California's Groundwater Containment Zones: SWRCB's Under-the-(Water)-Table Deal

by Conrad L. Huygen

The click and whir of facsimile machines bid inauspicious "Good Mornings" all across California during the early hours of March 13, 1995. The Toxics Assessment Group (TAG), a Davis-based environmental watchdog organization, had just fax-broadcast one of its seldom-used "TAGALERT" warnings to announce that the State Water Resources Control Board (SWRCB) was planning to drastically revise its groundwater remediation policy. As TAG so eloquently put it: "ATTENTION ALL POLLUTERS! Poisoned an aquifer lately? Have we got a deal for you! Declare that it is unreasonable to clean it up and abandon it instead! Call the State Water Resources Control Board for details."[1] The groundwater pollution issue of the decade was no longer a well-kept industrial secret.

SWRCB wants to change the rules of the water game by creating an unknown quantity of so-called "groundwater pollution containment zones." Basically, the Board plans to excuse polluters from having to clean up contaminated sites if they cannot "reasonably achieve" water quality objectives. The dischargers would only have to prevent contaminants from spreading to adjacent areas.[2] In the abstract, there are some compelling scientific findings that support a limited containment policy—current remediation technologies are simply ineffective against certain pollutants.[3] SWRCB's proposal, however, goes far beyond these findings and shows how easily political and economic interests can twist the scientific method into a self-serving tool. In its current form, the containment zone amendment is unreasonably broad and may violate the California Constitution.

"ATTENTION ALL POLLUTERS! Poisoned an aquifer lately? Have we got a deal for you! "

-Toxics Assessment Group

Groundwater for Beginners

Although nearly every Californian is aware (to some degree) of the state's precarious water situation, we tend to limit our consciousness to surface water supplies. These above-ground resources include rivers, lakes, and reservoirs; they are the tangible sparkling waters entrenched in the California Myth. What is harder to conceptualize, however, is the vast network of underground "rivers" that supplies the state with forty percent of its drinking water.[4] Unglamorous and unseen, groundwater is one of our least understood natural resources.

The world beneath the Earth's surface is not quite as exciting Jules Verne imagined it. It is, however, a highly complex medium of incredible hydrogeologic diversity. Water that seeps into this invisible realm becomes subject to the physics of history as it descends through time itself. Lithologic layers of rock and sediment are often disrupted by intrusions, fractures, folding and faults that reveal the Earth's slow violence. Subsurface variables dictate where groundwater goes and how fast it gets there.[5] (Please see Diagram 1.)

Within this underground maze, groundwater flow usually does not exceed a snail's-pace rate of 1000 feet per year; often it is restricted to only a couple of inches annually.[6] Subsurface currents

("aquifers") collect within basins that subtly mimic the surface topography, bounded by underlayers (and sometimes overlayers) of impermeable rock.[7] In California, the Department of Water Resources has named or identified over 461 such basins; they underlie nearly half the state and vary in storage capacity from 4,000 acre/feet to nearly 570 million acre/feet.[8]

Scientists did not recognize groundwater pollution as a problem until the 1970s. The "old school" thought was that the soil mantle sitting atop aquifers served to "filter" chemicals descending through the subsurface.[9] This erroneous paradigm gave way to the modern realization that pollutants reach groundwater supplies directly. Unfortunately, cleaning up contaminated aquifers is not always as simple as pumping out the affected water and treating it on the surface.[10] The problem is that the worst chemical culprits, once they find their way into the ground, "stick" to the subsurface like gum on the bottom of an industrial shoe.

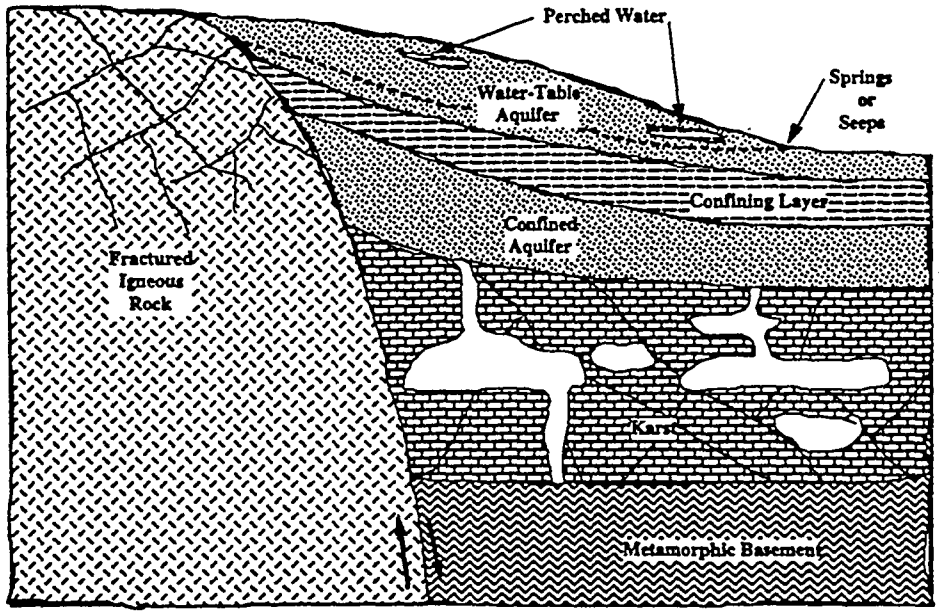

Diagram 1 - *This hypothetical subsurface cross-section illustrates the incredible diversity of the unseen world beneath us.* Source: Geological Society of America, *Continuing Education Manual on Soil and Groundwater Remediation* (1994).

The DNAPL Problem

The single most frustrating groundwater contaminant is a group of chemicals known as "dense non-aqueous phase liquids," or simply DNAPLs. (Pronounced "dee-napples.") DNAPL pollutants include chlorinated solvents used to degrease machinery, creosol-based wood preservatives, and certain pesticides.[11] They can be found in the largest industrial setting as well as the smallest tool and die shop.[12] Even small volumes of DNAPLs can create enormous groundwater problems. Since they have

low solubility points, DNAPLs can continually release small quantities of contaminants for hundreds of years.[13] They are especially dangerous because they degrade into compounds that are even more toxic than the original pollutant.[14]

Why are DNAPLs so hard to clean up? The problem lies in the fact that these chemicals are heavier than the water they invade. When a polluter discharges DNAPLs into the ground, the mass eventually seeps into the underlying aquifer. Once below the water line, a DNAPL mass will not drift with the aquifer's flow as would a dissolved contaminant. Instead, it will sink in a straight line and form pools on the impermeable underlayer.[15] DNAPL pools and their residual trails pollute the groundwater flowing past them much like a poisonous tea bag would flavor a cup of hot water. The resulting chemical "tea" is called a "plume."[16] (Please see Diagram 2.)

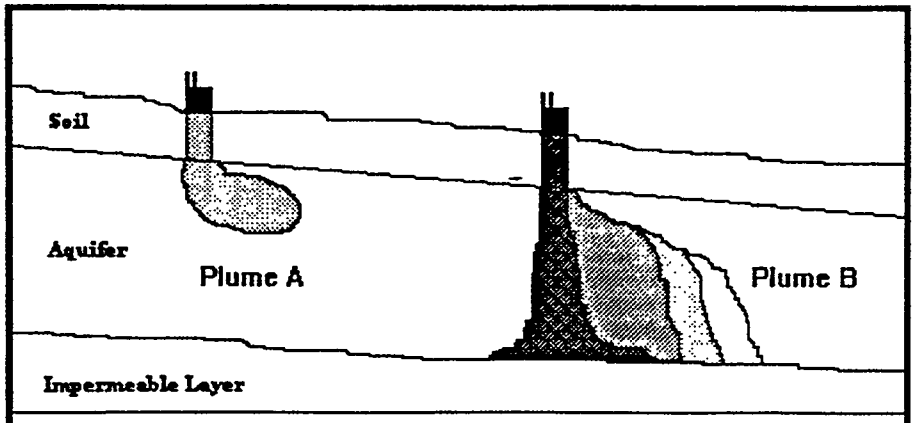

Diagram 2 - *As groundwater flows downgradient (left to right), it immediately carries dissolved Plume A with it--this is the traditional paradigm. Plume B, however, illustrates the DNAPL dilemma. These insoluble chemicals sink straight down to the underlayer. Even if Source B is removed, DNAPLs already in the ground will continue to be a source of pollution for centuries.* Source: Geological Society of America, *Continuing Education Manual on Soil and Groundwater Remediation.*

Since polluters spend over $10 billion nationwide on groundwater remediation each year, the financial incentive to shift abatement efforts to containment is tremendous.

Traditional clean-up techniques have not fared well in finding and abating DNAPLs after they enter an aquifer. Since DNAPL compounds migrate unpredictably once on the underlayer, locating and extracting a settled pollutant mass can only be accomplished through pinpoint direct-drilling;[17] California's subsurface variations make such an endeavor nearly impossible. Basically, current treatment methods are only effective in plume abatement.[18] We can pump away the tea, we just can't find the tea bag, much less extract it.[19,20]

"Reasonable" Water Quality

California currently requires polluters to clean up their chemical messes and then return any contaminated aquifers to "background" water quality standards.[21] There is, however, a caveat to this mandate. If abatement efforts cannot achieve background levels, dischargers need only attain the best

water quality which is reasonable.[22] Defining "reasonable" is literally a multi-million dollar question.

It is critical to note at this point that plume containment costs about one-quarter the price of full remediation operations.[23] Since polluters spend over $10 billion nationwide on groundwater remediation each year, the financial incentive to shift abatement efforts to containment is tremendous.[24] DNAPLs are prime containment zone candidates because their frustrating chemical and physical properties put them beyond current remediation technologies. Industrial interests, however, want to use DNAPLs as the means by which to avoid costly clean-ups on a much broader scale.

Dissatisfied with the prospect of a containment policy limited to a "technological feasibility" standard, companies such as General Electric, Aerojet, and Siemens want to escape their lawfully imposed abatement duties under the guise of "economic feasibility." These corporations are working hard to hide their cost-benefit agenda by making DNAPLs the poster-child of all groundwater remediation problems, including those sites that *can* be cleaned up.[25] Instead of a sensible, narrow policy based solely on science, the specter of saving hundreds of millions of dollars a year has pressured SWRCB to produce a blatantly one-sided proposal.

Strike One: Groundwater "Non-attainment"

In January 1995, the Board completed the initial draft of a groundwater containment policy. The concept came in the form of an amendment to SWRCB Resolution No. 92-49, the "Policies and Procedures for Investigation and Cleanup and Abatement under Section 13304 of the Water Code."[26] Accompanying the amendment was a paltry eight-page environmental impact analysis, or "Draft Functional Equivalent Document" (DFED).[27] An examination of both the policy and the DFED reveals why the Toxics Assessment Group wanted to alert as many Californians as possible—this amendment proposal amounted to little more than an industrial wish list.

"Non-attainment zones should be the exception rather than the rule."
- Hisam Baqai

The shortcomings of the proposed amendments begin with a misnomer. Instead of calling the new policy a "containment" plan, SWRCB originally termed the concept "groundwater non-attainment zones." What's in a name? In this case, an inaccurate analogy. Non-attainment zones (NAZs) are normally thought of in an air pollution context. The purpose behind air NAZs is to impose stricter emissions standards in a given area in order to improve overall air quality.[28] In contrast, groundwater NAZs would not require polluters to do anything beyond plume containment.[29] The difference between these two goals is fundamental.

The groundwater NAZ amendments' defects go much deeper than a misleading title. The heart of the policy revolves around measuring technological and economic feasibility as the standard for determining what is "reasonable."[30] DNAPLs, for example, would fall under the former category as being beyond current abatement techniques.[31] The latter classification, however, opens the policy to potential abuse because it is not an objective standard. Deciding whether remediation at a particular site is economically feasible would be reduced to an industry-influenced cost-benefit analysis; California's water quality would fall victim to the bottom line. The following is a summary of other areas where the January draft falls short:

* fails to establish how large or how many NAZs are permissible; the only limits are California's political boundaries;
* fails to specify any durational limits; NAZ status could last forever;
* fails to mandate NAZ revocation if new technology becomes available;
* leaves the ultimate NAZ designation decision to a lone Regional Water Board executive officer instead of the entire Board;[32]
* allows for lower water quality objectives within NAZs;[33]
* establishes a toothless enforcement standard for non-compliance;[34]
* does not contain a single word about permanent solutions;
* accompanied by a wholly inadequate Draft Functional Equivalent Document.[35]

Public Reaction

By mid-March 1995, SWRCB had received over one hundred written comments concerning the proposed groundwater NAZ policy.[36] Forty-four speakers reiterated these views during a hearing held on the 23rd of that month.[37] The comments and oral presentations split into three distinct camps: businesses, agencies, and citizens. Each of these groups lend valuable insight to the problem.[38]

Businesses: As one might expect, industrial interests were absolutely thrilled about non-attainment zones. From their perspective, common sense had finally won the day. Companies would no longer have to waste money on sites that were impossible to fully clean. NAZs, they argued, would result in a healthier environment by focusing limited resources on sites that can be remediated. Some commentators wanted to stretch this far-reaching policy even further. They wanted the amendments to include language that would allow SWRCB to "predesignate" entire chemical and geologic classes as NAZs *sight unseen* instead of having to go through a detailed site-by-site analysis.

Citizens: At the other end of the spectrum were a number of community organizations and individuals who adamantly oppose groundwater NAZs in any form. These groups, mostly from California's desert regions, rely almost exclusively on aquifers as their source of clean drinking water. They argued that without the penalty of high remediation costs, polluters will not have an economic incentive to innovate new abatement technologies. They sent SWRCB a crystal clear message: "We're watching you and we don't like what we see."

Agencies: Perhaps the most insightful comments came from the women and men who administer the state's groundwater programs. Their views assess the situation with refreshing frankness. Many expressed frustration at having to enforce a policy that wastes limited resources on hopeless situations (i.e. DNAPL sites). On the other hand, they were also wary about deviating too far from the current clean water program. As Hisam Baqai, Supervising Engineer at the Lahontan Regional Water Board, so aptly put it, "Non-attainment zones should be the exception rather than the rule."[39]

Strike Two: Containment Zones

With the comments from the first draft in mind, SWRCB went back to the drawing board. In September 1995, the agency publicly released a completely revised version of its January amendment draft. In addition, SWRCB distributed a more comprehensive (200+ pages) Draft Functional Equivalent Document.[40] The Board also renamed the proposal to more honestly reflect what this amendment is all about. Say good-bye to "non-attainment" and introduce yourself to California's Ground Water

"Containment" Zone Policy and the September 1995 amendments to Resolution 92-49.[41] (Please see Appendix A.)

To give SWRCB its due, the agency made several notable changes in both the amendments and the DFED. For example, the DFED actually explains why DNAPLs are such a problem.[42] There is also an entire section devoted to addressing each comment submitted regarding the original NAZ draft.[43] Likewise, the amendment text improved by eliminating the role of executive officers acting alone,[44] protecting critical recharge areas,[45] and making revocation of containment zone (CZ) status mandatory in the event of non-compliance.[46]

The bottom line, however, remains the same. Regardless of the name and packaging, the proposed containment zone policy is still far too broad; economic feasibility continues to be a primary determinant of what is "reasonable."[47] Again, a synopsis of where the policy amendments fall short:

* creates a new CZ category for loosely-defined "low risk sites";[48]
* allows SWRCB to predesignate certain pollutant and geologic classes with CZ status without any site-specific analysis;[49]
* STILL fails to mention how large or how many CZs are permissible;
* STILL fails to specify any durational limits;
* STILL fails to mandate CZ revocation should new technology become available;
* STILL allows for lower water quality objectives within CZs;[50]
* STILL does not contain a single word about permanent solutions.

Why Bother?

There is a fundamental question that serves as the threshold to this entire concept: Do the Regional Water Boards need a formal containment zone policy to determine what level of groundwater abatement is "reasonable?" The truth of the matter is NO.

The Porter-Cologne Water Quality Control Act (Water Code §§ 13000, et seq.), the legislation that containment zones would become a part of, makes it clear that the state must maintain water quality standards where it is reasonable to do so.[51] The San Francisco and Los Angeles Regional Water Boards have, on a case-by-case basis, already created *de facto* groundwater containment zones under the aegis of this language.[52] Walt Petit, the Executive Director of SWRCB, acknowledged that the Water Code allows for such discretionary action in a letter he wrote to Jody Sparks, TAG's President. Mr. Petit writes, "[Regional Water Board] enforcement actions under Water Code Section 13304 address individual cleanup cases. They are tailored to the facts of each case and establish cleanup conditions appropriate to such facts. Since adoption of cleanup and abatement orders is authorized by statute, *their issuance is not precluded by the absence of a statewide policy.*"[53] (Emphasis added.)

Although a written policy is not necessary, the darkest secret of groundwater remediation suggests that having one would be a good idea. What SWRCB hasn't been telling us is that the CZ policy is going to be huge. According to the U.S. Environmental Protection Agency, sixty percent of all groundwater remediation sites are probably contaminated by DNAPLs.[54] Although SWRCB declines to give projections, this national percentage would translate into over 10,600 potential containment zone sites in California.[55] Compare this with the DFED's Executive Summary, which outlines the purpose behind containment zones: "In recent years the SWRCB and [Regional Water Boards] have become

increasingly aware that, *in limited circumstances,* compliance with water quality objectives for ground water as part of cleanup actions cannot reasonably be achieved."[56] (Emphasis added.)

The inconsistencies within SWRCB's own documents are disturbing. The Board tells us that only in "limited circumstances" would a containment policy be warranted. Out of the other side of its mouth the Board hints that DNAPLs alone could lead to thousands of potential CZs. The agency openly describes the technological problems DNAPLs present, yet it never justifies why an economic feasibility factor should be part of the policy as well. SWRCB sounds like it needs some guidance from above...

Voice of the People

The California Constitution is the paramount law of this state, subject only to the United States Constitution. The California Supreme Court has explicitly reiterated this as recently as 1991.[57] Article X, section 2 of the California Constitution is the cornerstone upon which every state water law and policy must be built. The California Court of Appeals recently suggested that virtually every lawsuit affecting the public regulation of water resources be decided with Article X, section 2 in mind.[58] As a logical precursor, no decision affecting water should be made without referencing this all-encompassing section, which reads in relevant part:

> It is hereby declared that because of the conditions prevailing in this State the general welfare requires that the water resources of the State be put to beneficial use *to the fullest extent of which they are capable,* and that the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof *in the interest of the people and for the public welfare.* ...This section shall be self-executing, and the Legislature may also enact laws in the furtherance of the policy in this section contained.[59] (Emphasis added.)

This constitutional provision is the root of the "reasonable" language used in the containment zone proposal.[60] It is therefore instructive to note that this powerful section came into existence as the result of a 1928 statewide initiative.[61] Five years after the section's enactment, the California Supreme Court stated that the initiative represented "the highest and most solemn expression of the people of the state on behalf of the general welfare. The present and future well-being and prosperity of the state depend upon the conservation of its life-giving waters."[62] Because of the intent and spirit behind this supreme law to preserve water as an unparalleled resource of "transcendent importance,"[63] a cost-benefit analysis should not be read into Article X, section 2.[64] It follows that any containment zone policy SWRCB comes up with should not include an "economic feasibility" factor for determining when groundwater remediation is "unreasonable." Californians literally have a constitutional right to enjoy the highest level of water quality possible.[65]

Californians literally have a constitutional right to enjoy the highest level of water quality possible.

Free Advice

The proposed containment zone policy, as currently amended, is fatally flawed because it allows for an impermissible cost-benefit analysis of our state's groundwater quality. Even if restricted to technological feasibility, the amendments are overly vague and unreasonably broad. In addition, the

policy focuses solely on the question of containment and does not address any collateral issues. The following suggestions would help make a containment policy narrower in scope, yet more comprehensive in foresight.

First, SWRCB hasn't clearly articulated why a written containment zone policy is necessary. As discussed above, DNAPLs are uniquely problematic and tragically ubiquitous. They are, according to groundwater experts, THE remediation problem facing industry today.[66] SWRCB should come out and state, "The primary goal of containment zones is to allow polluters partial, temporary liability relief in those non-critical areas that are beyond technologically feasible abatement."

Second, the heart of a containment policy must be limited to a technological feasibility standard because of Article X, section 2 of the California Constitution. SWRCB would have the discretion to fine-tune this standard within the bounds of "generally accepted" scientific findings. DNAPLs seem to be the only chemical class that unquestionably fall into this exception.[67]

Third, the policy needs to set concrete limits on the size and duration of containment zones as procedural checks on the Regional Water Boards' discretion. The areal extent of all CZs combined should not, for example, exceed .01% of California's total groundwater supplies. Likewise, the state should issue CZ permits on a five-year renewable term basis—only diamonds should last forever.

Fourth, a containment policy *must* mandate groundwater remediation research and development. Since polluters are going to save untold millions of dollars in remediation costs,[68] it makes sense to have them devote a portion of these savings to research projects. Abatement techniques developed at Department of Defense facilities suggest that a solution to the DNAPL dilemma is closer than some containment proponents are willing to admit.[69] A "containment fee" of 20% over actual containment costs can help fuel this important work. Solving remediation problems should be the long-term goal of any sensible policy.

Fifth, the prohibitive costs of comprehensive remediation efforts had the positive effect of coercing industry to handle hazardous wastes with the utmost care. Common sense tells us that lowering liability will result in a lowered standard of care. The truth is that a "free" policy not only rewards past negligence, it also encourages future carelessness and subsequent spills. Substantial "containment fees," as discussed above, will help keep discharge liability and its associated standard of care meaningful.

Right to Pollute

Environmental regulation is so utterly complex because it is the intersection of science, politics, economics, and the law. The current containment zone policy pays too much attention to the larger economic interests involved and plays into politics without listening to the people. It goes beyond its own scientific findings and ignores an awakening trend in the law. The State Water Resources Control Board needs to reconsider its position on the containment zone issue.

SWRCB must remember that the primary groundwater remediation problem revolves around DNAPLs. Likewise, industry lobbyists should keep in mind that DNAPLs are, according to their own sources, the single largest drain on their limited funds. By promoting a policy that overreaches what is truly "reasonable," the proponents of CZs are setting themselves up for a legal fall. The further a containment policy deviates from a case-by-case DNAPL site evaluation, the more likely it becomes that

this amendment will not pass State constitutional muster.

Regardless of what SWRCB decides, the tragedy that lines this entire debate is that the right to pollute is a foregone conclusion. Untold quantities of contaminants are already deep in the ground—the action is past tense. Sadly enough, we're only haggling to see how long they stay there.

Author's Note

I've been involved with this issue since June 1995 when I helped research and analyze the original groundwater "non-attainment" policy for the Planning and Conservation League. This past November, I testified before the State Water Resources Control Board and shared my good faith belief that the current containment zone proposal violates the spirit and intent of the California Constitution. Unfortunately, my personal feeling is that the financial momentum behind this policy is too great to stop at the agency level. SWRCB is going to adopt these amendments, and I believe they are going to go for it all: a loosely-worded, broad-based "plan" based on economic feasibility and served on a silver platter to the industrial machine.

What has been so frustrating about this entire process is that SWRCB doesn't seem to care about the mistrust everyday Californians have concerning a policy that literally lets polluters off the hook yet provides no solutions; the same mistrust embodied in Article X, section 2 of the California Constitution. I urge you to stand up and be counted. Let SWRCB know you're watching them, that you know what's going on, and that you care about what they decide. Ask them why their policy doesn't address long-term groundwater solutions and why they refuse to project, even roughly, how many sites may become "containment zones." When you don't get straight-forward answers to even these most-basic questions, ask yourself how the details could possibly work as planned.

Whatever you do, don't blink; the groundwater pollution issue of the decade may just pass you by.

Please write:
RE: Groundwater Containment Zones
Land Disposal Section
Division of Clean Water Programs - SWRCB
P.O. Box 944212
Sacramento, CA 94244-2120
FAX (916) 227-4349

NOTE: Paragraph "H" of Appendix A is the one to watch; the Endnotes follow the appendix.

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STATE WATER RESOURCES CONTROL BOARD
RESOLUTION NO. 92-49
(As Amended on April 21, 1994 and _____)

POLICIES AND PROCEDURES
FOR INVESTIGATION AND
CLEANUP AND ABATEMENT OF
DISCHARGES UNDER WATER CODE
SECTION 13304

WHEREAS:

1. California WC (WC) Section 13001 provides that it is the intent of the Legislature that the State Water Resources Control Board (**State Water Board**) and each Regional Water Quality Control Board (**Regional Water Board**) shall be the principal state agencies with primary responsibility for the coordination and control of water quality. The State and Regional Water Boards shall conform to and implement the policies of the Porter-Cologne Water Quality Control Act (Division 7, commencing with WC Section 13000) and shall coordinate their respective activities so as to achieve a unified and effective water quality control program in the state;
2. WC Section 13140 provides that the State Water Board shall formulate and adopt State Policy for Water Quality Control;
3. WC Section 13240 provides that Water Quality Control Plans shall conform to any State Policy for Water Quality Control;
4. WC Section 13304 requires that any person who has discharged or discharges waste into waters of the state in violation of any waste discharge requirement or other order or prohibition issued by a Regional Water Board or the State Water Board, or who has caused or permitted, causes or permits, or threatens to cause or permit any waste to be discharged or deposited where it is, or probably will be, discharged into the waters of the state and creates, or threatens to create, a condition of pollution or nuisance may be required to clean up the discharge and abate the effects thereof. This section 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). The term waste discharge requirements includes those which implement the National Pollutant Discharge Elimination System;
5. WC Section 13307 provides that the State Water Board shall establish policies and procedures that its representatives and the representatives of the Regional Water Boards shall follow for the oversight of investigations and cleanup and abatement activities resulting from discharges of hazardous substances, including:
   a. The procedures the State Water Board and the Regional Water Boards will follow in making decisions as to when a person may be required to undertake an investigation to determine if an unauthorized hazardous substance discharge has occurred;
   b. Policies for carrying out a phased, step-by-step investigation to determine the nature and extent of possible soil and ground water contamination or pollution at a site;
   c. Procedures for identifying and utilizing the most cost-effective methods for detecting contamination or pollution and cleaning up or abating the effects of contamination or pollution;
   d. Policies for determining reasonable schedules for investigation and cleanup, abatement, or other remedial action at a site. The policies shall recognize the danger to public health and the waters of the state posed by an unauthorized discharge and the need to mitigate those dangers while at the same time taking into account, to the extent possible, the resources, both financial and technical, available to the person responsible for the discharge;
6. "Waters of the state" include both ground water and surface water;
7. Regardless of the type of discharge, procedures and policies applicable to investigations, and cleanup and abatement activities are similar. It is in the best interest of the people of the state for the State Water Board to provide consistent guidance for Regional Water Boards to apply to investigation, and cleanup and abatement;
8. WC Section 13260 requires any person discharging or proposing to discharge waste that could affect waters of the state, or proposing to change the character, location, or volume of a discharge to file a report with and receive requirements from the Regional Water Board;
9. WC Section 13267 provides that the Regional Water Board may require dischargers, past dischargers, or suspected dischargers to furnish those technical or monitoring reports as the Regional Water Board may specify, provided that the burden, including costs, of these reports, shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports;
10. WC Section 13300 states that the Regional Water Board may require a discharger to submit a time schedule of specific actions the discharger shall take in order to correct or prevent a violation of

requirements prescribed by the Regional Water Board or the State Water Board;

11. California Health and Safety Code (**HSC**) Section 25356.1 requires the Department of Toxic Substances Control (**DTSC**) or, if appropriate, the Regional Water Board to prepare or approve remedial action plans for sites where hazardous substances were released to the environment if the sites have been listed pursuant to HSC Section 25356 (state "Superfund" priority list for cleanup of sites);

12. Coordination with the U.S. Environmental Protection Agency (**USEPA**), state agencies within the California Environmental Protection Agency (**Cal/EPA**) (e.g., DTSC, Air Resources Control Board), air pollution control districts, local environmental health agencies, and other responsible federal, state, and local agencies: (1) promotes effective protection of water quality, human health, and the environment and (2) is in the best interest of the people of the state. The principles of coordination are embodied in many statutes, regulations, and interagency memoranda of understanding (**MOU**) or agreement which affect the State and Regional Water Boards and these agencies;

13. In order to clean up and abate the effects of a discharge or threat of a discharge, a discharger may be required to perform an investigation to define the nature and extent of the discharge or threatened discharge and to develop appropriate cleanup and abatement measures;

14. Investigations that were not properly planned have resulted in increases in overall costs and, in some cases, environmental damage. Overall costs have increased when original corrective actions were later found to have had no positive effect or to have exacerbated the pollution. Environmental damage may increase when a poorly conceived investigation or cleanup and abatement program allows pollutants to spread to previously unaffected waters of the state;

15. A phased approach to site investigation should facilitate adequate delineation of the nature and extent of the pollution, and may reduce overall costs and environmental damage, because: (1) investigations inherently build on information previously gained; (2) often data are dependent on seasonal and other temporal variations; and (3) adverse consequences of greater cost or increased environmental damage can result from improperly planned investigations and the lack of consultation and coordination with the Regional Water Board. However, there are circumstances under which a phased, iterative approach may not be necessary to protect water quality, and there are other circumstances under which phases may need to be compressed or combined to expedite cleanup and abatement;

16. Preparation of written workplans prior to initiation of significant elements or phases of investigation, and cleanup and abatement generally saves Regional Water Board and discharger resources. Results are superior, and the overall cost-effectiveness is enhanced;

17. Discharger reliance on qualified professionals promotes proper planning, implementation, and long-term cost-effectiveness of investigation, and cleanup and abatement activities. Professionals should be qualified, licensed where applicable, and competent and proficient in the fields pertinent to the required activities. California Business and Professions Code Sections 6735, 7835, and 7835.1 require that engineering and geologic evaluations and judgements be performed by or under the direction of registered professionals;

18. WC Section 13360 prohibits the Regional Water Boards from specifying, but not from suggesting, methods that a discharger may use to achieve compliance with requirements or orders. It is the responsibility of the discharger to propose methods for Regional Water Board review and concurrence to achieve compliance with requirements or orders;

19. The USEPA, California state agencies, the American Society for Testing and Materials, and similar organizations have developed or identified methods successful in particular applications. Reliance on established, appropriate methods can reduce costs of investigation, and cleanup and abatement;

20. The basis for Regional Water Board decisions regarding investigation, and cleanup and abatement includes: (1) site-specific characteristics; (2) applicable state and federal statutes and regulations; (3) applicable water quality control plans adopted by the State Water Board and Regional Water Boards, including beneficial uses, water quality objectives, and implementation plans; (4) State Water Board and Regional Water Board policies, including State Water Board Resolutions No. 68-16 (Statement of Policy with Respect to Maintaining High Quality of Waters in California) and No. 88-63 (Sources of Drinking Water); and (5) relevant standards, criteria, and advisories adopted by other state and federal agencies;

21. Discharges subject to WC Section 13304 may include discharges of waste to land; such discharges may cause, or threaten to cause, conditions of soil or water pollution or nuisance that are analogous to conditions associated with migration of waste or fluid from a waste management unit;

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22. The State Water Board has adopted regulations governing discharges of waste to land (California Code of Regulations (CCR), Title 23, Division 3, Chapter 15);

23. State Water Board regulations governing site investigation and corrective action at underground storage tank unauthorized release sites are found in 23 CCR Division 3, Chapter 16, in particular Article 11 commencing with Section 2720;

24. It is the responsibility of the Regional Water Board to make decisions regarding cleanup and abatement goals and objectives for the protection of water quality and the beneficial uses of waters of the state within each Region;

25. Cleanup and abatement alternatives that entail discharge of residual wastes to waters of the state, discharges to regulated waste management units, or leaving wastes in place, create additional regulatory constraints and long-term liability, which must be considered in any evaluation of cost-effectiveness;

26. It is not the intent of the State or Regional Water Boards to allow dischargers, whose actions have caused, permitted, or threaten to cause or permit conditions of pollution to avoid responsibilities for cleanup. However, in some cases attainment of applicable water quality objectives for ground water cannot reasonably be achieved. In these cases the State Water Board feels that establishment of a containment zone is appropriate if applicable requirements contained in the Policy are satisfied.

27. The Porter-Cologne Water Quality Control Act allows Regional Water Boards to impose more stringent requirements on discharges of waste than any statewide requirements promulgated by the State Water Board (e.g., in this Policy) or than water quality objectives established in statewide or regional water quality control plans as needed to protect water quality and to reflect regional and site-specific conditions.

THEREFORE BE IT RESOLVED:

These policies and procedures apply to all investigations, and cleanup and abatement activities, for all types of discharges subject to Section 13304 of the Water Code.

I. The Regional Water Board shall apply the following procedures in determining whether a person shall be required to investigate a discharge under WC Section 13267, or to clean up waste and abate the effects of a discharge or a threat of a discharge under WC Section 13304. The Regional Water Board shall:

A. Use any relevant evidence, whether direct or circumstantial, including, but not limited to, evidence in the following categories:

1. Documentation of historical or current activities, waste characteristics, chemical use, storage or disposal information, as documented by public records, responses to questionnaires, or other sources of information;
2. Site characteristics and location in relation to other potential sources of a discharge;
3. Hydrologic and hydrogeologic information, such as differences in upgradient and downgradient water quality;
4. Industry-wide operational practices that historically have led to discharges, such as leakage of pollutants from wastewater collection and conveyance systems, sumps, storage tanks, landfills, and clarifiers;
5. Evidence of poor management of materials or wastes, such as improper storage practices or inability to reconcile inventories;
6. Lack of documentation of responsible management of materials or wastes, such as lack of manifests or lack of documentation of proper disposal;
7. Physical evidence, such as analytical data, soil or pavement staining, distressed vegetation, or unusual odor or appearance;
8. Reports and complaints;
9. Other agencies' records of possible or known discharge; and
10. Refusal or failure to respond to Regional Water Board inquiries;

B. Make a reasonable effort to identify the dischargers associated with the discharge. It is not necessary to identify all dischargers for the Regional Water Board to proceed with requirements for a discharger to investigate and clean up;

C. Require one or more persons identified as a discharger associated with a discharge or threatened discharge subject to WC Section 13304 to undertake an investigation, based on findings of I.A and I.B above;

D. Notify appropriate federal, state, and local agencies regarding discharges subject to WC Section 13304 and coordinate with these agencies on investigation, and cleanup and abatement activities.

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II. The Regional Water Board shall apply the following policies in overseeing: (a) investigations to determine the nature and horizontal and vertical extent of a discharge and (b) appropriate cleanup and abatement measures.

A. The Regional Water Board shall:

1. Require the discharger to conduct investigation, and cleanup and abatement, in a progressive sequence ordinarily consisting of the following phases, provided that the sequence shall be adjusted to accommodate site-specific circumstances, if necessary:

   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 and abatement 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);

   e. Monitoring (to confirm short- and long-term effectiveness of cleanup and abatement);

2. Consider, where necessary to protect water quality, approval of plans for investigation, or cleanup and abatement, that proceed concurrently rather than sequentially, provided that overall cleanup and abatement goals and objectives are not compromised, under the following conditions:

   a. Emergency situations involving acute pollution or contamination affecting present uses of waters of the state;

   b. Imminent threat of pollution;

   c. Protracted investigations resulting in unreasonable delay of cleanup and abatement; or

   d. Discharges of limited extent which can be effectively investigated and cleaned up within a short time;

3. Require the discharger to extend the investigation, and cleanup and abatement, to any location affected by the discharge or threatened discharge.

4. Where necessary to protect water quality, name other persons as dischargers, to the extent permitted by law;

5. Require the discharger to submit written workplans for elements and phases of the investigation, and cleanup and abatement, whenever practicable;

6. Review and concur with adequate workplans prior to initiation of investigations, to the extent practicable. The Regional Water Board may give verbal concurrence for investigations to proceed, with written follow-up. An adequate workplan should include or reference, at least, a comprehensive description of proposed investigative, cleanup, and abatement activities, a sampling and analysis plan, a quality assurance project plan, a health and safety plan, and a commitment to implement the workplan;

7. Require the discharger to submit reports on results of all phases of investigations, and cleanup and abatement actions, regardless of degree of oversight by the Regional Water Board;

8. Require the discharger to provide documentation that plans and reports are prepared by professionals qualified to prepare such reports, and that each component of investigative and cleanup and abatement actions is conducted under the direction of appropriately qualified professionals. A statement of qualifications of the responsible lead professionals shall be included in all plans and reports submitted by the discharger;

9. Prescribe cleanup levels which are consistent with appropriate levels set by the Regional Water Board for analogous discharges that involve similar wastes, site characteristics, and water quality considerations;

B. The Regional Water Board may identify investigative and cleanup and abatement

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activities that the discharger could undertake without Regional Water Board oversight, provided that these investigations and cleanup and abatement activities shall be consistent with the policies and procedures established herein:

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:

A. Concur with any investigative and cleanup and abatement proposal which the discharger demonstrates and the Regional Water Board finds to have a substantial likelihood to achieve compliance, within a reasonable time frame, with cleanup goals and objectives that implement the applicable Water Quality Control Plans and Policies adopted by the State Water Board and Regional Water Boards, and which implement permanent cleanup and abatement solutions which do not require ongoing maintenance, wherever feasible;

B. Consider whether the burden, including costs, of reports required of the discharger during the investigation and cleanup and abatement of a discharge bears a reasonable relationship to the need for the reports and the benefits to be obtained from the reports;

C. Require the discharger to consider the effectiveness, feasibility, and relative costs of applicable alternative methods for investigation, and cleanup and abatement. Such comparison may rely on previous analysis of analogous sites, and shall include supporting rationale for the selected methods;

D. Ensure that the discharger is aware of and considers techniques which provide a cost-effective basis for initial assessment of a discharge.

1. The following techniques may be applicable:
   a. Use of available current and historical photographs and site records to focus investigative activities on locations and wastes or materials handled at the site;
   b. Soil gas surveys;
   c. Shallow geophysical surveys;
   d. Remote sensing techniques;
2. The above techniques are in addition to the standard site assessment techniques, which include:
   a. Inventory and sampling and analysis of materials or wastes;
   b. Sampling and analysis of surface water;
   c. Sampling and analysis of sediment and aquatic biota;
   d. Sampling and analysis of ground water;
   e. Sampling and analysis of soil and soil pore moisture;
   f. Hydrogeologic investigation;

E. Ensure that the discharger is aware of and considers the following cleanup and abatement methods or combinations thereof, to the extent that they may be applicable to the discharge or threat thereof:

1. Source removal and/or isolation;
2. In-place treatment of soil or water:
   a. Bioremediation;
   b. Aeration;
   c. Fixation;
3. Excavation or extraction of soil, water, or gas for on-site or off-site treatment by the following techniques:
   a. Bioremediation;
   b. Thermal destruction;
   c. Aeration;
   d. Sorption;
   e. Precipitation, flocculation, and sedimentation;
   f. Filtration;
   g. Fixation;
   h. Evaporation;
4. Excavation or extraction of soil, water, or gas for appropriate recycling, re-use, or disposal;

F. Require actions for cleanup and abatement to:

1. Conform to the provisions of Resolution No. 68-16 of the State Water Board, and the Water Quality Control Plans of the State and Regional Water Boards, provided that under no circumstances shall these provisions be interpreted to require cleanup and abatement which achieves

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water quality conditions that are better than background conditions;

2. Implement the provisions of Chapter 15 that are applicable to cleanup and abatement, as follows:

   a. If cleanup and abatement involves corrective action at a waste management unit regulated by waste discharge requirements issued under Chapter 15, the Regional Water Board shall implement the provisions of that chapter;

   b. If cleanup and abatement involves removal of waste from the immediate place of release and discharge of the waste to land for treatment, storage, or disposal, the Regional Water Board shall regulate the discharge of the waste through waste discharge requirements issued under Chapter 15, provided that the Regional Water Board may waive waste discharge requirements under WC Section 13269 if the waiver is not against the public interest (e.g., if the discharge is for short-term treatment or storage, and if the temporary waste management unit is equipped with features that will ensure full and complete containment of the waste for the treatment or storage period); and

   c. If cleanup and abatement involves actions other than removal of the waste, such as containment of waste in soil or ground water by physical or hydrological barriers to migration (natural or engineered), or in-situ treatment (e.g., chemical or thermal fixation, or bioremediation), the Regional Water Board shall apply the applicable provisions of Chapter 15, to the extent that it is technologically and economically feasible to do so; and

3. Implement the applicable provisions of Chapter 16 for investigations and cleanup and abatement of discharges of hazardous substances from underground storage tanks; and

G. Ensure that dischargers are required to clean up and abate the effects of discharges in a manner that promotes attainment of either background water quality, or the best water quality which is reasonable if background levels of water quality cannot be restored, considering 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, provided that the Regional Water Board considers the conditions set forth in Section 2550.4 of Chapter 15 in setting alternative cleanup levels pursuant to Section 2725 of Chapter 16; any such alternative cleanup level shall:

   1. Be consistent with maximum benefit to the people of the state;

   2. Not unreasonably affect present and anticipated beneficial use of such water; and

   3. 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 except as provided in H below; and

H. Consider the designation of containment zones for areas of ground water where water quality objectives cannot reasonably be achieved, notwithstanding any other provision of this or other policies, if the following procedures, conditions, and restrictions are met.

   1. The Regional Water Board shall determine whether water quality objectives can reasonably be achieved by considering what is technologically or economically feasible within a reasonable period and shall take into account environmental characteristics of the hydrogeologic unit under consideration and the degree of risk of any remaining pollutants pursuant to Section III.H.3. Technological feasibility is determined by assessing available technologies, pursuant to Sections III.B., C., and E. of this Policy, which have been shown to be effective under similar hydrogeologic conditions in reducing the concentration of the constituents of concern and removing constituent mass. Bench-scale or pilot-scale studies may be necessary to make this feasibility assessment. Economic feasibility is an objective balancing of the incremental benefit of attaining further reductions in the concentrations of constituents of concern and constituent mass as compared with the incremental cost of achieving those reductions. Economic feasibility, in this Policy, does not refer to the discharger's ability to finance cleanup. Availability of financial resources should be

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considered in the establishment of reasonable compliance schedules.

2. Prior to the designation of a containment zone the following conditions shall be met:

   a. Containment and storage vessels and floating free product that have caused, are causing, or are likely to cause ground water degradation must be removed. If necessary as determined by the Regional Board to prevent further water quality degradation, other sources (e.g., soils) must be either removed, isolated, or managed.

   b. A discharger or a group of dischargers must propose and implement a plan to assess, cleanup, abate, manage, monitor, and mitigate the remaining human health, water quality, and environmental risks to the satisfaction of the Regional Water Board. Risks will be evaluated in accordance with Section III.H.3. The plan to manage risks may include management measures, such as (1) land use controls[1], (2) engineering controls[2], or (3) agreements with other landowners. The contents of the management plan shall be dependent upon the specific characteristics of the proposed containment zone.

   c. The proposed management plan must provide reasonable mitigation measures to compensate for any significant adverse environmental impacts from residual waste/pollutants in the containment zone. The plan must provide for hydraulic control of pollutants and provide for alternative water supplies, increased water treatment cost to affected users, or increased costs associated with well modifications. Other mitigation measures will be dictated by the specific characteristics of the proposed containment zone but could include participating in regional ground water monitoring or contributing to ground water basin cleanup or management programs. Examples of the latter include financing off-site ground water cleanup projects or other suitable supplemental environmental projects. The discharger could undertake a mitigation project itself or make a contribution either to another person conducting a cleanup project or to cleanup funds such as the SWRCB's Cleanup and Abatement Account. Financing of off-site cleanup projects constitutes adequate mitigation where the financing will result in an improvement of water quality.

   d. The Regional Water Board shall determine the monitoring frequency, reporting frequency, and duration of monitoring in connection with the designation of a containment zone. The appropriate containment points must be at or as close as practicable to the edge of the area of polluted ground water so as to clearly demonstrate containment such that water quality objectives are attained and maintained at and beyond the containment monitoring points. Specific monitoring points will be defined on a case by case basis by determining what is necessary to demonstrate containment,

1. For the purposes of this section, "land use controls" means recorded instruments restricting the present and future uses of the site, including, but not limited to, recorded easements, covenants, restrictions or servitudes, or any combination thereof, as appropriate. Land use controls shall run with the land from the date of recordation, shall bind all of the owners of the land, and their heirs, successors, and assignees, and the agents, employees, and lessees of the owners, heirs, successors, and assignees. Such instruments shall provide for: (a) recision upon application by the holder of fee interest in the property when water quality objectives are satisfied or the non-attainment zone status is rescinded, (b) amendment of the restriction upon application of the holder of fee interest in the property if warranted by changed circumstances, and (c) except for the restriction contained in the instrument, the establishment of a non-attainment zone shall not prohibit the full use or enjoyment of the property.

2. For the purposes of this section, "engineering controls" means measures to prevent migration of pollutants and to prevent, minimize or mitigate environmental damage which may otherwise result from a release or threatened release, including, but not limited to, caps, covers, dikes, trenches, leachate collection systems, treatment systems, and ground water containment systems or procedures.

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as deemed appropriate by the Regional Water Board. A discharger or a group of dischargers must agree to implement the required monitoring program. All technical or monitoring program requirements and requirements for access shall be designated pursuant to WC Section 13267.

3. In order for a containment zone to be designated, it shall be limited in areal extent; reasonably protective of human health and safety; and compliance with water quality objectives outside the containment zone shall be maintained. The following factors must be considered in making such findings:

   a. The size of a containment zone shall be no larger than necessary based on the facts of the individual designation. In no event shall the size of a containment zone cause a substantial decline in the overall yield of a ground water basin.

   b. Evaluation of risks to water quality, human health, and the environment, shall take into consideration the following:

      1. The physical and chemical characteristics of the discharge;

      2. The hydrogeological characteristics of the site and surrounding land;

      3. The quantity of ground water and the direction of ground water flow;

      4. The proximity and withdrawal rates of ground water users;

      5. The present and probable future uses of ground water in the area;

      6. The existing quality of ground water, including other sources of contamination or pollution and their cumulative impact on the ground water quality;

      7. The potential for health risks caused by human exposure to waste constituents;

      8. The potential damage to wildlife, crops, vegetation, and physical structures caused by exposure to waste constituents;

      9. The persistence and permanence of any potential adverse effects;

      10. Exposure to human or other biological receptors from the aggregate of hazardous constituents in the environment; and

      11. The potential for the pollutants to degrade and the nature of the breakdown products.

   c. No provision of this Policy shall be interpreted to allow exposure levels of constituents of concern that may adversely affect human or other biological receptors.

   d. A containment zone shall not be designated in a critical recharge area. A critical recharge area is an artificial recharge area or an area determined to be a critical recharge area during the consultation process required by Section III.H.10. Further, a containment zone shall not be designated if it would be inconsistent with a local ground water management plan developed pursuant to Part 2.75 of Division 6 of the WC (commencing at Section 10750) or other provisions of law or court order, judgment or decree.

4. Containment zones may be designated by the Regional Water Board for sites in the following general categories when all applicable provisions of Section III.H. are met:

   a. Sites where an approved cleanup program has been fully implemented, and ground water pollutant concentrations have reached asymptotic levels (i.e., the rate of change in pollutant concentration is not significant with further cleanup efforts) and cleanup to applicable water quality objectives cannot reasonably be achieved. In this situation, the remediation system must have been reliably and optimally operated for a period of time that is adequate to understand both the hydrogeology of the site and the pollutant dynamics;

   b. "Low risk sites". "Low risk sites" are those sites where the plume is likely to neither enlarge nor otherwise pose a significant risk considering the factors in Section III.H.3.b. In addition, the Regional Water Board may designate containment zones for classes of "low-risk sites" as described above based on

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the criteria set forth in this Policy. Such classes must identify the type of site, the geologic conditions, the geographic locations, the pollutants, and the applicable water quality objectives.

c. Sites where either strong sorption of pollutants on soils, pollutant entrapment (e.g., dense non-aqueous phase liquids [DNAPLs]), or complex geology due to heterogeneity or fractures indicate that cleanup to applicable ground water quality objectives cannot reasonably be achieved. Sorption refers to processes that move solutes from the fluid phase and concentrate them on the solid phase of a medium. In such cases, the hydrogeology of the site must be thoroughly evaluated and the nature of the pollutants documented in addition to meeting the other requirements of this Policy. Removal of constituent mass from ground water may still be required. The degree of removal will be determined in the process of evaluating the proposal for designation of a containment zone.

5. The discharger or a group of dischargers is responsible for applying for designation of a containment zone. Where the Regional Water Board does not have sufficient information to make the requisite findings the Regional Water Board may request the discharger(s) to develop the necessary information.

6. No further action to reduce pollutant levels will be required within zones with containment status unless the Regional Water Board finds that the discharger(s) has failed to fully implement the required management plan or that violation of water quality objectives has occurred beyond the containment zone. If the required tasks contained in the approved management plan are not implemented, or appropriate access is not granted to the Regional Water Board for purposes of compliance inspection, or the contamination cannot be contained within the containment zone, the Regional Water Board after public notice shall promptly revoke the zone's containment status and shall take appropriate enforcement action against the discharger;

7. The designation of a containment zone shall be accomplished through the adoption of a cleanup and abatement order as authorized by WC Section 13304. Such orders shall be adopted by the Regional Boards themselves and not issued by the Executive Officers of the Regional Boards. These orders shall ensure compliance with all procedures, conditions, and restrictions set forth in Section III.H. As authorized by WC Section 13308, any time schedules issued as part of the establishment of a containment zone shall prescribe a civil penalty which shall become due if compliance is not achieved in accordance with that time schedule.

8. Containment zones, where petroleum products are the only pollutants of concern, may be designated by local agencies which are supervising the cleanup pursuant to provisions of the Underground Storage Tank Program. Sites considered shall be as described in Section III.H.4. Local agencies shall use the same procedures, processes, and criteria as the Regional Water Boards unless otherwise noted. Local agency designations of containment zones shall be accomplished through issuance of corrective action orders as authorized by Health and Safety Code Sections 25299.36, 25299.37 and 25299.52.

9. The Regional Water Board shall comply with the following public participation requirements (as required by WC Sections 13244, 13263, 13300-13304, and 23 CCR Sections 647-649.6, 2592, and 2728), prior to the designation of a containment zone:

a. Public notice of an intention to designate a containment zone shall be provided to all known interested persons, including local residents and agencies identified in Section III.H.10, 45 days prior to the proposed designation of any containment zone;

b. Interested persons shall be given the opportunity to review the proposed management plan, monitoring program and any other available materials and to comment on any proposed designation of a containment zone;

c. The proposed designation of a containment zone shall be placed on the agenda for consideration at a Regional Water Board meeting. Prior to designating a containment zone, the

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Regional Water Board shall make a finding of fact with regard to each of the conditions which serve as a prerequisite for containment zone designation.

d. If a local agency is proposing the designation and any person objects, the local agency will forward its files and proposal to the Regional Water Board for consideration. The matter shall be placed on the agenda of a Regional Water Board meeting.

10. During or preceding the comment period, the Regional Water Board shall formulate a technical advisory committee to review any proposed designation and shall meet as a committee at the request of any committee member. Such advisory committee shall consist of representatives from:

The California Department of Toxic Substances Control

The California Department of Health Services, Drinking Water Branch

The local health authority;

The local water purveyor, in the event ground water is used as a source of municipal water supply;

Any local ground water management agency.

In the event a designation is being considered by a local agency, the local agency shall include the Regional Water Board in the advisory committee.

11. The Regional Water Boards shall keep a master listing of all designated containment zones. If a containment zone is designated by a local agency that designation shall be forwarded to the Regional Water Board for incorporation in the master listing. The master listing shall describe the horizontal and vertical extent of each designated containment zone.

12. To assure consistency of application of this Policy the State Water Board will designate a "Containment Zone" Review Committee consisting of staff from the State Water Board and each of the Regional Water Boards. This review committee shall meet quarterly for two years and review all designation actions. The committee shall review problems and issues and make recommendations for consistency and improved procedures.

13. If a containment zone is designated, the Regional Water Board shall consider whether to modify applicable water quality objectives and beneficial use designations contained in the water quality control plan;

14. The Regional Water Board may prohibit future discharges not associated with the cleanup within the containment zone where necessary to preclude further degradation and promote future attainment of water quality objectives.

15. If a Regional Water Board or local agency finds that water quality objectives within the containment zone have been met, after public notice, the Regional Water Board or local agency will rescind the designation of the containment zone.

16. The Regional Water Board's cost associated with review of applications for containment zone designation will be recoverable pursuant to Section 13304 of the Water Code.

IV. The Regional Water Board shall determine schedules for investigation, and cleanup and abatement, taking into account the following factors:

A. The degree of threat or impact of the discharge on water quality and beneficial uses;

B. The obligation to achieve timely compliance with cleanup and abatement goals and objectives that implement the applicable Water Quality Control Plans and Policies adopted by the State Water Board and Regional Water Boards;

C. The financial and technical resources available to the discharger; and

D. Minimizing the likelihood of imposing a burden on the people of the state with the expense of cleanup and abatement, where feasible.

V. The State and Regional Water Boards shall develop an expedited technical conflict resolution process so when disagreements occur, a prompt appeal and resolution of the conflict is accomplished.

NOTES

[1] Toxics Assessment Group "TAGALERT" facsimile dated March 13, 1995.
[2] Amendment of Resolution No. 92-49 "Policies and Procedures for Investigation and Cleanup and Abatement under Section 13304 of the Water Code" from State Water Resources Control Board, State of California (Draft, Sept. 14, 1995). See Appendix A.
[3] Amendment of Resolution No. 92-49 "Policies and Procedures for Investigation and Cleanup and Abatement under Section 13304 of the Water Code" from State Water Resources Control Board, State of California (Draft Functional Equivalent Document, Sept. 14, 1995), at § 3.3.
[4] *Id.* § 3.1.5.
[5] Gorelick et al., Groundwater Contamination Optimal Capture and Containment, at §II.A.5 (1993).
[6] DFED, *supra* note 3, at § 3.1.3.
[7] *Id.* § 3.1.2.
[8] *Id.* § 3.1.5.
[9] *Id.* § 3.2.
[10] John Bredehoeft, *Editorial*, Ground Water, Nov.-Dec. 1992, at 834.
[11] Richard Gordon, *Waging the "Environmental War" Against DNAPLs*, Michigan Lawyers Weekly, Oct. 31, 1994 at 25A. Carbon Tetrachloride, Tetrachloroethylene, and Pentachlorophenol are all DNAPLs.
[12] *Id.*
[13] *Id.*
[14] *Id.*
[15] Dr. John Cherry, *Groundwater Remediation Issues*, Seminar at State Water Resources Control Board, Sacramento, California, July 13, 1995.
[16] *Id.*
[17] *Id.*
[18] *Id.*
[19] DNAPLs present an unparalleled groundwater remediation problem. The case study of a DNAPL site in New Jersey illustrates the point. Intense clean-up efforts successfully attained water quality standards in and around IBM's Dayton (NJ) plant in 1984. But because undissolved DNAPL remained trapped in the subsurface, pollutant concentrations in the area slowly increased to levels higher than when abatement efforts began. When it recommenced clean-up operations, IBM shifted its goal of attainment to a less intensive standard of on-site containment. Even though the company will have to maintain this effort for an indefinite period, the new strategy will actually lead to substantial savings. *See supra* note 3 at § 3.3.
[20] I cannot help but compare DNAPLs to the spot on Lady MacBeth's murderous hand. These chemicals mark the sins of an industrial nature—yet like MacBeth, we have all benefitted in one way or another from their use. What does that make us?
[21] DFED, *supra* note 3, at Appendix B, ¶ G. "Background" levels simply refer to the level of water quality that existed before contamination as measured by surrounding non-polluted water.
[22] *Id.*
[23] DFED, *supra* note 3, at § 3.3.4.
[24] Bredehoeft, *supra* note 10.
[25] Cherry, *supra* note 15. The aforementioned companies gleefully sponsored this seminar, but Dr. Cherry's perspective is only half the story. The scientists had their say, but I never heard a word from the double-breasted suit crowd about how dreadfully expensive abatement is; and they say

money talks!
[26] DFED, *supra* note 3, at Appendix F. (Non-attainment zone policy, Jan. 18, 1995).
[27] *Id.* at Appendix E.
[28] 42 U.S.C. § 7502 (Clean Air Act § 172).
[29] NAZ, *supra* note 26, at ¶ H.8.
[30] *Id.* ¶ H.2.
[31] DFED, *supra* note 3, at § 3.3.3.
[32] NAZ, *supra* note 26, at ¶ H.5.
[33] *Id.* ¶ H.7.
[34] *Id.* ¶ H.6.h.
[35] DFED, *supra* note 3, at Appendix E.
[36] DFED, *supra* note 3, at § 2.1.
[37] *Id.*
[38] This evaluation is the result of research I conducted at the Division of Clean Water Programs, June 29-30, 1995. I personally read and tabulated all 109 written comments submitted regarding the original "non-attainment zone" amendments.
[39] Memorandum from Hisam Baqai, Supervising Engineer, Lahontan Regional Water Board to State Water Resources Control Board Division of Clean Water Programs (Mar. 3, 1995).
[40] DFED, *supra* note 3.
[41] Draft, *supra* note 2.
[42] DFED, *supra* note 3, at § 3.3.
[43] *Id.* at Appendix C.
[44] Draft, *supra* note 2, at ¶ H.7.
[45] *Id.* ¶ H.3.d.
[46] *Id.* ¶ H.6.
[47] *Id.* ¶ H.1.
[48] *Id.* ¶ H.4.b.
[49] *Id.* ¶ H.4.c.
[50] *Id.* ¶ H.13.
[51] Cal. Water Code § 13000 (West Supp. 1995) states in relevant part: "...the quality of the waters of the state shall be regulated to attain the highest water quality which is reasonable..."
[52] DFED, *supra* note 3, at Appendices C.008, C.104.
[53] Letter from Walt Petit, Executive Director, State Water Resources Control Board to Jody Sparks, President, Toxics Assessment Group (Apr. 14, 1995).
[54] Gordon, *supra* note 11.
[55] DFED, *supra* note 3, at Table 3.1.
[56] *Id.* § 1.0.
[57] Sands v. Morongo Unif. Sch. Dist., 809 P.2d 809, 833 (Cal. 1991) (Lucas, C.J., concurring).
[58] Brydon v. East Bay Mun. Util. Dist., 29 Cal. Rptr.2d 128, 143 (Ct. App. 1994).
[59] Cal. Const. art. X, § 2. SWRCB notes that other states such as Connecticut, New Jersey, Massachusetts, and Ohio are considering their own containment zone policies—none of these states, however, have anything like Cal. Const. art. X, § 2 in their constitutions. So much for the Comparative Law angle.
[60] United States v. State Water Resources Control Bd., 227 Cal. Rptr. 161 (Ct. App. 1986) The court traced Water Code §§ 13000, et seq., to Cal. Const. art.X, § 2. See note 51, *supra.*
[61] Gin S. Chow v. City of Santa Barbara, 22 P.2d 5, 16-17 (Cal. 1933). For an excellent discussion of the evolution of California's "reasonable use" doctrine, see Gray, *In Search of Bigfoot: The*

Common Law Origins of Article X, Section 2 of the California Constitution, 17 Hastings Const. L.Q. 225 (1989).

62 *Id.*

63 *Id.*

64 SWRCB has itself stated, "Water Code Section 13241... allows economics to be considered in setting water quality objectives in water quality control plans. That section, however, does not apply to cleanup levels established under Section 13304." In other words, once SWRCB establishes water quality objectives, Cal. Const. art. X, § 2 kicks in to ensure the highest possible abatement efforts. See SWRCB Order No. WQ 92-09, 1992 Cal ENV LEXIS 14 (Sept. 17,1992), at FN12.

65 Cal. Const. art. X, § 2 does allow for a "technological feasibility" factor. As quoted in the text, that section states that state water resources shall be "put to beneficial use *to the fullest extent of which they are capable...*" Note that the word "they" refers to the water itself. The *"fullest extent"* to which water can itself be remediated is logically limited only by technological capabilities of a given era.

66 Bredehoeft, *supra* note 10.

67 DFED, *supra* note 3, at § 3.3. This section also discusses the problems that "light non-aqueous phase liquids" (LNAPLs) present. These contaminants include gasoline and other petroleum products that *float* on top of the water table. An LNAPL mass can largely be "skimmed" off the water table, but not completely. I cannot say if this or other contaminant classes are as beyond abatement as DNAPLs—SWRCB has limited the bulk of its findings and discussion to DNAPLs. One can infer that this means DNAPLs are truly in a class by themselves.

68 *See supra* notes 23, 24, 54, and 55.

69 Mary B. Powers, *Outpost is Hotbed of Technology*, Engineering News-Record, May 16, 1994, at 27.

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