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Sponsor: Dori Ellis, 4000, Acting

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GN470088 - PREPARATION AND REVIEW OF SAFETY ASSESSMENTS FOR MODERATE- AND HIGH-HAZARD NONNUCLEAR FACILITIES

Subject Matter Expert: Michael Vigil; SNL/CA Counterpart: N/A
GN470088, Issue C
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* Indicates a substantive change

Change History

*1.0 PURPOSE AND OWNERSHIP

1.1 Purpose

This document provides guidance for the preparation and review of safety assessments (SA) that are applicable to moderate- and high-hazard nonnuclear facilities below hazard category 3. These are facilities that contain radiological hazards to be controlled as prescribed by CPR400.1.1.32/MN471016, *Radiation Protection*

Procedures Manual. As well as through the CPR400.1.1/MN471001, *ES&H Manual*, Chapter 13C, "Authorization Basis Process." The intent is to provide a systematic methodology for both the preparation and review processes. Although, no high-hazard, nonnuclear facilities currently exist at SNL, this document serves to provide guidance for those facilities should it be required.

This document supplements CPR400.1.1/MN471001, *ES&H Manual*, Chapter 13, "Hazards Identification/ Analysis and Risk Management."

1.2 Ownership

Risk Management/Physical Security/MC&A/NMM Department (3111), hereafter referred to as "Risk Management", is responsible for this document. Submit suggestions for improvements to the manager of Risk Management.

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*2.0 RESPONSIBILITIES

2.1 Risk Management/Physical Security/MC&A/NMM Department (3111)

Risk Management personnel are responsible for:

- Maintaining this document
- Providing SNL organizations involved in safety assessment (SA) preparation with subject matter expert (SME) services to help plan the SA, and to address concerns and questions that arise in the course of SA preparation.

  Note: Authorization basis SMEs from Risk Management are available to assist with the implementation of any aspect of the SA at the request of management.

- Upon request, leading, participating in, or facilitating independent review teams.

2.2 SNL Management

SNL managers are responsible for ensuring that all SNL requirements leading to the approval of the SAs and other safety documentation prepared in support of their facilities are met. These responsibilities include:

- Preparation of Moderate- and High-Hazard Nonnuclear Facility Safety Assessments as described in Section 3, "Preparation of Safety Assessments."
- Ensuring an Independent Review of Safety Assessments against specific criteria as described in Section 4, "Independent Review of Safety Assessments (SAs) and Section 5, "Minimum Review Criteria."

Note on the Startup and Restart Process. The implementation of hazard controls resulting from an SA is verified and documented in accordance with CPR400.1.1/MN471001 *ES&H Manual*, Section 13D, "Readiness Review Process" and GN470089, Startup and Restart Process for SNL Moderate- and High-Hazard

Nonnuclear, Accelerator, and Nuclear Activities." Completion of a readiness assessment is a prerequisite to initiating any activity that has been the subject of an SA.

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*3.0 PREPARATION OF SAFETY ASSESSMENTS (SAs)

3.1 Background

A safety assessment (SA) is a more technically rigorous document than the hazards analysis (HA) produced by using the ISMS software. The approach to managing the development of the SA depends upon which of the following cases apply:

Case 1. Line Item Projectsper DOE) 413.3, "Program and Project Management for the Acquisition of Capital Assets."The SA constitutes the safety basisfor Line Item Projects in five stages defined by the critical decision milestones per DOE O 413.3, "Program and Project Management for the Acquisition of Capital Assets," Attachment 4. NNSA has approval authority encompassing the SA drafts at each milestone. Managers should consult with NNSA to accept or revise the acceptance criteria in Section 5, "Minimum Review Criteria," as early as possible. Sandia assurance basis requirements per CPR400.1.1/ MN471001 *ES&H Manual*, Attachment 13C-1, "Required Documentation and Authorization Authority by Hazard Classification," (new title) including management authorizations, apply at each stage prior to submittal of the draft SA to NNSA.

Case 2. General Plant Projects (GPPs): The SA constitutes the safety basis for GPPs in only one stage of the authorization. Under the governance pilot, Sandia normally has authorization authority. When NNSA is the authorization authority, Sandia assurance basis requirements per Section 13C, including line management authorizations, apply prior to submittal of the SA to NNSA.

The recommended content, format, review criteria, and Sandia authorization process is the same for Case 1 and Case 2. However, since NNSA has criteria for partial completion of sections at each stage of development, the guidance that follows conveys NNSA expectations. Sandia requires authorization per the Authorization Basis Process of the final SA only. However, managers may stage approvals of drafts as appropriate.

3.2 Objectives of the SA

Objectives of the SA follow:

- Identify potential hazards, consequences, and controls.
- Assess potential hazards in terms of their consequences and the controls needed to reduce associated risks.
- Make and document decisions about those controls that prevent or mitigate the hazards to adequate levels per regulatory requirements, standard industrial practice, CPR400.1.1/MN471001, *ES&H Manual*, or Sandia manager's risk acceptance criteria.
- Identify additional SAs that should be performed in support of subsequent decision milestones.

3.3 Guidance for Planning the SA

3.3.1 General Planning

Prior to initiating a SA, complete and document the following planning steps in the form of a SA plan:

Step	Action
1	Ensure that formal documented consideration of safety issues is initiated at the earliest appropriate time in the activities life cycle. **Note:** • Normally Facilities Management and Operations Center (10800) prepares a design criteria document (DCD) to guide the project design. • Management may require that Sandia safety SMEs provide input to the DCD (e.g., when the proposed facility involves the use or storage of hazardous materials).
2	Ensure identified SA document preparation and review personnel Understand: • The activity. • Sandia's Authorization Basis Process. • ES&H Manual and Supplement requirements. • Sandia management expectations. • DOE/NNSA expectations.
3	Identify relevant requirements for safe design and operation of the activity, including: • The activity. • All applicable federal, state and local regulatory requirements. • NNSA orders, as implemented through Sandia's ISMS program through the ES&H Manual. • NNSA expectations not fully covered by NNSA formal requirements.

4	Identify all review criteria. • Review the minimum review criteria in Section 5, “Minimum Review Criteria.” • Consider the need for additional criteria. **Note:** It is essential that any additional review criteria be coordinated between the reviewers, line management, and NNSA authorizers prior to initiating work on an SA.
5	Identify supporting data and resources - specify the location and availability of the data. **Note:** Safety relevant data are available in Sandia's *ES&H Manual*, government and industry standards, codes, specifications, program and historical data, and other relevant safety analyses. These may include the PHS, HA, HAD, or NEPA documentation for the proposed activity.
6	Identify the Applicable Methodology by selecting a methodology appropriate for the activities and their hazards. **Note:** See Section 3.4.4, “Hazard Assessment,” and Section 3.4.5, “Accident Analysis,” for additional guidance.
7	Plan to resolve and close issues relevant to hazards management. **Note:** At each draft in the development of the SA (as defined by DOE O 413.3, or SNL project management), decisions are made as to when analysis and controls are sufficient, or require further study for the subsequent draft. It is important to track hazards and control decisions to closure. Tracking tools range from databases to a posted tables. They provide a record of how hazards and related issues are resolved at each stage of the SA development process.
8	Plan to Manage the Review Cycle. • *ES&H Manual*, Section 13C, Authorization Basis Process and DOE O 413.3, specify requirements for independent reviews, Sandia management acceptance, and NNSA authorization at major activity milestones. • Managers are responsible for planning and managing a host of activities leading to each milestone completion including: ○ Internal reviews for technical adequacy and quality assurance. ○ Independent reviews for adequacy in relation to requirements and NNSA expectations.
9	Develop a Schedule. **Note:** Organize and plan the SA process to encompass all the above considerations around relevant management and NNSA authorization milestones.

3.4 Minimum Recommended Content of the (SA)

The content is the same for Cases 1 and 2, as defined in Section 3.1, “Background.” Additional sections may be required or provided at manager discretion. The tables of Expectations of % Completion, provided below for each major SA section, apply to Case 2 – Line Item projects per DOE O 413.3.

3.4.1 Executive Summary

Provide an overview of the SA’s contents, methodologies, and determinations. This may include:

- A brief facility overview.
- Discussion of the scope of analysis.
- A description of how the hazard classification was determined.
- A guide to organization and content.

Note: Also consider providing an overview of assumptions, approaches, and the conclusions of the analyses.

Expectation of % Completion - Executive Summary

Design and Construction Milestones				
Preliminary Design	Final Design	Construction Completion	Readiness	Post Start-up
Stages in the Development of the Safety Assessment				
Draft Preliminary SA	Final Preliminary SA	Draft SA	Draft Final SA	Final SA
NA	90-100%	100%	100%	100%

Note: Completeness of the Executive Summary at each stage should be consistent with that of the document overall.

3.4.2 Description of Site and Facility

Site: Describe the site (location, physical-geographic setting, special features), and summarize seismic, geological, hydrologic, or meteorological information relevant to hazards or accident analyses. As appropriate and relevant, refer to existing Sandia documents, such as the SNL, SAND2002-2145, “*Calendar Year 2001 Annual Site Environmental Report*” and the DOE, “*Sandia National Laboratories Final Site-Wide Environmental Impact Statement (SWEIS)*.”

Facility: Include and briefly discuss the following:

- Facility site plan, layout, and supporting schematics.
- Relevant architectural and structural design features.
- Mechanical systems, such as exhaust, smoke, recirculation, make-up air, heating, electrical systems, process systems (e.g., liquid nitrogen, chilled water, acid waste, vacuum, air) and process support systems (e.g., chemical storage areas, generators, fuel storage).
- Orientation (within the facility footprint) of specific safety important features (e.g., hazardous waste storage areas, fire protection systems, life safety systems [monitoring, alarm]; emergency generators).

- Location(s) of all utility system connections to facility.
- Identification of adjacent and nearby facilities and numbers of workers that could be affected by a design-basis accident.
- Identification of shared systems (i.e., between buildings, or other as applicable).
- Other site and facility features or attributes that may be relevant to the requirements of DOE 420.1A, "Facility Safety," and expectations implied In DOE G 420.1-1, "Nonreactor Nuclear Safety Design Criteria And Explosives Safety Criteria Guide."

Description of laboratory and test facilities should include the following:

- Equipment and systems essential to the performance and safety of facility activities (e.g., cables, winches, counterweights, facility-specific control rooms, alarms, fire suppression systems; burn pools; sled tracks, storage areas).
- Applicable building code(s) that the facility was or is based upon (e.g., Uniform Building Code [UBC], International Building Code [IBC], and International Fire Code [IFC]).
- For new design and construction, reference should be made to the Sandia "Facilities Design Standards Manual," "Facilities Construction Specifications," as well as project specific design and other criteria, as applicable.

Expectation of % Completion - Site & Facility Description, by Iteration

Design and Construction Milestones				
Preliminary Design	Final Design	Construction Completion	Readiness	Post Start-up
Stages in the Development of the Safety Assessment				
Draft Preliminary SA	Final Preliminary SA	Draft SA	Draft Final SA	Final SA
65-75%[1]	90-100%[2]	100%	100%	100%

[1] Recognizes that for new construction and renovation the preliminary design does not usually provide a sufficient basis for a complete safety analysis; [2] While the design may be final, allowance is made for additional consideration of selected hazards.

3.4.3 Description of Activities (i.e., operations, processes, etc.)

Description of operations should include the following:

- *Summary* – a list of main functional areas of the activity.
- *Description* – describes in greater detail activities occurring within the functional areas identified above. Process flowcharts, and other illustrations should be provided to facilitate document review.
- *Description of Hazardous Materials* – table of chemicals, their uses in operations, estimated quantities, hazardous properties, and methods of handling and storage.
- *Description of Controls* – List each safety-related control, and briefly describe how it function in terms of

the activity's Structures, Systems and Components (SSCs), as well as administrative procedures. These are the controls whose functioning will be validated by the readiness review process. Their rational is provided in later sections containing the comprehensive hazards assessment, and where appropriate, selected accident scenario analysis.

Expectation of % Completion - Description of Operations

Design and Construction Milestones				
Preliminary Design	Final Design	Construction Completion	Readiness	Post Start-up
Stages in the Development of the Safety Assessment				
Draft Preliminary SA	Final Preliminary SA	Draft SA	Draft Final SA	Final SA
75-95%	95-100%	100%	100%	100%

3.4.4 Hazard Assessment

This section documents the hazard assessment process and includes methods used to identify and assess the hazards, and the controls resulting from the assessment.

Hazards Identification. The product of hazards identification is a comprehensive description of hazards that need to be assessed for the application of appropriate control measures. Hazards classified by the Primary Hazards Screen (PHS) as standard industrial hazards should be summarized in a table with a very brief description of the applicable controls per the PHS. Activities classified as low, moderate, or high hazard require additional assessment beyond the PHS to justify control measures.

Hazards Assessment. Each identified hazard is evaluated to characterize relative risks (i.e. in terms of consequences and expected frequency) of unmitigated hazard scenarios. The assessment included a preliminary identification of control options that would prevent or mitigate a malfunction or accidental occurrence.

Select an appropriate assessment technique from several available standard methods widely used by government and industry. Acceptable methods are described in American Institute of Chemical Engineers (AIChE), Center for Chemical Process Safety (CCPS), "*Guidelines for Hazard Evaluation Procedures*." This reference is cited by DOE-STD-3009 Change 2, "*Preparation Guide for U.S. DOE Nonreactor Nuclear Facility Safety Analysis Reports*," as applicable to hazards analysis at non-reactor nuclear facilities.

Examples of methods useful for initial hazards identification include the "checklist" and "What if?" approaches. These methods are particularly effective in a facilitated session with project managers, designers, operators, and various ES&H SMEs. Complex operating systems may be further analyzed by SME's who use tools such as: hazard and operability analysis (HAZOP), fault tree analysis (FTA), failure modes and effects analysis (FMEA), and process hazards analysis (PrHA).

The outcome of the hazards assessments include the following mitigation measures:

- Designed into the structures, systems and components.
- Protective devices.
- Warning devices.

- Incorporation into operating procedures.

Criteria to Assess Acceptability of Methods and Techniques. Managers or their qualified designees choose the technique or method that meets at least one (if not each) of the following criteria.

- The method has been accepted by the NNSA or other federal agency.
- The method is a standard practice or has otherwise been accepted by industry.
- There is adequate precedent to constitute reliable benchmarking of the method.
- In the unlikely event that no method meets the above criteria adequately for the hazards at hand, specially designed methods or models are developed and/or applied with the advance concurrence of key project decision makers at SNL and NNSA.

A fundamental requirement of the hazard analysis process is that it be logical, accurate, readily understandable, and credible to the reviewer.

Expectation of % Completion - Hazards Analysis

Design and Construction Milestones				
Preliminary Design	Final Design	Construction Completion	Readiness	Post Start-up
Stages in the Development of the Safety Assessment				
Draft Preliminary SA	Final Preliminary SA	Draft SA	Draft Final SA	Final SA
50-75%	75%	75-95%	95-100%	100%

3.4.5 Accident Analysis

Accident analysis is a quantitative evaluation or simulation of how a given hazards scenario results in consequences for the worker, the public, the environment and property. Insights gained from the analysis inform decisions about safety controls inherent to structures, systems, or components (SSCs), applied as procedures, and other administrative controls and measures. The following are necessary elements of the accidents analysis chapter:

- *Accident Scenario Development*. Describe each of the scenarios based on a particular category (e.g., failure of a SSC, accident and natural phenomena events that can affect an SSC). Each scenario states an initiating event, and the chain of induced events that can harm workers, the public, the environment, and property. See DOE O 420.1A; DOE G 420.1-1; and DOE G 420.1-2, for guidance on NNSA expectations for the analysis of natural phenomena events. Use bounding scenarios to define the safety envelope.
    - Scenario input is to include:
        - Initiating events
        - Mechanisms to respond to the event

        - Onsite and offsite receptors
        - Operative controls together with an estimate of reliability based on data.
    - Scenario output is to include:
        - Severity of harm to persons, property and the environment
        - Probability of occurrence.

- *Source Term Analysis*. Describe and provide the situational context by which the hazard could trigger the consequences associated with the scenario (e.g. chemicals, fuels, electrical hazards, waste storage areas).
- *Consequence Analysis and Comparison to Evaluation Guidelines (EGs/)/Exposure Limits*. Compare the measured endpoints to evaluation guidelines. Examples of conventional evaluation guidelines (using chemical exposure as the example) include:
    - American Industrial Hygiene Association (AIHA) “Emergency Response Planning Guidelines and Workplace Environmental Exposure Level Guides,” The *AIHA 1997 Handbook*, The American Industrial Hygiene Association, Fairfax, Virginia; the AIHA guidelines are intended for planning protective actions, as such they include a margin for safety.
    - DOE, *ERPGs and TEELs for Chemicals of Concern*, WSMS-SAE-02-0171.
    - National Institute for Occupational Safety and Health (NIOSH), Immediately Dangerous to Life or Health (IDLH) Exposure Levels; Time-Weighted-Average (TWA); Permissible Exposure Limits (PEL)/Short-Term Exposure Limits (STEL); as with the ERPG levels the IDLH, TWAs, PELs, and STELs are also intended for planning protective actions, and as such they also include a margin for safety (ERPGs for off-site evaluation; IDLHs, PELs, TWAs, STELs, for on-site and in-facility exposure evaluation).
- *Controls*: Identify and design the safety SSCs and administrative controls that, according to the consequence analysis, will prevent exposure of workers or the public to hazardous material exposures above the evaluation guidelines and exposure limits as defined above, and otherwise protect them from potential harm associated with identified hazards. Apply defense-in-depth accident prevention principles. Assess the adequacy of the system of controls by estimating the risk (probability and consequences) of the design-basis accident.

Note: DOE-STD-3009 Change 2, *Preparation Guide for U.S. DOE Nonreactor Nuclear Facility Safety Analysis Reports*, requires that “unmitigated release” scenarios be used in accident analysis for nuclear facilities to establish whether an evaluation guideline (EG) has been met. The result determines whether the SSCs are classified as “safety-class” or “safety significant.” There is no DOE or Sandia requirement to apply this distinction to non-nuclear facilities or to analyze unmitigated releases. Analysts may elect to define and analyze unmitigated releases as appropriate for the specification of controls.

Principal outputs of the of the accident analysis include the following:

- Identification of potential consequences to the public, the worker, the environment, and to property, including the facility and equipment associated with the activity.

- Identification of additional “safety important” SSCs beyond those identified through hazard analysis.

Based on these outputs, managers are to decide on SSCs and their functional requirements.

Note regarding “safety important”: SSCs specified by accident analysis are designated “safety important.” These require engineering controls beyond those associated with standard industrial codes and federal mandates such as OSHA..

Expectation of % Completion - Accident Analysis

Design and Construction Milestones				
Preliminary Design	Final Design	Construction Completion	Readiness	Post Start-up
Stages in the Development of the Safety Assessment				
Draft Preliminary SA	Final Preliminary SA	Draft SA	Draft Final SA	Final SA
75-90%	90-100%	100%	100%	100%

3.4.6 Summary of Hazard Controls (beyond standard industrial controls)

The summary includes a high-level discussion of the following elements:

- Consideration of any precedence for specific hazard control solutions.
- Identification of SSCs integral to the design of a facility or activity, and serving one or more safety functions.
- Identification and description of the devices that measure or monitor a physical condition and the procedures that shut down the operation, activate another control measure, and/or set off an alarm when a predetermined threshold has been exceeded.
- Identification of the administrative procedures involving personnel who are instructed or trained as appropriate to follow specified procedures.
- Identification of any other activities or measures taken for the purpose of preventing a hazardous situation from developing, or for the purpose of reducing the consequences of that situation, should it occur.
- Overview of Emergency Response Planning. Discuss emergency response planning, including a summary overview of the roles and responsibilities of facility responders, corporate emergency response personnel and programs, and other response personnel (e.g., local fire departments).

Expectations of % Completeness - Summary of Hazard Controls Section

Design and Construction Milestones				
Preliminary Design	Final Design	Construction Completion	Readiness	Post Start-up
Stages in the Development of the Safety Assessment				
Draft Preliminary SA	Final Preliminary SA	Draft SA	Draft Final SA	Final SA

50-75%	90-100%	100%	100%	100%

3.4.7 Safety Envelope

The safety envelope defines the range of conditions covered by the safety documentation of an operation, under which safe operations are adequately controlled. It specifies:

- Hazard controls required for safe operation.
- Limitations on the scale or scope of operations.
- All limits placed on the operation of an activity to ensure that expected risks are consistent with decisions made on hazard controls made in the SA and other safety asis documents
- Limits on energy levels, hazardous material levels, and the proximity of personnel to the activity.

3.4.8 Quality Assurance

For specific guidance on quality assurance (QA), refer to CPR001.3.2, *Corporate Quality Assurance Program*.

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*4.0 INDEPENDENT REVIEW OF SAFETY ASSESSMENTS (SAs)

4.1 Reviewer Requirements

Reviewers shall carry out the following tasks:

- Use the review criteria listed in Section 5.0, "Minimum Review Criteria."
- Propose additional criteria as appropriate to the context and need.
- Develop a comprehensive understanding of Sandia and NNSA management expectations for all aspects of the review process.

  Note: This involves concurrence on proposed criteria, a mutual understanding of all criteria, scope of the review, depth of the review, and contents of the review report.
- Notify management of informational gaps or other factors that prevent or impede the completion of an adequate review of the SA.
- Write a review report that identifies any deficiencies with respect to the Minimum Review Criteria (see Section 5.0), plus any other appropriate criteria per line management direction or concurrence.

4.2 Reviewer Guidance

Independent reviewers should be engaged early in the SA process and become familiar with the preparation guidance provided in Section 3.0, "Preparation of Safety Assessments (SAs)." Independent reviewers should be assigned to participate at each critical milestone of the project development process.

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*5.0 MINIMUM REVIEW CRITERIA

5.1 General Criteria

SA REVIEW CONSIDERATIONS	Yes	No	COMMENT(S)
1. The scope, analysis method, and level of detail of the SA is appropriate for the complexity of the facility and the magnitude of its hazards.			
2. The descriptions and analyses in the SA are consistent with those of other required analyses and disclosure documents: ○ Primary hazard screens (PHS) ○ Hazards analyses (HAs) ○ NEPA documentation ○ AF Land Use Permits ○ Emergency response plans and HADs			
3. The SA sufficiently describes the facility: ○ Function. ○ Location. ○ Operations.			

4. Planning, design, and management measures, which are based on appropriate safety principles and methods, have been applied and adequately specified. Consider (applicable to facility operations): ❍ Inherent or passive safety features. ❍ Redundancy of safety-related controls and features. ❍ Diversity and independence of safety systems. ❍ Defense-in-depth accident prevention and accident mitigation measures.			
5. The SA identifies and evaluates reasonable measures to eliminate or control hazards and to help prevent accidents.			
6. The SA identifies: ❍ ES&H Manual requirements. ❍ Other codes, consensus standards, and requirements applicable to the industry represented by the operations.			

5.2 Hazards Assessments

SA REVIEW CONSIDERATIONS	Yes	No	COMMENT(S)
1. All moderate hazards identified in the PHS are analyzed.			
2. The SA adequately describes the methods and techniques used to identify and evaluate moderate facility hazards.			
3. The SA systematically identifies hazards with associated on-site and off-site impacts to workers, the public, and the environment for both normal operations and credible accidents.			

4. The SA identifies the facility's hazardous materials and energy sources (form, quantity, and location) relevant to the analysis.			

5.3 Accident Assessment

SA REVIEW CONSIDERATIONS	Yes	No	COMMENT(S)
1. The analysis is documented and its specific methods and techniques are adequately explained.			
2. The analysis includes reasonable consideration of the established hazard controls—adequacy.			
3. The analysis includes accident scenarios that have the potential to result in minor off-site impacts (people or the environment), or potentially significant on-site impacts.			
4. Accident risk is determined by evaluation of bounding scenarios and includes descriptions of initiating events, mechanisms, probability of occurrence, severity of impact, onsite and offsite receptors, and available controls, applicable to the selected method(s).			
5. The bounding accident scenarios are supported by discussions on: ❍ Types of material involved (e.g., identification of "at-risk" material, release mechanisms, and quantities). ❍ Relationships of exposure guidelines. ❍ Summary of impacts from reasonable* unmitigated release and mitigated release.			
6. Relevant evaluation guidelines (e.g., ERPGs) are identified.			

7. Quality control measures have been executed.			
8. The SA has analyzed potential consequences and clearly and objectively conveyed the results.			

Note: The independent reviewer is responsible for ensuring that where results are quantified, appropriate quality processes have been exercised to ensure that calculations are correct, calculation worksheets reside in the project records; and statistical techniques or database sources are reasonably free of bias.

5.4 Limiting Conditions - Normal and Emergency Operations

SA REVIEW CONSIDERATIONS	Yes	No	COMMENT(S)
1. The SA includes adequate information to demonstrate planning, coordination, and interface between facility management and applicable emergency response organizations.			
2. The SA describes the preventative or mitigative features used during normal and off-normal conditions.			

5.5 New Facilities/Operations for Line Item Projects per DOE O 413.3

SA REVIEW CONSIDERATIONS	Yes	No	COMMENT(S)
1. The SA has identified through a listing or other convention, all codes and standards employed in the design of structures, systems, and components (SSCs) (e.g., performance category).			
2. The report identifies how the design, construction, and testing of safety important SSCs meet quality standards commensurate with the item's safety importance.			
3. The SA identifies how the facility design conforms to designated safety design criteria, using a “safety design crosswalk” (glossary term?) approach or other convention, as applicable.			

Additionally, although not specifically a criterion, the independent review should also include any additional reviewer suggestions relevant to strengthening the presentation of the analyses in the document, or enhancement of safety, if reasonable for the given operation(s).

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*6.0 PERIODIC REVIEW OF SAFETY ASSESSMENTS (SAs)

Requirements

Managers are responsible for ensuring that the SA:

- Is reviewed and updated as needed at least once annually.
- Is reviewed when changes are made to the facility/activity that could affect the safety envelope.
    - When the facility activity change falls within the safety envelope, changes to the SA do not require additional hazards analysis.
    - When the facility activity change does not fall within the safety envelope, additional hazards analysis is required to ensure controls that maintain the current safety envelope or justify the expansion of that envelope.

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*7.0 RECORDS

Requirements

Managers are responsible for ensuring that:

Safety Assessments (SAs) and other authorization basis documents, as defined in Attachment 13C-1, "Required Documentation and Authorization Authority by Hazard Classification," are retained by line organizations in accordance with SNL CPSR400.2, "Information Management," SA-140-202-000, for at least the operational life of the facility, until the facility is turned over to the decommissioning and decontamination (D&D) phase.

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*8.0 REFERENCES

Requirements Source Documents

DOE O 413.3, *Program and Project Management for the Acquisition of Capital Assets*.

DOE O 420.1A, *Facility Safety*.

DOE G 420.1-2, *Guide for the Mitigation of Natural Phenomena Hazards for DOE Nuclear Facilities and NonNuclear Facilities*.

SNL, CPR400.1.1, MN471001, *ES&H Manual*, Section 13C, "Authorization Basis Process"

SNL, *Sandia Records Retention and Disposition Schedule*, SA-140-202-000, "Safety Assessments (SA) Records."

Implementing Documents

DOE, *Sandia National Laboratories Final Site-Wide Environmental Impact Statement (SWEIS)* DOE/EIS-0281, DOE Albuquerque Operations Office.

DOE, *ERPGs and TEELs for Chemicals of Concern*, WSMS-SAE-02-0171.

DOE G 420.1-1, *Nonreactor Nuclear Safety Design Criteria and Explosive Safety Criteria Guide*.

DOE-HDBK-XXX-YEAR PROPOSED, *Integration of Multiple Hazard Analysis Requirements and Activities (DRAFT)*

DOE-HDBK-1100-96, *DOE Handbook Chemical Process Hazards Analysis*.

DOE-STD-3009 Change 2, *Preparation Guide for U.S. DOE Nonreactor Nuclear Facility Safety Analysis Reports*.

SNL, CPR400.1.1, MN471001, *ES&H Manual*.

SNL, CPR001.3.2, *Corporate Quality Assurance Program*.

SNL, SAND95-0320, *Qualitative Methods for Assessing Risk*.

SNL, *Facilities Design Manual*, SNL Organization 10861.

Related Documents

American Industrial Hygiene Association (AIHA), *Emergency Response Planning Guidelines (ERPGs)/ Workplace Environmental Exposure Levels (WEELs) Handbook*.

American Institute of Chemical Engineers (AIChE), Center for Chemical Process Safety (CCPS), *Guidelines for Hazard Evaluation Procedures*.

ICBO (International Conference of Building Officials, *International Building Code*.

ICBO (International Conference of Building Officials, *Uniform Building Code*.

ICBO (International Conference of Building Officials, *International Fire Code*.

SNL, SAND2002-2145, *Calendar Year 2001 Annual Site Environmental Report, Sandia National Laboratories, New Mexico*.

NIOSH (National Institute for Occupational Safety and Health), *NIOSH Pocket Guide to Chemical Hazards*.

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CHANGE HISTORY

GN470088, *Preparation And Review Of Safety Assessments For Moderate- And High-Hazard Nonnuclear Facilities*

Administrative Changes Only
November 30, 2006

This document was revised to:

- **Add:** A review date to the header to indicate that an ES&H Manual Self-Assessment (SA) checklist was completed for this section.

Administrative Changes Only
May 17, 2006

This document was revised to:

- **Change:** The SME from Dann Ward to Michael J. Vigil.

Administrative Changes Only
June 29, 2005

This document was administratively revised to:

- **Change:** Executive Policy Sponsor from Les Shephard to Frank Figueroa

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May 8, 2003

This document has been completely rewritten and section by section changes are not

called out.

September 14, 2001

This version is a complete rewrite of this document. Therefore, there is no highlighted text. This "Change History" summarizes the significant revisions. This document was changed to:

Add:

- “Accelerator Safety Assessments” to the scope of the document.
- To Section 2.2, “SNL Management” responsibilities to follow requirements in 13C, "Authorization Basis Documentation Process," subsection "Moderate-Hazard Nonnuclear Operations" and Section 13D, "Readiness Review Process," subsection "Moderate- and High-Hazard Nonnuclear, Accelerator, and Nuclear Facilities."
- To Section 2.3, responsibilities of independent reviewers of safety assessments.
- To Section 3.0, “Moderate-Hazard Nonnuclear Facility Safety Assessments,” which incorporates information from the old Section 4.0, “Procedure.”
- To Section 4.0, “High-Hazard Nonnuclear Facility Safety Assessments,” as a placeholder for future information. The old Section 4.0, “Procedure,” was deleted (see Deleted below).
- To Section 5.0, “Accelerator Safety Assessments,” as a placeholder for future information. Renumber all sections to the end of the document.
- To Section 6.0,” Independent Review of Safety Assessments,” which incorporates information from the old Section 4.0, “Procedure.”
- To Section 6.3.5, "Identification of Hazards," add "material-at-risk" to the bulleted list.
- To Section 7.0, “Records,” direct and link the reader to the Sandia Records Retention and Disposition Schedule.

Change:

- Place into “Requirements/Guidance” format.
- Requirements from the previous version that were identified by terms such as “must,” “are,” and “verify” to guidance statements identified by terms such as “should” and “may.”
- The term “analysis” to “assessment” and “analyses” to “assessments.”
- To incorporate the “Requirements” paragraph into the “Purpose.”
- To update organization names and numbers.
- To remove redundancies in Section 1.0, "Purpose, Scope, and Ownership" and rename the section 1.0,"Purpose and Ownership."
- To move definitions to the ES&H Manual Glossary and link to them from the text.
- To delete Attachment A, “Safety Analysis Report Outline,” and Attachment B, “Safety Assessment Outline,” and incorporate their contents into the Section "Preparation of Safety Assessments,” as follows:

New Chapter	Source of Text
Executive Summary	Attachment B, Chapter 2
1	Attachment B, Chapters 1, 3, and 4
2	Attachment B, Chapter 5
3	Attachment B, Chapter 6
4	Attachment A, Chapter 9
5	Attachment A, Chapter 10
6	Attachment A, Chapter 11
7	Attachment A, Chapter 12
8	Attachment A, Chapter 13
9	Attachment A, Chapter 14
10	Attachment A, Chapter 15
11	Attachment A, Chapter 16

Appendix	Attachment B, Chapter 7

- From Department 7123 being responsible for record keeping following Sandia's Records Retention and Disposition Schedule, SA-140-202-000, "Safety Assessments (SA) Records," in Section 7.0, “Records.”

Delete:

- Section 4.0, “Procedure.” Information has been replaced by the new Section 3.0, “Moderate-Hazard Nonnuclear Facility Safety Assessments,” and Section 6.0,” Independent Review of Safety Assessments.”

- Attachment C, "Sample Document Comment/Resolution Sheet." The callout to this attachment was deleted from the revised text. There is no prescribed format for documenting review comments.

- Reference to GN470083, An Introduction to the Fundamentals of Safety Analysis, which has been archived.

- Section 5.0, Records.” Records information is given in Section 7.0, ‘Records.”

- From Paragraph 6.3.4, "Normal and Emergency Operating Procedures Limitation of Risk," the need to "Check that the safety analysis document provides a discussion of the facility-specific emergency operating procedures appropriate to the types of emergencies that may occur at the facility."

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