Proposed Low-Threat Petroleum UST Closure Policy

SWRCB Low-Threat UST Closure Policy Task Force

Los Angeles RWQCB Presentation

September 15, 2011

Prologue – Low-Threat Policy: An Evolutionary Process

STATE WATER RESOURCES CONTROL BOARD
RESOLUTION NO. 2009-0042
ACTIONS TO IMPROVE ADMINISTRATION OF THE UNDERGROUND STORAGE TANK (UST) CLEANUP FUND AND ***UST CLEANUP PROGRAM***

9. DFA and DWQ shall, by July 2009, create a **taskforce** composed of State and Regional Water Board staff, LOP and other local agency staff, consultants and tank owners and operators to make recommendations…. to improve the UST Cleanup regulatory program, *including additional approaches to risk-based cleanup.*

14. The issues identified in this resolution are of an ongoing nature and the State Water Board **will take further appropriate action to** address the funding shortfall and **improve program effectiveness**.

Prologue – Continued: More on Resolution 2009-0042

Therefore be it resolved:

- 5b. For cases where there is continued disagreement about whether the case should be closed, the Fund Manager shall within six months recommend the case to the State Water Board for consideration of closure.

- **SWRCB Agenda of October 19, 2010:**

- Item 6. Consideration of a proposed Order directing Underground Storage Tank Case Closures Pursuant to Health and Safety Code Section 25299.39.2: Various Locations in California.

- **Result:** SWRCB adopted order to close seven (7) LOP sites in Sacramento County . More on this later.

Low-Threat UST Closure Policy (July 14, 2011)

Stakeholder Group Members and Affiliation*

- David Arrieta, Western States Petroleum Association
- Ravi Arulanantham, Geosyntec, Environmental Consultant
- Kurt Berchtold, Executive Officer, Santa Ana Region RWQCB
- Roy Herndon, Orange County Water District
- Barry Marcus, Sacramento County Env. Mgt. Dept. (LOP)
- Jay McKeeman, CIOMA (CA Independent Oil Marketers)
- Markus Niebanck, Amicus, Consultant, Sierra Club Volunteer
- David Noren, Board Member, North Coast Region RWQCB
- Stephanie Shakofsky, CCLR (Center for Creative Land Recycling)

*While members provided the perspectives and priorities of their respective stakeholder groups during this work, the opinions stated by group members and the recommendations of this draft policy are those of the participants and not necessarily their affiliated entities.

Policy Structure

- **Preamble**
- **Criteria for Low-Threat Case Closure**
  - General Criteria (applicable to all sites)
  - Media-Specific Criteria
    - Groundwater
    - Vapor intrusion to Indoor Air
    - Direct Contact
    - Soil Only
- **Post Closure-Eligible Requirements**

Preamble

Discusses the background of California tank cleanup program and UST Cleanup Fund.

Discusses program experiences: a substantial fraction of a release can be mitigated with a "reasonable level of effort"

Acknowledges that residual mass is difficult to completely remove regardless of additional efforts.

Recognizes that natural attenuation is a viable remedial alternative for *residual contamination*

Discusses applicability of criteria to non-UST petroleum releases

Incorporates definitions by reference

Criteria For Low-Threat Closure General Discussion

States that cases *meeting* the general and media-specific criteria do not require further corrective action and *shall* be issued an NFA letter.

Caveat 1(the inclusion clause):

Regulatory agencies should issue an NFA letter for sites that *don't meet* the criteria if they believe that site-specific conditions justify a low threat closure.

Caveat 2 (the exclusion clause):

"Unique site attributes" may make application of policy criteria inappropriate. The policy puts the onus on the *regulatory agency* to identify and justify "unique attributes" (by reference to conceptual site model) that make a site ineligible for low-threat closure.

Criteria For Low-Threat Closure General Criteria

The policy lists, then discusses in greater detail, seven (7) general low-threat criteria that must *all* be met in order to proceed to evaluating media-specific criteria:

Site must be in service area of public water system. Note that the surrounding areas *may be* on private wells. Public water need only be available i.e. "within the service area."

Release must consist of "petroleum". As defined includes any fraction of crude oil, "petroleum solvents" (mineral spirits, Stoddard solvent), fuel oxygenates, additives, and "blending agents"

Release has been stopped. Tanks, piping, dispensers are identified as "primary source".

Free product removed to the extent practicable. This parallels, and is intended to comply with, language in the Federal UST regulations

Conceptual Site Model prepared and validated. Not a new requirement. The CSM is the culmination of the site characterization process. Unique to each site.

"Secondary Source" removal has been addressed. Remove or destroy-in-place the most readily recoverable fraction of source-area mass.

MTBE testing requirement. Per H&S Code 25296.15. Diesel-only exclusion.

Criteria For Low-Threat Closure: Media-Specific Criteria - Groundwater

- **General discussion of the intent and compatibility with existing statutes, codes, and regulations**

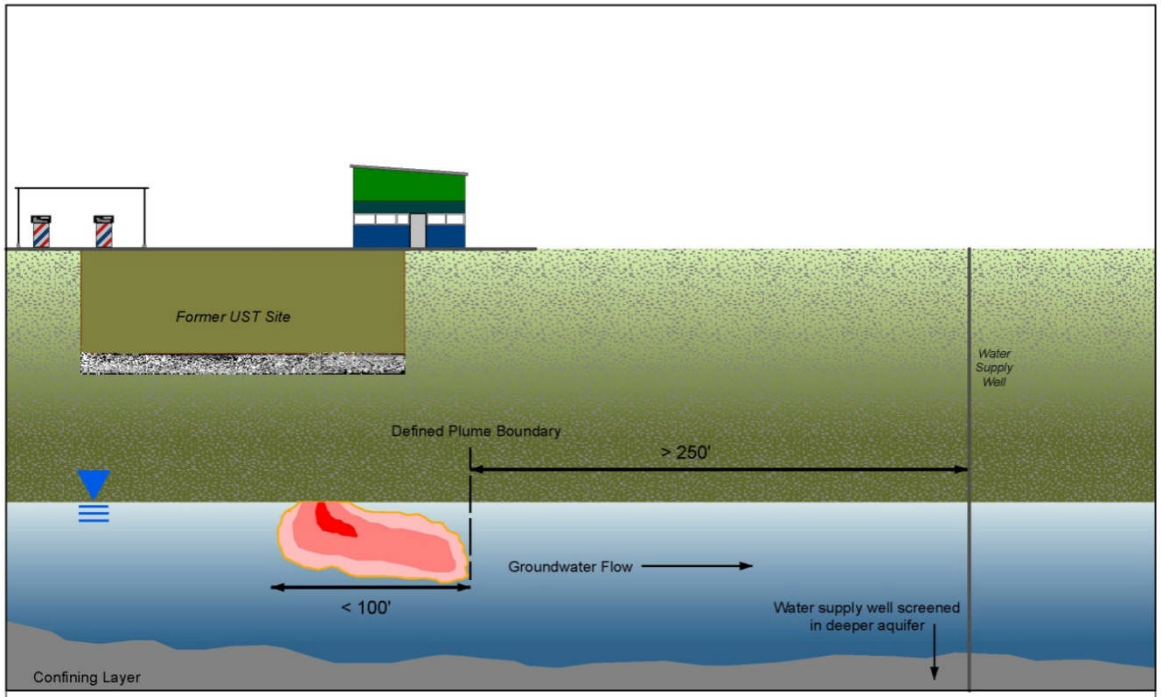
  Resolution No. 92-49 does not require that the requisite level of water quality be met at the time of case closure; it specifies compliance with cleanup goals and objectives within a *reasonable time frame* ("decades to hundreds of years" - Matthew Walker petition, 1998)

  If the closure criteria described in this policy are satisfied at a release site, water quality objectives will be attained through natural attenuation within a reasonable time, prior to the need for use of any affected groundwater.

  The area of the plume that exceeds water quality objectives must be *stable or decreasing* in areal extent. "Stable" is defined as the distance from the release where attenuation exceeds migration.

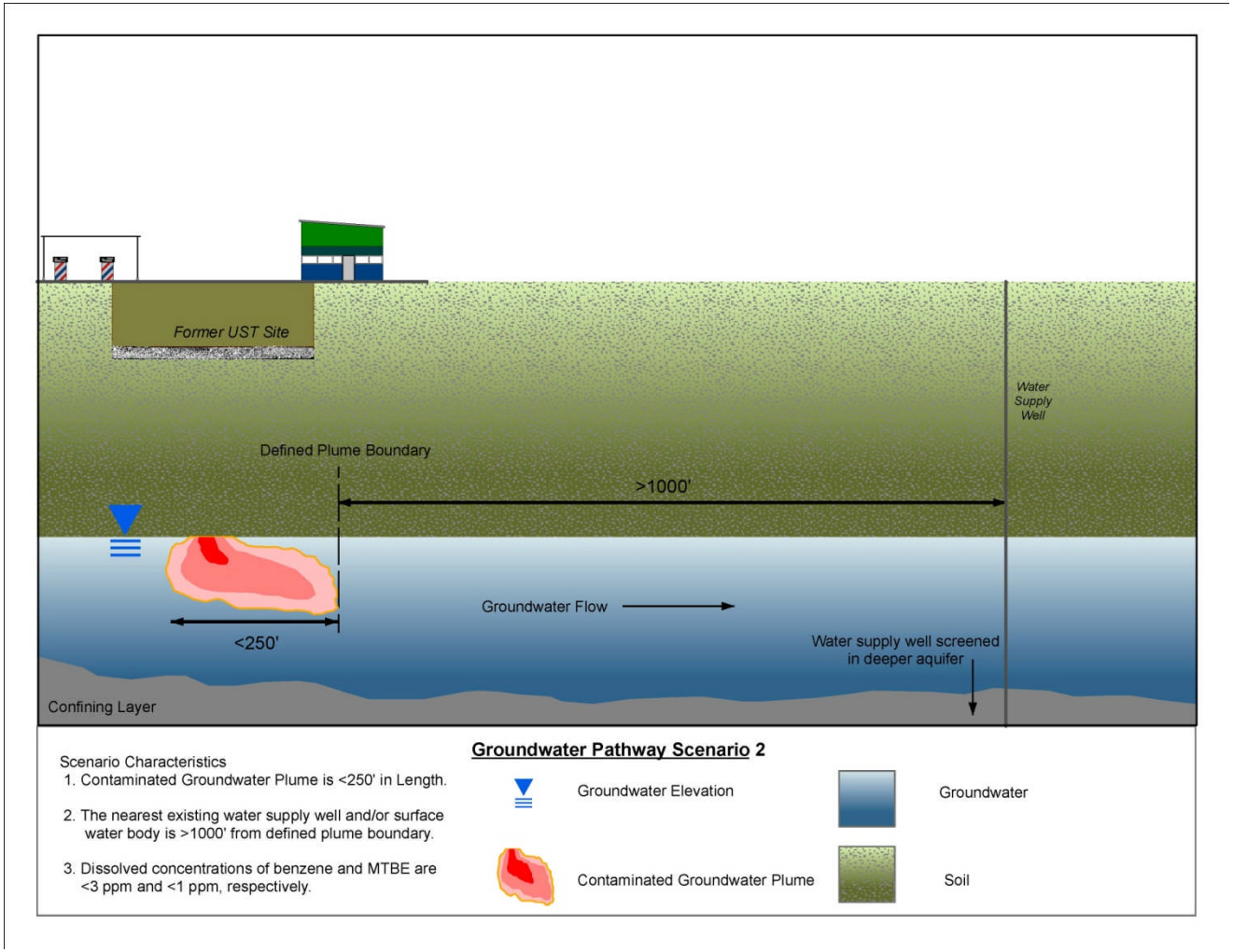
Media-Specific Criteria

Groundwater Class 1



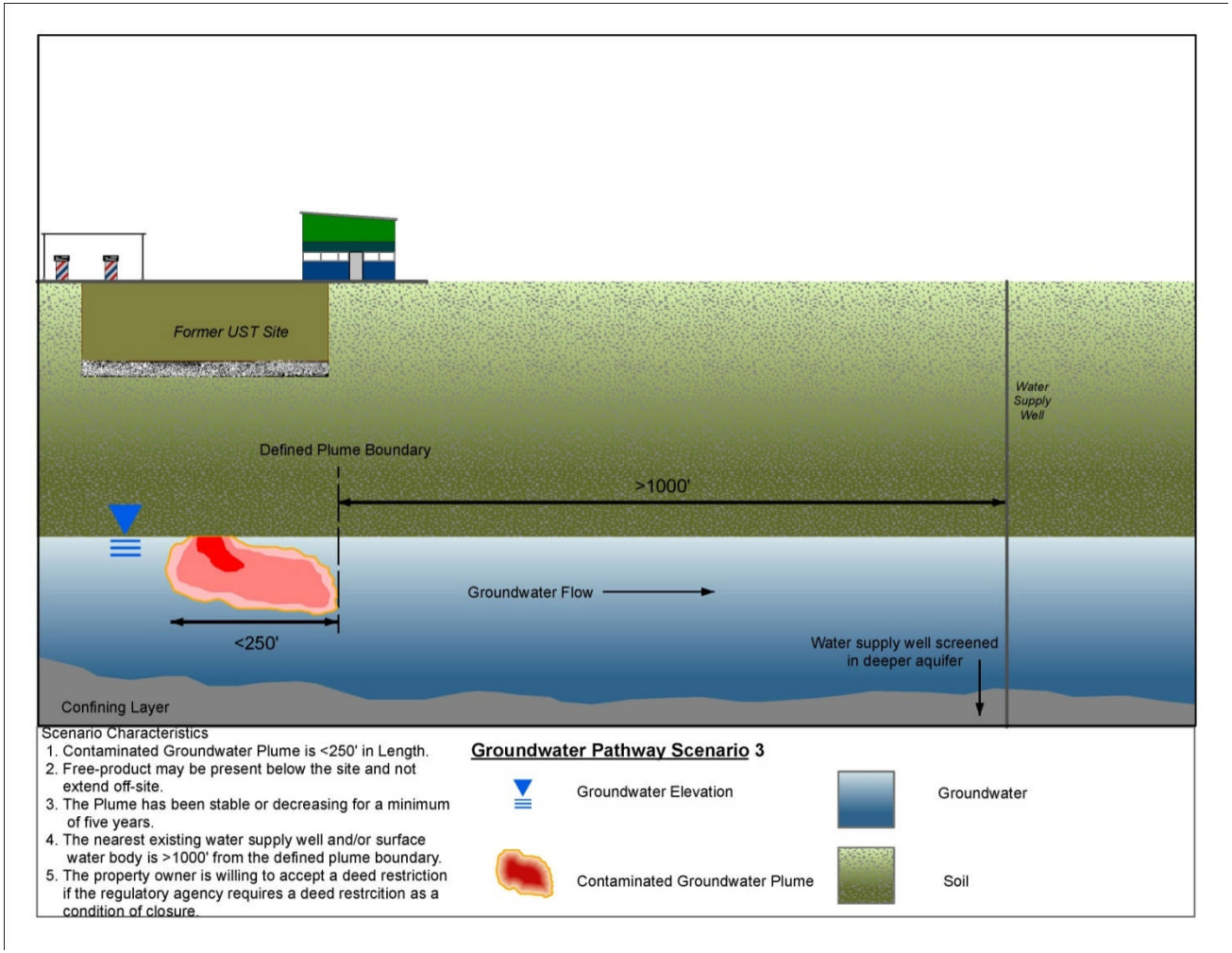
Media-Specific Criteria

Groundwater Class 2



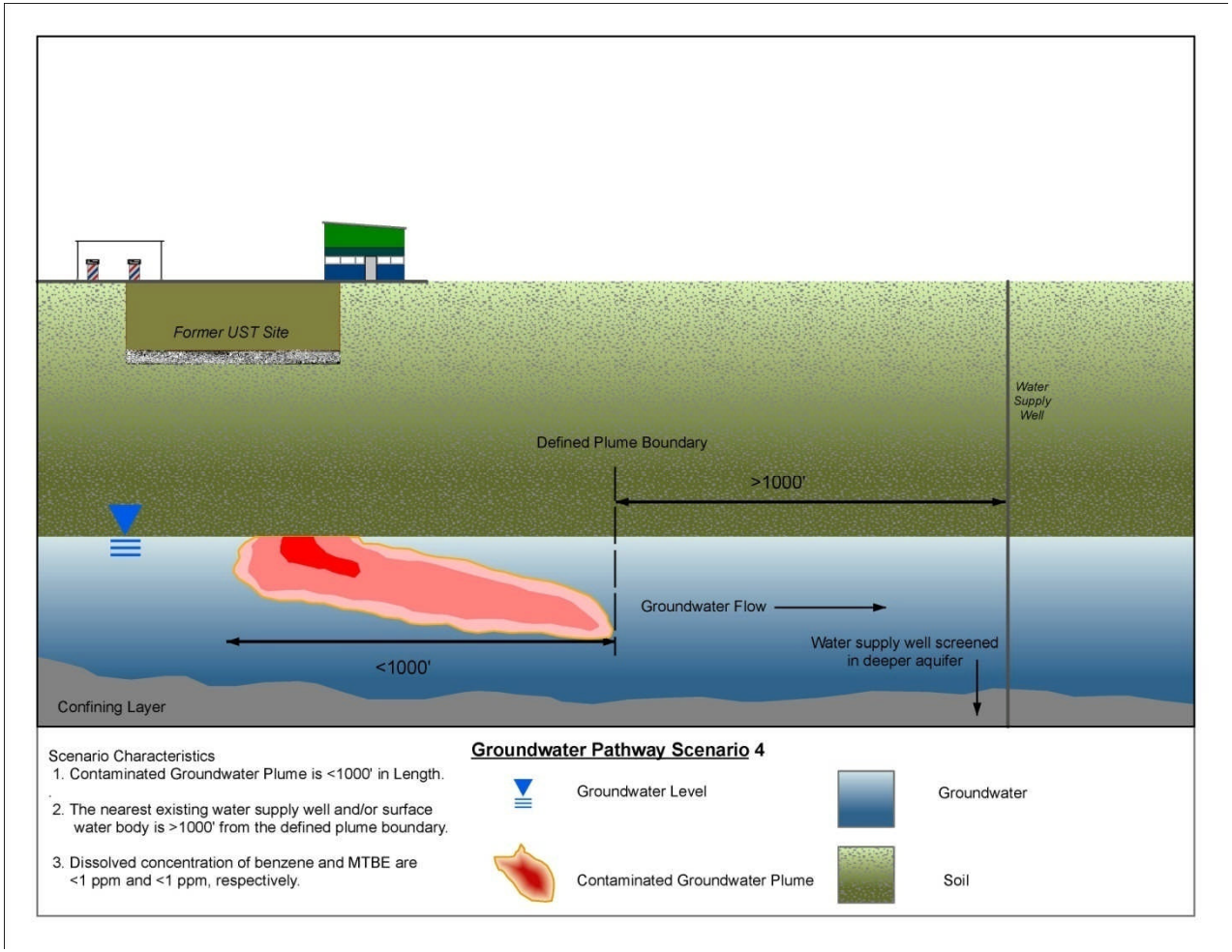
Media-Specific Criteria

Groundwater Class 3



Media-Specific Criteria

Groundwater Class 4



Media-Specific Criteria

Groundwater Class 5

- An analysis of site specific conditions determines that the site under current and reasonably anticipated near-term future scenarios poses a low threat to human health and safety and to the environment and water quality objectives will be achieved within a reasonable time frame.

Soil-Only Cases

"Sites with soil that does not contain sufficient mobile constituents (leachate, vapors, or LNAPL)to cause groundwater to exceed the groundwater criteria in this policy shall be considered low-threat sites for the groundwater medium."

Vapor-Intrusion to Indoor Air

Four vapor-intrusion-to-indoor air scenarios (1 through 4) are illustrated and described in appendices 1 through 4. The illustrative appendices *are part of the policy.*

"Scenario 5" = other site specific analysis

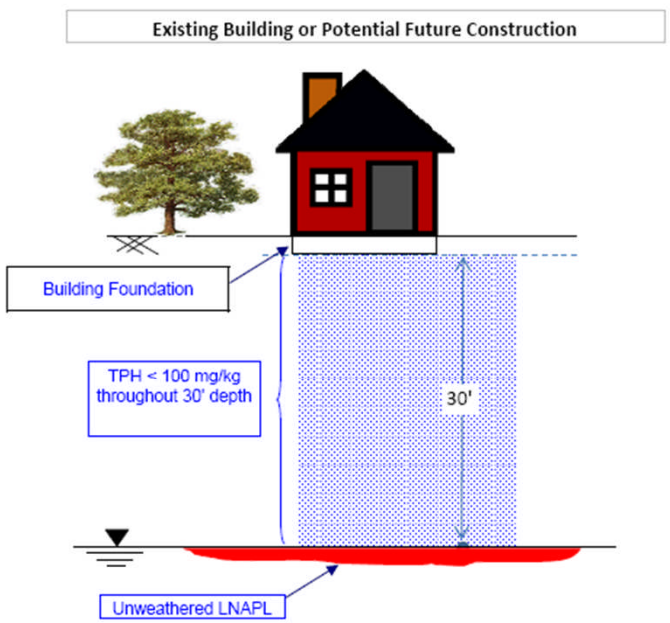
Active fueling system exclusion: Exposures to VI due to release are comparably insignificant. No VI required.

Vapor Intrusion

Scenario 1

Appendix 1
Scenario 1: Unweathered* LNAPL in Groundwater

Required Characteristics of the Bioattenuation Zone



Required Characteristics of the Bioattenuation Zone:
1. The bioattenuation zone shall be a continuous zone that provides a separation of at least 30 feet vertically between the LNAPL in groundwater and the foundation of existing or potential buildings; and
2. Total TPH (TPH-g and TPH-d combined) are less than 100 mg/kg throughout the entire depth of the bioattenuation zone.

*As used in this context, unweathered LNAPL is generally understood to mean petroleum product that has not been subjected to significant volitalization or solubilization, and therefore has not lost a significant portion of its volatile or soluble constituents (e.g., comparable to recently dispensed fuel).

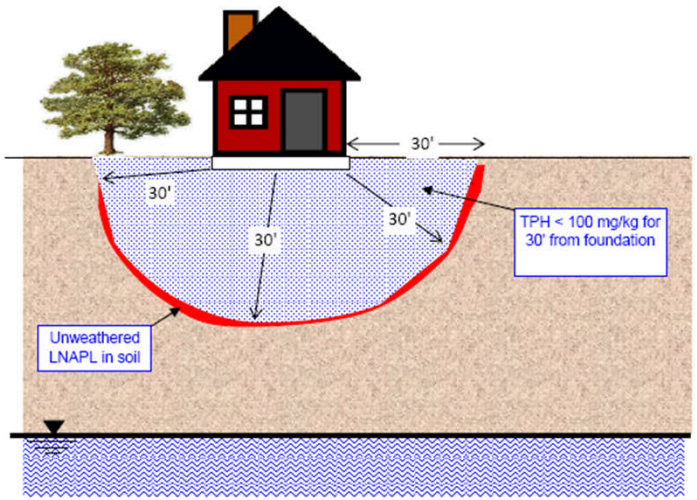
Vapor Intrusion

Scenario 2

Appendix 2
Scenario 2: Unweathered* LNAPL in Soil

Required Characteristics of the Bioattenuation Zone

Existing Building or Potential Future Construction



Required Characteristics of the Bioattenuation Zone:
1. The bioattenuation zone shall be a continuous zone that provides a separation of at least 30 feet both laterally and vertically between the LNAPL in soil and the foundation of existing or potential buildings, and
2. Total TPH (TPH-g and TPH-d combined) are less than 100 mg/kg throughout the entire depth of the bioattenuation zone.

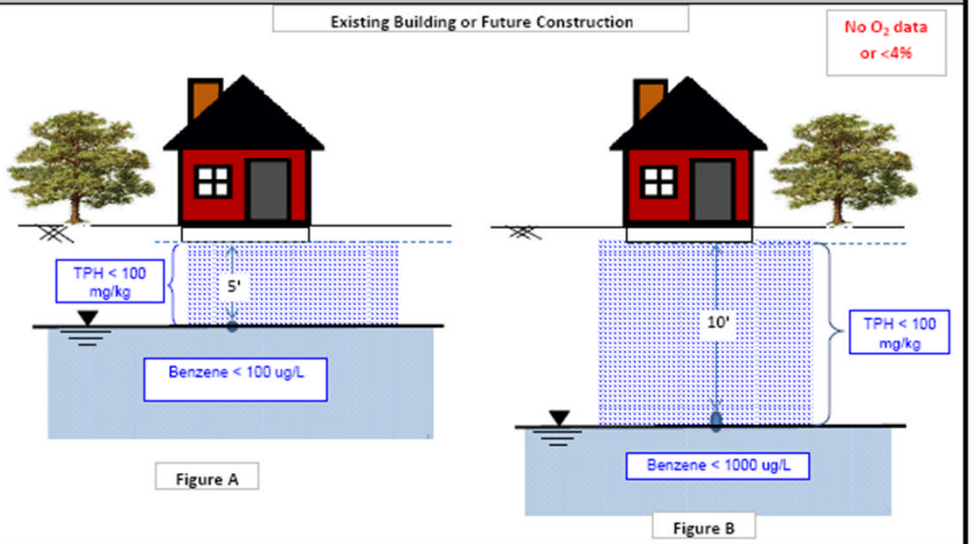
*As used in this context, unweathered LNAPL is generally understood to mean petroleum product that has not been subjected to significant volitalization or solubilization, and therefore has not lost a significant portion of its volatile or soluble constituents (e.g., comparable to recently dispensed fuel).

Vapor Intrusion

Scenario 3

Appendix 3
Scenario 3 - Dissolved Phase Benzene Concentrations Only in Groundwater
(Low concentration groundwater scenarios with or without O_2 measurements)

Defining the Bioattenuation Zone Without Oxygen Measurements or Oxygen <4%



Required Characteristics of Bioattenuation Zone For Sites Without Oxygen Measurements

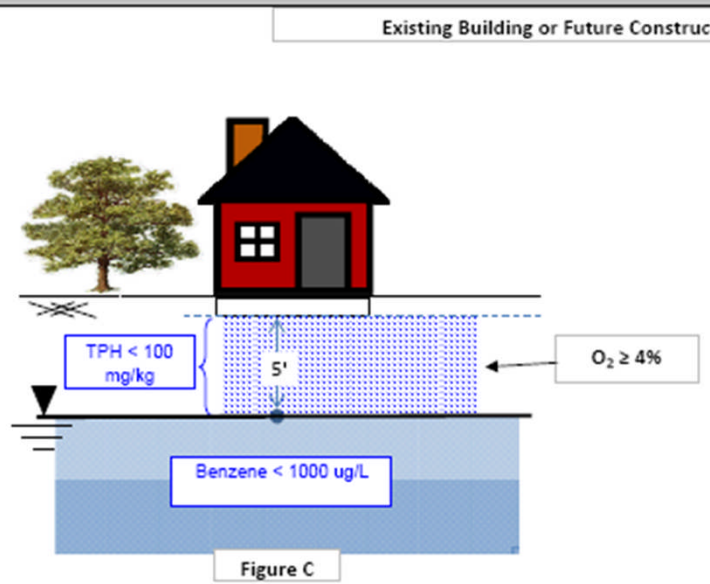
Figure A: 1) Where benzene concentrations are less than 100 ug/L, the bioattenuation zone:
a) Shall be a continuous zone that provides a separation of at least 5 feet vertically between the dissolved phase Benzene and the foundation of existing or potential buildings; and
b) Contain Total TPH (TPH-g and TPH-d combined) less than 100 mg/kg throughout the entire depth of the bioattenuation zone.

Figure B: 1) Where benzene concentrations are greater than 100 ug/L but less than 1000 ug/L, the bioattenuation zone:
a) Shall be a continuous zone that provides a separation of at least 10 feet vertically between the dissolved phase Benzene and the foundation of existing or potential buildings; and
b) Contain Total TPH (TPH-g and TPH-d combined) less than 100 mg/kg throughout the entire depth of the bioattenuation zone

Vapor Intrusion

Scenario 3 (continued)

Defining the Bioattenuation Zone With Oxygen ≥ 4%



Required Characteristics of Bioattenuation Zone For Sites With Oxygen ≥ 4%

Where benzene concentrations are less than 1000 ug/L, the bioattenuation zone:

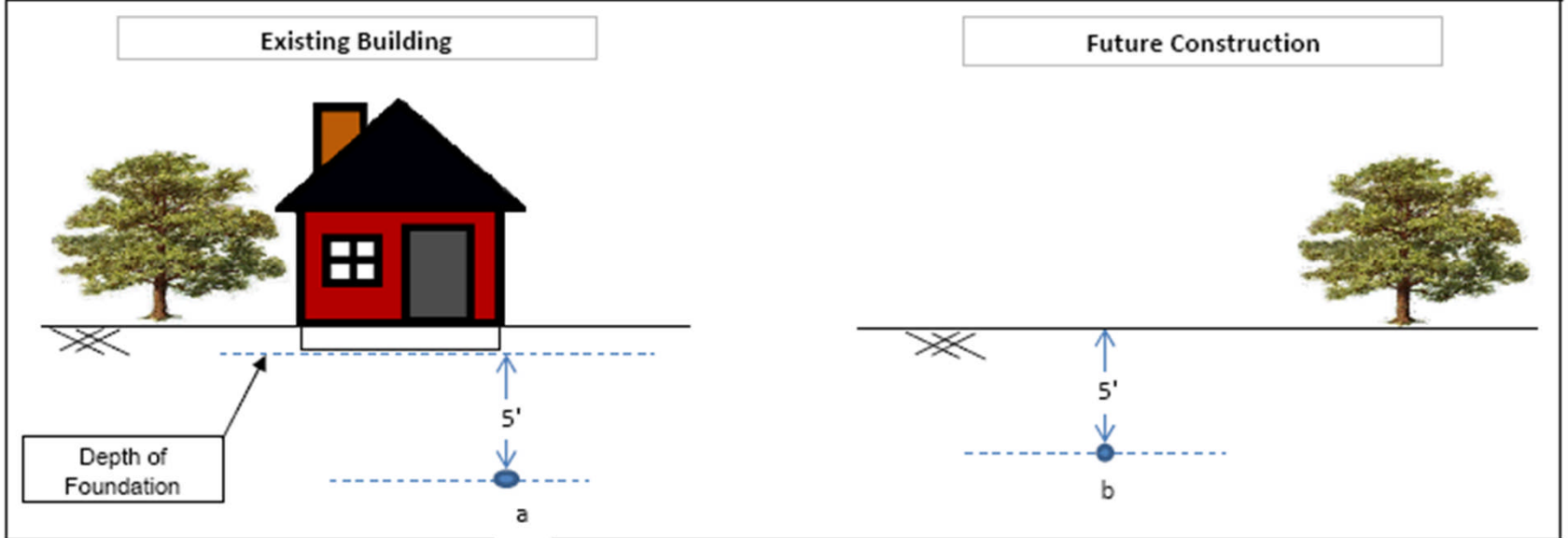
1. Shall be a continuous zone that provides a separation of least 5 feet vertically between the dissolved phase Benzene and the foundation of existing or potential buildings; and
2. Contain Total TPH (TPH-g and TPH-d combined) less than 100 mg/kg throughout the entire depth of the bioattenuation zone.

Vapor Intrusion

Scenario 4

Appendix 4
Scenario 4 - Direct Measurement of Soil Gas Concentrations

Soil Gas Sampling Locations – No Bioattenuation Zone



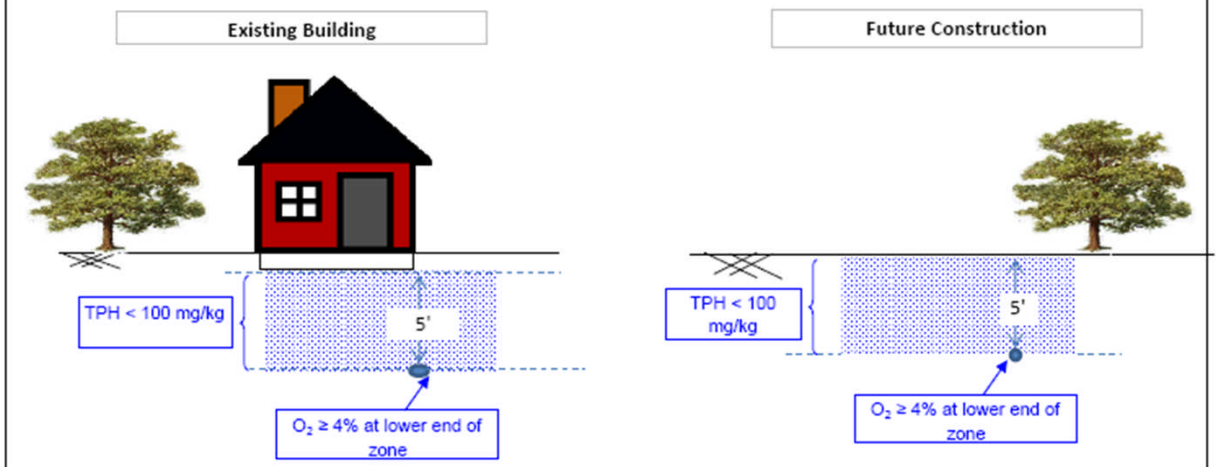
Description of Soil Gas Sample Locations

a - beneath or adjacent to building (soil gas sample shall be collected at least 5' deeper than the bottom of the building foundation)
b - for future construction scenarios (soil gas sample shall be collected at least 5' below the ground surface)

Vapor Intrusion

Scenario 4 (continued)

Soil Gas Sampling Locations – with Bioattenuation Zone



Required Characteristics of Bioattenuation Zone

Required data includes: petroleum concentrations in soil and soil gas, and oxygen concentrations.

Measured concentrations of soil gases must be less than the screening values indicated in the table below for the applicable scenarios.

Soil Gas Screening Levels (ug/m^3)

	With Bioattenuation Zone*		No Bioattenuation Zone	
	Residential	Commercial	Residential	Commercial
Constituent	Soil Gas Concentration (µg/m^3)		Soil Gas Concentration (µg/m^3)	
Benzene	< 85,000	< 280,000	< 85	< 280
Naphthalene	< 93,000	< 310,000	< 93	< 310

Notes:

*In order to use the screening levels with the bioattenuation zone, there must be:

1) 5 feet of soil between the soil vapor measurement and the building (or future building),
2) TPH (TPHg + TPHd) is less than 100 ppm (measured in at least two depths within the 5 foot zone), and
3) oxygen ≥ 4% measured at the ***bottom*** of the 5 foot bioattenuation zone.

A 1000-fold bioattenuation of petroleum vapors is assumed for the bioattenuation zone.

For the no bioattenuation zone, the screening criteria are the same as the California Human Health Screening Levels (CHHSLs).

Direct Contact

Exposure pathways include inhalation of contaminants volatilized to outdoor air and direct contact with contaminated soil. Three choices:

- Concentrations must be less than shown on policy table 1.
- A site-specific risk assessment demonstrates no significant risk.
- Control exposure through institutional or engineering controls.

Direct Contact

Table 1

Concentrations of Petroleum Constituents In Soil That Will Have No Significant Risk Of Adversely Affecting Human Health

Depth (ft)	Benzene (mg/Kg)	Naphthalene (mg/Kg)	PAH* (mg/Kg)
0-5	2.3	13	0.038
5 to 10	100	1500	7.5

*Notes: Based on the seven carcinogenic PAHs as benzo(a)pyrene toxicity equivalent [BaPe]. The PAH screening level is only applicable where soil was affected by either waste oil and/or Bunker C fuel.

Other Closure Requirements

"the following items, if applicable, shall be completed prior to the issuance of a uniform closure letter"

Proposed policy requires:

- Notification of proposed case closure to public water supply agencies, property owners, owners and occupants of adjacent parcels and parcels affected by the release, and land-use permitting agencies.
- Monitoring well destruction, as applicable.
- Disposal of investigation-derived waste.

Technical Justification

- Technical justification attachments are not part of the policy itself but are included to assist with a technical understanding of how portions of the policy were derived.

- Three sections:
  - Groundwater plume lengths
  - Vapor-Intrusion risk thresholds
  - Direct contact risk thresholds

Discussion – potential issues requiring regulatory negotiation

Varying interpretation of:

- “reasonable level of effort”
- “to the maximum extent practicable”
- “unique attributes”
- “bioattentuation zone”
- “stable”
- “addressed”
- “blending agents”
- “secondary source removal”

Epilogue – How do 10/19/10 SWRCB site closures compare to low-threat criteria?

7037 Power Inn Road – **increasing trend & public well ~350' DG from plume**

3106 Northgate Boulevard – **post-remedial (p.r.) increasing MTBE trend**

4625 El Camino Ave – **enforcement for well destruction**

3264 Ramona Street – **increasing p.r. trend**

8897 Greenback – meets criteria

14181 Grove Street – meets criteria

2732 Citrus Road – meets criteria

What's Next?

- CEQA review
- Scientific Peer Review – UC
- Review by California Office of Adminstrative Law
- Public/regulatory outreach
- Public Comment/Hearings
- Consideration of Adoption (early 2012)

Questions?

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Thank you