SNM-42

CHAPTER 3

INTEGRATED SAFETY ANALYSIS (ISA)

CHAPTER 3

INTEGRATED SAFETY ANALYSIS (ISA) AND ISA SUMMARY

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3.0 Introduction

The demonstration of compliance with the performance requirements of 10 CFR 70.61 is through an Integrated Safety Analysis (ISA).

The results of the ISA are documented in the ISA Summary, which is comprised of a general introductory chapter and a series of Safety Analysis Reports (SARs), for various processing areas. The ISA Summary provides a synopsis of the results of the ISA and exists as a separate document from the license. The ISA Summary is maintained through the comprehensive change control system described in Chapter 11, "Management Measures." The ISA documentation and supporting technical documentation is maintained on-site. The ISA Summary contains:

- a description of the structures, equipment, and processes at the facility that may affect the use or storage of Special Nuclear Material,
- an identification and analysis of identified, credible hazards at the facility,
- a general description of significant credible accident/event sequences that would result in unacceptable consequences,
- an identification and description of controls (i.e., structures, equipment, components, or procedures) that are relied on to limit or prevent potential accidents or mitigate their consequences, and
- an identification of means to ensure the availability and reliability of identified controls.

The unacceptable consequences of concern and therefore the scope of the ISA are those accident sequences that could result in the following:

- An unintended criticality;
- An acute worker dose of 25 rem or greater total effective dose equivalent (TEDE);
- An acute dose of 5 rem or greater TEDE to any individual located offsite;
- A 24-hour averaged release of radioactive material outside the restricted area in concentrations exceeding 5000 times the values in table 2 of appendix B to 10 CFR part 20;
- Under accident conditions any member of the public offsite would receive an intake of 30 milligrams of uranium in a soluble form

- An acute chemical exposure to an individual from licensed material or hazardous chemicals produced from licensed material that:

  - Could lead to irreversible or other serious, long lasting health effects to a worker, or

  - Could cause mild transient health effects to any individual located offsite

The scope of the ISA does not include 1) any initiating events caused by sabotage, acts of war, airplane crashes or meteorite impacts, or 2) administrative or recordkeeping requirements.

The scope of the ISA does include the hazards that may be presented by the consequences of meteorological and seismological phenomena (i.e., flooding, loss of structural integrity, etc.) to the extent such phenomena are considered credible for the plant site based on data published by the U.S. Geological Survey and the National Oceanic and Atmospheric Administration.

Documentation regarding process safety information, the ISA, and items relied on for safety is maintained at the facility. Process safety information and documents associated with the preparation of the ISA, including the PHA and SAR, will be retained, as a minimum, for the life of the process.

3.1 Process Safety Information

Process safety information is obtained and used to form the basis of the ISA. Process safety information includes discipline specific safety analyses, such as criticality safety, radiation safety, and fire safety. These safety analyses contain details regarding accident scenarios and the availability and reliability of the controls important to safety. Also included is hazard information for the materials being used or produced in the reviewed process, process technology information, and process equipment information.

The process safety information is used as a baseline for effective configuration management.

3.2 ISA

Documents associated with the ISA include facility descriptions, specific process descriptions, and a descriptive summary of the applicable ISA methodology, and results of the ISA. The process description includes narrative descriptions, process flow diagrams, plant drawings, operating procedures, and other documents necessary to adequately describe the process under review. The results of the ISA include the identification of hazards and accident scenarios, evaluation of consequences, and determination of likelihood.

3.2.1 Processes, Hazards, and Types of Accident Sequences

The ISA compliments the basis for the site safety program by identifying accidents of concern, evaluating the likelihood of each accident scenario, and designating controls and assurance measures.

The ISA is a systematic analysis of the facility's processes, equipment, structures, environment, and personnel activities to identify plant and external hazards and their potential for initiating accident sequences, their likelihood and consequences, and the items relied on for safety. The ISA is performed by a qualified team of safety and operational engineers (see 3.2.2) using appropriate Process Hazards Analysis (PHA) methodologies considering relevant hazards including radiological, nuclear criticality, fire, and chemical.

Documentation gathered or developed to support the ISA includes process safety information, ISA technical information, and the ISA Summary.

The initial phase of the ISA is the identification of hazards for the designated process. Hazards are materials, equipment, or energy sources that have the potential to cause injury or illness to humans and can include chemicals, radiological materials, fissile materials, explosive sources, and ignition sources. The chemical interaction/resistance matrices are developed. Lists of previous incidents, both internal and external, are evaluated, as well as current operating procedures, diagrams, and drawings. Where appropriate, lists of maximum intended inventories of hazardous materials are created along with their location in the facility. To analyze these hazards a Process Hazard Analysis (PHA) is performed to identify accident scenarios or process upsets that could occur. Accident scenarios are then formally constructed and evaluated. Then, the availability and reliability of controls used to prevent or mitigate each accident scenario are examined. A risk assessment is performed to determine the consequences and likelihood for each accident scenario. These results are then evaluated with the ISA threshold criteria listed in 3.0. Those controls that are identified as the barrier, which preclude the occurrence of the threshold criteria are identified as items relied on for safety (IRS or IROFS). For those accidents with unacceptable risk, recommendations for risk reduction are developed. In addition, recommendations for enhancing safety may be developed for accident scenarios that have an acceptable risk.

The ISA Summary is developed from the ISA. Each Safety Analysis Report (SAR) includes process descriptions, discipline specific analyses, items relied on for safety control matrix tables, and a general description of types of accident sequences for intermediate and high level consequence scenarios. The general description of types of accident sequences provides a summary of the significant accident scenarios for each safety discipline in a text format. The text identifies the types of accident initiating events and the prevention, protection, and mitigation mechanisms for accident scenarios that lead to unacceptable

consequences (i.e., those exceeding the performance requirements of 10CFR70). The text also provides, as appropriate, a discussion of safety margins for the parameters being controlled in the process to substantiate the conclusions of the risk assessment. Additional information in the form of actual scenario worksheets, with qualitative likelihood assignments in accordance with Tables 3.2.4-1 and 3.2.4-2, may be provided to further illustrate the methods used to ensure the performance requirements are met.

Potential accident sequences caused by process deviations or other events internal to the facility and credible external events, including natural phenomena, are evaluated. Process Hazards Analysis methodologies used by the site in conducting the Integrated Safety Analysis are described below. The PHA team leader selects one or more of these methodologies based on the characteristics of the process being reviewed in order to provide for the most adequate and efficient safety review.

3.2.2 ISA Team Qualifications and ISA Methods

To ensure the adequacy of the ISA, the analyses are performed by teams with expertise in engineering and process operations. The teams consist of persons experienced and knowledgeable in the following: nuclear criticality safety, radiation safety, fire protection, chemical process safety, and a cognizant engineer with experience and knowledge specific for each process being evaluated and an experienced operator. At least one member of the team shall be knowledgeable in the ISA methodology being used. The site provides "Process Hazard Analysis Leader Training" for engineers and safety specialists to qualify them to lead a team.

The traditional *checklist analysis* uses a list of specific items to identify known types of hazards, design deficiencies, and potential accident situations associated with common process equipment and operations. The Checklist Analysis technique can be used to evaluate materials, equipment, or procedures. Checklists are most often used to evaluate a specific design with which the site has a significant amount of experience, but may also be used at earlier stages of development for entirely new processes to identify and eliminate hazards that have been recognized through years of operation of similar systems.

The *What-If Analysis* technique is a creative, brainstorming examination of a process or operation. Safety analysts review the subject process or activity in meetings that revolve around potential safety issues identified by the analysts. Each member of the PHA team is encouraged to vocalize What-If questions or specific issues that concern them. The What-If Analysis technique may be used to examine virtually any aspect of facility design and operation.

The *What-If/Checklist Analysis* technique is a combination of the two previously discussed methods: What-If Analysis and Checklist Analysis. The What-

If/Checklist Analysis technique can be used for any type of process or activity at virtually any stage in the life of the process.

The *Hazard and Operability Analysis (HAZOP)* technique is based on the principle that several experts with different backgrounds can interact in a creative, systematic fashion and identify more problems when working together than when working separately and combining their results.

Failure Modes and Effects Analysis evaluates the ways equipment can fail (or be improperly operated) and the effects these failures can have on a process. These failure descriptions provide analysts with a basis for determining where changes can be made to improve a system design.

Double Contingency Analysis is a qualitative risk assessment methodology for nuclear criticality accidents that determines that a criticality accident is highly unlikely through the application of control systems that are robust and diverse. This qualitative analysis is based on the reliability and availability of the IROFS preventing the accident sequence, and no credit is taken for mitigation of the accident consequences. Processes are demonstrated to be subcritical under normal and credible abnormal conditions including the use of an approved margin of subcriticality described in Chapter 5. Determination that the accident sequence is highly unlikely is based on attributes of the criticality controls, and management measures are provided to assure the continued reliability and availability of these controls. Preference is given to engineered controls and those that fail in a safe and readily detectable manner.

Fault Tree Analysis is a deductive technique that focuses on one particular accident or main system failure, and provides a method for determining causes of the event. It provides a graphical model that displays the various combinations of equipment failures and human errors that can result in the main system failure of interest. It identifies the combination of basic equipment failures and human errors that can lead to an accident.

Event Tree Analysis is an inductive technique that shows the possible outcomes of an accident that results from an initiating event. It considers the response of safety systems and operators to the initiating event to identify the various accidents that can occur in a process. The results describe the possible accident outcomes in terms of the sequence of events that follow an initiating event, accounting for both the successes and failures of associated safety functions as the accident progresses.

3.2.3 Items Relied On For Safety

The primary purpose of performing the ISA is to identify the items relied on for safety (IRS or IROFS) such that they may be properly maintained to keep the facility operating safely.

IROFS may have attributes, components, or equipment that are necessary for the IROFS to accomplish the intended safety function. These are an integral and necessary part of the IROFS and are maintained by management measures to assure reliability. Failure of these attributes, components or equipment is considered a degradation or failure of the IROFS.

The site currently has no IROFS that are the sole item relied on for safety and does not plan to operate with sole items. If such items exist, however, the ISA Summary will contain a listing as required by 10 CFR 70.65(b)(8). The ISA process includes: 1) evaluating the hazards involving deviations from normal processing, internally initiated events, and externally initiated events that could result in consequences to the workers, public or environment; 2) identification of potential accident scenarios and consequence and likelihood of each; and 3) identifying engineered and administrative controls (items relied on for safety) so that the hazards will not result in unacceptable consequences.

The availability and reliability of the items relied on for safety is assured through the maintenance methods described in the control matrix in the SAR. Control maintenance includes such things as testing frequency, procedures, etc. Also, periodic inspections and audits are conducted as a method to ensure the control maintenance is fully implemented as described in the SAR.

3.2.4 Definitions of Unlikely, Highly Unlikely, and Credible

To determine the risk associated with an operation, facility, etc., an assessment is made with regard to the scope of the ISA listed in section 3.0. A risk assessment is performed for each potential accident scenario identified during the PHA. The risk is estimated qualitatively based upon the likelihood of occurrence and the severity of consequences of the accident scenario. Using these two "factors," a risk level is determined for the accident and assigned to one of three "risk zone" categories. The risk zones are assigned to require that credible high-consequence events be highly unlikely, and intermediate consequence events be unlikely.

Likelihood of Occurrence

The consequence and the likelihood of occurrence of each potential accident sequence that is identified by the ISA Team and the method used to determine the consequence and the likelihood is identified. The likelihood of occurrence of an accident is composed of two elements; the frequency of the initial event occurring despite prevention measures, and the reliability or effectiveness of protection measures that protect against the event progressing to the accident. Qualitative values are assigned to each of these two elements. These values are then combined to assign a score to the overall likelihood of occurrence for the accident

scenario. Tables 3.2.4-1 and 3.2.4-2 provide guidance for scoring for frequency and effectiveness of protection and provide ISA team members with appropriate guidewords for use of the two tables. The "occurrence rates" and "success rates" in Table 3.2.4-1 and 3.2.4-2 are not derived from published information, but are used as a supplement to the qualitative descriptions in the Tables to determine likelihood of the event. An assigned score for each element of likelihood is determined jointly by qualified ISA team members, and is based upon a complete understanding of the process, accident scenarios, operating history, and aspects of the control being credited. The specific controls evaluated by the ISA team to the requirements of Tables 3.2.4-1 & 3.2.4-2 that are credited to ensure the performance requirements of 10CFR 70.61 are met are designated as IROFS. Information regarding failure or degradation of IROFS, collected in accordance with Section 3.3, is used as a guideline in the likelihood determination such that the performance requirements of 10CFR 70.61 are maintained on a continuing basis.

The qualitative scoring method used by the ISA team is a conservative approach that provides a consistent, repeatable risk assessment technique. The scores are assigned using the guidance provided in Tables 3.2.4-1, 3.2.4-2, and 3.2.4-3, but do not represent an absolute conclusion regarding the likelihood or consequence severity for postulated accident scenarios. When appropriate, an independent risk analysis may be performed to ensure compliance with the performance requirements of 10CFR70. For example, a detailed criticality safety analysis for a system, performed in accordance with license requirements in Chapter 5 and implementing procedures, may determine that the performance requirements of the regulations are met.

There may be accident scenarios for which the indexing methodology of Tables 3.2.4.1.and 3.2.4.2 does not provide a direct description of the safety basis. In these cases, since the Double Contingency Principle is the benchmark for the risk assessment methodologies, an alternative but equivalent risk assessment is performed based on the Double Contingency Principle. This qualitative analysis is based on the reliability and availability of the IROFS preventing the accident sequence. Reliability and availability of these controls is assured through application of control systems that are robust and diverse with preference given to engineered controls and those that fail in a safe and readily detectable manner. In cases where indexing scores are adjusted by the ISA team, specific documentation shall be maintained justifying the scores.

Qualitative Assignment of Accident Likelihood Based on Prevention and Protection Mechanisms

Table 3.2.4-1: Frequency of Initiating Event

Score	Occurrence Rate	Qualitative Description and/or Example of Prevention Mechanisms
1	1/month	Expected to occur regularly during plant lifetime, no prevention or extremely weak prevention
0	1/year	Expected to occur occasionally during plant lifetime, prevention by a trained operator performing a non-routine task
-1	1/10 years	Expected to occur sometime during plant lifetime, prevention by a trained operator performing a routine task
-2	1/100 years	Not expected, but might occur during plant lifetime, prevention by a functionally tested hardware system
-3	1/1000 years	Not expected to occur during plant lifetime, prevention by an inspected passive safety device, or a functionally tested hardware system with trained operator back-up
-4	1/10,000 years	Physically possible (credible) but not expected to occur, prevention by two independent, redundant methods or systems each functionally tested
-5	-	Not physically possible (not credible) (events determined to be *not credible* are those events that are not expected to be possible based upon generally accepted physical or engineering principles; if an initiating event is determined to be *not credible*, then further analysis of the accident sequence progression is not necessary)

If *Detection and Correction Systems* are in place to detect and correct the failure that results in the initiating event, then the frequency may be adjusted by one order of magnitude. This is acceptable since detection and correction will limit the time the system remains in the failed state. This may be applied only to frequencies of 1, 0, -1 or -2.

Table 3.2.4-2: Effectiveness of Protection

Score	Success Rate	Qualitative Description or Example of Protection Mechanisms
0	0%	No protection or extremely weak protection
1	90%	Protection by a trained operator performing a non-routine task
2	99%	Protection by a trained operator performing a routine task, or a functionally tested hardware system
3	99.9%	Protection by an inspected passive safety device, or a functionally tested hardware system with trained operator back-up
4	99.99%	Protection by two independent, redundant methods or systems each functionally tested

For multiple protections that are independent and are each required to fail for the accident to progress, the index assigned may be a composite of the indices for the individual protection mechanisms.

Overall Likelihood (OAL) of the Accident Scenario
OAL = Frequency of Initiating Event Score – Effectiveness of Protection Score

Severity of Consequences

The severity of consequences of an accident is measured in terms of resulting health effects including fatalities or exceeding personnel exposure limits. A relative score from Table 3.2.4-3 is assigned to each accident scenario based upon its estimated consequences, taking into consideration all of the potential effects and whether the consequences are onsite or offsite.

Consequence mitigation may be applied to limit the potential accident consequence to that which is "reasonable and credible" given the conditions under which the facility is allowed to operate. Mitigation does not affect the likelihood of the accident but only serves to limit the consequences of the accident after it has occurred. Credit for reduction of the potential consequences based on mitigation is achieved qualitatively through operating experience, engineering judgment, and accident modeling.

There are two types of mitigation, characterized as *programmatic* and as *safety features. Programmatic mitigators* are those programmatic conditions or attributes that are in place as general license commitments, and are not translated into IROFS since they are already captured in regulatory space as general commitments. The second type of mitigation is a specific *safety feature* that serves to limit the potential consequences of an accident scenario. This type of mitigation includes engineered or administrative controls that limit the chemical or radiological impact of the accident (the irreversible event) on the worker, the public, or the environment as defined in 10CFR70. When the application of *safety feature* mitigation results in rendering a consequence acceptable under the regulation, these mitigators are IROFS.

Note that for criticality safety, the site does not credit any form of mitigation.

Some consequences described in Table 3.2.4-3 are below or outside the scope of the ISA as defined in paragraph 3.2; therefore, accident scenarios resulting in such consequences may or may not be addressed by site Management. Furthermore, any actions directed by site Management associated with those scenarios are not considered a part of the ISA required by 10 CFR 70.

Risk Levels and Acceptability

Risk levels are determined by combining the severity and likelihood factors established for the postulated accident. For the evaluation of pre-existing operations the following protocol is used: Risk Zone 1 operations are shut down, Risk Zone 2 operations are evaluated and either shut down or allowed to continue with a time limited waiver. Risk Zone 3 operations are acceptable as they meet established criteria.

For new operations the following risk level protocol is established: Risk Zones 1&2 are not acceptable and are designed out such that a Risk Zone 3 is achieved prior to start-up of that operation.

Table 3.2.4-3: Severity of Consequences Table

		CHEMICAL	FIRE	CRITICALITY	RADIOLOGICAL
SEV	Qualitative Descriptor Consequence of Event Order of Magnitude	Effects from Chemical Hazards Exposure (does not include plant conditions that result in an occupational risk, but do not affect the safety of licensed radioactive materials)	Effects from Fire Hazards Exposure (does not include plant conditions that result in an occupational risk, but do not affect the safety of licensed radioactive materials)	Effects from Criticality Hazards Exposure	Effects from Radiological Hazards Exposure
6	Very High Multiple fatalities	An acute chemical exposure to an individual from licensed material or hazardous chemicals produced from licensed material that could cause death to multiple workers (e.g., above the ERPG-3 limit, above IDLH, toxic inhalation, serious burns, explosive energy release, etc.) — or — permanently disable a member of the public at the site boundary.	Fire which could cause commensurate radiological, chemical, or criticality consequences.	Occurrence of criticality regardless of potential radiological exposure.	Lethal radiation dose
5	High Fatality or multiple permanent health effects	An acute chemical exposure to an individual from licensed material or hazardous chemicals produced from licensed material that could endanger the life of the worker (e.g., above the ERPG-3 limit, above IDLH, toxic inhalation, serious burns, explosive energy release, etc.) — or — exposes a member of the public at the site boundary above ERPG-2 limit and could lead to irreversible or long-lasting health effects.	Fire which could cause commensurate radiological or chemical consequences.		Acute worker dose of 100 rem, acute dose at site boundary of 25 rem or intake at site boundary of 30mg soluble uranium.
4	Intermediate Permanent loss of function/limb or multiple lost-time injury	An acute chemical exposure to an individual from licensed material or hazardous chemicals produced from a licensed material that could lead to irreversible or other serious long-lasting effects to a worker (e.g., above the ERPG-2 but less than ERPG-3 limit, toxic inhalation, serious burns, explosive energy release, etc.) — or — exposes a member of the public at the site boundary above ERPG-1 resulting in mild transient health effects.	Fire which could cause commensurate radiological or chemical consequences.		Acute worker dose of 25 rem, acute dose at site boundary of 5 rem, or 24 hour average release exceeding 5000 times Table 2 of 10CFR20, Appendix B at the Restricted Area boundary.

Table 3.2.4-3: Severity of Consequences Table (Cont.)

		CHEMICAL	FIRE	CRITICALITY	RADIOLOGICAL
3	Medial Restricted/lost time work injury or multiple medical treatment cases	A chemical accident that could result in exceeding radiological criteria.	Fire which could cause commensurate radiological or chemical consequences.		Exposure of worker or member of the public in excess of 10 CFR 20 limits.
2	Low Medical treatment or multiple first-aid cases	A chemical accident that could cause commensurate radiological consequences.	Fire which could cause commensurate radiological or chemical consequences.		Radioactive material spill ≥ 1000 ft^2, personnel contamination <500k dpm / 100 cm^2
1	Very Low Minor injury; first aid case	A chemical accident that could cause commensurate radiological consequences.	Fire which could cause commensurate radiological or chemical consequences.		Radioactive material spill ≥ 100 ft^2, personnel contamination <50k dpm / 100 cm^2 exposure of workers below 10 CFR 20 limits, offsite release causing doses below 10 CFR 20 limits.
0	Negligible Probably no health effects; nuisance odor, visible plume	A chemical accident that could cause commensurate radiological consequences.			Personnel contamination < 5k dpm / 100 cm^2, exposure of workers below license action levels, off-site release below license action levels

Note that in the above table, the occurrence of a criticality is considered a high consequence event regardless of potential exposure therefore in all cases, the occurrence of a criticality must be made Highly Unlikely.

Table 3.2.4-4: Risk Assessment Table

Overall Likelihood of Accident

Severity of Consequences		Highly Unlikely	Unlikely		Not Unlikely		
		≤ -4	-3	-2	-1	0	1
High	6						
	5						
Intermediate	4						
Medial	3						
Low	2	BELOW SEVERITY THRESHOLD					
	1						
	0						

= Risk Zone 1 (Does not meet performance criteria, immediate corrective action required)

= Risk Zone 2 (Does not meet performance criteria, corrective action required within time limited waiver)

= Risk Zone 3 (Meets performance criteria, no corrective action required or acceptable for startup of new operation)

3.3 Management Measures

In order to ensure the availability and reliability of the items relied on for safety, these items are to be properly designed, constructed, inspected, calibrated, tested, implemented and maintained. The site uses several management measures to assure the continued availability and reliability of the items relied on for safety such that they perform their function when needed. The management measures in place are described in Chapter 11.

The documenting of each discovery that an item relied on for safety (IROFS) or management measure has failed to perform its function upon demand or has degraded such that the performance requirements of 10CFR 70.61 are not satisfied is maintained by the site safety audit programs. IROFS and management measure failures are identified and resolved using the corrective action system or safety audit programs. These failures and degradations are documented in the site safety audit reports that maintain readily retrievable records such as a description of the failure, date of discovery, date (or estimated date) or the failure, and duration. The corrective action system and safety audit reports are described in Chapter 11, "Management Measures" of SNM-42.

Operational experience with tracking of failures or degradation of IROFS is also used as feedback to revise scenarios and the ISA Summary when necessary. Information regarding failure or degradation of IROFS, collected in accordance with the corrective action system and safety audit program, is used as a guideline in the likelihood determination such that the performance requirements of 10 CFR 70.61 are maintained on a continuing basis.

3.4 ISA Summary

The ISA summary is documented in the Safety Analysis Reports (SARs). This summary document includes the process description, safety discipline evaluation summary including general descriptions of types of accident sequences, and items relied on for safety control matrix. The change management system is used to keep this document updated in a controlled manner. The ISA Summary will includes a general description of the site including meteorology and seismology [10 CFR 70.65(b)(1)]. Also included is an identification of the controlled area boundary [10 CFR 70.65(b)(2)], a description of the requirements for criticality monitoring and alarms [10 CFR 70.65(b)(4)], and a generic accident analysis. The ISA Summary will include the Safety Analysis Reports (SARs) as described below. Each SAR will have information that satisfies the requirements of 10 CFR 70.65(b)(3) through 10 CFR 70.65(b)(9).

Safety Analysis Reports (SARs)

Individual SARs are generated for predetermined processes at the site. These SARs ensure conformance with the requirements of 10 CFR Part 70 and indicate that a systematic evaluation of the hazards and credible accident scenarios has been completed for each process. Each SAR contains a description of the evaluated process, block flow

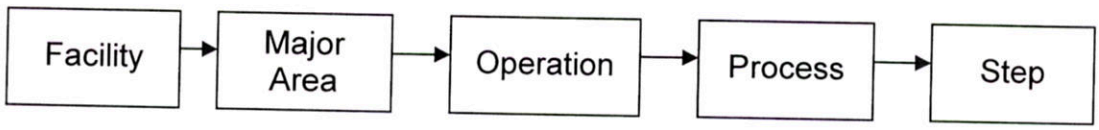
diagrams, facility-siting review, safety controls for the process, and references to other documentation pertaining to the prescribed process. Specifically included in each SAR are the narrative descriptions, PHA documentation, general description of types of accident scenarios (severity consequence score of 3 and higher), and the administrative and engineered controls required to prevent or mitigate the consequences of the identified accident scenarios for each process. Each Safety analysis Report contains tables that identify the following:

- **Parameter** being controlled
- **Limit** on the parameter being controlled
- **Control Type**, which identifies whether passive engineered, active engineered, enhanced administrative or simple administrative
- **Control Method** which actually identifies the IROFS
- **Control Maintenance** which identifies the specific management measures applied to the IROFS
- **Class A, B or C** which identifies the importance of the control. Class A is a sole control, Class B is one of multiple controls and Class C is a control over a medial or low consequence scenario. Class A or B Controls may be IROFS depending on whether the accident scenario consequences are under NRC oversight.
- **IROFS** which identifies whether the control is considered an IROFS or not.

Changes are expected to occur to existing processes at the site. Any change to facilities, structures, systems, components and procedures shall be evaluated before the change to ensure the implementation will not result in an unacceptable risk level.

Facility changes are evaluated against the requirements of 10 CFR 70.72 as well as internal procedures as described in Chapter 11. Chapter 11 also describes when changes can be made without prior NRC approval. Reporting of ISA Summary changes will be in accordance with 10 CFR 70.72(d)(3).

In general SARs are written for each Major Area or Operation as depicted in the example below. Accident scenarios that are reviewed can occur within any of the individual boxes shown below.



Lynchburg	Uranium Recovery Building	Uranium Scrap Recovery	Dissolution	Dissolving Weighing, etc.

The following is a typical Table of Contents for a SAR.

Table of Contents

15.x.1 Introduction

Includes team qualifications and method, 70.65(b)(5)

15.x.2 Process Description, 70.65(b)(3)

15.x.3 Facility Siting Review, 70.65(b)(1) & 70.65(b)(2).

15.x.4 Discipline Specific Safety Analysis, 70.65(b)(3).

15.x.4.1 Criticality Safety Analysis, including general types of accident sequences

15.x.4.2 Chemical Safety Analysis, including general types of accident sequences

This section will include specific exposure levels for chemicals pursuant to 10 CFR 70.65(b)(7).

15.x.4.3 Radiological Safety Analysis including general types of accident sequences

15.x.4.4 Fire Safety Analysis including general types of accident sequences

Table 15.x.4.1.1 Criticality Safety Parameters and Limits, Controls, and Control Maintenance, 70.65(b)(6)

Table 15.x.4.2.1 Chemical Safety Parameters and Limits, Controls, and Control Maintenance, 70.65(b)(6)

Table 15.x.4.2.2 Chemical Interaction Matrix

Table 15.x.4.3.1 Radiological Safety Parameters and Limits, Controls, and Control Maintenance, 70.65(b)(6)

Table 15.x.4.4.1 Fire Safety Parameters and Limits, Controls, and Control Maintenance, 70.65(b)(6)

List of Sole Items Relied on for Safety, if necessary