

2. ARARs and Remedial Action Objectives

Remedial Action Objectives (RAOs) are specific goals for protecting human health and the environment. RAOs are developed by evaluating ARARs that are protective of human health and the environment and the results of the remedial investigations, including the human and ecological risk assessments. ARARs are discussed below, followed by the Site 300 RAOs.

2.1. Identification of Applicable or Relevant and Appropriate Requirements

CERCLA Section 121 (d)(2)(A) requires that remedial actions meet any federal standards, requirements, criteria, or limitations that are determined to be legally applicable or relevant and appropriate. CERCLA Section 121 (d)(2)(A)(ii) requires state ARARs to be met if they are more stringent than federal requirements. In addition, the National Contingency Plan (NCP), published in 40 Code of Federal Regulations (CFR) Part 300, requires that local ordinances, unpromulgated criteria, advisories, or guidance that do not meet the definition of ARARs but that may assist in the development of remedial objectives be listed as “to be considered” (TBC).

Based on CERCLA guidance, there are three types of ARARs:

- Chemical-specific requirements, which define acceptable exposure concentrations or water quality standards.
- Location-specific requirements, which may restrict remediation activities at sensitive or hazard-prone locations such as active fault zones, wildlife habitat and flood plains.
- Action-specific requirements, which may control activities and/or technology.

Table 2-1 lists the proposed ARARs for Site 300. The three types of ARARs are described below.

2.2. Chemical-Specific ARARs

2.2.1. Risk-Based Requirements

40 CFR 300.430(e)(i)(A)(2) indicates that excess cancer risks greater than one in ten thousand (10^{-4}) are unacceptable, while excess cancer risk between 10^{-4} and one in one million (10^{-6}) may require risk management. The U.S. EPA states that “where the cumulative carcinogenic risk to an individual, based on a reasonable maximum exposure for both current and future land use is less than 10^{-4} , and the non-carcinogenic hazard quotient is less than 1.0, action generally is not warranted unless there are adverse environmental impacts,” unless maximum contaminant levels (MCLs) are exceeded. EPA uses the general 10^{-4} to 10^{-6} risk range as a “target range” within which risk management measures are taken as part of the Superfund cleanup (U.S. EPA, 1991). 40 CFR Part 300 also indicates that “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.” U.S. EPA (1989) indicates that a hazard index (HI) greater than 1.0 may be associated with a noncarcinogenic adverse health effect. Table 1-18

summarizes human health risk greater than 10^{-6} and hazard indices greater than 1.0 at Site 300 OUs as identified in the SWRI report (Webster-Scholten, 1994) or in subsequent characterization. Chemicals that were identified as presenting a risk greater than 10^{-6} and hazard index greater than 1.0 in any media for which a complete exposure pathway exists were considered as COCs and addressed in a remedial alternative.

2.2.2. Federal and State ARARs

Table 2-2 presents California and federal MCLs for chemicals of concern in ground water at Site 300. Because ground water is used for drinking water and MCLs apply directly to public drinking water systems with 15 or more service connections, ground water at Site 300 is considered a potential public drinking water source under federal and California law.

The U.S. EPA considers MCLs in setting cleanup standards for contaminated water that is, or may be used for, drinking water. Under CERCLA, the most stringent concentration limit is the ARAR for the chemical of concern. Under the Safe Drinking Water Act (SDWA), a state may set more stringent standards for public drinking water systems. As shown in Table 2-2, California has set more stringent MCLs for 1,1-DCE, 1,2-DCA, cis-1,2-DCE, trans-1,2-DCE, benzene, toluene, and nitrate.

The California RWQCB-Central Valley Region's Water Quality Control Plan (Basin Plan) establishes beneficial uses and water quality objectives (WQOs) for ground water and surface waters in the Central Valley region. The RWQCB considers the WQOs as a cleanup standard for contaminated water that is, or may be used for, drinking water. WQOs have been included in Table 2-2 for contaminants for which there is either no State MCL or the WQO is lower.

State Water Resources Control Board (SWRCB) Resolution No. 68-16 reflects the State's policies for "maintaining high quality of waters in California." Commonly referred to as the anti-degradation policy, this Resolution applies to discharging waste that might affect the existing quality of the water it is discharged into and, in turn, affect its beneficial use. The policy requires that waste discharges to existing high quality waters are required to meet best practical treatment or control. Title 23, California Code of Regulations (CCR), Division 3, Chapter 15, also applies to discharges of waste. SWRCB Resolution No. 92-49 establishes policies and procedures for the oversight of investigations and cleanup activities resulting from discharges that affect or threaten water quality. This policy authorizes regional boards to oversee cleanup activities and to require complete cleanup of all waste discharged. These policies are ARARs for the discharge of waste to ground water.

SWRCB Resolution No. 88-63 specifies that all surface and ground waters of the State are considered suitable, or potentially suitable, for municipal or domestic water supply with the following exceptions: (1) those water bodies with yields below 200 gallons per day (gpd), (2) total dissolved solids exceeding 3,000 mg/L (ppm), or (3) contamination that cannot reasonably be treated for domestic use by either best management practices or best economically achievable treatment practices.

2.2.3. Preliminary Remediation Levels

To comply with state and federal ARARs and CERCLA risk-based requirements, actions should be implemented that attempt to protect full beneficial use of ground water beneath

Site 300. Because ground water near Site 300 is used for drinking water supply, the preliminary remediation levels for the chemicals of concern are the MCLs, or WQOs if applicable, presented in Table 2-2.

State Water Board Resolutions 68-16 and 92-49 indicate that background conditions should also be a long-term remedial goal. At this time, however, available site and industry data are insufficient to evaluate whether remediation to background levels is technically or economically feasible. The inability to evaluate these factors results mainly from subsurface complexity and uncertainty about the site-specific efficacy of ground water extraction to remediate all portions of the ground water plumes. Information available on pump-and-treat remediation at Site 300 and ground water modeling at the GSA and other sites indicate that ground water extraction will generally accelerate VOC removal. However, industry experience shows that chlorinated solvents, such as TCE, often become sorbed onto low-permeability, clay-rich sediments that have limited capacity to desorb the contaminant back into ground water, thereby decreasing remediation efficiency and increasing remediation time and cost. In addition, the low-permeability, clay-rich units may retain VOCs for decades or longer and, during periods of no pumping, recontaminate remediated ground water and sediments. Because of the small scale and heterogeneous nature of geologic features that affect sorption and hydraulic properties and the impracticability of characterizing them, these factors are not fully defined for Site 300. Therefore, attaining background conditions may not be possible. However, because this is an important policy issue with the State, LLNL/DOE will reevaluate the achievability of this potential long-term goal in the future, as additional monitoring and remediation performance data, and/or new remediation technologies become available.

LLNL/DOE will gather the necessary information to assess the feasibility of different cleanup levels as the Interim Site-Wide ROD is implemented. This information will aid in setting final cleanup levels as part of a Final Site-Wide ROD, such that ground water will be cleaned up to the technically and economically feasible level between MCLs, or any more stringent WQOs, and natural background levels.

2.3. Location-Specific ARARs

2.3.1. Faults

California location standards for permitted hazardous waste transfer, treatment, storage, and disposal (TSD) facilities (22 CCR 66264.18[a]) prohibit location of new TSD facilities, or substantial modification of existing facilities, within 200 ft of a Holocene (active) fault. As described in Section 1.2.3.2, the right-lateral strike slip Corral Hollow-Carnegie Fault Zone (Fig. 1-6), which traverses the Pit 6 OU, is considered active and capable of generating an earthquake with a magnitude in the range of 6.3 to 7.1 (Carpenter et al., 1992.) However, no TSD facilities are planned in the Pit 6 OU that would be located within 200 ft of the Corral Hollow-Carnegie Fault Zone.

A potentially active extension of the Midway Fault has been mapped across the northeastern part of Site 300 (Dibblee, 1980) (Fig. 1-6). However, this fault, if it actually extends into the northeastern part of Site 300, is not near any Site 300 OU.

No other known active or potentially active faults have been identified at Site 300.

2.3.2. Wilderness Areas, Wildlife Refuges, and Scenic Rivers

No area within or near Site 300 is designated as a federal wilderness area, wildlife refuge, or scenic river. The California Department of Fish and Game (CDFG) maintains an ecological preserve adjacent to the eastern Site 300 boundary. No remedial action activities will occur within this preserve, and potential discharges of treated water will be conducted in a manner consistent with CDFG ecological management guidelines.

2.3.3. Floodplains and Wetlands

22 CCR 66264.18(b)(1), which states that TSD facilities within a 100-year floodplain must be designed, constructed, operated, and maintained to prevent washout of any hazardous waste by a 100-year flood, applies to areas within the Building 832 Canyon, HE Process Area and Pit 6 Landfill OUs, where discharge lines and other components of a treatment facility could lie within the 100-year floodplain. If any future treatment facilities are built on a 100-year floodplain, they will be constructed in accordance with this requirement as well as those outlined in DOE regulations found in 10 CFR 1022.

Other areas that are consistent with California and federal definition of wetlands (U.S. DOE, 1992) have been identified at or near Site 300. Although these areas are not currently regulated as wetlands by the U.S. Army Corps of Engineers (Coe, 1991), any future treatment-related activities will be carried out in accordance with DOE regulations (10 CFR 1022).

2.3.4. Historical Sites and Archaeological Findings

A discussion of archaeological investigations at Site 300 is presented in the SWRI. Additional surveys may be conducted prior to remedial activity to ensure that no historic properties will be affected by the activity. Remedial project construction personnel will be advised of the possibility of buried cultural artifacts and be alerted to likely indicators.

2.3.5. Rare, Threatened, or Endangered Species

The SWRI and the Site 300 Environmental Impact Statement/Environmental Impact Report (EIS/EIR) (U.S. DOE, 1992) indicate that portions of Site 300 are potential habitat for several species that have been designated by the federal and California governments as threatened or endangered. Those federally-listed species for which habitat have been identified, but which have not been observed at Site 300, include the San Joaquin kit fox (endangered), the Alameda whipsnake (threatened), and the valley elderberry longhorn beetle (threatened). In addition, the flora species commonly known as the large-flowered fiddleneck (endangered) grows on site. Several federally-designated candidate species, as well as species identified as being of special concern by the State, have either been observed on site or may potentially occur on site. Federally-listed threatened or endangered species observed since the EIS/EIR surveys include the peregrine falcon (endangered) and the Swainson's hawk (threatened).

The Swainson's hawk, however, is a rare visitor to Site 300; only one individual has been observed. The bird was sighted along Corral Hollow Creek in the California Department of Fish and Game Ecological Reserve. The peregrine is also a rare visitor at Site 300; there have been a limited number of fly-by sightings and the birds appeared transient. No nesting pairs have been

discovered onsite and they are considered unlikely residents. Section 1.5.3.2 discusses its significance of these sightings.

DOE is committed to protecting all potential habitats for these species. Mandatory 60-day advance notification of all ground-breaking activities will initiate an ecological survey by an LLNL biologist to identify the presence of sensitive species and to mitigate any adverse impacts of the project.

2.4. Action-Specific ARARs

Most action-specific ARARs address treatment, transportation, and disposal of hazardous waste. Table 2-1 includes descriptions of action-specific ARARs that may be associated with possible remedial actions. Chapters 3, 5, and 6 include discussions of ARAR compliance for specific technologies and cleanup activities.

2.5. Remedial Action Objectives

The National Contingency Plan specifies that RAOs be developed which address: (1) contaminants of concern, (2) media of concern, (3) potential exposure pathways, and (4) preliminary remediation levels.

The development of these goals involves ARARs and the results of the baseline human and ecological risk assessment in the SWRI. Cleanup standards for contaminant concentrations in the Final ROD will be between MCLs and background. This Site-Wide Feasibility Study (SWFS) assembles General Response Actions and technologies into implementable alternatives that satisfy these RAOs.

Preliminary RAOs for the Site-Wide FS are as follows:

For Human Health Protection:

- Prevent human ingestion of ground water containing contaminant concentrations (single carcinogen) above the State and federal MCLs and any more stringent WQOs. The preliminary contaminants of concern (COCs) for the Site-Wide OU, as well as the State and federal MCLs and RWQCB WQOs for these COCs are listed in Table 2-2.
- Prevent human incidental ingestion and direct dermal contact with contaminants in surface soil that pose an excess cancer risk greater than 10^{-6} or a hazard index (HI) greater than 1, a cumulative excess cancer risk (all carcinogens) in excess of 10^{-4} , or a cumulative HI (all noncarcinogens) greater than 1.
- Prevent human inhalation of VOCs and tritium volatilizing from subsurface soil to air that pose an excess cancer risk greater than 10^{-6} or HI greater than 1, a cumulative excess cancer risk (all carcinogens) in excess of 10^{-4} , or a cumulative HI (all noncarcinogens) greater than 1.
- Prevent human inhalation of contaminants (VOCs and tritium) volatilizing from surface water to air that pose an excess cancer risk greater than 10^{-6} or HI greater than 1, a cumulative excess cancer risk (all carcinogens) in excess of 10^{-4} , or a cumulative HI (all noncarcinogens) greater than 1.

- Prevent human inhalation of contaminants bound to resuspended surface soil particles that pose an excess cancer risk greater than 10^{-6} or HI greater than 1, a cumulative excess cancer risk (all carcinogens) in excess of 10^{-4} , or a cumulative HI (all noncarcinogens) greater than 1.
- Prevent human exposure to contaminants in media of concern that pose an cumulative excess cancer risk (all carcinogens) greater than 10^{-4} and/or a cumulative HI greater than one (all noncarcinogens).

For Environmental Protection:

- Restore water quality, at a minimum, to water quality objectives that are protective of beneficial uses within a reasonable timeframe. Maintain existing water quality that complies with water quality objectives. This will apply to both individual and multiple constituents that have additive toxicology or carcinogenic effects.
- Ensure ecological receptors important at the individual level of ecological organization (listed threatened or endangered, State of California species of special concern) do not reside in areas where relevant hazard indices exceed 1.
- Ensure existing contaminant conditions do not change so as to threaten wildlife populations and vegetation communities.

There is no RAO for human health protection/ARAR compliance for ingestion of surface waters (springs) because there is not a complete exposure pathway for ingestion of surface waters for humans at Site 300. Humans do not drink water from springs at the site. In addition, the springs in which contaminants are currently detected do not produce a sufficient quantity of water to be used as a water supply (greater than 200 gal/day). Since there is no exposure route for human ingestion of surface water at the site, an RAO was not developed for this pathway.

Chapter 7 of this document evaluates a number of alternative remedies to meet these RAOs. The Site-Wide Compliance Monitoring Plan/Contingency Plan, to be developed subsequent to the signing of the Interim ROD, will address the contingent processes and actions to be taken if the originally selected remediation alternatives are unsuccessful in meeting any of the RAOs. Contingent actions may include further evaluations and/or application of new remediation approaches.

2.6. References

- Carpenter, D. W., J. R. Copland, A. L. Lamarre, R. S. Mateik, M. J. Taffet, and W. M. Wade (1991), *Investigation of Holocene Faulting Near Closed Landfill Pit 6, Lawrence Livermore National Laboratory Site 300*, Lawrence Livermore National Laboratory, Livermore, Calif. (UCRL-ID-106316).
- Coe, T. (1991), U.S. Army Corps of Engineers, Sacramento, Calif., personal communication with Tina Carlsen, Lawrence Livermore National Laboratory environmental scientist.
- U.S. DOE (1992), *Environmental Impact Statement and Environmental Impact Report for Continued Operation of Lawrence Livermore National Laboratory and Sandia National Laboratories, Livermore, California*, U.S. Department of Energy, Washington, D.C. (DOE/EIS-0157).

- U.S. EPA (1989), *Risk Assessment Guidance for Superfund, Human Health Evaluation Manual (Part A) Interim Final*, Office of Emergency and Remedial Response, U.S. Environmental Protection Agency, Washington, D.C. (EPA/540/1-89/002).
- U.S. EPA (1991), Memorandum issued on the “*Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions*,” OSWER Directive 9355.0-30.
- Webster-Scholten, C. P., Ed. (1994), *Final Site-Wide Remedial Investigation Report, Lawrence Livermore National Laboratory Site 300*, Lawrence Livermore National Laboratory, Livermore, Calif. (UCRL-AR-108131).

Table 2-1. Potential ARARs for Site 300.

Action(s)	Source	Description	Application
Ground water actions: monitored natural attenuation, ground water extraction, <i>in situ</i> treatment, containment, and hydraulic control	Federal: Safe Drinking Water Act [42 USCA 300 and 40 CFR 141.11-141.16, 141.50-141.51] (Relevant and appropriate, chemical-specific)	Establishes treatment standards for current potential drinking water sources by setting Maximum Contaminant Levels (MCLs) and non-zero Maximum Contaminant Level Goals (MCLGs), which are used as interim cleanup standards at Site 300. Those standards for Site 300 are listed in Table 2-2.	Contaminants will be reduced to concentrations no higher than MCLs in all Site 300 ground water.
	State: State Water Resources Control Board (SWRCB) Resolution 92-49, Paragraph III G ^a (Applicable, chemical-specific)	Establishes requirements for investigation and cleanup and abatement of discharges. Among other requirements, dischargers must cleanup and abate the effects of discharges in a manner that promotes the attainment of either background water quality, or the best water quality that is reasonable if background water quality cannot be restored. Requires the application of Title 23, CCR, Section 2550.4, requirements to cleanup.	Final cleanup standards for ground water in the final Record of Decision will be equal to background concentrations unless such levels are technically and economically infeasible to achieve. In such cases, cleanup standards will not exceed applicable MCLs, or any more stringent WQOs.
	Cal. Safe Drinking Water Act [California Health and Safety Code Section 4010.1 et. seq., Title 22, CCR, Div. 4, Chapt. 15] (Relevant and appropriate, chemical-specific)	Establishes treatment standards for current potential drinking water sources by setting MCLs which are used as cleanup standards. Those standards for Site 300 are listed in Table 2-2.	Contaminants will be reduced to concentrations no higher than MCLs in all Site 300 ground water.

Table 2-1. Potential ARARs for Site 300. (Cont. Page 2 of 9)

Action(s)	Source	Description	Application
Ground water actions (cont.)	<i>State: (cont.)</i>		
	Chapter 15, California Code of Regulations (CCR), Title 23, Sections 2550.7, 2550.10 (Relevant and appropriate, chemical-specific)	Requires monitoring of the effectiveness of the remedial actions.	Contaminant concentrations in <i>in situ</i> ground water will be measured.
	Water Quality Control Plan (Basin Plan) for CVRWQCB (Applicable, chemical-specific)	Establishes beneficial uses and water quality objectives for ground water and surface waters in the Central Valley Region as well as implementation plans to meet water quality objectives and protect beneficial uses.	Specific applicable portions of the Basin Plan include beneficial uses of affected water bodies and water quality objectives to protect those uses. Any activity, including, but not limited to, the discharge of contaminated soils or waters or <i>in-situ</i> treatment or containment of contaminated soils or waters, must not result in actual water quality exceeding water quality objectives.
	SWRCB Resolution 88-63 (Applicable, chemical-specific)	Designates all ground and surface waters in the State as drinking water sources with specific exceptions.	Contaminant concentrations in ground water will be reduced to levels protective of beneficial uses.
	SWRCB Resolution 68-16 (Applicable, action-specific)	Requires that high quality surface and ground water be maintained to the maximum extent possible.	This applies to enhanced <i>in situ</i> bioremediation of ground water. The levels of residual injected materials or by-products will be below WQOs.

Table 2-1. Potential ARARs for Site 300. (Cont. Page 3 of 9)

Action(s)	Source	Description	Application
Soil vapor extraction	State: Water Quality Control Plan (Basin Plan) for CVRWQCB (Applicable, chemical-specific)	Establishes beneficial uses and water quality objectives for ground water and surface waters in the Central Valley Region, as well as implementation plans to meet water quality objectives and protect beneficial uses.	Specific applicable portions of the Basin Plan include beneficial uses of affected water bodies and water quality objectives to protect those uses. Any activity, including, but not limited to, the discharge of contaminated soils or waters or <i>in situ</i> treatment or containment of contaminated soils or waters, must not result in actual water quality exceeding water quality objectives.
	Chapter 15, CCR, Title 23, Sections 2550.7, 2550.10 (Relevant and appropriate, chemical-specific)	Requires monitoring of the effectiveness of the remedial actions.	Contaminant concentration in <i>in situ</i> soil vapor will be measured.

Table 2-1. Potential ARARs for Site 300. (Cont. Page 4 of 9)

Action(s)	Source	Description	Application
Treated ground water discharge	Federal: 40 CFR 122 (The National Pollutant Discharge Elimination System (NPDES): 40 CFR 122.41(d), (e), (j)(1), (j)(3), (j)(4), (l)(6), (m), and (n); 40 CFR 122.44(d), (g), and (i); 40 CFR 122.45, (d), (e), (f), and (g); and 40 CFR 122.48(a) and (b) (Applicable, action-specific)	These sections are the substantive requirements of NPDES permits. The RWQCB may issue an actual NPDES permit for some offsite discharges.	Will be applied to point source discharges of treated ground water to surface water drainages.
	State: SWRCB Resolution 68-16 (Anti-degradation policy) (Applicable, chemical-specific)	Requires that high quality surface and ground water be maintained to the maximum extent possible.	Applies to the discharge of treated ground water.
	Water Quality Control Plan (Basin Plan) for CVRWCB (Applicable, chemical-specific)	Establishes beneficial uses and water quality objectives for ground water and surface waters in the Central Valley Region as well as implementation plans to meet water quality objectives and protect beneficial uses.	Specific applicable portions of the Basin Plan include beneficial uses of affected water bodies and water quality objectives to protect those uses. Any activity, including, but not limited to, the discharge of contaminated waters must not result in actual water quality exceeding water quality objectives.

Table 2-1. Potential ARARs for Site 300. (Cont. Page 5 of 9)

Action(s)	Source	Description	Application
Treated ground water reinjection	Federal: Safe Drinking Water Act Underground Injection Control Program (40 CFR 144.26-144.27) (Applicable, action-specific)	Requires monitoring for reinjection of treated water.	Treated ground water will be analyzed to verify complete removal of contaminants to regulatory treatment standards, prior to reinjection.
	State: SWRCB Resolution 68-16 (Anti-degradation policy) (Applicable, chemical-specific)	Requires that high quality ground water be maintained to the maximum extent possible.	This is applicable to the discharge of treated ground water.
	Water Quality Control Plan (Basin Plan) for CVRWCB (Applicable, chemical-specific)	Establishes beneficial uses and water quality objectives for ground water and surface waters in the Central Valley Region as well as implementation plans to meet water quality objectives and protect beneficial uses.	Specific applicable portions of the Basin Plan include beneficial uses of affected water bodies and water quality objectives to protect those uses. Any activity, including, but not limited to, the discharge of contaminated waters must not result in actual water quality exceeding water quality objectives.

Table 2-1. Potential ARARs for Site 300. (Cont. Page 6 of 9)

Action(s)	Source	Description	Application
Treated soil vapor discharge	<p><i>Local:</i> San Joaquin Valley Unified Air Pollution Control District (SJVUAPCD) Rules and Regulations, Rules 4651 and 2201 (Applicable, chemical-specific)</p>	Regulates stationary sources of air contaminants and limits VOC emissions from the excavation and treatment of contaminated soil.	Soil vapor will be treated with granular activated carbon (GAC) or equivalent technologies, and discharged to the atmosphere. The compliance standards for treated soil vapor are contained in the Authority to Construct and subsequent Permit to Operate issued by the SJVUAPCD.
Capping/On-site consolidation	<p><i>State:</i> CCR, Title 27, Section 21090 (Applicable, action-specific)</p> <p>Title 22, CCR, Division 4.5, Chapter 14, Article 14 (Relevant and appropriate, action-specific)</p>	<p>Requires a final cover constructed in accordance with specific prescriptive standards, to be maintained as long as wastes pose a threat to ground water.</p> <p>Provides requirements for constructing and maintaining an onsite consolidation unit and for capping of existing pits.</p>	<p>Applies to wastes contained or left in place at the end of remedial actions that could affect water quality. Includes closure of landfills and other areas where waste has been disposed to land.</p> <p>Potentially applies to all landfill pits under consideration for either on-site consolidation or capping; Pits 2, 3, 5, 8, and 9.</p>
Disposition of hazardous waste	<p><i>State:</i> California Health and Safety Code, Division 20, Chapter 6.5, CCR, Title 22, Division 4.5, Chapters 11 and 12: Minimum Standards for Management of Hazardous and Extremely Hazardous Wastes (Applicable, action-specific)</p>	Controls hazardous wastes from point of generation through accumulation, transportation, treatment, storage, and ultimate disposal.	Applies to the spent GAC and resin vessels, and to excavated contaminated soil.

Table 2-1. Potential ARARs for Site 300. (Cont. Page 7 of 9)

Action(s)	Source	Description	Application
Disposition of hazardous waste (cont.)	State: California Health and Safety Code, Division 20, Chapter 6.5, CCR, Title 22, Division 4.5, Chapter 14, Article 14 (Relevant and appropriate, action-specific)	Requirements for constructing and maintaining an onsite consolidation up and for capping of existing pits.	Potentially applies to all landfill pits under consideration for either onsite consolidation or capping.
	Water Quality Control Plan (Basin Plan) for CVRWCB (Applicable, chemical-specific)	Establishes beneficial uses and water quality objectives for ground water and surface waters in the Central Valley Region as well as implementation plans to meet water quality objectives and protect beneficial uses.	Specific applicable portions of the Basin Plan include beneficial uses of affected water bodies and water quality objectives to protect those uses. Any activity, including, but not limited to, the discharge of contaminated soils or waters or <i>in situ</i> treatment or containment of contaminated soils or waters, must not result in actual water quality exceeding water quality objectives.
	Title 23, CCR, Division 3, Chapter 15 (Applicable, action-specific)	Establishes waste and siting classification systems and minimum waste management standards for discharges of waste to land for treatment, storage, and disposal. Engineered alternatives that are consistent with Title 23 performance goals may be considered. Also establishes corrective action requirements for responding to leaks and other unauthorized discharges.	Applies to <i>ex situ</i> treatment, storage, and disposal of any remediation-derived hazardous solid wastes.

Table 2-1. Potential ARARs for Site 300. (Cont. Page 8 of 9)

Action(s)	Source	Description	Application
Disposition of non-hazardous waste	State: Title 27, California Code of Regulations (CCR), Division 2, Subdivision 1 (Applicable, action-specific)	Establishes waste and siting classification systems and minimum waste management standards for discharges of waste to land for treatment, storage, and disposal. Engineered alternatives that are consistent with Title 27 performance goals may be considered. Also establishes corrective action requirements for responding to leaks and other unauthorized discharges.	Applies to <i>ex situ</i> treatment, storage, and disposal of remediation-derived non-hazardous solid waste.
Storm water controls	Federal: 40 CFR Parts 122, 123, 124, National Pollution Discharge Elimination System, implemented by California Storm Water Permit for Industrial Activities, State Water Resources Control Board Order #97-03-DWQ. (Applicable, action-specific)	Regulates pollutants in discharges of storm water associated with hazardous waste treatment, storage, and disposal facilities, wastewater treatment plants, landfills, land application sites, and open dumps. Requirements to ensure storm water discharges do not contribute to a violation of surface water quality standards.	Applies to storm water discharges from industrial areas. Includes measures to minimize and/or eliminate pollutants in storm water discharges and monitoring to demonstrate compliance.

Table 2-1. Potential ARARs for Site 300. (Cont. Page 9 of 9)

Action(s)	Source	Description	Application
Storm water controls (cont.)	Federal: 40 CFR Parts 122, 123, 124, National Pollution Discharge Elimination System, implemented by State Water Resources Control Board Order No. 92-08 DWQ (Applicable, action-specific)	Regulates pollutants in discharges of storm water associated with construction activity (clearing, grading, or excavation) involving the disturbance of 5 acres or more. Requirements to ensure storm water discharges do not contribute to a violation of surface water quality standards.	Applies to construction areas over 5 acres in size. Includes measures to minimize and/or eliminate pollutants in storm water discharges and monitoring to demonstrate compliance.
Protection of endangered species	Federal: Endangered Species Act of 1973, 16 USC Section 1531 et seq. 50 CFR Part 200, 50 CFR Part 402 [40 CFR 257.3-2] (Applicable, location-specific) State: California Endangered Species Act, California Department of Fish and Game Sections 2050-2068 (Applicable, location-specific)	Requires that facilities or practices not cause or contribute to the taking of any endangered or threatened species of plants, fish, or wildlife. NEPA implementation requirements may apply.	Prior to any well installation, facility construction, or similar potentially disruptive activities, wildlife surveys will be conducted and mitigation measures implemented if required.
Floodplain protection	State: 22 CCR 66264.18 (b)(1) (Relevant and appropriate, location-specific)	Requires that Treatment, Storage and Disposal (TSD) facilities within a 100-year floodplain must be designed, constructed, operated, and maintained to prevent washout of hazardous waste by a 100-year flood.	If it becomes necessary to install a treatment system within the 100- year floodplain, the system would be constructed in accordance with this requirement.

^a ARARs pertaining to clean-up standards will be selected at the time of the Final ROD.

Table 2-2. MCLs and WQOs for contaminants of concern in ground water at Site 300.

Chemical of concern	Federal MCL ($\mu\text{g/L}$)^a	State MCL or WQO ($\mu\text{g/L}$)^a	Operable Unit
<i>Halogenated VOCs</i>			
Acetone	None	WQO: 20,000	B834, B830
Chloroform	100 ^b	WQO: 1.1 MCL: 100 ^b	B834, Pit 6, HEPA, B830, B801 dry well
1,2-DCA	5	MCL: 0.5	Pit 6, B801 dry well
1,1-DCE	7	MCL: 6	HEPA, Pit 5
cis-1,2-DCE	70	MCL: 6	B834, Pit 6, HEPA, B830, B832, B833
trans-1,2-DCE	100	MCL: 10	Pit 6
PCE	5	MCL: 5	B834, Pit 6, B830, B851 firing table
1,1,1-TCA	200	MCL: 200	B834, Pit 6, B851 firing table
TCE	5	MCL: 5	B834, Pit 6, HEPA, Pit 5, B854, B830, B832, B801 dry well, B833, B851 firing table
Freon 113	None	MCL: 1,200	B851 firing table
<i>Aromatic VOCs</i>			
Benzene	5	MCL: 1	B833
Toluene	1,000	MCL: 150	B834, Pit 6, HEPA, Pit 5, B833
Total xylenes	10	MCL: 1,750	HEPA, Pit 5
<i>Radionuclides</i>			
Tritium	None	MCL: 20,000 pCi/L	Pit 6, B850/Pits 3 & 5, B854
Uranium-238	20 pCi/L ^c	MCL: 20 pCi/L	B850/Pits 3 & 5, B854, B851 firing table
<i>High Explosive Compounds</i>			
HMX	None	None	HEPA
RDX	None	WQO: 0.3	HEPA
4-Amino-2,6-dinitrotoluene	None	None	HEPA
<i>Other:</i>			
Carbon disulfide	None	None	HEPA
Nitrate (as NO ₃)	None	MCL: 45,000	B834, Pit 6, HEPA, B850/Pits 3 & 5, B854, B830, B832, B801

**Table 2-2. MCLs and WQOs for contaminants of concern in ground water at Site 300.
(Cont. Page 2 of 2)**

Chemical of Concern	Federal MCL ($\mu\text{g/L}$)^a	State MCL or WQO ($\mu\text{g/L}$)^a	Operable Unit
Other: (cont.)			
Perchlorate	None	Action level: 18	Pit 6, HEPA, B850/Pits 3 & 5, Pit 1, B854, B830, B832
TBOS/TKEBS	None	None	B834

Notes:

DCA = Dichloroethane.

DCE = Dichloroethylene.

HEPA = High Explosives Process Area.

MCL = Maximum Contaminant Level.

PCE = Tetrachloroethylene.

TCA = Trichloroethane.

TCE = Trichloroethylene.

VOC = Volatile Organic Compound.

WQO = Water Quality Objective

^a **Units in $\mu\text{g/L}$ except where otherwise indicated.**

^b **MCL for total trihalomethanes.**

^c **Proposed MCL.**