

STATE WATER RESOURCES CONTROL BOARD
RESOLUTION NO. 94-117

CONSIDERATION OF AMENDMENTS TO THE WATER QUALITY
CONTROL PLAN FOR THE SAN FRANCISCO BAY BASIN
REGARDING IMPLEMENTATION OF GROUND WATER PROGRAMS

WHEREAS:

1. The California Regional Water Quality Control Board, San Francisco Bay Region (San Francisco Bay RWQCB) revised the Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) on December 17, 1986.
2. The State Water Resources Control Board (SWRCB) approved the majority of the Basin Plan under Resolutions No. 87-49 and No. 87-82. Those portions that were remanded and subsequently reconsidered by the San Francisco Bay RWQCB were approved by the SWRCB under Resolution No. 87-92.
3. Division 7 of the California Water Code states that Basin Plans shall be periodically reviewed and, if appropriate, revised.
4. The San Francisco Bay RWQCB, under Resolution No. 92-131, adopted Basin Plan amendments addressing ground water protection and cleanup on October 21, 1992.
5. The SWRCB adopted Resolution No. 94-19 (Attachment 1) which approved the amendments to Chapters 1 Introduction, Chapter 2 Beneficial Uses, and Chapter 3 Water Quality Objectives, and portions of Chapter 4 Implementation. The remaining portions of Chapter 4 were remanded to the San Francisco Bay RWQCB for reconsideration of specific language.
6. On August 17, 1994, the San Francisco Bay RWQCB adopted, under Resolution No. 94-101 (Attachment 2), revised Basin Plan amendments that establish soil cleanup levels for volatile and semi-volatile organic compounds and that allow the establishment of ground water cleanup "non-attainment areas".
7. The Regional Water Quality Control Board, San Diego Region recently adopted a cleanup and abatement policy for ground water and soil, and while the two policies are similar, they are not fully consistent.
8. The revised Basin Plan amendments are consistent with the requirements of Public Resources Code Section 21000 et seq. (California Environmental Quality Act).
9. The San Francisco Bay RWQCB Resolution No. 94-101 was adopted in accordance with State laws and regulations.

10. These Basin Plan amendments do not become effective until approved by the SWRCB and until regulatory provisions are approved by the Office of Administrative Law (OAL).

THEREFORE BE IT RESOLVED THAT:

The SWRCB:

1. Approves the Basin Plan amendment adopted by the San Francisco Bay RWQCB under Resolution No. 94-101 on August 17, 1994 with the exception of:
 - a. Page 12 second bulleted paragraph, second sentence; and
 - b. The section titled "Non-Attainment of Ground Water Cleanup Levels" (page 19 - 21).
2. Holds consideration of items 1.a. and 1.b., above, in abeyance pending SWRCB consideration of the need for a statewide ground water cleanup policy.
3. Directs the SWRCB Executive Director to work with the RWQCB Executive Officers to develop a statewide policy on ground water and soil cleanup, for SWRCB review. It is the SWRCB's desire to have the matter brought forward for review and consideration within 120 days. The SWRCB requests the Executive Director to report at each SWRCB workshop in the interim on the progress toward development of the policy.
4. Authorizes staff to forward the regulatory provisions of the approved amendments to OAL.

CERTIFICATION

The undersigned, Administrative Assistant to the SWRCB, does hereby certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly adopted at a meeting of the State Water Resources Control Board held on December 13, 1994.


Maureen Marché
Administrative Assistant to the Board

STATE WATER RESOURCES CONTROL BOARD
RESOLUTION NO. 94-19

APPROVAL OF GROUND WATER AMENDMENTS TO THE WATER QUALITY
CONTROL PLAN FOR THE SAN FRANCISCO BAY BASIN REGARDING
PROTECTION AND CLEANUP OF GROUND WATER

WHEREAS:

1. The California Regional Water Quality Control Board, San Francisco Bay Region (San Francisco Bay Regional Water Board) revised the Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) on December 17, 1986 under Resolution No. 86-14.
2. The State Water Resources Control Board (State Water Board) approved the majority of the Basin Plan under Resolutions No. 87-49 and No. 87-82. Those portions that were remanded and subsequently readopted by the San Francisco Bay Regional Water Board were approved by the State Water Board under Resolution No. 87-92.
3. Division 7 of the California Water Code states that Basin Plans shall be periodically reviewed and, if appropriate, revised.
4. The San Francisco Bay Regional Water Board held a public workshop on September 3, 1992, conducted a public hearing on October 21, 1992, and adopted Resolution No. 92-131 (Attachment 1) amending the Basin Plan on October 21, 1992, following the public hearing.
4. The amendments modify the Basin Plan as follows:
 - a. Chapter 1, Introduction: incorporates language regarding ground water into the general discussion of regional water quality;
 - b. Chapter 2, Beneficial Uses: identifies specific ground water basins and designates their beneficial uses;
 - c. Chapter 3, Water Quality Objectives: incorporates updated ground water quality objectives; and
 - d. Chapter 4, Implementation: updates the discussion of current ground water programs and revises the implementation plan particularly with respect to cleanup of polluted ground water sites that are degrading or threatening to degrade ground water.
5. The amendments incorporate two guidance documents that are subject to the approval of the State Water Board pursuant to Water Code Section 13245.5:

- a. "Designated Level Methodology for Waste Classification and Cleanup Level Determination" (Designated Level Methodology) dated June 1989;
 - b. "Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites" (Tri-Regional Guidelines) dated August 1990;
6. The amendments incorporate State Water Board Resolution No. 92-49 which was disapproved by the Office of Administrative Law after the date of the San Francisco Bay Regional Water Board action, and it also references the "Leaking Underground Fuel Tank Field Manual" (LUFT Manual) which is out of date and undergoing revision.
 7. A section of the amendments which sets an unsaturated zone cleanup level for total volatile organic compounds (VOCs) is not clearly written.
 8. The term "alternative point of compliance" is defined in the amendment in a way that could result in confusion with existing regulatory language contained in Chapter 15 of the California Code of Regulations.
 9. Subsection "Modification of Ground Water Cleanup Levels" contains the specification "[g]round water pollutant concentrations have reached an asymptotic level using appropriate technology" which could be interpreted as allowing the Regional Water Board to set ground water cleanup levels at concentrations exceeding water quality objectives.
 10. The Basin Plan amendments are consistent with the requirements of Public Resources Code 21000 et seq. (California Environmental Quality Act).
 11. San Francisco Bay Regional Water Board Resolution No. 92-131 was adopted in accordance with State laws and regulations.
 12. Basin Plan amendments do not become effective until approved by the State Water Board and until regulatory provisions are approved by the Office of Administrative Law.

THEREFORE BE IT RESOLVED THAT:

The State Water Board:

1. Approves the Basin Plan amendments to Chapter 1 (Introduction), Chapter 2 (Beneficial Uses), and Chapter 3 (Water Quality Objectives) as adopted by San Francisco Bay Regional Water Board Resolution No. 92-131.
2. Approves the amendments to Chapter 4 (Implementation), except for those items specified in Attachment 2 which are remanded to the Regional Water Board for further consideration.
3. Authorizes staff to forward the regulatory provisions of the approved amendments to the Office of Administrative Law for approval.

CERTIFICATION

The undersigned, Administrative Assistant to the State Water Board, does hereby certify that the foregoing is a full, true, and correct copy of a policy duly and regularly adopted at a meeting of the State Water Resources Control Board held on February 17, 1994.


Maureen Marché
Administrative Assistant to the Board

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

RESOLUTION NO. 94-101

**ADOPTING A REVISED GROUND WATER AMENDMENT
TO THE WATER QUALITY CONTROL PLAN
AND REQUESTING APPROVAL FROM
THE STATE WATER RESOURCES CONTROL BOARD**

Whereas, the California Regional Water Quality Control Board, San Francisco Bay Region (Regional Water Board) adopted an amendment revising the ground water portions of the Water Quality Control Plan for San Francisco Bay Basin (Basin Plan) on October 21, 1992.

Whereas, the State Water Resources Control Board (State Water Board) approved portions of the ground water amendment and remanded selected sections of Chapter 4 for Regional Water Board clarification on February 17, 1994.

Whereas, the Regional Water Board has developed a revised amendment to the Basin Plan in accordance with Section 13240 et seq. of the California Water Code;

Whereas, the Regional Water Board circulated a draft of the revised amendment on June 1, 1994, and announced the availability of a staff report and other supporting documentation;

Whereas, the Regional Water Board held a public hearing on July 20, 1994 and on August 17, 1994 on the revised Basin Plan amendment in accordance with Section 13244 of the California Water Code;

Whereas, the revised Basin Plan amendment must be approved by the State Water Board as provided in Section 13245 and 13246 of the California Water Code before becoming effective;

Whereas, the Regional Water Board prepared and distributed a written report dated June 1, 1994 identifying alternatives to the proposed amendment and an environmental checklist in compliance with the Public Resources Code Section 21000 et seq. (CEQA) and found that no significant adverse environmental impacts could result from implementation of the revised Basin Plan amendment;

Whereas, the Regional Water Board finds no significant adverse environmental impacts could result from implementation of the revised Basin Plan amendment;

Whereas, the Regional Water Board concludes that this amendment as a whole involves "no potential for adverse effect, either individually or cumulatively on wildlife", and is therefore exempt from Department Fish and Game filing fees.


Therefore, be it resolved that:

The Regional Water Board adopts the Final Draft revised Basin Plan amendment, dated August 17, 1994.

The State Water Board is requested to approve the revised Basin Plan amendment in accordance with Sections 13245 and 13246 of the California Water Code.

The Regional Board directs the Executive Officer to sign and file a Certificate of Fee Exemption with the Department of Fish and Game for this amendment to the Basin Plan.

I, Steven R. Ritchie, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of a Resolution adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on August 17, 1994.



STEVEN R. RITCHIE
EXECUTIVE OFFICER

IV. IMPLEMENTATION

INTRODUCTION

(Delete first paragraph pg. IV-1 and replace with following)

The actions to protect the beneficial uses and water quality of the San Francisco Bay Basin are presented in this chapter under five categories: (1) point source control measures, (2) ground water protection and management, (3) nonpoint source control measures, (4) estuarine management, and (5) continued planning. The sum of these actions is a comprehensive water quality control program which is protective, yet flexible and aimed at achieving maximum efficiency and effect.

INDUSTRIAL WASTE DISCHARGES

(Delete third from last paragraph, pg. IV-26 and replace with following)

This section discusses industrial waste discharges to surface waters. Other industrial waste disposal practices are discussed in a later section titled "Hazardous and Nonhazardous Waste Disposal".

(Delete sections "Solid and Hazardous Waste", pgs. IV-27 through IV-30 and "Leaking Underground Tanks and Abandoned Sites", pg. IV-30, 31)

(Insert the following new section beginning on pg. IV-33)

GROUND WATER PROTECTION AND MANAGEMENT

Per Regional Water Board Resolution No. 89-39, almost all the Region's ground waters are considered to be existing or potential sources of drinking water. With limited resources, the Regional Water Board must concentrate its ground water protection and management efforts on the most important ground water basins. DWR has identified thirty-one individual ground water basins in the San Francisco Bay Region that serve, or could serve, as sources of high quality drinking water.

Increased demands on these ground water resources have become evident in the rapidly developing Bay Area. Years of drought and a decade of discoveries of ground water pollution have resulted in impacts or impairment to portions of these basins. Some municipal, domestic, industrial, and agricultural supply wells have been taken out of service due to the presence of pollution. Some of the basins have also been affected by over-pumping, resulting in land subsidence and salt water intrusion.

Such pressures on the ground water resource require that comprehensive environmental planning and management practices be developed and implemented for each individual basin by all concerned and affected parties. The Regional Water Board will foster this concept with the following ground water protection and management goals for the San Francisco Bay Region.

Program Goals:

- 1) *Identify and update beneficial uses and water quality objectives for each ground water basin*

Water quality objectives must maintain the existing high quality of ground water and protect its beneficial uses. The Regional Water Board's program to identify and update objectives is described below under "Application of Water Quality Objectives".

- 2) *Regulate activities that impact or have the potential to impact the beneficial uses of ground waters of the Region.*

Federal, State, and local ground water protection and remediation programs that will result in the overall maintenance or improvement of ground water quality must be implemented region-wide in a consistent manner. When a potential threat or problem is discovered, containment and cleanup efforts must be undertaken as quickly as possible to limit ground water pollution. Where activities that could affect the beneficial uses of ground water are not regulated by other Federal, State, or local

programs, the Regional Water Board will consider regulation depending upon the threat to beneficial uses and availability of Regional Water Board resources. The Regional Water Board's program for hazardous and nonhazardous waste disposal, shallow drainage wells, and cleanup of polluted sites is described below under "Regulation of Potential Pollution Sources".

3) *Prevent future impacts to the ground water resource through local and regional planning, management, and education.*

Ground water is an integral component of the hydrologic system of a watershed. A comprehensive watershed management approach is necessary to protect ground water resources. The Regional Water Board's program for broadening their information base on ground water resources and individual protection needs of basins is described below under "Ground Water Protection Program."

APPLICATION OF WATER QUALITY OBJECTIVES

Water quality objectives apply to all ground waters, rather than at a wellhead or at a point of consumption. The maintenance of the existing high quality of ground water (i.e., "background") is the primary objective. The primary objective defines the lowest concentration limit that the Regional Water Board requires for ground water protection. The Regional Water Board also has narrative and numeric water quality objectives for bacteria, chemical constituents, radioactivity, and taste and odor (see Chapter III). These objectives define the upper concentration limit that the Regional Water Board considers protective of beneficial uses. The lower and upper concentration limits define the range that the Regional Water Board considers for cleanup levels of polluted ground water. Establishment of cleanup levels are discussed below under "Cleanup of Polluted Sites".

Numerical limits that implement all applicable water quality objectives, including Maximum Contaminant Levels (MCLs) or and Secondary Maximum Contaminant Levels (SMCLs), are only acceptable as the upper end of a concentration range to protect the beneficial uses of municipal

and domestic drinking water sources. MCLs and SMCLs. Such numerical limits are appropriate only at the upper end as they some are set after technical feasibility and treatment costs are considered, leave no margin for future spills, or possible changes in MCLs, and do not account for the combined risks present when many chemicals are present.

Ideally, the Regional Water Board would establish numerical ground water objectives for all constituents. However, the Regional Water Board is limited in its ability and resources to independently establish numerical objectives for ground water and will usually look to other appropriate agencies and organizations (e.g., State Water Board, U.S. EPA, California Department of Health Services, Cal/EPA's Office of Environmental Health Hazard Assessment, Cal/EPA's Department of Toxic Substances Control, etc.) to provide the numerical criteria for Regional Water Board consideration as ground water objectives. The Regional Water Board refers to the Central Valley Regional Water Board's staff report, "A Compilation of Water Quality Goals", to identify the numeric criteria from these agencies and organizations.

In practice, the Regional Water Board uses water quality objectives for ground water somewhat differently from those for surface water. For ground water, the Regional Water Board's emphasis is the regulation of sites where objectives are not being met, cleanup is required and/or under way and no further waste discharges will be allowed in the future. In contrast, surface water discharges regulated by the Regional Water Board are usually for on-going discharges regulated to meet water quality objectives in receiving waters.

In the typical situation, the Regional Board must identify and establish site- and basin-specific ground water beneficial uses and standards for the cleanup of ground water polluted by the numerous and extensive spills and leaks of toxic chemicals (e.g., organic solvents, fuels, metals, etc.).

Very few waste discharges to land are allowed by the Regional Water Board and those that are permitted (e.g., landfills, industrial waste disposal, above ground soil treatment, etc.) are closely regulated under the requirements of existing laws and regulations in order to maintain and protect

ground water quality objectives. An additional category of discharges to land is the numerous individual domestic waste disposal systems (e.g., septic systems) that are permitted and regulated by the counties. The Regional Water Board waives regulation based upon the fact that the counties' regulation of the systems complies with applicable Regional Water Board requirements.

Ground water objectives for individual basins may be developed in the future. As the Regional Water Board completes projects which provide more detailed delineation of beneficial uses within basins, revised objectives may be developed for portions of ground water basins that have unique protection needs. One such project is described below under "Ground Water Protection Programs".

REGULATION OF POTENTIAL POLLUTION SOURCES

(Insert new section "Shallow Drainage Wells" as adopted by the Regional Water Board on September 1992 and after approval by the State Water Board)

HAZARDOUS AND NONHAZARDOUS WASTE DISPOSAL

Discharges of solid, semisolid and liquid wastes to landfills, waste piles, surface impoundments, and land treatment facilities can create sources of pollution affecting the quality of waters of the state. Unlike discharges of waste that can be assimilated by the receiving waters, if the concentration of pollutants in the waste is regulated (i.e., treated waste water from municipal or industrial facilities), discharges of wastes to waste management units require long term containment or active treatment following the discharge in order to prevent waste or waste constituents from migrating to and impairing the beneficial uses of the State. Pollutants from such discharges may continue to affect water quality long after the discharger has stopped discharging new wastes at a site, either because of continued discharges from the site, or because pollutants from the site have accumulated in underlying soils from which they are reaching ground water.

Landfills for disposal of municipal or industrial solid waste (solid waste disposal sites) are the major categories of waste management units in

the region, but there are also surface impoundments used for storage or evaporative treatment of liquid wastes, waste piles, and land treatment facilities where semi-solid sludge from wastewater treatment facilities and liquid wastes from refinery operations are discharged for biological treatment. The Regional Water Board issues waste discharge requirements to ensure that these discharges are properly contained to protect the Region's water resources from degradation, and to ensure that the dischargers undertake effective monitoring to verify continued compliance with requirements.

These discharges, and the waste management units at which the wastes are discharged, are subject to concurrent regulation by other State and local agencies responsible for land use planning, solid waste management, and hazardous waste management. "Local Enforcement Agencies" implement the State's solid waste management laws and local ordinances governing the siting, design, and operation of solid waste disposal facilities (usually landfills) with the concurrence of the California Integrated Waste Management Board (CIWMB). The CIWMB also has direct responsibility for review and approval of plans for closure and post-closure maintenance of solid waste landfills. The Department of Toxic Substance Control (DTSC) issues permits for all hazardous waste management treatment, storage, and disposal facilities (which include incinerators, tanks, and warehouses where hazardous wastes are stored in drums as well as landfills, waste piles and surface impoundments).

The State Water Board, Regional Water Boards, CIWMB, and DTSC have entered into a Memorandum of Understanding to coordinate their respective roles in the concurrent regulation of these discharges.

The Regional Water Board regulates landfills receiving municipal solid wastes and facilities receiving industrial wastes of various types. These sites are closely regulated and monitored; however, some water quality problems have been detected and are being addressed. As a result of federal laws in the area of hazardous waste regulation, more effort is devoted to regulation of the on-site treatment, storage, and disposal of hazardous waste. These are discharges that are operated by entities that generate the waste and where only wastes generated by the entities are disposed.

The laws and regulations governing the discharges of both hazardous and nonhazardous solid wastes have been revised and strengthened in the last few years. Implementation of the following programs is described below: California Code of Regulations (CCR) Title 23, Chapter 15; RCRA; Toxics Pits Cleanup Act; and Solid Waste Assessment Tests. The Regional Water Board's policies on two significant areas of regulatory concern with respect to landfills - Landfill Expansions and Bayfront Landfill Expansion Into Wetlands - are also included below.

CCR Title 23, Chapter 15

The most significant regulation used by the Regional Water Board in regulating hazardous and nonhazardous waste treatment, storage, and disposal is CCR Title 23, Division 3, Chapter 15, formerly Subchapter 15. These regulations include very specific siting, construction, monitoring and closure requirements for all existing and new waste treatment, storage, and disposal facilities. Chapter 15 also contains a provision requiring operators to provide assurances of financial responsibility for initiating and completing corrective action for all known or reasonably foreseeable releases from their waste management units. Detailed technical criteria are provided for establishing water quality protection standards, monitoring programs, and corrective action programs for releases from waste management units. Chapter 15 requires the review and update of waste discharge requirements for all hazardous waste treatment, storage, and disposal sites by January 1, 1993 and for all nonhazardous waste treatment, storage, and disposal sites by July 1, 1994.

Chapter 15 defines waste types to include hazardous wastes, designated wastes, nonhazardous solid wastes, and inert waste. Hazardous wastes are defined by DTSC in CCR Title 22. Designated wastes are defined as:

- 1) those non-hazardous wastes that consist of or contain pollutants which under ambient conditions at the waste management unit could be released at concentrations in excess of water quality objectives, or
- 2) hazardous wastes pursuant to CCR Title 22, which are not considered hazardous by the Federal RCRA definition, that have been granted a variance from hazardous waste

management requirements by DTSC.

Finally, nonhazardous solid wastes are those normally associated with domestic and commercial activities. Nonhazardous solid wastes and inert wastes can be regulated by the Regional Water Board if necessary to protect water quality.

The regulation of nonhazardous solid waste facilities (Class III) has been on-going by the Regional Water Board since the mid-1970's, and in some instances may extend to the early 1950's. Many of the small, older facilities have closed, and waste is now being disposed at large regional nonhazardous solid waste facilities. The Regional Water Board's main actions at nonhazardous solid waste facilities are the review and revision of waste discharge requirements for the active sites to assure consistency with the current regulations. These actions include defining the levels of designated wastes (see below), the upgrading of ground water monitoring systems to identify if water quality protection standards are violated, the establishment of corrective action programs where standards are violated, and review and oversight of the development and implementation of facility closure plans.

A significant task in implementing Chapter 15 by the Regional Water Board at nonhazardous solid waste facilities is defining designated wastes. Many wastes which are not hazardous still contain constituents of water quality concern that could become soluble in a nonhazardous solid waste facility and produce leachates and gases that could pose a threat to beneficial uses of state waters.

The criteria for determining whether a nonhazardous waste is a designated waste are based on water quality objectives in the vicinity of the site, the containment features of the solid waste facility, and the solubility/mobility of the waste constituents. Therefore, all owners and operators of active nonhazardous municipal solid waste facilities in the San Francisco Bay Region who wish to receive wastes other than municipal solid waste or inert wastes must propose waste constituent concentration criteria above which wastes will be considered designated waste and therefore, not suitable for disposal at their site. Such proposals are subject to approval by the Executive Officer when appropriately delegated by the Regional Water Board. *The Regional Water*

Board will refer to the Central Valley Regional Water Board's staff report, "Designated Level Methodology for Waste Classification and Cleanup Level Determination", or an equivalent methodology acceptable to the Executive Officer to assist in identifying designated waste criteria.

Resource Conservation and Recovery Act

The State implements RCRA's Subtitle C - Hazardous Waste Regulations for Treatment, Storage, and Disposal - through DTSC and the Regional Water Boards. In August 1992, the U.S. EPA formally delegated RCRA Subtitle C program implementation authority to DTSC. As described above, regulation of hazardous waste discharges is also included in CCR Title 23, Chapter 15. CCR Title 23, Chapter 15 monitoring requirements were also amended in 1991 so as to be equivalent to RCRA requirements. These will be implemented through the adoption of waste discharge requirements for hazardous waste sites covered by RCRA. The discharge requirements will then become part of a State RCRA permit issued by DTSC.

Federal regulations required by the RCRA's Subtitle D have been adopted for municipal solid waste landfills (40 CFR 257 & 258). These regulations are self-implementing, with portions effective October 1991, October 1993 and later. The CIWMB is the State lead agency for Subtitle D implementation. The State Water Board and the CIWMB are applying to EPA for State program approval. It is important to note that certain federal regulatory requirements will be effective unless and until the State program is approved.

Delegation of authority for the State Water Board to implement Subtitle I (Underground Storage Tanks) will occur after U.S. EPA approves the State's program approval application.

Toxic Pits Cleanup Act

The Toxic Pits Cleanup Act of 1984 (TPCA) required that all impoundments containing liquid hazardous wastes or free liquids containing hazardous waste be retrofitted with a liner/leachate collection system, or dried out by July 1, 1988, and subsequently closed to remove all contaminants or contain any residual contamination in accordance with Chapter 15, Title 22, and RCRA regulations. In 1985, there

were 26 sites in the Region with ponds subject to TPCA. As of 1992, one site is continuing to operate its facility following upgrading to meet under TPCA exemption requirements. Of the remaining sites, 19 have closed and the remainder have been delayed in closure either by complications in the federal/DTSC RCRA closure process, or by the Board's decision to grant a time extension to delay closure to allow for gradual removal and reuse of materials in the ponds. All these sites are expected to close by 1995.

Solid Waste Assessment Tests

Section 13273 added to the Water Code in 1985, requires all owners of both active and inactive nonhazardous landfills to complete a Solid Waste Assessment Test (SWAT) to determine if hazardous wastes have migrated from the landfill. There were 175 195 sites identified in the Region subject to this program. Pursuant to a list adopted by the State Water Board, 150 site owners statewide per year would complete this evaluation by the year 2001. All sites eventually will be required to complete a SWAT unless waived or exempted in accordance with the law. However, due to elimination of program funding was eliminated in 1991 and restored in 1992 solely for the review of backlogged SWAT documents from Ranks 1 through 5; SWAT reports from Ranks 6 and above are currently reviewed only for sites under regulation due to by other Regional Water Board programs, thus, significantly delaying completion of the program. All sites eventually will be required to complete a SWAT and more sites will be reviewed if more program funding becomes available as is expected. Assembly Bill 1220 (1993) provides for continued funding of the SWAT Program for Ranks 6 and beyond from the Integrated Waste Management Fund. Negotiations are currently in progress to accomplish this.

Landfill Expansions

The steady increase in the rate of solid waste generation in the Region has resulted in the filling and need for closure of existing disposal sites, and created needs for the expansion of existing sites and the creation of new ones. The Regional Water Board strongly discourages the location of new landfills or the expansion of existing facilities in sensitive ground water areas. To minimize the problems associated with the

disposal of solid wastes, this Regional Water Board supports the vigorous implementation of the requirement for 50 percent reduction in the total quantity of waste disposal by the year 2000 as called for in AB 939. Designated wastes should be precluded from Class III landfills through local checking programs, recycling, and diversion. To reduce the potential for household hazardous wastes entering municipal landfills, this Regional Water Board supports local programs for public education and for household hazardous waste disposal and recycling.

Bayfront Landfill Expansions Into Wetlands

A significant issue that the Regional Water Board has addressed in a few cases and may be asked to address for other sites is the expansion of existing bayfront landfills into wetland areas. The Regional Water Board, in a few cases, allowed modest expansions (and undesirable loss of wetlands) to allow local government time to develop other disposal options. However, both expansions were only approved because there was a demonstrated immediate public need. The State Water Board, in a decision on an appeal of one of the expansions, clearly indicated that such future expansions into wetlands would not be given the same approvals and that local governments must complete the necessary planning to avoid this problem. Given that position and the wetlands provisions contained elsewhere in this Plan, the Regional Water Board will not approve further expansions of bayfront landfills into wetlands.

CLEANUP OF POLLUTED SITES

The Regional Water Board has identified over 5,400 sites with confirmed releases of constituents of concern which have polluted or threaten to pollute ground water. Sources of pollution at these sites include: leaking underground storage tanks and sumps, leaking above ground tanks, leaking pipelines, surface spills from chemical handling, transfer or storage, poor housekeeping, and illegal disposal.

The Regional Water Board's strategy for managing polluted sites is discussed below under the following five sections:

- 1) Program areas
- 2) Requirements for site investigation and

remediation,

- 3) Progress of the Regional Water Board's program
- 4) Setting cleanup levels
- 5) Future regulatory management strategies

Several important Regional Water Board policies are detailed in these five sections. The following list summarizes these policies and indicates the section where they are explained:

- The Regional Water Board will follow procedures and policies in State Water Board Resolution No. 92-49, "Policies and Procedures for Investigation and Cleanup and Abatement of Discharges Under Water Code 13304", regardless of the type of discharge. (Section 2)
- ~~The Regional Water Board will consider modifying site specific ground water cleanup requirements only when a final remedial action plan is fully implemented, aggressively pursued, and a set of specific conditions are met. (Section 3)~~
- Ground water and soil cleanup levels are approved by the Regional Water Board. The Executive Officer or a local agency may approve cleanup levels as appropriately established by the Regional Water Board. (Section 4)
- Ground water cleanup levels are established based on beneficial uses of the waterbody and water quality objectives outlined in Chapter III. The concentration range for cleanup levels is high quality "background" or between "background" and numerical limits that implement all applicable water quality objectives, including the more restrictive of Maximum or Secondary Maximum Contaminant Levels for ground waters with a beneficial use of municipal and domestic supply. These numerical limits (e.g., MCLs or SMCLs) will only be considered worst case, upper concentration limits as they may not provide adequate public health protection in the instance of exposure to multiple chemicals. (Section 4)

- The Regional Water Board will use risk management techniques to consider establishment of cleanup levels above background and at or below MCLs or SMCLs numerical limits that implement all applicable water quality objectives for ground waters having with beneficial uses. ~~of municipal and domestic supply.~~ (Section 4)
- Compliance with ground water cleanup levels must occur throughout the pollutant plume. ~~Alternate points of compliance.~~ Establishment of ~~non-attainment areas.~~ may be considered under a specified set of conditions. (Section 4)
- Soil cleanup levels should be to background. Where soil cleanup levels remain above background, soil cleanup levels are established based upon acceptable health risks, if appropriate, and to ensure that any residual mobile pollutants ~~leachate~~ generated would not cause ground or surface water to exceed applicable water quality objectives. Minimal dilution may be considered. (Section 4)
- Verification of soil cleanup generally requires follow up ground water monitoring. (Section 4)
- The Regional Water Board will review and seek input on its overall approach to managing site cleanups. (Section 5)

1) PROGRAM AREAS

Sites with identified pollution problems are managed through five program areas. Significant implementation issues in each of the following program areas are discussed below:

- Underground Storage Tank (UST) Program (>5,000sites)
- Spills, Leaks, Investigation and Cleanup (SLIC) Program (>400sites)
- Department of Defense/Department of Energy Program (15 sites)
- U.S. EPA Superfund Program (30 sites)
- Aboveground Petroleum Storage Tank

Program (approx. 200 sites)

a. Underground Storage Tank Program

Implementation of the Underground Storage Tank (UST) Program is unique, as the Health and Safety Code Division 20, Chapters 6.7 and 6.75 give local agencies the authority to oversee investigation and cleanup of UST leak sites. The Corrective Action regulations (CCR, Title 23, Chapter 16, Article 11) use the term "regulatory agency" in recognition of the fact that local agencies have the option to oversee site investigation and cleanup, in addition to their statutory mandate to oversee leak reporting and tank closure.

~~Several local agencies now have the independent authority under UST laws to act on the Regional Water Board's behalf in requiring investigations and cleanup.~~ The Regional Water Board still retains ~~the~~ its Water Code authority to approve case closure. However, the Regional Water Board has authorized a few local agencies to close fuel leak cases where ground water has not been polluted and future ground water impacts are not expected.

Some local agencies also provide oversight for underground fuel storage tank cases under a Local Oversight Program (LOP) contract with the State Water Board. ~~All~~ Most oversight charges are billed to responsible parties. Additionally, a few other local agencies have funded their own (non-LOP) oversight programs and have developed guidance documents based upon State and Regional Water Board guidance. Table IV-9 provides a brief summary of these agencies programs.

There are several reference documents pertinent to releases from underground storage tanks as described below.

- State regulations regarding underground tank construction, monitoring, repair, closure, release reporting, and corrective action are contained within CCR Title 23, Chapter 16.
- Specific recommendations regarding Chapter 16 soil and ground water investigations are contained in "Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites", written by the staffs of the North Coast, Central Valley, and

San Francisco Bay Regional Water Boards. This document is commonly referred to as the "Tri-Regional Guidelines." The primary purpose of the document is to provide uniform procedures for performing investigations. It describes a systematic approach for determining which actions are required, including soil cleanup only or when a more comprehensive soil/ground water investigation is required.

~~The State Water Board issued the "Leaking Underground Fuel Tank (LUFT) Field Manual" as a tool for conducting site investigations and cleanup at fuel leak sites. It is being revised to incorporate the corrective action regulations, which became effective December 2, 1991, and to provide general guidance on the use of models and risk appraisal.~~

- Other local agency reference documents are listed on Table IV-9.

Table IV - 9. Summary of Local Agency UST Programs (as of April 1992)^g

Jurisdiction/Agency	Program Start Date	Staff	Cases	Comments
ALAMEDA COUNTY				
County Health Department	10/91	7.5	392	d,e
Alameda County Water District (Fremont, Union City, Newark)	1/89	4	330	a,c,e
CONTRA COSTA COUNTY				
County Health Services Department	1988	7	>270	c,e
MARIN COUNTY				
City of San Rafael	2/90	1	98	c,f
NAPA COUNTY				
Department of Environmental Management	5/89	2.3	152	a,e
SAN FRANCISCO COUNTY				
County Public Health Department	6/91	3	90	c
SAN MATEO COUNTY				
County Department of Health Services	1988	5	600	h

SANTA CLARA COUNTY				
Santa Clara Valley Water District	3/87	13	1134	a,b,d,e
SOLANO COUNTY				
County Health Department	1/92	1	30	c
SONOMA COUNTY				
County Health Department	4/88	8.75	360	a,c,d

Comments:

- a. Guidance Document is available, contact agency.
- b. Agency may close soil only pollution cases without review by RWQCB.
- c. Program is self-funded; agency does not have LOP contract with State Board
- d. Program is both self-funded and funded through an LOP contract
- e. Agency oversees other related activities including one or more of the following: tank and pipe line inspections, well permitting and inspection. Hazardous Materials Management Plan review, and ground water protection program oversight.
- f. The City of San Rafael contracts out some of their inspection and oversight work to private consulting firms. Responsible parties are billed for oversight costs.
- g. For more up-to-date or detailed information, please contact the local agency directly.

b. Spills, Leaks, Investigation, and Cleanup Program (SLIC)

Sites that are managed within the SLIC program include sites with pollution from recent or historic surface spills, subsurface releases (e.g. pipelines, sumps, etc.), complaint investigations, and all other unauthorized discharges that pollute or threaten to pollute surface or ground water. There is some overlap with the UST program as many SLIC cases also have leaking underground tanks. Alternatively, some cases that involve both leaking solvent tanks and other pollution sources may end up in the UST program.

Many historic spill cases were identified by the early 1980's survey conducted by the Regional Water Board. New spills are identified in a variety of ways including: discharger reports, complaints to the Regional Water Board's field investigation team, the Regional Water Board's own surveillance, proposed property transfer reports, and local agency reports. Initial response to spill incidents is generally handled by the Regional Water Board's Field Investigation Team. The case is then screened, with notices sent as appropriate under the Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Subsequent to the "control" of the spill, the case is transferred to SLIC program staff. High priority cases are assigned for follow up by the SLIC program as staffing permits.

Investigation, remediation, and cleanup at SLIC sites proceeds under procedures outlined in State Water Board Resolution No. 92-49 and is discussed in Section 2 below.

c. Department of Defense and Department of Energy Program

The goal of this program is cleanup of pollution at federal military sites (Department of Defense - DoD) and federal energy agency sites (Department of Energy - DoE).

Investigation and cleanup at these sites must meet the requirements of the U.S. EPA "Superfund" hazardous waste cleanup program. This involves completion of the formal Preliminary Assessment, Site Investigation, Remedial Investigation and Feasibility Study leading to a Record of Decision on an acceptable Remedial Action Plan.

The State has signed agreements with the

Department of Defense (Defense- State Memorandum of Agreement - DSMOA) and Department of Energy (Agreement in Principle) establishing procedures under which site investigation and cleanup will proceed, decisions made, and disputes resolved. Regional and State Water Board staff oversight costs are fully or partially reimbursed by various cost recovery mechanisms. At DoE sites, reimbursement is currently limited to tasks related to review of monitoring data and monitoring system adequacy to characterize sites and determine effectiveness of remedial actions. The potential exists to increase the scope of eligible reimbursement activities in the future.

The DoD program includes closing bases that are subsequently to be made available, to the extent possible, for sale or lease to private or public parties. There is considerable State and federal interest in moving parcels into economically productive uses, in part, to offset the negative economic impact of the base closures on the local community. Special care will be required to assure that such transfers are done in a manner consistent with protection of water quality, public health, and the environment.

d. U.S. EPA Superfund Program

In April 1988, the State and Regional Water Boards received a U.S. EPA grant for coordinating and enforcing ground water cleanup at Federal Superfund sites in the South Bay. The grant is known as the "South Bay Multi-Site Cooperative Agreement" (MSCA). The primary goals of MSCA are:

- To accelerate cleanup of polluted ground water at Superfund sites in the South Bay.
- To augment the Regional Water Board's existing programs to ensure that U.S. EPA's requirements, as defined in the National Contingency Plan, are met for those sites on the National Priority List (Superfund) assigned to the Regional Water Board as lead agency.
- To finance Regional Water Board staff support on U.S. EPA-lead Superfund sites to assure cleanup decisions meet state requirements.

At most of the 30 MSCA sites, the toxics threats and risks are either under short-term control

(awaiting long-term solutions) or the responsible parties have constructed and/or implemented long-term remediation projects. At the remaining sites, the Regional Water Board is requiring completion of Remedial Investigation/Feasibility studies and proposed Remedial Action Plans (RAPs). After public review and comments on these studies and plans, the Regional Water Board will adopt the RAPs in individual Site Cleanup Orders. When U.S. EPA approves of the Regional Water Board's actions, they will administratively adopt a Record of Decision.

e. Aboveground Petroleum Storage Act

The State's Aboveground Petroleum Storage Act was enacted in 1989 and amended in 1991. The Act became effective on January 1, 1990.

The purpose of this Act is to protect the public and the environment from the serious threat of spillage of millions of gallons of petroleum-derived chemicals stored in thousands of aboveground storage tanks. The Act requires that the Regional Water Board inspect aboveground petroleum storage tanks used for crude oil and its fractions, for compliance with their federally required Spill Prevention, Control and Countermeasure Plan. In the event that a release occurs that threatens surface or ground water, the Act allows the State to recover reasonable costs incurred in the oversight and regulation of the cleanup.

"Storage Statements" are required from the facilities describing the location, nature, and size of their tanks. Filing fees are required which are intended to fund inspections, training and research. There are approximately 200-225 facilities within the Region that have filed their Storage Statements.

2) REQUIREMENTS FOR SITE INVESTIGATION AND REMEDIATION

The State Water Board adopted State Water Board Resolution No. 92-49, "Policies and Procedures for Investigation, Cleanup and Abatement of Discharges Under Water Code Section 13304. This Resolution contains the policies and procedures that all Regional Water Boards shall follow for the oversight and regulation of investigations and cleanup and abatement activities resulting from all types of discharge or threat of discharge subject to Section

13304 of the Water Code. Therefore, the five program areas within the Regional Water Board, listed above (UST, AGT, SLIC, etc.), now follow the same policies and procedures outlined in Resolution No. 92-49 for determining:

- when an investigation is required;
- scope of phased investigations necessary to define the nature and extent of contamination or pollution;
- cost-effective procedures to detect, clean up or abate contamination; and,
- reasonable schedules for investigation cleanup, abatement, or any other remedial action at a site.

State Water Board Resolution No. 92-49 outlines the five basic elements of a site investigation. Any or all elements of an investigation may proceed concurrently, rather than sequentially, in order to expedite cleanup and abatement of a discharge, provided that the overall cleanup goals and abatement are not compromised. State Water Board Resolution No. 92-49 investigation components are as follows:

- a. Preliminary site assessment (to confirm the discharge and the identity of the dischargers; to identify affected or threatened waters of the state and their beneficial uses; and to develop preliminary information on the nature, and vertical and horizontal extent, of the discharge);
- b. Soil and water investigation (to determine the source, nature and extent of the discharge with sufficient detail to provide the basis for decisions regarding subsequent cleanup and abatement actions, if any are determined by the Regional Water Board to be necessary);
- c. Proposal and selection of cleanup action (to evaluate feasible and effective cleanup and abatement actions, and to develop preferred cleanup and abatement alternatives);
- d. Implementation of cleanup and abatement action (to implement the selected alternative and to monitor in order to verify progress); and
- e. Monitoring (to confirm short- and long-term

effectiveness of cleanup and abatement).

State Water Board Resolution No. 92-49 requires that the Regional Water Board ensure that the discharger is aware of and considers minimum cleanup and abatement methods. The minimum methods that the discharger should be aware of and consider, to the extent that they may be applicable to the discharge or threat thereof, are:

- 1a. Source removal and/or isolation;
- 2b. In-place treatment of soil or water including bioremediation, aeration, and fixation;
- 3e. Excavation or extraction of soil, water or gas for onsite or off-site treatment techniques including: bioremediation; thermal destruction; aeration; sorption; precipitation, flocculation, and sedimentation; filtration; fixation; and evaporation; and.
- 4d. Excavation or extraction of soil, water or gas for appropriate recycling, re-use, or disposal.

3) PROGRESS OF THE REGIONAL WATER BOARD'S PROGRAM

The Regional Water Board has over 10 years of experience in the cleanup of polluted sites. The following findings are drawn from this regulatory experience:

Investigation

- A complete on- and off-site investigation of soil and ground water to determine full horizontal and vertical extent of pollution is necessary to ensure that adequate cleanup plans are proposed.

Remediation

- Immediate removal of the source, to the extent practicable, is required to prevent further spread of pollution as well as being among the most cost-effective remediation actions.
- Pump and treat ground water remediation, in some instances, is effective in hydraulically

containing pollution and removing pollutants.

- Vacuum extraction of pollutants in the vadose zone can be a cost-effective method to remove pollution sources.
- Bioremediation of petroleum pollution can be a cost-effective soil and ground water treatment alternative.

Limits of Existing Technology

- Available options for removing or treating *in-situ* polluted ground water are limited.
- Recent research, much of which is being confirmed at sites within the Region, demonstrates that using pump and treat technology removes and controls pollutant mass migration. However, pump and treat technology is not adequate technology, in some situations, to meet low concentration ground water objectives because the costs and time-frames may be prohibitive.
- Ground water pollution cleanup is lengthy and requires significant resources of both the discharger and the regulator.

4) SETTING CLEANUP LEVELS

The Regional Water Board approves soil and ground water cleanup levels for polluted sites. State Water Board Resolution No. 92-49 requires conformance with the provisions of State Water Board Resolution No. 68-16 and applicable provisions of CCR Title 23, Chapter 15. ~~to the extent feasible.~~

State Water Board Resolution No. 92-49 directs the Regional Water Board to ensure that dischargers are required to cleanup and abate the effect of discharges. This cleanup and abatement shall be done in a manner that promotes attainment of either background water quality, or the highest best water quality which is reasonable if background levels of water quality cannot be restored, considering all demands being made. ~~The determination of what is reasonable shall consider all demands being made and to be made~~ on those waters and the total values involved, beneficial and detrimental, economic and social, tangible, and intangible. In approving any

alternative cleanup levels less stringent than background, apply Section 2550.4 of Chapter 15, or, for cleanup and abatement associated with underground storage tanks, apply Section 2725 of Chapter 16, while considering the factors in Section 2550.4 of Chapter 15. Any such alternative cleanup levels shall:

- 1a. be consistent with maximum benefit to the people of the state;
- 2b. not unreasonably affect present and anticipated beneficial uses of such water; and
- 3e. not result in water quality less than that prescribed in the Water Quality Control Plans and Policies adopted by the State and Regional Water Boards.

Ground Water Cleanup Levels

The overall cleanup level established for a waterbody is based upon the most sensitive beneficial use identified. In all cases, the Regional Water Board first considers high quality or naturally occurring "background" concentrations as the cleanup levels for polluted ground water and the factors listed above under "Setting Cleanup Levels". For ground waters with a beneficial use of municipal and domestic supply, cleanup levels are set no higher than:

- Numerical limits that implement all applicable water quality objectives, including Maximum Contaminant Levels (MCLs) or adopted Secondary Maximum Contaminant Levels, whichever is more restrictive, or
- A more stringent level (~~i.e., below MCLs~~) based upon a site specific risk assessment. Cleanup levels must be set to maintain the excess upperbound lifetime cancer risk to an individual less than 1 in 10,000 (10^{-4}) or a cumulative toxicological effect as measured by the Hazard Index of less than one. For all sites performing risk assessments, an alternative with an excess cancer risk 1 in 1,000,000 (10^{-6}) or less must also be considered.

The Regional Water Board determines excess cancer risks and the Hazard Index following the U.S. EPA procedures (U.S. EPA's "Risk Assessment Guidance for Superfund", Volume

I, Parts A, B, C, and Supplemental Guidance, 1989, or as updated). Occasionally, the Regional Water Board may modify the U.S. EPA's approach outlined in these publications based on Cal/EPA's Office of Environmental Health Hazard Assessment guidelines or more current site- or pollutant-specific information.

Ground water cleanup levels are approved on a case-by-case basis by the Regional Water Board. The Executive Officer or a local agency may approve cleanup levels as appropriately established by the Regional Water Board. Proposed final cleanup levels are based on a discharger developed feasibility study of cleanup alternatives that compares effectiveness, cost, time to achieve cleanup standards, and a risk assessment to determine impacts on beneficial uses, human health and the environment. Cleanup levels must also take into account the mobility, toxicity, and volume of pollutants. Feasibility studies of cleanup alternatives may include the guidance provided by Subpart E of the National Oil and Hazardous Substances Pollution Contingency Plan (40 CFR 300); Section 25356.1(c) of the California Health and Safety Code; U.S. EPA's Comprehensive Environmental Response, Compensation, and Liability Act; the State Water Board's Resolution Nos. 68-16 and 92-49; and the Regional Water Board's Resolution No. 88-160.

Soil Cleanup Levels

Soil pollution can present a health risk and a threat to water quality. The Regional Water Board sets soil cleanup levels for the unsaturated zone based upon threat to water quality. Guidance from the U.S. EPA, Department of Toxics Substances Control, and Cal/EPA's Office of Health Hazard Assessment is also considered on health risks. In addition, if it is unreasonable to cleanup soils to background concentration levels, the Regional Water Board may:

- allow residual pollutants to remain in soil at concentrations such that:
 - a) any ~~leachate~~ residual mobile constituents generated would not cause ground water to exceed applicable ground water quality objectives, and
 - b) health risks from surface or subsurface

exposure are within acceptable guidelines .

- require follow up ground water monitoring to verify that ground water is not polluted by chemicals remaining in the soil. Follow up ground water monitoring may not be required where residual soil pollutants are not expected to impact ground water.
- require measures to ensure that soils with residual pollutants are covered and managed to minimize pollution of surface waters and/or exposure to the public.
- where significant amount of wastes remain onsite, implement applicable provisions of Chapter 15 to the extent applicable. This may include, but is not be limited to, subsurface barriers, pollutant immobilization, toxicity reduction, financial assurances.

In order for a discharger to make site specific recommendations for soil cleanup levels above background, the fate and transport of leachate can be modeled by the discharger utilizing site specific factors and appropriate models. Reasonable assumptions for minimal leachate dilution, as proposed by the discharger, may be considered by the Regional Water Board.

Cleanup levels are approved by the Regional Water Board. The Executive Officer or a local agency may approve cleanup levels as established by the Regional Water Board. Due to the tremendous number of sites with soil pollution, the Regional Water Board has considered developing "generic" cleanup levels for common soil pollutants. However, given the extreme variability of hydrogeologic conditions in the Region, the Regional Water Board is presently unable to recommend levels that would be protective of ground water at every site. One exception to this is cleanup standards for volatile organic chemicals (VOCs) and semi-volatile organic chemicals.

Several Regional Water Board Orders, adopted primarily for Superfund sites, include cleanup standards of 1 mg/kg (ppm) for total VOCs and 10 ppm for total semi-volatiles (as defined by EPA Methods 8240 and 8270, respectively). These standards apply to unsaturated soils only, and are based on the modeling results at a Superfund site in the Region, the existence of similar standards in the state of New Jersey, and

the professional judgement of Regional Water Board staff. As these are cleanup standards for total VOCs and total semi-volatiles, levels for individual constituents at polluted sites commonly are generally significantly lower than 1 ppm and 10 ppm, respectively. In particular, some constituents of concern have water quality standards less than 5 ppb (e.g., benzene, vinyl chloride, ethylene dibromide). Individual cleanup levels well below the 1 ppm VOC and 10 ppm semi-volatile standards may be established for these constituents.

At this time the Regional Water Board finds that these are appropriate cleanup levels for total VOCs and total semi-volatiles in the unsaturated zone at sites where ground water is being monitored and where cleanup to background is unreasonable. At sites where it is determined that the 1 ppm cleanup total VOC and 10 ppm total SVOC cleanup levels may be inappropriate, the Executive Officer may modify these cleanup levels to whatever level is considered adequately protective of water quality, human health, and the environment. These levels can be appropriately modified by the Executive Officer downward as needed to restore and protect water quality. Likewise, these levels can be modified upward if a discharger is able to demonstrate, with site specific data, that higher levels of VOCs and semi-volatiles in the soil unsaturated zone will not impede ground water cleanup efforts or threaten the quality of waters of the State and that human health and the environment are protected.

A common misconception is that the Regional Water Board has developed "generic" cleanup levels for petroleum hydrocarbons (gasoline, gasoline by-products, and diesel). One source of the misconception is a misreading of "Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites", written by the staff of the North Coast, Central Valley, and San Francisco Bay Regional Water Boards. This document is commonly referred to as the "Tri-Regional Guidelines". The Guidelines use 100 ppm Total Petroleum Hydrocarbons in soil as one screening tool for prioritization. The 100 ppm level is not a "generic" cleanup level.

Modification Non-Attainment of Ground Water Cleanup Levels

As a result of the findings regarding limits of existing technology, described above under "Progress of Regional Water Board's Program", and in consideration of the reasonable protection of beneficial uses and the maximum benefit to the people of the state pursuant to State Water Resources Control Board's Resolution No. 68-16, the Regional Water Board may consider modifying points of compliance and/or established ground water cleanup standards under the conditions below, establish non-attainment areas. Non-attainment areas are limited ground water pollution zones where concentrations are above water quality objectives.

It is not the intent of the Regional Water Board to allow dischargers who have caused, permitted, or threatened to cause or permit, conditions of pollution or nuisance to avoid responsibilities for cleanup. However, in some cases cleanup to levels which comply with all applicable water quality objectives may not be technologically or economically achievable within a reasonable period of time. In these cases, a non-attainment area is an option for a discharger to consider as a management strategy. To ensure the protection of beneficial uses of ground water, the Board will require dischargers to develop a plan to contain and manage polluted ground water (criteria d, below). To document compliance with this plan, the Regional Water Board will require dischargers to monitor for containment at points located at the pollution plume boundary, the property boundary, or at other appropriate locations. As long as it remains infeasible to achieve compliance with cleanup levels that meet water quality objectives within the non-attainment areas, the Discharger will not be subject to enforcement actions. However, established cleanup levels that meet water quality objectives must be achieved at containment monitoring points. The Regional Water Board will limit further discharges of waste to land and to ground water within non-attainment area. Once water quality objectives are met throughout the non-attainment area, standard closure procedures may proceed.

Non-attainment areas may be established as acceptable containment and management strategies for two categories of sites listed here and described in detail below:

I). Sites which have ground water pollution and residual soil pollution with limited water quality, environmental, and human health risks;

II). Sites for which the approved cleanup program has not resulted in compliance with water quality objectives.

The criteria for each Category is listed below. The Regional Water Board may establish a Category I, non-attainment area for classes of sites (e.g., geographic locations, pollutant types, geologic conditions) based on the criteria stated below. The Regional Water Board will determine which sites meet the Category II criteria.

Category I. Sites which have ground water pollution and residual soil pollution with limited water quality, environmental, and human health risks;

Sites which fall under Category I, typically have small plumes and, with appropriate management, have limited environmental and human health risks. In order for a site to be considered under Category I, the Discharger must submit information that adequately addresses ALL of the following four criteria (a. through d.) and must have conducted site investigation pursuant to Resolution 92-49 and must have adequately defined the vertical and horizontal extent of soil and ground water pollution. In general, compliance with approved cleanup levels must occur at all points within the plume of pollutants unless defined otherwise by specific regulatory programs. Alternative compliance points may be considered where:

- a. The ground water is in low-yielding, fine-grained sediments (silts and clays) and the discharger has demonstrated (e.g., pump tests, ground water monitoring, transport modeling), and will verify (e.g., ground water monitoring) that no significant pollutant migration will occur due to hydrogeologic or chemical characteristics to underlying or adjacent aquifers; and
- b. Adequate source removal and/or isolation is undertaken to limit future migration of chemicals/pollutants to ground water; and
- c. Dissolved phase cleanup is not cost-effective due to limited water quality, environmental, and human health risks and separate phases have been or are actively being removed. Alternative or best available technologies are

~~inappropriate or not cost effective; and~~

d. An acceptable plan is submitted and implemented for containing and managing the remaining human health, water quality, and environmental risks, if any, posed by residual soil and ground water pollution. This plan ~~could~~ should include ~~institutional controls~~ an assessment of human health and environmental risks; management measures (e.g., deed notifications/restrictions; indemnification agreements; site operation, maintenance, health and safety plans; utility workers notice; etc.); contingency options; and a commitment to mitigating measures such as participation in a regional ground water monitoring or protection program. The plan should recommend the monitoring frequency and duration and a timeline for meeting closure criteria.

~~The Regional Water Board may consider modifying established ground water cleanup standards based on documentation of the following:~~

Category II: Sites for which the Regional Water Board approved cleanup program has not resulted in compliance with water quality objectives.

Sites which fall under Category II typically involve sites with hydrogeologic conditions and chemical characteristics which have resulted in significant plume migration and the resultant environmental and human health risks. The Discharger must provide documentation of the following:

- a. An aggressive appropriate cleanup program, including adequate source removal and free product removal, has been fully implemented and reliably operated for a period of time which is adequate to understand both the hydrogeology of the site and pollutant dynamics; *and*
- b. Ground water pollutant concentrations have reached an asymptotic level (the mass removed from the groundwater is no longer significant) using appropriate technology; *and*
- c. Alternative or ~~Best~~ best available technologies are ~~inappropriate or not cost effective~~ not technically or economically feasible to achieve further significant reduction in pollutant

~~concentrations; and~~

d. An acceptable plan is submitted and implemented for containing and managing the remaining human health, water quality, and environmental risks posed by residual soil and ground water pollution. This plan ~~eshould~~ include ~~institutional controls~~ an assessment of human health and environmental risks; management measures (e.g., deed notifications/restrictions; indemnification agreements; site operation, maintenance, health and safety plans; utility workers notice, etc.); contingency options; and a commitment to mitigating measures such as participation in a regional ground water monitoring or protection program. The plan should recommend monitoring frequency and duration and a timeline for meeting closure criteria.

In assessing technical feasibility, the Discharger should consider the availability of technologies which have been shown to be effective in reducing the concentrations of constituents of concern to the established cleanup levels. Bench-scale and/or pilot-scale studies may be necessary to make this feasibility assessment. In assessing economic feasibility the Discharger should evaluate the incremental benefit of attaining further reductions in constituents of concern as compared with the incremental cost of achieving those levels. Economic feasibility is not determined by the economic resources available to a particular discharger or responsible party.

~~The Regional Water Board has not yet approved alternative points of compliance or considered amending previously adopted ground water cleanup standards at sites meeting the above conditions. However, the Regional Water Board expects to consider such sites in the near future, and intends to develop policies and/or procedures on how to modify site cleanup levels and points of compliance adopted in Regional Water Board Orders.~~

5) FUTURE REGULATORY MANAGEMENT STRATEGIES

The following findings are drawn from the Board's current regulatory experience:

- Risk assessment and management techniques

can provide the Regional Water Board with a quantitative estimate of risks to assist in decision-making.

- An inflexible, resource-intensive approach is not the most cost effective, considering the multitude of existing and potential sources of ground water pollution requiring cleanup.
- Institutional controls, such as deed restrictions, are an additional mechanism to provide protection of beneficial uses and public health and safety. Guidance from the U.S. EPA and Department of Toxics Substances Control is considered in setting institutional controls.

As a result of these findings regarding regulatory management strategy, the Regional Water Board will also review its overall approach to managing site cleanups. Table IV-10 lists options that the Regional Water Board plans to consider. Additional input regarding these and other options will be sought from all interested and affected parties during the Triennial Review of the Basin Plan.

**Table IV-10.
OPTIONS FOR FUTURE MANAGEMENT STRATEGIES
OF GROUND WATER CLEANUP SITES**

CONTINUE EXISTING APPROACH:

Develop site specific cleanup levels utilizing Resolution Nos. 68-16 and No. 92-49, MCLs, and risk assessment.

ADOPT MORE STRINGENT APPROACH:

Require cleanup levels based exclusively on background or a stringent risk management requirement (e.g., 10⁻⁶ excess cancer, etc.)

STREAMLINE EXISTING PROGRAM:

Adopt basin plan amendments or a general Regional Water Board Order with a standardized process for dischargers to identify investigation, remediation, and clean-up level requirements.

Develop a decision process whereby individual site and pollution information could be used to determine specific cleanup levels.

Develop cleanup levels and policies for individual ground water basins or sub-basins based on designated beneficial uses.

Establish procedures to change cleanup standards, including long-term monitoring and hydraulic controls, when the Regional Water Board concurs that existing cleanup technology is no longer operating efficiently or will not meet cleanup standards.

Improve access to geographical information system-based databases to assist in identifying critical ground water resources.

DEVELOP AND IMPLEMENT REGIONAL OR SUB-REGIONAL MITIGATION PROGRAMS:

Identify conditions under which measures to mitigate the effect of pollution above prescribed cleanup levels should be considered by dischargers.

Identify potential mitigation alternatives such as regional ground water programs in individual basins that will have a net benefit of protecting ground waters.

GROUND WATER PROTECTION PROGRAMS

The intimate ties between the land, surface water, ground water, the estuary, and human activity must be acknowledged in order to promote wise, balanced, and sustainable use of water resources. In this regard, emphasis on planning and management is encouraged by supplying tools and information that will provide an integrated environmental management approach to problem-solving. It also must be recognized that ground water quality and quantity are inextricably linked. Because an informed and involved citizenry is crucial to realizing ground water protection, policies and plans should encourage and promote research, education, and public involvement as an integral part of any protection program.

Local water, fire, planning and health departments are actively involved with their own ground water protection programs. These programs include: salt water intrusion and land subsidence control, wellhead protection, ground water recharge area preservation, hazardous materials storage and management ordinances, Local Oversight Programs and non-Local Oversight Programs for cleanup of leaking underground fuel tanks, potential conduit well destruction, and well permitting and inspection. For some agencies, maintaining funding for protection programs is an ongoing challenge. Through three specific projects, the Regional Water Board is evaluating the ground water protection needs in specific basins, and thus will provide additional support for local agency efforts. These projects are described below.

GROUND WATER RESOURCE STUDY

A basin-wide approach for implementing and prioritizing ground water cleanup was recommended in a series of reports titled "San Francisco Bay Region Ground Water Resource Study" (1987). The reports were a cooperative effort by the Regional Water Board, the University of California, Berkeley, School of Public Health, and Department of Landscape Architecture. The 10 volume series covered eight high priority ground water basins: Niles Cone, Livermore and Sunol Valley, Ygnacio/Pittsburg/Clayton/San Ramon Basins, Suisun/Fairfield Basin, Napa Valley, Sonoma

Valley, and San Mateo Basin.

Information regarding well location, construction, areal geology, permeability, and depth to ground water; land use characteristics, and location of pollution sources were compiled into a relational data base. A methodology was developed which weighs site sensitivity and pollution severity factors. The resultant maps from the project illustrate the regional sensitivity of the above ground water basins to ground water pollution.

Several of the policy options listed on Table IV-10 under "Streamline Existing Program" could be addressed by utilizing the results of this planning program. In particular, the Regional Water Board will investigate the use of existing data and maps produced by the program, as well as other geographic information system-generated maps, as site screening tools to rank polluted sites and to assist in site-specific review of cleanup levels.

INTEGRATED ENVIRONMENTAL MANAGEMENT PROJECT

In 1987 the U.S. EPA completed the "Integrated Environmental Management Plan" (IEMP). This innovative study conducted in Santa Clara County sought to improve public health and environmental protection by integrating approaches for hazardous material management for land, air, and water. The IEMP's Drinking Water Subcommittee developed recommendations for addressing "how clean is clean". The committee wrote "....because contamination and cleanup impacts vary significantly in different sites and different hydrogeologic zones, the Regional Water Board should continue to develop and standardize a process for cleanup decision-making, rather than establish across-the-board clean-up levels." This recommendation ties in with the policy options listed on Table IV-10 under "Streamline Existing Programs".

STATE WATER BOARD GROUND WATER PROTECTION PLANNING CONTRACT

At the Regional Water Board's request, the State Water Board is funding a contract with the University of California at Berkeley for development of a regional ground water protection plan. The project focuses on the most utilized, high resource value basins: Santa Clara Valley, Niles Cone, Livermore Valley, San Mateo Plain, and Half Moon Bay Terrace (Table II-4).

The vulnerability to pollution of each of the basins will be determined from the U.S. EPA's DRASTIC Index Method (U.S. EPA Project No. 600/2-87-035, April 1987) on a computer based geographic information system.

An important component of the project will be the evaluation of present land and water use conditions as well as those planned for 2005 and a long-term buildout (e.g., 2025). Working closely with local agencies, comprehensive protection plans will be recommended that can mitigate or minimize future resource impacts. These plans may include revised water quality objectives for basin or subbasins that have differing protection needs. Developing basin specific objectives is one policy option listed on Table IV-10 under "Streamline Existing Program". A final regional ground water protection plan will be incorporated into the Basin Plan at a future date.

APPENDIX F

The following references are cited in Tables II-3 and Tables II-4.

- a. Alameda County Water District Staff, 1992, Personal Communication.
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- c. California Department of Water Resources, 1991, Groundwater Storage Capacity of the Alameda Bay Plain, Draft Report for Alameda Public Works Agency.
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- e. U.S. Geological Survey, 1984, Water quality conditions and an evaluation of ground- and surface water based sampling in Livermore-Amador Valley, WRI 84-4352.
- f. California Department of Water Resources, 1974, Evaluation of groundwater resources in the Livermore and Sunol Valleys, Bulletin 118-2.
- g. California Department of Water Resources, 1963, Alameda County Investigation, Bulletin 13.
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- i. California Department of Water Resources, 1964, Alameda Creek watershed above Niles; Chemical qualities of surface water, waste discharges and groundwater.
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