

Administrative Procedures

HMIS-PRO-NS-8366

Facility Hazard Categorization

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1.0 PURPOSE

This procedure provides direction to Hanford Mission Solutions Integration (HMIS) facility managers to properly characterize the potential nuclear safety hazard of HMIS facilities within their responsibility. “Nuclear” facilities have the potential for significant radiological consequences, which require a significant radionuclide inventory and an energy source, either internal or external, to disperse the radioactivity. **It is not within HMIS contract scope to manage nuclear facilities.** Nuclear facilities are subject to Department of Energy (DOE) nuclear safety requirements in Title 10, Code of Federal Regulations, Part 830 (10 CFR 830), *Nuclear Safety Management*, Subpart B, *Safety Basis Requirements*. This rule and associated guidance provide the basis for evaluating the potential nuclear safety hazard.

It is important to distinguish between nuclear facilities and “radiological” facilities. HMIS does manage radiological facilities, those that have a radionuclide inventory and are “below hazard category 3” (<HC-3) as defined by 10 CFR 830. These are not nuclear facilities and therefore not subject to the requirements of 10 CFR 830, Subpart B. This procedure does **not** determine the applicability of other sections of 10 CFR 830, such as the Quality Assurance Requirements, to any facility or activity.

This document partially implements the ISMS Guiding Principles – #1 Line Management Responsibility for Safety and Environmental Requirements, #2 Clear Roles and Responsibilities, #5 Identification of Safety and Environmental Standards and Requirements; as well as Core Function #2 Identify & Analyze the Hazards.

2.0 SCOPE

This procedure applies to facilities operated or managed by HMIS and which have a radionuclide inventory. Facilities are normally considered buildings, but in the nuclear safety context the term “facilities” includes any related activity, operation, area or structure. This definition also includes waste sites, such as those in the Waste Information Data System (WIDS).¹ A WIDS site may stand alone or it may be included within/beneath the footprint of another structure, such as a reactor building. For purposes of this procedure, the footprint of a building is considered to extend 150 feet from the outer wall. DOE has identified a special category of waste sites, termed “inactive waste sites” (IWS) with specific requirements that are also within the scope of this procedure.

¹ The Waste Information Data System (WIDS) is a database that provides a traceable source of information about sites of environmental interest at the Hanford Site. The system documents historical information and tracks investigation, remediation, and closure-action activities under the Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement) (Ecology et al., 1989). The WIDS is managed according to the Tri-Party Agreement procedure TPA-MP-14, “*Maintenance of the Waste Information Data System.*” The procedure provides mechanisms for adding sites to the database, evaluating them against regulatory criteria (classification), collecting information, and re-evaluating sites when conditions change (reclassification).

Subject to this procedure is any facility or waste site which:

- Had an initial hazard categorization (IHC) indicating it was a HC-3, HC-2, or HC-1 nuclear facility;
- Has been the subject of a final hazard categorization (FHC).

Excluded from evaluation under this procedure are:

- A facility or waste site previously assessed to be < HC-3 in an IHC and which has not changed since that determination. This includes assessments (IHC or equivalent) performed by Other Hanford Contractors prior to transferring ownership to HMIS;
- A WIDS site previously determined to not require remediation under RCRA/CERCLA because the radionuclide inventory is very low or non-existent; or
- A WIDS site which has been remediated to an applicable CERCLA residential or industrial cleanup levels (CUL) for radionuclides. Such a waste site is considered to be clearly < HC-3.

Excluded from the radionuclide inventory are contaminated biota or vegetation within or near a <HC-3 facility or waste site. The potential for contaminated biota and vegetation to affect hazard categorization has been evaluated and determined to be insignificant.²

The scope does *not* include:

- Accelerators and their operations;
- Activities involving only incidental use and generation of radioactive materials or radiation sources;
- Use of radioactive sources in research and experimental and analytical laboratory activities;
- Electron microscopes and X-ray machines; and
- Onsite transportation activities.

The scope does **not** include the steps and process for preparing an IHC or a final hazard categorization (FHC). A simple IHC for a simple facility may be performed by the HMIS organization responsible for the property. A more complex IHC or an FHC should be prepared only by an individual with nuclear safety expertise.

This procedure does **not** determine the applicability of other sections of 10 CFR 830, such as the Quality Assurance Requirements, to any facility or activity.

Evaluation of changes to applicable <HC-3 radiological facilities is addressed in HMIS-PRO-WP-61831, *Radiological Facility Change Management Process*. Proposed changes to these <HC-3 radiological facilities, or work in areas contiguous to the facility, must be evaluated for changes that could increase the radioactive inventory or alter its form and distribution in a manner such that the HC-3 radionuclide thresholds in Appendix D could be exceeded.

² HNF-8876, *Hazard Categorization Considerations for Hanford Radioactive Biota*, September 2001.

3.0 RESPONSIBILITIES

Responsibilities for facility hazard categorization are identified in this section.

3.1 Facility Manager

- Identifies facilities with a radiological inventory that are subject to this procedure.
- Initiates the facility hazard categorization process to characterize a facility.
- Maintains records of the categorization.

3.2 Nuclear Safety (NS) Subject Matter Expert (SME)

- Provides interpretation and guidance on implementation of this procedure, preparation of IHC and FHC, and other nuclear safety requirements.
- Reviews and concurs with decisions on facility hazard categorization through Site Form A-6003-136 *HMIS Certification of Radiological Facility Below Hazard Category 3*.
- Initiates appropriate notifications if a nuclear facility is identified.

4.0 INSTRUCTIONS

The nuclear safety basis for this procedure is provided in Section 4.1. The instructions provided in this section are as follows:

- Section 4.2 Facility and Waste Site Screening
- Section 4.3 Initial Hazard Categorization
- Section 4.4 Final Hazard Categorization

This process results in documentation for HMIS facilities regarding applicability of 10 CFR 830, Subpart B. Subpart B applies only to nuclear facilities. Note that in this context “facility” means any related activities, operations, areas, and structures, including IWS.

Supplemental guidance for applying DOE-STD-1027-92, Change 1 (see Section 4.0, req. #1) was transmitted to a prior contractor in DOE-RL Letter 07-SED-0321 (July 24, 2007, S.A. Sieracki to C.M. Murphy). Clarifications important to HMIS facility managers are:

- 1) Non-fissile sealed sources may be excluded from a facilities radioactive inventory as part of the initial hazard categorization if (a) the sources meet certain DOE, NRC or ANSI testing specifications, (b) the sources have maintained documentation demonstrating that they continue to meet the applicable requirements, (c) the sources are used under a program that maintains the minimum quality assurance requirements in applicable standards, and (d) procedures are in place to address leaks of sealed radioactive sources.
- 2) Commercially available products containing radioactive byproduct or source material as described in 10 CFR Parts 30.14-30.21 or 10 CFR 40.13, respectively, may be excluded from the facilities initial hazard categorization inventory if the commercially available

product is not modified or altered from its intended use (i.e., removal of tubes from a tritium exit sign).

- 3) Fissile material in sealed sources cannot be excluded from comparison to fissile material thresholds in DOE-STD-1027-92.
- 4) Fissile material in commercially available products cannot be excluded from comparison to fissile material thresholds in DOE-STD-1027-92.

4.1 Nuclear Safety Basis

A nuclear facility is one that has been determined to have the potential for “significant radiological consequences.” 10 CFR 830 partially defines nuclear facilities as: “those facilities, activities, or operations that involve, or will involve, radioactive and/or fissionable materials in such form and quantity that a nuclear [hazard] or a nuclear explosive hazard potentially exists to workers, the public, or the environment...” A nuclear facility must have a safety basis, which includes the documented safety analysis (DSA) and hazard controls. The safety basis provides reasonable assurance that the facility can be operated safely in a manner that adequately protects workers, the public, and the environment.

Under 10 CFR 830 nuclear facilities must be identified as hazard category (HC) 1, 2, or 3, based on the potential significance of radiological consequences. HC-1 has the greatest potential, for significant off-site consequences, and is typically limited to Class A nuclear reactors (those with a steady state power level greater than 20 MWt)³. HC-2 has the potential for significant on-site consequences beyond localized consequence, defined as 1 rem at 100 meters under conservative atmospheric conditions. Finally, HC-3 has the potential for only local significant consequences, less than 10 rem at 30 meters over 24 hours of exposure.

Importantly, 10 CFR 830 also provides for “below category 3” (<HC-3), those facilities which cannot have a significant radiological impact outside the facility. These are termed “radiological facilities.” HMIS does not have the contract authority or resources to manage nuclear facilities; this is the responsibility of the Other Hanford Contractors. However, HMIS does have the responsibility to manage radiological (<HC-3) facilities. It is important that a facility managed by HMIS or one transferred to HMIS from another Hanford Contractor be properly characterized under 10 CFR 830. Radiological facilities are not subject to 10 CFR 830 requirements but are subject to requirements of 10 CFR 835 *Occupational Radiation Protection* and other DOE directives.

The purpose of this procedure is provide facility managers with information and direction to properly characterize facilities to determine if 10 CFR 830 is applicable. Facility managers will be able to screen a facility on the basis of the radionuclide inventory present in the facility. They will also be able to determine if an initial hazard categorization (IHC) is necessary. Initial hazard categorization which is the first step in determining if a facility has enough radioactive material inventory to be considered a nuclear facility. If an IHC indicates enough radiological inventory is present for the HC-3 threshold quantities to be exceeded, facility managers will be

³ MWt = megawatt – thermal.

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able to take the steps for a more detailed final hazard categorization (FHC). The FHC may justify reducing the HC to <HC-3 or the FHC may confirm there is a nuclear facility. In all cases a documented basis is required to justify that determination.

4.2 Facility and Waste Site Screening

This section provides a method a facility manager can use to quickly determine if a facility or waste site may be subject to the requirements of 10 CFR 830 and require additional evaluation, including involvement of the Nuclear Safety (NS) Subject Matter Expert (SME). A facility may be quickly eliminated from consideration without involving the NS SME. The process flow diagram is shown in Appendix B.

Actionee	Step #	Action
Facility Manager (FM)	1.	IDENTIFY facilities to be categorized from the HMIS-assigned property contained in the Facilities Information Management System (FIMS) database. Transitioned reactors are included in this database. NOTE: "Facility" is used to mean any related activity, operation, area or structure and includes waste sites and IWS.
	2.	IDENTIFY any HMIS-assigned and accepted (but not reclassified) waste sites contained in WIDS. These may include IWS (characteristics as described in Appendix C).
FM	3.	CONSIDER activities inside facility boundaries/walls and within 150 feet of the building perimeter. For IWS consider activities inside boundaries and within 10 feet.
FM	4.	DETERMINE if the facility and radioactive materials are within scope of this procedure using criteria in Section 2.0. Some additional radioactive material exclusions and non-exclusions are shown in Section 4.0.
FM	5.	<u>IF</u> no applicable radionuclide inventory is present: <u>THEN COMPLETE</u> Part A of Site Form A-6003-136, <i>HMIS Certification of Radiological Facility Below Hazard Category 3</i> .
	6.	<u>IF</u> there is radionuclide inventory present, <u>THEN MARK</u> Part A as "N/A" AND GO TO Section 4.3.
FM	7.	SIGN Part A of the form, certifying no applicable radionuclide inventory is present.
	8.	ENTER the form as a record into IDMS. Maintain an information copy in the project files or database. Send a copy of the form to the NS SME.

Actionee	Step #	Action
	9.	SEND a copy of the form to the NS SME.

4.3 Initial Hazard Categorization (IHC)

This section provides basic methods and direction for a facility manager to use the initial hazard categorization (IHC) to determine if the facility or waste site is a nuclear facility or a radiological facility (< HC-3). An IHC is based simply on radionuclide quantities and using the sum-of-ratios of threshold quantities. Guidance on hazard categorization is provided in DOE-STD-1027-92 Change 1 and the applicable supplemental guidance of RL Letter 07-SED-0321.

Facility managers are encouraged to use the NS SME as a reference or request that NS perform the IHC. Regardless of who performs and documents the hazard analysis, the owning organization, i.e., the facility manager, is responsible for the content of the IHC. The process flow diagram is shown in Appendix B.

Actionee	Step #	Action
Facility Manager (FM)	1.	<u>IF</u> a radionuclide inventory is present as determined in Section 4.2, <u>THEN</u> DETERMINE if an IHC has already been performed for the facility. NOTE: <i>The IHC must be consistent with the guidance of DOE-STD-1027-92, Change 1 and RL Letter 07-SED-0321.</i>
FM	2.	<u>IF</u> an IHC does not exist and is needed, <u>THEN</u> CONTACT NS SME about preparation.
	3.	PREPARE an IHC. NOTE: <i>Steps in preparing an IHC are outside the scope of this procedure. The radionuclide threshold quantities to be used for determining the lowest hazard category nuclear facility (HC-3) are shown in Appendix D.</i>
FM	4.	VERIFY the IHC has documented the facility to be <HC-3. NOTE: <i>With concurrence of the NS SME, completion of Site Form A-6003-136 can verify facility status as <HC-3.</i>

Actionee	Step #	Action
	5.	<p><u>IF</u> the facility is <HC-3, <u>THEN</u> COMPLETE the appropriate part of Site Form A-6003-136 to certify it as a radiological facility:</p> <ul style="list-style-type: none"> • Part B certification is based on HC-3 radionuclide thresholds; • Part C certification is for IWS; • Part D certification when process knowledge is used. <p>NOTE: <i>With concurrence of the NS SME, completion of Site Form A-6003-136 can verify facility status as <HC-3.</i></p>
	6.	MARK Part A and the non-applicable parts as “N/A.”
FM	7.	SIGN and DATE the form.
	8.	OBTAIN concurrence signature from NS SME
	9.	ENTER form as a record into IDMS, reserving an information copy for the project file or database.
	10.	PROVIDE a copy of the form to the NS SME if requested.
FM	11.	<p><u>IF</u> the IHC has documented the facility to be HC-3 or greater (including HC-2 or HC-1), <u>THEN</u> CONTACT the NS SME.</p>
	12.	GO TO Section 4.4, Final Hazard Categorization (FHC).

4.4 **Final Hazard Categorization (FHC)**

In the event the IHC performed in Section 4.3 indicates a hazard category of HC-3 or greater, typically by a radionuclide sum-of-ratios of greater than or equal to 1 (≥ 1), a final hazard categorization (FHC) shall be performed. A FHC may also be performed for other conditions where the NS SME determines that a more detailed level of analysis is necessary, e.g., a sum-of-ratios less than 1 but where there is significant uncertainty in radionuclide quantities or in the process knowledge.

The FHC is based on an “unmitigated release” of available hazardous material. For the purposes of hazard categorization, “unmitigated” is meant to consider material quantity, form, location, dispersibility and interaction with available energy sources, but not to consider safety features (e.g., ventilation system, fire suppression, etc.) which will prevent or mitigate a release. Contact the NS SME for additional information and direction.

Actionee	Step #	Action
Facility Manager (FM)	1.	DETERMINE if a FHC has already been performed for the facility.
FM	2.	<p><u>IF</u> no FHC has been prepared and the IHC indicates HC-3 or greater <u>THEN</u></p> <ul style="list-style-type: none"> • CEASE all operation in and around the facility. • PLACE the facility in a safe and stable configuration. • CONTACT the NS SME about preparation of an FHC
FM	3.	<p>CONSULT with the NS SME for requirements and how to prepare the FHC.</p> <p>NOTE 1: <i>Preparation of a FHC is outside the scope of this procedure.</i></p> <p>NOTE 2: <i>The IHC must be consistent with the guidance of DOE-STD-1027-92, Change 1 and RL Letter 07-SED-0321.</i></p>
FM	4.	<p><u>IF</u> the FHC indicates HC-3 or greater (HC-2 or HC-1), <u>THEN</u>:</p> <ul style="list-style-type: none"> • NOTIFY the NS SME and Emergency Management (EM) Director. NS, EM, and Worker Protection (WP) will notify DOE-RL • DEVELOP a plan and actions to resolve the issue in conjunction with NS, EM, WP, and DOE-RL <p>NOTE : <i>Subsequent actions will be determined under the requirements of 10 CFR 830.</i></p>
FM	5.	VERIFY the FHC has documented the facility to be <HC-3.
	6.	<p><u>IF</u> facility is <HC-3, <u>THEN</u> COMPLETE appropriate part of Site Form A-6003-136 to certify as a radiological facility:</p> <ul style="list-style-type: none"> • Part B certification is based on HC-3 radionuclide thresholds; • Part C certification is for Inactive Waste Sites (IWS) • Part D certification when process knowledge is use

Actionee	Step #	Action
	7.	MARK Part A and the non-applicable parts as “N/A.”
	8.	SIGN and DATE the form.
	9.	OBTAIN concurrence signature from NS SME
	10.	ENTER form as a record into IDMS, reserving an information copy for the project file or database.
	11.	PROVIDE a copy of the form to the NS SME if requested

NOTE: *The Radiological Facility Change Management Process (HMIS-PRO-WP-61831) applies to activities around a facility or IWS with a FHC.*

5.0 RECORD IDENTIFICATION

All records are generated, processed, and maintained in accordance with HMIS-PRO-RM-10588, *Records Management Processes*, or HMIS-PRO-RM-32281, *Electronic Records Management*, as applicable.

Records Capture Table

Name of Document	Submittal Responsibility	Retention Responsibility
HMIS <i>Certification of Radiological Facility Less Than Hazard Category 3</i> (A-6003-136)	Facility Manager	Facility Manager

6.0 SOURCES

6.1 Requirements

Title 10, Code of Federal Regulations, Part 830 (10 CFR 830), *Nuclear Safety Management*

RL Letter 02-ABD-0109, *Contract No. DE-AC06-96RL13200 - Transmittal of Memorandum “Supplemental Environmental Management (EM) Guidance for Implementing 10 CFR 830, Subpart B Safety Basis Requirements,”* June 26, 2002 [memorandum from JH Roberson dated May 28, 2002]

DOE-STD-1027-92, *Change Notice 1, Hazard Categorization and Accident Analysis Techniques for compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports,* September 1997

RL Letter 07-SED-0321, *Contract No. DE-AC06-96RL13200 – Department of Energy Standard 1027 Supplemental Guidance*, July 24, 2007, transmitting SUPPLEMENTAL GUIDANCE FOR DOE STANDARD 1027, Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports, May 2007 [letter from GS Podonsky]

6.2 References

HMIS-PRO-RM-10588, *Records Management Processes*

HMIS-PRO-RM-32281, *Electronic Records Management*

HMIS-PRO-WP-61831, *Radiological Facility Change Management Process*

LA-12981-MS, *Table of DOE-STD-1027-92, Hazard Category 3 Threshold Quantities for the ICRP-30 List of 757 Radionuclides*, LANL Fact Sheet, Los Alamos National Laboratory

RL Letter 03-ABD-0008, *Contract No. DE-AC06-96RL13200 - Hazard Categorization of Hanford Inactive Waste Sites*, October 18, 2002

RL Letter 03-ABD-0025, *Contract No. DE-AC06-96RL13200 - Approval of Hazard Categorization Procedure for Inactive Waste Sites (IWS)*, December 13, 2002

RL Letter 03-ABD-0052, *Contract No. DE-AC06-96RL13200 - Inactive Waste Sites Categorized Using EM-1 Guidance*, February 19, 2002

10 CFR 835, Occupational Radiation Protection

DOE-STD-1120-2016, *Preparation of Documented Safety Analysis for Decommissioning and Environmental Restoration Activities*, March 2016

6.3 Site Forms

HMIS Certification of Radiological Facility Less Than Hazard Category 3 (A-6003-136)

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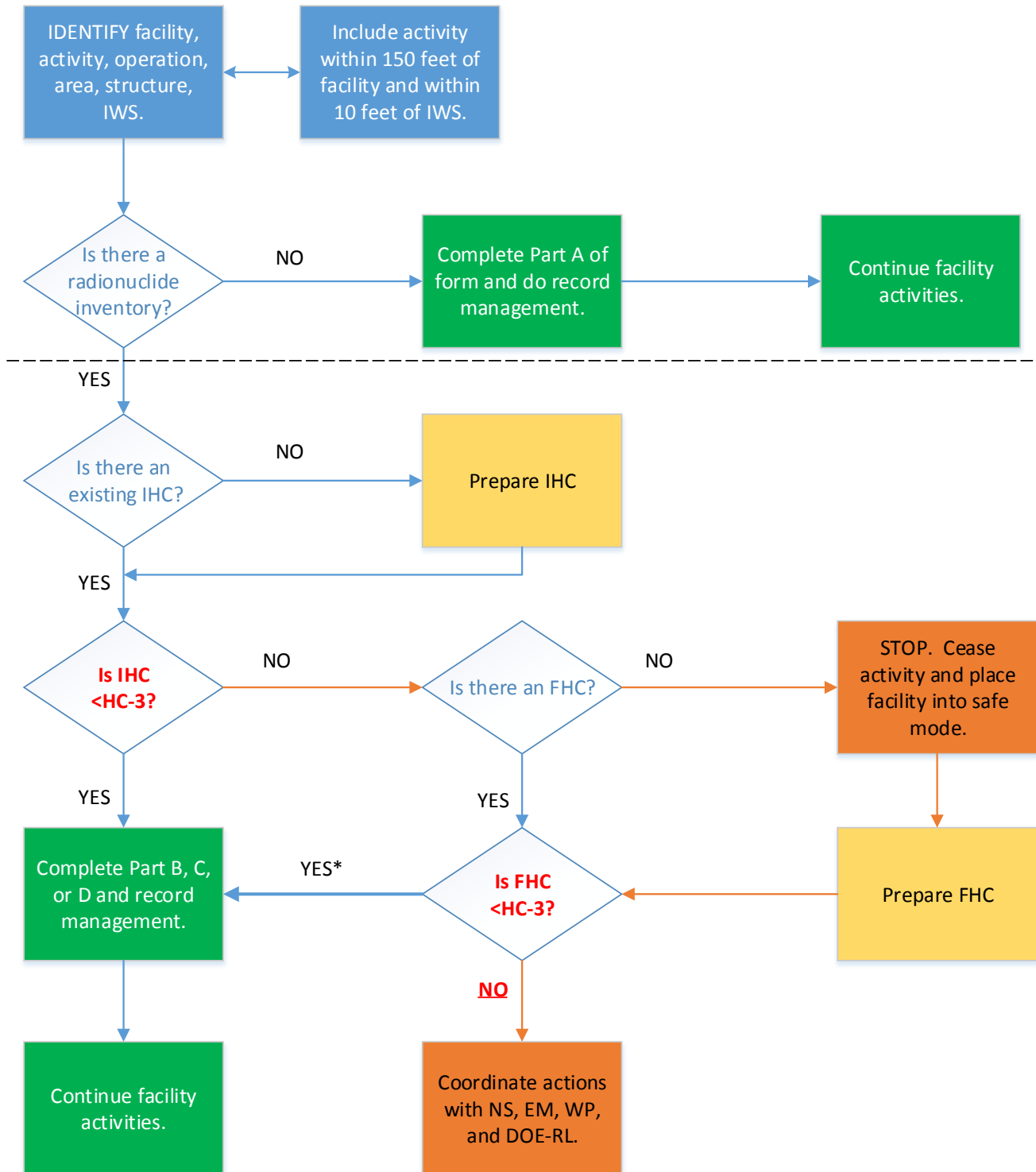
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APPENDIX A. REQUIREMENTS

NOTE: Under the requirement "type" column, "V" means verbatim and "I" means interpreted.

#	Requirement	Type V or I	Source
1.	...the contractor responsible for the facility must: ... (3) Categorize the facility consistent 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, September 1997);	V	10 CFR 830.202 (b)(3)
2.	A contractor must maintain complete and accurate records as necessary to substantiate compliance with the requirements of this part (<i>sic</i> 10 CFR 830).	V	10 CFR 830.6
3.	Unlike the quality assurance requirements of Part 830 that apply to all DOE nuclear facilities (including radiological facilities), the safety basis requirements only apply to hazard category 1, 2, and 3 nuclear facilities and do not apply to nuclear facilities below hazard category 3.	V	10 CFR 830 Appendix A C.2
4.	A DOE nuclear facility categorized as Below category 3 has the potential for Only consequences less than those that provide a basis for categorization as a hazard category 1, 2, or 3 nuclear facility	V	10 CFR 830 Appendix A C.2 Table 1
5.	For nuclear facilities with inventories above the hazard category 3 threshold quantity in DOE-STD-1027-92, Table A.1, but for which the proposed final hazard categorization is less than hazard category 3; <ul style="list-style-type: none"> DOE approval of the final hazard categorization is required. The assumptions and controls (e.g., inventory control), as defined in the approved final hazard categorization, are to be maintained. 	I	RL Letter 02-ABD-0109, Attachment 2, Item 2.2
6.	10 CFR 830.202(c)(1) requires that the safety basis be kept current to reflect changes in the facility, work, and hazards. Final hazard categorizations for below hazard category 3 nuclear facilities shall be revisited for any changes that may affect the approved final hazard categorization controls or assumptions (e.g., introduction of a new energy source).	I	RL Letter 02-ABD-0109, Attachment 2, Item 2.3
7.	Facilities whose hazard categorization is not final or DOE approval of the final hazard categorization downgrade is pending shall comply with 10 CFR 830, Subpart B, in accordance with the preliminary hazard categorization or the current approved final hazard categorization.	I	RL Letter 02-ABD-0109, Attachment 2, Item 2.4

APPENDIX B. FLOW PROCESS FOR HAZARD CATEGORIZATION



NOTE: Employees may print off this document for reference purposes but are responsible to check HMIS PS to ensure the most current version is used to prevent unintended use of obsolete versions.

APPENDIX C. CHARACTERISTICS OF <HC-3 INACTIVE WASTE SITES

In September 2002, a letter was issued by J. H. Roberson (received under RL Letter 03-ABD-0008). The letter stated that all DOE Office of Environmental Management (EM) inactive waste sites (IWS) which meet the following terms and conditions were to be documented and categorized as below hazard category 3 nuclear facilities.

DOE-RL has, by way of approving the terms and conditions within this appendix (RL Letter 03-ABD-0025), approved categorizations prepared in accordance with these terms and conditions. Therefore, this appendix is not to be altered without RL review and approval.

- A. IWS – Waste sites covered with a soil or engineered barrier. The waste materials are in a general soil matrix as a result of liquid discharge or spill, legacy burial grounds, or are areas that contain contaminated equipment, tanks, pipes, or other items. There are no current work activities occurring at the IWS which could cause a release of the radioactive hazardous material.

The following items are specifically *not* included in the definition of IWS:

1. Above ground structures or containers.
2. Below-grade facilities/structures with human access or active provision of services (e.g., ventilation, electricity, steam).
3. Any intrusive activity of the inactive waste site (e.g., waste sampling, acceptance or retrieval activities).
4. Above-ground remediation activities for an inactive waste site (e.g., pump and treat facilities adjacent to an inactive waste site).
5. Evaporation ponds and sludges.
6. Waste sites that could contain fissile material such that there is the potential for a criticality hazard because of water intrusion or material rearrangement.

NOTE: *Section 3.1 of Attachment 3 of RL Letter 03-ABD-0008 presents arguments that a waste site does not have the potential for a criticality if the ²³⁹Pu concentration is less than 2.5 g/L soil, and the ²³⁵U concentration is less than 1.8 g/L soil. Waste sites that contain spent nuclear fuel rods or assemblies **do not** qualify as an IWS that is “below Category 3.”*

7. Waste sites that could contain explosives or chemicals that might react with sufficient energy to cause a significant release.

NOTE: *Section 3.2 of Attachment 3 to RL Letter 03-ABD-0008 defines “sufficient energy to cause a significant release” as 5 lbs of Trinitrotoluene (TNT) equivalent. That is, waste sites that contain explosives or chemicals that could exothermically react with an energy release of the equivalent of 5 lbs of TNT or more **do not** qualify as an IWS that is below Category 3.*

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8. Unvented tanks, unless demonstrated that there is no potential to exceed tank bursting limits due to over pressurization. (See Section 3.3 of Attachment 3 to RL Letter 03-ABD-0008).
- B. The overburden on the IWS provides an inherent control from release of hazardous materials, and the overburden is at least 3 feet in depth.
- C. The IWS is located on DOE property and is therefore not readily accessible to the public.
- D. Workers are precluded from conducting activities that may disturb the IWS through mechanisms provided by established work control systems (e.g., Automated Job Hazard Analysis (AJHAs), excavation permits, or radiation work permits).
- E. Radiological controls are provided at the IWS per 10 CFR 835, *Occupational Radiation Protection*.
- F. The IWS is being regulated under the Resource Conservation and Recovery Act (RCRA) and/or the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

NOTE: *Once intrusive activities are commenced, the waste site no longer meets the description of an inactive waste site.*

- G. The IWS contains ≤ 0.7 g Pu per liter of soil.
1. If there is no information present to indicate that the concentration might be greater than 0.7 g Pu/L soil, there is no need to further characterize. Discussion of the basis for that judgment may be used in place of actual data. The limit of 0.7 g Pu per liter of soil is based on the calculations provided in the J. H. Roberson letter (received under RL Letter 03-ABD-0008). The calculations looked at inadvertent intrusion into the Z-9 crib, which was judged to be the most contaminated waste site at Hanford. This judgment was based on the fact that the site contained plutonium (with americium), yielding a greater dispersed dose than that of strontium or uranium. The dose factor within the calculations was based on 0.7 g Pu/L and then rounded up to the nearest whole number.
 2. If there is information indicating the concentration might be greater than 0.7 g Pu per liter of soil in some places, the site may still qualify as an IWS if it can be demonstrated that:
 - a. The site's Material at Risk (MAR) is bounded by the MAR of 9.6 kg ^{239}Pu in the Z-9 crib Inadvertent Ground Penetration scenario in Attachment 4 of RL Letter 03-ABD-0008, using bounding assumptions. This is allowable when the MAR is based on a lower volume of soil being disturbed or knowledge that the peak concentration is not present throughout the entire volume of disturbed soil.
 - b. The fissile material concentrations are bounded by those cited in RL Letter 03-ABD-0008, Attachment 3, Section 3.1 (i.e., 2.5 g ^{239}Pu per liter of soil and 1.8 g ^{235}U per liter of soil).

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APPENDIX D. HC-3 THRESHOLDS FOR KEY HANFORD AND HMIS RADIONUCLIDES

Nuclide	Element	atomic mass	HC-3 Threshold (Ci)	HC-3 Threshold (g)	BBI rank 12/31/2018	percent BBI inventory
H-3	H	3	1.66E+04	1.72E+00	18	0.001%
C-14	C	14	4.20E+02	9.40E+01	21	0.0005%
Ni-59	Ni	59	1.18E+04	1.46E+05	17	0.001%
Co-60	Co	60	2.80E+02	2.50E-01	19	0.0008%
Ni-63	Ni	63	5.40E+03	9.50E+01	6	0.114%
Se-79	Se	79	3.60E+02	5.17E+03	28	0.0001%
Sr-90	Sr	90	1.60E+01	1.20E-01	1	34.0%
Y-90	Y	90	1.42E+03	2.61E-03	2	34.0%
Zr-93	Zr	93	6.20E+01	2.50E+04	13	0.003%
Nb-93m	Nb	93m	2.00E+03	7.07E+00	14	0.024%
Mo-99	Mo	99	3.40E+03	7.10E-03	other	
Tc-99	Tc	99	1.70E+03	1.00E+05	9	0.003%
Tc-99m	Tc	99m	1.70E+04	3.23E-03	other	
Cd-113m	Cd	113m	1.18E+01	5.07E-02	16	0.002%
Sb-125	Sb	125	1.20E+03	1.16E+00	24	0.0002%
Sn-126	Sn	126	1.70E+02	6.00E+03	23	0.0003%
Cs-137*	Cs	137*	6.00E+01	6.90E-01	3	28.8%
Ba-137m	Ba					
Pm-147	Pm	147	1.00E+03	9.50E-01	Other	
Sm-151	Sm	151	1.00E+03	3.80E+01	4	2.8%
Eu-152	Eu	152	2.00E+02	1.20E+00	22	0.0005%
Eu-154	Eu	154	2.00E+02	7.60E-01	10	0.020%
Eu-155	Eu	155	9.40E+02	2.00E+00	12	0.005%
Po-210	Po	210	1.90E+00	4.20E-04	other	
U-233	U	233	4.20E+00	4.40E+02	20	0.001%
U-234	U	234	4.20E+00	6.70E+02	25	0.0002%
U-235	U	235	4.20E+00	1.90E+06	other	
U-238	U	238	4.20E+00	1.30E+07	26	0.0002%
Np-237	Np	237	4.20E-01	6.00E+02	30	0.0001%
Pu-238	Pu	238	6.20E-01	3.60E-02	15	0.002%
Pu-239	Pu	239	5.20E-01	8.40E+00	8	0.040%
Pu-240	Pu	240	5.20E-01	2.28E+00	11	0.009%
Pu-241	Pu	241	3.20E+01	3.10E-01	7	0.042%
Am-241	Am	241	5.20E-01	1.50E-01	5	0.12%
Cm-242	Cm	242	3.20E+01	9.70E-03	29	0.0001%
Cm-244	Cm	244	1.04E+00	1.28E-02	27	0.0002%

From LA-12981-MS, *Table of DOE-STD-1027-92, Hazard Category 3 Threshold Quantities for the ICRP-30 List of 757 Radionuclides*. For additional radionuclides users should refer to this report or DOE-STD-1027-92, chg 1.

NOTE: Employees may print off this document for reference purposes but are responsible to check HMIS PS to ensure the most current version is used to prevent unintended use of obsolete versions.

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*The tank waste Best Basis Inventory (BBI) includes Ba-137m as a separate radionuclide, at 94.40% of the Cs-137 activity. Ba-137m has a 2.65-minute half-life.

APPENDIX E. DEFINITIONS IMPORTANT TO HAZARD CATEGORIZATION

Inactive Waste Site (IWS) - A special category of facility that involves radioactive waste material buried in a soil matrix and not planned to be exhumed for an extended period of time. The waste materials may be the result of liquid discharges or spills, legacy burial grounds, or are areas that contain equipment, tanks, pipes, or other items. To qualify as an IWS, the facility must have had an initial hazard categorization of HC-3 or higher. A final hazard categorization is then performed (following the methodology of DOE-STD-0127-92) providing justification that the facility may be downgraded from HC-3 to <HC-3. See also DOE-STD-1120-2016. HMIS considers any activity within 10 feet as part of the IWS.

Hazard Category (HC) - DOE's graded approach to describing the relative potential for significant radiological consequences of an event that could occur in a nuclear facility. HC-3 has the lowest potential consequences, HC-1 the highest potential consequences.

New Facility - A DOE nuclear facility that does not qualify as an existing facility.

Nonreactor Nuclear Facility - Those facilities, activities or operations that involve, or will involve, radioactive and/or fissionable materials in such form and quantity that a nuclear or a nuclear explosive hazard potentially exists to workers, the public, or the environment. Excluded are accelerators and their operations; activities involving only incidental use and generation of radioactive materials or radiation such as check and calibration sources; use of radioactive sources in research and experimental and analytical laboratory activities; electron microscopes; and X-ray machines.

Nuclear Facility - Reactor and nonreactor nuclear facilities. In the context of nuclear safety analysis "facility" means any related activities, operations, areas, and structures, as well as Inactive Waste Sites (IWS). HMIS includes any activity within 150 feet of a facility and within 10 feet of an IWS as part of that facility.

Nuclear Safety - Those aspects of safety that encompass activities and systems that present the potential for uncontrolled releases of fission products or other radioactive materials to the environment or for inadvertent criticality.

Radiological Facility - A facility that does not meet or exceed hazard category 3 (HC-3) threshold criteria published in DOE-STD-1027-92, but still possesses some amount of radioactive material below the threshold values of Appendix C of this document.

Safety Basis - A combination of information relating to the control of hazards at a nuclear facility (including design, engineering analyses, and administrative controls) upon which DOE depends for its conclusion that activities at the facility can be conducted safely. The safety basis includes the documented safety analysis (DSA) and hazard controls.