UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
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ATLANTA, GEORGIA 30303-1257

May 13, 2011

Mr. Regis T. Repko
Vice President
Duke Energy Carolinas, LLC
McGuire Nuclear Station
MG01VP/12700 Hagers Ferry Road
Huntersville, NC 28078

SUBJECT: MCGUIRE NUCLEAR STATION - NRC TEMPORARY INSTRUCTION 2515/183 INSPECTION REPORT 05000369/2011008, 05000370/2011008

Dear Mr. Repko:

On April 29, 2011, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at your McGuire Nuclear Station using Temporary Instruction 2515/183, "Follow-up to the Fukushima Daiichi Nuclear Station Fuel Damage Event." The enclosed inspection report documents the inspection results which were discussed on May 11, 2011, with you and other members of your staff.

The objective of this inspection was to promptly assess the capabilities of McGuire to respond to extraordinary consequences similar to those that have recently occurred at the Japanese Fukushima Daiichi Nuclear Station. The results from this inspection, along with the results from this inspection performed at other operating commercial nuclear plants in the United States, will be used to evaluate the U.S. nuclear industry's readiness to safely respond to similar events. These results will also help the NRC to determine if additional regulatory actions are warranted.

All of the potential issues and observations identified by this inspection are contained in this report. The NRC's Reactor Oversight Process will further evaluate any issues to determine if they are regulatory findings or violations. Any resulting findings or violations will be documented by the NRC in a separate report. You are not required to respond to this letter.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS), accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html (the Public Electronic Reading Room).

Sincerely,

/RA/

Jonathan H. Bartley, Chief
Reactor Projects Branch 1
Division of Reactor Projects

Docket Nos.: 50-369, 50-370
License Nos.: NPF-9, NPF-17

Enclosure: 05000369/2011008, 05000370/2011008
w/Attachment: Supplemental Information

cc w/encl: (See page 3)

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Letter to Regis T. Repko from Jonathan H. Bartley dated May 13, 2011

SUBJECT: MCGUIRE NUCLEAR STATION - NRC TEMPORARY INSTRUCTION 2515/183 INSPECTION REPORT 05000369/2011008, 05000370/2011008

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U. S. NUCLEAR REGULATORY COMMISSION

REGION II

Docket Nos:	50-369, 50-370
License Nos:	NPF-9, NPF-17
Report No:	05000369/2011008, 05000370/2011008
Licensee:	Duke Energy Carolinas, LLC
Facility:	McGuire Nuclear Station, Units 1 and 2
Location:	Huntersville, NC 28078
Dates:	March 23, 2011, through April 29, 2011
Inspectors:	J. Heath, Resident Inspector
Approved by:	Jonathan H. Bartley, Chief Reactor Projects Branch 1 Division of Reactor Projects

Enclosure

INSPECTION RESULTS

IR 05000369/2011-008, 05000370/2011-008; 03/23/2011 – 04/29/2011; McGuire Nuclear Station, Units 1 and 2; Temporary Instruction 2515/183, Follow-up to the Fukushima Daiichi Nuclear Station Fuel Damage Event

This report covers an announced Temporary Instruction (TI) inspection conducted by the resident inspectors. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process."

INSPECTION SCOPE

The intent of the TI is to provide a broad overview of the industry's preparedness for events that may exceed the current design basis for a plant. The focus of the TI was on (1) assessing the licensee's capability to mitigate consequences from large fires or explosions on site, (2) assessing the licensee's capability to mitigate station blackout (SBO) conditions, (3) assessing the licensee's capability to mitigate internal and external flooding events accounted for by the station's design, and (4) assessing the thoroughness of the licensee's walk downs and inspections of important equipment needed to mitigate fire and flood events to identify the potential that the equipment's function could be lost during seismic events possible for the site. If necessary, a more specific follow-up inspection will be performed at a later date.

INSPECTION RESULTS

All of the potential issues and observations identified by this inspection are contained in this report. The NRC's Reactor Oversight Process will further evaluate any issues to determine if they are regulatory findings or violations. Any resulting findings or violations will be documented in a separate report.

03.01 Assess the licensee's capability to mitigate conditions that result from beyond design basis events, typically bounded by security threats, committed to as part of NRC Security Order Section B.5.b issued February 25, 2002, and severe accident management guidelines (SAMGs) and as required by Title 10 of the Code of Federal Regulations (10 CFR) 50.54(hh). Use Inspection Procedure (IP) 71111.05T, "Fire Protection (Triennial)," Section 02.03 and 03.03 as a guideline. If IP 71111.05T was recently performed at the facility the inspector should review the inspection results and findings to identify any other potential areas of inspection. Particular emphasis should be placed on strategies related to the spent fuel pool. The inspection should include, but not be limited to, an assessment of any licensee actions to:

Licensee Action	*Describe what the licensee did to test or inspect equipment.*
a. Verify through test or inspection that equipment is available and functional. Active equipment shall be tested and passive equipment shall be walked down and inspected. It is not expected that permanently installed equipment that is tested under an existing regulatory testing program be retested. This review should be done for a reasonable sample of mitigating strategies/equipment.	The licensee inspected installed and portable support equipment used for implementation of B.5.b mitigation strategies to ensure proper inventories and readiness of fire brigade equipment in selected storage areas. The equipment inspected included fire equipment located in both the turbine building and auxiliary building storage areas, existing outside fire water supply hydrants and hose stations, interior fire water supply piping, the diesel-driven portable pumps, hose equipment, and pre-fabricated B.5.b adapters and tools. The inspection included partial performance of the annual Hale pump test.
	Describe inspector actions taken to confirm equipment readiness (e.g., observed a test, reviewed test results, discussed actions, reviewed records, etc.).
	The inspectors evaluated through walkdowns, the adequacy of permanently installed and portable equipment staged explicitly for implementation of B.5.b mitigation strategies. The inspectors' walkdowns included interior and exterior firefighting equipment staged for B.5.b commitments located onsite.
	Discuss general results including corrective actions by licensee.
	All active and passive B.5.b mitigation equipment was verified to be in place and ready for use. The portions of the Hale pump test that were performed revealed no issues. Selected vendor-supported functions were not performed (pump flow verification, battery checks, gauge verification). The annual full performance test which included vendor-supported sections was last performed in October 2010.

		Attempts to run the Godwin portable sump pump were unsuccessful on initial attempts due to a failed battery. The vendor was notified, the battery was replaced, and the pump was successfully started. The Godwin portable sump pump was inspected but flow tests were not performed because the pump was staged for use to support Unit 2 outage activities. The pump vendor performs preventative pump maintenance on a three month interval. The maintenance was modified to include a battery check and diesel start. In addition, the licensee was evaluating adding a quarterly performance test.
Licensee Action		*Describe the licensee's actions to verify that procedures are in place and can be executed (e.g. walkdowns, demonstrations, tests, etc.)*
b. Verify through walkdowns or demonstration that procedures to implement the strategies associated with B.5.b and 10 CFR 50.54(hh) are in place and are executable. Licensees may choose not to connect or operate permanently installed equipment during this verification. This review should be done for a reasonable sample of mitigating strategies/equipment.		The licensee verified procedures that could be used for B.5.b or severe accident mitigations. The scope of those procedures included applicable abnormal (AP), response (RP), and operating (OP) procedures, extensive damage mitigation (EDM) guidelines and SAMGs. The licensee performed tabletops and walkdowns to validate that these procedures could be successfully implemented.
		Describe inspector actions and the sample strategies reviewed. Assess whether procedures were in place and could be used as intended.
		The inspectors reviewed a sample of the licensee's B.5.b mitigation procedures to independently verify procedures were in place, current, and executable. In addition, the inspectors independently performed field walkdowns of several of the licensee's tabletop walkthroughs for B.5.b mitigation actions. The scope of the independent walkdowns included several of the licensee's EDM strategies. The EDM guidelines provided initial operator actions to respond to onsite events involving large fires, explosions, and loss of ability to maintain spent fuel pool cooling under specific conditions. The EDM review included walkdowns of the spent fuel pool and outside yard area to verify equipment was in place and that implementation strategies were reasonable. The inspectors identified that several APs incorrectly referenced the staging location of the Godwin sump pump. There was reasonable assurance that the Godwin sump pump could be located and was available for use. This issue was previously identified by the licensee and was entered into their corrective action program (CAP).

		Discuss general results including corrective actions by licensee.
		The procedures reviewed were determined to be executable and the support equipment specified was appropriate. The licensee's review of SAMG strategies related to B.5.b did not identify any significant issues, however, several procedural enhancements specific to implementation of SAMG strategies were identified.
Licensee Action		*Describe the licensee's actions and conclusions regarding training and qualifications of operators and support staff.*
c. Verify the training and qualifications of operators and the support staff needed to implement the procedures and work instructions are current for activities related to Security Order Section B.5.b and severe accident management guidelines as required by 10 CFR 50.54 (hh).		The licensee verified qualifications of the Emergency Response Organization (ERO), Fire Brigade, and training records of individuals qualified to the five Technical Support Center (TSC) positions that require biennial SAMG and B.5.b training. The licensee also verified that Security personnel training qualifications were up to date. Operations (Ops) verified personnel qualifications to Hale pump, Godwin Pump, SAMGs, and EP/APs. Ops also verified operations personnel were qualified to fire protection procedures and procedures related to fire and sabotage events.
		Describe inspector actions and the sample strategies reviewed to assess training and qualifications of operators and support staff
		The inspectors performed a review of licensee-provided qualifications records for operations personnel to operate systems and equipment related to B.5.b and SAMG event response. Specific required systems and equipment qualifications reviewed included the standby shutdown facility (SSF), Hale pump, halon fire protection, and qualifications required by Operations personnel to perform selected activities specific to the Auxiliary Building and Turbine Building following fire or sabotage events. The review also included verification of all Fire Brigade qualifications along with Security personnel qualified to B.5.b functions.
		Discuss general results including corrective actions by licensee.
		Licensee reviews determined that all training and qualification requirements for personnel in ERO, Ops, Fire Brigade, and Security were satisfactory and up-to-date. No issues were identified or corrective actions taken with respect to B.5.b and SAMG training.

Licensee Action		
		Describe the licensee's actions and conclusions regarding applicable agreements and contracts are in place.
d. Verify that any applicable agreements and contracts are in place and are capable of meeting the conditions needed to mitigate the consequences of these events. This review should be done for a reasonable sample of mitigating strategies/equipment.		The licensee identified applicable contracts and agreements committed to be in place for the mitigation of a B.5.b related event. The licensee has a contract for diesel fuel oil delivery. In addition to the contracts, the licensee has Memorandums of Understanding (MOUs) in place with several offsite agencies for support during an emergency.
		For a sample of mitigating strategies involving contracts or agreements with offsite entities, describe inspector actions to confirm agreements and contracts are in place and current (e.g., confirm that offsite fire assistance agreement is in place and current).
		The inspectors verified by review of the contract agreement for diesel fuel oil supply to the Lincoln Combustion Turbine facility that it was current, and appeared to meet the licensee's mitigation strategy. The inspectors also discussed several MOUs with surrounding county emergency management divisions and determined that those agreements were in place and current.
		Discuss general results including corrective actions by licensee.
		All vendor contracts identified were determined to be in place and current. The licensee verified the following MOUs were current: • Fire Departments (Mecklenburg, Cornelius Volunteer, Huntersville) • County Emergency Management (Iredell, Lincoln, Gaston, Catawba, Cabarrus) • North Carolina State Emergency • Institute of Nuclear Power Operations • Department of Energy • Oak Ridge Radiation Emergency Assistance Center

Licensee Action		
		Document the corrective action report number and briefly summarize problems noted by the licensee that have significant potential to prevent the success of any existing mitigating strategy.

e. Review any open corrective action documents to assess problems with mitigating strategy implementation identified by the licensee. Assess the impact of the problem on the mitigating capability and the remaining capability that is not impacted.		There were no issues identified by the licensee that have the significant potential to prevent the success of the existing mitigation strategies.

03.02 Assess the licensee's capability to mitigate station blackout (SBO) conditions, as required by 10 CFR 50.63, "Loss of All Alternating Current Power," and station design, is functional and valid. Refer to TI 2515/120, "Inspection of Implementation of Station Blackout Rule Multi-Plant Action Item A-22" as a guideline. It is not intended that TI 2515/120 be completely reinspected. The inspection should include, but not be limited to, an assessment of any licensee actions to:		
Licensee Action		*Describe the licensee's actions to verify the adequacy of equipment needed to mitigate an SBO event.*
a. Verify through walkdowns and inspection that all required materials are adequate and properly staged, tested, and maintained.		All equipment that is relied upon to mitigate a SBO is permanently installed plant equipment. There is no staged equipment. The licensee verified through walkdowns that all equipment required to handle an SBO event was adequate and functional. The walkdowns were performed using SBO response procedures. The walkdowns included all components in the SSF, associated switchgear, and transfer bunkers located in the safety-related switchgear rooms. The licensee reviewed safety bus crosstie alignments and reviewed their Work Management System for any functional deficiencies that could affect SBO equipment.

		Describe inspector actions to verify equipment is available and useable.
		The inspectors performed independent walkdowns of the SSF and safety-related 4160V switchgear rooms to verify that the material condition of the equipment was adequate to ensure functionality.
		Discuss general results including corrective actions by licensee.
		No issues were identified or corrective actions taken with respect to the adequacy of equipment needed to mitigate an SBO event. In general, all installed plant systems required to respond to an SBO were found to be capable of performing their respective SBO design functions.
Licensee Action		*Describe the licensee's actions to verify the capability to mitigate an SBO event.*
b. Demonstrate through walkdowns that procedures for response to an SBO are executable.		See 03.02.a. The licensee reviewed procedures for SBO response by completing walkdowns, tabletop reviews, and document reviews to ensure the procedures were effective for the procedure scope and executable. The procedures reviewed included APs and EPs for loss of AC power, generator and grid disturbances, and SSF operation. The licensee also reviewed and walked down alternative strategy procedures that could be used to mitigate SBO events. These alternative strategies were beyond SBO and not required.
		Describe inspector actions to assess whether procedures were in place and could be used as intended.
		The inspectors independently reviewed a sample of the above procedures for SBO to verify they were in place, current and executable. In addition to the required procedures, the inspectors reviewed the licensee's alternative strategies for restoring power to a safety-related bus and walked down the relative equipment to verify the procedures were executable.
		Discuss general results including corrective actions by licensee.
		There were no issues identified by the licensee that had the potential to have a significant impact on the mitigation of an SBO event.

03.03 Assess the licensee's capability to mitigate internal and external flooding events required by station design. Refer to IP 71111.01, "Adverse Weather Protection," Section 02.04, "Evaluate Readiness to Cope with External Flooding" as a guideline. The inspection should include, but not be limited to, an assessment of any licensee actions to verify through walkdowns and inspections that all required materials and equipment are adequate and properly staged. These walkdowns and inspections shall include verification that accessible doors, barriers, and penetration seals are functional.		
Licensee Action		*Describe the licensee's actions to verify the capability to mitigate existing design basis flooding events.*
a. Verify through walkdowns and inspection that all required materials are adequate and properly staged, tested, and maintained.		The licensee performed a tabletop of APs and alternative strategies for mitigating flood events. Walk downs were performed for sections of the procedures/guidelines that required local actions. For external flooding mitigation, the licensee walked the yard drain system, even though the system is not credited to mitigate an external flood event. The licensee's review also included the evaluation of flood barriers and mitigation equipment that could be affected by a seismic event. Active equipment (including instrumentation) routinely tested and inspected under existing PMs was not included in the walkdowns. The licensee verified that those PMs were current.
		Describe inspector actions to verify equipment is available and useable. Assess whether procedures were in place and could be used as intended.
		The design basis for internal flooding relies on the isolation of the leak source to limit the flood levels within the Auxiliary and Turbine buildings. The inspectors sampled portions of the internal flooding AP to determine that they were able to be implemented. This sampling included walkdowns of the Turbine and Auxiliary buildings to ensure that required flood barriers were intact. The inspectors also walked down the site yard area for deficiencies that could compromise the mitigation strategy for an external flooding event. The inspectors also reviewed engineering calculations against Design Basis Documents to validate calculations for both internal and external flooding events. The inspectors determined that the procedures were in place and useable.
		Discuss general results including corrective actions by licensee.
		All equipment necessary for internal and external flood mitigation was verified to be in its designated storage location and in good working condition. There were no issues identified associated with active equipment required for flood detection.

03.04 Assess the thoroughness of the licensee's walkdowns and inspections of important equipment needed to mitigate fire and flood events to identify the potential that the equipment's function could be lost during seismic events possible for the site. Assess the licensee's development of any new mitigating strategies for identified vulnerabilities (e.g., entered it in to the corrective action program and any immediate actions taken). As a minimum, the licensee should have performed walkdowns and inspections of important equipment (permanent and temporary) such as storage tanks, plant water intake structures, and fire and flood response equipment; and developed mitigating strategies to cope with the loss of that important function. Use IP 71111.21, "Component Design Basis Inspection," Appendix 3, "Component Walkdown Considerations," as a guideline to assess the thoroughness of the licensee's walkdowns and inspections.	
Licensee Action	*Describe the licensee's actions to assess the potential impact of seismic events on the availability of equipment used in fire and flooding mitigation strategies.*
a. Verify through walkdowns that all required materials are adequate and properly staged, tested, and maintained.	The licensee performed walkdowns of permanently installed and portable firefighting and suppression equipment for possible interactions that could be affected following a seismic event. As part of the assessment, the licensee identified mitigation strategies would be appropriate to address seismic vulnerabilities associated with fire and flood protection equipment.
	Describe inspector actions to verify equipment is available and useable. Assess whether procedures were in place and could be used as intended.
	The inspectors reviewed the list of fire and flood mitigation equipment and features included in the licensee's assessment to verify the scope of the assessment was adequate. As part of the review, the inspectors walked down the outside yard area relating to fire and flood protection to verify the licensee's assessment. The inspectors determined that the procedures were in place and useable.

		Discuss general results including corrective actions by licensee. Briefly summarize any new mitigating strategies identified by the licensee as a result of their reviews.
		The following issues were identified: • Interior/Exterior fire protection systems (RF/RY) and equipment were not seismically designed. There were no contingencies in place to provide firefighting water in the event of a loss of all RF/RY due to a seismic event. • Appendix R fire equipment, which includes the SSF, and supporting firefighting and suppression equipment were not seismically qualified and therefore not credited to function following a design basis earthquake. • The Hale pump may be in use performing its B.5.b. function and may not be available for firefighting. • Hale pump and Godwin pump were located across a non-seismic bridge in non-seismic structures. • Several hose carts were stored between two non-seismic buildings • There were no debris removal procedures in place and therefore onsite motor vehicles relied upon to transport portable plant equipment following a seismic event may be immobilized. • Procedures were not written to remove beyond design basis flood water from the Auxiliary and Turbine Buildings. In addition to purchasing additional support equipment, plans for developing mitigating strategies to address these issues are under evaluation and completion dates have not been identified.

Meetings

Exit Meeting

On May 11, 2011, the inspectors presented the inspection results to Mr. Regis Repko, McGuire Vice President, and other members of licensee management. The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

SUPPLEMENTAL INFORMATION

KEY POINTS OF CONTACT

Licensee

K. Ashe, Manager, Regulatory Compliance
D. Black, Security Manager
D. Brenton, Superintendent, Plant Operations
D. Brewer, Manager, Safety Assurance
S. Capps, Station Manager
K. Crane, Regulatory Compliance
C. Curry, Engineering Manager
R. Repko, Site Vice President, McGuire Nuclear Station

LIST OF DOCUMENTS REVIEWED

The following is a list of documents reviewed during the inspection. Inclusion on this list does not imply that the NRC inspectors reviewed the documents in their entirety but rather that selected sections of portions of the documents were evaluated as part of the overall inspection effort. Inclusion of a document on this list does not imply NRC acceptance of the document or any part of it, unless this is stated in the body of the inspection report.

03.01 Assess the licensee's capability to mitigate conditions that result from beyond design basis events

Number	Description or Title	Date or Revision
PT/0/A/4400/019	Hale Portable Pump Quarterly	002
PT/0/A/4400/020	Hale Portable Pump Annual	004
PT/0/A/4600/112	Exterior/Interior Fire Equipment Inspection	007
OP/0/B/6400/019	Godwin Portable Sump Pump Operation	003
TSC	Site Threat Alternate Alignments and Strategies	Vol. 2
OP/0/A/6100/020	Operational Guidelines Following a Fire in the Aux. Bldg	023
OP/0/A/6100/021	Shutdown Outside the control room following a Fire	019
AP/1/A/5500/041	Loss of Spent Fuel Cooling or Level	009
AP/0/A/5500/044	Plant Flooding	009
AP/0/A/5500/047	Security Events	007
AP/0/A/5500/048	Extensive Damage Mitigation	003
RP/0/A/5700/006	Natural Disaster	022
RP/0/A/5700/007	Earthquake	019
RP/0/A/5700/008	Release of Toxic or Flammable Gases	006
AP/0/A/5500/045	Plant Fire	012
PT/0/B/4600/118	Fire Brigade	003
Emergency Plan	Support agreements in place with local fire departments, county emergency management, NC state, INPO, DOE and Oak Ridge	2010

PIP M-11-2188	Fukushima Daiichi nuclear station fuel damage caused by earthquake	3/16/11
PIP M-11-2382	Godwin portable sump pump did not start due to dead battery	3/21/11
PIP M-11-2502	MNS did not complete recommended INPO IER tasks related to Fukushima event on schedule	3/24/11
PIP M-11-2517	Discrepancies noted during performance of Exterior/Interior Fire Equipment Inspection	3/24/11
PIP M-11-2562	INPO event report requested licensee evaluate equipment for beyond design basis events, MNS needs to evaluate equipment and storage	3/25/11
PIP M-11-2725	Yard drain blocked by sandbags and steel plate	3/30/11
PIP M-11-2901	B.5.b fire hoses manufactured in 2007 have not been hydrostatically tested	4/5/11
PIP M-11-3154	PIP should have been written to capture a gap found during the development of the response to IER 11-1 vs. including the item in an existing PIP CA	4/14/11

03.02 Assess the licensee's capability to mitigate station blackout (SBO) conditions

Number	Description or Title	Date or Revision
Eng.	Review safety bus cross unit alignment impairments	NA
TSC Vol.2	Alternate Means to Restore Essential Power to 4160V Bus, Encl. 11	028
EP/1/A/5000/ECA 0.0	Loss of all AC power	028
AP/1/A/5500/05	Generator Voltage and Electric Grid Disturbances	008
AP/1/A/5500/007	Loss of Electrical Power	029
3/17	Fire Impairment Logs – Active Entries	

03.03 Assess the licensee's capability to mitigate internal and external flooding events required by station design

Number	Description or Title	Date or Revision
AP/0/A/5500/044	Plant Flooding	008
MCS-1465.00-00-0012	DBD for Flooding from External Sources	001
MCC-1206.47-69-1001	Auxiliary Building Flooding Analysis	015

03.04 Assess the thoroughness of the licensee's walkdowns and inspections of important equipment needed to mitigate fire and flood events to identify the potential that the equipment's function could be lost during seismic events

Number	Description or Title	Date or Revision
MCS-1569.RF-00-0001	Design Basis Specification (DBD) for the RF/RY System	019
MCS-1465.00-00-0012	DBD for Flooding from External Sources	001
MCS-1465.00-00-0009	DBD for Seismic Design	000
MCC-1206.47-69-1001	Auxiliary Building Flooding Analysis	015

LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management System
AP	Abnormal Procedure
CAP	Corrective Action Program
CFR	Code of Federal Regulations
EDM	Extensive Damage Mitigation
EP	Emergency Procedure
ERO	Emergency Response Organization
MOU	Memorandum of Understanding
NRC	United States Nuclear Regulatory Commission
OP	Operating Procedure
Ops	Operations
PIP	Problem Investigation Program
RF/RY	Interior/Exterior fire protection systems
RP	Response Procedure
SAMG	Severe Accident Mitigation Guidelines
SBO	Station Blackout
SSF	standby shutdown facility
TSC	Technical Support Center