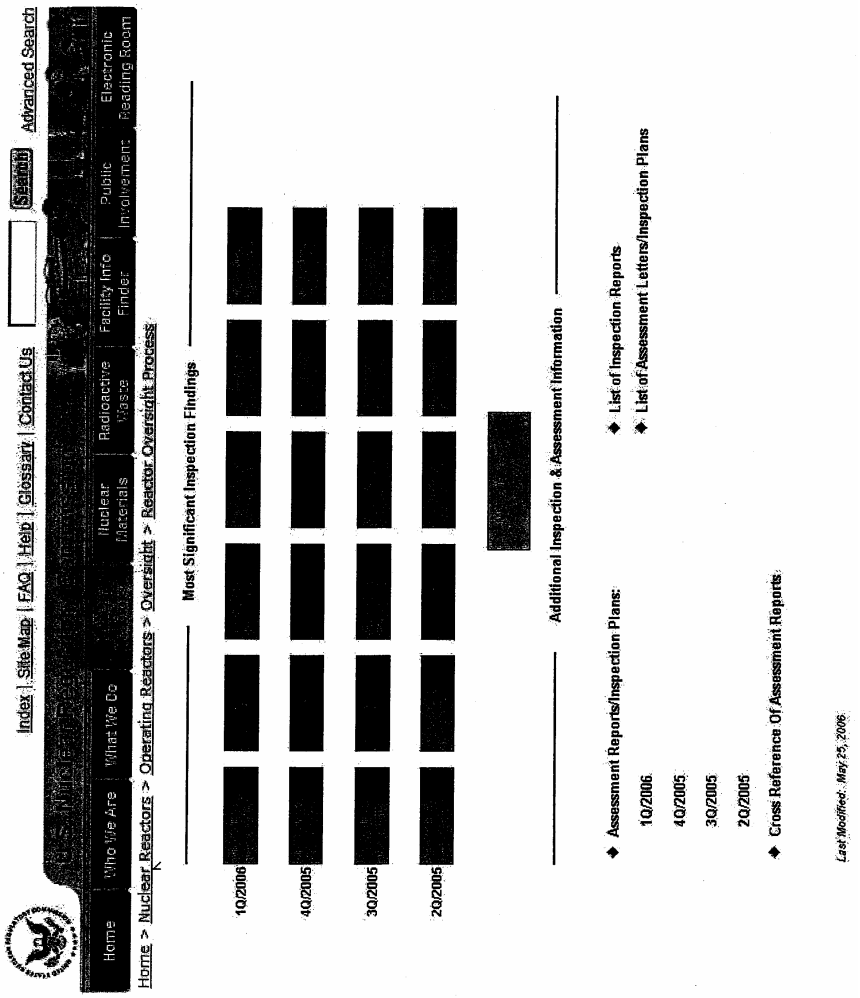

MR. WHITFIELD. Well, thank you, Mr. McGaffigan, and I appreciate you mentioning Mr. Diaz because I think we all believe that he's done a real good job and has made some significant improvements in the agency. And we appreciate the testimony of both you and Mr. Wells.

In the second panel today, our witness is Mr. Paul Gunter, who is the Director of the Reactor Watchdog Project for the Nuclear Information and Resource Service. And Mr. Wells, I wanted to ask you a question about in Mr. Gunter's written statement, he suggested that the NRC has cut corners in several of the safety cornerstones, including reactor safety, barrier integrity, physical security, and mitigating systems.

Now, you've had extensive research of the Reactor Oversight Process and have been involved in this. Do you agree with that statement? Or do you feel like that's inaccurate?

MR. WELLS. Mr. Chairman, I've not had the pleasure nor am I aware that my team has had any opportunity to look at the evidence that he's basing that statement on. I can tell you that the GAO was aware of the old program that the NRC had. It is clear that they had more inspection staff at the time. It's clear that they had more findings than the current ROP program. They were looking at different things, and sometimes that's what they were being criticized for. They were more procedural or administrative in nature and maybe not as significantly related to the actual safety concerns. It's clear that the existing ROP has fewer inspectors available, but from my understanding when I looked, they've been better targeted in terms of what they're looking at. So I'm unable to really comment on his conclusion without seeing his evidence. I would be glad to seek him out after this testimony.

MR. WHITFIELD. Okay. Mr. McGaffigan, Mr. Gunter also made the comment and he expresses serious concerns with NRC's Fire Safety Program. Can you please explain the current status of the NRC's Fire Safety Program and also explain whether you believe the NRC has done everything they can do in this area.

MR. MCGAFFIGAN. Sir, we put very significant resources into fire safety inspections. We are, at the moment, in a transition, we hope, to a risk-informed fire safety regime based on National Fire Protection Association Standard 805, which is a consensus standard that we endorsed in a recent rulemaking. We have, I believe, almost 40 plants lined up to try to utilize this new risk-informed program. Fire protection has been problematic, in all honesty, since the early '80s, when the NRC adopted a fire protection rule 10 CFR 50.48, and then we were sued by the industry, and the only way the appeals court said the rule could go into effect was if we promised to hand out exemptions left, right, and center, which we did promise, and we did do.

It's a very problematic area at the current time, because every plant has its own fire safety basis. So we're hoping, and we have invested our resources in recent years on making a transition to a risk-informed fire protection system to replace 50.48 based on the NFPA 805 standard.

MR. WHITFIELD. Thank you. Mr. McGaffigan, we have a list here of each of NRC's "yellow" and "red" inspection findings. And Mr. Wells, I guess, mentioned in his testimony, there are only a total of 12 such findings issued since the beginning of the Reactor Oversight Process. But of the five "red" inspection findings, three were given to the Point Beach plant in Wisconsin relating to problems with the plant's auxiliary feed water pumps, and these problems date back as far as 2001,

yet each of these "red" inspection findings at Point Beach is still open, meaning the underlying safety problems are unresolved.

So why has the NRC been unable to resolve these ongoing safety issues at Point Beach over the past five years?

MS. SCHAKOWSKY. Mr. Chairman, before you get that answer, I am just wondering--I'm sorry, I have to run. I'm wondering if I could have permission to submit these questions to be answered in writing.

MR. WHITFIELD. Absolutely. Without objection, absolutely.

MS. SCHAKOWSKY. Thank you.

MR. WHITFIELD. And thank you for coming to help us. Thank you.

MR. MCGAFFIGAN. Mr. Chairman, the Point Beach facility has been in the fourth column of our Action Matrix for several years now. It is frustrating to the Commission and to the staff and I'm sure to the licensee. We have closed out part of the issues. There has actually been some internal controversy within the agency about closing out one of the issues recently, and we have a process for trying to resolve that. The hope is that they are now on the path to resolving these issues. There were engineering issues. There were issues in terms of follow-up that have beset that plant for the last, as you say, 3 or 4 years.

It does not mean that the plant is unsafe. It is much better today than it was when we first found these issues, but it has not yet been released. Open means that they are not yet released from the additional oversight in our process. They have not performed all the actions required under a confirmatory action letter that was issued to them, outlining what they had to do to close out all aspects of their "red" findings.

MR. WHITFIELD. But I take it you don't see anything fundamentally wrong or systemically wrong with the oversight Reactor Oversight Process?

MR. MCGAFFIGAN. We don't see anything fundamentally wrong. At the last annual meeting we had last month, we talked about whether we needed to have licensees who were in this fourth column of the Action Matrix appear before the Commission, particularly licensees who had been in that for an extended period of time, and we've asked the staff to come back to us and for next year's annual meeting, that might be the extra push needed to encourage people to not spend too much time carrying out the corrective actions that we want them to carry out.

MR. WHITFIELD. Now, Commissioner McGaffigan, the NRC recently briefed our committee staff regarding several ongoing physical security problems at the Turkey Point plant in Florida. And I understand that over the past few years, there have been a series of security infractions at Turkey Point with respect to security equipment. For instance, in one case, a security guard at the site intentionally removed the firing pins from two weapons, rendering the weapons useless. In

another case, body armor was tampered with. In another case, someone drilled a hole in a gas mask used by one of the guards. And I was wondering if you might just comment on how the Reactor Oversight Process found what went wrong that allowed these chronic security problems to go undetected for several years before NRC became aware of the problem.

MR. MCGAFFIGAN. Sir, the security part of our process is one where we have put enormous resources since 9/11. We believed that we do find problems at these plants. We are particularly proud of our force-on-force exercises in the post-9/11 environment that are enormously better, infinitely better than what we did before 9/11. I'm not totally comfortable discussing the details of Turkey Point in public because I don't want to put a finger on Turkey Point. Turkey Point, we have said, that there was a very bad incident publicly in which we brought in the FBI with a hole drilled where it should not have been during a recent outage, but Turkey Point is not an outlier by any means. I don't want to rate the plants in security space because we haven't done that since 9/11 on our home page.

We have deleted the performance indicators, all of which were "green" forever. They didn't provide useful information to the public, and we deleted the inspection findings. What we have just recently done--and I will admit I was in the minority--is that we decided to put summary inspection reports about security findings onto the Web page. Just a summary, not the details. And if there are greater than "green" findings, we will note that without noting the number or without noting what the exact nature of the security findings were. For less than "green" findings--or for "green" findings, we will simply note that there were "green" findings and again, not discuss the details. So I'm not comfortable getting into security details. We don't want to help terrorists target any particular plant or know anything that is current information about any security deficiency at one of our plants.

MR. WHITFIELD. And this looks like maybe some disgruntled employee or whatever. I won't speculate on it. But I think overall, this GAO report was quite positive, and I think you all should be commended for the great progress that you're making. Obviously, any infraction or a problem in this area is something we have to be quite concerned about, but I appreciate it. My time has expired, and I thank you for your hard work.

I recognize the full committee Chairman, Mr. Barton from Texas.

CHAIRMAN BARTON. Mr. Chairman, I'm actually supposedly chairing another meeting right now. So I just came to show support for the hearing. I think the reports that have come out are generally favorable. I share some of the concerns some of the watchdog groups

do, especially on anti-terrorist security. I think we still need to be vigilant there, but we appear to be addressing that.

MR. MCGAFFIGAN. Sir, the amount of resources that we're putting into security today is a large factor of what we put in before 9/11, and we believe that we have excellent force-on-force exercises that we're now carrying out once every 3 years at every site, and we're getting deep insights, we're finding problems, and people are fixing them before we leave the site. I don't want to go into the details, but we are finding problems, and we're fixing them.

CHAIRMAN BARTON. I guess I should give the other two witnesses an opportunity to comment on that.

MR. WELLS. We have been active in reporting on the NRC security program in both classified and unclassified reports. Clearly NRC, I would agree, has expended a tremendous amount of resource and has come a long way in terms of testing the security at our commercial nuclear power plants, but I too would share some interest and concern that the NRC continue to seek ways to inform the American public about the types of activities that are underway and the types of activities that exist to help improve the public's perception about the quality of security that exists at our nuclear power plants. We have shared recommendations with the NRC to look at ways in which more information can be made available to the public and still protect security concerns. We think NRC could still do a better job at that.

CHAIRMAN BARTON. Is she with you?

MR. WELLS. Yes.

CHAIRMAN BARTON. Thank you, Mr. Chairman.

MR. WHITFIELD. Thank you, Mr. Chairman. Dr. Burgess.

MR. BURGESS. Thank you, Mr. Chairman. Mr. McGaffigan, if I could just ask you a question on the force-on-force exercises, and if it is information that you can't tell us, then just so indicate. But on a force-on-force exercise, are all sides aware that these exercises are happening?

MR. MCGAFFIGAN. Yes, sir. We have to. We are criticized for giving too much lead time to the licensees. We have tried to cut that back, but we have to conduct an exercise at one of these sites, say, South Texas or Comanche Peak, the licensee has to have enough lead time so that they can have two sets of security guards there. One protecting the plant. One armed with so-called MILES gear, laser target designator-type gear to play in the exercise. So they have twice the normal security force there for the exercise. We are increasingly doing night exercises because that would be the time when the plant might be more vulnerable, if you were a terrorist, you might have less to worry about in terms of being identified as you approach the plant. So we give them about 8 to 10 weeks notice. They put together their plans. We

table top with them. We have some ideas for how to improve the table top aspect by bringing in something called JCATS, which is used by the military, which we're hoping to pilot soon. Joint combined arms tactical simulation that's used by--Lawrence Livermore is the keeper of that software.

We have vastly improved the quality of the attacking force that we use. They are professional now. We used to have retired state policemen or retired security guards from other plants serving as the attacking force. We have a professional attacking force today. They are under NRC's supervision. We have a very qualified government contractor who comes in and helps us design the attacks that we use. The typical exercise has three attacks on each of three consecutive evenings, Tuesday, Wednesday, Thursday typically. And we exploit where our experts believe the weaknesses in that plant's security strategy are.

And most of the time, the vast majority of the time our attacking force is repelled. In some cases, the attacking force is successful in reaching target sets, and we don't want that to happen but very, very infrequently. But the vast majority of the time, I will tell you--we're working on an annual report at the current time, Mr. Chairman, Mr. Burgess, that will summarize last year's results of force-on-force exercises, and that should be available to the Congress next month. We're not going to identify individual plants, but we will tell you what we found as a general matter, and we will tell you examples of the sort of things that we did find and that we did improve as a result of the exercises.

I will give you one example. We did this in a closed session that Mr. Wells and I were at recently. I'm not going to name the site, but this particular site had decided to use an armored personnel carrier as part of its protective strategy. That's a pretty bad thing in the hands of a terrorist adversary. And unfortunately, the adversary managed to get control of the armored personnel carrier for reasons that I won't go into now, but that will never happen again. The licensee now understands why it cannot have the armored personnel carrier, which is theoretically a good idea, located where it was. They were using it for owner-controlled area patrols outside the protected area. They are never going to allow that armor personnel carrier to be overwhelmed again and seized.

MR. BURGESS. I hope not.

MR. MCGAFFIGAN. Yeah.

MR. BURGESS. We've had a lot of discussion here in this committee about the issue of cyber security. Can you address what you're doing in that realm?

MR. MCGAFFIGAN. We have a program that we have worked out with the experts and with the industry itself. The Department of Homeland Security is very supportive of it. They have a draft nuclear sector security plan out for public comment at the current time that has cyber security and whether the industry implements fully pursuant to the NRC guidance in cyber security as one of the metrics that they're proposing. Our plants are not particularly vulnerable to cyber security problems currently because all of the safety systems are generally analog and separated. They're not accessible. Some things like, you know, the grid--the interconnection between the plant and the grid are accessible because they have to be--but a terrorist, the plants are not particularly susceptible to cyber security, and we have, we think, a sound program that if fully implemented by the industry will preclude problems with cyber security.

MR. BURGESS. I don't know whether I should ask this of Mr. Wells or Mr. McGaffigan, but this list that the Chairman alluded to earlier under the "yellow" indicator at Indian Point II, four of seven operator crews failed to pass annual license requalification exams. That, to me just as a layperson, that's a little startling. Are we taking steps to address that and correct that?

MR. MCGAFFIGAN. Sir, those steps have been taken a long time ago. If they don't pass, they don't run the reactor. We have a very vigorous program both of initial qualification and requalification for all of our operators. They all have to have an NRC license to operate a power reactor. We take that very seriously. The industry takes it very seriously.

MR. BURGESS. But you had a 50 percent failure rate according to this.

MR. MCGAFFIGAN. One plant. One plant that was in trouble, as you can see above, for other reasons in the same time period, and that plant also has undergone a change in ownership since that time period. Entergy Corporation now runs that plant. Indian Point II in 2001 was--I forget whether it was Con Ed or NYPA, I always got them mixed up, New York Power Authority--the Consolidated Edison was then running Indian Point II, and Entergy, which it runs a fleet of nuclear plants, holds itself to a very high standard, is now in charge there.

And you know, as a general matter, I personally believe that the consolidation that has taken place in the industry, getting rid of people like Con Ed and NYPA and Boston Edison at Pilgrim and lots of other folks who were single-unit utilities back when I joined the NRC and having them instead now be part of large fleets run by the Exelons and Entergys and Dukes and Constellations, it has been a huge step forward in safety. These folks are serious. They're committed to the nuclear

business. When the CEOs of some of those former firms used to come into my office, you could tell that they were just figuring out how to exit from the nuclear business, and they sometimes provided resources to the staff, commensurate with their desire to not be in the nuclear business. The new folks provide resources that are needed to maintain the plant in a highly safe condition.

MR. BURGESS. It seems like whenever there's an incident or an accident, it wasn't just one event that caused it but a chain of events, and the Navy's been so successful with their nuclear submarine program within their culture of safety that just will accept no deviation. I just wondered if we would be better served if we sought to achieve that high a safety standard. Now, Mr. Wells, you point out that the NRC, over 5 years has over 4,000 inspections and 97 percent of these were considered of low significance to the overall safe operations of the plant. And in fact, if we have such a low level of findings, is it because the plants are doing a good job or we're not looking hard enough?

MR. WELLS. Could be both.

MR. BURGESS. Yeah. And therein is part of the problem. And that's when it wasn't part of this committee, but it's part of the investigation for the space shuttle disaster 2 years ago, reviewing the nuclear submarine program in the Navy, again, they've compiled a remarkable safety record since 1963, and one that they're rightly very proud of, and it stems from an unwillingness to accept any deviation, any deviation from standard. And I just wonder if our Nuclear Regulatory Commission should achieve to strive for that same high standard.

MR. WELLS. Mr. Congressman, you know, my first reaction is that clearly, we've heard debate within NRC as well as in the industry. The industry itself talks a lot about excellence and a lot of their inspections are designed to excellence, which is a little different than what you were talking about in the Navy program, even within the NRC circles, they're talking about the safety culture, which, in their mind, is a little different definition than excellence. Clearly the results that we've seen, the three plants that are in the highest level of safety oversight, the four plants that are in the second highest level of oversight, and the 11 plants that are currently in increased levels of oversight, in each and every one of these plants there are issues relating to repeating and recurring type of events, and repeating and recurring examples where corrective action has not been as timely or corrected the first time. So there seems to be a theme across the industry in terms of what causes some of these plants to be less good performers than other plants, and it seems to be this cross-cutting environment where there's a safety culture out there that they're not, in fact, doing the types of things that maybe you've experienced and seen in the Navy program.

MR. BURGESS. Mr. Chairman, this is an important aspect. I hope this is not the last time we'll visit it. With that, my time's expired. I'll yield back.

MR. WHITFIELD. Thank you, Dr. Burgess. And one other comment I would make, Commissioner McGaffigan, I touched on this earlier about the Reactor Oversight Process, but I will just ask you in closing, are you confident today yourself as a commissioner that this Reactor Oversight Process can proactively identify emerging safety issues like the one at Davis-Besse before similar major safety problems occur?

MR. MCGAFFIGAN. Sir, I don't think I can honestly answer that in the affirmative. I think that's too high a standard for a program. Will we ever make the Davis-Besse mistake again? No. But the problem is we do not have a leading indicator of bad performance.

When I first came to the Commission and we were designing the Reactor Oversight Process, Mr. Edward Jordan, who was one of our most senior staff and had been with us since the day the NRC was created, gave us new commissioners a lecture about leading indicators, and the then-two-decade-plus effort by the NRC staff to find leading indicators and to find ways to get ahead of problems; and every time we find one, or we think we find one and we pilot it, we find out it's a leading indicator of both good and bad performance.

So we don't have a magic indicator. Do we have the best program that human beings can design at this stage? Yes, I will affirmatively answer that. But will we always be ahead of degrading performance? I think that is a standard that a human institution is probably not going to achieve. Are we doing all we can to try to achieve it? Yes. But I cannot promise you there will not be another incident in the future where we get surprised. We're doing all we can to prevent it, but I cannot promise you that the system is infallible.

MR. WHITFIELD. Well, thank you all very much. We appreciate your being here. We appreciate your testimony. And as I said earlier, the GAO report on this was generally positive with some areas of concern, obviously. But we look forward to maintaining contact with you as we continue efforts to improve nuclear safety in the country. So with that, you all are dismissed.

At this time I'd like to call up the second panel, which consists of one person, and that is Mr. Paul Gunter, who is, as I said, Director of the Reactor Watchdog Project for the Nuclear Information and Resource Service.

Mr. Gunter, it's good to see you this afternoon. We appreciate your being here.

MR. GUNTER. Thank you very much.

MR. WHITFIELD. As you know, in Oversight and Investigations, we take testimony under oath. And do you have any difficulty of testifying under oath today?

MR. GUNTER. I do not.

MR. WHITFIELD. And do you have legal counsel with you?

MR. GUNTER. I do not.

MR. WHITFIELD. Thank you, Mr. Gunter. You are now under oath, and I would recognize you for your five-minute opening statement. Thank you.

TESTIMONY OF PAUL GUNTER, DIRECTOR, THE REACTOR WATCHDOG PROJECT, NUCLEAR INFORMATION AND RESOURCE SERVICE

MR. GUNTER. Good afternoon. My name is Paul Gunter. I am director of the Reactor Watchdog Project.

MR. WHITFIELD. Do you have your microphone on, Mr. Gunter?

MR. GUNTER. I believe it is on. Is it on now? It's on now. Thank you.

I want to thank you for the opportunity to share with you today some of the public interest community's concerns and insights with the Nuclear Regulatory Commission's current Regulatory Oversight Process. Whether you are for or against nuclear power, we can all agree that safety and security must be regarded as top priorities at all of the Nation's atomic power plants. While the new Reactor Oversight Process represents an improvement over the old systematic assessment of licensee performance, NIRS does not have confidence that this latest version is being fairly applied to hold the public safety and security in the highest regard. The public is concerned with evidence that the regulatory agency is cutting corners at safety and security cornerstones under the new process, particularly in the areas of assessment, inspection and enforcement. In March 2002, the Davis-Besse nuclear power station 20 miles outside of Toledo had not one greater than "green" finding when the worst reactor safety condition in the United States since Three Mile Island accident was discovered. The public became acutely aware with the discovery of the severely corroded hole in the head of the reactor pressure vessel that a lack of greater than "green" finding under the new oversight process does not necessarily equate to an assurance of safety. The NRC technical staff, in fact, had identified a potentially significant safety issue at Davis-Besse where six of the seven operating Babcock & Wilcox reactors had received inspections identifying cracking in susceptible material that fabricated the control rod drive mechanism penetration sleeves.

Davis-Besse was the only other Babcock & Wilcox reactor not inspected. Using its regulatory guidance, the NRC technical staff quantified the uncertain but growing risk of continued operation of Davis-Besse and found the risk to be unacceptable. An order was drafted and finalized in November of 2001 by the staff of the Nuclear Reactor Regulation to shut down the reactor in December 2001 for a safety inspection of the reactor vessel head. However, the final order was never issued. Instead, according to the NRC Office of Inspector General report, quote, "during its review of the potentially hazardous condition at Davis-Besse, the NRC staff considered the financial impact to the licensee of an unscheduled plant shutdown" which "was contrary to the goal of NRC bulletin 2001-01 to have at-risk reactors conduct timely inspections to ensure that NRC regulatory requirements related to reactor coolant leakage were met."

The OIG went on to state that, "with respect to Davis-Besse specifically, OIG reviewed a November 21, 2001 internal NRC memorandum related to a discussion between the nuclear reactor regulation director and First Energy Nuclear Operating Corporation president. The document conveyed that the NRR director had spoken to FENOC president and was aware of the licensee's financial concerns pertaining to an unscheduled shutdown. According to the memorandum, the FENOC president told the NRR director that the impact of shutdown prior to February 2002 would be significant, and Davis-Besse would be better positioned for a shutdown in February because of the availability of replacement fuel. The FENOC president confirmed to OIG that this discussion took place."

The NRC order was pulled. Moreover, the OIG reported that "NRC appears to have informally established an unreasonably high burden for requiring absolute proof of a safety problem versus lack of reasonable assurance of maintaining public health and safety before it will act to shut down a power plant. The staff articulated this standard to OIG as a rationale for allowing Davis-Besse to operate until February 16, 2002, even in light of information that had strongly indicated Davis-Besse was not in compliance with NRC regulations and plant technical specifications and may have operated with reduced safety margins." When the reactor was shut down in February 2002, not only did the licensee find cracking in the identified trouble spot but corrosive reactor coolant had been leaking through a crack over an extended time period and eaten a cavity into the reactor vessel through 6 3/4 inches of carbon steel.

A Federal laboratory study postulated that if a reactor continued to operate for as little as 2 additional months, the reactor pressure vessel may have ruptured during operation. To date, there has been not a more

compelling case for shutting down a reactor for safety-related inspections under any NRC regulatory oversight process and, in this case, occurred under the new oversight process.

A NRC lessons-learned task force was formulated to address the many mistakes that led up to the near miss accident at Davis-Besse and looked extensively at how to avoid similar accidents in the future.

However, the task force leaves one glaring omission unaddressed and unanswered in its mission: how in order to shut down Davis-Besse for safety inspections based on the agency's technical staff's risk informed and study judgment was canceled subsequent to the meeting between NRC senior management and a Davis-Besse executive officer.

Furthermore, the Davis-Besse task force still leaves open the issue of how the new oversight process informally requires, quote, "absolute proof of a safety problem," unquote, to shut down a reactor for safety inspections, while the same oversight process only requires reasonable assurance to start up that reactor.

In view of the identified public safety concerns and findings of the OIG report, an effective ROP should not set the bar so high for the burden of proof of the safety problem to be beyond the reach of timely regulatory action so as to first consider the financial interests of a licensee.

Similarly, NIRS' written testimony reflects that the public has no confidence in the security cornerstone for the ROP that is more determined by the regulators' assessment of how much the nuclear industry is willing to afford rather than a set of requirements of what is realistically needed to defend these potential radiological targets against existing threats.

My written testimony also looks at how under both the old and the new ROP widespread noncompliances with critical fire protection regulations for qualified fire barrier protection of the safe shutdown of the reactor in the event of fire have lingered unresolved for more than a decade, without resolution and without Federal enforcement action to require compliance. In the meantime, more firebearing materials are emerging as inoperable.

Congressman Dingell stated the obvious at a 1993 Oversight and Investigations hearing on fire protection noncompliances and the NRC oversight process more than 13 years ago. He said, "One must inquire whether a regulatory process which approves matters as a matter of courtesy is serving the public interest or, in fact, whether it is in fact a regulatory system. The question is, how does this happen. It results from a curious blind faith of NRC regulators and assurances made by utilities and by the industries they regulate."

Thank you.

[The prepared statement of Mr. Paul Gunter follows:]

PREPARED STATEMENT OF MR. PAUL GUNTER, DIRECTOR, REACTOR WATCHDOG PROJECT, NUCLEAR INFORMATION AND RESOURCE SERVICE

The public must look to the United States Nuclear Regulatory Commission's (NRC) oversight process to establish and uphold the safety and security standard in the day-to-day operation and maintenance of nuclear power plants through a rigorous process of assessment, inspection and enforcement. While the new Reactor Oversight Process (ROP) represents an improvement over the old Systematic Assessment of Licensee Performance, NIRS does not have confidence that this latest version is being fairly applied to hold the public safety and security in the highest regard.

The public is concerned with evidence that the regulatory agency is cutting corners at safety and security cornerstones under the new process particularly in the areas of assessment, inspection and enforcement.

In view of identified public safety concerns, an effective ROP should not set the bar so high for the burden of proof of a safety problem to be beyond the reach of timely regulatory action so as to first consider the financial interests of a licensee.

The public has no confidence in a Physical Protection Cornerstone of the ROP that is more determined by the regulator's assessment of how much the nuclear industry is willing to afford rather than a set of requirements of what is realistically needed to defend these potential radiological targets against existing threats.

Under both the old and new ROP, non-compliance with critical fire protection regulations for the safe shutdown of the reactor in the event of fire has lingered unresolved for more than a decade without resolution and without federal enforcement action to require compliance.

Congressman Dingell stated the obvious at that 1993 hearing on fire protection non-compliances and the NRC oversight process more than 13 years ago, *"One must inquire whether a regulatory process which approves matters as a matter of courtesy is serving the public interest or, in fact, whether it is in fact a regulatory system. The question is, how does this happen. It results from a curious blind faith of NRC regulators and assurances made by utilities and by the industries that they regulate."*

Good afternoon. My name is Paul Gunter. I am Director of the Reactor Watchdog Project for Nuclear Information and Resource Service in Takoma Park, Maryland.

I want to thank you for the opportunity to share with you today some of the public interest community's insights and concerns with the Nuclear Regulatory Commission's current Reactor Oversight Process.

Whether you are for or against nuclear power, we can all agree that safety and security must be regarded as top priorities at all of the nation's atomic power plants. It is all the more true with aging reactors in the Post September 11th world where safety margins and the security bar must be regarded with the highest standard.

Today, the public must look to the United States Nuclear Regulatory Commission's (NRC) oversight process to establish and uphold that standard in the day-to-day operation and maintenance of nuclear power plants through a rigorous process of assessment, inspection and enforcement. Unfortunately, we do not have confidence that the latest version of the oversight process is being fairly applied to hold our safety and security in the highest regard.

Following the Three Mile Island accident in 1979, NRC developed the Systematic Assessment of Licensee Performance. A significant drawback to the SALP process was the fact that the program did not have a rating for unacceptable performance. Following a near-miss accident in 1985 at Ohio's Davis-Besse nuclear power station, NRC

established a "Watch List" of reactors that warranted heightened safety-related regulatory attention. Public confidence steadily eroded under the old SALP where reactors like the two units at the Dresden nuclear power station outside of Chicago were allowed to remain on the agency's "Watch List" for eight years of an eleven year period all the while NRC management knew that reactor safety margins were significantly eroded. As the U.S. General Accounting Office pointed out, "*NRC has not taken aggressive enforcement action to force the licensees to fix their long-standing safety problems on a timely basis. As a result, the plant's condition has worsened, making safety margins smaller*." [1]NRC senior management's repeatedly failure to address declining safety performance at nuclear reactors eventually emerged on the cover of TIME magazine.[2]

In April 2000, NRC implemented the current reactor oversight process. In the view of industry the revision of the oversight process came about as the result of improved reactor performance and the need to remove overly burdensome regulatory oversight process. In the view public interest and safety groups the revised process was necessitated by the repeated failure of NRC management to address documented and declining reactor safety performance.

The obvious question today is whether or not we have a better reactor oversight process that accurately assesses reactor safety and security conditions, timely captures problems without gambling public safety and security and carries out enforcement actions to assure that problems are effectively remedied and not recurring. The Reactor Oversight Process is only as effective as the agency is able and willing to accurately assess safety and security problems and take timely enforcement action when violations occur and problems are not addressed.

The public is concerned with evidence that the regulatory agency is cutting corners at a safety and security cornerstones under the new process particularly in the areas of assessment, inspection and enforcement.

Cutting Corners in Reactor Safety and the Barrier Integrity Cornerstone

In March 2002, the Davis-Besse nuclear generating station, 20 miles outside of Toledo, Ohio had <u>not</u> <u>one</u> greater-than-Green performance indicator or inspection finding when the worst reactor safety condition in the United States since the Three Mile Island accident was discovered. The public became acutely aware with the discovery of the severely corroded hole-in-the-head of the Davis-Besse reactor pressure vessel that a lack-of-greater-than-Green finding under the new Reactor Oversight Process does not necessarily equate to an assurance of safety. In fact, disturbing photographic evidence of extensive corrosion was available to the NRC oversight process when the reactor was allowed to restart in April 2000, the same month that the new ROP was initiated.

The NRC technical staff had, in fact, identified a potentially significant safety issue at Davis-Besse where six of the seven operating Babcox & Wilcox reactors had received inspections identifying cracking in a susceptible material that fabricated the control rod drive mechanism penetration sleeves. Davis-Besse was the only other B&W reactor not inspected. An Order was drafted and finalized in November 2001 by the staff of Nuclear Reactor Regulation to shut down the reactor in December 2001 for a safety inspection of the reactor vessel head. However, the final Order was never issued. When the reactor was shut down in February 2002, not only did the operator find cracking in the identified trouble spot but corrosive reactor coolant had been leaking through the crack over an extended time period and eaten a cavity into the reactor vessel head through six and three

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[1] U.S. General Accounting Office, "Nuclear Regulation: Preventing Problem Plants Requires More Effective NRC Action," GAO/RCED-97-145, May 1997, pp. 2-3

[2] A Special Investigation "Blowing the Whistle on Nuclear Safety: How a showdown at a power plant exposed the federal government's failure to enforce its own rules," TIME, March 4, 1996, pp. 46-54.

quarter inches of carbon steel. A federal laboratory study postulated that if the corrosion rate had been allowed to continue for as little as two additional months the reactor pressure vessel may have ruptured.

A subsequent investigation by the NRC Office of Inspector General (OIG) concluded that *"during its review of the potentially hazardous condition at Davis-Besse, the NRC staff considered the financial impact to the licensee of an unscheduled plant shutdown"* and "*was contrary to the goal of NRC Bulletin 2001-01 to have at risk reactors conduct timely inspections to ensure that NRC regulatory requirements related to reactor coolant leakage were met."*[3] The OIG went on to state that *"With respect to Davis-Besse specifically, OIG reviewed a November 21 2001 internal NRC memorandum related to a discussion between the NRR* (Nuclear Reactor Regulation) *Director and the FENOC* (First Energy Nuclear Operating Corporation) *President. The document conveyed that the NRR Director had spoken to the FENOC President and was aware of the licensee's financial concerns pertaining to an unscheduled shutdown. According to the memorandum, the FENOC President told the NRR Director that the impact of a shutdown prior to February 2002 would be significant, and Davis-Besse would be better positioned for a shut down in February because of the availability of replacement fuel. The FENOC President confirmed to OIG that this discussion took place."* [4] The NRC Order was subsequently pulled.

Moreover, the OIG also reported that, "*NRC appears to have informally established an unreasonably high burden of requiring absolute proof of a safety problem, versus lack of reasonable assurance of maintaining public health and safety, before it will act to shut down a power plant. The staff articulated this standard to OIG as a rationale for allowing Davis-Besse to operate until February 16, 2002, even in light of information that strongly indicated Davis-Besse was not in compliance with NRC regulations and plant technical specifications and may have operated with reduced safety margins.*"[5]

In view of such public safety concerns, an effective Reactor Oversight Process should not set the bar so high for the burden of proof of a safety problem to be beyond the reach of timely regulatory action so as to first consider the financial interests of an operator.

The tendency for NRC to overlook significant safety warnings signs under the current ROP remains a concern to the public interest community today.

Cutting Corners in Safeguards and the Physical Protection Cornerstone

Along the same lines, the security bar for nuclear power stations should not be set so low so that Reactor Oversight Process performance indicators can not accurately assess the adequacy of reactor site security to defend against a terrorist attack and assess site vulnerabilities in need of timely resolution.

For example, testimony given this year by the Government Accountability Office (GAO) before the Subcommittee on National Security, Emerging Threats, and International Relations in the House Committee on Government Reform, raises concerns about the Reactor Oversight Process and the Design Basis Threat (DBT), which sets the thresholds for adversary characteristics that reactor sites are required to be able to defend against with a high degree of confidence.[6]

The GAO looked at the rigor of inspections and drills used to test security force readiness that determine the findings of the Physical Protection Cornerstone. GAO

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[3] U.S. Nuclear Regulatory Commission, Office of Inspector General, "NRC's Regulation of Davis-Besse Regarding Damage to the Reactor Vessel Head," Case No. 02-03S, December 30, 2002, p. 23

[4] Ibid, OIG, p.17

[5] Ibid, OIG, p.23

[6] U.S. Government Accountability Office (GAO), "Nuclear Power: Efforts Made to Upgrade Security, but the Nuclear Regulatory Commission's Design Basis Threat Process Should be Improved," April 4, 2006,

identified that NRC staff analyzed intelligence information in determining adversary characteristics including weapons that could be used in an attack as well as exchanged information with the Department of Energy, which has a DBT for comparable facilities that process or store radiological materials and as such are potential targets for radiological sabotage. GAO found that "*NRC generally established less rigorous requirements than DOE—for example, with regard to the types of equipment that could be used in an attack. The DOE DBT includes a number of weapons not included in the NRC DBT. Inclusion of such weapons in the NRC DBT for nuclear power plants would have required plants to take substantial security measures*."[7]

The GAO report reflects the concern of a broad range of public interest groups that the DBT as measured under the current Reactor Oversight Process does not reflect staff recommendation as formulated from intelligence information. Instead, GAO found "*the NRC staff made changes to some recommendations after obtaining feedback from stakeholders, including the nuclear industry, which objected to certain proposed changes, such as the inclusion of certain weapons. NRC officials said the changes resulted from the further analysis of intelligence information. Nevertheless, GAO found that the process used to obtain stakeholder feedback created the appearance that changes were made based on what the industry considered reasonable and feasible to defend against rather than on what an assessment of the terrorist threat called for*."[8]

The public has no confidence in a Physical Protection Cornerstone of the ROP that is more determined by the regulators assessment of how much the nuclear industry is willing to afford rather than a set of requirements of what is realistically needed to defend these potential radiological targets against existing threats.

Cutting Corners in Reactor Safety and Mitigating Systems Cornerstone

As stated on the NRC website with regard to the Reactor Safety and Mitigating Systems Cornerstone **"***The objective of this cornerstone is to monitor the availability, reliability, and capability of systems that mitigate the effects of initiating events to prevent core damage. Licensees reduce the likelihood of reactor accidents by maintaining the availability and reliability of mitigating systems*."[9]

Fire is potentially one of the highest risk initiating events. NIRS has long been concerned with the regulatory oversight process and specifically the protection of electrical cables for control, power and instrumentation equipment necessary to safely shut down the reactor in the event of fire. A nearly catastrophic fire that burned for seven hours at the Browns Ferry nuclear power station in 1975 resulted in the promulgation of new requirements for NRC's fire code.

We remain concerned with the questionable adequacy of the Reactor Oversight Process for post-fire safe shutdown requirements, today.

In 1992, NRC declared Thermo-Lag 330-1 fire barriers inoperable. Thermo-Lag 330-1 was then the most widely deployed fire barrier system used throughout the nuclear power industry. An industry whistleblower had exposed that the fire barrier wrap system could not pass standardized industry fire tests and did not meet the fire endurance requirements for protecting safe shut down electrical cables from fire damage, specifically where redundant safe shut down electrical systems were co-located in the same fire zone and could be destroyed by a single fire.

In March 1993, this Subcommittee held a hearing on "Fire Safety at Nuclear Power Plants" then chaired by Congressman John Dingell. I attended that hearing on behalf of Nuclear Information and Resource Service with particular concern for public safety involving the inoperable fire barrier wrap system.

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[7] Ibid, GAO, p. 9
[8] Ibid, GAO, Introduction
[9] http://www.nrc.gov/NRR/OVERSIGHT/ASSESS/cornerstone.html#MS

Congressman Dingell stated at that hearing *"This is what Yogi Berra might describe as déjà vu all over again*."[10] As Congressman Dingell further stated, *"The regulators, again appear to have exhibited some substantial failures in regulatory oversight, in passivity and in paralyses."*[11] Congressman Dingell went on to say, *"NRC accepted the utility's assurances, apparently without adequate scrutiny, and the material* (Thermo-Lag 330-1) *was installed in about 80 reactors across the country. The committee has received serious allegations that these result in substandard fire protection in those plants. The certifications continue to be accepted by NRC, in spite of the fact that NRC staff was given ample evidence of problems over a period extending over ten years."*

The bogus fire barrier resulted in NRC staff reviews and repeated meetings for five more years with nuclear power plant operators and the industry lobby group, then Nuclear Utility Management and Resources Council (NUMARC) and now the Nuclear Energy Institute. During that time, fire watches, as compensatory measures, were put in place for what would amount to more than six years at some sites despite the 1993 testimony by then Commissioner Ivan Selin before the same Subcommittee on Oversight and Investigations stating that fire watches were only intended for temporary durations of 6 to 9 months. "*They don't expect them for 2 years fulltime,"* said Selin.[12] During that extensive period of non-compliance many operators came to agreements with NRC staff to bring reactor fire protection violations into compliance with the applicable fire code (10 CFR 50.48 and 10 CFR 50 Appendix R III.G.2). About two dozen units were finally issued NRC Confirmatory Action Orders in 1998 to come into compliance by 2000 because of their inability to provide an acceptable and timely corrective action program for the inoperable fire barriers.

In 2000, the NRC implemented the new Reactor Oversight Process which included a series of systematic inspections of licensees' safe shutdown capability. A series of baseline fire protection inspections were conducted at reactor sites by NRC inspectors. During these baseline inspections, NRC inspectors discovered that many licensees had in fact not upgraded or replaced inoperable Thermo-Lag 330-1 fire barriers as agreed to NRC staff in their Thermo-Lag Corrective Action Programs and Confirmatory Action Orders. Between 1998 and 2001, licensees that received NRC Orders sent NRC letters indicating completion of the ordered Thermo-Lag corrective action. To date, those Orders remain in effect, neither rescinded nor relaxed. What has happened to the enforcement of those Orders under the Reactor Oversight Process?

We now know that instead of complying with Thermo-Lag Action Programs and Confirmatory Orders, licensees widely substituted "operator manual actions" that were in large part unreviewed and unapproved by NRC staff. These industry self-initiated manual actions allowed electrical circuits required under regulations as to be maintained free from fire damage to be sacrificed in the fire by taking no action on installing compliant fire barriers or establishing a minimum cable separation between redundant systems. The operator manual actions would instead send station personnel to the end piece of safety equipment and manually operate it or turn off spurious operations. The manual actions can be complicated, multi-tasked and require tools, ladders, key cards and even breathing apparatus to accomplish safety-related functions under duress of fire and potentially even attack. Given the difficulty in predicting fire behavior, the manual actions might not be achievable.

Enforcement Discretion and non-cited violations for non-compliances were put into place by NRC for unapproved operator manual actions. In 2005, NRC initiated a

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[10] "Fire Safety at Nuclear Power Plants," Hearing before the Subcommittee on Oversight and Investigation of the Committee on Energy and Commerce, House of Representatives, One Hundred Third Congress, March 3, 1993, Serial No. 103-21, p. 1

[11] Ibid, p.1

[12] Ibid, p. 110.

rulemaking to codify operator manual action in lieu of coming into compliance with physical fire protection design features; rated and operable fire barriers and minimal separation requirements used in conjunction with detection and automated suppression. After failing to get an endorsement from either the nuclear industry or the public interest community, NRC abandoned the rulemaking effort in March 2006.

NRC is now planning to accept "feasible and reliable" Operator Manual Actions as "temporary" compensatory actions (an additional three years on top of non-compliances going back to 1992) for inoperable fire barriers and failure to provide minimum cable separation while licensees to submit a large number of exemptions from fire protection requirements and move to a voluntary risk-informed and performance-based fire protection system.[13] The public lacks confidence in such analytical fire protection over physical fire protection features. To offer one basic reason for this lack of confidence, fire protection is fundamental to the security infrastructure in protecting the public from radiological sabotage. Terrorism can neither be effectively risk-informed or performance-based.

In the mean time, there is the recurrence of the Thermo-Lag "déjà vu all over again" with additional inoperable fire barrier system materials widely employed by the nuclear industry for protection of safe shut down electrical systems having been identified.[14] HEMYC and MT fire barriers, are now demonstrated to dramatically fail the same standardized fire tests and do not assure that safe shut down equipment can be maintained free from fire damage in the event of a significant fire at a U.S. reactor. NRC has set about to take regulatory action along the same paths as its 1992 discovery of inoperable Thermo-Lag barriers that remain an unresolved problem today under the new Regulatory Oversight Process. Given the unresolved nature of the problem created by inoperable Thermo-Lag, the public has little cause to have confidence that the current Regulatory Oversight Program will find closure any time sooner for HEMYC / MT fire barriers.

Congressman Dingell stated the obvious at that 1993 hearing on fire protection and the NRC oversight process more than 13 years ago, *"One must inquire whether a regulatory process which approves matters as a matter of courtesy is serving the public interest or, in fact, whether it is in fact a regulatory system. The question is, how does this happen. It results from a curious blind faith of NRC regulators and assurances made by utilities and by the industries that they regulate."*[15]

MR. WHITFIELD. Thank you, Mr. Gunter.

Obviously, you have some real concerns about this process, and I would ask the NRC and the GAO in its written testimony point out that the NRC has a proactive approach to improving the reactor oversight process and several mechanisms in place to incorporate feedback from both external and internal stakeholders.

And I was just curious from your experience, do you provide feedback and give-and-take with the NRC about these issues that you find deficient? Do you feel like you have an open dialogue with them or not?

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[13] NRC Regulatory Issue Summary 2006-XX, Regulatory Expectations with Appendix R Paragraph III.G.2 Operator Manual Actions, Public Meeting, June 6, 2006

[14] NRC Generic Letter 2006-03, "Potentially Nonconforming HEMYC and MT Fire Barrier Configurations," April 10, 2006, United States Nuclear Regulatory Commission, Accession No. ML053620142.

[15] Ibid, Subcommittee Hearing, p.2

MR. GUNTER. Yes, sir. We have been involved in meetings, public meetings both with the staff and the Commission. It remains a concern as to whether or not those meetings result in actions that we believe serve the public interests, particularly with--an example is in the area of fire protection--

MR. WHITFIELD. Right.

MR. GUNTER. --where we have been in meetings for well on 13 years with this regard. And we remain concerned that the issues are not only not closed, and the lingering safety concerns, but we have more inoperable fire barriers emerging.

MR. WHITFIELD. I have never met you, Mr. Gunter, before, and I am assuming that you are supportive of the use of nuclear energy; but your organization and you, personally, feel that there are some major safety issues out there that just have not been addressed to the way that you would like; would that be correct?

MR. GUNTER. No, sir. We are openly opposed to the continued operation of nuclear power and its expansion. This industry has had 50 years to prove itself, and it not only has not met the market tests, but it continues to raise growing safety concerns as well as nuclear waste and environmental concerns.

MR. WHITFIELD. Okay. You also point out that the public has no confidence in the physical protection cornerstone of the reactor oversight process. So I am assuming that you feel like they are vulnerable to attack, that it is just inadequate, the protection in place is simply inadequate; is that right?

MR. GUNTER. There is the question, first of all, of design, and it is hard to suggest that all reactors carry the same vulnerability. They don't. We have recognized that there are some sites that are more vulnerable than others, some designs more vulnerable than others. And it also comes down to the question of how much security is enough and how much security is to be afforded, and is the industry willing to afford that, and is the agency in a position to enforce such levels of adequate security?

So there are many aspects to this that, you know, make it a Gordian Knot.

MR. WHITFIELD. Okay. We have a vote on the floor. We are going to have three or four votes. And rather than keeping you for the entire time, at this time I will recognize Mr. Inslee for any questions that he may have.

MR. INSLEE. Thank you.

I just wonder, bottom line, how do you compare public safety, the status, from before the Reactor Oversight Process was put into place. Better? Worse? The same?

MR. GUNTER. You know, it is difficult to measure if, in fact, the process is not picking up the significant safety issues. Again, I go back to our concerns with the Davis-Besse finding that there were no greater than "green" findings, that everything was running along safely, supposedly, about three-sixteenths of an inch of stainless steel was bulging off the top of the reactor vessel head.

It raises significant confidence in the current oversight processes' ability to not only identify safety issues in a timely fashion, but for technical assessments to be translated into enforcement actions, which I think was a significant failing in the Davis-Besse issue.

MR. INSLEE. Thank you.

MR. WHITFIELD. Is that all of your questions, Mr. Inslee?

Dr. Burgess, do you have any?

MR. BURGESS. I'll submit them in writing.

MR. WHITFIELD. All right. Well, Mr. Gunter, I want to genuinely appreciate you being here today to express your concerns. We do have your testimony, and I want to thank the other panel of witnesses again. As I said, this is a very important area. Nuclear energy does provide about 20 percent of the electricity produced in the U.S. today, and we do need to ensure the safety so that hopefully we can expand nuclear energy. I know that is not where you all are coming from, but we can continue to have the dialogue and the debate, and thank you very much for being with us today.

And with that, the hearing is adjourned.

[Whereupon, at 5:15 p.m., the subcommittee was adjourned.]

RESPONSE FOR THE RECORD OF JIM WELLS, DIRECTOR, NATURAL RESOURCES AND THE ENVIRONMENT, GOVERNMENT ACCOUNTABILITY OFFICE

The Honorable Jan D. Schakowsky

1. Four years ago, the fifth most dangerous nuclear reactor incident in 25 years occurred at FirstEnergy's Davis-Besse plant. The Reactor Oversight Process was already in place, and Davis-Besse was in the green with its ratings. The public obviously wasn't safe then. Is there any guarantee that this type of incident wouldn't occur again? Are we safer now than we were then?

    - There is no question this event caught NRC and many by surprise. The event did cause action and the industry and NRC thoroughly explored the causes, learned lessons, and NRC's ROP was improved. It is not possible to guarantee that this type of incident won't happen again, but it is unlikely there will be another incident identical to that at Davis-Besse. I think that NRC's oversight overall has improved as a result of the wake-up call that it got from such a serious incident.
    - NRC's recent actions to assess and focus attention on safety culture should better provide early indications of declining plant performance.

2. Early this year, the Nuclear Regulatory Commission (NRC) staff raised questions about the effectiveness of the performance indicator program, saying that if all the results were "green," perhaps it didn't really measure anything of value. What is your position on the performance indicator program?

    - I would respond that we share NRC's and industry's concern that the existing performance indicators are less than perfect. Performance indicators can be valuable because they provide objective measures that licensees can use for managing their plants. Performance indicators also focus attention on areas important to safety. However, if measures are always green as they have been, you should question their value. It's good that they are green if this means that licensees are performing well nearly all the time. But there have been cases where performance indicators did not seem to accurately reflect performance (e.g. Davis Besse or the issue with warning sirens at Indian Point). We understand there are changes being made to improve these indicators in the future.

3. Initially, NRC staff estimated that about 5 percent of the findings under the Reactor Oversight Process would be greater than green. But less than 1 percent have fallen into that category. Does that mean all the reactors are safer than they were five years ago, or are the findings not measuring the right safety indicators?

    - It is true that the industry has logged a pretty impressive safety record over many years of operations and many issues related to safety have been corrected and improved. Nevertheless, NRC has acknowledged that many indicators may need to be redesigned to serve as a better measure of performance. In cooperation with the industry, NRC recently introduced one new key performance indicator, the mitigating systems performance indicator, and they intend to assess others as well.
    - At the nuclear power plant sites we looked at, we found that plant managers pay close attention to performance indicators and manage their

plants so as not to exceed thresholds—that is, they stated they would take action to fix the issue well before the indicator exceeded the threshold. In reality a lot is riding on well these plants perform, for example within the financial and shareholder community as well as the public perceptions of how safe these plants are.

4. At Davis-Besse, prior to the 2002 incident, the plant was all green, but there were serious problems under this new system. One of them was an overall poor safety culture. But it has taken the NRC four year to make changes to the oversight process to address safety culture. Why has it taken so long?

   - Our 2004 report, which analyzed the events at Davis-Besse, confirmed the findings that a poor safety culture played a major role in the unfortunate events that played out. Based on what we found, as well as others, we recommended NRC take action to get involved. We concluded their oversight should address safety culture issues. I think it is fair to say NRC has been hesitant to become involved in areas related to plant management. NRC officials told us for years that their role as the regulator was to regulate and not tell the industry how to run the plants. Their view was safety culture perhaps crossed the line too far into operations of the plant. Also, subjective issues such as safety culture are difficult to incorporate into their objective processes under the ROP. We think it is fair to question how quickly NRC moves forward to incorporate this change in oversight.

5. You stated in your testimony that overall plant performance declines when there are ineffective corrective action programs, problems related to human performance, or complacent management. How successful is the NRC in uncovering these kinds of "culture" problems?

   - The case of Davis Besse illustrated that the ROP failed in a sense, and did not have adequate tools for addressing declining safety culture. The primary tool being used at the time was the identification of substantive cross-cutting issues. NRC was struggling somewhat in consistently applying, identifying and watching these types of indicators. As a result, the meaningfulness of these determinations did not necessarily result in any real consequences. A weakness of the ROP was an underlying assumption that problems in these areas will be revealed through inspection findings. As Davis-Besse illustrated, however, this assumption is not always valid.
   - NRC's new safety culture initiative should provide them better tools to assess plant safety culture, but officials acknowledge this initiative is only a first step, and further modifications to the ROP may be needed.

6. What is the Government Accountability Office's view of the new safety culture oversight process?

   - As we have testified, NRC's ROP is not perfect, but we believe it is getting better than it was when it was created in 2000. NRC's initial step to implement revisions or modifications related to monitoring safety culture within the plants is being met with resistance and a challenge to NRC's existing authority. Even within the NRC there are varying opinions on how or if this will work. It is an important step toward preventing future problems like those encountered at

Davis-Besse. But NRC is just starting its implementation and will need to carefully monitor this initiative to ensure that it is achieving the goals for which it was designed.

RESPONSE FOR THE RECORD OF HON. EDWARD MCGAFFIGAN, JR., COMMISSIONER, U.S. NUCLEAR REGULATORY COMMISSION

QUESTIONS FROM REPRESENTATIVE BLACKBURN:

QUESTION 1. Mr. McGaffigan, what advantage does a risk-informed, performance-based approach to fire safety have over the prior deterministic approach?

ANSWER:

The advantage that a risk-informed, performance-based approach offers is that it allows licensees to perform realistic assessments of the risks to the public due to potential fires at plants. The results of these assessments enable the licensees to gain risk insights associated with specific fire protection issues and focus their resources where the most risk-significant issues exist, thereby improving the protection of the public health and safety. Additionally, the NRC staff may independently consider such insights to help focus its safety reviews and resources on the most risk-significant issues. Consequently, a risk-informed, performance-based approach enhances both the NRC and its licensees' focus on safety, while simultaneously reducing unnecessary burdens.

The deterministic Fire Protection Regulation 10 CFR 50.48, "Fire Protection," was first published in 1981, in the aftermath of a significant fire that occurred at the Browns Ferry Nuclear Plant in 1975. The NRC required a large number of nuclear plants that were already in operation or in advanced stages of construction in 1981 to comply with the deterministic requirements imposed by this rule. At that time probabilistic risk tools were not sufficiently mature to be used for this new rule, and some of the requirements imposed undue hardship that was not necessary to achieve the underlying purpose of the fire protection rule. As a result, many licensees requested relief from certain of these new requirements using the NRC's exemption process under 10 CFR 50.12 "Specific Exemptions." NRC staff then reviewed and approved about one thousand exemptions of specific requirements of the rule. These reviews posed significant resource burdens on both the licensees and NRC staff, in most cases without commensurate safety benefits.

The fire protection inspections continue to reveal additional findings, many of which have limited safety benefit, where licensees do not meet some of the deterministic requirements. Therefore, resolving these issues provides a very limited increase in safety while continuing to pose undue resource burdens on the staff and the licensees, and simultaneously diverting limited licensee and NRC staff resources from more safety significant issues.

QUESTION 2. The NRC advisory committee on reactor safeguards state that only a few nuclear plants have full scope fire risk assessments.

(A) How many plants have this assessment?

ANSWER:

Performance of a full scope fire risk assessment is not a regulatory requirement. All operating reactors have performed evaluations of the risk associated with fires as a part of their response to Generic Letter 88-20, Supplement 4, entitled "Individual Plant Examination for External Events." These assessments used conservative bounding assumptions in their analysis and identified the important factors that contributed to the risk imposed by fires. Therefore, even though these analyses did not constitute full scope risk assessments for most licensees, they were of sufficient quality to identify "risk outliers," i.e., instances where the relative risks were high.

The NRC has not collected information on the exact number of plants that possess a full scope fire risk assessment. However, to date 40 nuclear units have informed the NRC that they intend to adopt the performance-based fire protection rule, 10 CFR 50.48(c), "National Fire Protection Association Standard NFPA 805." This performance-based rule is commonly referred to as the "NFPA 805 Rule," since it endorses a standard developed by the National Fire Protection Association (NFPA) with a few exceptions. Most licensees who have committed to adopt the NFPA 805 Rule, committed to perform Fire Probabilistic Risk Assessments (PRAs).

(B) Does your ROP contain a requirement for nuclear reactors to have this assessment?

ANSWER:

At the present time, there are no NRC requirements for nuclear reactors to have a full scope risk assessment and NRC requirements do not require a fire PRA specifically. The ROP defines the NRC's inspection and assessment activities for nuclear reactors and does not impose regulatory requirements.

(C) (If no) Why not, especially since the advisory committee says it is absolutely necessary as plants move to the risk-informed approach?

ANSWER:

The advisory committee's statement pertains only to those licensees who voluntarily adopt risk-informed alternatives to the current regulations, specifically, in reference to those licensees who plan to adopt the NFPA 805 rule (10 CFR 50.48(c)).

Licensees that adopt the performance-based alternative to the current deterministic requirement must use Probabilistic Risk Assessment (PRA) tools to justify changes to the plant. The NRC staff plans to review the fire risk assessment capability of licensees that plan to adopt a performance-based alternative to the deterministic regulations, prior to granting their request to adopt a risk-informed, performance-based licensing basis for fire protection.

QUESTION 3. It is my understanding that the NRC sent a generic letter to nuclear plants that use Hemyc and MT fire barrier systems to take corrective actions.

(A) What is the status of compliance with this letter?

ANSWER:

The NRC issued Generic Letter 2006-03, entitled "Potentially Nonconforming Hemyc and MT Fire Barrier Configurations," on April 10, 2006. This Generic Letter requested licensees to inform the NRC whether they are in compliance with NRC's fire protection regulation 10 CFR 50.48, in light of the new information developed by the NRC during testing on the Hemyc and MT fire barrier systems' performance.

Under 10 CFR 50.54(f), all licensees are required to respond to NRC's request for information communicated via this Generic Letter. All licensees have complied with the requirement to respond to Generic Letter 2006-03.

(B) What penalties are available if they do not comply?

ANSWER:

All plants have complied with the NRC requirements to provide responses per 10 CFR 50.54(f), to the Generic Letter.

Most licensees have informed us that they are in compliance with 10 CFR 50.48, primarily because they do not use Hemyc or MT fire barriers in their facilities. However, some plants have declared their Hemyc and MT fire barriers inoperable in light of the new testing data developed by the NRC regarding the performance of these fire barriers. Licensees may continue to operate in certain instances where noncompliances are discovered while such noncompliance are being corrected, as long as the NRC has reasonable assurance that the noncompliance conditions have minimal effects on public health and safety. Since all plants with potential noncompliances have implemented compensatory measures, and informed us of their plans to take corrective actions, the NRC concluded that the plants may continue to operate until they re-establish compliance.

As such, currently the NRC has no plans to take any enforcement action. The NRC plans to use its periodic fire protection inspections to ensure that the licensees are implementing and following their corrective actions.

(C) What is the likelihood of a fire causing a nuclear plant to meltdown or causing core damage if the plants are using these inadequate fire barrier systems?

ANSWER:

The NRC staff has assessed the likelihood of a fire causing a nuclear plant meltdown or core damage of plants using these fire barrier systems and determined that the likelihood is low for several reasons.

As a 1-hour rated fire barrier, Hemyc is installed only in fire areas where fire detection and automatic fire suppression systems are present, or in fire areas where the licensee has previously obtained an exemption from the automatic fire suppression requirement because such suppression was deemed unnecessary (for example in areas where there is a negligible potential for fire due to low or no combustible material or ignition sources). The Hemyc fire barrier systems used at these plants constitute just one of several layers of defense-in-depth (fire detection, manual suppression, and automatic suppression) designed to protect the plant in the event of a fire.

For MT fire barrier systems, which consist of several layers of materials, the outermost being Hemyc, the NRC staff also concluded that the risk was low. In confirmatory fire testing, the MT fire barrier system demonstrated nearly an hour of protection in every test run. As such, the NRC concluded that the MT fire barrier systems would provide sufficient time for a fire brigade to reach and actively suppress the fire before cable damage is expected to occur.

The NRC's tests exposed the Hemyc and MT material to higher temperatures and more rapid temperature increases than are expected in fire areas where Hemyc and MT fire barrier systems are installed. The NRC considered the safety margins between the test and actual conditions to be sufficient such that the installed Hemyc and MT fire barrier systems are unlikely to be challenged at a level where failure sufficient to cause cable damage would occur.

QUESTION 4. What collaborations has NRC had with other countries in developing an adequate fire risk assessment of nuclear plants?

ANSWER:

The NRC is actively involved in a number of national and international fire risk assessment programs. On the international level, the NRC is a member of the Organization for Economic Co-Operation and Development (OECD) Nuclear Energy Agency (NEA) Fire Incident Records Exchange Project. In this project, the NRC is partnering with members from Canada, Finland, France, Germany, Japan, Spain, Sweden, Czech Republic, Netherlands and Switzerland to develop an international nuclear power plant (NPP) fire event data base. This data base will provide insights on fire frequency information and insights regarding international NPP fire experience.

The NRC is an active member of the International Collaborative Fire Model Project (ICFMP) with members from the United Kingdom, Germany, France, and Finland. The goal of this working group is to exercise the current fire modeling tools and determine their merit for use when performing risk assessment of NPPs. The NRC, in collaboration with the Electric Power Research Institute (EPRI) issued the draft joint report NUREG-1824, "Verification and Validation of Selected Fire Models for Nuclear Power Plant Applications," in January 2006 for public comment. NUREG-1824 utilized experimental data from this international project to perform the analysis of the fire models. The final report, NUREG-1824 will be issued early in 2007.

The NRC, again in collaboration with EPRI, issued NUREG/CR-6850, "Fire PRA Methodology for Nuclear Power Facilities" in September 2005. This report documents state-of-the-art methods, tools, and data for the conduct of a fire PRA in a commercial NPP. The NRC and EPRI have held two public workshops to date on this report. In addition to the US stakeholders and NRC inspectors, the workshops have been attended by foreign regulators and licensees from the United Kingdom, Canada, Germany, France, Japan, Korea, Finland and Sweden. Feedback from these international attendees indicate that the joint NRC/EPRI program is currently the most advanced NPP Fire PRA program available today.

While the Fire-Induced Damage to Electrical Cables and Circuits - Working Group was active, the NRC along with representatives from Germany, France, and Canada worked together to improve the technical basis for understanding the damage thresholds, damage mechanisms, failure modes, and consequences of fire-induced cable failures in NPPs, and supported the development of improved methods, tools, and data for predicting fire-induced circuit responses.

The NRC has met twice this year with Germany, France, and Belgium, to discuss conducting a joint research program to better understand electrical failures and resulting explosions and fires from High Energy Arcing Faults. These events have happened world wide and have the potential to pose a significant challenge to a NPP. Meetings are being scheduled for 2007 to finalize a work plan to start this research. The NRC continues to collaborate with national and international partners in the area of fire risk assessment and actively seeks partners when projects can be mutually beneficial to all parties.

QUESTION 5. What type of risk (low, moderate, high) does your ROP assign to inadequate medium voltage switch gear? (This type of gear can affect a significant electrical fault and cause fires.)

ANSWER:

The Reactor Oversight Process (ROP) does not assign a universal risk characterization for medium voltage switchgear. The relative risk importance of this class of switchgear depends on the specific type of power plant, the location of the switchgear within the plant, the proximity to other plant equipment and electrical cables, and/or the specific electrical loads being serviced by the switchgear. The ROP contains a

Significance Determination Process (SDP) that provides a means for the NRC to characterize the risk significance of licensee performance deficiencies including those that may result in deficient medium voltage switchgear. The SDP uses probabilistic risk assessment methods and qualitative methods to characterize the potential increase in plant risk using risk metrics such as change in core damage frequency (CDF).

For switchgear failures that do not represent a potential fire issue (e.g., an electrical breaker that prematurely opens and de-energizes equipment), the SDP under NRC Manual Chapter 609, contains general guidance on how to assess the importance of the issue. In these types of cases, the risk significance depends on factors such as a switchgear defect indirectly causing a reactor shutdown, unavailability of the service loads affected by the switchgear in question, and in some cases the length of time the condition existed.

Additionally, energized medium voltage switchgear in itself creates a potential fire hazard. NRC regulations require fire protection from these hazards when such switchgear is located in important locations within nuclear power stations. For inspection findings related to licensees' failure to meet federal fire protection requirements, the SDP contains a dedicated section (NRC Manual Chapter 609, Appendix F) to assess the risk significance of the condition including technical guidance on the treatment of medium voltage switchgear. Risk analysis for such cases are often complex since issues involve numerous variables such as fire growth modeling, time to fire damage of any adjacent equipment/cables, automatic fire suppression capability, fire brigade response, and plant operator's response to place the reactor in a safe shutdown condition. However, it should be noted that in the five years of the ROP, no fire protection issues have resulted in risk greater than the low-to-moderate risk range. Issues that are of low-to-moderate risk are called >White' findings under the color scheme used in the SDP and is the second lowest color in the hierarchy of significance.

QUESTIONS FROM REPRESENTATIVE STEARNS:

QUESTION 1. Would you please explain how the new ROP system will improve the regulatory review process for approving new nuclear power plants?

ANSWER:

The Reactor Oversight Process (ROP) is focused on operating power plants. The ROP allows the NRC staff to evaluate and respond consistently to licensee performance issues by using a series of performance indicators and NRC inspections. Both the performance indicators and inspections are focused on operating reactors. As a result, the ROP has no role in the licensing review and approval of a new nuclear plant. However, once licensed, constructed, and operating, each new plant will be monitored using the tools of the ROP, including the performance indicators and NRC inspections.

QUESTION 2. With respect to "risk-informed" regulations, how does their oversight fit into the new reactor oversight process? Do you see the two efforts complimenting each other? Are you happy with the progress that you are making in this regard?

ANSWER:

The Reactor Oversight Process (ROP) assesses, through scrutiny of carefully selected samples, whether licensee activities are properly conducted; whether licensees comply with NRC regulations; and whether plant equipment is properly maintained to ensure safe operations. Because there are many aspects of facility operation and maintenance, the NRC inspects utility programs and processes on a risk-informed sampling basis to obtain representative information. As regulations change and as we pursue other risk-informed initiatives, we evaluate the ROP to determine if changes need to be made in the oversight of licensee activities. Therefore, the ROP and the risk-informed regulatory changes will complement each other.

The NRC has made significant progress in the area of risk-informing its activities over the last several years. Nevertheless, a significant amount of work remains. NRC continues to pursue a number of risk-informed initiatives, including rulemaking and licensing actions. At the same time, the industry and the NRC are working to develop appropriate standards for the probabilistic risk analysis tools needed to support these activities. NRC is continuing to work to expand its capabilities in this area.

QUESTION 3. I understand that the reactor safety aspects of the ROP have a reasonably objective set of criteria for determining safety impacts and associated colors. However, it appears that the non-reactor safety aspects (Emergency Preparedness, Radiation Protection and Security) are far more subjective, and can generate results that don't make sense. This can confuse the public and may contradict your own assessment. What steps is the NRC taking to improve the objectivity of these non-reactor aspects, to ensure findings are colored more consistently with the reactor findings?

ANSWER:

The creation of significance determination processes (SDPs) across all seven cornerstones of safety, was a significant shift toward improved objectivity and transparency from our previous reactor assessment process. The SDPs for non-reactor

safety cornerstones, such as Emergency Preparedness (EP), Radiation Protection, and Security, are not able to utilize probabilistic tools as those SDPs associated with reactor safety systems do. In establishing the SDPs for the non-reactor safety areas, it was not possible to consistently relate deficient performance to quantitative risk measures such as core damage frequency or large early release frequency. From the start the staff has worked with industry and public stakeholder input, to the extent possible, to define SDPs in the non-reactor safety areas that result in agency responses that are considered appropriate for a range of performance problems. We continue to meet monthly with industry in public meetings to discuss SDP issues and potential improvements.

For example, the EP cornerstone risk-informs the significance of a finding by reflecting the potential impact on public health and safety. A group of emergency preparedness subject matter experts, including NRC staff, industry stakeholders and members of the public, identified the most risk significant aspects of emergency planning as (1) emergency classification; (2) notification of offsite response organizations; and (3) public protective action recommendations. Identification of the most risk significant EP aspects established a reasonably defined hierarchy of the significance of emergency planning findings consistent with the risk-informed approach utilized by the reactor safety aspects of the reactor oversight process.

With respect to the Security cornerstone, the NRC reviews all security-related inspection findings before they are included in an NRC inspection report. The review is conducted by an agency-wide panel that is headed by a manager from the Office of Nuclear Security and Incident Response. The Security Findings Review Panel assures consistency between all licensees and all four NRC regions, and helps assure that the significance of the security findings are consistent, objective, and predictable. In addition, findings that potentially could be greater than very low security significance are forwarded to an NRC enforcement panel named the Significance and Enforcement Review Panel to reach an agency determination of significance.

The agency issued its current physical protection significance determination process (PPSDP) for security in July 2004. The PPSDP provides for consistent, objective, and predictable results. Since then, the NRC staff has been continuously evaluating and monitoring the results of the PPSDP, further ensuring an objective and consistent approach. The end result of this evaluation will be to make any noted improvements to the SDP for security.

QUESTIONS FROM REPRESENTATIVE SCHAKOWSKY:

QUESTION 1. The near-accident at FirstEnergy's Davis-Besse plant in 2002 was ranked as the fifth most dangerous incident in the Nuclear Regulatory Commission's (NRC) history. Boric acid leaks had put a very large hole in the reactor vessel's head. This occurred under the Reactor Oversight Process reviewed in the recent hearing. The Union of Concerned Scientists and the Nuclear Information and Resource Service said this failure occurred because NRC headquarters staff did not back up the inspection staff who had proposed a mandatory shutdown because FirstEnergy refused to shut down voluntarily as the owners of all of the similar reactors had done. The NRC Inspector General found that the NRC put the financial impact of the shutdown on FirstEnergy above public safety. What has the NRC done to change those priorities?

ANSWER:

Assuring the public health and safety is and always has been the highest priority of the NRC. The NRC Chairman's response to the Inspector General and the NRR Director's response to David Lochbaum corrected factual inaccuracies in the referenced documents.

In his January 8, 2003, response to the NRC Inspector General, then NRC Chairman Richard Meserve stated:

> "There are several significant failings in the report. First, and perhaps most important, the report incorrectly indicates that the decision to allow the brief period of continued operation was driven in large part by the interest in reducing the financial impact on the licensee. The underlying inspections of reactor pressure vessel heads at all pressurized water reactors were undertaken as a result of staff safety concerns about circumferential nozzle cracking. And, as your report has found, the NRC staff allowed the Davis-Besse reactor to continue to operate only after the relevant expert staff reached unanimous agreement that there was no significant safety concern relating to nozzle cracks that would preclude the brief period of extended operation. It is a significant failing that the report does not acknowledge this fact in its findings. Assuring the public health and safety is the highest priority of the NRC, and we believe that the staff's action was consistent with this requirement."

Similarly, in a letter dated December 13, 2002, Samuel Collins, Director of NRR, responded to the assertions in David Lochbaum's letter dated October 14, 2002, as follows:

> "With regard to the NRC's regulatory activities, contrary to your assertion in Item 4 of your letter, NRC management did not overrule safety concerns of the staff in allowing Davis-Besse to operate until February 16, 2002. Rather, the technical staff recommended to management its conclusion, based on risk-informed decision making criteria and the information available to the staff, that the plant could operate until February 16, 2002, without undue risk to the public health and safety. In addition, the
> NRC sent Davis-Besse a closeout letter in response to Bulletin 2001-01. It provides much greater detail regarding the staff's decision making process."

QUESTION 2. Have any changes been made in procedures used by the NRC headquarters staff when considering a shutdown recommendation from the inspection staff? Because any unplanned shutdowns will have a significant financial impact on the licensee, is it now NRC policy that public safety takes precedence over financial impact in a situation such as Davis-Besse?

ANSWER:

Assuring the public health and safety is and always will be the highest priority of the NRC. Following the Davis-Besse reactor vessel corrosion issue, the NRC Executive Director for Operations chartered a Lessons Learned Task Force which was charged with conducting an evaluation of NRC's regulatory processes. Significant improvements have been made to NRC processes and procedures as a result of implementing the recommendations made by the task force. These improvements include a more proactive program for evaluating materials degradation; a revitalized and robust assessment of operational experience; enhanced internal and external communications and communications protocols; specific and detailed inspections program enhancements including resident inspector staffing; and the maintenance of a safety-conscious attitude by the NRC staff.

As an example, a new office instruction was issued which gives guidance on the performance and documentation of an analysis conducted to determine the appropriate regulatory response to an emerging issue. The guidance builds on the principles of risk-informed regulation presented in Regulatory Guide 1.174, "An Approach for Using Probabilistic Risk Assessment in Risk-Informed Decisions on Plant-Specific Changes to the Licensing Basis," and includes consideration of conformance with regulations, maintenance of defense-in-depth and safety margins, performance monitoring, as well as risk considerations. This office instruction is intended to apply when there is not an otherwise applicable NRC decision-making process.

QUESTION 3. In the Davis-Besse incident, the concerns of the regulatory division staff over the effectiveness of FirstEnergy's mitigation steps used to justify keeping the nuclear plant open beyond the proposed shutdown date were never documented. Could that happen today, or does the NRC have better procedures to track and document its discussions and decisions?

ANSWER:

As a result of the examination of the Davis-Besse reactor vessel corrosion incident, and the report generated by the Davis-Besse Lessons Learned Task Force, NRC has made several key changes to how it communicates both internally and externally. There has been substantial advancement in the use of information technology in making operating experience available to internal users and members of the public. There is a new database for managing all reported events, as well as a new operating experience information gateway that consolidates a large collection of individual databases and Web sources of information onto a single Web access page. The NRC Office of Nuclear Reactor Regulation has a new communication tool to promptly notify NRC staff of developing operating experience in their areas of expertise. Users may also use this tool to examine recent or developing operating experience in their respective areas. The NRC issued improved guidance in developing generic communications, establishing criteria for acceptable responses from licensees, properly documenting evaluations of licensee responses, and performing follow-up verification of licensee information.

As an example, NRC developed Office Instruction LIC-504, "Integrated Risk-Informed Decision-Making Process for Emergent Issues," which provides a number of templates for documenting both the analysis supporting a decision, and the decision itself. In documenting the decision, the office instruction stresses the importance of identifying the driving factors behind the decision, the limitations of and uncertainties associated with the supporting analyses, and providing the rationale behind the decision. LIC-504 has been issued for use and is expected to be invoked whenever there is not an otherwise applicable NRC decision-making process for dealing with a licensing issue.

QUESTION 4. In Davis-Besse, it was clearly a situation where the licensee that protested got the NRC to back off. Licensees that did the right thing and closed down their plants in a timely manner were penalized. Unfortunately, Davis-Besse had the most serious corrosion and cracking problems of all of the reactors. What has the NRC done to prevent that from happening again?

ANSWER:

As indicated in the response to Question 1, the NRC staff made the decision based on a determination that there was no significant safety concern associated with the brief period of extended operation. This risk-informed decision took into account commitments by the licensee to reduce the proposed period of operation by half and to institute additional compensatory measures. The responses to Questions 2 and 3 detail the additional procedural guidance provided to the staff since the event.

QUESTION 5. Critics have stated that the NRC's fine of $4.5 million against FirstEnergy, the owner of Davis-Besse, was "paltry" and a "slap on the wrist" for an incident in which the NRC later calculated the odds of a nuclear meltdown were 6 in 1,000. What are your views on the size of the fine?

ANSWER:

The total civil penalty was $5.45 million, and represented the largest ever issued by NRC. When determining the amount of the civil penalty, NRC considered several factors which included risk, safety significance and the economic benefit that FENOC gained by operating Davis-Besse with primary coolant pressure boundary leakage, a Technical Specification (TS) violation. In addition to the civil penalty, FENOC experienced substantial adverse economic impact resulting from their extended outage to replace the reactor pressure vessel head and to make improvements to satisfy NRC requirements and concerns. NRC also referred potential criminal aspects of the case to the Department of Justice which resulted in FENOC's agreement to pay $28 million to defer prosecution.

The NRC does not consider its approach in assessing civil penalties to be punitive, but rather a deterrence to emphasize the importance of compliance with requirements and to encourage prompt identification and comprehensive correction of violations. Therefore, the NRC determined that a civil penalty of $5,000,000 was appropriate for the violation of the Davis-Besse TS pressure boundary leakage requirement. The TS violation was processed under the Reactor Oversight Process (ROP) and determined to be a RED finding (a finding of high safety significance) under the Significance Determination Process (SDP.) In addition to the TS related violation, the NRC issued civil penalties totaling $450,000 for four willful violations of NRC requirements associated with corrective actions, adherence to procedures, and incomplete and inaccurate information.

This was the first time the Commission exercised its discretion to issue a civil penalty for a violation processed under the ROP and given a color under the SDP. While a civil penalty is not usually considered for issues evaluated under the SDP, absent actual consequences, the NRC considered this RED finding to be of significant regulatory concern and, accordingly, issued the civil penalty.

QUESTION 6. In order to have an effective oversight program, the NRC needs adequate staffing and resources. The Davis-Besse Lessons Learned Task Force concluded that staffing and resource issues "challenged the NRC's ability to provide effective regulatory oversight" at Davis-Besse. Has that problem been resolved? Does the NRC have more budget and resources for reactor inspections than it did in 2000 and 2001?

ANSWER:

The resource issues that challenged the NRC's ability to provide effective regulatory oversight at Davis-Besse have been resolved and the NRC has more resources for reactor inspections.

Reactor inspection resources were increased in FY 2004 as a direct result of the Davis-Besse events. Resources for supplemental and reactive inspections were increased by approximately 15 full time equivalents (FTE) to provide for inspection of a plant under NRC Inspection Manual Chapter 0350, Oversight of Reactor Facilities in a Shutdown Condition Due to Significant Performance and/or Operational Concerns, for follow-up activities to verify licensees' improvement plans pursuant to Inspection Procedures 95002 and 95003, and for reactor pressure vessel head inspections. There is also increased interaction between headquarters staff and regional inspection staff during monthly conference calls and periodic workshops.

Additionally, in 2003, the staff revised the resident inspector policy to allow early assignment of new resident and senior resident inspectors to a site. The policy allows the regional administrator to assign a permanent resident inspector up to 12 months before the planned departure of the incumbent resident inspector. Similarly, the regional administrator can assign senior resident inspectors up to six months before the planned departure of the incumbent. Regional management also implemented actions to reduce inspector vacancies through active recruiting; training new hires; and over-hiring in anticipation of retirements, attrition, and staff movement.

Resources for reactor safety and security inspections increased approximately 15 percent, by 110 FTE, between FY 2001 and FY 2007.

QUESTION 7. In May of this year, you were recently quoted in Nucleonics Week as asking if Davis-Besse could be relieved of its independent assessment obligations at an earlier date than prescribed. Can you explain your reasoning in light of the fact that this company is still under criminal investigation, just paid a $28 million fine, and had two former employees indicted for lying to the NRC?

ANSWER:

To be more specific, Commissioner McGaffigan noted during the NRC's May 16, 2006, Agency Action Review Meeting that perhaps the NRC should consider whether some of the four independent assessment requirements stated in the confirmatory order could be suspended, particularly in those areas in which Davis-Besse seems to be doing

very well. The order states that the regional administrator can suspend all or part of the requirements for the independent assessments based on good cause. Commissioner McGaffigan was suggesting that perhaps the resources could be better spent in other areas. Commissioner McGaffigan mentioned that at least two of the independent assessments need to continue and should not be considered for suspension, specifically the safety culture and corrective action program assessments.

If the licensee believes that any or all independent assessments are no longer necessary based on acceptable performance in those areas, it can formally request relief from the requirements. The staff specifically evaluates the progress of the order requirements on at least a semiannual basis during the mid-cycle and end-of-cycle performance meetings. In determining whether to suspend all or part of the four independent assessment requirements prior to the 5-year expiration date, the staff needs to consider the licensee's position as to why these additional assessments are not necessary, the results of the independent assessments, the robustness of the licensee's programs in these areas, and whether those areas and the specific issues are adequately covered by the NRC's baseline inspection program. Any agency decision to relieve the licensee of its independent assessment obligations ahead of the 5-year time-frame prescribed in the order will only be achieved through thorough analysis and a justified rationale.

QUESTION 8. One of the great failings at Davis-Besse was the lack of a corporate "safety culture." Next month - more than four years after the discovery of the corroded reactor vessel head at Davis-Besse - the NRC will put in place a process to evaluate a licensee's safety culture. Why did it take so long?

ANSWER:

The time required to implement the safety culture enhancements to the NRC processes was due to a number of factors, including that the staff sought to develop an approach to assess safety culture in an objective manner by (1) staying within the Reactor Oversight Process (ROP) framework, (2) being guided by the principles of the ROP (i.e., being objective, transparent, understandable, predictable, performance-based and risk-informed) (3) integrating information from inspections to develop an objective conclusion about licensee safety performance, and (4) seeking external stakeholder input throughout the development process. The staff also sought and received direction at a number of points from the Commission on safety culture initiative policy issues. Safety culture, as a new area of emphasis, necessitated that the staff expend considerable resources to develop an appropriate process. Finally, the analysis of safety culture is very fact dependent and is subject to the possibility of subjective outcomes if it is not correctly developed and applied. Given the difficulty of this area, the Commission wanted to take the time necessary to get it right. The following is a summary of some of the NRC activities over the past four years.

Summary of Activities:

The degraded reactor vessel head problem was identified by the licensee at Davis-Besse on March 5, 2002. The NRC initiated a number of responses to the problem, one of which was the formation of the Davis-Besse Lessons Learned Task Force. The purpose of the task force was to conduct an independent evaluation of the NRC's regulatory processes related to assuring reactor pressure vessel head integrity and to identify and recommend areas of improvement for the NRC. The final task force report was issued on September 20, 2002. While the recommendations spanned a wide cross-section of NRC activities, further information is provided below to describe the

intervening actions (between 2002 and 2005) that the NRC took with respect to safety culture.

Several of the task force recommendations related to enhancing the reactor oversight process. The staff initiated a number of safety culture-related improvements in the inspection program during the period 2002-2005 including:

> 1) Providing required web-based training on the Columbia space shuttle accident for inspectors and their managers on having a more questioning attitude in the conduct of inspections toward safety and the potential consequences when an organization's questioning attitude (a safety culture aspect) is lost or compromised.
>
> 2) Modifying inspection procedures to include additional inspection requirements to more closely inspect licensee corrective action programs (a safety culture component) to be alert for conditions such as repetitive equipment failures or human performance issues that might warrant additional follow-up inspections.
>
> 3) Modifying an inspection procedure to more rigorously screen and review licensee corrective action program (a safety culture component) deficiency information using a semi-annual review to identify trends that might indicate the existence of a more significant safety issue.
>
> 4) Providing more specific guidance for handling inspection issues in the areas of human performance and problem identification and resolution (which are related to a number of safety culture components). These efforts were designed to provide a more direct way to assess and react to licensee performance weaknesses in these areas.

With regard to a licensee's Safety Conscious Work Environment (SCWE), the staff proposed some options and recommendations to the Commission and received further Commission direction on how to proceed. A public workshop was held in 2004 to discuss the development of a Regulatory Issues Summary (RIS) which would provide guidance to the industry on establishing and maintaining a SCWE. Following the public meeting, a draft RIS was published in the Federal Register for public comment. The RIS, entitled "Establishing and Maintaining a Safety Conscious Work Environment," was issued on August 25, 2005. The RIS provided guidance and best practices for licensees to establish and maintain an effective SCWE.

In support of Commission direction provided in 2004, the NRC staff formed a Safety Culture Steering Committee, Working Group, and Support Team to develop further improvements to the ROP relative to safety culture oversight. Between November 2005 and February 2006 frequent public meetings were held with external stakeholders where the staff, with the participation of stakeholders, developed an approach to further enhance the ROP to address safety culture. The enhanced ROP inspection documents were revised based on this approach and were then provided for further public review and comment. The NRC staff evaluated the public comments and finalized the ROP inspection procedures and other ROP documents. The enhanced ROP provides the NRC with a range of regulatory responses to licensee safety culture issues that include requesting the licensee perform an assessment of its safety culture and for the NRC to assess independently the licensee's safety culture.The staff developed and provided training for inspectors and their managers on safety culture and on the changes to the ROP prior to implementing the revised ROP inspection protocols. The training included focused computer-based training as well as in-depth classroom type training.

All but one of the revised ROP inspection protocols were issued on June 22, 2006, and were implemented on July 1, 2006. The remaining revised inspection procedure is expected to be issued in August 2006. The staff is also developing a RIS to provide operating reactor licensees information on the changes made to the ROP to improve oversight of safety culture. The RIS is expected to be issued shortly.

In summary, the staff has expended considerable resources since the Davis-Besse head incident to make stepwise improvements in the ROP inspection and assessment programs. The staff will assess the safety culture improvements as part of its annual ROP self-assessment, to ensure that they are meeting the goals of the ROP and the Commission direction.

QUESTION 9. Three years ago, the NRC Inspector General did a survey of 1,525 NRC employees and found that only half of them felt it was safe to speak up at the NRC. Twenty-four percent did not believe that the NRC's commitment to public safety was apparent in what the agency did on a day-to-day basis. Has the NRC made any changes to improve its own "safety culture"?

ANSWER:

Several press reports following the NRC Inspector General's 2002 safety culture and climate survey report highlighted the survey's results in a single category, noting that nearly a third of the agency staff question the agency's commitment to safety. However, it is important to note that employee attitudes about the effectiveness of the NRC as a regulatory entity were covered by several other categories in the survey. As the report notes, the results in these categories, "in whole, demonstrate a workforce that has become much more positive about the NRC as an organization."

In addition, the NRC has taken a number of steps to improve its safety culture since 2002. This includes an increased emphasis on better face-to-face and employee to supervisor communications, development of better senior management communication tools to reinforce the agency's safety consciousness, and enhanced leadership training. The agency also reinforced the paramount importance of the NRC's safety mission relative to its other strategic goals in a number of communication vehicles.

The agency also revamped its Differing Professional Opinion (DPO) program, which encourages employees to raise any concerns and express differing views on any issue with their supervisors on a regular basis. In 2005, the staff participated in another safety culture and climate survey. On average, the NRC improved its scores in virtually every category from the 2002 scores and 66% of the staff indicated they felt it was "safe to speak up" in the NRC. The contractor who conducted the survey noted that it is rare, in their experience, that scores improve to this degree between survey iterations. In their evaluation report, they noted that "Efforts to follow-up on the results from 2002 appear to be successful and should be implemented once again in 2005." The contractor also noted that in the 2005 survey, the results indicated that employees are encouraged to communicate ideas to improve nuclear safety, and the scores for continuous commitment to public safety were greatly improved.

The agency recognizes that there is always room for improvement. In response to 2005 survey results, to foster continuous improvement in the agency's safety culture, individual offices and regions are developing action plans to address specific improvement areas. In addition, the agency has developed a non-concurrence policy, so that individuals who may not agree with a staff proposal may voice their opinion in a more informal manner than is the case with the DPO program.

QUESTION 10. Early this year, NRC staff raised questions about the effectiveness of the performance indicator program, saying that if all the results were "green," perhaps it didn't really measure anything of value. What is your position on the performance indicator program?

ANSWER:

The performance indicator (PI) program continues to provide the NRC with objective indications regarding plant performance, and it has met the goals and intended outcomes of the ROP. The PI program has generally fulfilled the regulatory principles of being objective, risk-informed, understandable, and predictable, and it has accomplished the three applicable NRC strategic goals (ensuring safety, openness, and effectiveness).

The acceptable "green" performance threshold was established based on mid-1990's industry performance. However, the staff and some public stakeholders remain concerned with the capability of the current PIs to contribute to the identification of declining performance. As a result, the staff is working with industry to revise several PIs (changes to the voluntary program require agreement by industry). A new risk-informed PI, mitigating system performance index (MSPI), has been developed and is in the initial stages of implementation. Also, the NRC/industry task group is working on another indicator for monitoring complicated rapid automatic or manual reactor shutdowns. The staff believes that this new PI has the potential to be a leading indicator of declining performance in that a plant that has a history of complicated scrams may be more likely to have a risk-significant scram. The staff plans to continue to work with the industry to revise and/or introduce other PIs to improve the program's effectiveness in contributing to the identification of declining performance.

QUESTION 11. Initially NRC staff estimated that about 5 percent of the findings under the Reactor Oversight Process would be greater than green. But less than 1 percent have fallen into that category. Does that mean all the reactors are safer than they were five years ago, or are the findings not measuring the right safety indicators?

ANSWER:

Every year the staff provides an assessment of the reactor oversight process (ROP) and the status of the industry trends program to the Commission. As part of the ROP assessment, the staff reviews the inspection program and how those resources are being used. Based on the CY2005 review, the Commission believes the ROP program is monitoring the correct safety performance areas.

With respect to industry performance over the last 5 years, the number of plants in each of the ROP action matrix columns has remained relatively stable. The number of green findings has increased 34%, but the number of findings that are greater-than-green has decreased by 45% over the last 5 years. In addition, most of the industry trend program metrics have shown stable or improved trends over the last 5 years. Based on this information, the Commission believes the NRC has seen some improvement in licensee performance over the last 5 years.

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