Summary of Changes

This summary of changes is a synopsis of the NRC Requests for additional Information (RAI) and the FCS response to those requests. A detailed version of the response can be found in LIC-17-0047 that was submitted to the NRC on May 15, 2017. The NRC **approved** the Permanently Defueled Emergency Plan (PDEP) based on FCS response to the RAI's on December 12th, 2017 by Amendment No. 295 effective April 7, 2018 and this amendment shall be implemented within 90 days of the effective date. PORC approved the PDEP submitted to the NRC on December 16, 2016 and this summary only covers changes made since that time. NOTE: No changes were made to EP-FC-1001 Addendum 3 other that adding the procedure number to the top of each page. The content of EP-FC-1001 Addendum 3 remains the same as the initial submittal and was previously approved by PORC.

Editorial changes are also being made in addition to the RAI's. USAR was changed to DSAR in Section 4.2. Dosimeter chargers was removed from section 8.4.2, Dosimetry Kits, to align with dosimetry utilized on site.

RAI Summary:

(NRC) FCS-RAI-1 - One of the considerations for the granting of the exemptions is that FCS maintains the equipment, procedures and personnel for implementation of SFP mitigation strategies in the unlikely event of a beyond design-basis-accident. Please provide a basis for this statement or revise the application to align.

FCS Response: FCS maintains procedures and strategies for the movement of any necessary portable equipment that will be relied upon for mitigating the loss of Spent Fuel Pool (SFP) water. These diverse strategies provide defense-in-depth and ample time to provide makeup water or spray to the SFP prior to the onset of zirconium cladding.

For clarity, the reference to "additional compensatory actions" has been removed.

(NRC) FCS-RAI-2 - Please update the application accordingly, to reflect current Federal guidance provided in EPA-400/R-17/001 (January 2017) (ADAMS Accession No. ML17044A073).

FCS Response: The proposed PDEP has been revised to address current Federal guidance provided in EPA-400/R-17/001.

(NRC) FCS-RAI-3 - Please provide any documentation of discussions with the State of Iowa and Harrison County indicating agreement that notification of an emergency declaration or change in classification is not required, as well as notification of whether a radiological release is taking place.

FCS Response: PDEP Sections 4, 5, and 16 were updated to add the State of Iowa to the notification.
Reviewer Note: References to notifying the counties was removed throughout the PDEP to align with FCS's response that the States of Nebraska and Iowa will provide notification to Washington County (Nebraska) and Harrison County (Iowa).

(NRC) FCS-RAI-4 – "Emergency action levels shall be reviewed with the State and local government authorities on an annual basis." Please provide additional clarification (see Exemption RAI-002).

FCS Response: FCS will continue to include the State of Iowa and Harrison County in the annual EAL review. Corresponding changes have been made to the proposed PDEP in section 16. Reviewer note: The State of Iowa and Harrison County had were not included on the initial submittal.

(NRC) FCS-RAI-5 – There is no reference to any personnel specifically assigned to perform SFP inventory makeup strategies in the proposed PDEP. Please explain who performs SFP inventory makeup strategies.

FCS Response: Table 2.1, "On-Shift and Emergency Response Organization Staffing Requirements," includes an "*" next to the Non-Certified Operator (NCO), Shift Manager (SM), and the on-shift Radiation Protection Technician indicating these positions are on-shift personnel required to direct or perform site-specific mitigation strategies required for a catastrophic loss of SFP inventory.

(NRC) FCS-RAI-6 – Please clarify if Blair Hospital provides medical treatment of patients from FCS who have injuries complicated by radioactive contamination, and revise PDEP accordingly to reflect capability.

FCS Response: Sections 3.1.4 and 12.0 of the proposed PDEP have been revised to clarify that Blair Hospital does not provide medical treatment for radiologically contaminated injuries and radiation exposure.

(NRC) FCS-RAI-7 – Please clarify why references to the letters of agreement, identifying the specific organizations, are not included as an Appendix to the proposed PDEP, or revise accordingly.

FCS Response: Rather than include the listing in an appendix to the proposed PDEP, details of offsite response organization responsibilities are described in Section 3.0 of the proposed PDEP. Letters of Agreement between each organization and OPPD and maintained by the EP department.

(NRC) FCS-RAI-8 – NUREG-0654 Criteria E.4, in Attachment 1 to NSIR/DPR-ISG-02, states: The licensee, in coordination with State and local organizations, shall establish the contents of the emergency messages to be sent from the nuclear facility. A detailed listing was not included.

FCS Response: Section 5.1.2 of the proposed PDEP has been revised to include the information contained in Criteria E.4 of NUREG-0654.

(NRC) FCS-RAI-9 – No reference to NUREG-0654 Criterion K.3.a and b could be found in Section 11.0

FCS Response: Section 11.2 of the proposed PDEP has been revised to address the information contained in Criteria K.3.a and b of NUREG-0654

(NRC) FCS-RAI-10 – No reference to NUREG-0654 Criterion K.5.a and b could be found in Section 11.0

FCS Response: Section 11.3 of the proposed PDEP has been revised to address the information contained in Criteria K.5.a and b of NUREG-0654

(NRC) FCS-RAI-11 - Please provide a description of the methods of communications to be used between FCS and Blair Hospital and the University of Nebraska Medical Center.

FCS Response: Section 12.0 of the proposed PDEP has been revised, and Section 6.3 (Communications with Medical Support Facilities) have been added to the proposed PDEP.

(NRC) FCS-RAI-12 - It appears that the PDEP does not address Blair Hospital as also being invited to participate in the annual exercise and/or scheduled drill(s).

FCS Response: For clarity, Section 14.2.1 of the proposed PDEP has been revised to state that the ambulance service is invited to participate in the annual exercise and/or scheduled drill.

(NRC) FCS-RAI-13 - "Training for individuals assigned to licensee first aid teams shall include courses equivalent to Red Cross First Aid, CPR, AED for Lay Responders or equivalent." Please provide further information on who these personnel are on-shift (e.g., is duty performed as a collateral function), and what level and frequency of training they are given.

FCS Response: Table 2.1 of the proposed PDEP has been revised to indicate that the first aid duties are assigned to on-shift personnel assigned other functions. Additionally, Section 15.0 of the proposed PDEP has been revised to include a section on first aid training (new Section 15.1.4). Reviewer Note: Updates in First Aid Training approved in Rev 3 of EP-FC-1001 were also incorporated into this procedure change and was previously approved by PORC.

(NRC) FCS-RAI-14 - Section 16.0, "Responsibility for the Planning Effort: Periodic Review and Distribution of Emergency Plans," of Enclosure 1 does not specifically address these criteria. Please explain why.

FCS Response: - Section 16 of the proposed PDEP has been revised to specifically refer to the Emergency Planning Manager as the position responsible for the development and updating of emergency plans and coordination of emergency planning activities with off-site response organizations.

References:

1. LIC-17-0047, FCS Response to Request for Additional Information (RAI)

2. NRC Docket No. 50-285 OPPD FCS Unit No. 1 EP Exemption (ML17263B198)

3. NRC Amendment No. 295 to License No. DRP-40 PDEP and EAL approval (ML17276B286)

4. Letter from OPPD (S. M. Marik) to USNRC (Document Control Desk), "License Amendment Request 16-07: Revise the Fort Calhoun Station Emergency Plan to the Permanently Defueled Emergency Plan and Permanently Defueled Emergency Action Level Scheme" dated December 16, 2016 (LIC-16-0108) (ML16351A464) (CAC MF8951)

5. OPPD Letter (S. Marik) to USNRC (Document Control Desk) – "Request for Exemptions from Portions of 10 CFR 50.47 and 10 CFR Part 50, Appendix E," dated December 16, 2016 (LIC-16-0109) (ML16356A578) (CAC MF9067)

6. Letter from OPPD (S. M. Marik) to USNRC (Document Control Desk), "License Amendment Request (LAR) 16-02: Revise the Fort Calhoun Station Emergency Plan to Address the Permanently Defueled Condition," dated September 2, 2016 (LIC-16-0076) (ML16246A321) (CAC MF8326)

OPPD NUCLEAR

PERMANENTLY DEFUELED EMERGENCY PLAN FOR FORT CALHOUN STATION

OMAHA PUBLIC POWER DISTRICT
FORT CALHOUN STATION
PERMANENTLY DEFUELED EMERGENCY PLAN

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COMMITMENTS

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1.0 INTRODUCTION

The Permanently Defueled Emergency Plan (PDEP) describes the plan for responding to emergencies that may arise at Fort Calhoun Station (FCS), while in a permanently shut down and defueled configuration. FCS has provided certification to the U.S. Nuclear Regulatory Commission (NRC) required by 10 Code of Federal Regulation (CFR) 50.82(a)(1)(i) and (ii) that FCS has permanently ceased power operations and that all fuel has been permanently removed from the reactor vessel. In this configuration, all irradiated fuel is stored in the Independent Spent Fuel Storage Installation (ISFSI) and in the Spent Fuel Pool (SFP). In this condition, no reactor operations can take place and the facility is prohibited from emplacement or retention of fuel in the reactor vessel. The PDEP adequately addresses the risks associated with FCS's current conditions.

The analyses of the potential radiological impacts of postulated accidents in a permanently defueled condition indicates that any releases beyond the Site Boundary would be below the Environmental Protection Agency (EPA) Protective Action Guide (PAG) exposure levels, as detailed in the EPA's "Protective Action Guides and Planning Guidance for Radiological Incidents, EPA-400/R-17/001" dated January 2017 (EPA PAG Manual). No remaining postulated accidents will result in radiological releases requiring offsite protective actions and the slow progression rate of beyond design basis accident scenarios indicate sufficient time is available to initiate appropriate mitigating actions to protect the health and safety of the public. Therefore, the PDEP adequately addresses the risk associated with FCS's permanently defueled condition and continues to provide adequate protection for plant personnel and the public. Exemptions from the applicable portions of 10 CFR 50.47(b), Appendix E to 10 CFR Part 50, and 10 CFR 50.47(c)(2) were previously approved by the NRC.

1.1 Overview of the Permanently Defueled Emergency Plan

In the event of an emergency at FCS, actions are required to identify and assess the nature of the emergency and bring it under control in a manner that protects the health and safety of onsite personnel.

This plan is activated by the Shift Manager/Emergency Director upon identification of an emergency situation based upon the Emergency Action Level (EAL) criteria. The emergency measures described in the subsequent sections and associated Emergency Plan Implementing Procedures (EPIPs) are in accordance with the classification and nature of the emergency at the direction of the Shift Manager/Emergency Director.

This plan describes the organization and responsibilities for implementing emergency measures. It describes interfaces with Federal, State, and local organizations that may be notified in the event of an emergency and may provide assistance. Emergency fire, ambulance, and law enforcement services are provided by local public and private entities. Fixed medical services are provided

by Blair Hospital to provide medical support for work related injuries, and University of Nebraska Medical Center (UNMC) in Omaha, which maintains a regional Radiation Health Center that provides services for the treatment of radiologically contaminated injuries and radiation exposure evaluation.

Because there are no postulated accidents that would result in offsite dose consequences that are large enough to require offsite emergency planning, emergencies are divided into two classifications: Notification of Unusual Event (NOUE) and Alert. This classification scheme, developed in accordance with NEI 99-01, "Development of Emergency Action Levels for Non-Passive Reactors", Revision 6, November 2012, has been discussed and agreed upon with responsible offsite organizations and is compatible with their respective emergency plans. According to the EPA PAG Manual, the EPZ is based on the maximum distance at which a PAG might be exceeded. If determined appropriate by government officials, protective actions may be implemented to protect the public using the existing all hazards emergency planning.

FCS is responsible for planning and implementing emergency measures within the Site Boundary. This plan is provided to meet this responsibility. To carry out specific emergency measures discussed in this plan, detailed EPIPs are established and maintained. A list of EPIPs is included in Appendix A.

In addition to the description of activities and steps that can be implemented during an emergency, this plan also provides a general description of steps taken to recover from an emergency situation. It also describes the training, drills, planning, coordination, and program maintenance appropriate to maintain an adequate level of emergency preparedness.

1.1.1 Purpose

The purpose of the PDEP is to assure an adequate level of preparedness to cope with the spectrum of postulated emergencies, including the means to minimize radiation exposure to facility personnel. This plan integrates the necessary elements to provide effective emergency response considering cooperation and coordination of organizations expected to respond to potential emergencies. All changes to the PDEP are reviewed in accordance with 10 CFR 50.54(q).

1.1.2 Scope

The PDEP has been developed to respond to potential emergencies at FCS considering the permanently shut down and defueled condition. There are no postulated accidents that would result in offsite dose consequences that are large enough to require offsite emergency planning. Therefore, the overall scope of this plan delineates the actions necessary to safeguard onsite personnel and minimize damage to

property. If determined appropriate by government officials, protective actions may be implemented to protect the public using an all hazards approach to emergency planning.

The concepts presented in this plan address the applicable regulations stipulated in 10 CFR 50.47, "Emergency Plans", and 10 CFR 50, Appendix E, "Emergency Planning and Preparedness for Production and Utilization Facilities," as exempted. Exemptions to selected portions of 10 CFR 50.47(b); 10 CFR 50.47(c)(2); and 10 CFR 50, Appendix E were previously approved by the NRC. The plan is consistent with the remaining applicable guidelines established in NUREG-0654/FEMA-REP-1, Revision 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants" (NUREG-0654). Appendix B contains a cross-reference to the applicable guidance in NUREG-0654.

Abbreviations and acronyms used in this Plan are included in Appendix C.

1.1.3 Objectives

The basic objectives of this plan are:

1) To establish a system for identification and classification of the emergency condition and initiation of response actions;

2) To establish an organization for the direction of activity within the facility to limit the consequences of the incident;

3) To establish an organization for control of assessment activities to determine the extent and significance of any uncontrolled release of radioactive material;

4) To identify facilities, equipment, and supplies available for emergency use;

5) To establish an engineering support organization to aid the facility personnel in limiting the consequences of and recovery from an event;

6) To generally describe the elements of an emergency recovery program;

7) To specify a system for coordination with Federal, State, and local authorities and agencies offsite support organizations;

8) To develop a communications network between facility and offsite authorities to provide notification of emergency situations; and

9) To develop a training and Emergency Plan drill and exercise program to assure effectiveness of the plan is maintained.

1.2 Site Description

FCS has ceased power operations and has certified that fuel has been permanently removed from the reactor vessel. The license for FCS, under 10 CFR 50, no longer authorizes operation of the reactor or emplacement or retention of fuel in the reactor vessel, as specified in 10 CFR 50.82(a)(2).

Fort Calhoun Station is located midway between Fort Calhoun and Blair, Nebraska, on the west bank of the Missouri River. The site consists of approximately 660.46 acres with an additional exclusion area of 582.18 acres on the northeast bank of the river directly opposite the plant buildings. The SFP is located in the Auxiliary Building, adjacent to the Containment Building. The Fort Calhoun Station includes the ISFSI, located within the Protected Area, approximately 200 meters north northwest of the Containment Building. The distance from the reactor containment to the nearest site boundary is approximately 910 meters; and the distance to the nearest residence is beyond the site boundary.

2.0 ORGANIZATIONAL RESPONSIBILITY

A predesignated group is assigned to various roles, during an event, to ensure capable emergency response and mitigation at the FCS. These assignments are made to ensure that the administrative, managerial and technical support needed for accident mitigation are met. A sufficient number of individuals are assigned to these positions to ensure around-the-clock and continued long term support.

Responsibility for emergency response lies with the Shift Manager. The Shift Manager assumes the Emergency Director position upon declaration of an emergency. The command and control position is responsible for ensuring the continuity of resources throughout an event.

The ERO augments the normal on-shift organization to respond to declared emergencies when activated. ERO personnel are trained and assigned to a position based on job qualifications or by being specifically trained to fill the positon. The ERO is activated at the Alert declaration or at the discretion of the Shift Manager/Emergency Director. The designated on-shift and augmented ERO staff are capable of continuous (24-hour) operations for a protracted period.

The minimum staff required to conduct routine and immediate emergency mitigation is maintained at the station.

2.1 Facility On-Shift Organization

During normal conditions, the minimum staff on duty at the facility during all shifts consists of one (1) Shift Manager, one (1) Non-Certified Operator (NCO), one (1) Radiation Protection Technician. Security personnel are maintained in accordance with the Security Plan. The minimum staff required to conduct routine and immediate emergency mitigation is maintained on-shift 24 hours a day.

Figure 2.1 and Table 2.1 outline the minimum requirements for the FCS on-shift and ERO staffing.

2.1.1 Shift Manager/Emergency Director

The Shift Manager position is staffed 24 hours a day. This position is the senior management position at the facility during off-hours. This position is responsible for monitoring facility conditions and approving onsite activities. The position has the authority, management ability, and technical knowledge to classify and declare a facility emergency and assume the Emergency Director role.

The Emergency Director shall assume command and control upon declaration of an event. The Emergency Director shall not delegate the following responsibilities:

- Classification of an event
- Emergency notification approval (Task of making the notifications may be delegated)
- Authorization of radiation exposures in excess of 10 CFR Part 20 limits.

Other Emergency Director responsibilities:

- Notification of the emergency classification to the NRC & States.
- Management of resources available to the facility
- Coordination of mitigative actions
- Coordination of corrective actions
- Coordination of onsite protective actions
- Decision to call for offsite assistance
- Coordination of Security activities
- Termination of the emergency condition when appropriate
- Performance of initial dose assessment
- Maintenance of records of event activities

2.1.2 Non-Certified Operator

The NCO, on shift 24 hours a day, performs system and component manipulations. The organizational relationship to the Shift Manager/Emergency Director is the same during normal situations and during situations where the PDEP has been implemented.

2.1.3 Radiation Protection Technician

The Radiation Protection Technician, on shift 24 hours a day, is available to monitor personnel exposure, determine radiological conditions, and provide survey results if necessary.

2.1.4 Security Force

Security is administered in accordance with the Security Plan. The Security Force will report to the Emergency Director when implementing the PDEP.

2.2 Emergency Response Organization

The ERO shall be activated at the Alert classification. The ERO shall augment the on-shift staff within approximately 120 minutes of an Alert declaration. However, the ERO may be activated, in part or in whole, at any time at the discretion of the Shift Manager/Emergency Director.

2.2.1 Technical Coordinator

The Technical Coordinator reports to the Emergency Director. The responsibilities of the Technical Coordinator when implementing the PDEP include:

- evaluating technical data pertinent to facility conditions,
- augmenting the emergency staff as deemed necessary,
- designating engineering support, as necessary, to evaluate facility conditions and provide technical support,
- recommending mitigation and corrective actions,
- coordinating search and rescue,
- coordinating maintenance and equipment restoration,
- establishing and maintaining communications as desired by the Emergency Director, and
- maintaining a record of event activities.

2.2.2 Radiation Protection Coordinator

The Radiation Protection Coordinator reports to the Emergency Director. The responsibilities of the Radiation Protection Coordinator when implementing the PDEP include:

- monitoring personnel accumulated dose,
- advising the Emergency Director concerning Radiological EALs
- augmenting the emergency staff as deemed necessary,
- directing radiological monitoring analysis,
- performing dose assessment,
- coordinating decontamination activities,
- establishing and maintaining communications as desired by the Emergency Director, and
- maintaining a record of event activities.

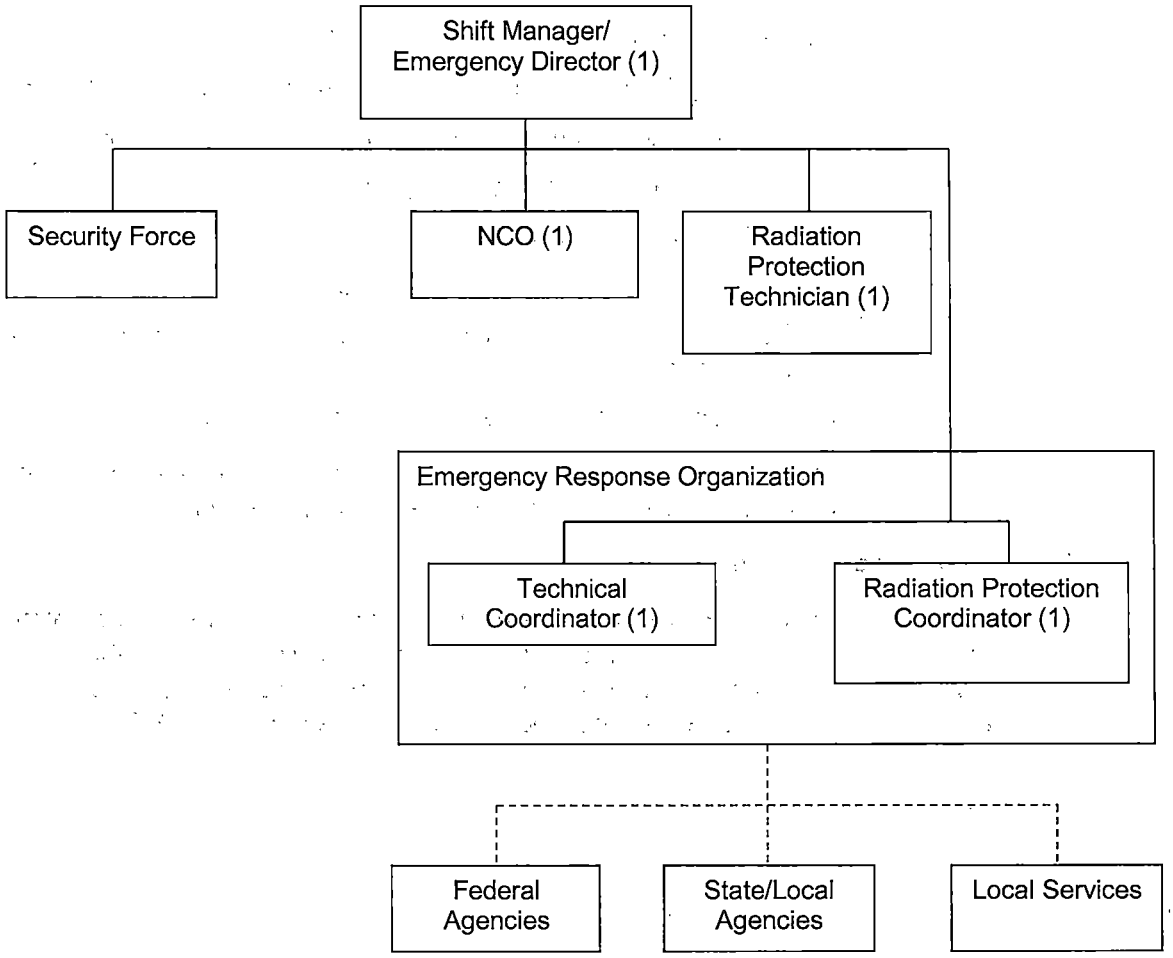
Table 2.1 provides a representation of the functional responsibilities of the on-shift and ERO positions that fulfill the emergency staffing requirements.

2.3 Offsite Organizations

Offsite organizations may respond to a declared emergency at FCS. Each of these groups are capable of 24-hour response and operation. The details of their responsibilities are described in Section 3.0 of this Plan and are contained in their respective Letter of Agreement between each organization and OPPD.

FIGURE 2.1

On-Shift and Emergency Response Organization



(#) Denotes number of staff (either on-shift or designated ERO)

TABLE 2.1
On-Shift and Emergency Response Organization Staffing Requirements

MAJOR FUNCTIONAL AREA	LOCATION	FCS STAFF	# ON-SHIFT	FCS AUGMENTED CAPABILITY (120 MIN.)
Operations and assessment of Operational Aspects	Control Room/On-Scene	Non-Certified Operator*	1[1]	-
Emergency Direction & Control	Control Room	Shift Manager*	1[1]	-
Notification/Communication	Control Room			-
Radiological Accident Assessment and Support of Operational Accident Assessment	As Directed by the Emergency Director	Radiation Protection Coordinator	-	1 (may augment with Radiation Monitoring personnel if necessary)
Protective Actions (In-Facility)	On-Scene	Radiation Protection Technician*	1	-
Condition Evaluation, Repair, and Corrective Action	As Directed by the Emergency Director	Technical Coordinator	-	1 (may augment with technical support and emergency repair personnel if necessary)
Firefighting	On-Scene	Per the Fire Protection Procedures		Offsite Response Organizations**
Rescue Operations/First Aid	On-Scene	***		
Site Access Control and Accountability	Per the Security Plan	Security Personnel	Per the Security Plan	-

[1] Technical Specifications allow the Technical Specification-required on-shift positions to be vacant for not more than 2 hours, in order to provide for unexpected absence, provided immediate action is taken to fill the required position.
* On-Shift personnel required to direct or perform site-specific mitigation strategies required for a catastrophic loss of SFP inventory.
** Response time is based on Fire Protection Procedures or response capability of the offsite response organization.
*** Provided by on-shift personnel assigned other functions.

3.0 EMERGENCY RESPONSE SUPPORT AND RESOURCES

Radiological emergency preplanning is not required for the State of Nebraska, the State of Iowa, or the counties surrounding FCS (Washington County, Harrison County, and Pottawattamie County). State and County response to an emergency will be performed in accordance with each organization's plans and procedures and will be commensurate with the hazard posed by the emergency.

Letters of Agreement are in place for those local organizations that will provide ambulance services, treatment of contaminated and injured patients, fire support services, and law enforcement response as requested by FCS. These letters are maintained on file in the Emergency Planning Department at FCS.

3.1 Support Provided by Local Organizations

3.1.1 Law Enforcement

The Nebraska State Patrol and the Washington County Sheriff's Department have agreed to provide the primary law enforcement support to the FCS Security Department.

3.1.2 Fire and Rescue Support

The Blair Volunteer Fire Department has agreed to provide the primary fire support services for FCS. The Fort Calhoun Volunteer Fire Department has agreed to provide backup fire response.

3.1.3 Transportation of Injured and Contaminated Personnel

Omaha Public Power District (OPPD) vehicles may transport non-injured potentially contaminated personnel.

The Blair Volunteer Fire Department has agreed to provide primary rescue and transportation support, for injured and/or contaminated personnel.

Fort Calhoun Volunteer Fire and Rescue has agreed to provide backup services.

3.1.4 Treatment of Radioactively Contaminated and Injured Personnel

UNMC, in Omaha, maintains a regional Radiation Health Center which provides services for the treatment of radiologically contaminated injuries and radiation exposure evaluation.

4.0 EMERGENCY CLASSIFICATION SYSTEM

This section describes the emergency classification scheme adopted by the OPPD for FCS.

4.1 Classification of Emergencies

The emergency classification system covers the entire spectrum of possible radiological and non-radiological emergencies at FCS. The emergency classification system categorizes accidents and/or emergency situations into two emergency classification levels depending on emergency conditions at the time of the incident. The emergency classification levels applicable to FCS, in order of increasing severity are NOUE and Alert. Each of these emergency classes requires notification of the responsible State of Nebraska and Iowa authorities, and the Nuclear Regulatory Commission (NRC). The Emergency Response Organization (ERO) will be notified at an Alert declaration.

FCS's permanently defueled emergency classification system is developed consistent with NEI-99-01, "Development of EALs for Non-Passive Reactors," Revision 6. Appendix C of NEI 99-01, Rev. 6 contains a set of Initiating Conditions (ICs)/EALs for permanently defueled nuclear power plants that had previously operated under a 10 CFR Part 50 license and have permanently ceased operations. The classification system referenced in NEI 99-01, Rev. 6 has been endorsed by the NRC and provides a standard method for classifying emergencies.

When indications are available to on-shift personnel that an EAL has been met, the event is assessed and the corresponding emergency classification level is declared. FCS maintains the capability to assess, classify, and declare an emergency condition within 30 minutes after the availability of indications that an EAL threshold has been reached.

Incidents may be classified in a lower emergency classification level first, and then upgraded to the higher level if the situation deteriorates.

The following subsections outline the facility actions at each emergency classification level. Refer to the Permanently Defueled Emergency Action Level Technical Bases for actual parameter values, annunciators, and equipment status used by FCS personnel to classify emergencies.

4.1.1 Notification of Unusual Event

NOUE conditions do not cause serious damage to the facility. The purpose of the NOUE declaration is to: 1) bring the ERO to a state of readiness; 2) make required and needed notifications; 3) provide for

systematic handling of information and decision-making; and 4) augment shift personnel if necessary.

4.1.2 Alert

The purpose of the Alert declaration is to: 1) activate the ERO; 2) make required and needed initial notifications as well as updates to event conditions; and 3) ensure all necessary resources are being applied to accident mitigation.

The Alert status shall be maintained until termination of the event occurs. Recovery operations may be entered without termination. Offsite authorities will be informed of the change in the emergency status and the necessary documentation shall be completed as specified in the EPIPs.

4.2 Postulated Accidents

The Defueled Safety Analysis Report (DSAR) describes the postulated accidents applicable to FCS. Methods for detecting and evaluating these events include the use of installed systems, instrumentation, alarms, approved procedures, as well as field observation.

4.3 Emergency Classification System Review

The emergency classification system and the EALs are reviewed with the States of Nebraska and Iowa, Washington County (Nebraska) and Harrison County (Iowa) on an annual basis.

5.0 NOTIFICATION METHODS AND PROCEDURES

The decision to make notifications is based on the emergency action levels and corresponding emergency classifications described in Section 4.0 of this Plan. OPPD is capable of notifying and activating its Emergency Response Organization 24 hours per day. It is also able to make notifications to the States of Nebraska and Iowa, and the NRC on a 24 hour per day basis.

5.1 Notification and Activation

The Shift Manager is responsible for the initial emergency declaration and then assumes the duties of the Emergency Director. The authority and responsibility for classifying and declaring emergencies, initiating notification to the States and Federal officials, and initiating corrective and mitigative actions resides with the Emergency Director position.

FCS personnel in the Protected Area are notified via the Emergency or Fire Alarm and a public address system message. If required, personnel outside the Protected Area are notified by public address systems installed in the buildings outside the

Protected Area. Site Security personnel may assist in the notification of all other personnel on OPPD property.

5.1.1 Emergency Response Organization Activation

On-site staff are informed of an emergency condition through the use of the facility public address system, office telephone, and/or wireless devices capable of receiving telephone calls and text messages. In the event that personnel required to staff ERO positions are not on-site at the time an emergency is declared, they may be contacted by commercial telephone including land lines and/or wireless devices capable of receiving telephone calls and text messages. Mobilization of the ERO will be conducted under the direction of the Emergency Director, according to personnel assignments and telephone numbers maintained in various telephone directories.

5.1.2 State and Local Government Notification

Notification to the responsible State authorities is required within 60 minutes of the emergency classification. The commercial telephone network serves as the primary means to provide emergency notification to State agencies. It is used to provide initial and updated notifications and for general information flow between these agencies.

OPPD, in coordination with the States of Nebraska and Iowa, have established the contents of the initial emergency messages to be sent from FCS in the event an emergency is declared. These messages contain the following information if it is known and appropriate:

- Location of the incident;
- Name and telephone number (or communications channel identification) of caller;
- Date and time of the incident;
- Class of emergency;
- Licensee emergency response actions underway;
- Request for any needed onsite support by offsite organizations; and
- Prognosis for worsening or termination of event based on facility information

In the event the commercial telephone system is unavailable, wireless communications can be used to make emergency notifications. In addition, electronic means may be used to transmit the notification message.

Follow-up emergency messages incorporate elements as determined necessary by the States of Nebraska and Iowa. These messages are transmitted by telephone or facsimile. Updated messages are sent at least every 60 minutes. The frequency of updates may be modified during ongoing events if requested by the States of Nebraska or Iowa and the status of the event has not changed.

5.1.3 NRC Event Notification System

The NRC Event Notification System (ENS) is a dedicated telephone system used to notify the NRC Operations Center of an emergency. The NRC will be notified as soon as possible after State notifications and within 60 minutes of event classification or change in classification. In the event that the ENS fails, commercial phone lines will be used to notify the NRC. Notification to the NRC is the responsibility of the Emergency Director.

6.0 EMERGENCY COMMUNICATIONS

A number of communications systems are available for use among the principal response organizations. Provisions for 24-hour per day notification to State and local authorities is discussed in Section 5.0 of this plan. Provisions for activating OPPD ERO personnel are also discussed in section 5.0 of this plan. Provisions for periodic testing of the emergency communications system are described in Section 14.0 of this plan.

6.1 FCS Alarm System

Emergency or fire alarms are sounded from the Control Room when an emergency requiring ERO activation or fire is declared. Their function is to alert personnel within the Protected Area to an emergency condition.

6.2 Communication Systems

Several modes of communication are available to facility staff to transmit information onsite and offsite during normal and emergency situations.

6.2.1 FCS Paging Systems

The Protected Area paging system (Gai-tronics) provides a means of intra-plant communications. Stations on this system provide access to the paging system and to intercom lines. These stations and speakers are placed throughout the facility including the Control Room.

Buildings outside of the Protected Area also have public address announcing capabilities. Access to the public address system in both locations can be accomplished via the site's telephone system. This system can be used to notify personnel of an emergency.

6.2.2 Telephone System

The commercial telephone system (see Section 5.1.2) is the primary emergency notification system between FCS and State agencies and is used to provide initial and follow-up notifications and for general information flow between these agencies.

Additional methods of communication are available to facility staff to transmit information onsite and offsite during normal and emergency situations.

The telephone system can be used for in-facility as well as outside communications. The telephone system is the primary means to activate the ERO upon declaration of an emergency, as directed by the Emergency Director. In the event that personnel required to staff emergency positions are not on-site at the time an emergency is declared, they may be contacted by commercial telephone including land lines and/or wireless devices capable of receiving telephone calls and text messages. Telephone numbers are maintained in various telephone directories.

The phone system includes many automated or programmable features that improve notification and allow flexibility. Wireless communications serve as the backup means of communication.

6.2.3 Federal Telecommunications System

The NRC ENS utilizes the Federal Telecommunications System (FTS) telephone network for emergency communications. The FTS line exists between the NRC Operations Office in Rockville, Maryland and the FCS Control Room. Emergency notification, facility status information, and radiological information are communicated via the ENS.

6.2.4 Portable Radios

Portable radios may be utilized by station personnel and ERO personnel during an emergency.

6.3 Communications with Medical Support Facilities

Several modes of communication are available to facility staff to maintain communications with medical support facilities and mobile rescue units during normal and emergency situations.

6.3.1 Telephone System

FCS ERO personnel can communicate with Blair Hospital, the UNMC, the Washington County Emergency Communications Center, and mobile rescue units via the site telephone systems described earlier in this section.

6.3.2 Portable Radios

When FCS personnel accompany a contaminated and/or injured employee during transport, portable radios may be utilized by station personnel and ERO personnel to communicate with the ambulance.

6.3.3 Non-OPPD Radio Systems

Non-OPPD radio systems provide communications between medical support facilities and mobile rescue units as well as inter-unit communications. These radio systems have the capability to use the common medical emergency frequency which ensures coordinated communications.

7.0 PUBLIC INFORMATION

As part of its normal corporate structure, OPPD maintains a Corporate Communications Division that can be called upon to provide resources as necessary. The Corporate Crisis Communication Plan provides guidance for the dissemination of information during emergencies.

The spokesperson function would typically be performed by OPPD Corporate Communications Division personnel. However, the function could be performed by FCS or other corporate personnel. The spokesperson function participates in news conferences as appropriate with Federal, State, and local emergency response organizations. Principle points of contact with news media are also determined per the Corporate Crisis Communication Plan.

8.0 EMERGENCY FACILITIES AND EQUIPMENT

Following the declaration of an emergency, the activities of the ERO are coordinated from the Control Room. Adequate emergency facilities and equipment to support emergency response are provided and maintained.

8.1 Control Room

During a declared emergency, command and control is maintained in the Control Room. Facility personnel assess conditions; evaluate the magnitude and potential consequences of abnormal conditions; initiate preventative, mitigating and corrective actions; and perform onsite and offsite notifications. When activated, the ERO reports to the Control Room.

8.2 Laboratory Facilities

A laboratory for radioisotopic analysis and non-radiological chemical analysis is available at FCS. A laboratory for non-radiological chemical analysis is also available at OPPD's North Omaha Power Station.

The Nebraska Public Power District Cooper Nuclear Station is capable of providing a backup facility in the event Fort Calhoun's radiochemistry laboratory is not functional. The Cooper Station's radiochemistry laboratory is equipped to perform gross and isotopic determinations on radionuclides in concentrations and counting geometries necessary for nuclear power plant operation and emergency monitoring. They will provide analysis of liquid, air particulate, and cartridges on a priority basis after receiving the sample.

8.3 Emergency Equipment

FCS maintains and operates on-site monitoring systems needed to provide data that is essential for initiating emergency measures and performing accident assessment, including dose assessment and assessing the magnitude of a release. This includes monitoring systems for facility processes, radiological conditions, meteorological conditions, and fire hazards.

Emergency kits are described in Section 8.4.

8.3.1 Process Monitors

Annunciator and computer alarms are provided for a variety of parameters including the SFP and the SFP systems to indicate SFP level and temperature. The manner in which process monitors are used for accident recognition and classification is detailed in FCS's Permanently Defueled EALs.

8.3.2 Radiological Monitors

Radiation monitors and monitoring systems provide continuous radiological surveillance. These monitors, which include Control Room readout and alarm functions, exist in order that appropriate action can be

initiated to limit fuel damage and/or contain radioactive material. The system performs the following basic functions:

- Warns personnel of potential radiological health hazards
- Gives early warning of certain equipment malfunctions that might lead to a radiological hazard or facility damage
- Prevents or minimizes the effects of inadvertent releases of radioactivity

Plant instrumentation provides Control Room personnel with the following parameters necessary to perform dose assessment and determine the magnitude of a potential release:

- Gaseous and liquid effluent monitor readings
- Area radiation levels

In addition to installed monitoring systems, onsite portable radiation and contamination monitoring equipment is available.

8.3.3 Meteorological Monitoring

Meteorological data is available in the Control Room. The data are used to determine the projected radiological consequences in the event of an accidental release of radioactivity to the environment.

In addition, the National Weather Service operates on a twenty-four (24) hour per day basis. Upon request, this organization can provide FCS with meteorological conditions including predicted temperature inversions, precipitation, wind patterns, and velocity.

8.3.4 Fire Detection and Suppression Equipment

The fire protection system is detailed in the Station Fire Plan.

8.4 Emergency Kits

Emergency kits and equipment are maintained to support an emergency response.

8.4.1 Radiological Emergency Kits

Radiological Emergency kits include protective equipment, radiological monitoring equipment and emergency supplies. Kits are located in the Control Room. The methods and frequencies for instrument calibration, repair, and replacement are maintained in accordance with facility procedures.

8.4.2 Dosimetry Kits

Dosimetry kits include dosimetry and appropriate paperwork. Kits are located in the Control Room.

8.4.3 Medical Kits

First aid equipment and supplies are located in the First Aid Room. Trauma and primary response kits are available throughout the facility. These kits are inspected and maintained in accordance with approved facility procedures.

Contaminated/injured person kits are located near the Radiation Protection Count Room and are maintained in accordance with facility procedures.

9.0 ACCIDENT ASSESSMENT

The activation of the PDEP and the continued assessment of accident conditions requires monitoring and assessment capabilities. FCS maintains and operates on-site monitoring systems needed to provide data that is essential for initiating emergency measures and performing accident assessment, including dose assessment.

9.1 Radiological Assessment

9.1.1 Initial Assessment

Classification of an emergency is performed by the Emergency Director in accordance with the Permanently Defueled EAL Scheme.

9.1.2 Initial Dose Assessment

Initial dose assessment is performed by qualified on-shift personnel, under the direction of the Emergency Director. When the ERO is augmented, the Radiation Protection Coordinator assumes subsequent dose assessment responsibilities.

9.2 Corrective Actions

Station procedures and EPIPs provide preventative and/or corrective actions that mitigate the consequences of events. Instrumentation, control systems, and radiation monitoring systems provide indications related to the safe and orderly implementation of corrective actions. These systems provide indication of SFP storage inventory, temperature, cooling, and supporting systems.

FCS maintains procedures and strategies for the movement of any necessary portable equipment that will be relied upon for mitigating the loss of SFP water. These mitigative strategies are maintained in accordance with License Condition 3.G of the FCS Renewed Facility Operating License and Technical Specifications. These diverse strategies provide defense-in-depth and ample time to provide makeup water or spray to the SFP prior to the onset of zirconium cladding ignition when considering very low probability beyond design basis events affecting the SFP.

9.3 Dose Assessment

EPIPs utilize radiological instrumentation readings and meteorological data to provide a rapid method of determining the magnitude of a radioactive release during an emergency. FCS is capable of performing dose assessment 24 hours a day. Dose assessment is the responsibility of the Emergency Director. When augmented, the Radiation Protection Coordinator assumes the dose assessment responsibilities.

10.0 PROTECTIVE ACTIONS

Protective actions for personnel at the facility are provided for their health and safety. Implementation guidelines for protective actions are provided in the EPIPs. Station procedures also provide protective actions to protect personnel during hostile actions.

It is the policy of OPPD to keep personnel radiation exposure within federal regulations, and station limits and guidelines and to keep exposures As Low As Reasonably Achievable (ALARA). Every effort will be made to keep exposures for those providing emergency functions within the limits of 10 CFR Part 20.

10.1 Accountability

Accountability should be considered and used as a protective action whenever a site-wide risk to health and safety exists and prudence dictates. If personnel accountability is required, at the direction of the Emergency Director, all individuals at the site (including non-essential employees, visitors, and contractor personnel) shall be notified by sounding the facility alarm and making announcements over the Public Address System. Following announcement of an emergency declaration, and when accountability has been requested, facility

personnel are responsible for reporting to designated areas and aiding Security in the accountability process.

Accountability of all personnel on the site should be accomplished within 60 minutes of the accountability announcement. If personnel are unaccounted for, teams shall be dispatched to locate the missing personnel.

Accountability may be modified or suspended if the safety of personnel may be jeopardized by a Security event or other event hazardous to personnel.

10.2 Site Egress Control Methods

All visitors and unnecessary contractors are evacuated from the facility at the discretion of the Emergency Director. In the event of a suspected radiological release, personnel are monitored for radioactive contamination prior to leaving the Protected Area. Portable radiation survey meters are available to monitor for potential contamination.

11.0 RADIOLOGICAL EXPOSURE CONTROL

During a plant emergency, abnormally high levels of radiation and/or radioactivity may be encountered by plant personnel. All reasonable measures shall be taken to control the radiation exposure to emergency response personnel providing rescue, first aid, decontamination, emergency transportation, medical treatment services, or corrective or assessment actions within applicable limits specified in 10 CFR Part 20.

11.1 Radiological Control Areas

The Radiation Protection Coordinator will ensure Radiological Control Areas (RCAs) are established in response to the event. The Radiation Protection Coordinator shall direct control of access to all RCAs unless immediate access control is authorized by the Emergency Director to protect personnel or facilitate emergency repairs.

11.2 Exposure Control

Individuals authorized to enter RCAs are required to have dosimetry capable of measuring a dose received from external sources of ionizing radiation. Emergency workers are issued permanent reading dosimeters (e.g., Dosimeter of Legal Record (DLR)) as a means of recording radiation exposure for permanent records prior to entering a RCA. Additionally, personnel are issued electronic alarming dosimetry capable of measuring dose and dose rate on a real-time basis. These dosimeters indicate dose on a digital display and are programmed to provide an audible alarm at a pre-determined dose or dose rate limit. Dose records are maintained in accordance with facility procedures. DLRs may be processed with increased periodicity during a response to an emergency.

The capability exists for the emergency processing of DLRs on a 24-hour per day basis.

All reasonable measures shall be taken to control the radiation exposure to emergency response personnel providing rescue, first aid, decontamination, emergency transportation, medical treatment services, corrective actions, and assessment actions within applicable limits specified in 10 CFR Part 20.

The Emergency Director is responsible for authorizing personnel to receive doses in excess of 10 CFR Part 20 limits, if necessary. This authorization is coordinated with the Radiation Protection Coordinator when available. Table 11.1 contains the guidelines for emergency exposure criteria, which is consistent with Table 3-1, "Emergency Worker Guidelines," provided in the EPA PAG Manual.

Dosimeters and DLRs are typically located in each of the emergency lockers in the Control Room. Additional dosimeters and DLRs are available.

11.3 Contamination Control and Decontamination Capability

During emergency conditions, normal facility decontamination and contamination control measures are maintained as closely as possible. However, these measures may be modified, by the Emergency Director, should conditions warrant.

Contamination control measures are maintained to address access control, drinking water and food supplies, and the return of areas and items to normal use in accordance with proper radiation and contamination control techniques. Documentation surveys and decontamination activities shall be maintained in accordance with facility procedures.

FCS procedures establish requirements and specific action levels for decontamination of personnel, equipment, areas, and for the release of the affected personnel, equipment, and areas from radiological controls. If actual or potential contamination problems exist onsite, the Emergency Director may elect to establish contamination control and monitoring measures. These measures may consist of the establishment of contamination control boundaries to minimize the spread of contamination and monitoring of personnel evacuating the affected area using installed monitors in the Security Building or personnel with portable equipment.

Contaminated areas are isolated as restricted areas with appropriate radiological protection and access control. Personnel leaving contaminated areas are monitored to ensure both themselves and their clothing are not contaminated. Supplies, instruments, and equipment that are in contaminated areas or have been brought into contaminated areas will be monitored prior to removal. Items

found to be contaminated, will be decontaminated using normal plant decontamination techniques and facilities or may be disposed of as radioactive waste. Tools, equipment, and areas that become contaminated will be decontaminated as determined by Radiation Protection personnel.

If personnel decontamination becomes necessary, decontamination is performed under the direction of the Radiation Protection Coordinator. Contaminated personnel that are evacuated will be decontaminated as determined by Radiation Protection personnel. If the contaminated individual has an injury involving contamination, efforts to decontaminate the injured person to reasonable levels are made prior to transfer to offsite medical facilities. If decontamination is not practical, the injured person is covered in such a manner as to minimize the spread of contamination until either medical aid can be obtained or until the injured person can be transported to the UNMC Radiation Health Center. Additional decontamination facilities are available at the UNMC Radiation Health Center. Radioactive waste is controlled to ensure that the contents are monitored and processed, if necessary.

Priorities for decontaminating tools, equipment, and areas will be established by the Emergency Director, with top priority given to contamination within areas that are or will be inhabited by emergency workers. Decontamination of non-essential areas, tools, and equipment should be delayed to allow for natural decay of radioactive materials.

Protective clothing is maintained in the Control room. Additional sets are available.

Monitoring and issue of respiratory protection equipment will be conducted in accordance with facility procedures.

TABLE 11.1

EMERGENCY EXPOSURE CRITERIA

(Refer to Note 1)

Guideline	Activity	Condition
5 rem	All occupational exposures	All reasonably achievable actions have been taken to minimize dose.
10 rem[(a)]	Protecting critical infrastructure necessary for public welfare	Exceeding 5 rem is unavoidable and all appropriate actions have been taken to reduce dose. Monitoring available to project or measure dose.
25 rem[(b)(c)]	Lifesaving or Protection of Large Population	Exceeding 5 rem is unavoidable and all appropriate actions have been taken to reduce dose. Monitoring available to project or measure dose.

NOTES:

1. Reference for this table is Table 3-1 of the EPA PAG Manual.

(a) For potential doses > 5 rem, medical monitoring programs should be considered.

(b) In the case of a very large incident, consider the need to raise the property and lifesaving Response Worker Guideline to prevent further loss.

(c) Only on a voluntary basis. Response actions that could cause exposures in excess of 25 rem should only be undertaken with an understanding of the potential acute effects of radiation to the exposed responder and only when the benefits of the action clearly exceed the associated risks.

12.0 MEDICAL AND HEALTH SUPPORT

FCS maintains on-shift personnel and equipment to provide first aid for personnel working at the site. Medical supplies for emergency first aid treatment are provided on the site at various locations.

If immediate professional medical help is needed, local ambulance services are available to transport seriously ill, injured, or radioactively contaminated injured personnel. Patients can also be transported to the facility via medical ambulance helicopters. FCS is capable of maintaining communications with medical support facilities and the local ambulance service while transporting a patient. These capabilities are described in Section 6.3.

An agreement is in place with UNMC in Omaha for medical treatment of patients from FCS who have injuries complicated by radioactive contamination. The hospital has trained personnel and detailed procedures for handling radioactively contaminated patients from FCS.

13.0 RECOVERY

The emergency measures presented in this plan are actions designated to mitigate the consequences of the accident in a manner that affords the maximum protection to plant personnel. Planning for the recovery involves the development of general principles and an organizational capability that can be adapted to any emergency situation. Upon termination of an emergency and transition to recovery phase, the Emergency Director assembles the recovery organization to address the specific emergency circumstances of the terminated event.

The Emergency Director directs the recovery organization and is responsible for:

- Ensuring the facility is maintained in a safe condition;
- Managing onsite recovery activities; and
- Keeping corporate support apprised of recovery activities and requirements.

The remainder of the recovery is accomplished using the normal facility and emergency organizations as necessary to provide radiological and technical expertise to the Emergency Director in order to restore the facility to normal conditions.

The recovery organization's responsibilities include:

- Maintaining comprehensive radiological surveillance of the facility to assure continuous control and recognition of problems
- Controlling access to the area and exposure to workers
- Decontaminating affected areas and/or equipment

- Conducting clean-up and restoration activities
- Isolating and repairing damaged systems
- Documenting all proceedings of the event and reviewing the effectiveness of the emergency organization in reducing public hazard and plant damage

When plant conditions allow a transition from the emergency phase to the recovery phase, the Emergency Director conducts a plant emergency management meeting to discuss the recovery organization. The actions taken by this organization concerning termination of the emergency proceeds in accordance with a recovery plan developed specifically for the accident conditions.

14.0 EXERCISES AND DRILLS

Periodic exercises are conducted to evaluate major portions of emergency response capabilities. Periodic drills are conducted to develop and maintain key emergency response skills. Deficiencies as a result of exercises or drills are identified and corrected.

14.1 Exercises

Biennial exercises shall be conducted to test the timing and content of implementing procedures and methods and to ensure that emergency personnel are familiar with their duties. Offsite organizations are offered the opportunity to participate to the extent assistance would be expected during an emergency declaration. However, participation by offsite organizations is not required, nor are offsite response organizations evaluated.

14.2 Drills

Communication checks with offsite agencies, fire drills, medical drills, radiological monitoring drills and health physics drills are performed as indicated in the following sections.

14.2.1 Medical Drills

A medical emergency drill shall be conducted annually. The drill involves a simulated contaminated injury. The local ambulance service and the UNMC Radiation Health Center are invited to participate in an annual exercise and/or scheduled drill(s) to demonstrate and practice the receipt and treatment of contaminated patients. Involvement by hospital and medical transport services may be included as part of any drill or exercise.

14.2.2 Accountability Drills

An accountability drill shall be conducted annually. This drill shall include identifying the locations of all personnel onsite. This drill can be performed as part of any drill or exercise.

14.2.3 Health Physics Drills

Health Physics drills are conducted semi-annually involving response to, and the analysis of, simulated elevated in-facility airborne and liquid samples and direct radiation measurements in the environment. This drill can be performed as part of any drill or exercise.

14.2.4 Augmentation Capability Drills

An off-hours, unannounced augmentation drill shall be conducted semi-annually to estimate emergency response personnel response times. No actual travel is required. Participants provide an estimate time of arrival to their designated ERO position.

14.2.5 Fire and Security Drills

Fire Drills and Security Drills are conducted in accordance with the respective FCS plans and procedures.

14.2.6 Communication Tests

A. The ENS used to communicate with the NRC is tested monthly.

B. To ensure the reliability of the plant's call-in procedure, a semi-annual functional test of the ERO notification system is performed to test system performance. This can be performed separately or during the Augmentation Capability Drill described in Section 14.2.4.

C. The following communication systems, as detailed in Section 6.2, are used on a frequent basis. Therefore, periodic testing of these systems is not necessary:

   a. FCS Paging System

   b. Commercial Telephone System

   c. Portable Radios

14.3 Scenarios

An Exercise/Drill Coordinator is responsible for the overall development of the scenario package.

A scenario development team is assembled (if needed) by the Exercise/Drill Coordinator to create the various segments of the scenario which include, but are not limited to, the following:

- Objective(s)
- Date, time period, place and participating organizations
- Simulation lists
- Timeline of real and simulated events
- A narrative summary
- List of controllers and participants

The final scenario shall be approved by a designated member of senior facility management. Drill/Exercise confidentiality must always be maintained.

14.4 Critique/Evaluation

Critiques will evaluate the participant's performance during a drill or exercise. The ability of participants to self-evaluate weaknesses and identify areas of improvement is the key to successful exercise/drill conduct.

Exercise and drill performance objectives are evaluated against measurable demonstration criteria. As soon as possible following the conclusion of each drill/exercise, a critique, including participants, controllers, and evaluators, is conducted to evaluate the ability of the participants to meet the performance objectives. Deficiencies are identified and entered into the corrective action system.

A written report is prepared including the evaluation of designated objectives. The report evaluates and documents the participants' response to the emergency situation. The report will also contain reference to corrective action and recommendations resulting from the drill/exercise.

15.0 RADIOLOGICAL EMERGENCY RESPONSE TRAINING

Radiological emergency response training is provided to those who may be called on to assist in an emergency. FCS Management is responsible to ensure all members of the Emergency Response Organization receive the required initial training and continuing training.

15.1 Emergency Response Training

The training program for ERO personnel is based on applicable requirements of Appendix E to 10 CFR Part 50 and position-specific responsibilities as defined in

the PDEP. Emergency response personnel in the following categories receive initial training and annual retraining.

15.1.1 Emergency Response Organization Training

Shift Managers/Emergency Directors, Technical Coordinators, and Radiation Protection Coordinators shall have training conducted such that proficiency is maintained on topics listed below. These topics should be covered as a minimum on an annual basis.

- Emergency Action Level Classification
- Dose Assessment
- Federal, State, and local notification procedures
- ERO Augmentation
- Emergency Exposure Control
- Mitigating strategies for a catastrophic loss of spent fuel pool inventory
- Recovery

FCS personnel available during emergencies to perform emergency response activities as an extension of their normal duties receive duty specific training. This includes facility on-shift personnel, maintenance, radiation protection, and security personnel. Personnel assigned to liaison with offsite fire departments are trained in accordance with the Fire Protection Program, including mitigating strategies required for a catastrophic loss of SFP inventory. Personnel assigned the responsibility of on-shift first aid shall attend first aid training.

15.1.2 General Employee Training

An overview of the Emergency Plan is given to all personnel allowed unescorted access into the Protected Area at Fort Calhoun Station. Personnel receive this information during initial training and are requalified on an annual basis. This training includes identification of the emergency alarm, the fire alarm and the steps to follow for a plant and site evacuation.

15.1.3 Local Support Services Personnel Training

Training is offered annually to offsite organizations which may provide specialized services during an emergency at FCS (fire-fighting, medical services, transport of contaminated and/or injured personnel, etc.). The training shall be structured to meet the needs of that organization with

respect to the nature of their support. Topics of event notification, site access, basic radiation protection and interface activities are included in the training.

15.1.4 First Aid Training

Personnel assigned the responsibility for responding to a medical emergency at FCS receive the American Red Cross Standard First Aid Training Program, or equivalent. To maintain qualifications in accordance with the American Red Cross, CPR and First Aid Training are given once every two years. The associated training records are maintained in accordance with Training Department procedures.

15.2 Documentation of Training

FCS procedures outline the process to document training of the FCS Emergency Response Organization. An Emergency Planning procedure is used to verify training provided to offsite organizations.

16.0 RESPONSIBILITY FOR THE PLANNING EFFORT: PERIODIC REVIEW AND DISTRIBUTION OF EMERGENCY PLANS

Senior plant leadership is responsible for the implementation of actions required to periodically exercise the PDEP and the EPIPs and for maintaining an effective ERO staff.

Senior plant leadership is responsible for the final approval of PDEP and the EPIPs used for emergency classification, and for maintaining an effective emergency response capability at FCS.

Emergency Planning Manager is responsible for the development, administration and maintenance of the PDEP, EPIPs, review and approval of all EPIP changes (with the exception of the EPIP used for emergency classification), planner training, the overall development and implementation of the FCS ERO Training and Qualification Program and coordination of emergency planning activities with off-site emergency organizations.

16.1 Document Maintenance

16.1.1 Review and Update of the PDEP and EPIPs

The FCS PDEP, Permanently Defueled EAL Technical Bases, and the EPIPs included in Appendix A are reviewed annually and updated as needed. All proposed changes will be reviewed in accordance with 10 CFR 50.54(q) to ensure that the change would not compromise the effectiveness of any other EPIP or degrade the effectiveness of the PDEP. Emergency Planning Manager is responsible for forwarding

approved changes to the plan to appropriate organizations and individuals with responsibility for implementation of the plan.

16.1.2 Emergency Planning Documents

Letters of Agreement with support agencies shall be reviewed annually. Agreements will be revised or recertified. Recertification may include a recertification letter/memorandum, purchase order, email, documented telephone conversation or other correspondence. Designated FCS management has the authority to enter into these agreements with outside organizations.

The emergency classification system and the EALs are reviewed with the States of Nebraska and Iowa, Washington County (Nebraska) and Harrison County (Iowa) on an annual basis.

The FCS emergency telephone directory will be maintained in specified locations and updated quarterly.

16.2 Inventory and Maintenance of Emergency Equipment

Periodic inventory, testing, and calibration of emergency equipment and supplies are conducted in accordance with approved facility procedures. This equipment includes, but is not limited to:

- Portable radiation monitoring equipment
- Emergency medical response equipment
- Dosimeters
- Portable radios

Emergency equipment and instrumentation shall be inventoried, inspected and operationally checked periodically as indicated by the procedure and after each use. Sufficient reserves of equipment and instrumentation are stocked to replace emergency equipment and instrumentation removed from service for calibration and/or repair.

APPENDIX A

EMERGENCY PLAN IMPLEMENTING PROCEDURES

APPENDIX A

EMERGENCY PLAN IMPLEMENTING PROCEDURES

Document	Document Title
EP-FC-1001 Addendum 3	PERMANENTLY DEFUELED EMERGENCY ACTION LEVELS FORT CALHOUN STATION
EP-FC-110	ASSESSMENT OF EMERGENCIES
EP-FC-111	EMERGENCY CLASSIFICATION
EP-FC-112	EMERGENCY RESPONSE ORGANIZATION ACTIVATION AND OPERATION
EP-FC-112-100	CONTROL ROOM OPERATIONS
EP-FC-113	PERSONNEL PROTECTIVE ACTIONS
EP-FC-114	NOTIFICATIONS
EP-FC-115	TERMINATION AND RECOVERY

APPENDIX B

CROSS-REFERENCE BETWEEN THE PDEP, NUREG-0654/FEMA-REP-1, 10 CFR 50.47(b) PLANNING STANDARDS, AND APPENDIX E.IV PLANNING REQUIREMENTS

APPENDIX B

CROSS-REFERENCE BETWEEN THE PDEP, NUREG-0654/FEMA-REP-1, the 10 CFR 50.47(b) PLANNING STANDARDS, AND APPENDIX E.IV PLANNING REQUIREMENTS

NUREG-0654, Section II Evaluation Criteria	Planning Standard (10CFR50.47)**	Planning Requirement (Appendix E.IV)**	FCS PDEP Section
A	(b)(1)	A.1,2,4,7	2.0
B	(b)(2)	A.1,2,4,9; C.1	2.0
C	(b)(3)	A.6,7	3.0
D	(b)(4)	B.1,2;C.1,2	4.0
E	(b)(5)	A.6,7;C.1,2;D.1,3;E	5.0
F	(b)(6)	C.1;D.1,3;E	6.0
G	(b)(7)	A.7;D.2	7.0
H	(b)(8)	E;G	8.0
I	(b)(9)	A.4;B.1;C.2;E	9.0
J	(b)(10)	C.1;E;I	10.0
K	(b)(11)	E	11.0
L	(b)(12)	A.6,7;E	12.0
M	(b)(13)	H	13.0
N	(b)(14)	E9;F	14.0
O	(b)(15)	F	15.0
P	(b)(16)	G	16.0

** As Exempted

APPENDIX C

DEFINITIONS AND ACRONYMS

1.0 DEFINITIONS

Accountability – The process of determining the location of onsite personnel in order to identify missing and or injured personnel.

Alert – Events are in progress or have occurred which involve a potential or actual substantial degradation of level of safety of the facility, or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of hostile action. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

Annual – Frequency of occurrence equal to once per calendar year, January 1 to December 31, unless otherwise specified.

Assessment Actions – Those actions taken during or after an incident to obtain or process information necessary for decisions in specific emergency measures.

Corrective Actions – Those emergency measures taken to mitigate or terminate an emergency situation at or near the source of the problem in order to reduce the magnitude.

Emergency Action Levels – Predetermined, site specific, observable threshold for an Initiating Condition (IC) that, when met or exceeded, places the facility in a given emergency classification.

Emergency Classification – Names set forth by the Nuclear Regulatory Commission (NRC) for grouping off-normal events or conditions according to potential effects or consequences. In order of severity: Notification of Unusual Event (NOUE) and Alert.

Emergency Plan Implementing Procedures – The procedures which detail the specific course of action for implementing the emergency plan at FCS.

Emergency Response Organization – The organizational structure of assigned FCS personnel responsible for coordinating response and recovery from emergency conditions at the facility.

Exclusion Area – The property of FCS surrounding the Protected Area in which the licensee has the authority to determine all activities including exclusion or removal of personnel and property from the area.

Hostile Action – An act toward a facility or its personnel that includes the use of violent force to destroy equipment, take hostages, and/or intimidate the licensee to achieve an end. This includes, but is not necessarily limited to, attack by air, land, or water using guns, explosives, projectiles, vehicles or devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. Hostile action should not be construed to include acts of civil disobedience or felonious acts are not part of a concerted attack on the facility. Violent acts between individuals in the owner controlled area do not meet this definition.

Independent Spent Fuel Storage Installation - A complex that is designed and constructed for the interim storage of spent nuclear fuel and other radioactive materials associated with spent fuel storage.

Initiating Condition – An event or condition that aligns with the definition of one of the two emergency classification levels by virtue of the potential or actual effects or consequences.

Monthly – Frequency of occurrence equal to once per calendar month.

Notification of Unusual Event – Events are in progress or have occurred which indicate a potential degradation of the level of safety of the facility or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Onsite – The area within the Exclusion Area Boundary.

Projected Dose – The estimated radiation dose that would be received by individuals following a release of radiation.

Protected Area – The area normally within the facility security fence designated to implement the security requirements of 10 CFR 73.

Protective Actions – Measures taken to effectively mitigate the consequences of an accident by minimizing the radiological exposure that would likely occur if such actions were not taken.

Radiological Control Area – An area in which radioactive material is present and the potential exists for the spread of radioactive contamination. The area will be posted for purposes of protecting individuals against undue risks from exposure to radiation and radioactive materials.

Recovery – Actions taken after the emergency has been controlled to restore the facility as nearly as possible to its pre-emergency condition.

Site Evacuation – Removal of all personnel, except essential FCS personnel from the Exclusion Area and FCS Protected Area.

2.0 ACRONYMS

CFR Code of Federal Regulation
DLR Dosimeter of Legal Record
EAL Emergency Action Level
ENS Emergency Notification System
EPA Environmental Protection Agency
EPIP Emergency Plan Implementing Procedure
ERO Emergency Response Organization
FCS Fort Calhoun Station
FTS Federal Telecommunications System
IC Initiating Condition
ISFSI Independent Spent Fuel Storage Installation
NCO Non-Certified Operator
NOUE Notification of Unusual Event
NRC U.S. Nuclear Regulatory Commission
NWS National Weather Service
OPPD Omaha Public Power District
PAG Protective Action Guide
PDEP Permanently Defueled Emergency Plan
RCA Radiological Control Area
SFP Spent Fuel Pool

FCS

EP-FC-1001 Addendum 3
Revision 4

OPPD NUCLEAR

PERMANENTLY DEFUELED EMERGENCY ACTION LEVEL TECHNICAL BASES

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1.0 PURPOSE

This document provides the detailed set of Emergency Action Levels (EALs) applicable to the Fort Calhoun Station (FCS) and the associated Technical Bases using the EAL development methodology found in NEI 99-01, "Development of Emergency Action Levels for Non-Passive Reactors," Revision 6 (NEI 99-01, Rev. 6). As a permanently defueled facility, FCS will use the Recognition Category "PD" (Permanently Defueled) providing a stand-alone set of Initiating Conditions (ICs)/Emergency Action Levels (EALs) for a permanently defueled facility to consider for use in developing a site-specific emergency classification scheme and Recognition Category "E" ICs for the ISFSI. Permanently defueled ICs and EALs are addressed in Appendix C of NEI 99-01, Rev. 6. All recommendations for changes to this document or associated implementing procedures are reviewed in accordance with 10 Code of Federal Regulations (CFR) 50.54(q).

This document should be used to facilitate review of the FCS Permanently Defueled EALs, provide historical documentation for future reference and serve as a resource for training. Decision-makers responsible for implementation of the Permanently Defueled Emergency Plan (PDEP) may use this document as a technical reference in support of EAL interpretation.

The expectation is that emergency classifications are to be made as soon as conditions are present and recognizable for the classification, but within 30 minutes or less in all cases of conditions present. Use of this document for assistance is not intended to delay the emergency classification.

2.0 DISCUSSION

2.1 Permanently Defueled Facility

NEI 99-01 provides guidance for an emergency classification scheme applicable to a permanently defueled facility. This is a facility that generated spent fuel under a 10 CFR Part 50 license, has permanently ceased operations, and will store the spent fuel onsite for an extended period of time. The emergency classification levels (ECLs) applicable to this type of facility are consistent with the requirements of 10 CFR Part 50 and the guidance in NUREG-0654/FEMA-REP-1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, Rev. 1" (NUREG-0654).

In order to relax the emergency plan requirements previously applicable to an operating facility, the licensee must demonstrate that no credible event can result in a significant radiological release beyond the site boundary. This verification confirms that the source term and motive force available in the permanently defueled condition are insufficient to warrant classifications of a Site Area Emergency or General Emergency. Therefore, the

generic ICs and EALs applicable to a permanently defueled facility may result in either a Notification of Unusual Event (Unusual Event) or an Alert classification.

2.2 Independent Spent Fuel Storage Installation

Selected guidance in NEI 99-01, Rev. 6 is applicable to licensees electing to use their 10 CFR Part 50 emergency plan to fulfill the requirements of 10 CFR 72.32 for a stand-alone Independent Spent Fuel Storage Installation (ISFSI). The ECLs applicable to an ISFSI are consistent with the requirements of 10 CFR Part 50. The ICs germane to a 10 CFR 72.32 emergency plan (as described in NUREG-1567) are subsumed within the classification scheme for a 10 CFR 50.47 emergency plan.

The analysis of potential onsite and offsite consequences of accidental releases associated with the operation of an ISFSI is contained in NUREG-1140, "A Regulatory Analysis on Emergency Preparedness for Fuel Cycle and Other Radioactive Material Licensees" (NUREG-1140). NUREG-1140 concluded that the postulated worst-case accident involving an ISFSI has insignificant consequences to public health and safety. This evaluation shows that the maximum offsite dose to a member of the public due to an accidental release of radioactive materials would not exceed one (1) rem Total Effective Dose Equivalent.

Regarding the above information, the expectations for an offsite response to an Alert classified under a 10 CFR 72.32 emergency plan are generally consistent with those for an Unusual Event in a 10 CFR 50.47 emergency plan (e.g., to provide assistance, if requested). Also, the licensee's Emergency Response Organization (ERO) required for a 10 CFR 72.32 emergency plan is different than that prescribed for a 10 CFR 50.47 emergency plan (e.g., no emergency technical support function).

3.0 KEY TERMINOLOGY USED

There are several key terms that appear throughout the NEI 99-01, Rev. 6 methodology. These terms are introduced in this section to support understanding of subsequent material. As an aid to the reader, the following table is provided as an overview to illustrate the relationship of the terms to each other.

Emergency Classification Level	
Unusual Event	**Alert**
↓	↓
Initiating Condition	**Initiating Condition**
↓	↓
Permanently Defueled Emergency Action Level[1] • Notes • Basis	**Permanently Defueled Emergency Action Level[1]** • Notes • Basis
[1] When making an emergency classification, the Shift Manager/Emergency Director must consider all information having a bearing on the proper assessment of an Initiating Condition. This includes the PD and E EALs, Notes, and the Basis information.	

3.1 Emergency Classification Levels

One of a set of names or titles established by the Nuclear Regulatory Commission (NRC) for grouping off-normal events or conditions according to (1) potential or actual effects or consequences, and (2) resulting onsite and offsite response actions. The ECLs, in ascending order of severity, are:

- Unusual Event
- Alert

3.1.1 Unusual Event

Events are in progress or have occurred which indicate a potential degradation of the level of safety of the facility or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

Purpose: The purpose of this classification is to assure that the first step in future response has been carried out, to bring the operations staff to a state of readiness, and to provide systematic handling of unusual event information and decision-making.

3.1.2 Alert

Events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the facility or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the Environmental Protection Agency (EPA) Protective Action Guides (PAG) exposure levels.

Purpose: The purpose of this classification is to assure that emergency personnel are readily available to respond if the situation becomes more serious or to perform confirmatory radiation monitoring if required, and provide offsite authorities current information on facility status and parameters.

3.2 Initiating Condition

An event or condition that aligns with the definition of one of the two ECLs by virtue of the potential or actual effects or consequences.

Discussion: An Initiating Condition (IC) describes an event or condition, the severity or consequences of which meets the definition of an ECL. An IC can be expressed as a continuous, measurable parameter (e.g., radiation monitor readings) or an event (e.g., an earthquake).

Appendix 1 of NUREG-0654 does not contain example EALs for each ECL, but rather ICs (i.e., conditions that indicate that a radiological emergency, or events that could lead to a radiological emergency, have occurred). NUREG-0654 states that the ICs form the basis for establishment by a licensee of the specific facility instrumentation readings (as applicable) which, if exceeded, would initiate the emergency classification. Thus, it is the specific instrument readings that would be the EALs.

3.3 Emergency Action Level

A pre-determined, site-specific, observable threshold for an IC that, when met or exceeded, places the facility in a given ECL.

Discussion: EAL statements may utilize a variety of criteria including instrument readings and status indications, observable events, results of calculations and analyses, entry into particular procedures, and the occurrence of natural phenomena.

4.0 GUIDANCE ON MAKING EMERGENCY CLASSIFICATIONS

4.1 General Considerations

When making an emergency classification, the Emergency Director must consider all information having a bearing on the proper assessment of an IC. This includes the EAL plus Notes and the informing Basis information.

All emergency classification assessments should be based upon valid indications, reports or conditions. A valid indication, report, or condition, is one that has been verified through appropriate means such that there is no doubt regarding the indicator's operability, the condition's existence, or the report's accuracy. For example, validation could be accomplished through an instrument channel check, response on related or redundant indicators, or direct observation by personnel. The validation of indications should be completed in a manner that supports timely emergency declaration.

For ICs and EALs that have a stipulated time duration (e.g., 15 minutes, 60 minutes, etc.), the Emergency Director should not wait until the applicable time has elapsed, but should declare the event as soon as it is determined that the condition has exceeded, or will likely exceed, the applicable time. If an ongoing radiological release is detected and the release start time is unknown, it should be assumed that the release duration specified in the IC/EAL has been exceeded, absent data to the contrary.

A planned work activity that results in an expected event or condition which meets or exceeds an EAL does not warrant an emergency declaration provided that 1) the activity proceeds as planned and 2) the facility remains within the limits imposed by the operating license. Such activities include planned work to test, manipulate, repair, maintain, or modify a system or component. In these cases, the controls associated with the planning, preparation, and execution of the work will ensure that compliance is maintained with all aspects of the operating license provided that the activity proceeds and concludes as expected. Events or conditions of this type may be subject to the reporting requirements of 10 CFR 50.72.

The assessment of some EALs is based on the results of analyses that are necessary to ascertain whether a specific EAL threshold has been exceeded (e.g., gaseous and liquid effluent sampling, etc.); the EAL and/or the associated basis discussion will identify the necessary analysis. In these cases, the declaration period starts with the availability of the analysis results that show the threshold to be exceeded (i.e., this is the time that the EAL information is first available).

While the EALs have been developed to address a full spectrum of possible events and conditions which may warrant emergency classification, a provision for classification based on operator/management experience and judgment is still necessary. The NEI 99-01 scheme provides the Emergency Director with the ability to classify events and

conditions based upon judgment using EALs that are consistent with the ECL definitions (refer to PD-HU3 and PD-HA3). The Emergency Director will need to determine if the effects or consequences of the event or condition reasonably meet or exceed a particular ECL definition.

4.2 Classification Methodology

To make an emergency classification, the user will compare an event or condition (i.e., the relevant facility indications and reports) to an EAL(s) and determine if the EAL has been met or exceeded. The evaluation of an EAL(s) must be consistent with the Notes. If an EAL has been met or exceeded, then the IC is considered met and the associated ECL is declared in accordance with facility procedures.

When assessing an EAL that specifies a time duration for the off-normal condition, the EAL time duration runs concurrently with the emergency notification time duration.

4.3 Classification of Multiple Events and Conditions

When multiple emergency events or conditions are present, the user will identify all met or exceeded EALs. The highest applicable ECL identified during this review is declared. For example:

- If an Unusual Event EAL and an Alert EAL are met, an Alert should be declared.

There is no "additive" effect from multiple EALs meeting the same ECL. For example:

- If two Unusual Event EALs are met, an Unusual Event should be declared.

Related guidance concerning classification of rapidly escalating events or conditions is provided in Regulatory Issue Summary (RIS) 2007-02, "Clarification of NRC Guidance for Emergency Notifications During Quickly Changing Events."

4.4 Classification of Imminent Conditions

Although EALs provide specific thresholds, the Emergency Director must remain alert to events or conditions that could lead to meeting or exceeding an EAL within a relatively short period of time (i.e., a change in the ECL is IMMINENT). If, in the judgment of the Emergency Director, meeting an EAL is IMMINENT, the emergency classification should be made as if the EAL has been met. While applicable to all ECLs, this approach is particularly important at the higher ECL since it provides additional time for implementation of protective measures.

4.5 Emergency Classification Level Upgrading and Termination

An ECL may be terminated when the event or condition that meets the IC and EAL no longer exists.

As noted above, guidance concerning classification of rapidly escalating events or conditions is provided in RIS 2007-02.

4.6 Classification of Short-Lived Events

Event-based ICs and EALs define a variety of specific occurrences that have potential or actual safety significance. By their nature, some of these events may be short-lived and, thus, over before the emergency classification assessment can be completed. If an event occurs that meets or exceeds an EAL, the associated ECL must be declared regardless of its continued presence at the time of declaration.

4.7 Classification of Transient Conditions

Several of the ICs and/or EALs contained in this document employ time-based criteria. These criteria will require that the IC/EAL conditions be present for a defined period of time before an emergency declaration is warranted. In cases where no time-based criterion is specified, it is recognized that some transient conditions may cause an EAL to be met for a brief period of time (e.g., a few seconds to a few minutes). The following guidance should be applied to the classification of these conditions.

EAL momentarily met during expected facility response - In instances where an EAL is briefly met during an expected (normal) facility response, an emergency declaration is not warranted provided that associated systems and components are operating as expected, and operator actions are performed in accordance with procedures.

EAL momentarily met but the condition is corrected prior to an emergency declaration – If an operator takes prompt manual action to address a condition, and the action is successful in correcting the condition prior to the emergency declaration, then the applicable EAL is not considered met and the associated emergency declaration is not required.

It is important to stress that the emergency classification assessment period is not a "grace period" during which a classification may be delayed to allow the performance of a corrective action that would obviate the need to classify the event; emergency classification assessments must be deliberate and timely, with no undue delays.

4.8 After-the-Fact Discovery of an Emergency Event or Condition

In some cases, an EAL may be met but the emergency classification was not made at the time of the event or condition. This situation can occur when personnel discover that an event or condition existed which met an EAL, but no emergency was declared, and the event or condition no longer exists at the time of discovery. This may be due to the event or condition not being recognized at the time or an error that was made in the emergency classification process.

In these cases, no emergency declaration is warranted; however, the guidance contained in NUREG-1022, "Event Report Guidelines 10 CFR 50.72 and 50.73," is applicable. Specifically, the event should be reported to the NRC in accordance with 10 CFR § 50.72 within one hour of the discovery of the undeclared event or condition. The licensee should also notify appropriate State and local agencies in accordance with the agreed upon arrangements.

4.9 Retraction of an Emergency Declaration

Guidance on the retraction of an emergency declaration reported to the NRC is discussed in NUREG-1022.

5.0 REFERENCES

5.1 Developmental

5.1.1 NEI 99-01 Revision 6, Development of Emergency Action Levels for Non-Passive Reactors, November 2012

5.1.2 10 CFR Part 50, Domestic Licensing of Production and Utilization Facilities

5.1.3 RIS 2007-02, Clarification of NRC Guidance for Emergency Notifications During Quickly Changing Events, February 2007

5.1.4 NUREG-1022, Event Reporting Guidelines 10 CFR 50.72 and 50.73

5.1.5 10 CFR 50.72, Immediate Notification Requirements for Operating Nuclear Power Reactors

5.1.6 NUREG-0654/FEMA-REP-1, Rev. 1, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants

5.1.7 10 CFR 72.32, Emergency Plan

5.1.8 NUREG-1567, Spent Fuel Dry Storage Facilities

5.1.9 10 CFR 50.47, Emergency Plans

5.1.10 NUREG-1140, A Regulatory Analysis on Emergency Preparedness for Fuel Cycle and Other Radioactive Material Licensees

5.2 Implementing

5.2.1 Permanently Defueled Emergency Plan

5.2.2 EAL Comparaison Matrix

5.2.3 EAL Classification Matrix

5.3 Commitments

None

6.0 ACRONYMS & DEFINITIONS

6.1 Acronyms

AOP ..... Abnormal Operating Procedure
CDE ..... Committed Dose Equivalent
CFR ..... Code of Federal Regulations
cpm ..... Counts per Minute
EAL ..... Emergency Action Level
ECL ..... Emergency Classification Level
EPA ..... Environmental Protection Agency
FAA ..... Federal Aviation Administration
FBI ..... Federal Bureau of Investigation
FEMA ..... Federal Emergency Management Agency
HSM ..... Horizontal Storage Module
ISFSI ..... Independent Spent Fuel Storage Installation
IC ..... Initiating Condition
mRem ..... milli-Roentgen Equivalent Man
MSL ..... Mean Sea Level
NEI ..... Nuclear Energy Institute
NORAD ..... North American Aerospace Defense Command
NRC ..... Nuclear Regulatory Commission
ODCM ..... Off-site Dose Calculation Manual
ORO ..... Off-site Response Organization
PAG ..... Protective Action Guide
PD ..... Permanently Defueled
rem ..... Roentgen Equivalent Man
TEDE ..... Total Effective Dose Equivalent
USAR ..... Final Safety Analysis Report as Updated

6.2 Definitions

The following definitions are taken from Title 10 CFR, and related regulatory guidance documents.

Alert

Events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the facility or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA PAG exposure levels.

Unusual Event

Events are in progress or have occurred which indicate a potential degradation of the level of safety of the facility or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occurs.

The following key terms are necessary for overall understanding the NEI 99-01 emergency classification scheme.

Emergency Action Level (EAL): A pre-determined, site-specific, observable threshold for an Initiating Condition that, when met or exceeded, places the facility in a given ECL.

Emergency Classification Level (ECL): One of a set of names or titles established by the Nuclear Regulatory Commission (NRC) for grouping off-normal events or conditions according to (1) potential or actual effects or consequences, and (2) resulting onsite and offsite response actions. The ECLs, in ascending order of severity, are:

- Unusual Event
- Alert

Initiating Condition (IC): An event or condition that aligns with the definition of one of the two ECLs by virtue of the potential or actual effects or consequences.

Selected terms used in IC and EAL statements are set in all capital letters (e.g., ALL CAPS). These words are defined terms that have specific meanings as used in this document. The definitions of these terms are provided below.

CONFINEMENT BOUNDARY: The irradiated fuel dry storage cask barrier(s) between areas containing radioactive substances and the environment.

EXPLOSION: A rapid, violent and catastrophic failure of a piece of equipment due to combustion, chemical reaction or over pressurization. A release of steam (from high energy lines or components) or an electrical component failure (caused by short circuits, grounding, arcing, etc.) should not automatically be considered an explosion. Such events may require a post-event inspection to determine if the attributes of an explosion are present.

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute FIRES. Observation of flame is preferred but is not required if large quantities of smoke and heat are observed.

HOSTAGE: A person(s) held as leverage against the licensee to ensure that demands will be met by the facility.

HOSTILE ACTION: An act toward a facility or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILES, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the facility. Non-terrorism-based EALs should be used to address such activities, (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTILE FORCE: One or more individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming, or causing destruction.

IMMINENT: The trajectory of events or conditions is such that an EAL will be met within a relatively short period of time regardless of mitigation or corrective actions.

INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI): A complex that is designed and constructed for the interim storage of spent nuclear fuel and other radioactive materials associated with spent fuel storage.

NORMAL LEVELS: As applied to radiological IC/EALs, the highest reading in the past twenty-four hours excluding the current peak value.

OWNER CONTROLLED AREA (OCA): The property associated with the facility and owned by the licensee. Access is normally limited to persons entering for official business.

PROJECTILE: An object directed toward a facility that could cause concern for its continued operability, reliability, or personnel safety.

PROTECTED AREA: The area normally within the facility security fence designated to implement the security requirements of 10 CFR 73.

SECURITY CONDITION: Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the facility. A SECURITY CONDITION does not involve a HOSTILE ACTION.

UNPLANNED: A parameter change or an event that is not: 1) the result of an intended evolution; or 2) an expected facility response to a transient. The cause of the parameter change or event may be known or unknown.

VISIBLE DAMAGE: Damage to a component or structure that is readily observable without measurements, testing, or analysis. The visual impact of the damage is sufficient to cause concern regarding the operability or reliability of the affected component or structure.

7.0 FCS-TO-NEI 99-01 EAL CROSS-REFERENCE

The following cross-reference table is provided to facilitate association and location of a FCS EAL within the NEI 99-01, Rev. 6 IC/EAL identification scheme. Further information regarding the development of the FCS EALs based on the NEI guidance can be found in the EAL Comparison Matrix (Reference 5.2.2).

FCS Permanently Defueled IC/EALs	NEI 99-01, Rev. 6, Appendix C – Permanently Defueled Station ICs/EALs
PD-RU1	PD-AU1
PD-RA1	PD-AA1
PD-RU2	PD-AU2
PD-RA2	PD-AA2
PD-HU1	PD-HU1
PD-HA1	PD-HA1
PD-HU2	PD-HU2
PD-HU3	PD-HU3
PD-HA3	PD-HA3
PD-SU1	PD-SU1
FCS ISFSI ICs/EAL	**NEI 99-01, Rev. 6, Section 8 – ISFSI ICs/ EALs**
E-HU1	E-HU1

8.0 ATTACHMENTS

8.1 Attachment 1, Recognition Category PD EAL Bases

8.2 Attachment 2, Recognition Category E EAL Basis

Attachment 1
Recognition Category PD EAL Bases

Recognition Category PD EAL Bases

Recognition Category PD (Permanently Defueled) provides a stand-alone set of ICs/EALs for a permanently defueled facility to consider for use in developing a site-specific emergency classification scheme. For development, it was assumed that the facility had operated under a 10 CFR Part 50 license and that the licensee has permanently ceased power operations and removed fuel from the reactor vessel. Further, the licensee intends to store the spent fuel within the permanently defueled facility for some period of time.

When in a permanently defueled condition, the licensee typically receives approval from the NRC for exemptions from specific emergency planning requirements. These exemptions reflect the reduced radiological source term and risks associated with spent fuel pool storage relative to reactor at-power operation. Source terms and accident analyses associated with plausible accidents are documented in the facilities' Final Safety Analysis Report as Updated (USAR). As a result, FCS has developed a facility-specific emergency classification scheme using the NRC-approved exemptions, revised source terms, and revised accident analyses as documented in the station's USAR.

Recognition Category PD uses the same ECLs as operating reactors; however, the source term and accident analyses typically limit the ECLs to an Unusual Event and an Alert. The Unusual Event ICs provide for an increased awareness of abnormal conditions while the Alert ICs are specific to actual or potential impacts to spent fuel. The source terms and release motive forces associated with a permanently defueled facility would not be sufficient to require declaration of a Site Area Emergency or General Emergency.

A permanently defueled station is essentially a spent fuel storage facility with the spent fuel stored in a pool of water that serves as both a cooling medium (i.e., removal of decay heat) and shield from direct radiation. These primary functions of the spent fuel storage pool are the focus of the Recognition Category PD ICs and EALs. Radiological effluent ICs and EALs were included to provide a basis for classifying events that cannot be readily classified based on an observable events or facility conditions alone.

Appropriate ICs and EALs from Recognition Categories A, C, F, H, and S of NEI 99-01 were modified and included in Recognition Category PD to address a spectrum of the events that may affect a spent fuel pool. The Recognition Category PD ICs and EALs reflect the relevant guidance in NEI 99-01, Rev. 6 (e.g., the importance of avoiding both over-classification and under-classification). Nonetheless, FCS has developed its emergency classification scheme using the NRC-approved exemptions, and the source terms and accident analyses specific to FCS. Security-related events are also considered.

The following table, Table PD-1: Recognition Category "PD" Initiating Condition Matrix, provides a summary of ICs associated with Recognition Category PD.

Table PD-1: Recognition Category "PD" Initiating Condition Matrix

UNUSUAL EVENT	ALERT
PD-RU1 Release of gaseous or liquid radioactivity greater than 2 times the ODCM limits for 60 minutes or longer.	**PD-RA1** Release of gaseous or liquid radioactivity resulting in offsite dose greater than 10 mRem TEDE or 50 mRem thyroid CDE.
PD-RU2 UNPLANNED rise in facility radiation levels.	**PD-RA2** UNPLANNED rise in facility radiation levels that impedes facility access required to maintain spent fuel integrity.
PD-HU1 Confirmed SECURITY CONDITION or threat.	**PD-HA1** HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat within 30 minutes.
PD-HU2 Hazardous event affecting equipment necessary for spent fuel cooling.	
PD-HU3 Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Unusual Event.	**PD-HA3** Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Alert.
PD-SU1 UNPLANNED spent fuel pool temperature rise.	

PD-RU1

Emergency Classification Level:

Unusual Event

Initiating Condition:

Release of gaseous or liquid radioactivity greater than 2 times the Offsite Dose Calculation Manual (ODCM) limits for 60 minutes or longer.

Emergency Action Level (EAL): (1 or 2)

Notes:

- The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.
- If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded 60 minutes.
- If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.

1. Reading on ANY Table R1 effluent monitors greater than 2 times the alarm setpoint established by a current radioactive release discharge permit for 60 minutes or longer.

Table R1 Effluent Monitor Thresholds

Effluent Monitor	Description	Value
RM-052 (aligned to Aux Building stack)	AB Stack (gas)	2 X High Alarm
RM-062	AB Stack (gas)	2 X High Alarm
RM-055 (if discharge not isolated)	Liquid Discharge Header	2 X High Alarm

OR

2. Sample analysis for a gaseous or liquid release indicates a concentration or release rate greater than 2 times the ODCM limits for 60 minutes or longer.

Basis:

This IC addresses a potential decrease in the level of safety of the facility as indicated by a low-level radiological release that exceeds regulatory commitments for an extended

period of time (e.g., an uncontrolled release). It includes any gaseous or liquid radiological release, monitored or un-monitored, including those for which a radioactivity discharge permit is normally prepared.

Fort Calhoun Station incorporates design features intended to control the release of radioactive effluents to the environment. Further, there are administrative controls established to prevent unintentional releases, and to control and monitor intentional releases. The occurrence of an extended, uncontrolled radioactive release to the environment is indicative of degradation in these features and/or controls.
Radiological effluent EALs are also included to provide a basis for classifying events and conditions that cannot be readily or appropriately classified on the basis of facility conditions alone. The inclusion of both facility condition and radiological effluent EALs more fully addresses the spectrum of possible accident events and conditions.

Classification based on effluent monitor readings assumes that a release path to the environment is established. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.

Releases should not be prorated or averaged. For example, a release exceeding 4 times release limits for 30 minutes does not meet the EAL.

EAL #1 addresses radioactivity releases that cause effluent radiation monitor readings to exceed 2 times the limit established by a radioactivity discharge permit. This EAL will typically be associated with planned batch releases from non-continuous release pathways (e.g., radwaste, waste gas).

EAL #2 addresses uncontrolled gaseous or liquid releases that are detected by sample analyses or environmental surveys, particularly on unmonitored pathways (e.g., spills of radioactive liquids into storm drains, heat exchanger leakage in river water systems, etc.).

Escalation of the emergency classification level would be via IC PD-RA1.

Basis Reference:

1. NEI 99-01 Rev. 6, PD-AU1

PD-RA1

Emergency Classification Level:

Alert

Initiating Condition:

Release of gaseous or liquid radioactivity resulting in offsite dose greater than 10 mRem TEDE or 50 mRem thyroid CDE.

Emergency Action Level (EAL): (1 or 2 or 3 or 4)

Notes:

- The Emergency Director should declare the event promptly upon determining that the applicable time has been exceeded, or will likely be exceeded.
- If an ongoing release is detected and the release start time is unknown, assume that the release duration has exceeded 15 minutes.
- If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.
- The pre-calculated effluent monitor values presented in EAL #1 should be used for emergency classification assessments until the results from a dose assessment using actual meteorology are available.

1. A valid reading on ANY Table R2 effluent monitor greater than the value shown for 15 minutes or longer:

Table R2 - Effluent Monitor Thresholds		
Effluent Monitor	**Description**	**Value**
RM-052 (aligned to Aux Building stack)	AB Stack (gas)	9×10^6 cpm
RM-062	AB Stack (gas)	9×10^6 cpm
RM-055 (if discharge not isolated)	Liquid Discharge Header	9×10^6 cpm

OR

2. Dose assessment using actual meteorology indicates doses greater than 10 mRem TEDE or 50 mRem thyroid CDE at or beyond the site boundary.

OR

3. Analysis of a liquid effluent sample indicates a concentration or release rate that would result in doses greater than 10 mRem TEDE or 50 mRem thyroid CDE at or

beyond the site boundary for one hour of exposure.

OR

4. Field survey results indicate **EITHER** of the following at or beyond the site boundary:
   - Closed window dose rates greater than 10 mRem/hr expected to continue for 60 minutes or longer.
   - Analyses of field survey samples indicate thyroid CDE greater than 50 mRem for one hour of inhalation.

Basis:

This IC addresses a release of gaseous or liquid radioactivity that results in projected or actual offsite doses greater than or equal to 1% of the EPA Protective Action Guides (PAGs). It includes both monitored and un-monitored releases. Releases of this magnitude represent an actual or potential substantial degradation of the level of safety of the facility as indicated by a radiological release that significantly exceeds regulatory limits (e.g., a significant uncontrolled release).

Radiological effluent EALs are also included to provide a basis for classifying events and conditions that cannot be readily or appropriately classified on the basis of facility conditions alone. The inclusion of both facility condition and radiological effluent EALs more fully addresses the spectrum of possible accident events and conditions.

The TEDE dose is set at 1% of the EPA PAG of 1000 mRem while the 50 mRem thyroid CDE was established in consideration of the 1:5 ratio of the EPA PAG for TEDE and thyroid CDE.

Classification based on effluent monitor readings assumes that a release path to the environment is established. If the effluent flow past an effluent monitor is known to have stopped due to actions to isolate the release path, then the effluent monitor reading is no longer valid for classification purposes.

The threshold value for RM-052 was determined via Calculation FC08515. The RM-052 reading that corresponds to the 10 mRem TEDE (1.1×10^8 cpm) threshold exceeds the maximum count rate for the monitor (1×10^7 cpm). Based on the guidance presented in NEI 99-01, Rev. 6 the EAL threshold value is set at 90% of the maximum monitor reading, corresponding to 9×10^6 cpm.

The threshold value for RM-062 was determined via Calculation FC08515. The RM-062 reading that corresponds to the 10 mRem TEDE (9.3×10^7 cpm) threshold exceeds the maximum count rate for the monitor (1×10^7 cpm). Based on the guidance presented in NEI 99-01, Rev. 6 the EAL threshold value is set at 90% of the maximum monitor reading,

corresponding to 9×10^6 cpm.

The threshold value for RM-055 was determined via Calculation FC08516. The RM-055 reading that corresponds to the 10 mRem TEDE threshold exceeds the maximum count rate for the monitor (1×10^7 cpm). Based on the guidance presented in NEI 99-01, Rev. 6 the EAL threshold value is set at 90% of the maximum monitor reading, corresponding to 9×10^6 cpm.

Basis Reference:

1. NEI 99-01 Rev. 6, PD-AA1
2. Calculation FC08515
3. Calculation FC08516

PD-RU2

Emergency Classification Level:

Unusual Event

Initiating Condition:

UNPLANNED rise in facility radiation levels.

Emergency Action Level (EAL): (1 or 2)

1. a. UNPLANNED water level drop to below the normal range in the spent fuel pool as indicated by the following:

   - LT-2846 (Spent Fuel Pool Level)
   - LI-2846 (Local Indication)

   AND

   b. UNPLANNED rise in area radiation levels as indicated by a valid reading on **ANY** radiation monitor in Table R3.

Table R3 - Radiation Monitors	
RMS	**Area Monitored**
RM-80, 85, 87	Spent Fuel Storage Area Radiation Monitor
Portable Area Rad Monitor	Auxiliary Building near fuel handling areas

OR

2. Area radiation monitor reading or survey result indicated an UNPLANNED rise of 25 mRem/hr over NORMAL LEVELS.

Basis:

UNPLANNED: A parameter change or an event that is not: 1) the result of an intended evolution; or 2) an expected facility response to a transient. The cause of the parameter change or event may be known or unknown.

NORMAL LEVELS: As applied to radiological IC/EALs, the highest reading in the past twenty-four hours excluding the current peak value.

This IC addresses elevated radiation levels caused by a decrease in water level above irradiated (spent) fuel or other UNPLANNED events. The increased radiation levels are indicative of a minor loss in the ability to control radiation levels within the facility or radioactive materials. Either condition is a potential degradation in the level of safety of the facility.

A water level decrease will be primarily determined by indications from available level instrumentation. Other sources of level indications may include reports from personnel or video camera observations (if available). A significant drop in the water level may also cause a rise in the radiation levels of adjacent areas that can be detected by monitors in those locations.

The effects of planned evolutions should be considered. Note that EAL #1 is applicable only in cases where the elevated reading is due to an UNPLANNED water level drop. EAL #2 excludes radiation level increases that result from planned activities such as the use of radiographic sources and movement of radioactive waste materials.

Escalation of the emergency classification level would be via IC PD-RA1 or PD-RA2.

Basis Reference:

1. NEI 99-01 Rev. 6, PD-AU2

PD-RA2

Emergency Classification Level:

Alert

Initiating Condition:

UNPLANNED rise in facility radiation levels that impedes facility access required to maintain spent fuel integrity.

Emergency Action Level (EAL): (1 or 2)

1. UNPLANNED dose rate greater than 15 mRem/hr in **ANY** of the following areas requiring continuous occupancy to maintain control of radioactive material or operation of systems needed to maintain spent fuel integrity.

   - Main Control Room
   - Central Alarm Station

OR

2. Area Radiation Monitor readings or survey results indicate an UNPLANNED rise by 100 mRem/hr over NORMAL LEVELS that impedes access to **ANY** of the following areas needed to maintain control of radioactive material or operation of systems needed to maintain spent fuel integrity.

   - Room 4
   - Room 5
   - Room 24
   - Room 25
   - Room 26
   - Room 69

Basis:

NORMAL LEVELS: As applied to radiological IC/EALs, the highest reading in the past twenty-four hours excluding the current peak value.

UNPLANNED: A parameter change or an event that is not: 1) the result of an intended evolution; or 2) an expected facility response to a transient. The cause of the parameter change or event may be known or unknown.

This IC addresses increased radiation levels, as discussed in NEI 99-01, that impede necessary access to areas containing equipment that must be operated manually or that

requires local monitoring in order to maintain systems needed to maintain spent fuel integrity. As used here, "impede" includes hindering or interfering, provided that the interference or delay is sufficient to significantly threaten necessary facility access. It is this impaired access that results in the actual or potential substantial degradation of the level of safety of the facility.

This IC does not apply to anticipated temporary increases due to planned events.

Basis Reference:

1. NEI 99-01 Rev. 6, PD-AA2

PD-HU1

Emergency Classification Level:

Unusual Event

Initiating Condition:

Confirmed SECURITY CONDITION or threat.

Emergency Action Level (EAL): (1 or 2 or 3)

1. A SECURITY CONDITION that does not involve a HOSTILE ACTION as reported by the Security Shift Supervisor.

OR

2. Notification of a credible security threat directed at the site.

OR

3. A validated notification from the NRC providing information of an aircraft threat.

Basis:

HOSTAGE: A person(s) held as leverage against the licensee to ensure that demands will be met by the facility.

HOSTILE ACTION: An act toward a facility or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILES, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the facility. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

PROJECTILE An object directed toward a facility that could cause concern for its continued operability, reliability, or personnel safety.

SECURITY CONDITION: Any Security Event as listed in the approved security contingency plan that constitutes a threat/compromise to site security, threat/risk to site personnel, or a potential degradation to the level of safety of the facility. A SECURITY CONDITION does not involve a HOSTILE ACTION.

This IC addresses events that pose a threat to facility personnel or equipment necessary to maintain spent fuel integrity, and thus represent a potential degradation in the level of facility safety. Security events which do not meet one of these EALs are adequately addressed by the requirements of 10 CFR § 73.71 or 10 CFR § 50.72. Security events assessed as HOSTILE ACTIONS are classifiable under IC PD-HA1.

Timely and accurate communication between Security Shift Supervision and the Control Room is essential for proper classification of a security-related event. Classification of these events will initiate appropriate threat-related notifications to site personnel and Off-Site Response Organizations.

Security plans and terminology are based on the guidance provided by NEI 03-12, *Template for the Security Plan, Training and Qualification Plan, Safeguards Contingency Plan [and Independent Spent Fuel Storage Installation Security Program].*

EAL #1 references Security Shift Supervisor because these are the individuals trained to confirm that a security event is occurring or has occurred. Training on security event confirmation and classification is controlled due to the nature of Safeguards and 10 CFR § 2.390 information.

EAL #2 addresses the receipt of a credible security threat. The credibility of the threat is assessed in accordance with SY-FC-101-132, *Security Assessment and Response to Unusual Activities*.

EAL #3 addresses the threat from the impact of an aircraft on the facility. The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an aircraft. The status and size of the plane may also be provided by NORAD through the NRC. Validation of the threat is performed in accordance with AOP-37, *Security Events*.

Escalation of the emergency classification level would be via IC PD-HA1.

Basis Reference:

1. NEI 99-01 Rev. 6, PD-HU1

Emergency Classification Level:

Alert

Initiating Condition:

HOSTILE ACTION within the OWNER CONTROLLED AREA or airborne attack threat within 30 minutes.

Emergency Action Level (EAL): (1 or 2)

1. A HOSTILE ACTION is occurring or has occurred within the OWNER CONTROLLED AREA as reported by the Security Shift Supervisor.

OR

2. A validated notification from NRC of an aircraft attack threat within 30 minutes of the site.

Basis:

HOSTAGE: A person(s) held as leverage against the licensee to ensure that demands will be met by the facility.

HOSTILE ACTION: An act toward a facility or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILES, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the facility. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

HOSTILE FORCE: One or more individuals who are engaged in a determined assault, overtly or by stealth and deception, equipped with suitable weapons capable of killing, maiming, or causing destruction.

OWNER CONTROLLED AREA (OCA): The property associated with the facility and owned by the licensee. Access is normally limited to persons entering for official business.

PROJECTILE: An object directed toward a facility that could cause concern for its continued operability, reliability, or personnel safety.

PROTECTED AREA: The area normally within the facility security fence designated to implement the security requirements of 10 CFR 73.

This IC addresses the occurrence of a HOSTILE ACTION within the OWNER CONTROLLED AREA or notification of an aircraft attack threat. This event will require rapid response and assistance due to the possibility of the attack progressing to the PROTECTED AREA, or the need to prepare the facility and staff for a potential aircraft impact.

Timely and accurate communication between Security Shift Supervision and the Control Room is essential for proper classification of a security-related event.

Security plans and terminology are based on the guidance provided by NEI 03-12, *Template for the Security Plan, Training and Qualification Plan, Safeguards Contingency Plan [and Independent Spent Fuel Storage Installation Security Program].*

As time and conditions allow, these events require a heightened state of readiness by the facility staff and implementation of onsite protective measures (e.g., evacuation, dispersal or sheltering). The Alert declaration will also heighten the awareness of Offsite Response Organizations (OROs), allowing them to be better prepared should it be necessary to consider further actions.

This IC does not apply to incidents that are accidental events, acts of civil disobedience, or otherwise are not a HOSTILE ACTION perpetrated by a HOSTILE FORCE. Examples include the crash of a small aircraft, shots from hunters, physical disputes between employees, etc. Reporting of these types of events is adequately addressed by other EALs, or the requirements of 10 CFR § 73.71 or 10 CFR § 50.72.

EAL #1 is applicable for any HOSTILE ACTION occurring, or that has occurred, in the OWNER CONTROLLED AREA. This includes any action directed against the ISFSI.

EAL #2 addresses the threat from the impact of an aircraft on the facility, and the anticipated arrival time is within 30 minutes. The intent of this EAL is to ensure that threat-related notifications are made in a timely manner so that onsite personnel and OROs are in a heightened state of readiness. This EAL is met when the threat-related information has been validated in accordance with AOP-37, *Security Events*.

The NRC Headquarters Operations Officer (HOO) will communicate to the licensee if the threat involves an aircraft. The status and size of the plane may be provided by NORAD through the NRC.

In some cases, it may not be readily apparent if an aircraft impact within the OWNER CONTROLLED AREA was intentional (i.e., a HOSTILE ACTION). It is expected, although not certain, that notification by an appropriate Federal agency to the site would clarify this point. In this case, the appropriate federal agency is intended to be NORAD, FBI, FAA or

NRC. The emergency declaration, including one based on other ICs/EALs, should not be unduly delayed while awaiting notification by a Federal agency.

Basis Reference:

1. NEI 99-01 Rev. 6, PD-HA1

PD-HU2

Emergency Classification Level:

Unusual Event

Initiating Condition:

Hazardous event affecting equipment necessary for spent fuel cooling.

Emergency Action Level (EAL):

1. a. The occurrence of **ANY** of the following hazardous events:

   - Seismic event (earthquake)
   - Internal or external flooding event
   - High winds or tornado strike
   - FIRE
   - EXPLOSION
   - Low river level as indicated by less than 976 feet, 9 inches MSL elevation
   - Other events with similar hazard characteristics as determined by the Shift Manager

   AND

   b. The event has damaged at least one train of a system needed for spent fuel cooling.

   AND

   c. The damaged equipment cannot, or potentially cannot, perform its design function based on **EITHER**:

   - Indications of degraded performance
   - VISIBLE DAMAGE

Basis:

EXPLOSION: A rapid, violent and catastrophic failure of a piece of equipment due to combustion, chemical reaction or over pressurization. A release of steam (from high energy lines or components) or an electrical component failure (caused by short circuits, grounding, arcing, etc.) should not automatically be considered an explosion. Such events may require a post-event inspection to determine if the attributes of an explosion are present.

FIRE: Combustion characterized by heat and light. Sources of smoke such as slipping drive belts or overheated electrical equipment do not constitute FIRES. Observation of flame is preferred but is NOT required if large quantities of smoke and heat are observed.

VISIBLE DAMAGE: Damage to a component or structure that is readily observable without measurements, testing, or analysis. The visual impact of the damage is sufficient to cause concern regarding the operability or reliability of the affected component or structure.

This IC addresses a hazardous event that causes damage to at least one train of equipment needed for spent fuel cooling. The damage must be of sufficient magnitude that the system(s) train cannot, or potentially cannot, perform its intended function. This condition reduces the margin to a loss or potential loss of the fuel clad barrier, and therefore represents a potential degradation of the level of safety of the facility.

For EAL 1.c., the first bullet addresses damage to equipment that is in service/operation since indications for it will be readily available.

For EAL 1.c., the second bullet addresses damage to equipment that is not in service/operation or readily apparent through indications alone. Operators will make this determination based on the totality of available event and damage report information. This is intended to be a brief assessment not requiring lengthy analysis or quantification of the damage.

Escalation of the emergency classification level could, depending upon the event, be based on any of the ALERT ICs: PD-RA1, PD-RA2, PD-HA1, or PD-HA3

Basis Reference:

1. NEI 99-01, Rev. 6, PD-HU2

PD-HU3

Emergency Classification Level:

Unusual Event

Initiating Condition:

Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Unusual Event.

Emergency Action Level (EAL):

1. Other conditions exist which in the judgment of the Emergency Director indicate that events are in progress or have occurred which indicate a potential degradation of the level of safety of the facility or indicate a security threat to facility protection has been initiated. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of systems needed to maintain spent fuel cooling occurs.

Basis:

This IC addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency classification level description for an Unusual Event.

Basis Reference:

1. NEI 99-01, Rev. 6, PD-HU3

PD-HA3

Emergency Classification Level:

Alert

Initiating Condition:

Other conditions exist which in the judgment of the Emergency Director warrant declaration of an Alert.

Emergency Action Level (EAL):

1. Other conditions exist which, in the judgment of the Emergency Director, indicate that events are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the facility or a security event that involves probable life threatening risk to site personnel or damage to site equipment because of HOSTILE ACTION. Any releases are expected to be limited to small fractions of the EPA Protective Action Guideline exposure levels.

Basis:

HOSTAGE: A person(s) held as leverage against the licensee to ensure that demands will be met by the facility.

HOSTILE ACTION: An act toward a facility or its personnel that includes the use of violent force to destroy equipment, take HOSTAGES, and/or intimidate the licensee to achieve an end. This includes attack by air, land, or water using guns, explosives, PROJECTILES, vehicles, or other devices used to deliver destructive force. Other acts that satisfy the overall intent may be included. HOSTILE ACTION should not be construed to include acts of civil disobedience or felonious acts that are not part of a concerted attack on the facility. Non-terrorism-based EALs should be used to address such activities (i.e., this may include violent acts between individuals in the owner controlled area).

PROJECTILE: An object directed toward a facility that could cause concern for its continued operability, reliability, or personnel safety.

This IC addresses unanticipated conditions not addressed explicitly elsewhere but that warrant declaration of an emergency because conditions exist which are believed by the Emergency Director to fall under the emergency classification level description for an Alert.

Basis Reference:

1. NEI 99-01, Rev. 6, PD-HA3

PD-SU1

Emergency Classification Level:

Unusual Event

Initiating Condition:

UNPLANNED spent fuel pool temperature rise.

Emergency Action Level (EAL):

1. UNPLANNED spent fuel pool temperature rise to greater than 150 °F as indicated on **T408A/B/C** or locally by handheld instrument.

Basis:

UNPLANNED: A parameter change or an event that is not: 1) the result of an intended evolution; or 2) an expected facility response to a transient. The cause of the parameter change or event may be known or unknown.

This IC addresses a condition that is a precursor to a more serious event and represents a potential degradation in the level of safety of the facility. If uncorrected, boiling in the pool will occur and result in a loss of pool level and increased radiation levels.

Escalation of the emergency classification level would be via IC PD-RA1 or PD-RA2.

Basis Reference:

1. NEI 99-01 Rev. 6, PD-SU1

Attachment 2
Recognition Category E EAL Basis

Recognition Category E EAL Basis

Recognition Category E provides a set of ICs/EALs for an ISFSI. An ISFSI is a complex that is designed and constructed for the interim storage of spent nuclear fuel and other radioactive materials associated with spent fuel storage. A significant amount of the radioactive material contained within a cask must escape its packaging and enter the atmosphere for there to be a significant environmental effect resulting from an accident involving the dry storage of spent nuclear fuel. Formal offsite planning is not required because the postulated worst-case accident involving an ISFSI has insignificant consequences to the public health and safety.

An Unusual Event is declared on the basis of the occurrence of an event of sufficient magnitude that a loaded cask confinement boundary is damaged or violated. This includes classification based on a loaded fuel storage cask confinement boundary loss leading to the degradation of the fuel during storage or posing an operational safety problem with respect to its removal from storage.

Table E-1: Recognition Category "E" Initiating Condition Matrix

UNUSUAL EVENT
E-HU1 Damage to a loaded cask CONFINEMENT BOUNDARY.

E-HU1

Emergency Classification Level:

Unusual Event

Initiating Condition

Damage to a loaded cask CONFINEMENT BOUNDARY.

Emergency Action Level (EAL):

1. Damage to a loaded cask CONFINEMENT BOUNDARY as indicated by an on-contact radiation reading:

   - ≥ 1600 mRem/hr (gamma + neutron) on the Horizontal Storage Module (HSM) front surface

   OR

   - ≥ 400 mRem/hr (gamma + neutron) on the HSM door centerline

   OR

   - ≥ 16 mRem/hr (gamma + neutron) on the end shield wall exterior

Basis:

CONFINEMENT BOUNDARY: The irradiated fuel dry storage cask barrier(s) between areas containing radioactive substances and the environment.

INDEPENDENT SPENT FUEL STORAGE INSTALLATION (ISFSI): A complex that is designed and constructed for the interim storage of spent nuclear fuel and other radioactive materials associated with spent fuel storage.

This IC addresses an event that results in damage to the CONFINEMENT BOUNDARY of a storage cask containing spent fuel. It applies to irradiated fuel that is licensed for dry storage beginning at the point that the loaded storage cask is sealed. The issues of concern are the creation of a potential or actual release path to the environment, degradation of one or more fuel assemblies due to environmental factors, and configuration changes which could cause challenges in removing the cask or fuel from storage.

The existence of "damage" is determined by radiological survey. The radiation limits listed in the EAL reflect 2 times the cask technical specification for radiation level. The technical specification multiple of "2 times" is used here to distinguish between non-emergency and

emergency conditions. The emphasis for this classification is the degradation in the level of safety of the spent fuel cask and not the magnitude of the associated dose or dose rate. It is recognized that in the case of extreme damage to a loaded cask, the fact that the "on-contact" dose rate limit is exceeded may be determined based on measurement of a dose rate at some distance from the cask.

Amendment number 9 to COC 1004 Technical Specifications for the Standardized NUHOMS® Horizontal Storage Module System contains radiation dose levels for the dry storage cask that should not be exceeded based on whether the dry storage cask is being transported inside the fuel transfer cask or it is stored in the horizontal storage module. Based on the guidance contained in NEI 99-01, Rev. 6, an Unusual Event is warranted for radiation levels of twice the Technical Specification value; the values chosen for EAL E-HU1 represent these values.

Security-related events for ISFSIs are covered under ICs PD-HU1 and PD-HA1.

Basis References:

1. NEI 99-01, Rev. 6, E-HU1
2. Amendment 9 to COC 1004 Technical Specifications for the Standardized NUHOMS® Horizontal Storage Module System

Summary of Changes for EP-FC-1001 Addendum 4

This summary of changes is a listing of all the Industry Decommissioning Commitments (IDSs) and Staff Decommissioning Assumptions (SDAs) Comparison changes that have been made since the original NRC submittal for PDEP. A cover page, table of contents, introduction, procedure header, and page numbers were also added to the document. The NRC **approved** the Permanently Defueled Emergency Plan (PDEP) on December 12th, 2017 by Amendment No. 295 effective April 7, 2018 and this amendment shall be implemented within 90 days of the effective date. PORC approved the PDEP submitted to the NRC on December 16, 2016 and this summary only covers changes made since that time. EP-FC-1001 Addendum 4 is a new procedure that is being issued to ensure commitments related to the PDEP are not inadvertently deleted until the ISFSI only Emergency Plan is implemented.

Summary:

USAR was changed to DSAR

EP-FC-112-100-F-01 title changed from "Command and Control Checklist – Control Room" to "Shift Manager Checklist".

EP-FC-122 Drill and Exercises changed to EP-FC-2001-DRILL

Training requirements listed in EP-FC-10 were moved into TQ-DC-FC-113 ERO Training and Qualification and the ERO Training and Qualification procedure number changed from TQ-FC-113 to TQ-DC-FC-113

The title Non-Certified Fuel Handlers was changed to Non-Certified Operators

OCAG-3 was deleted as RCS is no longer "intact"

OP-AA-201-010-1001 was changed to OP-FC-201-010-1001

EP-FC-11 Operation Stations Emergency Preparedness Process Description was deleted and all relevant information was move to EP-FC-2001, Emergency Plan Administration

HU-AA-104-101 was changed to HU-FC-104-101

The term Emergency Feedwater Storage Tank was removed as we no longer credit it.

The term General Emergency was removed and replaced with Alert as this is the highest classification that can be reached in the PDEP.

Updated SFP system walk down information to ensure operator logs are taken once per.

References:

1. LIC-17-0047, FCS Response to Request for Additional Information (RAI)
2. NRC Docket No. 50-285 OPPD FCS Unit No. 1 EP Exemption (ML17263B198)
3. NRC Amendment No. 295 to License No. DRP-40 PDEP and EAL approval

(ML17276B286)

4. Letter from OPPD (S. M. Marik) to USNRC (Document Control Desk), "License Amendment Request 16-07: Revise the Fort Calhoun Station Emergency Plan to the Permanently Defueled Emergency Plan and Permanently Defueled Emergency Action Level Scheme" dated December 16, 2016 (LIC-16-0108) (ML16351A464) (CAC MF8951)

5. OPPD Letter (S. Marik) to USNRC (Document Control Desk) – "Request for Exemptions from Portions of 10 CFR 50.47 and 10 CFR Part 50, Appendix E," dated December 16, 2016 (LIC-16-0109) (ML16356A578) (CAC MF9067)

6. Letter from OPPD (S. M. Marik) to USNRC (Document Control Desk), "License Amendment Request (LAR) 16-02: Revise the Fort Calhoun Station Emergency Plan to Address the Permanently Defueled Condition," dated September 2, 2016 (LIC-16-0076) (ML16246A321) (CAC MF8326)

FCS

EP-FC-1001 Addendum 4
Revision 0

OPPD NUCLEAR

PDEP

Industry Decommissioning Commitments (IDCs) Comparison

&

Staff Decommissioning Assumptions (SDAs) Comparison

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Commitments:

AR 67658 (Delete Commitment with the implementation of the approved ISFSI Only Emergency Plan)

INTRODUCTION

NUREG-1738 identifies beyond design basis seismic events as the dominant contributor to events that could result in a loss of SFP coolant that uncovers fuel for plants in the Central and Eastern United States. Additionally, NUREG-1738 identifies a zirconium fire resulting from a substantial loss-of-water inventory from the SFP, as the only postulated scenario at a decommissioning plant that could result in a significant offsite radiological release. The scenarios that lead to this condition have very low frequencies of occurrence (i.e., on the order of one to tens of times in a million years) and are considered beyond design basis events because the SFP and attached systems are designed to prevent a substantial loss of coolant inventory under accident conditions. However, the consequences of such accidents could potentially lead to an offsite radiological dose in excess of the EPA PAGs at the EAB.

The risk associated with zirconium cladding fire events decreases as the spent fuel ages, decay time increases, decay heat decreases, and short-lived radionuclides decay away. As decay time increases, the overall risk of a zirconium cladding fire continues to decrease due to two factors:

1) the amount of time available for preventative actions increases, which reduces the probability that the actions would not be successful; and

2) the increased likelihood that the fuel is able to be cooled by air, which decreases the reliance on actions to prevent a zirconium fire.

FCS has demonstrated that no credible accident will result in radiological releases requiring offsite protective actions. Additionally, there is sufficient time, resources and personnel available to initiate mitigative actions that will prevent an offsite release that exceeds EPA PAGs. Design and operation of the FCS SFP has been evaluated against the industry decommissioning commitments (IDCs) and staff decommissioning assumptions (SDAs) contained in NUREG-1738. This evaluation is contained in Section 1 and 2.

SECTION 1
PDEP Industry Decommissioning Commitments (IDCs) Comparison

IDC	Industry Commitments	Response
1	Cask drop analyses will be performed or single failure-proof cranes will be in use for handling of heavy loads (i.e., phase II of NUREG-0612 will be implemented).	DSAR 14.24: The FCS auxiliary building crane with its main hook is used to move the spent fuel casks into the spent fuel pool. The capacity of the crane lifting system using the main hook is 106 tons to accommodate the ISFSI spent fuel casks. The design of this lifting system is single failure proof. Therefore, the likelihood of dropping the spent fuel casks into the spent fuel pool or in the auxiliary building is extremely low. The crane, main hook and lifting system meet the requirements of NUREG-0612, NUREG-0554, ANSI-30.2-1976, Regulatory Guide 1.104, CMAA-70 and ASME NOG-1-2004 as a single failure proof system. GM-OI-HE-002, Attachment 13, Summary of HE-2 Licensing Basis as a Single Failure Proof Crane: The licensing basis for the control of heavy loads associated with the Refueling Area Crane consists of commitment to NUREG 0612 "Control of Heavy Loads at Nuclear Power Plants" Phase 1 requirements. The Auxiliary Building Crane large hook conforms to the design requirements of NUREG 0554 "Single-Failure-Proof Cranes for Nuclear Power Plants", as demonstrated through conformance with the generic topical report for nuclear safety-related X SAM crane EDR-1. The basis for FCS' defense-in-depth approach for the control of heavy loads in the spent fuel pool area consists of preventing load drops due to crane failure, rigging failure, or human error through a combination of the use of the single-failure-proof crane and through compliance with the following guidelines from NUREG 0612. 1. Definition of safe load paths 2. Development of load handling procedures 3. Periodic inspection and testing of cranes 4. Qualifications, training and specified conduct of operators 5. Special lifting devices should satisfy the guidelines of ANSI N14.6 6. Lifting devices that are not specially designed should be installed and used in accordance with the guidelines of ANSI B30.9 7. Design of cranes to ANSI B30.2 or CMAA-70

IDC	Industry Commitments	Response
		Rigging equipment meeting guidelines no. 5 and 7 must be used to maintain single failure proof status. The licensing basis with regard to these guidelines requires that off the shelf and specially designed rigging equipment meet one of the following requirements: 1. Provide redundancy or duality such that a single lift point failure will not result in uncontrolled lowering of the load; lift points must have a design factor of safety with respect to ultimate strength of five times the maximum load. The following is an example for meeting this requirement. Lifting a 10,000 lb load requires two sets of rigging, each rated for at least 10,000 lbs (with a 5:1 factor of safety). The total combined factor of safety would then be 10:1. OR 2. A non-redundant or non-dual lift point system must have a design safety factor of ten times the maximum load. This can be met by using one set of rigging rated at 20,000 lbs (with a 5:1 factor of safety) to lift a 10,000 lb load. The total combined factor of safety would then be 10:1. Because the auxiliary building crane is single-failure proof, an accidental load drop is considered not to be a credible event such that condition 5.1.2(1) of NUREG-0612 is satisfied and analysis of cask drop accidents in accordance with condition 5.1.2(4) of NUREG-0612 is not required. **Note that CR 2015-04649 addresses concerns regarding the auxiliary building crane. The calculations to support the crane usage for the next dry fuel storage will be updated to address concerns.**
2	Procedures and training of personnel will be in place to ensure that onsite and offsite resources can be brought to bear during an event.	FCS procedures are in place to ensure onsite and offsite resources can be brought to bear during an event, including: AOP-1, Acts of Nature, AOP-6, Fire Emergency, AOP-37, Security Event, AOP-31, 161kV Grid Malfunctions, AOP-38, Blair Water Main Trouble, and OCAG-1/2/4, Operational Contingency Action Guidelines. EP-FC-112-100-F-01, SHIFT MANAGER CHECKLIST, directs the Control Room to implement EP-FC-114-100, OFF-SITE NOTIFICATIONS. The Shift Manager or other designated Control Room personnel activates the ERO Notification System, in accordance with EP-FC-112-100-F-06, ERO NOTIFICATION OR AUGMENTATION. This process ensures FCS emergency personnel report to their proper locations. Periodic Emergency Plan drills are conducted with opportunities for off-site response organization participation in accordance with EP-FC-2001-DRILL, DRILLS AND EXERCISES. Training requirements are outlined in and executed per TQ-DC-FC-113, ERO TRAINING AND QUALIFICATION.

IDC	Industry Commitments	Response
		The post-shutdown on-shift operations staff, including Certified Fuel Handlers (CFH) and Non - Certified Operators (NCO) will be appropriately trained on these procedures. Finally, in accordance with OP-FC-201-010-1001, B.5.b MITIGATING STRATEGIES EQUIPMENT EXPECTATIONS, the systematic approach to training is implemented to ensure Operations and other appropriate personnel receive initial and continuing training on B.5.b event related procedures and strategies credited in the Mitigation Strategy License Condition under 10 CFR 50.54 (hh)(1), 10CFR 50.54 (hh)(2), and Attachment 2 to NRC order EA-06-137. Additionally, ERO decision makers are to receive initial and continuing training in accordance with TQ-DC-FC-113, ERO TRAINING AND QUALIFICATION. Finally, training is to be provided on strategies and command and control aspects of a 10 CFR 50.54 (hh)(1) and 10CFR50.54(hh)(2) B.5.b event that includes the following: Initial operational response, Initial damage assessments, and Appropriate offsite notifications of ERO.
3	Procedures will be in place to establish communication between onsite and offsite organizations during severe weather and seismic events.	FCS has the following procedure to provide guidance for establishing and maintaining communications between offsite agencies and the onsite ERO during severe weather and seismic events: 1. EP-FC-2001, Emergency Plan Administration 2. EP-FC-111, EMERGENCY CLASSIFICATION 3. EP-FC-114-100, OFF-SITE NOTIFICATIONS 4. EP-FC-114-100-F-01, FORT CALHOUN STATION – STATE/LOCAL EVENT NOTIFICATION FORM 5. EP-FC-114-100-F-02, Notification/Update of States 6. AOP-1, ACTS OF NATURE 7. OCAG-1, OPERATIONAL CONTINGENCY ACTION GUIDELINE ***10 CFR 2.390***** 8. OCAG-2, OPERATIONAL CONTINGENCY ACTION GUIDELINE FOR DAM FAILURE OR PREDICTED FLOOD GREATER THAN 1014 FEET MSL ***10 CFR 2.390*** 9. OCAG-4, MITIGATING BEYOND DESIGN BASIS FLOODING GREATER THAN EL. 1036' WITH RCS OPEN ***10 CFR 2.390*****
4	An offsite resource plan will be developed which will include access to portable pumps and emergency power to supplement onsite resources. The plan would principally identify organizations or suppliers where offsite	The following procedures provide guidance for access to offsite resources including a listing of providers, contact information and resources, as well as mitigation strategies for SFP damage and water supply: 1. OP-FC-201-010-1001, B.5.b MITIGATING STRATEGIES EQUIPMENT EXPECTATIONS 2. OCAG-1, OPERATIONAL CONTINGENCY ACTION GUIDELINE ***10 CFR 2.390*****

IDC	Industry Commitments	Response
	resources could be obtained in a timely manner.	3. OCAG-2, OPERATIONAL CONTINGENCY ACTION GUIDELINE FOR DAM FAILURE OR PREDICTED FLOOD GREATER THAN 1014 FEET MSL ***10 CFR 2.390*** 4. OCAG-4, MITIGATING BEYOND DESIGN BASIS FLOODING GREATER THAN EL. 1036' WITH RCS OPEN ***10 CFR 2.390***** External support resources are validated on an annual basis per OP-FC-201-010-1001.
5	SFP instrumentation will include readouts and alarms in the control room (or where personnel are stationed) for SFP temperature, water level, and area radiation levels.	The FCS design is consistent with this IDC, which include multiple readouts and alarms for SFP temperature, water level, and area radiation monitors. Additionally, FCS has procedure AOP-36, LOSS OF SPENT FUEL POOL COOLING, to guide the response in the event that cooling or level is lost in the SFP. At FCS the control room and local operating panel (AI-100) is also alerted by alarm when a SFP cooling pump is not running. This allows for prompt operation action prior to having an issue with cooling. SFP temperature indication in the Control Room and remote locations is monitored from a point in the SFP cooling path on the outlet of the heat exchanger. Additionally, the Component Cooling water temperature through the heat exchanger is also monitored. Both of these indications will cause alarms in the Control Room on high temperature. Additionally, temperature indications from the 1013-, 1022- and 1035-foot elevations of the SFP are displayed and recorded on the Emergency Response Facility computer (ERF). These indications have high, high-high, and rate of change alarms. SFP water level is monitored shiftly as part of required Operator rounds using an installed level indication and visual verification. This level indication also drives a control room alarm on both high and low level. There is also a ruler mounted indication in the SFP for monitoring level. In the event of a beyond design basis flooding event, additional level indication is installed in the SFP as driven through OCAG-2/4. SFP area radiation levels are monitored via area radiation monitors that provide indication and alarm annunciation in the Control Room. A local alarm to notify personnel of high area radiation levels is also in place.
6	SFP seals that could cause leakage leading to fuel uncovery in the event of seal failure shall be self limiting to leakage or otherwise engineered so that drainage cannot occur.	At FCS the design of the SFP and its cooling system and connections to the pool are such that the pool cannot be drained below the level of the top of the stored fuel when in its storage rack. Additionally, drainage grooves are provided behind the stainless steel liner to permit detection of any liner leakage. On a quarterly basis, the liner leakage is evaluated per preventative maintenance work instructions. Basically, the hydraulic design of the Spent Fuel Pool Cooling

IDC	Industry Commitments	Response
		System is such that the single failure of any line or other single component will not drain the spent fuel pool. The top of the fuel assemblies in the rack is at elevation 1008'6", which is the same as the elevation of the bottom of the gate connecting the pool with the fuel transfer canal. A plate has been installed across the bottom of the gate to raise the minimum possible water level in the pool to 1009'8.5". The gate is a taper design that is 7'4" wide at the top and tapers to 4'6" wide at the bottom. The gate is constructed of carbon steel with stainless steel plate. The lower one-third is filled with concrete to withstand hydrostatic forces. The gate is sealed using a rubber gasket at the gate-to-SFP liner interface. This design provides a passive seal (e.g., in comparison to the active seal of designs using inflatable bladders). The spent fuel pool cooling system had two suction points. The upper suction line enters at elevation 1034'0" and is the normal suction point. The lower suction line enters at elevation 1011'4" which is above the top of the stored fuel. The lower suction normally has a closed valve, but if the valve is inadvertently left open, the upper cooling water suction line and strainer would serve as a vacuum breaker and prevent draining of the pool. A rupture of the suction line upstream of the valve would only drain the pool to a level still above the spent fuel assemblies. The spent fuel pool cooling water discharges to the pool at 1034'0" and ends at 1031'7" (a 90 degree elbow to direct flow downward). The line is provided with a 1/2 inch hole to act as a vacuum breaker in the event that a discharge piping rupture occurs causing the line to act as a siphon. The transfer tube is isolated except during refueling by a flange on the reactor side and by gate valve in the fuel transfer canal. The isolation valve is a 36-inch, double sliding stem gate valve, manually operated from the 1038-foot level of the spent fuel deck area.
7	Procedures or administrative controls to reduce the likelihood of rapid drain down events will include (1) prohibitions on the use of pumps that lack adequate siphon protection or (2) controls for pump suction and discharge points. The functionality of anti-siphon devices will be periodically verified.	Administrative controls are in place that drive procedure use and adherence and risk management. Specifically, HU-FC-104-101, Procedure Use and Adherence, establishes the expectations and requirements for procedure adherence and usage for all personnel performing activities. Additionally, all work activities are subject to the work process controls and Integrated Risk Management per WC-FC-100 where the activities are analyzed and managed for risk (e.g., address SFP activities). At FCS the SFP is designed to reduce the likelihood of rapid drain down events. Specifically, the spent fuel pool cooling lower suction, which is still well above the top of stored fuel, has a manual valve that is controlled/locked closed. If the valve were to be inadvertently left open, the upper suction line and strainer would serve as a vacuum breaker and prevent draining of the pool. A

IDC	Industry Commitments	Response
		rupture of the suction line upstream of the valve would only drain the pool to a level still above the spent fuel assemblies. The spent fuel cooling discharge line is provided with a 1/2 inch hole to act as a vacuum breaker in the event that a discharge piping rupture occurs causing the line to act as a siphon. FCS maintains an administrative requirement that the spent fuel pool be maintained at an elevation of 1033' to 1037' 9" at all times. This corresponds to 37.5' and 42.3' on local level indication. This administrative requirement is placed in procedures as a precaution/limitation. Additionally, the ISFSI equipment design is such that there are no SFP operations that have the potential to cause a rapid drain down. The ISFSI controlling procedures carefully control water volume move in and out of the SFP during operations.
8	An onsite restoration plan will be in place to provide repair of the SFP cooling systems or to provide access for makeup water to the SFP. The plan will provide for remote alignment of the makeup source to the SFP without requiring entry to the refuel floor.	FCS practices align with this IDC. The onsite restoration plan for repair of the SFP cooling system and for makeup water to the SFP are incorporated into procedures AOP-36, LOSS OF SPENT FUEL POOL COOLING, and OCAG-1, OPERATIONAL CONTINGENCY ACTION GUIDELINE. (also OCAG-2/4) AOP-36 establishes multiple makeup sources from onsite that include: 1. Demineralized Water 2. Blair Water (city water) 3. Fire Water Storage Tank 4. Diesel Fire Pump (river water) OCAG-1 establishes multiple makeup sources from onsite and offsite including: 1. Firehose routed to edge of SFP using Diesel Fire Pump 2. Firehose routed to edge of SFP using Fire Truck from hydrant 3. Firehose routed near SFP to spray the pool using Fire Truck from hydrant 4. Firehose routed near SFP to spray the pool using Fire Truck from river OCAG-2/4 establishes additional makeup sources from onsite in the event of major flooding: 1. Safety Injection Refueling Water Storage Tank 2. Fire Protection System There are multiple ways to add makeup water to the SFP with or without entry to the pool floor as depicted above. Additionally, OCAG-1 has guidance for repair of a SFP wall breach.

IDC	Industry Commitments	Response
9	Procedures will be in place to control SFP operations that have the potential to rapidly decrease SFP inventory. These administrative controls may require additional operations or management review, management physical presence for designated operations or administrative limitations such as restrictions on heavy load movements.	Administrative controls are in place that drive procedure use and adherence and risk management. Specifically, HU-FC-104-101, Procedure Use and Adherence, establishes the expectations and requirements for procedure adherence and usage for all personnel performing activities. Additionally, all work activities are subject to the work process controls and Integrated Risk Management per WC-FC-100 where the activities are analyzed and managed for risk (e.g., address SFP activities). FCS maintains an administrative requirement that the spent fuel pool be maintained at an elevation of 1033' to 1037' 9" at all times. This corresponds to 37.5' and 42.3' on local level indication. This administrative requirement is placed in procedures as a precaution/limitation. Additionally, the ISFSI equipment design is such that there are no SFP operations that have the potential to cause a rapid drain down. The ISFSI controlling procedures carefully control water volume move in and out of the SFP during operations. The fuel handling procedures at FCS require additional personnel to verify fuel assemblies are correctly grappled prior to movement. Additionally, the fuel handling tools are designed with a J-Hook that prevents a fuel assembly from separating from the tool. The heavy loads and crane usage around the SFP are controlled through GM-OI-HE-002, Auxiliary Building Crane HE-2 Normal Operation. Attachment 13 of this procedure summarizes the licensing basis for the auxiliary building crane being single failure proof. FCS maintains a defense-in-depth approach to control heavy loads in the SFP area. The basis for FCS' defense-in-depth approach for the control of heavy loads in the spent fuel pool area consists of preventing load drops due to crane failure, rigging failure, or human error through a combination of the use of the single-failure-proof crane and through compliance with the following guidelines from NUREG 0612. 1. Definition of safe load paths 2. Development of load handling procedures 3. Periodic inspection and testing of cranes 4. Qualifications, training and specified conduct of operators 5. Special lifting devices should satisfy the guidelines of ANSI N14.6 6. Lifting devices that are not specially designed should be installed and used in accordance with the guidelines of ANSI B30.9

IDC	Industry Commitments	Response
		7. Design of cranes to ANSI B30.2 or CMAA-70 Rigging equipment meeting guidelines no. 5 and 7 must be used to maintain single failure proof status. The licensing basis with regard to these guidelines requires that off the shelf and specially designed rigging equipment meet one of the following requirements: 1. Provide redundancy or duality such that a single lift point failure will not result in uncontrolled lowering of the load; lift points must have a design factor of safety with respect to ultimate strength of five times the maximum load. The following is an example for meeting this requirement. Lifting a 10,000 lb load requires two sets of rigging, each rated for at least 10,000 lbs (with a 5:1 factor of safety). The total combined factor of safety would then be 10:1. OR 2. A non-redundant or non-dual lift point system must have a design safety factor of ten times the maximum load. This can be met by using one set of rigging rated at 20,000 lbs (with a 5:1 factor of safety) to lift a 10,000 lb load. The total combined factor of safety would then be 10:1.
10	Routine testing of the alternative fuel pool makeup system components will be performed and administrative controls for equipment out of service will be implemented to provide added assurance that the components would be available, if needed.	FCS practices align with this IDC. Fuel pool makeup strategies are outlined in AOP-36 and OCAG documents as previously outlined. One of the primary makeup strategies is from the Fire Protection System. The Fire Protection System has redundant pumping capability and power supplies to ensure alternate SFP makeup functions. The system is supplied by redundant pumps, one diesel driven that can be "black started" and one electric motor driven, each design rated for 2000 gpm at 125 psig discharge pressure. Both pumps take suction from the plant intake cooling water structure from the Missouri River. The fire protection header is normally maintained at greater than 130 psig by a jockey pump. If pressure decreases in the system, the fire pumps are automatically started by their initiation logic to maintain the fire protection system header pressure. The electric motor driven pump starts when system pressure decreases to 110 psig and the diesel driven pump is started in 10 sec if the electric motor driven pump does not start or when system pressure drops to 100 psig. The onsite Fire Truck can also take suction from the Missouri River or a hydrant to provide an alternate source of makeup water to the SFP. The Fire Protection System can also be cross-connected with the Blair Water System (city water). The Fire Protection System provides defense-in-depth, and is routinely tested to ensure capability is maintained. OCAG-1 establishes multiple makeup sources from onsite and offsite as discussed previously. OP-FC-201-010-1001 contains the maintenance, verification and testing requirements of B.5.b Equipment.

IDC	Industry Commitments	Response
		Administrative controls are in place that drive procedure use and adherence and risk management. Specifically, HU-FC-104-101, Procedure Use and Adherence, establishes the expectations and requirements for procedure adherence and usage for all personnel performing activities. Additionally, all work activities are subject to the work process controls and Integrated Risk Management per WC-FC-100 where the activities are analyzed and managed for risk (e.g., address SFP activities). Once all fuel is removed from containment, a large inventory of water above the fuel still exists to extend the time to boil or until fuel uncovered. The spent fuel cooling system has far fewer interfaces than the RCS that could impact the ability of the system to perform its function; however, there are also less redundancy and makeup sources available which constitutes a higher risk. Therefore, SO-O-21, Shutdown Operations Protection Plan, has special requirements to adhere to or additional clarifying information when crediting or considering available systems and equipment to fulfill Shutdown Condition – Reactor Defueled with all Fuel Assemblies Removed from Containment.

SECTION 2
PDEP Staff Decommissioning Assumptions (SDAs) Comparison

SDA	Staff Assumptions	Response
1	Licensee's SFP cooling design will be at least as capable as that assumed in the risk assessment, including instrumentation. Licensees will have at least one motor-driven and one diesel-driven fire pump capable of delivering inventory to the SFP.	The FCS design is consistent with this SDA. The spent fuel pool cooling system was designed and constructed to Seismic Class I standards. The spent fuel racks are Class I. This system is protected by a Nuclear Safety Design Class I structure. The SFP cooling system heat exchangers are ultimately cooled by the Missouri River (ultimate heat sink) using redundant pumps that are supplied by redundant power sources. The pumps are normally powered from offsite power, but can be supplied from an alternate reliable power source. The makeup system is adequate to provide water at the required capacity. The spent fuel pool makeup system can provide 500 gpm, and additional water is available from both the demineralized water system and the fire protection system using hoses. The station design includes a motor-driven fire pump and a diesel-driven fire pump, both of which will be maintained until all fuel is removed from the SFP. Each fire pump has the capability to deliver 200 to 500 gallons per minute (gpm) of makeup water to the SFP (ref. TDB-OCAG-1). FCS also has a pumper type fire truck, which is able to provide 200 to 500 gpm of makeup water to the SFP.
2	Walk-downs of SFP systems will be performed at least once per shift by the operators. Procedures will be developed for and employed by the operators to provide guidance on the capability and availability of onsite and offsite inventory makeup sources and time available to initiate these sources for various loss of cooling or inventory events.	FCS operators perform a walk down of the SFP systems once per shift as driven by operator rounds. The onsite restoration plan for repair of the SFP cooling system and for makeup water to the SFP are incorporated into procedures AOP-36, LOSS OF SPENT FUEL POOL COOLING, and OCAG-1, OPERATIONAL CONTINGENCY ACTION GUIDELINE. (also OCAG-2/4) AOP-36 establishes multiple makeup sources from onsite that include: 1. Demineralized Water 2. Blair Water (city water) 3. Fire Water Storage Tank 4. Diesel Fire Pump (river water) OCAG-1 establishes multiple makeup sources from onsite and offsite including: 1. Firehose routed to edge of SFP using Diesel Fire Pump 2. Firehose routed to edge of SFP using Fire Truck from hydrant

SDA	Staff Assumptions	Response
		3. Firehose routed near SFP to spray the pool using Fire Truck from hydrant 4. Firehose routed near SFP to spray the pool using Fire Truck from river OCAG-2/4 establishes additional makeup sources from onsite in the event of major flooding: 1. Safety Injection Refueling Water Storage Tank 2. Fire Protection System There are multiple ways to add makeup water to the SFP with or without entry to the pool floor as depicted above. Additionally, OCAG-1 has guidance for repair of a SFP wall breach.
3	Control room instrumentation that monitors SFP temperature and water level will directly measure the parameters involved. Level instrumentation will provide alarms at levels associated with calling in offsite resources and with declaring a general emergency.	The FCS design is consistent with this SDC, which include multiple readouts and alarms for SFP temperature, water level, and area radiation monitors. Additionally, FCS has procedure AOP-36, LOSS OF SPENT FUEL POOL COOLING, to guide the response in the event that cooling or level is lost in the SFP. At FCS the control room is also alerted by alarm when a SFP cooling pump is not running. This allows for prompt operation action prior to having an issue with cooling. SFP temperature indication in the Control Room is monitored from a point in the SFP cooling path on the outlet of the heat exchanger. Additionally, the component cooling water temperature through the heat exchanger is also monitored. Both of these indications will cause alarms in the control room on high temperature. Additionally, temperature indications from the 1013-, 1022- and 1035-foot elevations of the SFP are displayed and recorded on the plant computer. These indications have high, high-high, and rate of change alarms. SFP water level is monitored shiftly as part of operator rounds using an installed level indication. The level indication includes an alarm in the control room for both high and low SFP level. This alarm will be changed to reflect the requirement of Emergency Plan limits. There is a field installed ruler type level indication mounted to the SFP liner and can be used to manually monitor the SFP level. In the event of a beyond design basis flooding event, additional level indication is available for installation in the SFP as driven through OCAG-2/4. FCS will continue to use the approved NRC EAL scheme, based on NEI 99-01, Development of Emergency Action Levels for Non-Passive Reactors, Revision 6. FCS has implemented the Permanently Defueled EALs based on Appendix C of NEI 99-01. Based on the current EAL scheme a declaration of Alert would be based on radiation levels from a fuel handling accident.

SDA	Staff Assumptions	Response
4	Licensee determines that there are no drain paths in the SFP that could lower the pool level (by draining, suction, or pumping) more than 15 feet below the normal pool operating level and that licensee must initiate recovery using offsite sources.	FCS is not fully compliant with the SDA due to having drain paths that are more than 15 feet below the normal pool operating level. This response discusses the control for the lower drain paths. The normal pool operating level is 1035' 6". The SFP cooling system is normally supplied through an 8" pipe at 1034' 0". The SFP cooling system discharges through an 8" pipe. The discharge pipe enters the SFP at 1034' 0" and ends at 1031' 7" (a 90 degree elbow to direct flow downward). This discharge line is provided with a 1/2 inch hole to act as a vacuum breaker. A 4" purification line from the SFP cooling system directly discharges at 1034'0". This discharge line also includes the normal borated makeup path for the SFP. The SFP cooling system has an additional lower suction point at an elevation of 1011' 4", which is more than 15 feet below the normal pool operating level, but above the top of the fuel assemblies, which are at an elevation of 1008" 6". The lower suction valve is locked closed and controlled closed. Additionally, FCS maintains an administrative requirement that the SFP be maintained at an elevation of 1033' to 1037' 9" at all times. This ensures compliance with Technical Specifications, maintaining greater than 23 feet of water above the top of the fuel. The gate connecting the SFP to the fuel transfer canal is designed such that the minimum possible water level in the SFP is 1009' 8.5". The gate is a taper design that is 7'4" wide at the top and tapers to 4'6" wide at the bottom. The gate is constructed of carbon steel with stainless steel plate. The lower one-third is filled with concrete to withstand hydrostatic forces. The gate is sealed using a rubber gasket at the gate-to-SFP liner interface. This design provides a passive seal (e.g., in comparison to the active seal of designs using inflatable bladders). The fuel transfer canal has two openings that are more than 15 feet below the normal pool operating level. These lower openings are only a credible drain path when the SFP gate is removed. The lowest entry point to the fuel transfer canal when the gate is removed is at the 1009' 8.5" elevation (i.e., cannot drain below this elevation). The first opening is the fuel transfer tube, where the opening centerline is at 1001' 6" and the bottom of the transfer tube is at 1000'. The transfer tube is isolated except during refueling by a flange on the reactor side and by a gate valve in the fuel transfer canal. The isolation valve is a 36 inch, double sliding stem gate valve, manually operated from the 1038' elevation of the spent fuel deck area. The second opening is the drain at the bottom of the fuel transfer canal, which is at 995' 6". This opening has a locked closed isolation valve that is controlled closed except during specific operations (e.g., transfer to waste, draining transfer canal). Both of these openings cannot draining below an elevation of 1009' 8.5" since that is the bottom of the SFP gate opening.

SDA	Staff Assumptions	Response
		FCS currently has procedures and guidelines in place to obtain offsite assistance if necessary for mitigation of events that result in significant loss of SFP inventory. These mitigating strategies were implemented as part of B.5.b requirements.
5	Load Drop consequence analyses will be performed for facilities with nonsingle failure-proof systems. The analyses and any mitigative actions necessary to preclude catastrophic damage to the SFP that would lead to a rapid pool draining would be sufficient to demonstrate that there is high confidence in the facilities ability to withstand a heavy load drop.	The FCS design is in alignment with this description. The heavy loads and crane usage around the SFP are controlled through GM-OI-HE-002, Auxiliary Building Crane HE-2 Normal Operation. Attachment 13 of this procedure summarizes the licensing basis for the auxiliary building crane being single failure proof. FCS maintains a defense-in-depth approach to control heaving loads in the SFP area. The basis for FCS' defense-in-depth approach for the control of heavy loads in the spent fuel pool area consists of preventing load drops due to crane failure, rigging failure, or human error through a combination of the use of the single-failure-proof crane and through compliance with the following guidelines from NUREG 0612. 1. Definition of safe load paths 2. Development of load handling procedures 3. Periodic inspection and testing of cranes 4. Qualifications, training and specified conduct of operators 5. Special lifting devices should satisfy the guidelines of ANSI N14.6 6. Lifting devices that are not specially designed should be installed and used in accordance with the guidelines of ANSI B30.9 7. Design of cranes to ANSI B30.2 or CMAA-70 Rigging equipment meeting guidelines no. 5 and 7 must be used to maintain single failure proof status. The licensing basis with regard to these guidelines requires that off the shelf and specially designed rigging equipment meet one of the following requirements: 1. Provide redundancy or duality such that a single lift point failure will not result in uncontrolled lowering of the load; lift points must have a design factor of safety with respect to ultimate strength of five times the maximum load. The following is an example for meeting this requirement. Lifting a 10,000 lb load requires two sets of rigging, each rated for at least 10,000 lbs (with a 5:1 factor of safety). The total combined factor of safety would then be 10:1. OR

SDA	Staff Assumptions	Response
		2. A non-redundant or non-dual lift point system must have a design safety factor of ten times the maximum load. This can be met by using one set of rigging rated at 20,000 lbs (with a 5:1 factor of safety) to lift a 10,000 lb load. The total combined factor of safety would then be 10:1. Because the auxiliary building crane is single-failure proof, an accidental load drop is considered not to be a credible event such that condition 5.1.2(1) of NUREG-0612 is satisfied and analysis of cask drop accidents in accordance with condition 5.1.2(4) of NUREG-0612 is not required.
6	Each decommissioning plant will successfully complete the seismic checklist provided in Appendix 2B to this study [NUREG-1738]. If the checklist cannot be successfully completed, the decommissioning plant will perform a plant specific seismic risk assessment of the SFP and demonstrate that SFP seismically induced structural failure and rapid loss of inventory is less than the generic bounding estimates provided in this study (<1 x10^{-5} per year including non-seismic events).	FCS conducted a seismic assessment in response to the NRC Near-Term Task Force (NTTF) request. The seismic assessment included all structures including the SFP was prepared and submitted for NRC review. The OPPD submittal (LIC-14-0047) documents the seismic evaluation in conformance with NTTF recommendation 2.1 including the HCLPF values and the 1E-5 per year hazard level. The Staff review of the NTTF submittal specifically for the Spent Fuel Pool Evaluation associated with the reevaluated seismic hazard implementing NTTF recommendation 2.1 (CAC No. MF3735) is documented in NRC-16-0068 (ML16182A361). The NRC staff concludes that the licensee's assessment was performed consistent with the NRG-endorsed SFP Evaluation Guidance Report and has provided sufficient information including the SFP integrity evaluation to meet the SFP Evaluation Guidance (Item 9 in Enclosure 1 of the NRC's 5-.54(f) letter), thus supporting SDA No. 6 of NUREG-1738.
7	Licensees will maintain a program to provide surveillance and monitoring of Boraflex in high-density spent fuel racks until such time as spent fuel is no longer stored in these high-density racks.	The FCS spent fuel racks utilize Boral rather than Boraflex as a neutron absorbing material. There are two regions or types of racks in the SFP that both contain Boral as described in DSAR 9.5. The Boral is attached as panels between each storage cell. The panels are protected with a stainless steel sheath. The technical specifications describe the surveillance test requirements, which requires poison sample coupons to be tested for dimensional change, weight, neutron attenuation change, and specific gravity change. This is required 1, 2, 4, 7, and 10 years after installation, and every 5 years thereafter. The purpose of the coupon sample program is to ensure that the required amount of boron remains in the neutron absorber material throughout the life of the racks. These coupon samples are sent out for analysis to an independent firm whose results are reviewed and accepted by FCS. The coupon test program is administered through RE-ST-RX-0004 and 0005.