

**USEPA REQUIREMENTS FOR SITE DELETION AT HOMESTAKE MINING
COMPANY SUPERFUND SITE**

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The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 CFR 300.425(e)) states that a site may be deleted from, or recategorized on, the National Priorities List (NPL) when no response or no further response is appropriate. The EPA must consult with the state in making this determination. Site deletion is a rulemaking based on an administrative record known as the deletion docket. To delete a site from the NPL, EPA must determine, based on the deletion docket, that one of the following criteria have been met:

- Responsible or other parties have implemented all appropriate response actions required;
- All appropriate Fund-financed response under CERCLA has been implemented, and no further response action by the responsible party is appropriate; or
- The remedial investigation (RI) has shown that the release poses no significant threat to public health or the environment, and, therefore, taking of remedial measures is not appropriate.

In order to document that the deletion criteria have been met, the EPA believes a Record of Decision (ROD) is necessary to deliver the Agency's determination that appropriate response actions have been implemented for OU 1 and OU 2. The purpose of the ROD for OU 1 and OU 2 is to ensure that CERCLA processes were adequately followed to arrive at the current remedy in place and that substantive CERCLA standards have been met. In developing the ROD, the EPA will consider CERCLA-equivalent documents (or information and analysis contained in such documents) for remedial investigation/feasibility study (RI/FS) and remedial design (RD) that Homestake Mining Company (HMC) may have already generated pursuant to NRC closure requirements. If equivalent documents do not exist, the EPA will require compilation of this information to satisfy CERCLA criteria.

An integral part of the ROD is an evaluation of the Selected Remedy's compliance with Applicable or Relevant and Appropriate Requirements (ARARs) and other requirements to be considered (TBCs) (NCP §§300.430(f)(5)(ii)(B) and (C)). For radioactive contaminated sites the EPA has identified the following guidance documents and ARARs that may be potential ARARs or TBCs for the HMC site:

- 1) OSWER directive No. 9200.4-18, Aug. 22, 1997. Establishment of Cleanup Levels for CERCLA Sites with Radioactive Contamination.
- 2) OSWER Directive No. 9272.0-15P. Feb. 17, 2000. Interim Final Evaluation of Facilities Currently or Previously Licensed NRC Sites under CERCLA.
- 3) OSWER Directive 9200.4-31P. EPA 540/R/99/006. Dec. 1999. Radiation Risk Assessment At CERCLA Sites: Q&A and other Superfund Risk Assessment Guidance.
- 4) Meet all standards mentioned in 40 CFR Part 192- subpart A,B,C,D and E.
- 5) Comply with NCP standards for protection of human health and the environment.

There are three different types of ARARs: chemical-specific, location-specific, and action specific. Under the NCP, ARARs and To Be Considered (TBC) enter into the CERCLA response process at several critical junctures, including but not limited to 1) scoping for the RI/FS (based on site characterization data available at the time), 2) after the initial screening of alternatives, but before the detailed analysis phase of the FS, and 3) making ARAR and TBC determinations in the ROD, based on the analysis in the FS and public comment. Finally, even after selection of ARARs and TBCs in the ROD, if EPA receives significant new information not available at the time the ROD was issued, such as a change in ARARs or TBCs for a chemical, location, or action that impacts the protectiveness of a remedy previously selected in a ROD, EPA may reopen the administrative record to include the new information, which may necessitate a change in the remedy (40 CFR 300.825(c)). As HMC compiles the administrative record to support the deletion docket, it should include identification and analysis of chemical-specific, location-specific, and action-specific ARARs and TBCs associated with the contamination, geographic features, and response measures taken or planned at the Site.

When considering the potential for health risks caused by human exposure to known or suspected carcinogens, alternate concentration limits (ACL) should be established at concentration levels which represent an excess lifetime cancer risk, at a point of exposure, to an average individual no greater than between 1×10^{-4} and 1×10^{-6} . EPA had generated several Preliminary Remediation Goals (PRGs) associated with different media and different land use scenarios. See EPA PRG Calculator (<http://epa-prgs.ornl.gov/radionuclides/>). In Table 2 is a list of soil PRGs for radionuclides assuming a residential scenario for the HMC site. In a residential scenario, assumptions are made that an individual is exposed to soil through the incidental ingestion of soil, inhalation of particulates, external exposure and ingestion of produce grown in contaminated soil. The PRGs are concentrations in soil associated with a 1×10^{-6} excess cancer risk using the residential exposure scenario. PRGs are usually modified as more information is generated from a site specific risk assessment. The PRGs for a farmer (subsistent living) are more restrictive. Please see EPA PRG calculator for more information and requirements. Table 1 states the inhalation PRGs for radon gas at the site. Table 3 contains PRGs for metals expected in soil at the HMC site. Note that even if the standards are not directly Applicable to the HMC site, they are potentially Relevant and Appropriate Requirements. If the PRGs are less than background levels, then background levels are used as cleanup levels.

The NCP (40 CFR 300.430(e)(2)(i)) requires the establishment of remedial action objectives specifying contaminants and media of concern, potential exposure pathways, and remediation goals. Initially, preliminary remediation goals are developed based on readily available information, such as chemical-specific ARARs or other reliable information. Remediation goals shall establish acceptable exposure levels that are protective of human health and the environment and shall be developed by considering the following: Applicable or relevant and appropriate requirements under federal environmental or state environmental or facility siting laws, if available, and consideration must be given to concentration levels to which the human population, including sensitive subgroups, may be exposed without adverse effects over a lifetime or part of a lifetime.

The NCP(40 CFR 300.430(e)(2)(i)(A)(2)) provides that when establishing acceptable exposure levels for known or suspected carcinogens for use as remediation goals (for a Superfund site), consideration must be given to concentration levels that represent an excess upper bound lifetime cancer risk to an individual of between 10^{-4} and 10^{-6} using information on the relationship between dose and response. The 10^{-6} risk level shall be used as the point of departure for determining remediation goals for alternatives when ARARs are not available or are not sufficiently protective because of the presence of multiple contaminants at a site or multiple pathways of exposure.

For the HMC site, Preliminary Remediation Goals set at the 10^{-6} excess cancer risk using reasonable maximum exposure individual are given to radionuclides and chemicals listed below in tables 1, 2 and 3 assuming a potential residential scenario. Residential scenario is assumed here since the area adjacent to the site is considered residential/agricultural land use. Expansion to parts of the site may continue to be residential which could be a conservative assumption. The area down gradient from the Large Tailings Pile (LTP) had been leased in the past for grazing dairy and beef herds. Land use could continue to be agriculture for grazing animals in the future. The DOE, Office of Legacy Management (LM) preferred land reuse option is disposition of the land, but site information might dictate the best final land use. For example, LM plans for the Bluewater Site is Energy-related reuse, that is, a commercial-scale photovoltaic development at Bluewater, New Mexico. The decision for such land use was based on site specific information. The HMC site is close to the Bluewater site and might also be developed into a commercial energy-related reuse. Because of the uncertainty in the future development of the HMC site, future residential land use is assumed here. If land use is changed, then the PRGs may also change depending on the future actual land use.

Preliminary remediation goals are the starting points in the development of final cleanup levels at the site. As at all sites addressed under the NCP, these goals may be modified, depending on physical characteristics of a site, State laws and guidance, and other site specific factors such as additional exposure routes or different land use.

For HMC, the following PRGs, ARARs and TBC media concentrations, are developed to assure protectiveness of exposed individuals currently and in the future. Because current exposure or exposure during the remediation is taking a long time, current exposures numbers are similar to long term exposure levels.

On-site Current

- 1) Air on-site
 - a) Likely Federal Radiation ARARs. Most of the standards mentioned in the table below are not applicable to HMC site **BUT** are considered potentially Relevant and Appropriate Requirement to HMC site.

Standard	Citation	When is standard Applicable(Conduct /Operation or Level of Cleanup¹	When is standard potentially a Relevant and Appropriate Requirement
National Emission Standards for Hazardous Air Pollutants (NESHAPs) under the Clean Air Act, that apply to radionuclides.	40 CFR 61 Subparts H and I	Airborne emissions during the cleanup of Federal Facilities and licensed NRC facilities (CO)	Cleanup of other sites with radioactive contamination.
Design requirements for remedial actions that involve disposal for controlling combined releases of radon-220 and radon-222 to the atmosphere at inactive uranium processing sites designated for remedial action	40CFR 192.02	Never: Standards are applicable only to UMTRCA sites that are exempt from CERCLA	Sites with radon-220 or radon-222 as contaminants which will be disposed of on-site.
Combined exposure limits for cleanup of radon decay products in buildings at inactive uranium processing sites designated for remedial action	40CFR 192.12(b)(1) and 192.41(b)	Never: Standards are applicable only to UMTRCA sites that are exempt from CERCLA	Sites with radioactive contamination that is currently, or may potentially, result in radon that is caused by site related contamination migrating from the soil into buildings
Concentration limits for cleanup of gamma radiation in buildings at inactive uranium processing sites designated for remedial action.	40 CFR 192.12 (b) (2)	Never: Standards are applicable only to UMTRCA sites that are exempt from CERCLA	Sites with radioactive contamination that is currently, or may potentially, emit gamma radiation
¹ Conduct/operation (C/O) refers to those standards which are typically ARARs for the conduct or operation of the remedial action.			

On-Site Future

- 2) Site Soil
 - a) Likely Federal ARARs.

Standard	Citation	When is standard Applicable(Conduct /Operation or Level of Cleanup¹	When is standard potentially a Relevant and Appropriate Requirement
Concentration Limits for cleanup of radium-226, radium-228, and thorium in soil at inactive uranium processing sites	40 CFR 192.12(a), 192.32(b)(2), and 192.41	Never: Standards are applicable to UMTRCA sites that are exempt from CERCLA	Sites with soil contaminated with radium-226, radium-228, and/or thorium
Performance objectives for the land disposal of Low level radioactive waste (LLW).	10 CFR 61.41	Unlikely: Existing licensed LLW disposal sites at the time of license renewal. (L/C) Unlikely that this would occur	Previously closed sites containing LLW if the waste will be permanently left on site.
¹ Level of Cleanup (L/C) refers to those standards which are typically ARARs for determining the final level of cleanup.			

b) To Be Considered.

**Table 2: Summary Preliminary Remediation Goals (PRGs)
(assuming Residential Soil Exposure Scenario)**

Contaminant	Screening Level						Protection of Groundwater	
	Ingestion PRG (pCi/g)	Inhalation PRG (pCi/g)	External Exposure PRG (pCi/g)	Produce Ingestion PRG (pCi/g)	Total PRG (pCi/g)	Total PRG (mg/kg)	SSL Risk-Based (pCi/g)	SSL MCL-Based (pCi/g)
Ba-140	1.13E+04	2.11E+08	8.83E+01	2.87E+04	8.73E+01	1.19E-09	--	--
Bi-212	8.05E+07	1.67E+10	2.06E+04	9.46E+06	2.05E+04	1.40E-09	--	--
Bi-214	1.01E+09	1.36E+11	7.95E+03	1.08E+08	7.95E+03	1.80E-10	--	--
Co-60	7.92E+01	8.08E+05	3.90E-02	1.18E+01	3.89E-02	3.44E-11	8.13E-02	2.41E+00
Cs-137	2.54E+01	8.38E+05	2.81E+02	4.85E+00	4.02E+00	4.62E-08	4.92E-01	5.66E+01
I-131	5.94E+03	3.48E+08	6.68E+01	1.84E+03	6.38E+01	5.15E-10	5.05E+00	--
K-40	1.28E+01	6.98E+05	1.52E-01	5.09E-01	1.16E-01	1.66E-02	--	--
Pa-234m	-	-	1.36E+07	-	1.36E+07	1.99E-08	--	--
Pb-210	6.63E-01	3.99E+03	1.10E+02	6.82E-01	3.35E-01	4.40E-09	1.15E-02	1.03E-02
Pb-212	2.03E+05	2.13E+08	3.67E+03	2.53E+05	3.55E+03	2.56E-09	4.49E+3	--
Pb-214	3.80E+08	8.08E+10	4.48E+04	4.40E+08	4.48E+04	1.37E-09	7.78E+06	--
Ra-223	8.18E+02	1.91E+05	1.60E+02	2.56E+02	8.79E+01	1.72E-09	9.44E+00	--
Ra-226	1.10E+00	6.29E+02	4.75E+00	2.56E-01	1.99E-01	2.01E-07	5.89E-05	3.22E-01
Ra-228	1.29E+00	5.16E+03	-	3.40E-01	2.69E-01	9.88E-10	1.21E-02	1.19E+00
Th-227	2.35E+03	8.31E+04	1.11E+02	3.07E+04	1.05E+02	3.43E-09	1.83E+02	--
Th-228	2.98E+01	5.92E+02	1.99E+02	3.84E+02	2.34E+01	2.85E-08	2.17E+00	6.59E+01
Th-230	3.93E+00	2.52E+02	1.23E+02	4.40E+01	3.46E+00	1.71E-04	2.35E-01	6.06E+00
Th-232	3.44E+00	1.66E+02	2.94E+02	3.94E+01	3.07E+00	2.80E+01	2.12E-01	6.06E+00
Th-234	3.73E+03	7.38E+07	2.01E+03	4.85E+04	1.27E+03	5.51E-08	2.91E+02	--
Tl-208	-	-	2.31E+04	-	2.31E+04	7.85E-11	--	--
U-234	5.02E+00	6.31E+02	3.99E+02	2.19E+01	4.02E+00	6.44E-04	8.98E-03	2.24E+03
U-235	5.06E+00	7.12E+02	2.01E-01	2.22E+01	1.92E-01	8.89E-02	9.12E-03	7.77E-01
U-238	5.55E+00	7.72E+02	2.01E+03	2.42E+01	4.48E+00	1.33E+01	9.92E-03	1.21E-01

Table 3: PRGs for Metals in Soil

Contaminant		Screening Level		Protection of Groundwater	
Analyte	CAS No.	Resident Soil (mg/kg)	key	Risk-based SSL (mg/kg)	MCL-based SSL (mg/kg)
Arsenic, Inorganic	7440-38-2	3.9E-01	c*	1.3E-03	2.9E-01
~Lead and Compounds	7439-92-1	4.0E+02	n		1.4E+01
Molybdenum	7439-98-7	3.9E+02	n	3.7E+00	
Selenium	7782-49-2	3.9E+02	n	9.5E-01	2.6E-01
Vanadium and Compounds	NA	3.9E+02	n	1.8E+02	
Uranium (Soluble Salts)	NA	2.3E+02	n	4.9E+01	1.4E+01
c=cancer	n=noncancer				

Off-Site Current/Future

The same ARARs and TBC media concentration used for on-site above are also used for the residential communities down gradient from the site.