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MN471017_Appendices NF-01, Safety Basis Manual

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Appendix NF-01. Nuclear Facility Hazard Categorization

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1.0 Introduction

1.1 Purpose

The purpose of this appendix is to provide a consistent approach for establishing the hazard category for a nuclear facility as required in 10 CFR 830, *Nuclear Safety Management*,

Subpart B, "Safety Basis Requirements," Section 202 (b)(3). As defined, this approach is consistent with DOE-STD-1027-92 Change Notice No. 1, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports* (hereafter DOE-STD-1027-92), and facilitates the use of updated dosimetry and release fractions as provided in NNSA SD G 1027 Admin Change 1, *Guidance on Using Release Fraction and Modern Dosimetric Information Consistently with DOE STD 1027-92, Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports, Change Notice No. 1* (hereafter NNSA SD G 1027).

1.2 Scope

This approach shall be used for activities or facilities that involve radioactive material. These activities or facilities shall be categorized as nuclear Hazard Category-1, -2, or -3 or radiological facilities (i.e., nuclear facilities below Hazard Category 3, hereafter referred to as radiological) through the Primary Hazard Screening (PHS) process. This approach covers:

- New activities or facilities.
- Proposed changes to process or mission for existing facilities that could affect the hazard categorization.
- Identification of new information that creates the potential to revise the hazard categorization of existing activities or facilities.
- Application of updated data that creates the potential to revise the hazard categorization of existing activities or facilities.
- Annual Primary Hazard Screening (PHS) updates to existing nuclear facilities.

The PHS process is described in MN471017, *Safety Basis Manual*, Appendix SB-01, "Preparation, Maintenance, and Review of Primary Hazard Screenings (PHSs)."

1.3 Applicability

The approach or process described in this appendix applies to Members of the Workforce who support activities or facilities controlled by Sandia National Laboratories (SNL) and involve radioactive material.

Note: For purposes of this document, the general term "nuclear facility" refers to activities or facilities categorized as nuclear Hazard Category-2, or -3 as defined in 10 CFR 830, Subpart B, "Safety Basis Requirements," and radiological facilities unless otherwise noted. There are no existing or planned Hazard Category-1 nuclear activities or facilities at SNL.

1.4 Background

DOE-STD-1027-92 provides the process required by 10 CFR 830, Subpart B, "Safety Basis Requirements" for the categorization of DOE nuclear facilities. Supplemental Directive NA-1 SD G 1027 was released on November 28, 2011 to provide a consistent approach to facilitate the use of updated dosimetry and release fractions when categorizing a nuclear facility. This guidance provides re-calculated hazard category thresholds that were developed using updated dose conversion information for breathing rates and dose coefficients.

On December 18, 2012, the Department of Energy (DOE) National Nuclear Security Administration (NNSA) Sandia Field Office (SFO) issued a letter of direction, *Performance Direction to Implement NA-1 SD G 1027*, to implement NA-1 SD G 1027.

Per the letter of direction, implementation plan ES&H-PLN-13-01, "Implementation Plan For NA-1 SD G 1027, Guidance on Using Release Fraction and Modern Dosimetric Information Consistently with DOE-STD–1027–92, Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports, Change Notice 1," was developed to address the implementation conditions for hazard categorization purposes contained in the DOE letter.

When NNSA SD G 1027 was released on May 13, 2014, NA-1 SD G 1027 was cancelled. The revised supplemental directive describes threshold adjustments based on modern dosimetry during final categorization. Primary changes include a revised process for initial facility hazard categorization, revised breathing rate, and recalculated threshold values. In response, the implementation plan was revised based on the revised supplemental guidance. When implemented for a nuclear facility, the methodology provided in NNSA SD G 1027 should be used in conjunction with DOESTD–1027–92 to provide a consistent approach for establishing hazard categorization.

The PHS portion of the Integrated Safety Management System (ISMS) software is the mechanism by which SNL performs and documents the initial and final categorization of a nuclear facility or activity. When required, the process described in MN471017, *Safety Basis Manual*, Appendix SB-02, "Hazard Aggregation Rollup Process (HARP)," is used to account for multiple PHS results of individual activities into one facility hazard categorization.

1.5 Requirements

This appendix is consistent with:

- 10 CFR 830, *Nuclear Safety Management*, Subpart B, "Safety Basis Requirements."
- DOE-STD-1027-92, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports.*
- NNSA SD G 1027, *Guidance on Using Release Fraction and Modern Dosimetric Information Consistently with DOE STD 1027-92, Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports, Change Notice No. 1.*

2.0 Responsibilities

2.1 Nuclear Facility Operations (NFO) Managers

NFO Managers are responsible for ensuring that:

- Personnel performing hazard categorization are qualified.
- Initial and final hazard categorization is completed in accordance with this document, technically correct, technically defensible, and accurately reflects the maximum quantity and form of radiological material allowed within the facility.

- Existing radiological facilities are categorized using the threshold values in NNSA SD G 1027 no later than the annual facility PHS revision following completion of the PHS system modification to support the implementation of NNSA SD G 1027.
- Existing Hazard Category 2 and 3 nuclear facilities are categorized using the threshold values in NNSA SD G 1027 no later than the next annual safety basis update cycle following completion of the PHS system modification to support the implementation of NNSA SD G 1027.
- Facility-specific inventory control processes and procedures are revised to reflect the NNSA SD G 1027 threshold values.
- Updated or revised safety basis documentation for HC-2 or -3 facilities is submitted to NNSA/SFO for approval or for radiological facilities is submitted to the SNL Safety Basis Approval Authority (SBAA) for approval.

2.2 Personnel Performing Hazard Categorization

The personnel performing hazard categorization are responsible for:

- Being sufficiently familiar with hazard categorization methodology and the facility to perform a technically adequate hazard categorization.
- Ensuring that supporting calculations and other supporting documents are prepared and approved by qualified personnel and are on file and available for review.
- Ensuring that the final hazard categorization accurately reflects the maximum credible amount of radiological material allowed within the facility (quantity and form) and the worst-case credible dispersal mechanism.

2.3 ES&H Planning Department

The ES&H Planning Department is responsible for:

- Revising the PHS system to incorporate updated threshold values and support the implementation of NNSA SD G 1027.
- Reviewing and concurring with updated/revised Hazard Category-2 and -3 nuclear facility categorization, prior to submittal of revised safety basis documentation to NNSA/SFO for approval.
- Reviewing and concurring with updated/revised radiological facility categorization prior to submittal of revised safety basis documentation to the SNL SBAA for approval.
- Performing hazard analyses as required or reviewing and concurring with hazard analyses performed by the facilities.
- Calculating and distributing threshold values for radionuclides not covered in NNSA SD G 1027, Attachment 2, “Hazard Categorization Threshold Tables for Dosimetric Update,” Table 1, “Revised Thresholds for Radionuclides,” as necessary for final hazard categorization of nuclear facilities.
- Using the methodology from NNSA SD G 1027 to adjust the Table 1 threshold values if the release mechanisms (e.g., explosives activities, dynamic experiments) or release fractions, assumed in Table 1 of Attachment 2 or Attachment 6, could result in a different

radiological release or exposure for scenarios being analyzed than assumed in the updated thresholds.

3.0 Performing Nuclear Facility Hazard Categorization

For nuclear Hazard Category-1, -2, or -3 facilities, the hazard category drives the applicable required safety basis requirements. DOE/NNSA has established specific safety basis document requirements for Hazard Category-1, -2 and -3 nuclear facilities as specified in 10 CFR 830, *Nuclear Safety Management*, Subpart B, "Safety Basis Requirements." For radiological facilities, the safety analysis need not comply with 10 CFR 830, Subpart B, "Safety Basis Requirements," but should be of sufficient rigor to provide confidence in the facility categorization. The required safety analysis documentation for radiological facilities may require additional rigor documented in the safety basis classification process, as described in of MN471017, *Safety Basis Manual*, Chapter 2, "Safety Basis Planning and Implementation." Table 3-1, "Nuclear Facility Hazard Categories" documents the nuclear facility categories and their definitions.

Table 3-1. Nuclear Facility Hazard Categories

Hazard Category	Definition
1	Category A reactor or facility specified by a DOE/NNSA Program Secretarial Officer. **Note:** There are no Hazard Category-1 nuclear facilities at SNL.
2	Category B reactor facilities, facilities that have potential for criticality, or facilities with radioactive material inventory that meet or exceed the Hazard Category-2 threshold quantities of radioactive materials listed in NNSA SD G 1027, Attachment 2, "Hazard Categorization Tables," Table 1, "Revised Thresholds for Radionuclides," or threshold quantities determined by the ES&H Planning Department.
3	Facilities with radioactive material inventory that meet or exceed the Hazard Category-3 threshold quantities but is less than Hazard Category-2 threshold quantities of radioactive materials listed in NNSA SD G 1027, Attachment 2, "Hazard Categorization Tables," Table 1, "Revised Thresholds for Radionuclides," or threshold quantities determined by the ES&H Planning Department.
Radiological	Facilities with radioactive material inventory less than the Hazard Category-3 threshold quantities of radioactive materials listed in NNSA SD G 1027, Attachment 2, "Hazard Categorization Tables," Table 1, "Revised Thresholds for Radionuclides," or threshold quantities determined by the ES&H Planning Department.

Type A reactors are, by definition, categorized as nuclear Hazard Category-1. Type B reactors, by definition, are categorized as nuclear Hazard Category-2. Because the reactor type defines the facility hazard categorization, no further validation of initial hazard categorization is required. The defined hazard categorization shall be documented in the facility's DSA.

Initial categorization of a facility can also be based on whether a sufficient quantity of fissile material is present in a form that could support a nuclear critical configuration under normal or credible abnormal scenarios other than the introduction of additional fissile material. If the potential for nuclear criticality exists, the facility is Hazard Category-2. Refer to ESH100.2.SB.2, *Nuclear Criticality Safety Program*, for procedures for determining the potential for criticality and the threshold limits for fissile inventories. These threshold values are the minimum

theoretical mass necessary for a nuclear criticality to occur with moderation and reflection. Other fissionable nuclides are considered on a case-by-case basis.

For all other cases, the facility hazard categorization is based on the facility's maximum total radioactive material inventory either present at the facility or authorized for use at the facility. To protect a facility's hazard categorization, dependent on material inventory assumptions, a control for material inventory shall be created. This maximum inventory is compared against threshold quantities identified in NNSA SD G 1027 using the sum of fractions methodology (described in Section 3.2). These threshold quantities are generally conservative for a broad range of possible situations.

In addition to hazard categorization based on a facility's maximum total radioactive material inventory, detailed ground rules for each category are provided in Attachment 1 to DOE-STD-1027-92. The ground rules, as well as the release fractions in NNSA SD G 1027, shall be considered in determining the final hazard categorization.

3.1 Categorization Methodology

Nuclear facilities shall be categorized consistent with DOE-STD-1027-92 and NNSA SD G 1027 using the sum of ratios method described in Section 3.2. In accordance with NNSA SD G 1027, SNL personnel use a two-stage hazard categorization process to categorize nuclear facilities, including those initially categorized as radiological.

The Primary Hazard Screening (PHS) system is the mechanism by which SNL documents the classification of facilities and activities – including nuclear facilities. In Phase I, the PHS is used to perform an initial radiological hazards screening in which the Threshold Quantities for radioactive materials listed in DOE-STD-1027-92, Table A.1, "Thresholds for Radionuclides" are used and compared to an initial inventory of hazardous material at the facility.

Initial categorization screening is performed for all new facilities or major modifications requiring a readiness activity to operate per DOE O 425.1D Chg 1, *Verification of Readiness to Start Up or Restart Nuclear Facilities*, for mission changes at existing nuclear facility that cannot be addressed via the Unreviewed Safety Question (USQ) process, and/or requires a readiness activity beyond an implementation validation review (IVR). The initial hazard categorization is used as screening criteria to assist with determining the level of rigor necessary for the hazards/safety analysis used for the final hazard categorization.

Initial categorization does not need to be re-performed for existing Sandia National Laboratories (SNL) nuclear facilities that have been appropriately categorized using DOE-STD-1027-92 per 10 CFR 830 [§830.202, item (b)(3)], unless a facility's mission changes (as specified above). If a radiological facility increases its inventory such that the facility's content exceeds the HC-3 nuclear facility threshold, a NEPA checklist shall be completed and forwarded to the ES&H Planning Department for comparison of the radiological inventory with NNSA SD G 1027 threshold values.

Final hazard categorization for all existing nuclear facilities is required using the PHS and the revised threshold values from NNSA SD G 1027 (excluding Category B reactor and critical

assembly facilities which are Hazard Category 2) and documented in the PHS. Final categorization will be performed under the following circumstances:

- Completion of initial categorization as described above for new or modified facilities,
- During the annual facility PHS revision for existing facilities.

All existing facilities shall be categorized using NNSA SD G 1027 through the PHS system. SNL nuclear facilities initially categorized as radiological will require final hazard categorization to ensure that the assumptions made in developing the threshold values remain valid. Final hazard categorization shall be formally documented; development of a Documented Safety Analysis is only required if the final categorization results in defining a facility as a Hazard Category 1, 2 or 3 nuclear facility.

Final hazard categorization may require additional analysis to ensure that the assumptions made in developing the hazard category threshold values remain valid. These additional analyses will be performed on a case-by-case basis in situations where release mechanisms (e.g., explosives activities, dynamic experiments) exist and the credible release fractions could be significantly different based on physical and chemical form of the nuclear material and available dispersive energy sources. These additional analyses will be based on an "unmitigated release" of available hazardous material considering material quantity, form, location, dispersibility and interaction with available energy sources, but not considering safety features which will prevent or mitigate a release (unless the safety feature is physically necessary to create the release environment). Additional rigor may be required if the complexity of the facility/activity necessitates additional analyses to ensure that assumptions credited to maintain the facility's hazard categorization remain valid or adjustment of threshold values is required. The level of rigor for the hazard categorization documentation will be determined by the ES&H Planning Department on a case-by-case basis. Guidance for these situations is included in a ES&H Planning Department procedure AOP 14-04, "Process for Final Categorization of Nuclear Facilities."

The PHS includes ES&H Planning Department review for situations where release mechanisms could result in a greater radiological release than assumed in the updated thresholds. The ES&H Planning Department will determine the necessary analysis required to support the hazard categorization for these scenarios based on guidance in the ES&H Planning Department procedure AOP 14-04, "Process for Final Categorization of Nuclear Facilities." Final hazard categorization determinations will be documented in the PHS, with reference to supporting analysis as applicable.

NNSA SD G 1027 provides a limited subset of Hazard Category 2 and 3 threshold values for isotopes existing at SNL. However, the guidance provides a methodology for calculating additional threshold values consistent with the methodology in DOE-STD-1027-92, Change Notice No. 1. Threshold values for the additional isotopes will be calculated by the ES&H Planning Department as required using the methodology defined in Attachment 4 of NNSA SD G 1027.

Facility-specific inventory control processes and procedures will be revised to reflect the NNSA SD G 1027 threshold values and any new threshold values calculated by the ES&H Planning Department.

Upon completion of final categorization, supporting documentation will be submitted to the Safety Basis Approval Authority for appropriate action (see Section 1.4.1.1 of MN471017, *Safety Basis Manual*).

3.2 Sum of Radionuclide Threshold Ratios Methodology

Facilities or facility segments (see Section 3.3.3) with combinations of radioactive materials should be designated as Hazard Category-2 or -3, if the sum of the ratios for the quantity of all material exceeds one (1) for either Hazard Category-2 or -3 associated thresholds. The following steps are used to perform this summation:

1. For initial categorization, the quantity of each radioactive isotope is calculated as a fraction of its associated Hazard Category-3 threshold value as presented in DOE-STD-1027-92, Table A.1. For final categorization the threshold values in NNSA SD G 1027, Attachment 2, Table 1, are used.
2. The isotopic fractions are summed.
3. If the sum of fractions is less than unity, the facility is categorized as a radiological facility.
4. If the sum of fractions is equal to unity, the facility is categorized as a Hazard Category-3 nuclear facility.
5. If the Hazard Category-3 sum of fractions exceeds unity, calculate the quantity of each radioactive isotope as a fraction of its associated Hazard Category-2 threshold values.
6. If the sum of fractions equals or exceeds unity, the facility is categorized as a Hazard Category-2 nuclear facility.
7. If the sum of fractions is less than unity, the facility is categorized as a Hazard Category-3 nuclear facility.

3.3 Factors Influencing Categorization

3.3.1 Facility Information

In order to correctly perform the facility hazard categorization, a basic understanding of the facility shall be acquired which includes:

- Boundaries and interfaces including facility location and configuration, passive design features, segmentation, facility boundaries and controlled access areas.
- Activities to be evaluated.
- Pre-existing facility/activity information, including the PHS.
- Hazardous material inventory including nuclear material quantities and forms present, location/distribution of materials within the facility or facility segment, and hazardous energy sources present.
- Potential interactions with other facilities, activities, or external events.
- Available dispersive energy sources (e.g., explosives activities, dynamic experiments, or fires) that could result in greater radiological release fractions than assumed in the updated thresholds.

This information is gathered and documented in conjunction with the hazard identification and characterization step outlined in the Hazard Identification process in MN471017, *Safety Basis Manual*, Appendix NF-03, "Developing a NFSB Hazard Analysis."

3.3.2 Passive Design Features

The passive design features utilized for hazard categorization of the facility must be defined. Because of their generally high reliability, passive design features may be credited when determining the facility hazard category; however, care should be exercised. For nuclear Hazard Category-1, -2, or -3 facilities, the passive design features credited for hazard categorization are captured in the Technical Safety Requirements (TSRs) and the TSR bases notes that the design feature was credited for hazard categorization purposes.

For facility hazard categorization, the unmitigated release may credit passive safety features that will support segmentation. However, crediting passive safety features to mitigate releases is not permitted (e.g., building filtration to produce a leak path reduction in the source term).

Passive design features credited for hazard categorization must be robust, i.e., not easily defeated. These passive design features must be able to survive all credible failure mechanisms (i.e., NPH, external events, operational upsets) to be credited for the purposes of hazard categorization. Examples of easily defeated controls include active engineered systems, administrative programs or procedures, and passive design features that can be inadvertently altered so as to defeat their safety function.

3.3.3 Part-Time Inventory

A facility with an inventory of hazardous materials that varies with time shall be categorized on the basis of its maximum inventory of hazardous materials during any point of the facility lifetime.

3.3.4 Segmentation

Facilities may be considered segmented for sum-of-ratios calculations when postulated hazard scenarios or accidents occurring in one portion of the facility cannot affect radioactive inventory in a different portion of the facility. Substantial passive barriers or other physical means that can justify such segmentation are generally required to separate facility segments. The use of segmentation at SNL shall be considered only when hazard categorization criteria on segmentation can be met and a significant benefit can be achieved.

The phenomenology of the hazard or accident scenario and the robustness of passive design features used for segmentation are considered in determining whether the postulated hazard or accident scenario can affect radioactive inventory in a different portion of the facility. Passive design features credited for hazard categorization shall be robust as described in Section 3.3.2, to be credited for the purposes of hazard categorization and segmentation. For example, historically the separate bunkers at the Manzano Nuclear Facility created segmented rooms.

Typically, a facility is associated with its highest segment categorization (i.e., if a facility has a Hazard Category-2 segment, it is typically considered as a Hazard Category-2 facility), but the

development of safety analysis and management of hazards in a particular segment should be consistent with its specific final categorization.

For nuclear Hazard Category-1, -2, or -3 facilities, segmentation assumptions credited for hazard categorization should be considered for inclusion in the TSRs and the TSR bases.

3.3.5 Material Exclusions

The following nuclear material exclusions are permitted only during facility hazard categorization. The material that is excluded from the facility material at risk (MAR) during facility hazard categorization cannot be excluded from the MAR when performing the safety analyses, unless the analyses result in the exclusion of material (e.g., sealed sources could potentially be excluded from a fire scenario if they can be demonstrated to withstand the fire but not necessarily excluded from a deflagration scenario).

3.3.5.1 Check and Calibration Sources and Other Sealed Sources

Certified check and calibration sources and other sealed sources can be excluded from a facility's nuclear material inventory for hazard categorization purposes if the following requirements from DOE-STD-1027-92 are met:

- The sealed radioactive sources are engineered to pass one of the following:
  - The special form testing specified by the Department of Transportation (DOT) in 49 CFR 173.469, *Tests for Special Form Class 7 (Radioactive) Materials*;
  - Testing specified by ANSI N43.6-2007, *Sealed Radioactive Sources – Classification;* or
  - NRC Special Form Criteria in 10 CFR 71.75, *Qualification of Special Form Radioactive Material*. The facility shall have documentation stating the source or prototypes of the source have been tested and have passed the tests.
- Facilities shall also have in place a source-control policy that complies with DOE G 441.1-1C Admin Chg 1, *Radiation Protection Programs Guide for Use with Title 10, Code of Federal Regulations, Part 835, Occupational Radiation Protection*. Should a sealed radioactive source fail, as indicated by an increase in the removable activity, the source shall be removed from service and handled in accordance with the source-control policy established for the facility.

Note: The requirement documents listed in the previous bullets supersede the requirement documents listed in DOE-STD–1027–92.

Fissile material in sealed sources shall be accounted for when determining hazard category status relative to criticality safety concerns and cannot be excluded from comparison to the fissile material limits in DOE-STD–1027–92.

3.3.5.2 Department of Transportation (DOT) Type-B Shipping Containers

Material contained in DOT Type-B shipping containers (with or without overpack) may be excluded from the facility's radioactive inventory for hazard categorization purposes if the following requirements are met:

- The Certificates of Compliance are current and the materials stored are authorized by the Certificate.
- It has been demonstrated that Type-B containers without overpack could withstand the design basis facility fire.
- The Type-B container is not opened.
- The Type-B container shall be resistant to the common industrial hazards associated with facility operations.
- The Type-B container shall be able to withstand the full range of unmitigated and credible operational accident scenarios for the activity or facility.

3.3.5.3 Commercially Available Products

Hazardous materials used in exempted**,** commercially available products that meet the criteria in 10 CFR 30, *Rules of General Applicability to Domestic Licensing of Byproduct Material*, or 10 CFR 40.13, *Domestic Licensing of Source Material*, should not be considered part of a facility's nuclear material inventory for hazard categorization purposes (e.g., timepieces, illumination devices, thermostats, electron tubes, microwave receiver tubes).

3.3.5.4 Electron Microscopes and X-Ray Machines

The 10 CFR 830, *Nuclear Safety Management*, definition of nonreactor nuclear facility explicitly exempts electron microscopes and x-ray machines from being included in a nuclear facility categorization. However, electron microscopes and x-ray machines located within a nuclear facility, categorized as nuclear for other reasons, shall be evaluated in the facility safety basis.

3.3.6 Collocated Energy Sources

DOE-STD-1027-92, and NNSA SD G 1027 assume a release fraction associated with fire to be the worst of the three accident families identified (i.e., drops, spills, and fires). If the hazard identification process identifies a potential for explosive dispersal energy, the threshold quantities for Hazard Category-2 and -3 shall be divided by the ratio of the release fraction for the explosive dispersal mechanism to the release fraction for fire. The physical and chemical form of the nuclear material may also impact the release fraction for other accident types and warrant adjustment to the threshold quantity.

Note 1: When performing this evaluation, consideration should also be given to the fact that some events with the potential for higher release fractions will affect only a localized fraction of the facility inventory. If this is the case, and with appropriate justification, the release fraction in DOE-STD–1027–92 or NNSA SD G 1027 may still be adequate for hazard categorization purposes.

Note 2: In the case of MAR contiguous with explosives, the release fraction could approach 1. Contact the ES&H Planning Department to determine the appropriate respirable release fractions for the specific situation.

3.4 Documentation

Hazard categorization shall be documented and approved for a nuclear facility as part of the PHS, DSA, or safety assessment (SA) development process. Supporting calculations for hazard categorization are used to approve the safety basis document and shall be maintained as records.

4.0 Records

Records are maintained in accordance with the records retention and disposition requirements specified in Sandia Records Retention and Disposition Schedule.

5.0 References

5.1 Requirement Drivers

DOE O 420.1C Chg 1, *Facility Safety.*

DOE O 425.1D Chg 1, *Verification of Readiness to Start Up or Restart Nuclear Facilities.*

DOE O 5480.30 Chg 1, *Nuclear Reactor Safety Design Criteria.*

5.2 Additional Drivers

10 CFR 30, *Rules of General Applicability to Domestic Licensing of Byproduct Material.*

10 CFR 40.13, *Domestic Licensing of Source Material.*

10 CFR 71.75, *Qualification of Special Form Radioactive Material.*

10 CFR 830, *Nuclear Safety Management.*

40 CFR 302.4, *Designation of Hazardous Substances.*

49 CFR 173.469, *Tests for Special Form Class 7 (Radioactive) Materials.*

ANSI N43.6-2007, *Sealed Radioactive Sources – Classification.*

DOE-G-441.1-1C Admin Chg 1, *Radiation Protection Programs Guide for Use with Title 10, Code of Federal Regulations, Part 835, Occupational Radiation Protection.*

DOE-HDBK-3010-94, *Airborne Release Fractions/Rates and Respirable Fractions for Nonreactor Nuclear Facilities.*

DOE-STD-1027-92, Change Notice No. 1, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports.*

DOE-STD-3009-94, *Preparation Guide for U.S. Department of Energy Nonreactor Nuclear Facility Documented Safety Analyses*.

ES&H-PLN-13-01, Implementation Plan For NA-1 SD G 1027, *Guidance on Using Release Fraction and Modern Dosimetric Information Consistently with DOE STD 102792, Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports, Change Notice No. 1.*

ICRP 68, *Dose Coefficients for Intakes of Radionuclides by Workers*. ICRP Publication 68. Ann. ICRP 24 (4), 1994.

ICRP 72, *Age-dependent Doses to the Members of the Public from Intake of Radionuclides* – Part 5 Compilation of Ingestion and Inhalation Coefficients. ICRP Publication 72. Ann. ICRP 26 (1), 1995.

LA-12846-MS, *Specific Activities and DOE-STD-1027-92 Hazard Category 2 Thresholds*, LANL Fact Sheet, November 1994.

LA-12981-MS, *Table of DOE-STD-1027 Hazard Category 3 Threshold Quantities for the ICRP-30 List of 757 Radionuclides*, October 2002.

NNSA SD G 1027 Admin Change 1, *Guidance on Using Release Fraction and Modern Dosimetric Information Consistently with DOE STD 1027-92, Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports, Change Notice 1.*

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NSTP 2002-2, Nuclear Safety Technical Position, *Methodology for Final Hazard Categorization for Nuclear Facilities from Category 3 to Radiological*.

SNL, ESH100.2.SB.2, *Nuclear Criticality Safety Program.*

SNL, GN470080, *Implementing the Unreviewed Safety Question (USQ) Process for Nuclear Facilities*.

SNL, MN471017, *Safety Basis Manual.*