

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

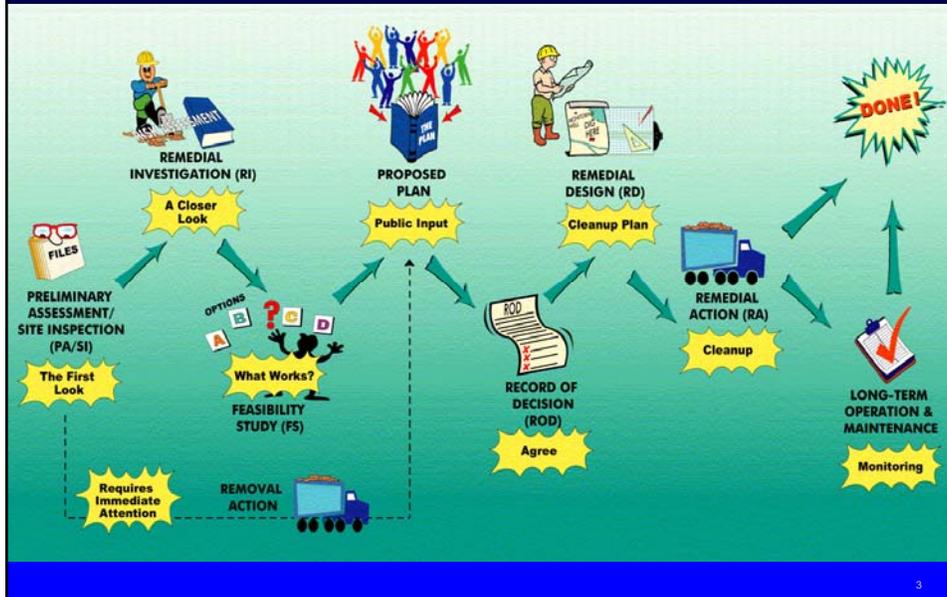
1

Meeting Agenda

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

2

Superfund Cleanup Process



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**

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

5

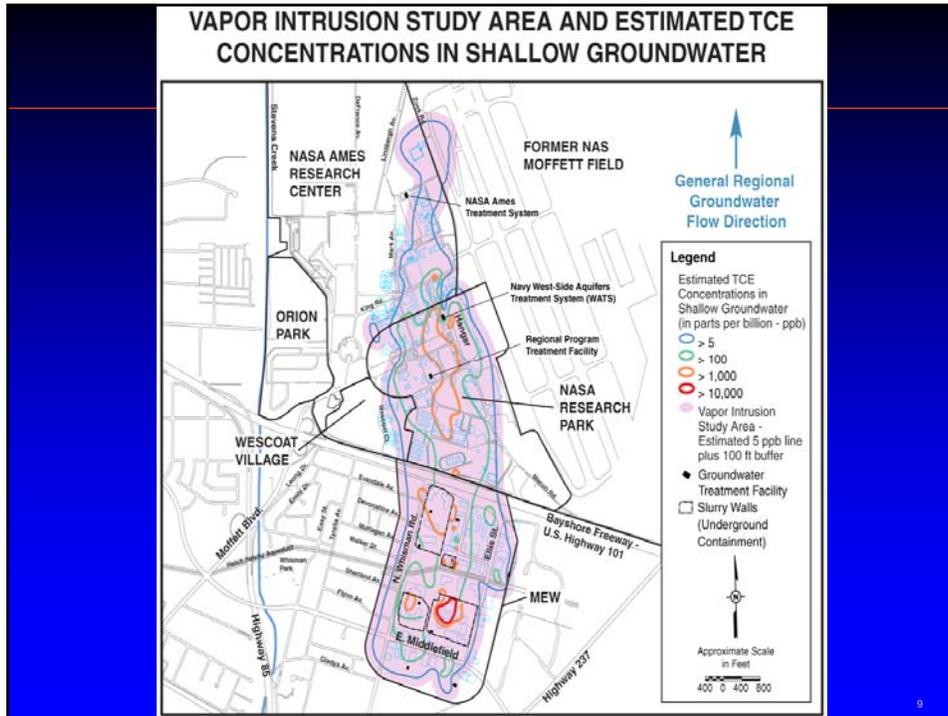
Proposed Plan for the Vapor Intrusion Pathway

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

July 23, 2009



**Alana Lee
EPA Region 9**



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

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.

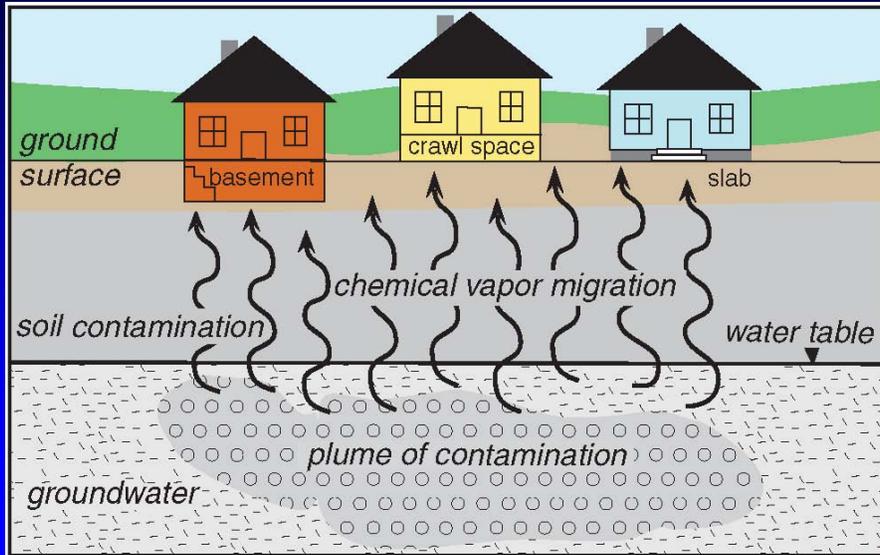
11

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)

12

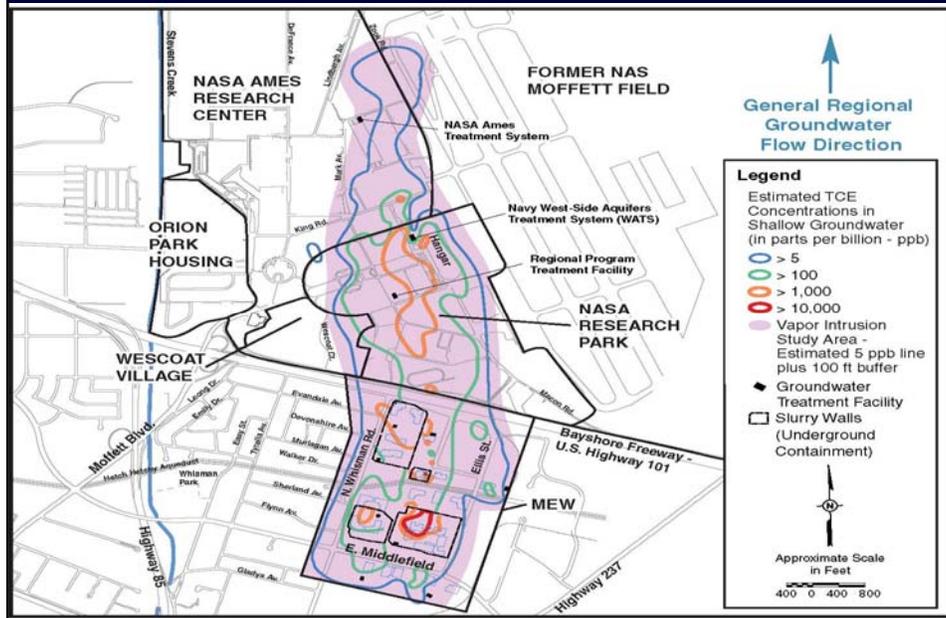
Vapor Intrusion Pathway



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

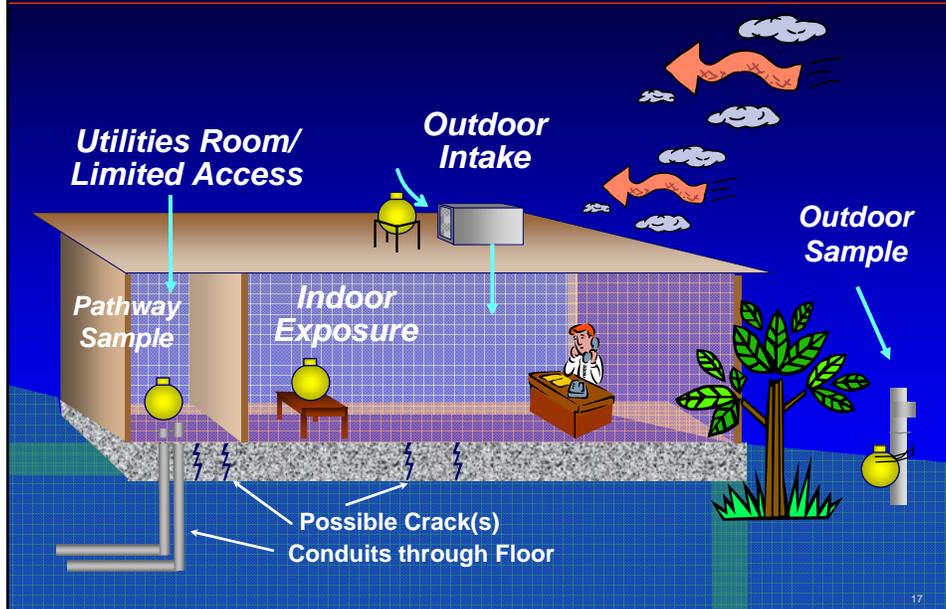
Vapor Intrusion Study Area



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.

Types of Air Samples

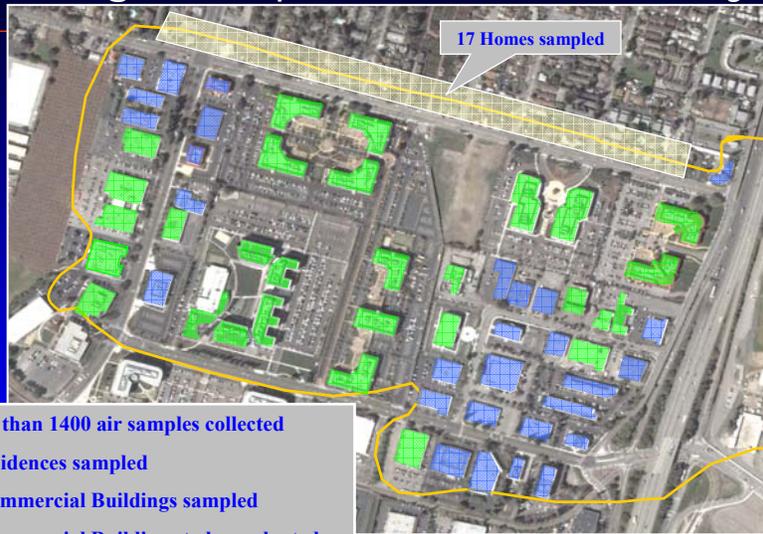


Criteria EPA Used To Evaluate Air Results

- 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

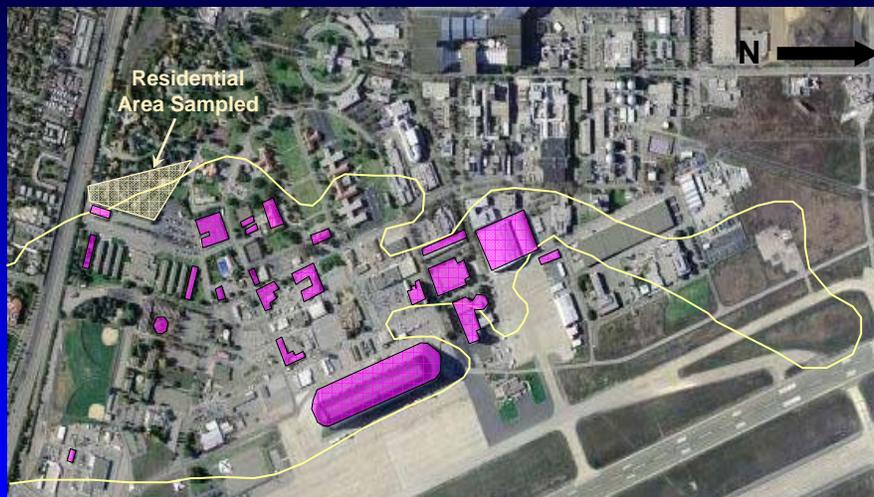
18

Buildings Sampled – South Of Hwy 101



Building Sampled Est TCE Plume Boundary Building to be Evaluated

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



Building Sampled Estimated TCE Plume Boundary

What We Found

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

21

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.

22

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).**

23

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.**

24

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

25

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.

26

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.

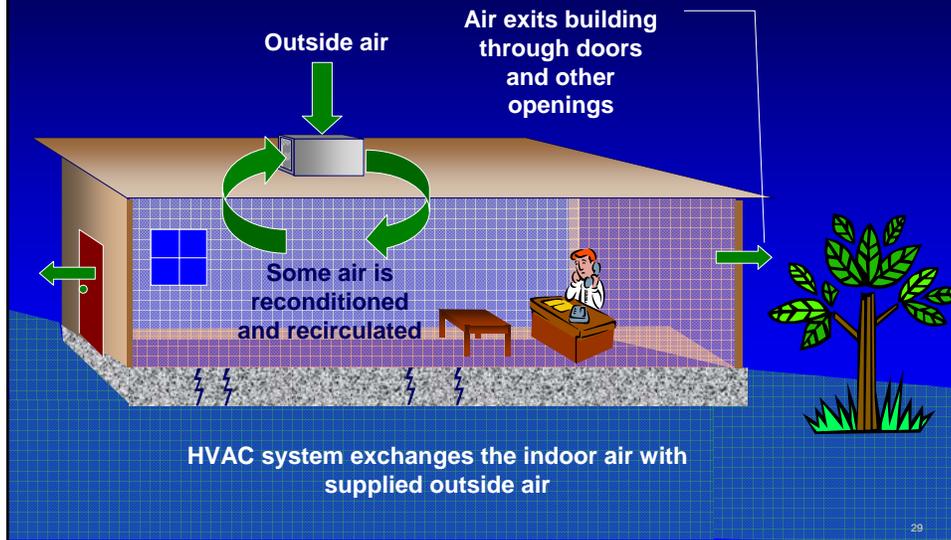
27

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

28

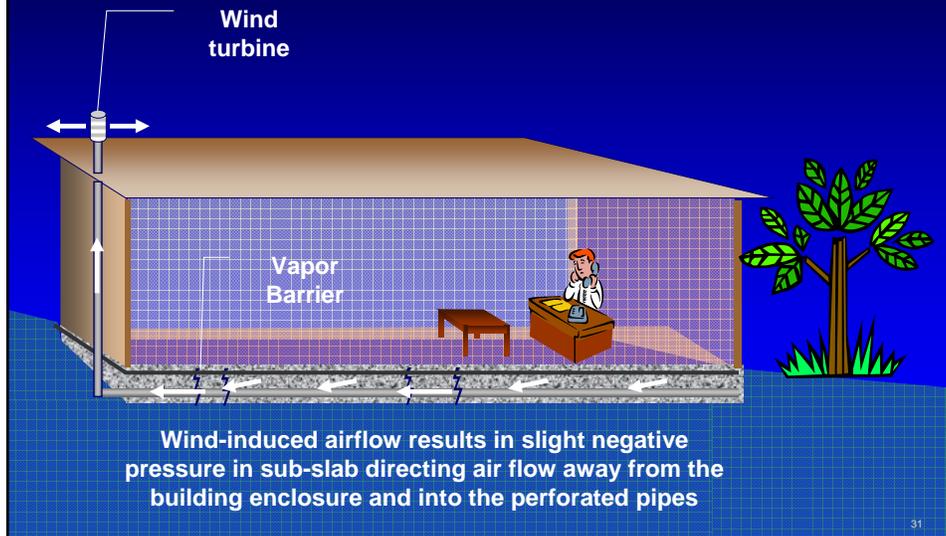
Alternative 2: HVAC System



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.

Alternative 3: Passive Ventilation and Vapor Barrier

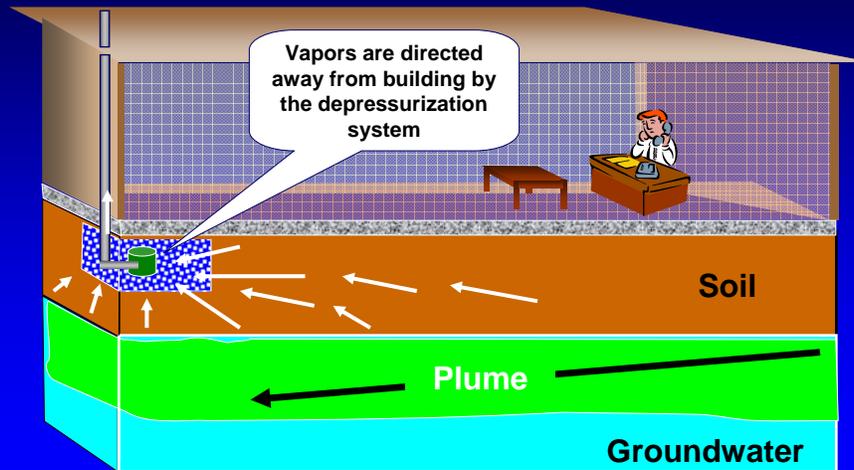


Alternative 4A/B: Sub-slab or Sub-membrane Depressurization

- **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

32

Alternative 4A: Sub-slab Depressurization



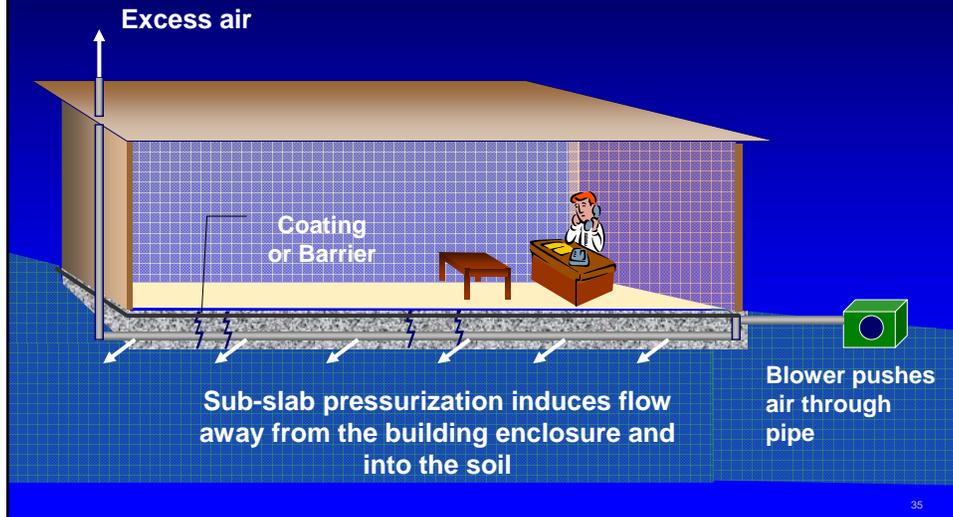
33

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.

34

Alternative 5: Sub-slab Pressurization (SSP)



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

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

37

Evaluation of Alternatives – Existing Buildings

Evaluation Criteria	Alternative 1: 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

38

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

39

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

40

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.

41

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

42

Clarifying Questions

43

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**

44

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**

45

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)**

46

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

47

Closing

- Thank you for attending!

48