

**DEPARTMENT OF TOXIC SUBSTANCES CONTROL**

REGION 2

900 HEINZ AVE., SUITE 200  
BERKELEY, CA 94710-2737

(510) 540-2122



February 7, 1995

*Rec'd  
2/9/95  
MEM*

Mr. Michael McClelland  
Engineering Field Activity, West  
Mail Code TD1MM  
900 Commodore Way  
San Bruno, California 94066-0720

Dear Mr. McClelland:

**STATE APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs)  
FOR HUNTERS POINT ANNEX, SAN FRANCISCO**

Pursuant to Section 7.6 of the Hunters Point Federal Facility Agreement (FFA), the Department of Toxic Substances Control is forwarding the enclosed ARARs for your consideration. The enclosed ARARs are from the Bay Area Air Quality Management District, Department of Health Services, and San Francisco Regional Water Quality Control Board.

Should you have any questions regarding this letter and would like to seek clarification, please call me at (510) 540-3821.

Sincerely,

Cyrs Shabahari  
Project Manager  
Office of Military Facilities

**Enclosures**

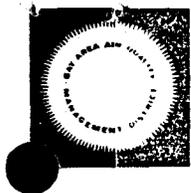
cc: US EPA  
Region IX  
Attn: Alydda Manglesdorf  
Mail Code H-9-2  
75 Hawthorne Street  
San Francisco, California 94105

Regional Water Quality Control Board  
Attn: Richard Hiett  
2101 Webster Street, Suite 500  
Oakland, California 94612



Mr. Michael McClelland  
February 7, 1995  
Page Two

cc: City and County of San Francisco  
Department of Public Health  
Attn: Amy Brownell  
101 Grove Street, Room 207  
San Francisco California, 94102



# BAY AREA AIR QUALITY MANAGEMENT DISTRICT

January 19, 1995

Mr. Cyrus Shabahari  
Project Manager, Office of Military Facilities  
Department of Toxic Substances Control  
Region 2  
700 Heinz Avenue, Suite 200  
Berkeley, California 94710-2737



Dear Mr. Shabahari:

The District staff has received your request to identify ARARs that may impact on the remedial actions at the Hunters Point Shipyard in San Francisco. At this preliminary stage of the cleanup process the staff cannot be certain of the District regulations that might apply. Those that seem most likely to be applicable are the following:

- Regulation 1-301: Public Nuisance
- Regulation 2-1 : Permits
- Regulation 2-2 : New Source Review
- Regulation 6 : Particulate Matter and Visible Emissions
- Regulation 7 : Odorous Substances
- Regulation 8-34 : Landfill Operations
- Regulation 8-40 : Aeration of Contaminated Soil and Removal of  
Underground Storage Tanks
- Regulation 8-47 : Air Stripping and Soil Vapor Extraction  
Operations
- Regulation 9-2 : Hydrogen Sulfide
- Regulation 11-1 : Lead

The Navy should be aware that additional District regulations may be applicable; this will depend on the precise nature of the remedial actions to be taken.

In any event, if the Navy is subject to more than one emission standard for the same air contaminant, the more stringent shall apply. In addition,

Mr. Cyrus Shabahari, DTSC

1-19-95

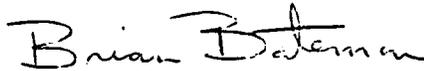
page 2

a risk screening analysis will be required for any proposed remedial activity(ies) that would cause the emission of significant amounts of toxic air contaminants. If the resulting risk exceeds one in a million, a more detailed analysis of risk may be required. Authority for these requirements is granted in Sections 40000 and 41700 of the California Health and Safety Code and in the BAAQMD Risk Management Policy (1991).

Authorities to Construct and Permits to Operate will be required for all activities impacted by applicable District Regulations.

If you have any questions, please feel free to call Ms. Catherine Fortney (415/749-4671) or Mr. Scott Lutz (415/749-4676).

Sincerely,



Brian Bateman  
Manager  
Air Toxics Evaluation Unit

# Memorandum

● : January 6, 1994

To : T-1  
Cyrus Shabahari  
Project Manager  
Office of Military Facilities  
Department of Toxic Substances Control, Region 2  
700 Heinz Avenue, Suite 200  
Berkeley, CA 94710-2723

From : Environmental Management Branch  
601 North 7th Street, MS-216  
P. O. Box 942732  
Sacramento, CA 94234-7320

Subject: Meeting on January 24, 1995 to discuss Hunters Point

● In your letter of December 28, 1994, to Ms. Terry Macaulay of the Department of Defense Program, you requested program staff to attend/participate at a meeting on January 24, 1995 to discuss Hunters Point. Because of prior commitments, we will be unable to attend the meeting.

We are submitting the attached document "Guidance for the Cleanup and Closing of Military Bases" for distribution and discussion at the meeting. The statements in the Summary on pages 17 and 18 identify areas which we believe should be addressed in any discussions of Applicable or Relevant and Appropriate Requirements pertaining to radioactive materials.

Should you have any questions, please call Mr. Claude Goode or Ms. Terry Macaulay at (916) 445-0498.

*Rufus B. Howell*  
Rufus B. Howell, Chief  
Environmental Health Services Section  
Environmental Management Branch

Attachment

● cc: See next page.

Cyrus Shabahari

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January 6, 1995

cc: Terry Macauly  
Associate Waste Management Engineer  
Department of Defense Program  
Department of Health Services  
601 North 7th Street

Claude Goode  
Associate Health Physicist  
Department of Defense Program  
Department of Health Services  
601 North 7th Street

Bill Watson  
Associate Health Physicist  
Department of Defense Program  
Department of Health Services  
4840 Market Street, Suite D  
Ventura, CA 93003

Don Diebert  
Senior Engineer  
Office of Military Facilities  
Department of Toxic Substances Control  
400 P Street  
P. O. Box 806  
Sacramento, CA 95812-0806

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
SAN FRANCISCO BAY REGION**

286-1255  
2101 WEBSTER STREET, SUITE 500  
OAKLAND 94612

Phone: (510)

Fax: (510) 286-1380  
BBS (510) 286-0404



Mr. Cyrus Shabahari  
DTSC  
700 Heinz Avenue  
Berkeley, CA 94710

January 18, 1994

**RE: Applicable or Relevant and Appropriate Requirements (ARARs) and To-Be-Considered (TBCs) Requirements for Hunter's Point Annex**

Dear Mr. Shabahari:

The following are ARARs and TBCs promulgated by this agency.

- Porter Cologne Water Quality Control Act
- Water Quality Control Plan, San Francisco Bay Region and Amendments
- Toxic Pits Cleanup Act of 1984
- The Safe Drinking Water and Toxic Enforcement Act of 1986
- SWRCB Sources of Drinking Water Policy
- Title 23 California Code of Regulations, Division 3, Chapters 15 and 16

Chapter 15, Discharges of Waste to Land  
Chapter 16, Underground Tank Regulations

- Solid Waste Assessment Test
- Other Standards, Requirements:
  - SWRCB Resolution 68-16 ( Non Degradation Policy),
  - SWRCB Resolution 92-49 ( Policies and Procedures for Investigation and Abatement of Discharges Under Water Code Section 13304),

Pretreatment Standards under the Clean Water Act,  
HP-ARARs &TBCs  
Page 2 of 2

A Compilation of Water Quality Goals

The Designated Level Methodology for Waste Classification and Cleanup Level  
Determination

Attached please find our State Board Legal Staff's Memorandum which further explains these requirements in detail. Please contact me if you would like to discuss the specific application of ARARs or TBCs on a particular site or parcel.

Sincerely,

A handwritten signature in black ink, appearing to read "Richard Hiatt", written in a cursive style.

Richard Hiatt

April 5, 1994

# GUIDANCE FOR CLEANUP OF RADIOACTIVITY ON CLOSING MILITARY BASES FOR UNRESTRICTED PUBLIC USE OF PROPERTY

Environmental Management Branch  
Division of Drinking Water and Environmental Management

Radiological Health Branch  
Division of Food, Drug and Radiation Safety

California Department of Health Services  
601 North 7th Street  
P.O. Box 942732  
Sacramento, CA 94234-7320

## 1. INTRODUCTION

- 1.1. This document presents guidance to assist interested parties in the evaluation of levels of environmental radioactivity on closing military bases and resulting radiation exposures to the general population. It provides direction on managing potential risks of cancer from radionuclides in the environment for purposes of site cleanup and decontamination associated with the cleanup of closing military bases so that the property can be utilized by the public. Reducing radiation exposure levels and minimizing cancer risks to the levels set forth in this discussion will be protective against other adverse health effects of radiation (*e.g.*, reproductive and developmental effects) that would be associated with environmental radioactive contamination.
- 1.2. The Department of Health Services (DHS) views it appropriate to maintain consistency with existing health-based standards whenever those standards exist. Hence, DHS believes that its drinking water standards for radionuclides are appropriate cleanup levels for water, as are the radon action level for indoor air, and the federal Environmental Protection Agency's (EPA's) standards for cleanup of residual radium in soil.

## 2. CLEANUP OF RADIOACTIVE SITES—BASIC PRINCIPLES

- 2.1. Documentation of the history of use, storage and disposal of radioactive material on the site should be complete.
  - 2.1.1. A site characterization document for the site should identify all past and current use, storage and disposal of radioactive material.
    - 2.1.1.1. The site characterization for radioactive material should begin with a review of the general and specific licenses from the US Nuclear Regulatory Commission (US NRC) and Department of Defense (DOD) permits for radioactive material on the site, and reports required pursuant to those licenses and permits.

2.1.1.2. The site characterization should include reviews of written histories and documents, and oral histories or interviews with current and past employees—including current and past base radiation safety officers—and others who would have historical insights into past activities using radioactive material.

2.1.1.3. The various military service branches within DOD have organizations that need to be contacted for consultation about characterization of the site, and for documentation of the historic use, storage, and disposal of radioactive material at the base in question. These include:

- The Air Force's Radioisotope Committee and Armstrong Laboratory at Brooks Air Force Base in Texas.
- The Army's Environmental Hygiene Agency at the Aberdeen Proving Ground, Maryland.
- The Army Corps of Engineers in Omaha, Nebraska.
- The Navy's Radiological Affairs Support Office in Yorktown, Virginia.

## 2.2. Cleanup of discrete radioactive items.

2.2.1. With the exception of standard commercial smoke detectors installed in buildings, all discrete items that are radioactive and known to be present should be removed. This includes, but is not limited to, (a) radioactive sources, (b) gauges, dials, knobs and other material painted with or containing radium or other radionuclides, (c) radionuclides in electronic equipment and instrumentation, and (d) materials containing depleted uranium. Examples of sources of radioactivity on military bases are presented in Table 2-1.

2.2.2. If radioactive items cannot be removed, unrestricted public use would not be an option for the property in question. The nature of restrictions to be placed on the property, as well as the future use of the site, would require deliberations by concerned parties.

## 2.3. Cleanup of diffuse radioactive contamination.

2.3.1. Radioactive contamination on the property that is diffuse should be removed to levels that would minimize the cancer risk to the exposed population, consistent with the guidance that follows in this document.

2.3.2. If diffuse radioactive contamination cannot be removed to levels that would minimize the cancer risk to the exposed population, unrestricted public use would not be an option for the property in question.

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**Table 2-1. Examples of sources of radioactivity on military bases.**

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The Department of the Army's Corps of Engineers distributed to its regional commands a memorandum (dated December 8, 1993) addressing awareness of radioactive materials used at DOD facilities. That memorandum pointed out that the DOD has issued over 2800 different types of instruments and articles containing radioactive materials, and that radioactive contamination may exist in materials in base supply warehouses, or in shops used for the manufacture, repair or maintenance of such articles. The memorandum also points out that "during the 1940s, 1950s, and 1960s, on-base burial, sometimes in radioactive waste disposal cells and often in on-base landfills, was a reasonable and acceptable disposal technique." That memo plus other information from DOD point out a number of sources of radioactivity that may be found on military bases:

- a. Radium dials, gauges, and illuminators were used extensively in military applications, and represent the most common and the greatest radioactive health and environmental hazard found on bases. Examples include luminous dials on a variety of components used in navigation and communication, and on watch dials, weapons sights, and compasses. To illustrate this point, about half a million deck markers (each with about 20 microcuries of radium-226 or strontium-90) were made for and used by the Navy in 1952. The decommissioning of the Battleships Iowa, Missouri, and New Jersey resulted in the removal of about 1,200 radium-226 components from each vessel. As another example, the equipment utilized for mobile ground control approach (GCA) radar systems contained extensive amounts of radium-226 in readily accessible components such as knobs, dials, and gauges. Some of this GCA equipment had a component that contained up to 5,000 microcuries of radium-226.
  - b. Depleted uranium used in armor and armor piercing ordnance, as well as in shipping containers for use in sealed source radiography.
  - c. Tritium as a source of illumination, especially for exit signs.
  - d. Thorium as a component in lenses to enhance the optical quality, and in magnesium-thorium metal used for machinery, aircraft and rocket parts, plus welding rods used in thick metal welding.
  - e. Hospital and research facilities used tritium and carbon-14 in liquid scintillation counting. Liquid scintillation counting fluids contain xylene or toluene which are hazardous wastes.
  - f. Washdown areas for contaminated equipment (*e.g.*, aircraft and ships) used in association with or in monitoring above-ground nuclear weapons tests.
  - g. Calibration sources for radiation survey instruments.
  - h. Hospital sources used in diagnostic techniques and for radiation therapy procedures, plus sources used in research facilities.
  - i. Sources used in radiography.
  - j. Gauges used to measure the level, thickness, or the density of an object of interest.
  - k. Sources known as commodities which are used extensively as components for weapons systems and within navigation and communication equipment.
  - l. Low-level radioactive waste from reactor and primary plant maintenance and repair, weapons processing, and associated with some of the sources mentioned above.
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### 3. CHEMICAL CARCINOGEN EXPOSURES—REGULATORY PERSPECTIVE

3.1. Carcinogenic chemical substances that are released into the environment are regulated for the protection of public health to strict standards in non-occupational settings. Regulatory levels are established to limit the cancer risk. Cancer risk is expressed in terms of "excess" cancer cases, that is, those that exceed the cancer cases that would normally occur in a given population (i.e., about 25 to 30%).

3.1.1. The lower end of the range (one excess case of cancer in a population of 1,000,000 people exposed for a 70-year lifetime, the so-called " $10^{-6}$ " risk) is the usual regulatory goal, though costs and technical feasibility may lead to the higher end of the range (one excess case of cancer in an exposed population of 10,000 people exposed for a 70-year lifetime (the " $10^{-4}$ " risk).

3.1.1.1. Human exposures to chemical carcinogens that would result in lifetime cancer risks below the  $10^{-6}$  risk are often referred to as posing a "*de minimis*" risk, and are usually do not receive much regulatory attention, although public health agencies often seek to reduce exposures that result in risks of this magnitude, as well.

3.1.1.2. Human exposures to chemical carcinogens that would result in lifetime cancer risks greater than one excess case of cancer in a population of 100,000 people (the  $10^{-5}$  risk), if allowed by regulatory agencies, could be required to be accompanied by warnings or notices to the exposed population. For example, see California Health and Safety Code §25249.5, *et seq.* or §44300, *et seq.*

3.1.1.3. Risks of  $10^{-4}$  may be allowed by federal and state regulatory agencies if there is an offsetting public health benefit (e.g., the cancer risk from exposure to byproducts of drinking water chlorination), or if the costs of cleanup to a lower risk level are considered excessive, when compared to the benefit.

3.1.1.4. Human exposures to chemical carcinogens that would result in cancer risks to the general population (non-occupational exposures) greater than the  $10^{-4}$  risk level are generally not allowed by federal and state regulatory agencies.

3.2. The US EPA's *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Interim Final* (October 1988), has as a step in the evaluation process, a determination as to "[w]hether the remediation goals for all carcinogens of concern . . . provides protection within the risk range of  $10^{-4}$  to  $10^{-7}$ ." (page 4-15). The lower end of this range is a lifetime cancer risk of one excess case of cancer per 10,000,000 people.

In *Risk Assessment Guidance for Superfund: Volume I—Human Health Evaluation Manual (Part B, Development of Risk-based Preliminary Remediation Goals), Interim* (December 1991), the US EPA states that “action is generally warranted at a site when the cumulative carcinogenic risk is greater than  $10^{-4}$ . . .,” and that preliminary remediation goals are “not needed for any chemicals in a medium with a cumulative cancer risk of less than  $10^{-6}$ .” When the cancer risk for a medium is “within the range of  $10^{-6}$  to  $10^{-4}$ , a decision about whether or not to take action is a site-specific determination.” (page 15).

3.3. The DOD's Base Realignment and Closure (BRAC) Cleanup Plan Guidebook (Fall, 1993) identifies “areas of contamination below action levels” for carcinogens (page 4-52) as areas that “risk estimates completed for contamination do not do the following:”

- Exceed  $10^{-6}$  for any carcinogenic hazardous substance or petroleum constituent detected in any medium.
- Exceed  $10^{-6}$  for all carcinogenic hazardous substances and petroleum constituents, taken together, in any exposure pathway.
- Exceed  $10^{-4}$  for all carcinogenic hazardous substances and petroleum constituents accumulated across all pathways.

3.3.1. The DOD BRAC Cleanup Plan Guidebook states: “At present, sites exhibiting a cancer risk of  $10^{-4}$  or greater are considered unacceptable, and require action to protect human health. Sites with cancer risks below  $10^{-6}$  are considered acceptable, and are likely candidates for NFA [no further action]. Sites exhibiting risks between these two values require the exercise of considerable professional judgment on a site-by-site basis. . . . The classification of the carcinogens, and the likelihood of the exposure assumptions and the future land use scenarios should be considered in site-specific interpretations of the risk estimate. The result will facilitate the identification of site-specific solutions and actions that are appropriate for each site to protect human health and the environment. However, consistency across a given installation is desirable and a general consistent installation-wide approach to cost/benefit analysis of remedial alternatives will facilitate application of risk management policies.” (page 4-71).

3.3.2. The DOD continues: “Examples [of sites that require special consideration] are sites . . . where a proven human (class A) carcinogen is present, resulting in lower acceptable risk estimates.” (page 4-71).

3.3.2.1. The US EPA has designated all radionuclides to be Class A carcinogens, “based on their property of emitting ionizing radiation and on the extensive weight of epidemiological evidence of radiation-induced cancer in humans.” (US EPA, *Risk Assessment Guidance for*

*Superfund: Volume I—Human Health Evaluation Manual (Part B, Development of Risk-based Preliminary Remediation Goals), Interim, December 1991, page 33.)*

#### 4. RADIATION EXPOSURES—CANCER RISK AND EXPOSURE LIMITS

4.1. Radiation standards are established or recommended by a number of agencies, including the US EPA, the NRC, the National Academy of Sciences/National Research Council (NAS/NRC), the National Council for Radiation Protection and Measurements (NCRP), the International Council for Radiological Protection (ICRP), and the California Department of Health Services (DHS). These groups utilize a linear dose/effect relationship for the estimate of radiation effects, extrapolating to low exposures from the high exposures that are associated with human radiogenic cancer.

4.1.1. Lifetime cancer risk from radiation exposure is estimated in the NAS/NRC's *Health Effects of Exposure to Low Levels of Ionizing Radiation*, BEIR V (Table 4.4, Page 176, NAS/NRC, 1990) to be 520 and 600 excess cancer deaths per 100,000 for males and females, respectively, for a continuous exposure of 1 milligray per year (100 millirads per year). From these values, an estimated lifetime risk of  $6 \times 10^{-5}$  per mrad/yr results. Hence, 0.016 mrad/yr would yield a lifetime cancer risk of  $1 \times 10^{-6}$ , and 1.6 mrad/yr would yield a lifetime cancer risk of  $1 \times 10^{-4}$ .

4.1.2. The NRC, in its 1990 Below Regulatory Concern Policy Statement, based on reports by the United Nations Scientific Committee on the Effects of Atomic Radiation and ICRP, cited an annual cancer risk of  $5 \times 10^{-7}$  per mrem/yr, or a lifetime (70-yr) risk of  $3.5 \times 10^{-5}$ . From this risk, an exposure of 0.028 mrem/yr would result in a lifetime cancer risk of  $1 \times 10^{-6}$ , and 2.8 mrem/yr would result in a lifetime cancer risk of  $1 \times 10^{-4}$ . The estimates of cancer risk per exposure are helpful for purposes of this guidance. In 1993, NRC abandoned its Below Regulatory Concern Policy Statements.

4.1.3. The NCRP, in *Limitation of Exposure to Ionizing Radiation*, (Table 7.1, Report No. 116, 1993) presents estimates of  $5 \times 10^{-2}$  excess fatal cancers per sievert (100 rem) and  $1 \times 10^{-2}$  excess non-fatal cancers per sievert, based on NCRP and ICRP reports. These can be summed to equal  $6 \times 10^{-2}$  per sievert, or  $6 \times 10^{-2}$  per 100 rem, or, with a linear assumption,  $6 \times 10^{-7}$  per mrem. From this, an annual exposure of 1 mrem each year for 70 yr would result in a lifetime risk of  $4.2 \times 10^{-5}$  excess cases of cancer. From this, an annual exposure of 0.024 mrem would result in a lifetime cancer risk of  $1 \times 10^{-6}$ , and 2.4 mrem would result in a lifetime cancer risk of  $1 \times 10^{-4}$ .

4.2. Based upon the doses and risk estimates presented above, lifetime cancer risks can be approximated for various lifetime annual radiation exposures, as presented in Table 4-1.

4.2.1. The current radiation standard for workers is 5,000 mrem/yr.

- 4.2.2. Current federal and state standards for members of the general public include 100 mrem/yr for members from all radiation sources, 25 mrem/yr from nuclear power operations or radioactive waste, 10 mrem/yr from airborne radionuclide emissions, 4 mrem/yr from radionuclides in drinking water.

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**Table 4-1. Lifetime (70-year) cancer risks and corresponding annual radiation exposures.** For purposes of conversion among risk levels, the exposure/risk relationship is assumed to be linear.

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Lifetime cancer risk	Annual radiation exposure (mrem/yr)
10 <sup>-2</sup>	200
10 <sup>-3</sup>	20
10 <sup>-4</sup>	2
10 <sup>-5</sup>	0.2
10 <sup>-6</sup>	0.02

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- 4.2.2.1. Current standards are for federal operations (*i.e.*, Department of Energy facilities), or for permitted operations that are regulated by federal or state agencies (*i.e.*, US NRC, US EPA, or the California DHS).

4.2.2.1.1. As described by the NRC in 1992, its criteria for acceptable levels of radioactive contamination associated with cleanup are inconsistent and not binding on NRC licensees.

- 4.4.2.2. Standards related to the cleanup of radioactive contamination and restoration of sites are under development by the US NRC and the US EPA. The NRC's proposed regulations are to be available in spring of 1994, and EPA's, later in 1994.

- 4.4.2.3. Existing California law (California Health and Safety Code §25249.5, *et seq.*) requires warnings for exposure to radionuclides and may limit discharges of radioactivity to sources of drinking water if lifetime cancer risks exceed 10<sup>-5</sup>.

## 5. BENEFITS OF A COMMON APPROACH TO REGULATING ENVIRONMENTAL CARCINOGENICITY

- 5.1. A uniform, risk-based approach to dealing with radioactive materials and with chemical carcinogens would enable regulators and the public to ensure that environmental cleanup is targeting the exposures that pose the greatest carcinogenic risk.
- 5.2. A uniform approach would enable radioactive materials on closing military bases to be addressed in the same manner as chemical carcinogens (see Section 3.2, above).
  - 5.2.1. Such an approach allows comparisons of sites based on cancer risk, no matter whether concerns are radiation-related, chemical-related, or both.
  - 5.2.2. Such an approach provides a basis prioritization of sites based on cancer risk, for purposes of resource utilization.
  - 5.2.3. Such an approach provides for consistency in dealing with carcinogenic substances, since the focus is on the risk, and not the source of the risk (e.g., radiation vs. chemical).
  - 5.2.4. In determining the overall health risk to the public from environmental exposures, the total cancer risk from radioactive and non-radioactive materials should be considered in the evaluative process.
- 5.3. Currently, the regulation of radiation exposures to minimize cancer risk, when compared with the regulation of exposures to carcinogenic chemical contaminants and expressed in terms of permitted lifetime risk, is generally less restrictive (see Table 5-1).
- 5.4. The establishment of standards to limit radiation exposures to the same cancer risk level used in the regulation of chemical exposures would require that the standards be between 0.02 millirem per year and 2 millirems per year.
  - 5.4.1. These limits would be applied to environmental contamination that results in radioactivity ingested or inhaled by a person and from external irradiation from that contamination (e.g., air, water, and ingested soil, and external exposures from contaminated soil).
  - 5.4.2. Exposures would be in excess of background levels of radioactivity in water, soil, and air, as discussed in below.

**Table 5-1. Comparison of lifetime cancer risks and annual radiation exposures, with notes on selected standards.<sup>1</sup>**

<u>Chemical standard</u>	<u>LIFETIME CANCER RISK or ANNUAL RADIATION EXPOSURE</u>	<u>Radiation standard</u>
	10,000 mrem/yr	
	10 <sup>-1</sup>	Workplace limit (5,000 mrem/yr)
Cancer risk at occupational limit—vinyl bromide	1,000 mrem/yr	
Cancer risk at occupational limit—p-toluidine	10 <sup>-2</sup>	
Cancer risk at occupational limit for several chemicals (acrylamide, amitrole, carbon tetrachloride, chloroform, o-toluidine)	100 mrem/yr	NRC/DOE limit—all sources (100 mrem/yr) EPA action level for radon in indoor air (4 pCi/l)
	10 <sup>-3</sup>	EPA limit—Nuclear Power Operations (25 mrem/yr) NRC limit—Radioactive Waste (25 mrem/yr)
	10 mrem/yr	EPA limit—Air (10 mrem/yr) EPA limit—Drinking Water (4 mrem/yr)
Upper limit—public (non-occupational) exposures to chemical carcinogens (e.g. trihalomethanes as byproducts of drinking water disinfection)	10 <sup>-4</sup>	
	1 mrem/yr	NCRP Negligible individual dose (1 mrem/yr)
California Proposition 65 standard <sup>2</sup> ; Air "Toxic Hot Spots" notification requirement	10 <sup>-5</sup>	
	0.1 mrem/yr	
"De minimis" level for exposures to chemical carcinogens—usually not regulated below this level (e.g., California Recommended Public Health Levels for drinking water)	10 <sup>-6</sup>	
	0.01 mrem/yr	
	10 <sup>-7</sup>	

<sup>1</sup>Lifetime cancer risk for radiation exposures is estimated to be  $4.2 \times 10^{-5}$  excess cases of cancer for an annual exposure of 1 mrem each year for 70 years. For chemical carcinogens, cancer risk is estimated by methods utilized by the US EPA and other federal regulatory agencies, and by State of California regulatory agencies. The methods are generally consistent, though for certain chemicals, the specific risk may differ among different federal and state agencies. Radiation standards from US EPA, *Issues Paper on Radiation Site Cleanup Regulations*, EPA 402-R-93-084, September 1993. Cancer risks from occupational exposures are taken from the US Occupational Safety and Health Administration's Final Rule on Air Contaminants 29 CFR Part 1910, Section 15, "Substances for which limits are based on avoidance of cancer." *Federal Register* 54: 2668 (1989).

<sup>2</sup>Includes radionuclides.

## 6. BACKGROUND RADIATION CONSIDERATIONS

- 6.1. Radiation from natural sources in the environment results in external and internal radiation exposures to people. This is usually around 300 mrem/yr. Long-lived fission products deposited as world-wide fallout from historic above-ground testing of nuclear weapons also contribute to the global environmental radioactivity burden and to ambient background radiation.
- 6.2. Recommended cleanup levels are exclusive of location-specific ambient background radioactivity. For purposes of this document, "ambient" includes radioactivity from global fallout associated with above-ground nuclear weapons testing, and radioactivity from natural origins within (1) building materials such as bricks and aggregate, and (2) fertilizers.
- 6.3. Resulting cancer risks are those that result from radiation exposures in excess of background exposures.
- 6.4. Cleanup of a particular radionuclide need not be to levels below its background concentration for a given site or medium.
- 6.5. Determination of background radiation levels is an important part of the site characterization process, when embarking on a cleanup of a radionuclide contaminated site.

## 7. DETERMINATION OF RADIONUCLIDE CONCENTRATION LIMITS AND EXTERNAL RADIATION EXPOSURES

- 7.1. The following default assumptions should be used in determining exposures to radionuclide contaminated soil, water, or air, unless scientifically more appropriate values can be justified:
  - 7.1.1. Drinking water consumption: 2 liters per day.
  - 7.1.2. Air inhalation: 20 cubic meters per day.
  - 7.1.3. Soil ingestion: 0.1 gram per day.
  - 7.1.4. Lifespan: 70 years (25,500 days).
  - 7.1.5. Residence time on soil: 70 years.
- 7.2. In determining radiation exposures, the dosimetric monitoring, documentation and calculations should be clearly shown and references should be appropriately identified. Any method or methods that are utilized in the determination of radiation exposure and dose calculation should follow the hierarchy of methods set forth in Section 8.
- 7.3. Dose calculations and risk should be based on the tissue or organ of concern—that is, the tissue or organ that received the greatest committed dose equivalent per unit of radioactivity intake. Where there is no specific target tissue or organ, the total body should be the tissue or organ of concern, and the total effective dose equivalent should be used.

## 8. METHODS OF ANALYSIS FOR RADIONUCLIDES IN ENVIRONMENTAL MEDIA AND EXTERNAL RADIATION EXPOSURES

- 8.1. "Method of analysis" or "methods of analysis" refer to the method or methods of detection of radiation exposure or detection and calculation of radiation exposure or of a radionuclide in a particular environmental medium, including but not limited to, water, air, soil, or food.
  - 8.1.1. Included herein are methods and procedures concerning the number of samples and the frequency and site of sampling that are appropriate for the monitoring of radioactivity in environmental media or external radiation exposures.
  - 8.1.2. The calculations of dose, dose equivalence, or other expressions of absorption of deposited energy associated with the interaction of ionizing radiation with biological cells, tissues, organs, etc., are also considered to be within the realm of "method of analysis."
- 8.2. In performing an analysis to determine external radiation exposures of a contaminated site, or background external radiation exposures, generally accepted standards and practice, including, but not limited to, radiation monitoring, location and frequency of sampling, equipment, collection of data, statistical analysis, interpretation of results, modeling and dose calculations should be observed.
- 8.3. In performing an analysis to determine the concentration of a given radionuclide in a given environmental medium, or the background concentration of that radionuclide in that medium, generally accepted standards and practice, including, but not limited to, location and frequency of sampling, sample collection, numbers of samples, sample storage, and preparation, radiochemical analysis, statistical analysis, interpretation of results, modeling and dose calculations should be observed.
- 8.4. Complete written documentation should be maintained for all procedures, including but not limited to, frequency and location of sampling, types of dosimeters and instrumentation used, sample collection, sample handling and chain of custody, storage, and preparation, analyses, and dose calculations.
- 8.5. The following is the hierarchy that is to be utilized in establishing the method or methods of analysis to be used for the evaluation of environmental radioactivity, for purposes of describing radioactive contamination and for establishing background radiation levels.
  - 8.5.1. If the California DHS has adopted or employs a method of analysis for external radiation exposures or for a radionuclide in a specific medium, that method is the appropriate method of analysis. If more than one method of analysis has been adopted or is employed by DHS, each may be used as a method of analysis.

- 8.5.1.1 The DHS's Radiologic Health Branch's Policy Memorandum "Clearance Inspection and Survey", Policy No. IPM-88-2, effective September 15, 1991, identifies the procedure to verify that a facility in which licensed materials were used has been decontaminated to acceptable levels and to assure that the facility will not present a radiation hazard to future occupants.
- 8.5.2. If DHS has not adopted or does not employ a method of analysis, a method of analysis for external radiation exposures or for a radionuclide in a specific medium adopted or employed by another state or local agency (e.g., the Department of Toxic Substances Control, the Air Resources Board, a local air pollution control district, the State Water Resources Control Board or a Regional Water Quality Control Board) is the appropriate method of analysis. If more than one method of analysis has been adopted or is employed by another state or local agency, each may be used as a method of analysis.
- 8.5.3. If no state or local agency has adopted or employs a method of analysis, a method of analysis for external radiation exposures or for a radionuclide in a specific medium adopted or employed by a federal regulatory agency (e.g., the US EPA, or the US NRC) is the appropriate method of analysis. If more than one method of analysis has been adopted or is employed by a federal regulatory agency, each may be utilized as a method of analysis.
- 8.5.3.1. The DOD BRAC Cleanup Guide (page 4-55) directs BRAC Cleanup Teams to review data in accordance with the outline given in section 5 of the US EPA guidance document *Guidance for Data Usability in Risk Assessment*.
- 8.5.3.2. The document *Residual Radioactive Contamination from Decommissioning, Technical Basis for Translating Contamination Levels to Annual Total Effective Dose Equivalent, Final Report*, by W. E. Kennedy, Jr., and D. L. Strange, NUREG/CR-5512, PNL-7994, Vol. 1, October 1992 (reprinted January 1993), provides generic and site-specific estimates of radiation dose for exposures to residual radioactivity after facilities decommissioning. It was prepared for the NRC's Office of Regulatory Applications.
- 8.5.4. If no regulatory agency has adopted or employs a method of analysis, a method of analysis for external radiation exposures or for a radionuclide in a specific medium that is generally accepted by the scientific community—as evidenced by its publication in compilations by professional and scientific associations or societies, in peer-reviewed technical journals published by such associations or societies, or in technical documents prepared for government regulatory agencies—is the appropriate method of analysis. If more than one method of analysis has been generally accepted by the scientific community, each may be utilized as a method of analysis.

## 9. USE OF DRINKING WATER STANDARDS AS LIMITS OF RADIATION EXPOSURE

9.1. Whenever a source of drinking water is contaminated with a radionuclide, cleanup of an area should be to a concentration resulting in a cancer risk level lower than  $10^{-6}$  to  $10^{-4}$ , except as noted below.

9.1.1. Whenever a source of drinking water is contaminated with a radionuclide for which a specific drinking water maximum contaminant level (MCL) exists, cleanup need not be more restrictive than the MCL for that radionuclide for purposes of protecting public health.

9.1.1.1. California drinking water MCLs exist for the following radionuclides:

- Hydrogen-3 (The California MCL is 20,000 pCi/l)
- Strontium-90 (8 pCi/l)
- Radium-226 and radium-228, combined (5 pCi/l)
- Natural uranium (20 pCi/l—based on chemical toxicity)

9.1.2. Discharges or releases of radioactivity into sources of drinking water may be subject to other regulation and enforcement and should be limited accordingly.

## 10. USE OF CURRENT ACTION LEVEL FOR RADON IN INDOOR AIR

10.1 The action level of 4 picocuries of radon per liter of air applies to residential indoor air, consistent with State and federal law.

## 11. USE OF FEDERAL STANDARDS FOR RADIUM IN SOILS

11.1 The Uranium Mill Tailings Radiation Control Act (UMTRCA) and regulations in 40 CFR 192 provide guidance for the cleanup of Department of Energy uranium mill tailing sites for unrestricted use. They state that a site must achieve a concentration of less than 5 pCi of radium per gram above the typical background level for the top 15 centimeters of soil. At depths greater than 15 cm, however, the maximum concentration of radium can be up to 15 pCi/g.

11.1.1. These standards are appropriate for use in situations involving radium contaminated soils, in the absence of other federal guidance. However, they do not apply to soil contaminated by spills or disposal of radium paint, or to radium-containing dials, knobs and gauges that are present in soil.

11.2 Section 11.1 notwithstanding, the NRC and EPA are developing guidance documents for the cleanup of residual radioactivity for property intended for unrestricted use.

## 12. HEALTH RISKS FROM URANIUM

- 12.1 In evaluating the human health concerns from uranium exposures, the risks associated with uranium's chemical toxicity (principally to the kidneys) may exceed the risks related to its radioactivity. Hence, each endpoint should be evaluated as cleanup options are being considered.

## 13. CALCULATIONS OF RADIATION EXPOSURES THAT RESULT FROM SELECTED RADIONUCLIDES IN WATER, AIR AND INGESTED SOIL

- 13.1. Comparison of concentrations of selected radionuclides in water, air and soil with various cancer risk levels ( $10^{-6}$ ,  $10^{-5}$ , or  $10^{-4}$  lifetime cancer risk).

13.1.1. Table 13-1.1 presents various intake levels of selected radionuclides and the corresponding lifetime cancer risk from ingested contaminated water. Intakes from water to yield the various lifetime cancer risks are calculated from US EPA's Health Effects Assessment Summary (January 1992). The risk per pCi from US EPA is converted to pCi ingested for a specific cancer risk, divided by (365 days/yr x 70 yr =) 25,550 days, for a daily intake. This value is divided by 2 liters per day to yield corresponding radionuclide concentrations in ingested water.

Table 13-1.1. Concentrations of specific radionuclides in drinking water that would yield various lifetime cancer risks. The drinking water consumption rate is two liters per day for 70 years.

Radionuclide	Lifetime Cancer Risk:		
	$10^{-6}$ (pCi/l)	$10^{-5}$ (pCi/l)	$10^{-4}$ (pCi/l)
Hydrogen-3	370	3,700	37,000
Carbon-14	22	220	2,200
Cobalt-60	1.3	13	130
Strontium-90	6	60	600
Iodine-131	0.55	5.5	55
Cesium-137	0.7	7	70
Radium-226	0.16	1.6	16
Uranium-238	1.3	13	130
Plutonium-239	0.085	0.85	8.5

13.1.2. Table 13-1.2 presents various intake levels of selected radionuclides and the corresponding lifetime cancer risk from inhaling contaminated air. Intakes from air to yield the various lifetime cancer risks are calculated from US EPA's Health Effects Assessment Summary (January 1992). The risk per pCi from US EPA is converted to pCi inhaled for a specific cancer risk, divided by (365 days/yr x 70 yr =) 25,550 days, for a daily intake. This value is divided by 20 cubic meters per day to yield corresponding radionuclide concentrations in inhaled air.

**Table 13-1.2. Concentrations of specific radionuclides in air that would yield various lifetime cancer risks. The inhalation rate is 20 cubic meters of air per day for 70 years.**

Radionuclide	Lifetime Cancer Risk:	10 <sup>-6</sup> (pCi/m <sup>3</sup> )	10 <sup>-5</sup> (pCi/m <sup>3</sup> )	10 <sup>-4</sup> (pCi/m <sup>3</sup> )
Hydrogen-3		26	260	2,600
Carbon-14		320	3,200	32,000
Cobalt-60		0.01	0.1	1
Strontium-90		0.04	0.4	4
Iodine-131		0.08	0.8	8
Cesium-137		0.11	1.1	11
Radium-226		0.00065	0.0065	0.065
Uranium-238		0.00008	0.0008	0.008
Plutonium-239		0.00005	0.0005	0.005

13.1.3. Table 13-1.3 presents various intake levels of selected radionuclides and the corresponding lifetime cancer risk from ingested soil. Intakes from soil to yield the various lifetime cancer risks are calculated from US EPA's Health Effects Assessment Summary (January 1992). The risk per pCi from US EPA is converted to pCi ingested for a specific cancer risk, divided by (365 days/yr x 70 yr =) 25,550 days, for a daily intake. This value is divided by 0.1 gram per day, to yield corresponding radionuclide concentrations in ingested soil.

**Table 13-1.3. Concentrations of specific radionuclides in ingested soil that would yield various lifetime cancer risks. The ingestion rate is 0.1 gram of soil ingested per day for 70 years.**

Radionuclide	Lifetime Cancer Risk:		
	10 <sup>-6</sup> (pCi/g of soil)	10 <sup>-5</sup> (pCi/g of soil)	10 <sup>-4</sup> (pCi/g of soil)
Hydrogen-3	7,400	74,000	740,000
Carbon-14	430	4,300	43,000
Cobalt-60	26	260	2,600
Strontium-90	120	1,200	12,000
Iodine-131	11	110	1,100
Cesium-137	14	140	1,400
Radium-226	3.2	32	320
Radium-228	3.9	39	390
Uranium-238	25	250	2,500
Plutonium-239	0.17	1.7	17

## 14. CALCULATIONS OF EXTERNAL RADIATION EXPOSURES RESULTING FROM RADIONUCLIDES IN SOIL

14.1. Radionuclides in soil, besides presenting an opportunity for human exposure via the pathway of soil ingestion, can also result in human exposures from external radiation, owing to emissions related to their radiologic decay. Table 14-1 presents various concentrations of selected radionuclides and the corresponding lifetime cancer risk from external exposures (10<sup>-6</sup>, 10<sup>-5</sup>, or 10<sup>-4</sup> lifetime cancer risk).

**Table 14-1. Lifetime cancer risks from external exposures to radionuclides in soil. Lifetime cancer risks from radionuclides in soil are calculated from US EPA's Health Effects Assessment Summary (January 1992). The annual risk per pCi/g from US EPA is converted to lifetime risk by dividing the annual risk by 70 years.**

Radionuclide	Lifetime Cancer Risk:		
	10 <sup>-6</sup> (pCi/g of soil)	10 <sup>-5</sup> (pCi/g of soil)	10 <sup>-4</sup> (pCi/g of soil)
Hydrogen-3	—	—	—
Carbon-14	—	—	—
Cobalt-60	0.002	0.02	0.2
Strontium-90	—	—	—
Iodine-131	0.01	0.1	1
Cesium-137*	0.007	0.07	0.7
Radium-226*	0.002	0.02	0.2
Radium-228*	0.005	0.05	0.5
Uranium-238*	0.4	4	40
Plutonium-239	840	8,400	84,000

\*includes risks from radioactive decay chain products

## 15. SUMMARY

15.1. For closing military bases, the following should occur:

15.1.1. A complete history of the use, storage, and disposal of radioactive material should be documented. Where information is lacking, the discussion should identify the extent in information gaps.

15.1.2. Known discrete radioactive items should be removed.

15.1.3. Diffuse radioactive contamination should be removed to a level that minimizes the risk of exposure to people.

15.2. Cleanup levels can rely upon appropriate existing standards for water, air, and soil.

15.2.1. Cleanup of radioactivity in water need not be more restrictive than drinking water MCLs for radionuclides.

15.2.2. Radon in indoor air need not be considered of concern at concentrations below the federal and state radon action levels of 4 pCi radon per liter of air.

15.2.3. In the absence of federal regulation, cleanup of radium in soil need not be more restrictive than 5 pCi/g for the top 15 cm of soil, consistent with EPA rules for cleanup of uranium mill tailings.

15.3. For areas that are intended to have unrestricted use upon release to the public, exposures from radionuclide contamination associated with radionuclides other than those identified in 15.2, should not result in a cancer risk in excess of  $10^{-6}$  to  $10^{-4}$ , and should be consistent with the cancer risks resulting from residual chemical carcinogens.

15.3.1. The corresponding limit on the cancer risk for areas that are intended to be unrestricted upon release to the public corresponds to the annual radiation exposures of from about 0.02 to 2 millirems per year.

15.3.2. The annual radiation exposure of from 0.02 to 2 millirems per year for areas that are intended to be unrestricted upon release to the public is in excess of background radiation exposures.

15.3.3. Pursuant to existing California law, exposures that result in cancer risks greater than  $10^{-5}$  may require the property owner to provide warnings to the public.

15.4. The method or methods of analysis for external radiation exposures and for external ambient background radiation exposures should be scientifically appropriate, and consistent with existing regulations or guidelines.

- 15.5. The method or methods of analysis for a radionuclide in a specific medium and for the ambient background concentration of a radionuclide in that medium should be scientifically appropriate, and consistent with existing regulations or guidelines.
- 15.6. For exposures from radionuclide contamination associated with radionuclides other than those identified in 15.2, the following applies: If the  $10^{-6}$  to  $10^{-4}$  cancer risk limit corresponds to a radiation exposure that is below background radiation exposures, cleanup should be to the level of non-detection (*i.e.*, to background levels).
- 15.6.1. If the cancer risk limit corresponds to a radiation exposure that is below background radiation exposures, then an external radiation exposure from radioactive contamination that is greater than background, using appropriate radiation monitoring and statistical methodologies, exceeds the limit. This finding should prompt further cleanup and reevaluation of whether the property is to be released for unrestricted use.
- 15.6.2. If the cancer risk limit corresponds to a concentration of radionuclide contamination in a given medium that is below the background concentration of that radionuclide in that medium, then a concentration of the radionuclide in a medium that is greater than its background concentration in that medium, using the appropriate method of analysis including appropriate statistical methods, exceeds the limit. This finding should prompt further cleanup and reevaluation of whether the property is to be released for unrestricted use.

## 16. REFERENCES

California Code of Regulations Title 22 Chapter 3. Safe Drinking Water and Toxic Enforcement Act of 1986, §12000 *et seq.* List of substances subject to the Act and implementing regulations.

California Department of Health Services, Radiologic Health Branch, Policy Memorandum "Clearance Inspection and Survey", Policy No. IPM-88-2, effective September 15, 1991.

California Health and Safety Code §25249.5, *et seq.*, the Safe Drinking and Toxic Enforcement Act of 1986 ("Proposition 65").

California Health and Safety Code §44300, *et seq.*, Air Toxics "Hot Spots" Information and Assessment Act of 1987.

Department of the Army, Corps of Engineers, Memorandum to Regional Commands Re: Awareness of Radioactive Materials Used at Department of Defense Facilities, December 8, 1993.

Department of Defense, Base Realignment and Closure (BRAC) Cleanup Plan (BCP) Guidebook, Fall 1993.

National Academy of Sciences/National Research Council, *Health Effects of Exposure to Low Levels of Ionizing Radiation*, BEIR V, NAS/NRC, 1990.

National Council on Radiation Protection and Measurements, *Limitation of Exposure to Ionizing Radiation*, NCRP Report No. 116, NCRP, 1993.

US Environmental Protection Agency, *Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, Interim Final*, EPA 540-G-80-804, October 1988.

US Environmental Protection Agency, *Risk Assessment Guidance for Superfund: Volume I—Human Health Evaluation Manual (Part B, Development of Risk-based Preliminary Remediation Goals)*, *Interim*, (December 1991), EPA/540/R-52/003, December 1991.

US Environmental Protection Agency, Health Effects Assessment Summary, Table 4A, Radionuclide Carcinogenicity—Slope Factors (in Units of Picocuries), January 1992.

US Environmental Protection Agency, *Issues Paper on Radiation Site Cleanup Regulations*, EPA 402- -93-084, September 1993.

US Occupational Safety and Health Administration, Final Rule on Air Contaminants, 29 CFR Part 1910, Section 15, "Substances for which limits are based on avoidance of cancer," *Federal Register* 54: 2668, 1989.

US Nuclear Regulatory Commission, Below Regulatory Concern Policy Statement, 1990 (Withdrawn by NRC in 1993).

US Nuclear Regulatory Commission, A Summary of NRC's Interim Radiological Cleanup Criteria and Current Dose Bases, Decommissioning and Regulatory Issues Branch, November, 1992.

US Nuclear Regulatory Commission, *Residual Radioactive Contamination from Decommissioning, Technical Basis for Translating Contamination Levels to Annual Total Effective Dose Equivalent, Final Report*, by W. E. Kennedy, Jr., and D. L. Strange, NUREG/CR-5512, PNL-7994, Vol. 1, October 1992 (reprinted January 1993).

**m o r a n d u m**

To : Executive Officers  
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Date: July 14, 1992



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Subject: APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS (ARARs),  
TO-BE-CONSIDERED REQUIREMENTS (TBCs), AND PERMIT REQUIREMENTS  
OF CERCLA

The Comprehensive Environmental Response, Compensation, and Liability Act, as amended by the Superfund Amendments and Reauthorization Act, 42 U.S.C. §§ 9601 et seq., (hereinafter "CERCLA") is a federal law that requires remedial actions at sites subject to CERCLA to attain applicable or relevant and appropriate requirements (ARARs), including state requirements, as defined in §121(d) of CERCLA. Remedial actions must also attain other requirements (To-Be-Considered Requirements (TBCs)) if necessary to protect public health and the environment. The purpose of this Memorandum is to guide the State and Regional Water Boards in complying with the CERCLA process for identifying state ARARs to make sure that state requirements are incorporated into CERCLA cleanups.

This Memorandum addresses issues concerning ARARs, TBCs, and permits at CERCLA sites. Part I defines ARARs and their use at appropriate sites. Parts II and III discuss criteria for determining whether a state requirement is an ARAR or a TBC and the process for choosing and enforcing ARARs. Part IV discusses TBCs. Part V discusses permit requirements at National Priority List (NPL) sites. Part VI discusses ARARs and permit requirements at non-NPL sites. Part VII summarizes the typical ARARs and TBCs used by the Regional Water Boards. Part VIII provides a list of reference documents. Attached to this Memorandum is a chart that the Regional Water Boards may use to identify ARARs for specific sites.

July 14, 1992

If you have questions or comments concerning this Memorandum, please contact Frances McChesney at the State Water Resources Control Board (State Water Board) at (916) 657-2106 or 8-437-2106 or Jon Marshack at the Regional Water Quality Control Board, Central Valley Region (Regional Water Board) at (916) 361-5724 or 8-495-5724.

#### I. GENERAL CERCLA REQUIREMENTS FOR STATE ARARS

CERCLA was enacted in 1980 and amended in 1986 for the purpose of remediating hazardous waste sites. CERCLA established a "Superfund" to be used by the Environmental Protection Agency (EPA) to respond to releases of hazardous substances at certain sites, including primarily sites on the NPL. Sites listed on the NPL are considered the worst sites in the country and are compiled with input from the states. CERCLA also authorizes EPA to take enforcement actions to require responsible parties to remediate sites. The Superfund Amendments and Reauthorization Act (SARA) which amended CERCLA included the Defense Environmental Restoration Program (DERP), 10 U.S.C. §2701 et seq. Section 120 of CERCLA specified that all federal agencies must comply with CERCLA to the same extent as any private party. DERP established specific requirements for the Department of Defense (DOD), including environmental restoration requirements, authority to pay for state support services, and a requirement to pay for state permit fees and charges.

CERCLA authorized the President of the United States to carry out its mandates. The President has delegated this authority primarily to EPA, but also to other federal agencies for property under their control. See Executive Order 12580.

Under CERCLA, remedial actions selected by EPA or other delegated federal agency (hereinafter referred to as EPA unless specifically noted) for sites listed on the NPL, other fund-financed sites, and federal facilities must be protective of human health and the environment. CERCLA §121(d)(1), 42 U.S.C. §9621(d)(1). If the CERCLA hazardous substances are to remain onsite, the remedial action must attain "legally applicable or relevant and appropriate" requirements (ARARs). CERCLA §121(d)(2)(A), 42 U.S.C. §9621(d)(2)(A). ARARs are defined in CERCLA as standards, requirements, criteria, or limitations of federal environmental laws and any more stringent standards, requirements, criteria, or limitations of state environmental or facility siting laws. CERCLA §121(d)(2), 42 U.S.C. §9621(d)(2). To qualify as a state ARAR, the requirement must be a state environmental or facility siting law, not a local law. The requirement must be promulgated (legally enforceable and of general applicability), more stringent than the federal

requirement, and identified in a timely manner. EPA may waive ARARs in certain situations, including those where state ARARs have not been consistently applied. See CERCLA §121(d)(4).

According to CERCLA §121(d) the issue of ARARs is only relevant at facilities (1) that are listed on the NPL or subject to EPA enforcement actions; (2) where EPA is spending funds from the Superfund, including emergency response actions ("fund-financed actions"); or (3) that are federal facilities. CERCLA §120, 42 U.S.C. §9620.<sup>1</sup> In this memorandum, sites subject to the ARAR process are referred to as "CERCLA sites".

Applicable requirements are those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site. 40 CFR 300.5. Relevant and appropriate requirements are those same standards mentioned above that, while not applicable at the CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site. 40 CFR 300.5. EPA has divided ARARs into three categories to facilitate their identification:

- o Chemical-specific ARARs are usually health- or risk-based numerical values or methodologies used to determine acceptable concentrations of chemicals that may be found in or discharged to the environment, e.g., Maximum Contaminant Levels (MCLs) or other water quality criteria that establish safe levels in drinking water.
- o Location-specific ARARs restrict actions or contaminant concentrations in certain environmentally sensitive areas. Examples of areas regulated under various federal and state laws include flood plains, wetlands, and locations where endangered species or historically significant cultural resources are present.
- o Action-specific ARARs are usually technology- or activity-based requirements or limitations on actions or conditions involving specific substances.

In addition to ARARs EPA evaluates to-be-considered requirements (TBCs), which are non-promulgated criteria, advisories, guidance, or proposed regulations issued by the federal or state

<sup>1</sup> CERCLA §121, concerning ARARs, applies to all NPL sites, whether federal or private facilities. However, for those federal facilities that are not on the NPL, all state laws concerning removal and remedial action also apply to the sites. See CERCLA §120(a)(4). See Part IV of this memorandum.

government that are not legally binding and do not have the status of potential ARARs. However, in many circumstances TBCs will be considered along with ARARs as part of the site risk assessment and may be used in determining the necessary level of cleanup for protection of health or the environment. EPA has stated that cleanup goals for some substances may have to be based on non-promulgated criteria and advisories rather than on ARARs because ARARs do not exist for those substances or because an ARAR alone would not be sufficiently protective in the given circumstances. In these situations, the cleanup requirements, in order to meet the cleanup goals, will not be based on ARARs alone but also on TBCs.<sup>2</sup>

It is important to understand that ARARs govern the degree of cleanup at the site and apply only where the hazardous substance will remain onsite. ARARs address the extent to which federal or state laws, regulations, and other requirements apply to a CERCLA site. If the hazardous substance remains onsite, the final remedial action must, in most situations, attain ARARs. EPA may select a remedial action that does not attain ARARs in certain circumstances, i.e., it may waive ARARs. CERCLA §121(d)(4)(E), 42 U.S.C. §9621(d)(4)(E).<sup>3</sup>

If the hazardous substance is taken offsite, the transport, storage, treatment, or disposal of that substance must comply with all legally applicable federal, state, and local requirements. See CERCLA §121(d)(3), 42 U.S.C. §9621(d)(3). The hazardous substance is considered to remain onsite where, for example, the ground water is contaminated. In such a case, the contaminated aquifer must attain ARARs. If the treated water is discharged offsite, e.g., to a surface stream, the discharge is subject to all applicable state requirements, including permit requirements. If the treated water is discharged onsite, the discharge must comply with ARARs, but not permit requirements.

CERCLA applies to the cleanup of "hazardous substances" and "pollutants or contaminants" as defined in CERCLA. If the substance to be cleaned up is not a CERCLA hazardous substance,

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<sup>2</sup> See U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, "CERCLA Compliance With Other Laws Manual", August 1988, Supplement September 1989.

<sup>3</sup> The remedial action need not attain ARARs if EPA finds that:

- state ARARs have not been consistently applied;
- the remedial action selected is only part of a total remedial action;
- compliance with the ARAR is technically impracticable from an engineering perspective;
- there is insufficient federal funding where other sites pose a greater environmental or public health threat.

See CERCLA §121(d)(4) for further conditions.

CERCLA requirements may not apply. The terms "hazardous substance" and "pollutants or contaminants" are defined in CERCLA Section 101 and specifically exclude petroleum. Because petroleum is excluded from CERCLA, the cleanup of petroleum that has, for example, leaked from an underground tank would not be subject to CERCLA unless the petroleum has commingled with a CERCLA hazardous substance. A number of pesticides are not listed as CERCLA hazardous substances. Where CERCLA does not apply to the waste, the ARAR process need not be followed. Instead, even if a site is on the NPL, the Regional Water Board may take separate enforcement action to require cleanup of wastes that are not subject to CERCLA, such as tank cleanups. In such situations, the Regional Water Board could issue a cleanup and abatement order, or other appropriate enforcement order, in the same way it does for any other site.

## II. ARAR CRITERIA

### 1. Applicable or Relevant and Appropriate Requirements

The remedial action at a CERCLA site must attain applicable requirements if the remedial action or circumstances at the site satisfy all the jurisdictional aspects of the requirement. Jurisdictional requirements include (1) the party subject to the law; (2) the substances or activities that fall under the authority of the law; (3) the time period during which the law is in effect; and (4) the types of activities the law requires, limits, or prohibits. For example, if a remedial action involved constructing a land disposal unit, 23 California Code of Regulations, Division 3, Chapter 15 requirements would be applicable. If a remedial action included a discharge of treated ground water to a clean aquifer, State Water Board Resolution 68-16 (the Anti-degradation Policy) would be applicable.

The remedial action must attain relevant and appropriate requirements to the same degree as applicable requirements. Relevant and appropriate requirements are those requirements that address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site. If a requirement is relevant but not appropriate, it would not be applied to the site. The California Environmental Quality Act (CEQA), California Public Resources Code, Division 13, §§21000, et seq., applies to California public agencies, which are defined as state and local agencies, but not to federal agencies. Since one of the jurisdictional requirements of CEQA would prevent it from applying to a federal agency it is not an "applicable" requirement for purposes of a CERCLA action at a federal

facility. However, CEQA would be a relevant and appropriate requirement at such sites. If only part of a requirement is considered relevant and appropriate, that part of the requirement would be applied to the site. For example, if the remedial action involved contaminated ground water caused by discharges to land not within a waste management unit, 23 California Code of Regulations, Division 3, Chapter 15, Article 5 requirements would be considered relevant and appropriate. Chapter 15, Article 5, requirements concerning corrective action are intended to address situations similar to the cleanup of hazardous substances required by CERCLA.

## 2. More Stringent Requirements

For purposes of CERCLA, state requirements are ARARs only if the requirements are more stringent than federal requirements. State requirements may be considered more stringent than federal requirements in the following ways:

- \* If the State is implementing a program that is federally authorized and the requirements in that program are required to be "at least as" stringent as federal requirements. For example, to have an approved state program implementing the Resource Conservation and Recovery Act (RCRA) the state program must be at least as stringent as RCRA and its regulations. Thus, an approved state RCRA program would be considered under CERCLA to be more stringent than federal law and would be a state ARAR.
- \* When the state programs do not have a federal counterpart because they would include requirements that are not found in federal law. The Toxic Pits Cleanup Act (TPCA), Health and Safety Code §25208, would be more stringent. Proposition 65, Health and Safety Code §§ 25249.5 et seq., would be more stringent.
- \* When state requirements are similar to federal requirements. State requirements that are more stringent than federal requirements are state ARARs. For example, the State Water Board's Chapter 15 requirements specify land disposal siting requirements that are in some respects more stringent than the federal RCRA siting requirements. Where the remedy would include land disposal on site, Chapter 15 would be applicable. More stringent state MCLs would be ARARs. The California Water Code is more stringent than federal requirements because in part it is in lieu of the Clean Water Act and in part it includes requirements not found in federal law.

### 3. Timely Manner

CERCLA requires EPA to provide the State with the opportunity for substantial and meaningful involvement in the initiation, development, and selection of the remedial action. CERCLA §121(f), 42 U.S.C. §9621(f). EPA must provide the State with an opportunity, among other things, to participate in long-term planning at NPL sites, to comment on studies concerning the remedial investigation, feasibility study, and engineering design, to comment on the proposed remedial plan, and to provide ARARs.<sup>4</sup> EPA must also provide the State with an opportunity to participate in negotiations with any potentially responsible parties (PRPs). For federal facilities, these requirements would apply at both NPL and non-NPL sites.

As part of the review process, the Regional Water Boards should determine and provide its ARARs to EPA, in coordination with the Department of Toxic Substances Control (DTSC) and other state agencies.<sup>5</sup> The ARARs must be provided to EPA in a timely manner. EPA has determined that "in a timely manner" means as early as possible but at least prior to the issuance of the final Record of Decision (ROD) for the site. See 40 CFR 300.400(g)(5), 300.515(d)(1), and 300.515(h)(2). The appropriate time period for the Regional Water Boards to provide their ARARs usually begins at the Remedial Investigation (RI) stage of the remedial action and continues to the issuance of the final ROD. EPA usually provides a time schedule for identification of ARARs, but it is the responsibility of the Regional Water Boards to provide ARARs regardless of the existence of a formal agreement. If the Regional Water Boards do not provide their ARARs in a timely manner, EPA has stated that it need not incorporate the ARARs into the remedial action.

After issuance of the ROD, the remedial action may be changed as a result of information obtained during the remedial design phase. If EPA does intend to incorporate additional ARARs, or other changes to the ROD after it becomes final, it may only do

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<sup>4</sup> *The Memorandum of Understanding (MOU) between the Department of Health Services, Toxic Substances Control Program (now the Department of Toxic Substances Control (DTSC)) and the State and Regional Water Boards (August 1, 1990) specifies the criteria for determining appropriate lead and support agency roles at CERCLA sites, including federal sites. The appropriate Regional Water Board and DTSC regional office should coordinate in providing comments, including ARARs, to EPA.*

<sup>5</sup> *The Cleanup MOU referenced in footnote 4, and federal facility agreements establish procedures for providing ARARs to EPA or a federal agency. Regardless of the lead/support agency status, each agency defends its own ARARs.*

so in certain situations and must provide public notice and comment. 40 CFR §300.435(c). The ROD must be amended only when the remedial action taken fundamentally alters the remedial action selected in the ROD. If the action taken differs substantially but does not fundamentally alter the action, an explanation of significant difference would be prepared, which is subject to public comment.

The ARAR process is iterative and as the remedial action is further defined, such as the disposal options for treated ground water, the more specific ARARs should be developed. There may be a need to develop several sets of specific ARARs especially during the Feasibility Study (FS) phase. It may be difficult to identify ARARs without appropriate information. For example, it may be difficult to determine compliance with State Water Board Resolution 68-16 (anti-degradation policy) until sufficient technical information about the contaminated plume, receiving water quality and the treatment technology to be used is obtained. Regional Water Board staff should review workplans, RI and FS reports, and other pre-ROD documents and provide comments in writing if necessary to obtain the appropriate information. Appropriate information could include the same type of information required in a report of waste discharge. The dispute resolution process may be necessary if the proper information is not provided to enable the Regional Water Boards to determine the ARARs. It may not be appropriate for the Regional Water Boards to concur in a ROD if there is not sufficient information to determine ARARs.

In documenting ARARs, EPA suggests that states provide citations to the statutes and regulations, and the description and scope of the requirements. They should provide information to show that the requirement is more stringent than the federal requirement and should describe how the requirement is applicable or relevant and appropriate to the site or action. See attached ARAR chart.

#### 4. Properly Promulgated

A state requirement must be promulgated to qualify as an ARAR. According to EPA, a state requirement is promulgated if it is legally enforceable and of general applicability. 40 CFR §300.400(g)(4). A state requirement is legally enforceable if the state law or regulation has its own specific enforcement mechanism or it can be enforced through the state's general legal authority. A state requirement is of general applicability if it "was not adopted for the purpose of precluding onsite remedial actions or other land disposal for reasons other than protecting human health and the environment."

CERCLA §121(d)(2)(C), 42 U.S.C. 9621(d)(2)(C). For example, the California Water Code, Title 23 CCR, water quality control plans, and other policies and guidance of the State and Regional Water Boards that have been adopted formally by the Boards are legally enforceable because the Water Code has enforcement mechanisms for violations of those requirements. Those same laws, regulations, and policies are also of general applicability because they were not adopted for the purpose of precluding CERCLA remedial actions. They apply to all discharges that affect the water quality of California.

The State and Regional Water Board water quality control plans sometimes use the terms "policies" or "guidance," rather than "regulations". The title of the document is not conclusive as to whether or not it is "promulgated." State and Regional Water Board water quality control plans and "policies" that have been adopted by the Boards are "promulgated" and therefore may be ARARs if they meet the other criteria for ARARs.

Water quality control plans contain numerical and narrative water quality standards that are promulgated and therefore may be ARARs. The plans contain methodologies, such as implementation plans or action plans, for attaining compliance with numerical and narrative standards. Specific narrative standards may also contain implementation methodologies. These methodologies should be considered ARARs. For example, State Water Board Resolution 68-16 contains the standard that all discharges to high quality waters must use the "best practicable treatment or control."<sup>6</sup> This use of a technology-based standard is consistent with EPA's Compliance With Other Laws Manual which requires use of best professional judgment to determine the appropriate technology-based standard where effluent limits are not available.<sup>7</sup> EPA does not consider unpromulgated methodologies that are designed to implement narrative standards as ARARs, but at EPA's discretion they may be considered in determining the remedy. Such unpromulgated methodologies could include the determination of the cleanup standard to attain the taste and odor narrative standard. See Part IV below, "To Be Considered" requirements.

#### 5. Consistently Applied ARARs

Section 121(d)(4) of CERCLA authorizes EPA to waive ARARs in certain situations. One such situation occurs when state ARARs have not been or will not be consistently applied to both CERCLA

<sup>6</sup> Resolution 68-16 is also incorporated into other promulgated requirements, including the Chapter 15 regulations (Title 23, California Code of Regulations, Division 3, Chapter 15), and State Water Board Resolution 92-49 (Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304).

<sup>7</sup> See Compliance With Other Laws Manual, p. 3-11 (August 1988).

and non-CERCLA sites within the State. State requirements are presumed to have been consistently applied unless there is evidence to the contrary. In other words, the Regional Water Board need not justify the consistent application of its ARARs at the time it submits its ARARs. Evidence must be provided by others to demonstrate that a requirement has not been consistently applied.<sup>8</sup> In most situations, consistent compliance within the jurisdiction of a Regional Water Board is sufficient.

### III. OTHER CONSIDERATIONS IN SELECTING ARARS

#### 1. Selection of ARARS

As part of the preparation of the ROD and selection of the remedy, EPA must provide a response to state comments on the draft ROD, including an explanation regarding any decision on ARARs. The comments must be provided in the proposed ROD. CERCLA §121(f)(1)(G), 42 U.S.C. 9621(f)(1)(G). If EPA chooses a remedial action that does not attain state ARARs, EPA must provide the State with an opportunity to concur or not concur with the remedy prior to publishing the final ROD. The State may challenge such a decision.<sup>9</sup> The Regional Water Board staff should carefully review the draft ROD and invoke the dispute resolution process if appropriate to resolve any ARAR or other disputes.

If the Department of Defense (DOD) (or federal agency other than EPA) is the lead federal agency, that federal agency makes the initial selection of the ARARs and remedy at NPL sites. CERCLA §120(e)(4), 42 U.S.C. §9620(3)(4). If there is a dispute, EPA makes the final decision on the selection of the remedy and ARARs. If the state disagrees with the chosen remedy, it may challenge the remedy. See footnote 9. The Regional Water Boards should work with the federal agency and EPA prior to issuance of the ROD to address site-specific ARARs.

<sup>8</sup> See *Compliance With Other Laws Manual*, p. 1-74 (August 1988).

<sup>9</sup> The Regional Water Boards should carefully review the draft ROD regarding ARAR selection and EPA's comments and attempt to resolve concerns prior to issuance of the final ROD. After issuance of the ROD, a challenge to the ROD is cumbersome. For those actions where EPA is the lead federal agency, the State may seek to have the remedy conform to State ARARs by intervening in the United States district court when the proposed consent decree is lodged and prior to entry (approval by the court) of the consent decree. CERCLA §121(f)(2), 42 U.S.C. §9621(f)(2). For those actions where another federal agency is the lead agency, the State must file an action in United States District Court. CERCLA §121(f)(3), 42 U.S.C. §9621(f)(3). In either case, the court would determine whether the State ARAR should apply. If it rules against the State, the State may pay the extra cost of compliance with the State ARAR.

## 2. ARARs for Removal Actions

Fund-financed removal<sup>10</sup> actions are required to attain or exceed ARARs "to the extent practicable considering the exigencies of the situation." 40 CFR 300.415(i). What is practicable depends on the urgency of the situation and the scope of the removal action. For example, urgent action may be required where leaking drums pose a threat of fire or explosion in a residential area. In such case ARARs need not be identified and attained. Removal actions should comply with ARARs that are within the scope of the action. For example, if the removal action is conducted to remove leaking drums and contaminated soil, ARARs should be considered for those activities, but not for ground water remediation that is not part of the removal action. If the action is not time critical, compliance with ARARs should, in most situations, be required.

Where the removal action on an NPL facility is being taken by another federal agency, e.g., a DOD agency, the action must also attain or exceed ARARs to the same degree as an EPA funded action. See Section V, below, for a discussion of permit requirements, and Section VI, below, for non-NPL site issues.

## 3. Partial Remedies and ARARs

CERCLA Section 121(d)(4) specifies that where the remedial action selected is only part of a total remedial action, such as an operable unit, it need not attain ARARs if the total remedial action will attain ARARs when completed. At the typical CERCLA site, there are several operable units for which a ROD is prepared. A comprehensive site-wide ROD is also prepared to consider activities at each of the operable units to ensure overall site remediation. Each operable unit may not attain the final ARARs, but the comprehensive site ROD for the final remedy must ensure that ARARs are attained. In addition, certain interim activities, including removal and remedial actions, may raise the question of ARAR compliance. Where ARARs for the interim action are associated with construction of the remedial technology, e.g., action-specific ARARs, the ARARs would be considered final and must be attained as part of that interim remedy, such as meeting effluent limits for discharge of treated ground water. If the ARARs for the interim activity are associated with cleanup levels they need not be attained until completion of the final remedy.

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<sup>10</sup> CERCLA defines the term "response" to include both removal actions and remedial actions. 42 U.S.C. 9601 (25). Both removal and remedial actions include the cleanup of the environment. Removal actions are usually short term and lower cost actions necessary to stabilize conditions, particularly in time-critical situations. Remedial actions are intended to provide permanent actions at the site.

#### 4. Enforcement of ARARs.

CERCLA authorizes the State to enforce both federal and state ARARs to which the remedial action at an NPL site is required to conform. Such enforcement is through a civil action in United States district court, not through administrative action before the Regional Water Boards. In addition, if a Regional Water Board is a signatory to an agreement concerning remediation of the site, it may enforce requirements as specified in the agreement. CERCLA §121(e), 42 U.S.C. §9621(e).

#### IV. "TO BE CONSIDERED" REQUIREMENTS

In addition to attaining ARARs, remedial actions at CERCLA sites must be protective of human health and the environment, CERCLA §121(d)(1), 42 U.S.C. §9621(d)(1). EPA will consider other "materials," such as criteria or guidelines, to make sure that the remedy is protective. Those materials are called "To Be Considered" (TBCs) requirements. EPA uses TBCs to develop numerical cleanup levels where no numerical ARARs exist. EPA also uses TBCs to interpret state requirements. State policies and guidance that have not been promulgated or are not enforceable are not potential ARARs but may be TBCs. The Regional Water Boards should provide to EPA TBCs at the same time that they identify ARARs.

#### V. PERMIT REQUIREMENTS AT NPL SITES

CERCLA states that no federal, state, or local permit shall be required for any "removal or remedial action conducted entirely onsite, where such remedial action is selected and carried out in compliance with this section." CERCLA §121(e), 42 U.S.C. §9621(e). In other words, if the treatment, storage, disposal, or transport of the hazardous substance, pollutant, or contaminant is carried out onsite, no permit is required, but if the hazardous substance is transported, treated, stored, or disposed of offsite, appropriate federal, state, and local permits are required.

For purposes of permits, the term "onsite" means "the areal extent of contamination and all suitable areas in very close proximity to the contamination necessary for implementation of the response action." See 40 CFR §300.400(e). "Onsite" may include property other than that owned by the responsible party, if, for example, a ground water plume has migrated... "Onsite" could also include uncontaminated areas overlying contaminated ground water. If a location is not onsite then it is offsite. At some federal facilities site-specific agreements, or the NPL, may define the site to include the entire base property. However, for purposes of permit requirements, the site includes

only those areas that fit within the definition of "onsite" contained in the National Contingency Plan (NCP), 40 CFR §300.400(e). In other words, if the discharge would occur to an area that is not contaminated or not in "very close proximity" to a contaminated area, the area is offsite and the discharge would require a permit. Whether or not the area is inside the installation boundaries is not relevant to whether it is offsite or onsite for purposes of permits.

EPA has interpreted the term "permit" to include all administrative requirements associated with a permit, whether or not they relate to actually obtaining a permit. EPA defines administrative requirements as those that prescribe methods and procedures by which substantive requirements are made effective for purposes of a particular environmental or public health program. The CERCLA process is intended to document that the substantive requirements have been identified and will be complied with. Administrative requirements include approval by administrative bodies (such as the Regional Water Boards), consultation requirements, issuance of permits, and documentation, reporting, record keeping, and enforcement requirements associated with permits. The term "permit" does not include "substantive" requirements. The substantive requirements are ARARs and TBCs. Onsite activities must comply with substantive requirements; offsite activities must comply with both substantive and administrative requirements. Monitoring requirements are considered substantive. Best management practices are considered substantive.<sup>11</sup> If it is unclear whether a requirement is administrative or substantive, it should be treated as substantive. The CERCLA process incorporates many administrative requirements the Regional Water Boards would normally impose. For example, EPA could impose administrative requirements, such as reporting and record keeping to ensure compliance with substantive monitoring requirements. The Regional Water Board should request that reporting and record keeping be required.

Where permits need not be obtained, the Regional Water Boards should provide EPA, or the discharger, with a document specifying the substantive requirements that would be applied to the situation if a permit were required, including monitoring requirements. For remedial actions, the Regional Board should provide such requirements in the process of identifying ARARs prior to the issuance of the ROD. For removal actions or other

<sup>11</sup> EPA's CERCLA Compliance With Other Laws Manual (August 1988) provides guidance on determining ARARs under federal and State law. For example, at CERCLA sites there may be no technology-based effluent limitations for wastewater discharges. In that case, best professional judgment is used to identify the appropriate technology (BCT or BAT) to determine the effluent limitations.

actions that might be taken without a ROD, the Regional Water Board should provide the necessary requirements prior to the action.

Offsite discharges from CERCLA sites must comply with all applicable federal, state, and local requirements and are not exempt from administrative, including permitting, requirements. In addition, activities on a site that are not related to the CERCLA response actions are not exempt from the administrative requirements. Such activities could include onsite sewage disposal or other activities associated with operations.

#### VI. ARARS AND PERMIT REQUIREMENTS AT NON-NPL SITES

Compliance with ARARs is required at private sites that are on the NPL or for fund-financed actions. At all other private sites, the activities must comply with applicable state and local requirements. Private parties whose sites are not subject to CERCLA may attempt to comply with the NCP for private cost recovery purposes. Regardless of their efforts to comply with the NCP, they must still comply with all state requirements, both administrative and substantive.

CERCLA specifically addresses federal facilities in Section 120, 42 U.S.C. §9620. Section 120 specifies that CERCLA applies to the same extent to federal facilities as to any other facility. If a federal facility is listed on the NPL, the remedial action must comply with ARARs to the same extent as other listed sites. EPA makes the final decision concerning the remedial action.<sup>12</sup> If a federal facility is not listed on the NPL, it must comply with state laws regarding removal or remedial actions, including enforcement requirements. CERCLA Section 120(a)(4) states:

"State laws concerning removal and remedial action, including state laws regarding enforcement, shall apply to removal and remedial action at facilities owned or operated by a department, agency, or instrumentality of the United States when such facilities are not included on the National Priorities List. The preceding sentence shall not apply to the extent a state law would apply any standard or requirement to such facilities which is more stringent

<sup>12</sup> CERCLA §120(e) requires a federal agency to enter into interagency agreement with EPA for all sites on the NPL. The agreements must include the review of alternative remedial actions, selection of the remedy, a schedule for completion of the remedy, and arrangements for long-term operation and maintenance. Selection of the remedy is made by EPA in case of disagreement with the federal agency.

than the standards and requirement applicable to facilities which are not owned or operated by any such department, agency, or instrumentality."

42 U.S.C. §9620(a)(4). However, the State must enforce its requirements consistently at all facilities, both federal, state, and private. The State makes the determination concerning whether the action is in compliance with state law.<sup>13</sup>

#### VII. STATE AND REGIONAL WATER BOARD ARARS

As part of the scoping phase of the remedial investigation/feasibility study (RI/FS) process,<sup>14</sup> government agencies are to identify ARARs (and should also identify TBCs) and provide a list to EPA or other lead agency. This part of the Memorandum identifies ARARs and TBCs that Regional Water Board staff should consider for any proposed remedial or removal action at CERCLA sites.

The following is a compilation of the ARARs and TBCs believed to be the most significant to the Regional Water Board for site cleanup activities. A brief description of how these ARARs and TBCs may be relevant is also provided. This summary is intended to highlight those ARARs and TBCs which could be important in determining interim and final actions at most sites. Since remedial actions at a site may not begin for a number of years, it is likely that these ARARs and TBCs will change with time. Regional Water Board staff must provide as complete a list as possible of ARARs and TBCs to guide the remedial investigation, feasibility study and, ultimately, the

<sup>13</sup> DERP, CERCLA §120(a)(4) (concerning non-NPL federal facilities), and CERCLA §121 (concerning ARARs), use different words in stating the responsibilities of federal facilities and create an ambiguity regarding the applications of State laws at federal facilities that are not on the NPL. Federal-State agreements at non-NPL federal facilities, called Federal Facility Site Remediation Agreements (FFSRAs), have recognized that there is a different standard at NPL and non-NPL federal facilities. The FFSRAs do not resolve the dispute raised by the differences between Sections 121 and 120(a)(4) of CERCLA. Instead, they provide that the federal agencies propose the response actions with review, comment, and approval by the State. The agreements also provide for a dispute resolution process if disagreements arise during the review process and approval stages. If the dispute is not resolved through this process, all parties retain their authority to use the courts to resolve the dispute. CERCLA §120(a)(4) has been interpreted in United States v. Pennsylvania Dept. of Environmental Resources, CV-89-1526 (D. Penn., Dec. 2, 1991) to include state laws that provide general authority to require removal and remedial actions.

<sup>14</sup> The purpose of the RI/FS is to assess site conditions and evaluate alternatives to the extent necessary to select the remedy.

selection of remedial actions and cleanup levels for a specific site, when requested by the lead agency or by the responsible party. Attached to this Memorandum is a chart for the Regional Water Boards to use in identifying ARARs. (See Attachment I.)

1. Porter-Cologne Water Quality Control Act  
(Porter-Cologne)

The State Water Board and the nine Regional Water Boards derive their statutory authority from Porter-Cologne and, as such, are responsible for the protection of existing and probable future beneficial uses of waters of the state within their respective jurisdictions. Porter-Cologne is codified in Division 7 of the California Water Code. Under Porter-Cologne, the objectives of the Regional Water Boards are achieved primarily through an ongoing program of basin planning, the regulation of waste discharges through the establishment of waste discharge requirements (WDRs) for any proposed discharge of waste to waters of the state or to land, where such discharge has the potential for water quality impacts, and through enforcement of such plans and orders. Additionally, WDRs are written to implement regulations promulgated by the State Water Board in Title 23 of the California Code of Regulations (CCR). The establishment of WDRs by the Regional Water Boards may be necessary to regulate any proposed offsite discharge of waste that is associated with CERCLA site cleanup activities, and any proposed onsite discharge of non-CERCLA waste. The substantive requirements of Porter-Cologne would also be ARARs for onsite remedial activities. Requirements under Porter-Cologne could be chemical-specific, action-specific, and/or location-specific.

Existing WDRs adopted for a site by the Regional Water Boards prior to the start of the RI/FS could also be ARARs for the site. Such WDRs may establish chemical-specific, action-specific, and location-specific limitations on the discharge of waste so as to protect water quality consistent with the Water Quality Control Plans (see below). WDRs also include monitoring and reporting programs to gauge compliance with the requirements. See Parts V and VI of the Memorandum discussing permit requirements at CERCLA sites.

Water Quality Control Plans of the State Water Resources Control Board and the Regional Water Quality Control Boards

Water Quality Control Plans are promulgated pursuant to both state and federal statutes. Porter Cologne (§§13240 et seq.) provides for the adoption of Water Quality Control Plans by the State Water Board and by Regional Water Boards with approval by

the State Water Board. Water Quality Control Plans adopted by the State Water Board include:

- o The Inland Surface Waters Plan
- o The Enclosed Bays and Estuaries Plan
- o The Ocean Plan
- o The Thermal Plan (temperature control in coastal and interstate waters and enclosed bays and estuaries)
- o The Delta Plan (Sacramento-San Joaquin Delta and Suisun Marsh)
- o Lake Tahoe Basin Plan

Of these Plans, the Inland Surface Waters Plan, the Enclosed Bays and Estuaries Plan, and the Ocean Plan are most applicable to CERCLA cleanups. These plans contain numerical and narrative water quality objectives applicable to nearly all discharges to surface water.

Water Quality Control Plans adopted by the Regional Water Boards are often called Basin Plans, as they apply to waters within specific water quality control regions or subregions (basins). Each Regional Water Board has one or more Basin Plans. For example, the Central Valley Regional Water Board has adopted two Basin Plans, one which covers surface and ground waters of the Sacramento River, Sacramento-San Joaquin Delta and San Joaquin River Basins (5A, 5B and 5C), and one which covers surface and ground waters of the Tulare Lake Basin (5D).

After adoption or approval by the State Water Board, the Water Quality Control Plans are noticed to the state legislature. EPA approval, under authority of the federal Clean Water Act, follows. The Water Quality Control Plans fulfill the State and Regional Water Boards' obligation to promulgate water quality standards pursuant to §303 of the federal Clean Water Act. Under CERCLA, state standards established in Water Quality Control Plans are potential ARARs.

Unlike water quality standards as defined by the Clean Water Act, Porter-Cologne does not restrict water quality standards to surface waters or point sources and does not impose a particular type or level of control technology on chemicals being discharged. Porter-Cologne requires the promulgation of Water Quality Control Plans which are applicable to ground water and nonpoint sources, as well. Water quality standards in the water

quality control plans include beneficial use designations, water quality objectives to protect those uses, and implementation programs to achieve objectives. Cleanup activities subject to one or more of the Water Quality Control Plans and their water quality standards could be chemical-specific, action-specific, and/or location-specific.

## 2. Toxic Pits Cleanup Act of 1984 (TPCA)

The Toxic Pits Cleanup Act (California Health and Safety Code, §§25208 et seq.) authorizes the Regional Water Boards to regulate surface impoundments containing hazardous waste. This act prohibits the discharge of liquid hazardous waste or hazardous waste containing free liquids after 30 June 1988 to surface impoundments not meeting specific siting and design standards. Persons owning or discharging to surface impoundments found to be containing hazardous waste are required to file a hydrogeologic assessment report (HAR) with the Regional Water Board upon notification. Closure of these impoundments is regulated under TPCA as well as other programs under Porter-Cologne and Title 23 CCR. Some cleanup activities at CERCLA sites may be subject to TPCA and this statute would be action-specific and location-specific. Since the hazardous waste identification criteria contained in Title 22 CCR, Division 4.5, Chapter 11 (formerly Division 4, Chapter 30, Article 11) are used to define hazardous waste under TPCA, these regulatory criteria would also be chemical-specific ARARs. Since this ARAR requires compliance during the site characterization phase, it is important to inform the responsible party of TPCA applicability in an early stage of the remedial investigation, so that HAR requirements can be met within the CERCLA process.

## 3. The Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65)

Found in Division 20 of the California Health and Safety Code, Proposition 65 prohibits the discharge of a significant amount of a known human carcinogen or reproductive toxin into any source of drinking water or onto or into land where it may pass into a source of drinking water. The State Office of Environmental Health Hazard Assessment (OEHHA) under the California EPA (Cal/EPA) is the lead agency under this act. OEHHA has promulgated, in Title 22 CCR §§12000 et seq., lists of chemicals subject to the discharge prohibition and regulatory levels defining a significant amount for many of these chemicals. The discharge prohibition and regulatory levels would be chemical-specific, action-specific, and location-specific ARARs.

#### 4. SWRCB Sources of Drinking Water Policy

The State Water Board has adopted a water quality control policy defining sources of drinking water with respect to Proposition 65 and other State and Regional Water Board requirements (Resolution No. 88-63). This policy has been incorporated into the Regional Water Boards' Water Quality Control Plans. The Resolution states that, with few specific exceptions, all surface and ground waters of the state are to be considered existing or potential sources of drinking water. This policy is an ARAR, which could be both chemical-specific and location-specific with respect to cleanup activities.

#### 5. Title 23 California Code of Regulations Division 3, Chapters 15 and 16

Division 3 of Title 23 CCR contains regulations adopted by the State Water Board for the purpose of implementing certain provisions of the California Water Code. Chapter 15 of Division 3 contains regulations governing discharges of waste to land where water quality could be adversely impacted. The regulations in Chapter 16 are intended to protect waters of the state from discharges of hazardous substances from underground storage tanks. The following is a brief description of Chapters 15 and 16.

##### a. Chapter 15, Discharges of Waste to Land

Chapter 15 regulations govern the discharge of waste to land for treatment, storage, and disposal and establish siting, containment, monitoring, and closure standards. Activities included in this program are the issuance of WDRs by the Regional Water Boards for the discharge of hazardous, designated and nonhazardous solid wastes to land and the oversight of corrective actions at leaking waste management units. Cleanup activities involving the discharge of waste to land or the closure of leaking waste management units at a CERCLA site would be subject to the substantive requirements of Chapter 15. State Water Board Resolution 92-49 requires actions to clean up discharges of waste to comply with Chapter 15. Thus, corrective action, closure, and other requirements of Chapter 15 are applicable to CERCLA cleanups, not just to cleanups involving waste management units. These regulations contain both action-specific and location-specific ARARs.

##### b. Chapter 16, Underground Tank Regulations

Regulations contained in Chapter 16 allow for local enforcement agencies to be the lead in permitting and enforcement of leaking underground storage tanks. Under these regulations, the Regional Water Boards provide oversight of cleanup activities associated with leaking underground tanks. Corrective actions

taken with respect to leaking underground tanks would be subject to the regulations in Chapter 16 as well as the Water Code and associated regulations and policies. These regulations may be both chemical-specific and action-specific ARARs.

6. Solid Waste Assessment Test  
(SWAT) Program

Assembly Bill 3525 (Calderon) added §13273 to the California Water Code in 1984. This section authorizes the Regional Water Boards to implement the SWAT program with respect to water quality. The purpose of the SWAT program is to identify solid waste disposal sites that may be leaking hazardous wastes and threatening water quality. Certain aspects of the SWAT program may be applicable to the cleanup activities at CERCLA sites if solid waste disposal units are identified during the remedial investigation. Cleanup and abatement of a disposal unit found to be polluting surface or ground waters may be undertaken pursuant to existing authority in the Water Code and in Chapter 15.

7. Other Standards, Requirements, Criteria,  
and Limitations and Guidance

a. Statement of Policy with Respect to Maintaining High  
Quality of Waters in California, State Water Board  
Resolution No. 68-16

One of the most significant water quality control policies with respect to the protection of water quality from contaminated sites is State Water Board Resolution No. 68-16. This resolution, which satisfies the federal Clean Water Act antidegradation policy requirement, requires the continued maintenance of high quality waters of the state even where that quality is better than needed to protect beneficial uses, unless specific findings are made. In any case, water quality may not be allowed to be degraded below what is necessary to protect beneficial uses. This policy would be a chemical-specific and an action-specific ARAR. This and other important water quality control policies have been incorporated into the Water Quality Control Plans by the Regional Water Boards.

State Water Board Resolution 68-16 applies most often at CERCLA cleanups that involve extracting, treating, and discharging treated ground water. Any activities that result in discharges to high quality water are required to use the best practicable treatment or control of the discharge necessary to avoid a pollution or nuisance and to maintain water quality. Best practicable treatment would take into account technical and economic feasibility. For example, where a ground water aquifer or portion of a ground water aquifer is of high quality (e.g.,

contains nothing but naturally-occurring substances), Resolution 68-16 would prohibit the discharge of contaminated water to that aquifer, unless it was in the public interest to allow such a discharge. If the discharge is allowed, it must be treated prior to discharge using the best practicable treatment or method of control. If the best practicable treatment or method of control will treat the discharge to levels that will maintain the existing water quality, then a discharge which would create a lower quality would not be in compliance with the policy. It might be in the public interest to allow a lower quality if it were not technologically or economically feasible to achieve the higher quality. In that case, the beneficial uses must still be protected.

To comply with Resolution 68-16, the responsible party must determine the water quality of the contaminated area, including the concentrations of total dissolved solids (TDS), metals, and pesticides, as well as the constituents of concern. The responsible party must also determine the water quality of the receiving water. Discharges to high quality water should be treated to the most stringent level that is technically and economically feasible. The goal is to treat to background, but if background is not feasible, the least stringent level is that level that would protect the beneficial uses. Discharges to ground water within the zone of influence of the contaminated plume need not necessarily be treated to as stringent a level as discharges to non-contaminated areas.

Resolution 68-16 also applies to the establishment of cleanup levels for ground water in-site and for soils which threaten water quality. At a minimum, cleanup levels must restore and protect all beneficial uses. To assure that cleanup levels are "consistent with the maximum benefit to the people of the State", cleanup levels must also be the lowest levels that are technologically and economically achievable. Resolution 68-16 forms the basis for the cleanup level setting requirements of Section 2550.4 of Chapter 15. These requirements contain the only mechanism for compliance with Resolution 68-16 which has been promulgated as regulation.

In identifying ARARs, Resolution 68-16 will nearly always be applicable to ground water remediation. The Regional Water Board staff should identify it as an ARAR and should specify as early as possible the data necessary to comply with the Policy.

b. Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304, State Water Board Resolution 92-49

State Water Board Resolution 92-49 establishes policies and procedures for the oversight of investigations and cleanup and

abatement activities resulting from discharges which affect or threaten water quality. The Resolution states that Water Code Section 13304 authorizes Regional Water Boards "to require complete cleanup of all waste discharged and restoration of affected water to background conditions (i.e., the water quality that existed before the discharge)" to the extent feasible. The Resolution requires actions for cleanup and abatement to conform to State Water Board Resolution 68-16 and State and Regional Water Board Water Quality Control Plans and Policies. Cleanup levels are not required to be more stringent than background. Cleanup levels and effluent discharge limitations need not be identical for the same site. Actions to cleanup and abate must also comply with applicable provisions of Title 23 CCR, Division 3, Chapter 15 to the extent feasible.

c. Pretreatment Standards under the Clean Water Act

Discharges of treated waste to sanitary sewers may be proposed as part of a remedial actions. These discharges may be regulated under the pretreatment program of the appropriate Publicly Owned Treatment Works (POTW). The Regional Water Board is involved in oversight of this pretreatment program and how this program relates to the WDRs issued to the POTW. Remedial actions involving proposed discharges to sanitary sewers are regulated by these pretreatment standards and the Regional Water Board would have oversight authority. This ARAR would be action-specific and could be chemical-specific, as well.

d. A Compilation of Water Quality Goals

Many of the water quality objectives contained in the Basin Plans for protection of beneficial uses of waters of the state (California's water quality standards) are stated in narrative terms. To implement these narrative standards, Central Valley Regional Water Board staff has produced a report entitled, A Compilation of Water Quality Goals. This report defines a procedure for selection of appropriate concentrations of chemical constituents and water quality parameters used to determine compliance with the narrative water quality objectives. (See Attachments II and III.) Published numerical values, designed to protect various beneficial uses, have been compiled from a number of state and federal sources in the tables of this report. The procedures for selecting appropriate numerical values from the tables are detailed in the narrative Selecting Water Quality Goals, found at the front of the report. This staff report is periodically updated to remain current with new and revised published numerical values. In conjunction with the Basin Plans, this document could be used at CERCLA sites to determine effluent limits, ground water and surface water cleanup levels, and corresponding remedial actions. Therefore,

the staff report contains chemical-specific and location-specific standards that may be applicable, relevant and appropriate, or TBC, depending on the source of the numerical values.

e. The Designated Level Methodology for Waste Classification and Cleanup Level Determination

The Designated Level Methodology staff report of the Central Valley Regional Water Board offers guidance on how to classify wastes under the definitions contained in the Chapter 15 regulations so as to select appropriate disposal practices protective of beneficial uses of waters of the state. The classification of a waste as a designated waste is based on concentrations of extractable waste constituents as they relate to water quality objectives or numerical values selected from the Water Quality Goals staff report. Waste constituent-specific and site-specific concentration limits called Designated Levels are calculated from numeric water quality limits using conservative assumptions regarding the attenuation of the constituents and/or environmental fate analysis. This methodology could be used at CERCLA sites to determine the classification of wastes and contaminated soils proposed to be left onsite. Therefore, the staff report would be a chemical-specific, action-specific, and location-specific TBC.

According to EPA's CERCLA Compliance with Other Laws Manual, ARARs (and TBCs necessary for protection), pertaining both to contaminant levels and to performance or design standards, should generally be attained at all points of potential exposure, or at the point specified by the ARAR itself. CERCLA requires, to the maximum extent practicable, the use of permanent solutions. Restrictions on use or access should not be a substitute for remediation to appropriate levels. The Designated Level Methodology is also used by the Regional Water Board to determine the degree to which contaminated soils should be cleaned so that they do not threaten to adversely impact existing and probable future beneficial uses of waters of the state. Soil cleanup levels determined by this methodology are based on water quality objectives and, in the case of narrative objectives, numerical limits taken from the Water Quality Goals staff report. The basis of the methodology is similar to CERCLA risk assessment, except that the waters of the state act as the receptor. In California, this is necessary because Porter-Cologne requires the Regional Water Boards to restore or maintain beneficial uses throughout an affected or potentially affected body of water.

VIII. SUPPLEMENTAL DOCUMENTS

- ▣ Comprehensive Environmental Response, Compensation, and Liability Act, as amended by the Superfund Amendments and Reauthorization Act, 42 U.S.C. §§9601 et seq.
- ▣ National Oil and Hazardous Substances Pollution Contingency Plan (National Contingency Plan or NCP), 40 CFR Part 300.
- ▣ Defense Environmental Restoration Program, 10 U.S.C. §2701 et seq.
- ▣ CERCLA Compliance with Other Laws Manual: Interim Final. EPA, Office of Emergency and Remedial Response, Washington, DC 20460 (EPA/540/G-89/006) (August 1988). Supplement (September 1989).
- ▣ EPA Quick Reference Fact Sheets:
- ▣ ARARs Q's & A's: General Policy, RCRA, CWA, SDWA, Post-ROD Information, and Contingent Waivers, EPA Office of Emergency and Remedial Response (Publication 9234.2-01/FS-A) (June 19, 1991).
- ▣ ARARs Q's & A's: State Ground Water Antidegradation Issues, EPA Office of Emergency and Remedial Response (Publication 9234.2-11/FS) (July 1990).
- ▣ CERCLA Compliance with State Requirements, EPA Office of Emergency and Remedial Response (Publication 9234.2-05/FS) (December 1989).

Attachments

## STATE AND REGIONAL WATER BOARD ARARS

This chart provides a summary of the statutes, regulations, plans, and policies that are the source of State and Regional Water Board requirements that are applicable or relevant and appropriate or to-be-considered at CERCLA sites. The first column states the name and citation of the requirement. The second column provides a description of the requirement. The third column should be used to state whether the requirement is (1) applicable, (2) relevant and appropriate, or (3) to-be-considered. This column should be used for other comments, including, if unclear, why the requirement is an ARAR or TBC. These generic ARARs should be used to identify chemical-specific, location-specific, and action-specific ARARs at the appropriate stage of the investigation. Not each requirement listed in the first column will be an ARAR for every site. When providing ARARs, list only those that are ARARs for the site. For example, the Aboveground Petroleum Storage Act is not an ARAR where there are no aboveground tanks at a site.

STATE AND REGIONAL WATER BOARD ARARS

CITATION

DESCRIPTION

COMMENTS

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California Water Code,  
Division 7, Section 13000,  
et seq. (Porter-Cologne Water  
Quality Control Act)

The Water Code authorizes the State and  
Regional Water Boards to establish in Water  
Quality Control Plans beneficial uses and  
numerical and narrative standards to protect  
both surface and ground water quality.  
Authorizes Regional Water Boards to issue  
permits for discharges to land or surface or  
ground water that could affect water quality,  
including NPDES permits, and to take  
enforcement action to protect water quality.  
Implemented through regulations (Title 23  
California Code of Regulations), plans,  
policies and guidelines.

Water Quality Control Plan  
(specify plan) (Water Code  
§13140, 13240)

The Plans establish water quality standards  
(including beneficial use designations, water  
quality objectives to protect those uses, and  
implementation programs to meet the  
objectives) that apply statewide or to  
specific water basins.

Include Regional Water  
Board Basin Plans, Inland  
Surface Waters Plan,  
Enclosed Bays and  
Estuaries Plan, Ocean  
Plan, Thermal Plan, Delta  
Plan, Lake Tahoe Basin  
Plan

Water Quality Control Plan  
for the \_\_\_\_\_  
\_\_\_\_\_ Region,  
\_\_\_\_\_ Basin,  
(\_\_\_\_\_ Region  
Basin Plan). (Water Code  
§13240)

The Basin Plan describes the water basins in  
the Region, establishes beneficial uses of  
ground and surface waters, establishes water  
quality objectives including narrative and  
numerical standards, establishes implementa-  
tion plans to meet water quality objectives  
and protect beneficial uses, and

CITATION

DESCRIPTION

COMMENTS

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Water Quality Control Plan  
for Inland Surface Waters of  
California (Water Code  
§13170; Clean Water Act  
§303(c)(1))

incorporates statewide water quality control plans and policies. (In designating ARARs, cite all applicable uses, objectives, and implementation program elements for the site.)

In compliance with the Water Code and the Clean Water Act, the State Water Board adopted the Inland Surface Waters Plan, which establishes numerical water quality objectives for the protection of human health and freshwater aquatic life for a large number of toxic pollutants. It also establishes narrative objectives and toxicity objectives. The plan provides a program of implementation and specifies proposals to adopt numerical standards for water bodies that are reclaimed water dominated and agricultural drainage dominated.

Water Quality Control Plan  
for Control of Temperature in  
the Coastal and Interstate  
Waters and Enclosed Bays and  
Estuaries of California  
(Thermal Plan) (Water Code  
§§13140, 13142.5)

The Thermal Plan establishes prohibitions on discharges to cold interstate waters and maximum temperature changes to other waters to protect natural receiving water temperatures. The plan includes site specific temperature objectives for certain water bodies.

Water Quality Control Plan  
for Ocean Water of California  
(California Ocean Plan)  
(Water Code §13170.2)

The Ocean Plan establishes beneficial uses of ocean waters, numerical and narrative water quality objectives, effluent quality objectives including toxic material limitations, and discharge prohibitions.

Water Quality Control Plan  
for the Enclosed Bays and  
Estuaries of California  
(Water Code §13140)

The Enclosed Bays and Estuaries Plan establishes numerical water quality objectives for the protection of human health and aquatic life, effluent quality requirements and prohibitions that apply to disposal of waste to enclosed bays and estuaries.

CITATION

DESCRIPTION

COMMENTS

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State Board Resolution No. 68-16 (Policy on Maintaining the High Quality of State Waters) (Water Code §13140, Clean Water Act regulations 40 CFR §131.12)

Resolution No. 68-16 (anti-degradation policy) has been incorporated into all Regional Board Basin Plans. Requires that quality of waters of the State that is better than needed to protect all beneficial uses be maintained unless certain findings are made. Discharges to high quality waters must be treated using best practicable treatment or control necessary to prevent pollution or nuisance and to maintain the highest quality water. Requires cleanup to background water quality or to lowest concentrations technically and economically feasible to achieve. Beneficial uses must, at least, be protected.

State Board Resolution No. 88-63 (Sources of Drinking Water Policy)

Resolution No. 88-63 has been incorporated into all Regional Board Basin Plans. The policy designates all ground and surface waters of the state as drinking water except where the TDS is greater than 3000 ppm, the well yield is less than 200 gpd from a single well, the water is a geothermal resource or in a waste water conveyance facility, or the water cannot reasonably be treated for domestic use using either best management practices or best economically achievable treatment practices.

State Water Board Resolution 92-49 (Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code Section 13304) (Water Code §13307)

Resolution 92-49 establishes policies and procedures for the oversight of investigations and cleanup and abatement activities resulting from discharges of waste which affect or threaten water quality. It requires cleanup of all waste discharged and restoration of affected water to background conditions (i.e., the water quality that existed before the discharge). Requires actions for cleanup and

CITATION

DESCRIPTION

COMMENTS

Title 23 California Code of Regulations, Division 3, Chapter 15 (Discharges of waste to land)

abatement to conform to Resolution 68-16, water quality control plans and policies, and applicable provisions of Title 23 California Code of Regulations, Division 3, Chapter 15 (discharges of waste to land) as feasible.

Title 23 California Code of Regulations, Division 3, Chapter 15, Article 5

Chapter 15 regulates the siting, design, construction, operation, closure, and monitoring (including corrective action) of waste discharges to land for treatment, storage, or disposal, including landfills, surface impoundments, waste piles, and land treatment facilities. Wastes regulated include "hazardous waste," "designated waste," "nonhazardous solid waste", and "inert waste".

Title 23 California Code of Regulations, Division 3, Chapter 16, (Underground tank regulations)

Article 5 contains monitoring requirements for waste management units and establishes water quality protection standards for corrective action including concentration limits for constituents of concern at background levels unless infeasible to achieve. Cleanup levels greater than background must meet all applicable water quality standards, must be the lowest levels technologically and economically achievable, must consider exposure via other media, and must consider combined toxicologic effects of pollutants.

Toxic Pits Cleanup Act, California Health and Safety Code §§25208, et seq.

Chapter 16 regulates permitting and testing of underground tanks and specifies requirements for corrective action of discharges from tanks.

TPCA authorizes the Regional Water Boards to regulate surface impoundments containing hazardous waste as defined in Title 22. California Code of Regulations, prohibits discharges to such surface impoundments unless they meet specified siting and design

CITATION

DESCRIPTION

COMMENTS

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Aboveground Petroleum Storage Act, California Health and Safety Code, Division 20, Chapter 6.67, §§25270, et seq.

requirements. Requires compliance with specific investigation, remediation, and reporting requirements.

APST regulates use of and discharges from aboveground petroleum tanks, including testing and corrective action requirements.

Safe Drinking and Toxic Enforcement Act of 1986 (Prop. 65), California Health and Safety Code, Division 20.

Proposition 65 prohibits the discharge of known human carcinogens or reproductive toxins to sources of drinking water or on land where it could pass into a source of drinking water. Chemicals and applicable regulatory levels are listed at Title 22, California Code of Regulations §§12000, et seq.

California Environmental Quality Act (CEQA), California Public Resources Code, §§21100, et seq.

CEQA requires analysis of environmental impacts of response actions, comparison of alternative actions, and implementation of appropriate mitigation measures. No hazardous substances may remain onsite unless further mitigation is not feasible.

Title 22, California Code of Regulations, Division 4, Chapter 15, §§66401, et seq. (Public Water Supply)

Establishes standards for public water supply systems, including primary and secondary MCLs. Includes requirements for water quality analyses and laboratories. State MCLs must be at least as stringent as federal MCLs. State MCLs are incorporated into State and Regional Water Quality Board Water Quality Control Plans as water quality objectives for protection of current and potential drinking water supply sources. MCLs are some of the applicable upper-end remedial action objectives for ambient ground and surface water where the water is a source of drinking water, as defined in the Water Quality Control Plans.

CITATION

42 United States Code §300f  
(Safe Drinking Water Act)

40 Code of Federal  
Regulations Part 141  
(National Primary Drinking  
Water Regulations)

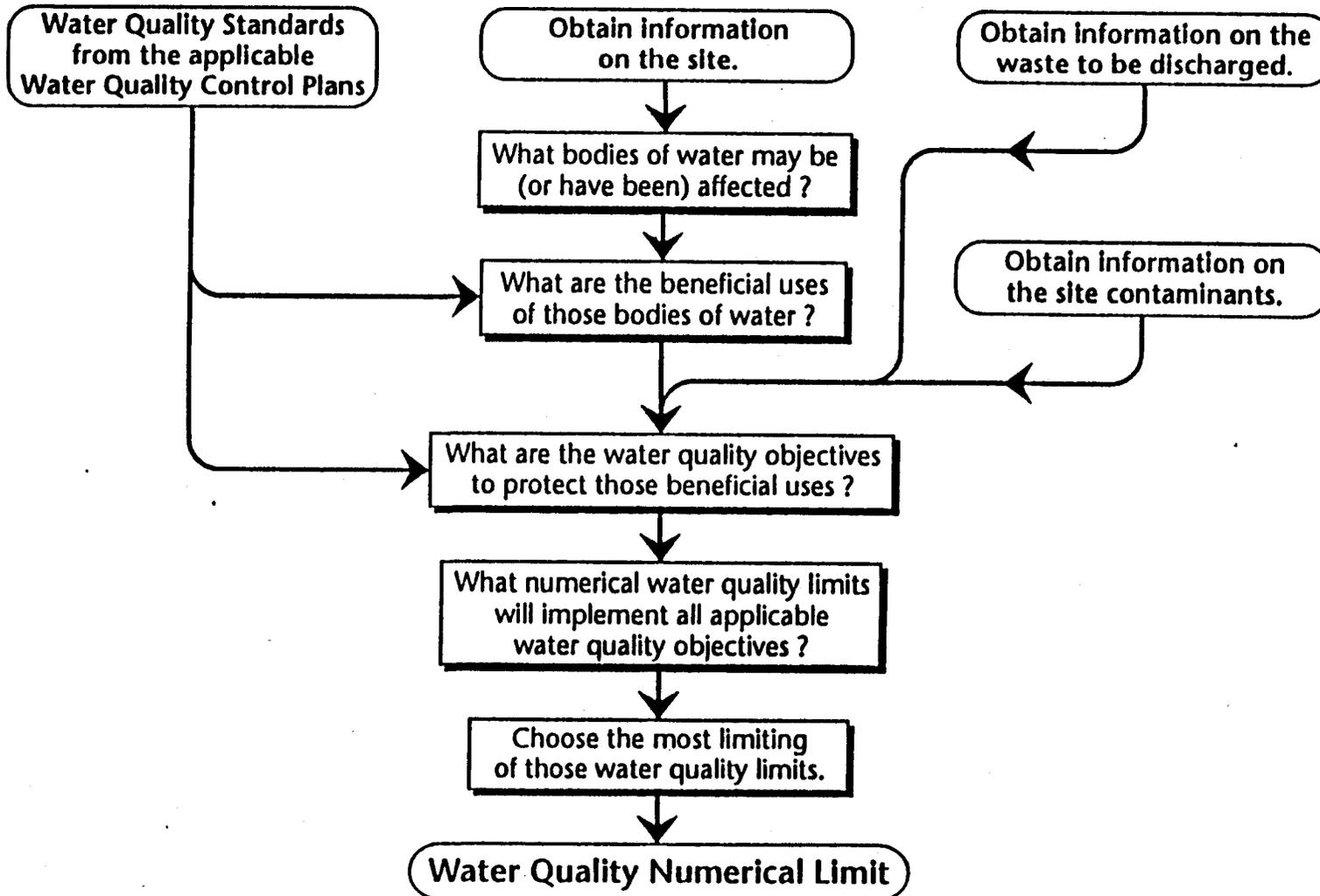
DESCRIPTION

SDWA establishes standards for current and potential drinking water supplies by setting Maximum Contaminant Levels (MCLs) and non-zero Maximum Contaminant Level Goals (MCLGs).

COMMENTS

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# Selecting Water Quality Numerical Limits



*The following is offered as an example of the enumeration of Chapter 15 requirements and Water Quality Control Plan standards applicable to setting ground water cleanup levels for a hypothetical CERCLA site contaminated with a mixture of chlorinated solvents and diesel:*

## STANDARDS FOR GROUND WATER AT THE COMPANY "X" FACILITY, CENTRAL VALLEY COUNTY

### *Water Quality Protection Standard*

The Company "X" Facility contains a TPCA impoundment, which is a waste management unit. Therefore, the TPCA impoundment is subject to the requirements of 23 California Code of Regulations, Division 3, Chapter 15, *Discharges of Waste to Land*.<sup>1</sup> Article 5 of Chapter 15 requires that the Regional Water Board establish a water quality protection standard for each waste management unit. The water quality protection standard includes concentration limits for constituents of concern, which must be met at and downgradient of the point of compliance. The point of compliance is a vertical surface through the uppermost aquifer at the downgradient edge of the waste management unit. §2550.4 requires that concentration limits be established at background levels. Only in a corrective action program where the discharger has demonstrated that background levels are technologically and economically feasible to achieve, may the Regional Water Board adopt concentration limits greater than background (CLGBs). §2550.4(c) and (e) require that the CLGBs:

- a) shall be set at the lowest concentrations for the individual pollutants which are technologically and economically achievable;
- b) shall not exceed the maximum concentrations allowable under applicable statutes and regulations for individual pollutants (includes water quality objectives and implementation programs to protect beneficial uses from the applicable Water Quality Control Plans, established under the Water Code);
- c) shall not pose a hazard to health or to the environment (risk assessment); and
- d) theoretical risks from concentrations of pollutants associated with the release shall be considered additive across all media of exposure and shall be considered to be at least additive for those pollutants which cause similar toxicologic effects and for those which are carcinogens.

<sup>1</sup> Chapter 15 requirements may also be invoked through State Water Board Resolution 92-49, which states, in part:

"III. The Regional Water Board shall implement the following procedures to ensure that dischargers shall have the opportunity to select cost-effective methods for detecting discharges or threatened discharges and methods for cleaning up or abating the effects thereof. The Regional Water Board shall:

"F. Require actions for cleanup and abatement to:

- "2. Implement the applicable provisions of Chapter 15, Division 3, Title 23, California Code of Regulations, to the extent feasible"

### ***Water Quality Standards***

Under the federal Clean Water Act, "water quality standards are provisions of state or federal law which consist of a designated use or uses for waters of the United States and water quality criteria for such waters based upon such uses." [40 CFR 130.2(c) and 131.3(i)] Under the Porter-Cologne Act, the Water Quality Control Plans contain the state's water quality standards, which are applicable to surface and ground "waters of the state". These standards include: beneficial use designations, water quality objectives (criteria) to protect such uses, and implementation program requirements to achieve the objectives. These water quality standards are enforceable standards for surface and ground water quality, as opposed to drinking water standards, which are enforceable standards for water within a water distribution system and at the tap.

### ***Beneficial Uses***

Chapter II of the Water Quality Control Plan for the Sacramento River, Sacramento-San Joaquin Delta, and San Joaquin River Basins (Basin Plan) identifies the following beneficial uses of ground water in the area of the Company "X" Facility:

municipal and domestic supply

agricultural supply — irrigation and stock watering

industrial supply — process and service

Shallow ground water beneath the Company "X" Facility does not meet any of the exceptions from being "considered to be suitable, or potentially suitable, for municipal or domestic water supply" under State Water Board Resolution 88-63, the "Sources of Drinking Water" policy.

### ***Water Quality Objectives***

Chapter III of the Basin Plan identifies the following water quality objectives applicable to ground water in the area of the Company "X" Facility:

- a) "Ground waters shall not contain chemical constituents in concentrations that adversely affect beneficial uses."
- b) "Ground waters designated for use as domestic or municipal supply (MUN) shall not contain concentrations of chemical constituents in excess of the maximum contaminant levels specified in California Code of Regulations, Title 22, Division 4, Chapter 15." [drinking water standards]