

January 12, 2001

Mr. Harold W. Keiser  
President and Chief Nuclear Officer  
PSEG Nuclear Limited Liability Company  
Post Office Box 236  
Hancocks Bridge, NJ 08038

SUBJECT: HOPE CREEK NUCLEAR GENERATING STATION - NRC INSPECTION  
REPORT 05000354/2000-011

Dear Mr. Keiser:

On December 30, 2000, the NRC completed an inspection of your Hope Creek facility. The enclosed report presents the results of that inspection. The preliminary findings were presented to PSEG Nuclear management led by Mr. David Garchow in an exit meeting on January 3.

NRC inspectors examined numerous activities as they related to reactor safety and compliance with the Commission's rules and regulations, and with the conditions of your license. The inspection consisted of selective review of procedures and representative records, observations of activities, and interviews with personnel. Specifically, this inspection involved seven weeks of resident inspection, and a region-based inspection of the Licensed Operator Requalification Program. No findings of significance were identified.

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Sincerely,

**/RA/**

Glenn W. Meyer, Chief,  
Projects Branch 3  
Division of Reactor Projects

Docket No.: 05000354  
License No.: NPF-57

Enclosure: Inspection Report 05000354/2000-011

Mr. Harold W. Keiser

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cc w/encl:

E. Simpson, Senior Vice President and Chief Administrative Officer

M. Bezilla, Vice President - Technical support

D. Garchow, Vice President - Operations

G. Salamon, Manager - Licensing

R. Kankus, Joint Owner Affairs

J. J. Keenan, Esquire

Consumer Advocate, Office of Consumer Advocate

F. Pompper, Chief of Police and Emergency Management Coordinator

M. Wetterhahn, Esquire

State of New Jersey

State of Delaware

Mr. Harold W. Keiser

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Distribution w/encl:  
Region I Docket Room (with concurrences)  
J. Schoppy - NRC Resident Inspector  
H. Miller, RA  
J. Wiggins, DRA  
G. Meyer, DRP  
R. Barkley, DRP  
C. O'Daniell, DRP  
J. Shea, OEDO  
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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No: 05000354  
License No: NPF-57

Report No: 05000354/2000-011

Licensee: PSEG Nuclear LLC

Facility: Hope Creek Nuclear Generating Station

Location: P.O. Box 236  
Hancocks Bridge, NJ 08038

Dates: November 12 - December 30, 2000

Inspectors: J. G. Schoppy, Jr., Senior Resident Inspector  
C. G. Cahill, Resident Inspector  
G. C. Smith, Sr. Physical Security Specialist  
L. E. Briggs, Senior Operations Engineer  
J. M. D'Antonio, Operations Engineer

Approved By: Glenn W. Meyer, Chief,  
Projects Branch 3  
Division of Reactor Projects

## Summary of Findings

IR 05000354-00-11, on 11/12 - 12/30/2000, Public Service Electric Gas Nuclear LLC, Hope Creek Generating Station. Licensed Operator Requalification.

The inspection was conducted by resident inspectors, a regional security specialist (acting resident inspector), and regional operations engineers. This inspection identified no findings of significance. The significance of most findings is indicated by their color (Green, White, Yellow, or Red) and is determined by the Significance Determination Process (SDP) in Inspection Manual Chapter 0609 (see Attachment 1). Findings for which the SDP does not apply are indicated by “no color” or by the severity level of the applicable violation.

### A. Inspector Identified Findings

#### **Cornerstone: Mitigating Systems**

- No Color. Written examination overlap during the biennial exam cycle reached about 70 percent which could result in reduced discrimination validity of operator requalification examinations. Such a large overlap does not appear to meet the intent of the guidance of ES-601, Paragraph E.3.b.(6). No evidence of a reduction of examination validity was identified.

The safety significance of this finding is very low (no color) because there was no evidence of a reduction of examination validity. The finding is more than minor and has extenuating circumstances because if left uncorrected, it has the potential for impacting the NRC’s ability to perform its regulatory function related to allowing facility requalification evaluation of licensed operator performance. (Section 1R11)

### B. Licensee Identified Findings

The inspectors reviewed one violation of very low significance which PSEG Nuclear identified related to speed limit settings for the recirculation pumps. PSEG Nuclear’s corrective actions, taken and planned, appeared reasonable. This violation is listed in Section 40A7 of this report.

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## Report Details

### **SUMMARY OF PLANT STATUS**

The Hope Creek plant operated continuously at or near full power for the duration of the inspection period except for planned power reductions on December 1 for turbine valve testing and December 4 for an offsite power line outage (New Freedom line 5023).

#### **1. REACTOR SAFETY (Cornerstones: Initiating Events, Mitigating Systems, and Barrier Integrity)**

##### R01 Adverse Weather Protection

###### a. Inspection Scope

The inspectors reviewed operations' implementation of HC.OP-AB.ZZ-0139, *Acts of Nature*, with a high wind warning in effect. The inspectors performed a walkdown of exposed portions of the protected area. In addition, the inspectors reviewed notifications involving adverse weather preparations (20047104, 20047505, 20047804, 20048748, 20049021, 20049067, 20050791, 20050917, 20051402 and 20051436).

###### b. Issues and Findings

No findings of significance were identified.

##### R04 Equipment Alignment

###### a. Inspection Scope

The inspectors performed equipment alignment verifications on redundant equipment during system outages on the B control room emergency filtration (CREF) system and the B residual heat removal (RHR) pump. The inspectors verified by plant walkdowns and main control room tours that an emergent equipment problem on B CREF and the planned outage of the B RHR pump did not adversely affect the redundant components. The inspectors also verified that the B CREF and the B RHR pump were restored to an operable condition after maintenance was complete. Additionally, the inspectors reviewed various corrective action notifications associated with equipment alignment deficiencies (20047686, 20048607, 20048796, 20048819, 20048824, 20050003, and 20051485).

###### b. Issues and Findings

No findings of significance were identified.

R05 Fire Protection

a. Inspection Scope

The inspectors reviewed Hope Creek's Individual Plant Examination for External Events (IPEEE) for risk insights and noted that the Control/Diesel Building is the most significant building, contributing 86 percent of the fire induced core damage frequency. The IPEEE specifically identifies Channel A and B switchgear rooms (rooms 5416 and 5412, respectively) as important because these are the most important channels with respect to providing electrical power to safety related equipment.

The inspectors performed walkdowns of the Channel A, B, C and D switchgear rooms (rooms 5416, 5412, 5414 and 5410, respectively) and reviewed fire protection impairment reports. Additionally, the inspectors reviewed several notifications associated with fire protection deficiencies (20047119, 20047804, 20047931, 20048254, and 20048822).

b. Issues and Findings

No findings of significance were identified.

R11 Licensed Operator Requalification

a. Inspection Scope

The inspectors reviewed the operating history from a sampling of inspection reports, licensee event reports, PSEG Nuclear notifications and orders (corrective action system documents), and the NRC plant issues matrix (PIM) from 1999 and 2000. The inspectors selected specific events which indicated possible performance deficiencies and verified that they had been appropriately incorporated and addressed in training by review of appropriate lesson plans and scenario exercises.

Samples of the written and operating exams for licensed personnel for the examinations scheduled for the weeks of December 4 and 11, 2000, were reviewed. These exams were compared for duplication of questions and differences in level of difficulty. Content of the examinations was reviewed against 10 CFR 55.59 and the NRC Examination Standards.

Records of remediation and retake examinations for all failed quizzes and examinations from the last biennial examination through the current (December 11, 2000) biennial examination were reviewed and evaluated for acceptability.

Observations were made of PSEG Nuclear's practices in administration of the operating test to one shift crew and their evaluation of crew and individual operator performance. The inspectors also assessed the simulator's performance and fidelity to the reference plant during simulator scenarios and JPM performance.

A review was conducted of training response to feedback by students and incorporation of plant and industry events into the training program for the two-year training cycle.



A sample of medical records, training attendance records, and documentation for maintaining an active license or for license reactivation were reviewed.

b. Issues and Findings

The facility guidance for written examination preparation specifies no more than 50% overlap from one exam to the next, and the exams for this biennial exam period were conservatively limited to approximately 30% overlap. The facility also ensures that questions on the biennial exam taken from segment quizzes would not be given to the same licensed operator. However, by week 5 of the exam, question reuse from prior biennial exams during the six week training segment was as high as 70%. This did not appear to meet the intent of NRC Examination Standard (ES) NUREG 1021, Revision 8, Section 601, Paragraph E.3.b.(6) guidance which states that overlap across all examinations in the two year requalification cycle should not be so high as to result in reduced discrimination validity. ES-601 does not give a specific number for acceptable overlap; a specific limit would be dependent on the specific situation at each facility.

At Hope Creek the exam bank is a closed bank, and no indications of a reduction of discrimination validity were apparent. Also, the distribution of exam grades did not rise from week to week, and the exam in the week prior to this inspection resulted in one written exam failure, additional indications of validity.

The safety significance of this finding is very low (no color) because there was no evidence of a reduction of examination validity. The finding is more than minor and has extenuating circumstances because if left uncorrected, it has the potential for impacting the NRC's ability to perform its regulatory function related to allowing facility requalification evaluation of licensed operator performance.

R12 Maintenance Rule Implementation

a. Inspection Scope

The inspectors reviewed all corrective action notifications initiated from August 1 to September 15, 2000, for maintenance rule screening. The inspectors further reviewed four notifications that included system engineer functional failure determinations (20036573, 20039142, 20039197, and 20039498), two notifications involving maintenance preventable functional failure reviews (20038035 and 20038106), and one notification involving failure to meet (a)(1) goals (20041800). The inspectors also reviewed Hope Creek Expert Panel Meeting Minutes (HCEP 00-11 and HCEP 00-12).

To assess PSEG Nuclear's implementation of 10CFR 50.65 *Maintenance Rule* requirements, the inspectors reviewed the following documents:

- SE.MR.HC.02, *System Function Level Maintenance Rule VS Risk Reference*
- NRC Regulatory Guide 1.160, *Monitoring the Effectiveness of Maintenance at Nuclear Power Plants*, Revision 2
- NUMARC 93-01, *Industry Guideline For Monitoring the Effectiveness of Maintenance at Nuclear Power Plants*, Revision 2.

b. Issues and Findings

No findings of significance were identified.

R13 Maintenance Risk Assessments and Emergent Work Control

a. Inspection Scope

The inspectors evaluated on-line risk management for emergent work concerning a B reactor recirculation pump flow anomaly, a trip of the B CREF chiller (BK400), and a high pressure coolant injection (HPCI) system jockey pump failure. The inspectors reviewed maintenance risk evaluations, work schedules, recent corrective action notifications, and control room logs to verify that other concurrent planned and emergent maintenance or surveillance activities did not adversely affect the plant risk already incurred due to this emergent work. Following the reactor recirculation pump flow anomaly, the inspectors discussed the issue with operations management and the Transient Assessment Response Plan (TARP) team leader; reviewed the system operating procedure, pertinent abnormal operating procedures, the associated Technical Issues Fact Sheet and the corrective action plan; and observed troubleshooting activities from the control room. In addition, the inspectors reviewed other notifications involving risk assessment and emergent work (20047116, 20047225, 20047265, 20047566, 20047705, 20048171, 20048391, 20049051, 20049678, and 20050885).

b. Issues and Findings

No findings of significance were identified.

R16 Operator Workarounds

a. Inspection Scope

The inspectors reviewed the operator work-around list, corrective action notifications, operator logs, and instrument panel status to evaluate potential impacts on the operators' ability to implement abnormal or emergency operating procedures.

b. Issues and Findings

No findings of significance were identified.

R17 Permanent Plant Modificationsa. Inspection Scope

On December 1, 2000, PSEG Nuclear submitted a request for increased power level to the NRC (LCR H00-05). During this inspection period, maintenance and engineering commenced installation of improved feedwater flow instrumentation needed to support the power uprate. While awaiting NRC power uprate approval (in addition to environmental permit approval and a PJM interconnection agreement), PSEG Nuclear plans to use the more accurate feedwater flow instrumentation to provide improved measurement of thermal power level. The inspectors reviewed engineering's power uprate plan for Hope Creek, discussed the modification with design engineers, observed installation of portions of the modification, and walked down accessible cabling and components. The inspectors verified that the design and licensing bases of existing plant systems were not degraded through the modification.

The inspectors reviewed the following documents during this inspection:

- Power Uprate Project Plan (PLCM-1), Revision 0
- Installation of Crossflow Meter for Flow Nozzle Correction (DCP 80010404) 10CFR50.59 Safety Evaluation

b. Issues and Findings

No findings of significance were identified.

R19 Post Maintenance Testinga. Inspection Scope

The inspectors witnessed post maintenance testing (PMT) on the C 125 Vdc 1E battery charger and the D safety auxiliaries cooling system pump. The inspectors also reviewed the completed work order and PMT for an A CREF chiller (AK400) design change (ECA 80016521). The inspectors reviewed NC.NA-TS.ZZ-0050, *Maintenance Testing Program Matrix*, and verified that the PMTs were adequate for the scope of maintenance performed. The inspectors also reviewed notifications concerning problems associated with PMTs (20048616, 20048745, 20049047, 20049787, 20049926, 20049397, 20050548, and 20051229).

The inspectors reviewed the following documents:

- Control Area Chilled Water Chiller Gas Bypass Setpoint Change (ECA 80016521)
- Control Room Chilled Water System Health Report
- 18 Month 125 Volt Battery Charger Service Test (HC.IC-ST.PK-0003)

b. Issues and Findings

No findings of significance were identified.

R22 Surveillance Testing

a. Inspection Scope

The inspectors observed portions of and reviewed the results of HPCI, emergency diesel generator, and 4160 volt feeder degraded voltage testing. The inspectors reviewed the test procedures to verify that applicable system requirements for operability were incorporated correctly into the test procedures, test acceptance criteria were consistent with the technical specification and updated final safety analysis requirements, and the systems were capable of performing their intended safety functions. The inspectors also reviewed notifications concerning problems encountered during surveillance testing (20047028, 20047101, 20047621, 20047718, 20048116, 20048212, 20048394, 20050136, 20050881, and 20051592).

The inspectors reviewed the following documents:

- HPCI Main and Booster Pump Set Inservice Test, (HC.OP-IS.BJ-0001)
- Emergency Diesel Generator CG400 Operability Test - Monthly (HC.OP-ST.KJ-0003)
- Class 1E 4.16 KV Feeder Degraded Voltage Monthly Instrumentation Channel Functional Test (HC.MD-ST.PB-0003)

b. Issues and Findings

No findings of significance were identified.

**4. OTHER ACTIVITIES [OA]**

OA1 Performance Indicator Verification

Safety System Functional Failures

a. Inspection Scope

The inspectors verified the accuracy and completeness of the data that PSEG Nuclear used to calculate and report the *Safety System Functional Failure* (SSFF) performance indicator (PI). The inspectors reviewed all Hope Creek licensee event reports dated October 1, 1999, through September 30, 2000, to determine whether issues meeting the SSFF definition in NEI 99-02 Revision 0, *Regulatory Assessment Performance Indicator Guideline*, were included in the data set. The inspectors also used NRC NUREG-1022, Revision 1, *Event Reporting Guidelines 10 CFR 50.72 and 50.73*, to assess reportability for this PI.

b. Observations and Findings

No findings of significance were identified.

## OA2 Identification and Resolution of Problems

The inspectors reviewed numerous notifications associated with PSEG Nuclear's identification, evaluation, and resolution of problems without findings and are listed in Sections 1R01, 1R04, 1R05, 1R12, 1R13, 1R16, 1R019, and 1R22 of this report.

## OA3 Event Follow-up

- .1 (Open/Closed) LER 354/2000-010-00: Reactor recirculation pump motor generator set scoop tube mechanical and electrical stop overspeed setpoints found outside of technical specification limits. When this LER was issued on November 3, PSEG Nuclear believed that they had violated Technical Specification 3.4.1.1 due to non-conservative electrical and mechanical stop settings. Subsequently on December 8, engineering determined that an instrumentation & controls technician used incorrect information (scaling data) to calibrate the GETARS computer points for reactor recirculation pump speed on both reactor recirculating pumps. Engineering determined that the electrical and mechanical high-speed stops, although scaled incorrectly, had been set at the correct values (administratively limited to 105% and 107% of core flow, respectively). Licensing planned to submit a supplement to this LER.

The inspectors reviewed engineering's root cause analysis report for this event (condition report 70010787) and discussed the issue with the reactor engineering manager. Although the technical specification limits were not violated, the potential existed to exceed the recirculation pump RPM limit, set to reduce containment vibration and vibration of piping within containment. Engineering determined that the technician used uncontrolled data to calibrate GETARS in April 1999 and that procedure HC.IC-LC.BB-0004, *M/G Set Electrical Limiter and Mechanical Stop Settings*, did not provide adequate information to verify and validate the data used.

The inspectors determined that the failure to establish an adequate procedure to control the input and verification of the recirculation pump speed limit settings is a violation of Appendix B, Criterion V, *Instructions, Procedures, and Drawings*. This violation is more than minor because if left uncorrected, it would become a more significant fuel cladding integrity concern due to the potential to allow core flow in excess of technical specification limits and threaten the minimum critical power ratio safety limit. This violation is dispositioned in Section 4OA7 of this report, as a licensee-identified violation.

- .2 (Open/Closed) LER 354/2000-011-00: Entry into Technical Specification 3.0.3 due to loss of two independent control room emergency filtration systems. This LER discussed a trip of the B control room chiller while the A control room chiller was out of service for maintenance. PSEG Nuclear entered this event into their corrective action system as notification 20043421. The inspectors reviewed this LER and identified no findings of significance. The inspectors reviewed additional aspects of this event under Sections 1R04, 1R013, and 1R019 of this inspection report.

OA4 Cross-cutting Issues

The event discussed in section 4OA3.1 of this report also had implications regarding PSEG Nuclear's human performance. Specifically, in April 1999 a technician used uncontrolled data to calibrate the GETARS computer points for reactor recirculation pump speed on both reactor recirculating pumps.

OA6 Management Meetings

Exit Meeting Summary

On January 3 the inspectors presented their overall findings to members of PSEG Nuclear management led by Mr. Dave Garchow. PSEG Nuclear management stated that none of the information reviewed by the inspectors was considered proprietary.

- OA7 Licensee Identified Violations. The following finding of very low significance was identified by PSEG Nuclear and is a violation of NRC requirements which meets the criteria of Section VI of the NRC Enforcement Policy, NUREG-1600, for being dispositioned as Non-Cited Violations (NCV):

**(NCV 05000354/2000-011-01)** Appendix B, Criterion V, *Instructions, Procedures, and Drawings*, requires that activities affecting quality be prescribed by documented instructions, procedures or drawings. PSEG Nuclear failed to establish an adequate procedure to control the input and verification of the recirculation pump speed limit settings as described in condition report 70010787.

If you deny this non-cited violation, you should provide a response with the basis for your denial, within 30 days of the date of this inspection report, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement; and the NRC Resident Inspector at the Hope Creek facility.

## SUPPLEMENTAL INFORMATION

a. Key Points of Contact

Nick Conicella, Nuclear Training Supervisor - Licensed Training  
 Mike Dammann, Maintenance Team #4 Department Lead  
 Archie Faulkner, Operations Superintendent  
 Bud Havens, Licensed Operator Requalification Program Coordinator  
 Don Jackson, Manager, Nuclear Training  
 Brooke Knieriem, Licensing Engineer  
 Kurt Krueger, Operations Manager  
 Mike Mohney, System Engineering Manager  
 Devon Price, Assistant Operations Manager  
 Jim Reid, Operations Training Manager  
 Gabor Salamon, Licensing Manager  
 Larry Wagner, Work Management Department Lead

b. List of Items Opened, Closed, and Discussed

Opened/Closed

05000354/2000-010-00	LER	Reactor recirculation pump motor generator set scoop tube mechanical and electrical stop overspeed setpoints found outside of technical specification limits. (Section 4OA3.1)
05000354/2000-011-00	LER	Entry into Technical Specification 3.0.3 due to loss of two independent control room emergency filtration systems. (Section 4OA3.2)
05000354/2000-011-01	NCV	Failure to establish an adequate procedure to control the input and verification of the recirculation pump speed limit settings. (Section 4OA7)

c. List of Documents Reviewed

In addition to the documents identified in the body of this report, the inspectors reviewed the following documents and records:

Hope Creek Generating Station (HCGS) Updated Final Safety Analysis Report  
 Technical Specification Action Statement Log (SH.OP-AP.ZZ-108)  
 HCGS NCO Narrative  
 HCGS Plant Status Report  
 HCGS PSA Risk Evaluation Forms for Work Week Nos. 149 - 155  
 Reactor Recirculation System Operation, (HC.OP-SO.BB-0002)  
 Recirculation Pump Trip, (HC.OP-AB.ZZ-0112)  
 Positive Reactivity Addition, (HC.OP-AB.ZZ-0204)  
 M/G Set Electrical Limiter and Mechanical Stop Settings, (HC.IC-LC.BB-0004)

d. List of Acronyms

CREF	Control Room Emergency Filtration
ES	Examination Standard
HCGS	Hope Creek Generating Station
HPCI	High Pressure Coolant Injection
IPEEE	Individual Plant Examination For External Events
NCV	Non-cited Violation
NRC	Nuclear Regulatory Commission
PARS	Publicly Available Records
PI	Performance Indicator
PIM	Plant Issues Matrix
PMT	Post Maintenance Testing
PSEG	Public Service Electric Gas
RHR	Residual Heat Removal
SDP	Significance Determination Process
SSFF	Safety System Functional Failure
TARP	Transient Assessment Response Plan



## ATTACHMENT 1

### NRC's REVISED REACTOR OVERSIGHT PROCESS

The federal Nuclear Regulatory Commission (NRC) recently revamped its inspection, assessment, and enforcement programs for commercial nuclear power plants. The new process takes into account improvements in the performance of the nuclear industry over the past 25 years and improved approaches of inspecting and assessing safety performance at NRC licensed plants.

The new process monitors licensee performance in three broad areas (called strategic performance areas): reactor safety (avoiding accidents and reducing the consequences of accidents if they occur), radiation safety (protecting plant employees and the public during routine operations), and safeguards (protecting the plant against sabotage or other security threats). The process focuses on licensee performance within each of seven cornerstones of safety in the three areas:

<b>Reactor Safety</b>	<b>Radiation Safety</b>	<b>Safeguards</b>
<ul style="list-style-type: none"><li>● Initiating Events</li><li>● Mitigating Systems</li><li>● Barrier Integrity</li><li>● Emergency Preparedness</li></ul>	<ul style="list-style-type: none"><li>● Occupational</li><li>● Public</li></ul>	<ul style="list-style-type: none"><li>● Physical Protection</li></ul>

To monitor these seven cornerstones of safety, the NRC uses two processes that generate information about the safety significance of plant operations: inspections and performance indicators. Inspection findings will be evaluated according to their potential significance for safety, using the Significance Determination Process, and assigned colors of GREEN, WHITE, YELLOW or RED. GREEN findings are indicative of issues that, while they may not be desirable, represent very low safety significance. WHITE findings indicate issues that are of low to moderate safety significance. YELLOW findings are issues that are of substantial safety significance. RED findings represent issues that are of high safety significance with a significant reduction in safety margin.

Performance indicator data will be compared to established criteria for measuring licensee performance in terms of potential safety. Based on prescribed thresholds, the indicators will be classified by color representing varying levels of performance and incremental degradation in safety: GREEN, WHITE, YELLOW, and RED. GREEN indicators represent performance at a level requiring no additional NRC oversight beyond the baseline inspections. WHITE corresponds to performance that may result in increased NRC oversight. YELLOW represents performance that minimally reduces safety margin and requires even more NRC oversight. And RED indicates performance that represents a significant reduction in safety margin but still provides adequate protection to public health and safety.

The assessment process integrates performance indicators and inspection so the agency can reach objective conclusions regarding overall plant performance. The agency will use an Action Matrix to determine in a systematic, predictable manner which regulatory actions should be taken based on a licensee's performance. The NRC's actions in response to the significance (as represented by the color) of issues will be the same for performance indicators as for inspection findings. As a licensee's safety performance degrades, the NRC will take more and increasingly significant action, which can include shutting down a plant, as described in the Action Matrix.

More information can be found at: <http://www.nrc.gov/NRR/OVERSIGHT/index.html>.