Public Meeting

Proposed Plan for the Vapor Intrusion Pathway

Middlefield-Ellis-Whisman (MEW)
Superfund Study Area
Mountain View and Moffett Field, CA

July 23, 2009

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Meeting Agenda

- **Introductions**
- **Presentation of EPA's Proposed Plan**
- **Clarifying Questions**
- **EPA Receives Formal Public Comments**
- **Closing**

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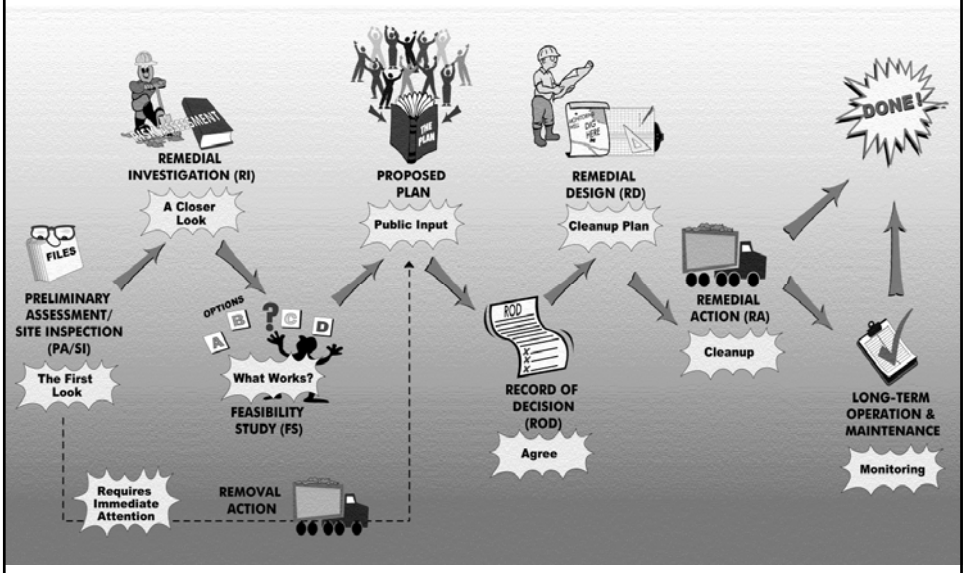
Superfund Cleanup Process



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Where Are We in the Process?

- **Final Supplemental Remedial Investigation and Feasibility Study for the Vapor Intrusion Pathway - June 2009**
- **Proposed Plan for the Vapor Intrusion Pathway - July 2009**
- **30-day Public Comment Period**

  July 10 - August 9, 2009
- **EPA received several requests for an extension. Granted additional 30 days until September 8, 2009**

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Public Meeting To Accept Oral Comments On Proposed Plan

- **Verbal comments accepted at the end of EPA's presentation on the Proposed Plan**
  - Speaker cards located in the back or raise your hand and one will be provided to you
  - 3 minute time limit to allow everyone an opportunity to comment

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Proposed Plan for the Vapor Intrusion Pathway

Middlefield-Ellis-Whisman (MEW) Superfund Study Area Mountain View and Moffett Field, CA

July 23, 2009

Alana Lee
EPA Region 9

Overview

- **Site Background**
- **Vapor Intrusion Pathway**
- **What We Found**
- **Remedial Action Objectives**
- **Remedial Alternatives**
- **Comparative Analysis of Alternatives**
- **EPA's Preferred Alternatives**
- **Next Steps**
- **Public Comments**

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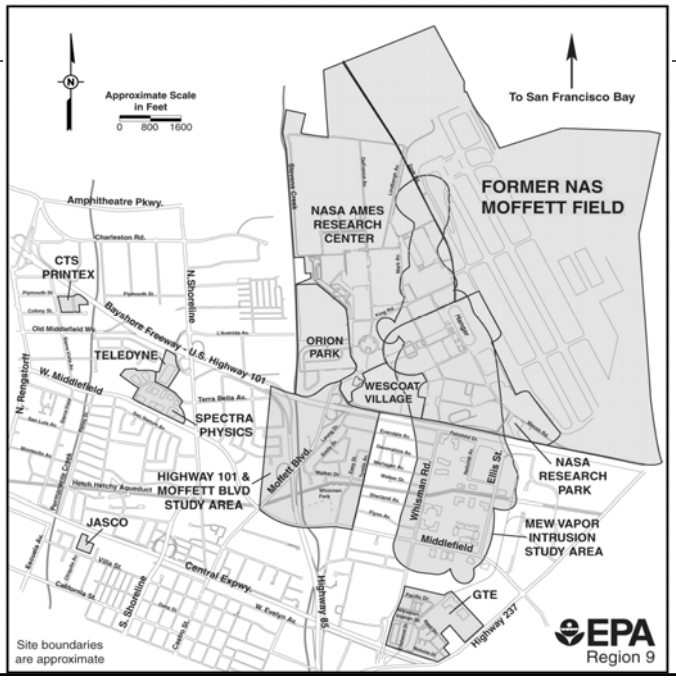
MEW SITE LOCATION AND VICINITY



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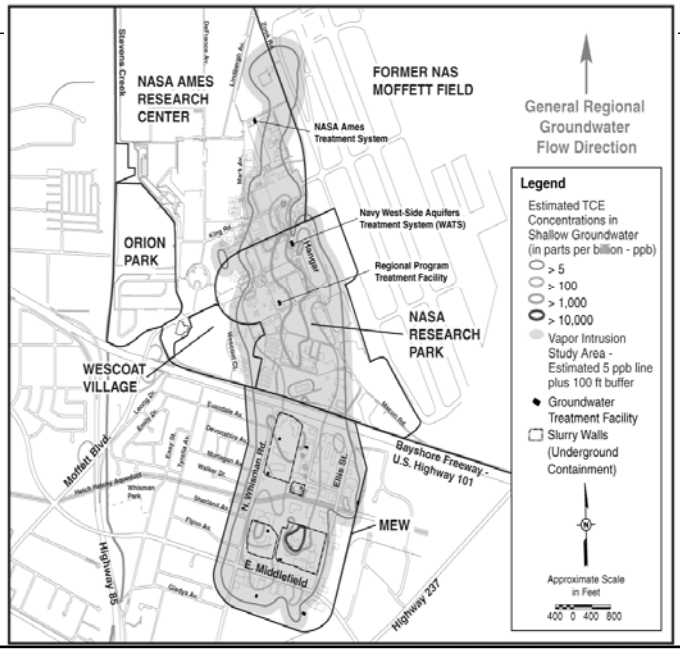
VAPOR INTRUSION STUDY AREA AND ESTIMATED TCE CONCENTRATIONS IN SHALLOW GROUNDWATER



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Site Background

- **Site used by private (MEW) Companies, Navy, and NASA**
- **Industrial activities in 1960s and 1970s released volatile organic compounds (VOCs) to soil and groundwater**
- **EPA Record of Decision (ROD) for Soil and Groundwater remedy - 1989**
  - **Soil cleanup is complete**
  - **Groundwater cleanup (extraction and treatment) continues**

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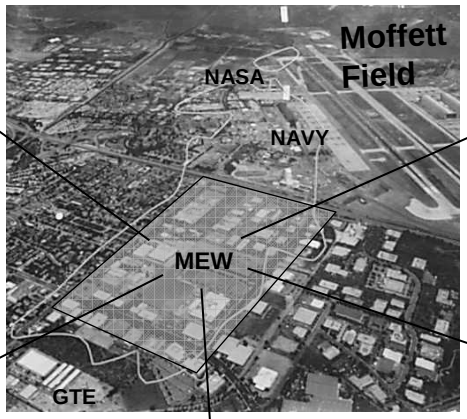
MEW Site Cleanup Progress

Interim remedial measures began in 1982. Four slurry walls were installed.

Ten groundwater treatment systems have treated over 4 billion gallons of water and removed more than 90,000 pounds of VOCs.



The plume has been stabilized. Groundwater concentrations have been reduced by more than 75%.

Parties have spent more than $140 million on investigation and cleanup activities.

Achieved soil cleanup standards. More than 36,000 cubic yards of soils were excavated. Five soil vapor extraction systems were installed and operated.

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MEW / NAS Moffett Field Site Background

- **Shallow groundwater – 5 to 20 feet below ground surface**
- **High concentrations of volatile organic compounds, primarily trichloroethene (TCE), in shallow groundwater**
- **Groundwater not currently used for drinking water or other household uses.**
- **New information on the potential for TCE in the subsurface to migrate into overlying buildings (vapor intrusion pathway)**

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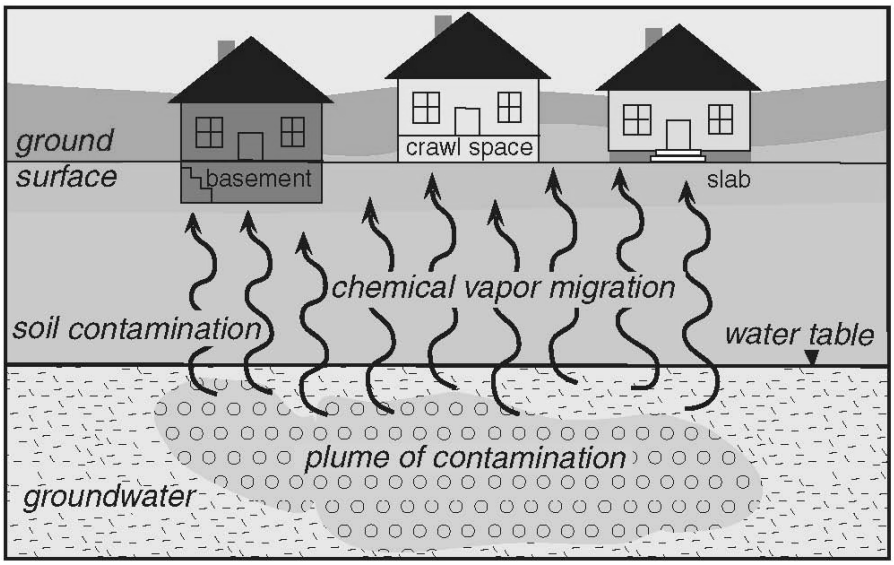
Vapor Intrusion Pathway



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Vapor Intrusion Study Area

- **All buildings overlying the shallow groundwater contamination**
- **Defined by the area where TCE concentrations in shallow groundwater are greater than 5 micrograms per liter (ug/L), or parts per billion (ppb)**
- **Includes a 100 foot buffer zone beyond the estimated 5 ppb TCE plume boundary**

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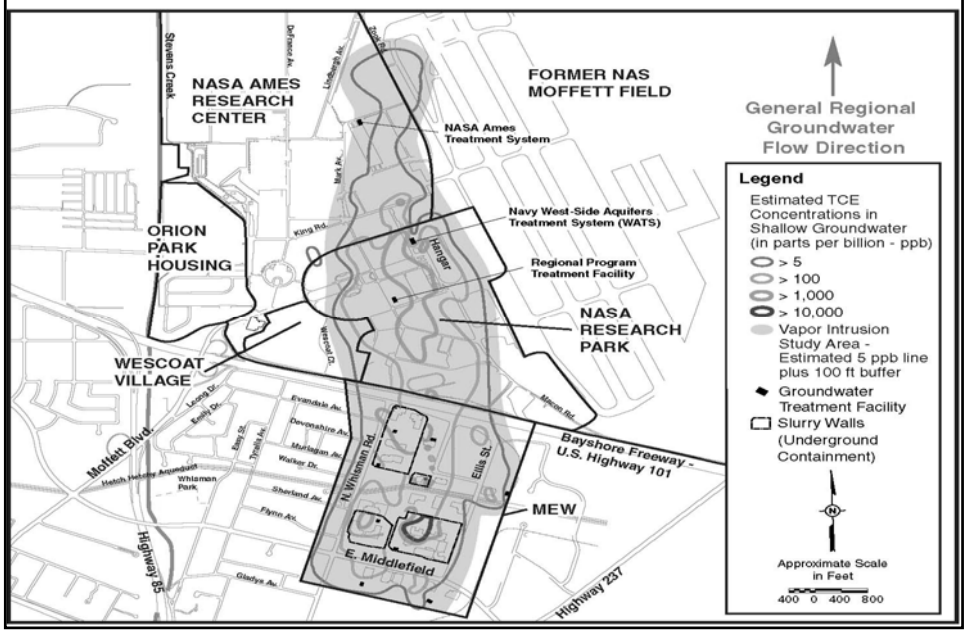
Vapor Intrusion Study Area



Supplemental Remedial Investigation

- **Indoor air investigation conducted by MEW Companies, NASA, U.S. Navy, and EPA to assess the potential vapor intrusion pathway**
- **Evaluated whether VOCs (primarily TCE) in shallow groundwater are potentially impacting indoor air quality in buildings overlying shallow TCE plume**
- **Over 2,800 indoor and outdoor air samples collected from 47 commercial buildings and 31 residences within the Vapor Intrusion Study Area.**

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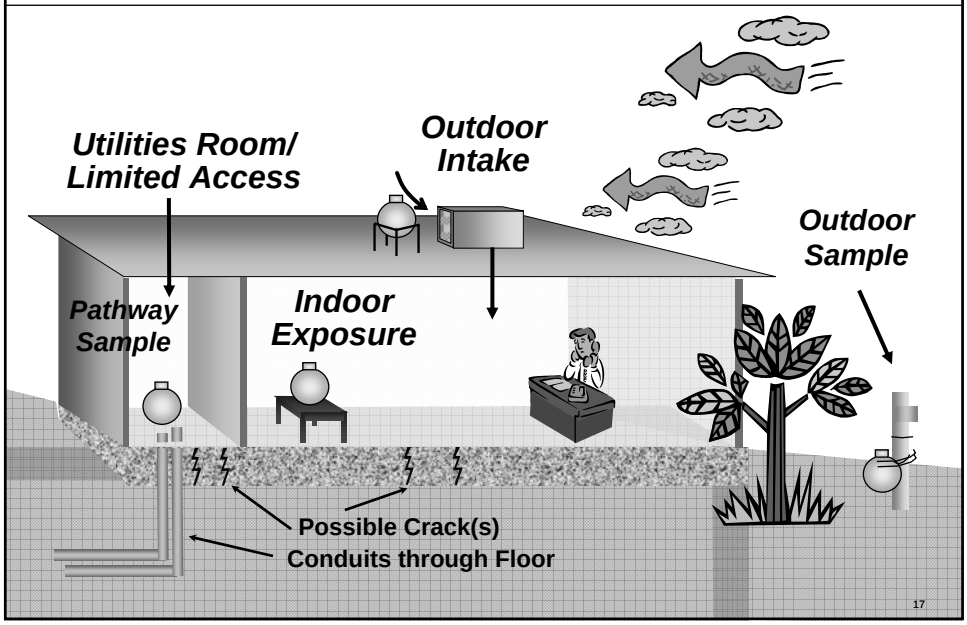
Types of Air Samples



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Criteria EPA Used To Evaluate Air Results

- **Compare indoor air to outdoor air results**
  - **concurrent indoor/outdoor sampling to help determine outdoor air levels entering the building**
- **Note: It is EPA's policy not to set cleanup levels or take action to reduce levels below background or outdoor ambient levels.**
- **Compare indoor air results to short-term health-based screening levels**
- **Compare indoor air results to long-term health-based screening levels for residents / indoor workers**

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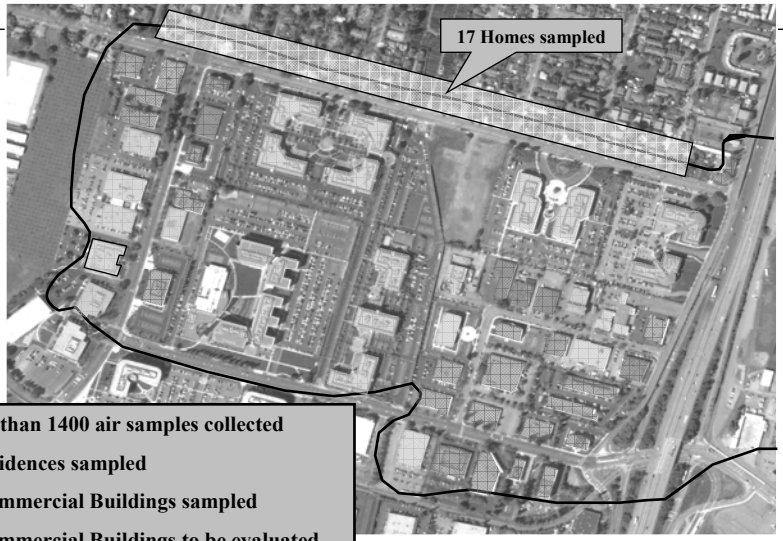
Buildings Sampled – South Of Hwy 101



More than 1400 air samples collected

17 residences sampled

30 Commercial Buildings sampled

30 Commercial Buildings to be evaluated

Building Sampled | Est TCE Plume Boundary | Building to be Evaluated

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Buildings Sampled – North of U.S Highway 101 – Moffett Field

Building Sampled | Estimated TCE Plume Boundary

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What We Found

- No immediate or short-term health concern (TCE: 540 micrograms per cubic meter [ug/m^3]).
- TCE was found in some buildings to be above outdoor air concentrations (~ 0.4 ug/m^3).
- TCE was detected in indoor air above EPA action levels for long-term exposure in several commercial buildings (5 ug/m^3) and a few residences (1 ug/m^3)
- Subsurface structures (wet basements, utility vaults, elevator shafts) – pathways for vapor intrusion.
- Varying ventilation conditions in commercial buildings and ventilation makes a difference.

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Interim Response Actions and Screening of Alternatives

- Mitigation measures implemented to reduce levels of TCE and other VOCs (sealing potential conduits, modifying ventilation systems, installing air purifiers, sub-slab ventilation systems). Confirmation samples collected to ensure effectiveness.
- Determined operation of ventilation systems (HVAC) in commercial buildings could be sufficient in reducing TCE concentrations.
- Initially screened alternatives in the Supplemental Feasibility Study using information from implementation of interim mitigation measures.

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Basis for Taking Action - Scope and Role of Response Action

- **Shallow TCE groundwater contamination is the primary source for potential vapor intrusion into existing and future buildings at the MEW Site.**
- **Proposed response action will address the potential health risks associated with long-term exposure to TCE through the vapor intrusion pathway.**
- **The proposed remedy for the vapor intrusion pathway will be incorporated into the overall Site remedy through an amendment to EPA's 1989 Record of Decision (ROD Amendment).**

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Vapor Intrusion Remedial Action Objectives

- **Ensure building occupants (workers and residents) are protected from subsurface Site contamination by preventing migration into indoor air or accumulation indoors at levels of concern for long-term exposure.**
- **Reduce or minimize the source of vapor intrusion (i.e., shallow groundwater contamination)***

***This is being addressed by current groundwater remedy and optimization efforts underway. Other options to clean up the groundwater faster and more effectively will be evaluated in a separate future Site-wide groundwater Feasibility Study.**

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Remedial Alternatives

Alternative	Description
1	**No Action with Monitoring**
2	**Heating, Ventilation, and Air Conditioning (HVAC) System, Monitoring, and Institutional Controls (ICs)**
3	**Sub-slab Passive Ventilation with Vapor Barrier (and Ability to Convert to Active), Monitoring, and ICs**
4A	**Sub-slab Depressurization, Monitoring, and ICs**
4B	**Sub-membrane Depressurization, Monitoring, and ICs**
5	**Sub-slab Pressurization with Vapor Barrier, Monitoring, and ICs**

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Common Elements – Monitoring and Institutional Controls

Each Alternative consists of an appropriate engineering control, institutional control, and monitoring.

- **Monitoring – to ensure remedy is effective and protective of human health**
- **Institutional Controls – what are they?**
  - non-engineered legal and administrative tools to help minimize the potential for exposure to contamination and to ensure the protectiveness of an engineered remedy.

Some Examples: Health and safety ordinances, zoning restrictions, building or excavation permits, and land use covenants.

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Alternative 1: No Action With Monitoring

- **No action would be taken to prevent exposure to Site contaminants in indoor air from the vapor intrusion pathway**
  - **Establishes a baseline for comparison to other alternatives**
  - **Monitoring would be performed to evaluate the potential for vapor intrusion, or to verify the presence or absence of the vapor intrusion pathway into specific buildings.**

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Alternative 2: HVAC System

- **Provides mechanical ventilation of building air, bringing outdoor air into the building space and venting indoor air to the outdoors**
  - **can be implemented in existing and future commercial buildings**
  - **not applicable for residential buildings**

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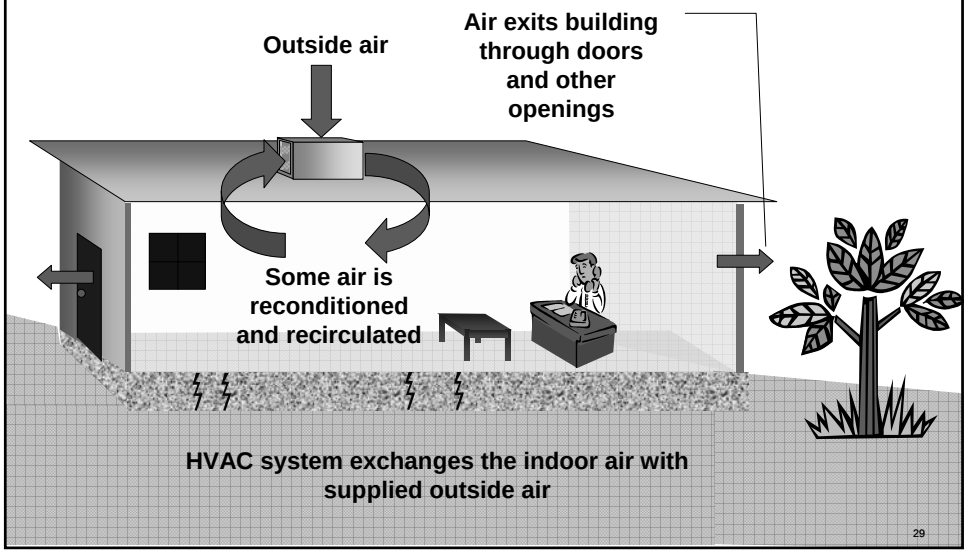
Alternative 2: HVAC System



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Alternative 3:
Sub-slab Passive Ventilation With Vapor Barrier
(With Ability To Convert To Active)

- **Uses slight pressure differences to force contaminant vapors to flow away from the building space**
  - **applicable for future commercial and residential buildings**
  - **not applicable for existing buildings because of difficulty of placing a venting layer and vapor barrier under existing buildings.**

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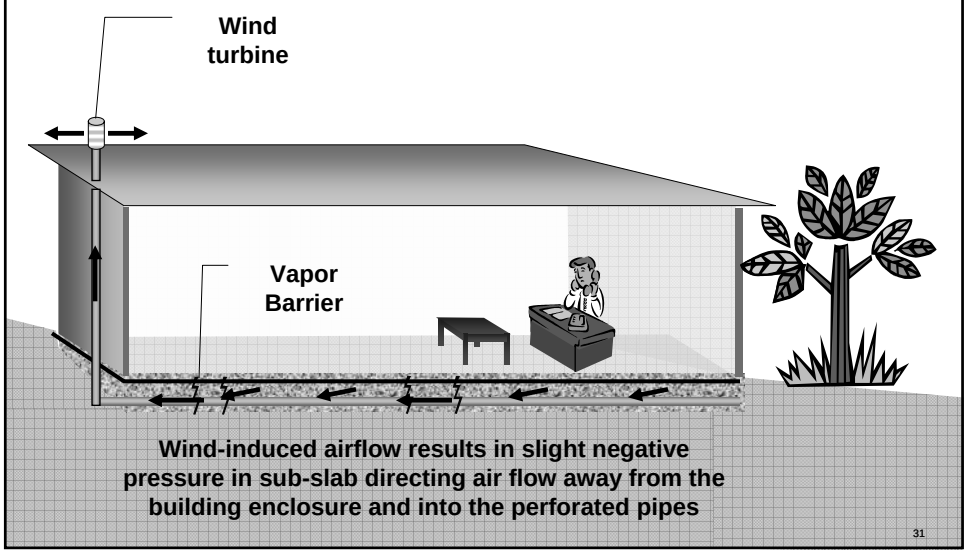
Alternative 3:
Passive Ventilation and Vapor Barrier



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Alternative 4A/B:
Sub-slab or Sub-membrane Depressurization

- **Pulls soil vapors from beneath the slab/membrane and vents it to the atmosphere away from building**
  - **applicable to existing and future commercial and residential buildings**

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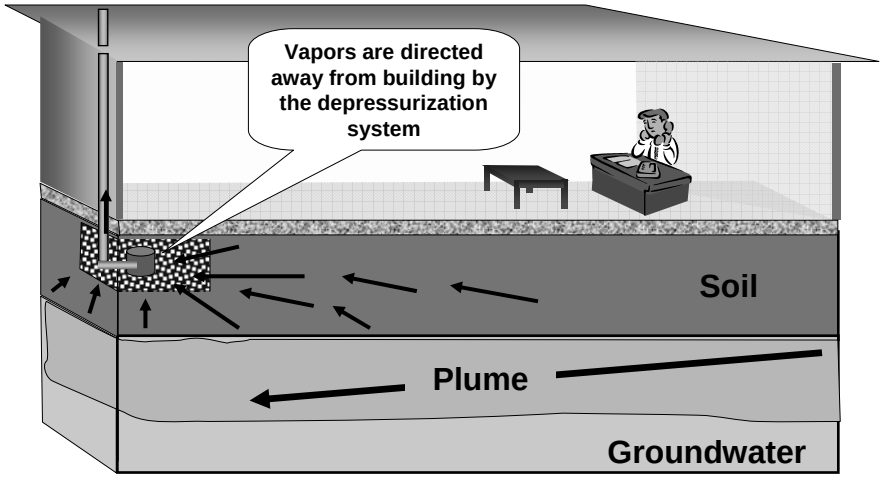
Alternative 4A: Sub-slab Depressurization



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Alternative 5: Sub-slab Pressurization with Vapor Barrier

- **Pushes air downward into the area below the slab. Pressure difference forces contaminated air to the sides the building, where it is vented away**
  - **applicable for future commercial and residential buildings**
  - **not applicable for existing buildings because of difficulty of placing a venting layer and vapor barrier under existing buildings.**

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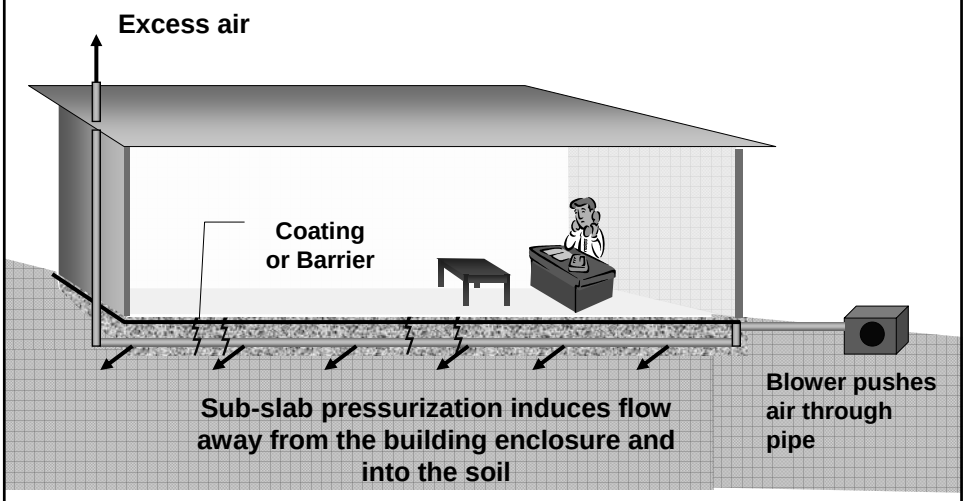
Alternative 5: Sub-slab Pressurization (SSP)



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Purpose of Institutional Controls

- Ensure engineering controls used to prevent indoor air contaminant levels from reaching EPA's action level are implemented, operated, and monitored as required by the remedy
- Access to install and operate stand-alone building remedy, as necessary
- Ensure appropriate remedy installed in new development
- Inform building owners, managers, and occupants of remedy and its requirements
- Inform responsible parties and EPA when building ownership or building configuration changes

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Alternatives Evaluated By Nine Criteria

- Overall protectiveness of Human Health and the Environment
- Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)
- Long-term Effectiveness
- Reduction of Toxicity, Mobility, or Volume of Contaminants through Treatment
- Short-term Effectiveness
- Implementability
- Cost
- State Acceptance - **will be evaluated after the public comment period**
- Community Acceptance- **will be evaluated after the public comment period**

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Evaluation of Alternatives – Existing Buildings

Evaluation Criteria	Alternative1: No Action with Monitoring	Alternative 2: HVAC System	Alternative 4A/B: Sub-slab/ Sub-membrane Depressurization
Overall Protectiveness of Human Health and the Environment	○	■	■
Compliance with ARARs	-	■	■
Long-term Effectiveness and Permanence	-	▲	■
Reduction of Toxicity, Mobility, or Volume of Contaminants Through Treatment	-	N/A	N/A
Short-term Effectiveness	-	■	■
Implementability	-	■	■
Cost (per Commercial building)	-	$50,000	$325,000 for SSD $331,000 for SMD
Cost (per Residential per building)	-	N/A	$24,000 for SMD $60,000 for SMD

State Acceptance - State Acceptance is a modifying criterion that will be evaluated after the public comment period

Community Acceptance – Community Acceptance is a modifying criterion that will be evaluated after the public comment period

■ High rating. Meets Criterion Best ▲ Medium rating. Meets Criterion ○ Low rating. Does Not Meet Criterion

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Evaluation of Alternatives – Future Buildings

Evaluation Criteria	Alt 1: No Action	Alt 2: HVAC System	Alt 3: Sub-slab Passive Ventilation, Vapor Barrier	Alt 4A/B: SSD/SMD	Alt 5: SSP, Vapor Barrier
Overall Protectiveness of Human Health and the Environment	○	■	■	■	■
Compliance with ARARs	-	■	■	■	■
Long-term Effectiveness and Permanence	-	▲	▲	■	▲
Reduction of Toxicity, Mobility, or Volume of Contaminants Through Treatment	-	N/A	N/A	N/A	N/A
Short-term Effectiveness	-	■	■	■	■
Implementability	-	■	■	■	■
Cost (per Commercial building)	-	$185,000	$207,500	$241,000 for SSD $203,000 for SMD	$318,500
Cost (Residential per residential building)	-	N/A	$36,500	$38,000 for SSD $56,500 for SMD	$48,000

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EPA's Preferred Alternatives

Building Scenario	EPA's Preferred Alternative
Existing Buildings	
Commercial (with existing HVAC system)	**Alternative 2:** HVAC System, Monitoring, and ICs
Commercial (without existing HVAC system)	**Alternative 4A/B:** Sub-slab/Sub-membrane Depressurization Monitoring, and ICs
Residential	**Alternative 4A/B:** Sub-slab/Submembrane Depressurization Monitoring, and ICs
Future Buildings	
Commercial and Residential (overlying low groundwater concentrations)	**Alternative 3:** Sub-Slab Passive Ventilation with Vapor Barrier (and Ability to Convert to Active), Monitoring, and ICs
Commercial and Residential (overlying higher groundwater concentrations)	**Alternative 4A/B:** Sub-slab/membrane Depressurization, Monitoring, and ICs

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EPA's Preferred Alternatives

- **EPA's Preferred Institutional Control (IC) to support each of EPA's preferred engineering control for the vapor intrusion remedy is a City ordinance because it can achieve the objectives most efficiently, consistently, and ensure protection of human health.**

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For More Information

For Proposed Plan, Administrative Record index and files:

EPA website: www.epa.gov/region09/MEW

Information Repositories

Mountain View Public Library
385 Franklin Street
Mountain View, CA 94041
Ph: 650.903.6887

EPA Region 9 Superfund Records Center
95 Hawthorne Street
San Francisco, CA 94105
Ph: 415.536.2000

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Clarifying Questions

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EPA Receives Formal Public Comments

- **Speaker cards located in the back or raise your hand and one will be provided to you**
- **3 minute time limit to allow everyone an opportunity to comment**

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Public Comment Period

- **Written comments via e-mail, mail or fax to:**
- **Alana Lee, Project Manager**
  U.S. EPA Region 9
  75 Hawthorne Street, SFD-7-3
  San Francisco, California 94105
  Ph: 415.972.3141
  Fax: 415.947.3528
- ***E-mail: Lee.Alana@epa.gov***
- **Must be postmarked by September 8, 2009**

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What Happens Next

- **Public Comment Period through September 8, 2009**
- **EPA will review and consider all written comments received during the public comment period and the verbal comments provided at tonight's public meeting.**
- **EPA will include responses to comments in a Responsiveness Summary and select the vapor intrusion remedy in an amendment to EPA's 1989 Record of Decision (ROD Amendment)**

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Superfund Process - Next Steps

Supplemental Remedial Investigation and Feasibility Study (RI & FS)

June 2009

→

Proposed Plan

Public Meeting

July 23, 2009

Extended Public Comment Period (60 days)
July 10 – Sept 8, 2009

→

Record of Decision Amendment & Responsiveness Summary

Anticipated Fall 2009

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Closing

- **Thank you for attending!**

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