

Appendix A Criticality Safety Cornerstone

Objective

The objective of this cornerstone is to ensure that nuclear criticality safety (NCS) controls and items relied on for safety (IROFS) protect worker and public health and safety by preventing criticalities. This includes ensuring adequate NCS analyses and ensuring the availability, reliability, and capability of NCS controls and IROFS.

Desired Results

Demonstration that there is reasonable assurance that inadvertent nuclear criticality events will be prevented.

Key Attributes and Scope

1. Protection against External Events
 - a. Adverse Weather Protection Scope - Inspection activities in this area focus on evaluating the licensee's readiness for protecting NCS controls and IROFS from external factors such as tornado, hurricane, high winds, high temperatures, cold weather and other adverse weather related conditions. This inspection determines whether NCS controls and IROFS will perform within the design assumptions for adverse weather.
 - b. Fire Protection Scope - The inspection is conducted in two phases. Phase one consists of annual assessment of conditions related to ignition sources, control of combustible materials, and fire protection systems and equipment and assessment of fire brigade staffing, training and performance. (For licensees with resident inspectors, Phase one is conducted at the frequency specified in resident inspection procedures.) Phase two is a periodic inspection that is a more in-depth review of fire protection of NCS controls and IROFS and other fire protection required by the license.
 - c. Flood Protection Scope - Inspection activities in this area focus on a licensee's readiness to protect NCS controls and IROFS from potential internal and external flooding. These inspection activities would include walkdown of key plant areas to determine whether flood protection features are adequately implemented, review of procedures including verification of key plant staff actions credited for coping with flood, and evaluation of compensatory measures during impending conditions of flooding or heavy rains. The inspection will also focus on determining whether the licensee's flooding mitigation plans and equipment are consistent with the licensee's Integrated Safety Analysis (ISA) or safety analysis.
2. Human Performance
 - a. Staff Training and Qualification Scope – Inspection activities in this area focus on the effectiveness of the licensee's program for conducting plant staff initial NCS training and qualification and requalification training through observation of plant staff performance and walk-throughs. Any deficient performance is evaluated to

- a. NCS Control and IROFS Design and Performance Capability Scope – Inspection activities in this area include review of the ISA Summary and ISA or safety analysis, as-built conditions, modifications, testing, and normal and emergency operations of risk-significant systems. This would be an in-depth review of a selected risk significant system and support systems.

6. Configuration Control

- a. Permanent Plant Modifications Scope - Inspection activities in this area include the review of design, installation, configuration control, and post-modification testing for risk significant permanent modifications potentially affecting NCS controls and IROFS. Inspection activities include an in-depth review of changes to the initial licensed design, ISA and ISA Summary or safety analysis, management measures, and normal and emergency operating procedures. Inspections determine whether the licensee's evaluations of the modifications meet the requirements of 10 CFR 70.72.
- b. Temporary Plant Modifications Scope - Inspection activities in this area include a review of design, installation, configuration control, and post-modification testing for selected potentially risk significant temporary modifications that impact NCS controls and IROFS. Inspections determine whether the licensee's evaluations of the modifications meet the requirements of 10 CFR 70.72.
- c. Equipment Alignment Scope – Inspection activities determine whether equipment is aligned in accordance with procedures and the ISA or safety analysis and whether there are discrepancies that impact the NCS controls or IROFS. This includes conducting approximately X partial walkdown inspections each A to determine whether NCS controls and IROFS are properly aligned. In addition, inspectors will perform Y complete walkdown every Z months.

7. Criticality Analysis (Analytical Assumptions and Adequate Subcritical Margin)

Inspection activities include regular reviews of new and changed criticality analysis to determine that adequacy of analytical assumptions and resulting subcritical margin. The inspection evaluates the overall adequacy of the criticality safety basis, resulting IROFS and controls and the effect of changes on assumptions, conclusions, and subcritical margin.

8. Corrective Action Program (CAP) Scope (Audits/Audit Findings, Infraction Follow Up, Event Follow Up, and Other CAP Findings)

Inspection activities include reviews of selected NCS items in the licensee's CAP to determine whether the items were adequately identified and corrected. This inspection is to complement the periodic inspection of the CAP program that evaluates implementation of the overall CAP program. This process is a management measure for Part 70 licensees.

Metrics Used to Measure Key Attributes

Key Attribute	Area to Measure	Metric	Discussion
Protection against External Events	Adverse Weather Protection	Licensee actions ensure availability and reliability of controls and IROFS per Part 70 and ISA or safety analysis and license	
	Fire Protection	Licensee actions ensure availability and reliability of controls and IROFS per Part 70 and ISA or safety analysis and license	
	Flood Protection	Licensee actions ensure availability and reliability of controls and IROFS per Part 70 and ISA or safety analysis and license	
Human Performance	Staff Training and Qualification	Training adequate to assure effective procedure use	
	Operator Workarounds	Temporary changes evaluated per license and are adequately implemented	
Procedure Quality	NCS Control and IROFS Clarity	Implement controls and IROFS adequately and properly used	
Equipment Performance	Maintenance Effectiveness	Capable, available and reliable per Part 70 and ISA or safety analysis and license	
	Surveillance Testing	Capable, available and reliable per Part 70 and ISA or safety	

		analysis and license	
	Post Maintenance Testing	Capable, available and reliable per Part 70 and ISA or safety analysis and license	
NCS Control and IROFS Design and Performance Capability	Accident sequence identification	Credible sequences identified per Part 70 or license	
	Analysis	Done in accordance with license requirement	
	IROFS identification/implementation	Meets 70.61 and 70.62 or license	
Configuration Control	Permanent Plant Modifications	Meets 70.72, 70.61, and 70.62 or license	
	Temporary Plant Modifications	Meets 70.72, 70.61, and 70.62 or license	
	Equipment Alignment	Properly aligned in accordance with analysis and procedures	
Criticality Analysis	Criticality Safety Basis, IROFS and Controls and the Effect of Changes on Assumptions, Conclusions and Subcritical Margin	Meet 70.61 and 70.72 and license requirements	
Corrective Action Program (CAP)	Audits	Conducted as required by license	
	Audit Findings	Resolve adequately and timely	
	Infraction Follow Up	Follow up resolves issue, prevents reoccurrence and adequately considers extent of condition	
	Event Follow Up	Follow up resolves issue, prevents reoccurrence and	

		adequately considers extent of condition	
	Other CAP Findings	Other Criticality Safety issues in CAP adequately resolved	

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Appendix B

Chemical Process Safety Cornerstone

Objective

The objective of this cornerstone is to ensure that chemical process safety IROFS or controls protect worker and public health and safety by preventing and or controlling chemical releases (for those chemicals under NRC jurisdiction per the Memorandum of Understanding (MOU) with the Occupational Health and Safety Administration (OSHA)) that could cause intermediate or high consequences (as defined in 10 CFR Part 70). This includes ensuring adequate chemical process safety analyses and ensuring the availability, reliability, and capability of Chemical Process Safety controls or IROFS.

Desired Results

Demonstration that there is reasonable assurance that chemical process upsets do not affect the safe handling of licensed materials, and that workers, members of the public, and the environment are protected from chemical and radiological effects of licensed materials, hazardous chemicals produced from processing licensed materials, and plant conditions which affect the safety of licensed materials (those areas under the NRC/OSHA MOU). Chemical impacts and any resultant radiological impacts from accidents are less than those defined in 10 CFR Part 70 or the safety analysis.

Key Attributes and Scope

1. Protection against External Events
 - a. Adverse Weather Protection Scope - Inspection activities in this area focus on evaluating the licensee's readiness for protecting Chemical Process Safety controls or IROFS from external factors such as tornado, hurricane, high winds, high temperatures, cold weather and other adverse weather related conditions. This inspection determines whether Chemical Process Safety controls or IROFS will perform within the design assumptions for adverse weather.
 - b. Fire Protection Scope - The inspection is conducted in two phases. Phase one consists of annual assessment of conditions related to ignition sources, control of combustible materials, and fire protection systems and equipment and assessment of fire brigade staffing, training and performance. (For licensees with resident inspectors, Phase 1 is conducted at the frequency specified in resident inspection procedures.) Phase two is a periodic inspection that is a more in-depth review of fire protection of Chemical Process Safety controls or IROFS and other fire protection required by the license.
 - c. Flood Protection Scope - Inspection activities in this area focus on a licensee's readiness to protect Chemical Process Safety controls or IROFS from potential internal and external flooding. These inspection activities would include walkdown of key plant areas to determine whether flood protection features are adequately implemented, review of procedures including verification of key operator actions credited for coping with flood, and evaluation of compensatory measures during impending conditions of flooding or heavy rains. The inspection

will also focus on determining whether the licensee's flooding mitigation plans and equipment are consistent with the licensee's Integrated Safety Analysis (ISA) or safety analysis.

2. Human Performance

- a. Staff Training and Qualification Scope – Inspection activities in this area focus on the effectiveness of the licensee's program for conducting plant staff initial Chemical Process Safety training and qualification and requalification training through observation of plant staff performance and walk-throughs. Any deficient performance is evaluated to determine if it results from deficient training and qualification.
- b. Operator Workarounds Scope - Inspection activities in this area focus on plant staff actions taken because of equipment deficiencies, degradation, or unavailability. In these cases, operators would likely be using temporary procedure changes or instructions. Inspections evaluate the impact plant staff performance because of the workarounds and resulting temporary instructions. Inspection activities focus on workarounds that have the potential to degrade Chemical Process Safety controls and IROFS.

3. Procedure Quality

- a. Chemical Process Safety Control or IROFS Clarity Scope - Inspection activities in this area focus on the clarity of plant procedures with regard to Chemical Process Safety controls or IROFS. Inspection activities include observation of plant staff performance during operations and during walk-throughs provided by inspectors. Any deficient performance is evaluated to determine if it results from inadequate, deficient or unclear procedures. While reviewing the use of procedures, inspections also evaluate whether the procedure and activities observed result in compliance with regulations and license requirements. In addition, selected changes to procedures are reviewed to determine whether the procedures provide adequate guidance to plant staff to meet NRC requirements.

4. Equipment Performance

- a. Maintenance Effectiveness Scope – Inspection activities in this area review the following items to determine whether the licensee is assuring adequate Chemical Process Safety controls or IROFS performance by applying management measures appropriately including reviewing selected IROFS' and management measures' failure evaluation as required by 10 CFR 70.62(a). In addition, inspections observe maintenance activities for Chemical Process Safety controls or IROFS to evaluate work practices.
- b. Surveillance Testing Scope – Inspection activities focus on determining whether surveillance testing of Chemical Process Safety controls or IROFS assures that they are capable of performing their intended safety functions. Inspections review surveillance test results for adequacy in meeting the requirements, observe ongoing testing to evaluate human performance, and ensure that appropriate test acceptance criteria are in agreement with Chemical Process Safety control or IROFS specifications.

- c. Post Maintenance Testing Scope – Inspection activities focus on determining whether the post maintenance test procedures and test activities are adequate to verify Chemical Process Safety controls or IROFS will perform their intended function after the maintenance.
- 5. Design (Accident Sequence Identification, Analysis, and IROFS Identification/ Implementation)
 - a. Chemical Process Safety Control or IROFS Design and Performance Capability Scope – Inspection activities in this area include review of the ISA summary and ISA or safety analysis, as-built conditions, modifications, testing, and normal and emergency operations of risk-significant systems. This would be an in-depth review of a selected risk significant system and support systems.
- 6. Configuration Control
 - a. Permanent Plant Modifications Scope - Inspection activities in this area include the review of design, installation, configuration control, and post-modification testing for risk significant permanent modifications potentially affecting Chemical Process Safety controls or IROFS. Inspection activities include an in-depth review of changes to the initial licensed design, ISA and ISA Summary or safety analysis, management measures, and normal and emergency operating procedures. Inspections determine whether the licensee's evaluations of the modifications meet the requirements of 10 CFR 70.72.
 - b. Temporary Plant Modifications Scope - Inspection activities in this area include a review of design, installation, configuration control, and post-modification testing for selected potentially risk significant temporary modifications that impact Chemical Process Safety controls or IROFS. Inspections determine whether the licensee's evaluations of the modifications meet the requirements of 10 CFR 70.72.
 - c. Equipment Alignment Scope – Inspection activities determine whether equipment is properly aligned and whether there are discrepancies that impact the Chemical Process Safety controls or IROFS. This includes conducting approximately X partial walkdown inspections each A to determine whether Chemical Process Safety controls or IROFS are properly aligned. In addition, inspectors will perform Y complete walkdown every Z months.
- 7. Corrective Action Program (CAP) Scope (Audits/Audit Findings, Infraction Follow Up, Event Follow Up, and Other CAP Findings)

Inspection activities include reviews of selected Chemical Process Safety items in the licensee's CAP to determine whether the items were adequately identified and corrected. This inspection is to complement the periodic inspection of the CAP program that evaluates implementation of the overall CAP program. This process is a management measure for Part 70 licensees..

Metrics Used to Measure Key Attributes

Key Attribute	Area to Measure	Metric	Discussion
Protection against External Events	Adverse Weather Protection	Licensee actions ensure availability and reliability of controls and IROFS per Part 70 and ISA or safety analysis and license	
	Fire Protection	Licensee actions ensure availability and reliability of controls and IROFS per Part 70 and ISA or safety analysis and license	
	Flood Protection	Licensee actions ensure availability and reliability of controls and IROFS per Part 70 and ISA or safety analysis and license	
Human Performance	Staff Training and Qualification	Training adequate to assure effective procedure use	
	Operator Workarounds	Temporary changes evaluated per license and are adequately implemented per license of procedure	
Procedure Quality	Chemical Process Safety Control and IROFS Clarity	Implement controls and IROFS adequately and properly used	
Equipment Performance	Maintenance Effectiveness	Capable, available and reliable per Part 70 and ISA or safety analysis and license	

	Surveillance Testing	Capable, available and reliable per Part 70 and ISA or safety analysis and license	
	Post Maintenance Testing	Capable, available and reliable per Part 70 and ISA or safety analysis and license	
Chemical Process Safety Control or IROFS Design and Performance Capability	Accident sequence identification	Credible sequences identified per Part 70 and ISA or safety analysis and license	
	Analysis	Done in accordance with license requirement	
	IROFS identification/implementation	Meets 70.61 and 70.62 or license	
Configuration Control	Permanent Plant Modifications	Meets 70.72, 70.61, and 70.62 or license	
	Temporary Plant Modifications	Meets 70.72, 70.61, and 70.62 or license	
	Equipment Alignment	Properly aligned in accordance with analysis and procedures	
Corrective Action Program (CAP)	Audits	Conducted as required by license	
	Audit Findings	Resolve adequately and timely	
	Infraction Follow Up	Follow up resolves issue, prevents reoccurrence and adequately considers extent of condition	
	Event Follow Up	Follow up resolves issue, prevents	

		reoccurrence and adequately considers extent of condition	
	Other CAP Findings	Other Chemical Process Safety issues in CAP adequately resolved	

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Appendix C

Emergency Preparedness Cornerstone

Objective

The objective of this cornerstone is to ensure that the license is capable of implementing adequate measures to protect public health and safety in the event of a radiological or chemical emergency (for those chemicals under NRC jurisdiction).

Desired Results

Demonstration that there is reasonable assurance that the licensee can effectively implement its emergency plan to adequately protect the public health and safety in the event of a radiological or chemical emergency.

Key Attributes and Scope

1. Emergency Response Organization (ERO) Performance
 - a. Timely and accurate classification of events – including the recognition of events as potentially exceeding emergency action levels (EALs) and any assessment actions necessary to support classification.
 - b. Timely and accurate notification of offsite government authorities – including notifications in the Plan.
 - c. Timely and accurate development and communication of protective action recommendations (PARs) to offsite authorities (where applicable) – providing PARs to governmental authorities, the decision making process to develop PARs and accident assessment to support PAR development.
 - d. ERO Performance Assessment – licensee self-assessment of performance, identification of deficiencies in ERO performance, identification of trends, effectiveness of corrective actions.

Scope - Inspection activities in these areas (a. – d. above) are an evaluation of a licensee's performance during the conduct of the emergency exercise every two years, and also evaluation of the licensee's critiques of performance during the conduct of this exercise and during drills.

- e. ERO Drill Participation Scope – participation in drills and proficiency development (including self-assessment noted below). Inspection activities include review of drill participation frequency for members of the ERO.
- f. Timely ERO Augmentation Scope – functioning of ERO notification system, adequacy of ERO response, and adequacy of duty roster to provide timely full ERO staffing. Inspection activities include review of the results of the licensee's testing of augmentation timeliness and evaluation of ERO augmentation during exercises and actual events.

2. Facilities and Equipment

- a. Availability of Alert and Notification System (ANS) (where applicable) Scope – ability to perform design function as specified in the Emergency Plan. Inspection includes a review of the licensee’s testing activities for the ANS.
- b. Availability of facilities and equipment Scope – surveillance of Emergency Plan and implementing procedure facilities and equipment. Inspection focuses on determining whether surveillance testing of facilities and equipment assures they are capable of performing their intended safety functions. Inspections review surveillance test results for adequacy in meeting the requirements.

3. Procedure Quality

The risk-significant areas of procedure quality are:

- a. Classification of events
- b. Notification of offsite governmental authorities
- c. Development and communication of protective action recommendations to offsite authorities (where applicable)

Scope - Inspection activities in this area focus on the clarity of Emergency Plan implementing procedures with regard to these Emergency Preparedness components through observation of ERO performance in the exercise conducted every two years, in drills, or during walk-throughs provided in NRC inspections. Any deficient performance is evaluated to determine if it results from deficient or unclear procedures. While reviewing the use of procedures, inspections also evaluate whether the procedure and activities observed result in compliance with regulations and license requirements. In addition, selected changes to procedures are reviewed to determine whether the procedures provide adequate guidance to plant staff to meet NRC requirements.

4. Offsite Emergency Preparedness Support (where applicable) Scope – information provided by licensee to offsite support such as fire department, medical support, etc. as defined in the Plan. Inspection activities in this area include review of training and orientation of offsite support groups by the licensee and potentially discussions with offsite support group representatives to determine that training and orientation were offered and conducted as required by the Emergency Plan.
5. Corrective Action Program (CAP) Scope (Audits/Audit Findings, Infraction Follow Up, Event Follow Up, and Other CAP Findings)

Inspection activities include reviews of selected Emergency Preparedness items in the licensee’s CAP to determine whether the items were adequately identified and corrected. This inspection is to complement the periodic inspection of the CAP program that evaluates implementation of the overall CAP program.

Metrics Used to Measure Key Attributes

Key Attribute	Area to Measure	Metric	Discussion
Emergency Response Organization (ERO) Performance	Timely and accurate classification of events	Proper classifications made in exercise in timeframe specified in Plan	
	Timely and accurate notification of offsite government authorities	Proper notifications made in exercise in timeframe specified in Plan	
	Timely and accurate development and communication of protective action recommendations (PARs) to offsite authorities (where applicable)	Proper PARs made in timeframe specified in Plan	
	ERO Performance Assessment	Licensee's critique of exercise identifies key deficiencies in exercise performance	
	ERO Drill Participation Scope	ERO participates in drill at frequency specified in Plan or procedure	
	Timely ERO Augmentation Scope	ERO augmentation drills show augmentation of staff in time specified in Plan	
Facilities and Equipment	Availability of Alert and Notification System (ANS) (where applicable)	ANS tests show system available and reliable	
	Availability of facilities and equipment	Surveillance shows facilities and equipment available and reliable per Plan	
Procedure Quality	Classification of events	Effectively used in exercise	

	Notification of offsite governmental authorities	Effectively used in exercise	
	Development and communication of protective action recommendations to offsite authorities (where applicable)	Effectively used in exercise	
Offsite Emergency Preparedness Support (where applicable)		Support offered at frequency specified in Plan.	
Corrective Action Program (CAP)	Audits	Conducted as required by license or procedure	
	Audit Findings	Resolve adequately and timely	
	Infraction Follow Up	Follow up resolves issue, prevents reoccurrence and adequately considers extent of condition	
	Event Follow Up	Follow up resolves issue, prevents reoccurrence and adequately considers extent of condition	
	Other CAP Findings	Other emergency preparedness issues in CAP adequately resolved	

Appendix D

Public Radiation Safety Cornerstone

Objective

The objective of this cornerstone is to ensure adequate protection of public health and safety from exposure to radioactive effluents from normal (non-accident) plant operations.

Desired Results

Demonstration that there is reasonable assurance that members of the public and the environment are protected from exposure to radioactive material (for non-accident situations) such that the requirements in 10 CFR Parts 20, 61, and 71 and license conditions are met and that doses are as low as is reasonably achievable (ALARA).

Key Attributes and Scope

1. Limits Scope – Inspection activities in this area include reviews of licensees' projections and measurements to determine whether offsite dose limits and constraints in 10 CFR Parts 20 and in the license have been met.
2. Facilities, Equipment, and Instrumentation Scope – Inspection activities include review of the availability, reliability and capability of radiation and radioactivity monitoring and measurement systems, radioactivity air sampling systems, gaseous, liquid and solid waste processing systems, radiological environmental monitoring equipment, meteorological instrumentation, and transportation packaging. Inspections include walkdowns of selected portions of systems to determine whether they are operating adequately and include review of equipment calibration and surveillance.

3. Procedure Quality Scope

The risk-significant areas of procedure quality are:

- a. Projected offsite dose calculation – Inspection activities in this area include review of selected offsite dose calculations to determine whether the procedures and related tools used to develop offsite dose projections are adequate and are used adequately.
- b. Transportation packaging and surveys – Inspection activities in this area include review of selected shipments to determine whether plant staff's use of procedures resulted in packages that were adequately prepared, quality control (QC) was adequately implemented, and package dose rates meet requirements.
- c. Potentially contaminated material release – Inspection activities include review of the use of procedures for selected materials released from the controlled area to determine whether adequate release surveys were done.
- d. Measured offsite dose – Inspection activities include review of the use of procedures in determining selected offsite dose measurements to determine whether dose limits and ALARA criteria were met.

- e. Actions for abnormal release – Inspection activities include review of the use of procedures for selected off normal evolutions to determine whether adequate controls were put in place to control releases.
- f. Measurement equipment QC – Inspections include review of use of procedures to develop selected QC records and include discussions with plant staff to determine whether adequate QC is implemented.
- g. Gaseous, liquid, and solid waste processing systems – Inspections include walkdowns of selected processing equipment to determine their material condition and review of procedure use to determine whether processes are being operated properly. Inspections also review selected licensee evaluations made to show compliance with 10 CFR Part 61.
- h. Environmental sample collection, processing, and results evaluation – Inspections include discussion of sampling and measurement processes with plant staff to determine if procedures are used adequately and review of selected sample results and the licensee’s results evaluation.

Scope - Inspection activities in this area will focus on the clarity of procedures through observation of plant staff performance. Deficient performance is evaluated to determine if it results from deficient or unclear procedures. While reviewing the use of procedures, inspections also evaluate whether the procedure and activities observed result in compliance with regulations and license requirements. In addition, selected changes to procedures are reviewed to determine whether the procedures provide adequate guidance to plant staff to meet NRC requirements.

- 4. Human Performance Scope – training and qualification of plant staff and their performance. Inspection activities in this area focus on the effectiveness of the licensee’s program for conducting plant staff initial training and qualification and requalification training. Inspection activities will include observation of plant staff performance and walk-through as discussed in 3. Above. Any deficient performance is evaluated to determine if it results from deficient training and qualification.
- 5. ALARA Planning and Controls – Inspection activities determine whether the licensee maintains public radiation doses ALARA by reviewing the results of a licensee’s determination of doses from airborne and liquid plant effluents and any resultant action to assure they are ALARA. These results are evaluated against license ALARA specifications and the public dose constraints in 10 CFR Part 20.
- 6. Corrective Action Program (CAP) Scope (Audits/Audit Findings, Infraction Follow Up, Event Follow Up, and Other CAP Findings)

Inspection activities include reviews of selected Public Radiation Safety items in the licensee’s CAP to determine whether the items were adequately identified and corrected. This inspection is to complement the periodic inspection of the CAP program that evaluates implementation of the overall CAP program.

Metrics Used to Measure Key Attributes

Key Attribute	Area to Measure	Metric	Discussion
Limits Scope	Dose Projections	Meet 10 CFR 20 and license limits and constraints	
	Dose measurements	Meet 10 CFR 20 and license limits and constraints	
Facilities, Equipment, and Instrumentation Scope	Radiation and radioactivity monitoring and measurement systems	Available, reliable, calibrated to perform surveys required by Part 20 or license	
	Radioactivity air sampling systems	Available, reliable, calibrated to perform surveys required by Part 20 or license	
	Gaseous, liquid and solid waste processing systems	Available, reliable, good material condition to perform surveys required by Part 20 or license	
	Radiological environmental monitoring equipment	Available, reliable, calibrated to perform surveys required by Part 20 or license	
	Meteorological instrumentation	Available, reliable, calibrated to perform surveys required by Part 20 or license. Good material condition.	
	Transportation packaging	Meets 10 CFR 71 and certificate of compliance	
Procedure Quality Scope	Projected offsite dose calculation	Procedure used effectively to give adequate result per Part 20 or license	
	Transportation packaging and	Procedure used effectively to give	

	surveys	adequate result per Part 20 or license	
	Potentially contaminated material release	Procedure used effectively to give adequate result per Part 20 or license	
	Measured offsite dose	Procedure used effectively to give adequate result per Part 20 or license	
	Actions for abnormal release	Procedure used effectively to give adequate result per Part 20 or license	
	Measurement equipment QC	Procedure used effectively to give adequate result per Part 20 or license	
	Gaseous, liquid, and solid waste processing systems	Procedure used effectively to give adequate result per Part 20 or license	
	Environmental sample collection, processing, and results evaluation	Procedure used effectively to give adequate result per Part 20 or license	
Human Performance	Same elements as in Procedure Quality as above	Training adequate to assure effective procedure use to meet Part 20 or license	
ALARA Planning and Controls	Dose from airborne plant effluents	Licensee action per license ALARA specifications and constraints in 10 CFR Part 20.	
	Doses from liquid plant effluents	Licensee action per license ALARA specifications.	
Corrective Action Program (CAP)	Audits	Conducted as required by license or procedure	

	Audit Findings	Resolve adequately and timely	
	Infraction Follow Up	Follow up resolves issue, prevents reoccurrence and adequately considers extent of condition	
	Event Follow Up	Follow up resolves issue, prevents reoccurrence and adequately considers extent of condition	
	Other CAP Findings	Other Public Radiation Safety issues in CAP adequately resolved	

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Appendix E

Worker Radiation Safety Cornerstone

Objective

The objective of this cornerstone is to ensure adequate protection of worker health and safety from exposure to radiation and radioactive materials during normal (non-accident) fuel cycle facility operation.

Desired Results

Demonstration that there is reasonable assurance that workers are protected from exposure to radiation and radioactive materials (for non-accident situations) such that the limits in 10 CFR Part 20 and in license conditions are met and that such doses are ALARA.

Key Attributes and Scope

1. Limits Scope – Inspection activities include review of results of internal and external dose determinations for workers, including external and extremity dosimetry and determination of internal dose from air sampling and bioassay results.
2. Facilities and Equipment Scope - Inspection activities include determination of whether the following are available, reliable, and calibrated to perform their intended function: airborne radioactivity monitors, area radiation monitors, airborne radioactivity sampling systems (fixed and portable), airborne sample measurement equipment, bioassay sampling and analysis equipment, radiation measuring equipment, and whole body and lung counting equipment.
3. Procedure Quality Scope

The risk-significant areas of procedure quality are:

- a. Radiation worker practices and procedures Scope - Inspection activities include review of plant staff's use of procedures in processing licensed materials to determine whether plant staff members working in controlled areas adequately implement plant practices and procedures to control worker dose.
- b. Airborne radioactivity sampling and measurement – Inspection activities include review of plant staff's use of procedures for use of supplemental ventilation, air sampler calibration, sample change and analysis, airborne concentration and intake result evaluation, and actions based on intake evaluations.
- c. Personnel contamination control – Inspection activities include use of procedures by plant staff for use of protective equipment and clothing, personnel contamination surveys, and decontamination (if necessary).
- d. Non-routine work planning/radiation work permits (RWPs) – Inspection activities include review of plant staff's use of procedures for the development of RWP controls and their implementation.

- e. Actions for elevated airborne concentrations – Inspection include review of plant staff's use of procedures for follow-up licensee actions for elevated airborne concentrations, evaluations, and corrective actions.
- f. Determination of internal dose – Inspection activities include review of plant staff's use of procedures to determine worker internal dose.
- g. Measurement equipment quality control - Inspection activities include review of plant staff's use of procedures for radiological measurement processes QC.

Inspection activities in this area focus on the clarity of procedures through observation of plant worker (radiation work practices and controls) and HP technician performance. Deficient performance will be evaluated to determine if it results from deficient or unclear procedures. While reviewing the use of procedures, inspections also evaluate whether the procedure and activities observed result in compliance with regulations and license requirements. In addition, selected changes to procedures are reviewed to determine whether the procedures provide adequate guidance to plant staff to meet NRC requirements.

- 4. Human Performance Scope – training and qualification of plant staff and their performance. Inspection activities in this area focus on the effectiveness of the licensee's program for conducting plant staff initial training and qualification and requalification training. Inspection activities include observation of plant staff performance and walk-throughs conducted during NRC inspections for those areas listed in 3. above. Any deficient performance will be evaluated to determine if it results from deficient training and qualification.
- 5. ALARA Planning and Controls Scope – Inspection activities in this area focus on the licensee's actions to maintain worker radiation doses ALARA by properly planning and controlling airborne radioactivity concentrations and intake. This could involve reviewing airborne radioactivity and radiation trends and determining what evaluations of these trends were made by the licensee and what actions, if any, the licensee took as a result of evaluations.
- 6. Corrective Action Program (CAP) Scope (Audits/Audit Findings, Infraction Follow Up, Event Follow Up, and Other CAP Findings)

Inspection activities include reviews of selected Worker Radiation Safety items in the licensee's CAP to determine whether the items were adequately identified and corrected. This inspection is to complement the periodic inspection of the CAP program that evaluates implementation of the overall CAP program.

Metrics Used to Measure Key Attributes

Key Attribute	Area to Measure	Metric	Discussion
Limits Scope	Internal, external, and extremity dose	Meet 10 CFR Part 20	
Facilities and Equipment Scope	Airborne radioactivity monitors	Available, reliable, calibrated to perform surveys require by Part 20 or license	
	Area radiation monitors	Available, reliable, calibrated to perform surveys require by Part 20 or license	
	Airborne radioactivity sampling systems (fixed and portable)	Available, reliable, calibrated to perform surveys require by Part 20 or license	
	Airborne sample measurement equipment	Available, reliable, calibrated to perform surveys require by Part 20 or license	
	Bioassay sampling and analysis equipment	Available, reliable, calibrated to perform surveys require by Part 20 or license	
	Radiation measuring equipment	Available, reliable, calibrated to perform surveys require by Part 20 or license	
	Whole body and lung counting equipment.	Available, reliable, calibrated to perform surveys require by Part 20 or license	
Procedure Quality Scope	Radiation worker practices and procedures	Procedure used effectively to give adequate result per Part 20 or license	
	Airborne radioactivity sampling and measurement	Procedure used effectively to give adequate result per Part 20 or license	

	Personnel contamination control	Procedure used effectively to give adequate result per Part 20 or license	
	Non-routine work planning/radiation work permits (RWPs)	Procedure used effectively to give adequate result per Part 20 or license	
	Actions for elevated airborne concentrations	Procedure used effectively to give adequate result per Part 20 or license	
	Determination of internal dose	Procedure used effectively to give adequate result per Part 20 or license	
	Measurement equipment quality control	Procedure used effectively to give adequate result per Part 20 or license	
Human Performance Scope	Same elements as in Procedure Quality as above	Training adequate to assure effective procedure use per Part 20 or license	
ALARA Planning and Controls Scope	Results and trend reviews	Licensee action per license ALARA specifications	
	Actions to implement controls	Licensee action per license ALARA specifications	
Corrective Action Program (CAP)	Audits	Conducted as required by license or procedure	
	Audit Findings	Resolve adequately and timely	
	Infraction Follow Up	Follow up resolves issue, prevents reoccurrence and adequately considers extent of condition	
	Event Follow Up	Follow up resolves issue, prevents	

		reoccurrence and adequately considers extent of condition	
	Other CAP Findings	Other Worker Radiation Safety issues in CAP adequately resolved	

DRAFT