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**RELEASE INSTRUCTIONS (RI)**

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WHC-CM-7-5  
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Date Prepared: December 7, 1995

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**IMPLEMENTATION NOTICE**

**6.0, Rev. 2, Change 5, "Inactive Waste Sites"**

Changes were made to correctly reflect the change in a document number. WHC-CM-1-6 has now become HSRCM-1.

(Continued on back)

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# RELEASE INSTRUCTIONS (RI)

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## 8.0, Rev. 2, Change 1, "Water Quality"

A section has been added. This particular section was in Section 7.0, "Solid Waste Management," but it belonged in Section 8.0.



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**Inactive Waste Sites**

- Immediate spill response
- Other corrective measures.

**BASIS:** WHC-CM-4-11 states that the goal and objective of the As Low As Reasonably Achievable (ALARA) Program is to minimize human and environmental exposures to radiation and hazardous substances and conditions, commensurate with sound economics and operating practices and verbatim requirements from HSRCM-1, "Hanford Site Radiological Control Manual."

2. Information regarding routine activities shall be provided for documentation into the WIDS database.

**BASIS:** WHC best management practice for ensuring that the correct documentation gets into the WIDS and is available during the RI/FS or RFI/CMS process.

3. Facility operations management shall accurately and permanently mark inactive radioactive waste site boundaries, including unplanned release areas that have become disposal sites, with concrete posts as specified in AC-5-40. Post areas in accordance with HSRCM-1, "Hanford Site Radiological Control Manual," and keep records in accordance with 6.3.3 of this section.

**BASIS:** DOE 5820.2A (III.3.i.[9][b]), as invoked by 5400.5, requires permanent markers be placed for disposal excavations. HSRCM-1, "Hanford Site Radiological Control Manual," specifies the applicable WHC posting requirements.

4. Maintenance of the inactive sites shall include control of deep-rooted vegetation that could provide transport of contamination to the surface through plant uptake. The application of herbicides or pesticides may be required and shall conform to the requirements of Section 3.6 of this manual.

**BASIS:** DOE 5480.11(9.j.) states, "Radiation exposure rates in controlled workplace areas should be reduced to as low as reasonably achievable levels by proper facility design and control." The continued use of herbicides or equivalent techniques to prevent the growth of deep-rooted plants is necessary to reduce radiation exposures of occupational workers and the environment to ALARA. Such control of plants and wildlife is also essential to prevent the loss of control/containment and to prevent the spread of contamination.

**6.3.2.3 Nonroutine activities**

1. Prior to initiating a nonroutine activity which includes actions on an area greater than 5 acres, such as stabilization, soil removal, fixative, or sealant application in an inactive waste site, the facility manager or landlord shall notify and obtain concurrence from NFM.

## | Inactive Waste Sites

**BASIS:** WHC best management practice for ensuring that the roles and responsibilities for regulatory oversight are in compliance with the authorities delegated in Executive Order 12580, *Superfund Implementation*, the Tri-Party Agreement, 40 CFR 300, 40 CFR 264, and DOE 5400.

2. The facility manager or landlord shall provide a barrier over any contamination source to inhibit radionuclide transport to the surface, or fix the surface contamination in place through the use of sealants, fixatives, or other surface treatments to prevent further spread. The barrier design shall be based on proven techniques that are appropriate for the type of disposal. The adequacy of the barrier shall be verified by demonstrating, through routine surveillance, that surface contamination levels do not exceed the limits established in 6.5.3 of this manual. Such barriers or methods used to inhibit radionuclide transport should not, to the extent practical, diminish the cost-effectiveness of or preclude any future cleanup alternatives that may be associated with the waste site.

**BASIS:** Historical and current records show that animals and deep-rooted vegetation have intruded into waste sites and transported radioactive contamination to the surface. Further transport by wind and biota has resulted in several large contaminated areas at Hanford Site. The cost of cleanup and final disposition of these areas is extremely high. Barriers over waste sites prevent intrusion by animals and vegetation, and inhibit radionuclide transport to the surface.

3. Inactive radioactive waste sites shall comply with the performance objectives of Section 7.4 of this manual. Engineered barriers or other effective measures shall also be used to limit biotransport of contamination and personnel exposure.

**BASIS:** DOE 5820.2A, as invoked by 5400.5, specifies the performance objectives for DOE low-level radioactive waste sites (III.3.a.).

4. Documentation of nonroutine activities shall be supplied to NFM for inclusion in the WIDS database.

**BASIS:** WHC best management practice for ensuring that the correct documentation gets into the WIDS.

#### 6.3.2.4 CERCLA and RCRA past practice site activities

Remediation and restoration activities are the responsibility of BHI and are undertaken for CERCLA or RCRA past practice authorities. They shall be done in accordance with 40 CFR 300 or 40 CFR 264.101 requirements, as applicable. In addition, RCRA and CERCLA past practice unit remediation and restoration activities shall be done in accordance with the processes and requirements established in the Tri-Party Agreement and DOE 5400.4.

**BASIS:** 40 CFR 300 establishes requirements for actions undertaken for CERCLA. The 40 CFR 264.101 delineates requirements for corrective actions undertaken at permitted RCRA past practice sites. The Tri-Party Agreement establishes additional requirements for past practice activities, including specific requirements regarding implementation of the CERCLA/RCRA past practice

Inactive Waste Sites

**6.5.1 Responsibilities**

1. Managers of projects, facilities, and waste generators shall ensure that the applicable requirements of this section are met.
2. Facility and project managers ensure that the calculations needed for compliance with 6.5 are made and that the appropriate sampling and analyses are performed.

**6.5.2 Threshold concentrations**

Dose limits and pathway calculations define the radiological soil concentrations below which soil and included rubble do not require controls as site radioactive materials. Soil concentrations below the Table 6.1 and 6.2 values may be left in situ. Table values depend on location, access, mobility, transfer factors, and associated pathway considerations. Therefore, the soil values may not be suitable for other purposes or locations. When there is more than one radionuclide in the soil, the sum of the concentration fractions, known or postulated to table values, must be equal to one or less. (See the the last page of Appendix C for an example of the sum-of-the-concentration fractions calculation.) In all cases, ALARA program procedures shall be observed.

BASIS: Dose limits of DOE 5400.5, Chapter II, paragraph 1.b.

**unrestricted release**

Values, below which unrestricted release of soils will occur, will be defined in an applicable record of decision.

**accessible soils**

Hanford soils that are not behind security fences must meet the Table 6.2 values. The values reflect a 10 mrem/yr EDE limit from Hanford operations to the most exposed member of the public.

**inaccessible soils**

Areas from which the general public is excluded (by fences, posting, patrols, or distance) but which are still subject to meteorological effects, are subject to a 10 mrem/yr operational EDE limit, as reflected in Table 6.1.

BASIS: The values in Tables 6.1 and 6.2 are generated using the GENII software system. This method and the use of Table 6.1 are consistent with DOE 5400.5, paragraphs II.6.(b)(1), IV.2.a.(1), and IV.4.a. Tables 6.1 and 6.2 are constructed to be consistent with the dose constraints of paragraphs II. 1. a, b, and d and 40 CFR 61.92. The "Surface Contamination Guidelines" of the U.S. Nuclear Regulatory Commission Regulatory Guide 1.86 are not used here, as they are inappropriate as soil limits.

**Inactive Waste Sites**

Except for unrestricted released areas, other soil and operational sources of public exposure must also be taken into account when considering the total allowable doses to the public.

**BASIS:** DOE 5400.5, paragraph II.1.a.(2), requires that doses to members of the public from all exposure modes that can contribute significantly to the total dose shall be considered. The DOE 5400.5, paragraph IV.3.a, limits released real property to 100 mrem/year EDE. However, once released, the property will no longer be under the jurisdiction of the DOE, but rather the State of Washington.

Compliance with the tables shall be determined by a combination of statistically supported surface scans and surveys, augmented by sampling within the area. Field surveys and sampling shall follow a documented plan implementing the requirements in this section.

**6.5.3 Posting soils**

Irrespective of the values in Tables 6.1 and 6.2, soils may require posting for occupational protection purposes. Posting for occupational purposes shall be in accordance with HSRCM-1, "Hanford Site Radiological Control Manual."

**BASIS:** HSRCM-1, "Hanford Site Radiological Control Manual," requires posting and thereby control of occupational dose rates and, in turn, maintains control of total annual doses as required by DOE 5480.11.

**6.5.4 Criteria for disposal of contaminated soils**

Any Hanford soils containing concentrations of radionuclides in excess of the table values (see Tables 6.1 and 6.2) applicable to the location and condition of the soil in question shall be documented and managed as radioactive waste or remediated to below the applicable table values. Where mixtures of radionuclides exist, an area shall be managed as radioactive waste or remediated unless the sum of each radionuclide's concentration divided by its appropriate table value is equal to, or less than, one. (Unity rule as defined in Appendix A of this manual with an example found at the end of Appendix C.)

Movement of these soils in excess of CERCLA reportable quantities constitutes a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) reportable action where such action causes offsite radiological dose limits to be exceeded or where they are not part of a planned, programmatic activity (see Sections 5.3 and Section 5.2.a.[4]). The original spill, and changes to it, should be entered into the Waste Information Database System (WIDS) through ECS, as required by Section 5.4 of this manual.

Management shall take measures to prevent the migration of contaminated soil.

**BASIS:** DOE 5400.5, paragraph 6.b.

The dose from Hanford Site operations to any offsite individual resulting from all release pathways (including the liquid and airborne release pathways and those involving groundwater or surface water used for drinking, irrigation, or recreation) shall not exceed a committed

## Water Quality

**8.4.4.4 Surface impoundments must meet WAC standards**

Surface impoundments used to store or treat nondangerous, nonradioactive solid wastes (except stormwater runoff) that are liquids or sludges containing free liquids shall be managed in accordance to the standards of WAC 173-304-430(2). These standards require that such impoundments:

1. Meet the performance standards of WAC 173-304-460(2) for limiting contamination of groundwater, air, and surface waters.
2. Have a liner or other means that meets the requirements of WAC 173-304-430(2)(b) to prevent the migration of solid waste constituents or leachate.
3. Avoid washouts
4. Have sloped dikes
5. Maintain at least 18 inches of freeboard
6. Have groundwater monitoring systems or leachate system (if required by WAC 173-304-430(2)(f))
7. Close in accordance with WAC 173-304-430(2)(g).

**8.4.5 Subsurface discharges (underground injection)**

1. Underground injection wells are defined as, a "well" that is used for the subsurface emplacement of fluids " with the definition of a well as "a bored, drilled or driven shaft, or dug hole whose depth is greater than the largest surface dimension", and includes structures such as french drains, dry wells, and steam traps which are used at Hanford.

BASIS: WAC 173-218

2. No new underground injection wells shall be constructed except to receive uncontaminated stormwater and heat pump return flow, which contains no other contaminants except for a temperature change. The heat pump water must originate in the ground, not the river. These discharges must be registered with Ecology prior to construction.

BASIS: WAC 173-218

3. Any new disposal structure for discharging industrial wastewater to the ground, other than that described above, must be designed such that it does not meet the definition of an UIC, and be permitted by either a categorical or waste discharge permit.

BASIS: WAC 173-218

Water Quality

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4. Existing underground injection wells shall be registered with Ecology, in accordance with WAC 173-218. Contact Air and Water Permits for assistance in registering underground injection wells.

BASIS: WAC 173-218

5. Notify Air and Water Permits if the effluent characteristics discharged to an underground injection well are changed, rerouted, or discharge ceases.

BASIS: Best management practice to keep inventory/registrations current.

6. Radionuclides in the discharge to underground injections wells shall be below Table II of 10 CFR 20, Appendix B, and discharges shall not contain hazardous waste.

BASIS: WAC 173-218

7. Any underground injection well receiving waste in excess of the limits in item 6 above shall immediately be taken out of service. Ecology shall be notified through Environmental Services.

BASIS: WAC 173-218

8. Discharges to underground injection wells shall be in accordance with WAC 173-218. WAC 173-218 standards include requirements established in 40 CFR 146 and 40 CFR 148.

BASIS: WAC 173-218

#### 8.4.6 Control standards and requirements for waste disposal sites

1. The impacts of using a waste disposal site shall be evaluated, using the appropriate dispersion and decay models, if concentrations of radionuclides or nonradioactive pollutants in the groundwater exceed the limits in either (a) or (b) below.
  - a.  $(0.04) \times (\text{DCG})$
  - b. WAC 173-200 Water Quality Standards for Groundwater listed in Table 8-1 of this section.

BASIS: WHC best management practice.

2. Routine evaluations of liquid waste disposal sites shall include an assessment by Hanford Technical Services of the site impact of the buildup of groundwater mounds and their resultant impact on contaminant migration in the unconfined aquifer.

BASIS: Consent Order No. DE 91NM-177.

3. Process Engineering shall notify EM and Hanford Technical Services in writing of any flowsheet modifications or throughput rate changes related to changes in feedstock, operational procedures, or flow rates that could cause changes in the volume or in the radiological or chemical characteristics of the effluent stream prior to initiation of changes.

BASIS: Consent Order No. DE 91NM-177.

##### 8.4.6.1 Requirements for operational groundwater monitoring by Hanford Technical Services

1. For active or inactive liquid or solid waste treatment, storage, and/or disposal facilities (including tank farms) that are not monitored under the RCRA or the CERCLA, and where contaminants are known to or may reasonably be expected to migrate through the vadose zone to the water table of the unconfined aquifer, the following monitoring requirements apply:
  - a. A monitoring plan must be prepared for each area or group of sites. The monitoring plan shall provide a summary of current site conditions, or a baseline, and information on the frequency of monitoring. Each plan shall also specify the frequency of reporting.

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If contaminant concentrations in a groundwater monitoring well exceed the indicated standards in this paragraph, the source of the contamination will be investigated by Hanford Technical Services and impacts of continued operation of the contributing facility will be evaluated by facility management. The evaluation will be based on the following factors: sampling and measurement statistics, effluent and contaminant chemical characteristics, proximity of well(s) to release point or zone, effluent discharge rate and trends in adjacent monitoring wells.