DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY
(INSTALLATIONS AND ENVIRONMENT)
110 ARMY PENTAGON
WASHINGTON DC 20310-0110

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Memorandum for DISTRIBUTION

SUBJECT: Interim Vapor Intrusion Policy for Environmental Response Actions

1. The enclosed Interim Vapor Intrusion (VI) policy for environmental response actions is forwarded for implementation at all Army activities.

2. In 2002, the U.S. Environmental Protection Agency published draft VI guidance, but received negative technical comments, and has not finalized the guidance. Meanwhile several States have issued or in the process of issuing VI guidance. While useful, these guidance do not qualify as "Applicable or Relevant and Appropriate Requirements" under Comprehensive Environmental Response, Compensation, and Liability Act or "media cleanup standard" under Resource Conservation and Recovery Act for response actions. The field is receiving increased number of requests from regulators for VI analysis without existing Army policy.

3. This policy establishes environmental response actions relating to:

a) existing buildings

b) future buildings as to VI modeling and further investigation (ambient/background sampling, near slab or sub-slab soil vapor sampling, groundwater sampling, and indoor air sampling (when appropriate) to determine a possible response action.

4. Specific VI technical guidance is under development by the Tri-Service Environmental Risk Assessment Working Group and will be proposed for issuance within the year.

5. My point of contact for this action is Mr. Richard Newsome at (703) 697-1987or email: richard.newsome@hqda.army.mil.

Tad Davis

Encl

Addison D. Davis, IV
Deputy Assistant Secretary of the Army
(Environment, Safety, and Occupational Health)

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SUBJECT: Interim Vapor Intrusion Policy for Environmental Response Actions

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U.S. Army
Interim Vapor Intrusion Policy
for Environmental Response Actions

This policy applies to the Army's nationwide Installation Restoration and Compliance Related cleanup programs, and the Department of Defense's (DoD) Formerly Used Defense Sites (FUDS) program as appropriate. For vapor intrusion contamination that resulted from Army activities or from former DoD activities at FUDS, a legal driver may exist to evaluate and respond to releases into the environment that present an unacceptable risk.[1] However, vapor intrusion is a developing field of science. Methodologies for predicting fate and transport of volatile chemicals and methods to distinguish indoor air emissions from vapor intrusion are still in development.

1. Vapor Intrusion Issues Generally:

Vapor intrusion is the migration of volatile chemicals from subsurface media into overlying buildings.[2] Common vapor intrusion chemicals may include volatile organic compounds, which may include petroleum hydrocarbons, such as benzene, chlorinated solvents, such as trichloroethylene, semi-volatile organic compounds, polycyclic aromatic hydrocarbons, certain pesticides, and mercury, among others. Vapor intrusion issues may occur if such chemicals in subsurface groundwater or soils volatilize and leak through cracks or holes in buildings located above the contamination. The nature of any vapor intrusion pathway would depend on the building's construction, its foundation, air exchange rates and building use factors.

2. Regulatory Drivers under CERCLA or RCRA Corrective Action:

Under the appropriate circumstances as identified in this policy, a vapor intrusion exposure pathway can be evaluated and addressed under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or Resource Conservation and Recovery Act (RCRA) corrective action,[3] given the broad mandate to protect human health from unacceptable risk. Under CERCLA, vapor intrusion involves a release[4] to surface soil and/or groundwater ("into the environment") that then migrates into existing buildings. If the requirements set forth in paragraph 5 below are met in

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[1] For example, the excess upper bound lifetime cancer risk to an individual is greater than 10^{-4}, and the Hazard Quotient/Hazard Index for non-cancer adverse effects is greater than 1.

[2] USEPA, *Draft Guidance for Evaluating The Vapor Intrusion to Indoor Air Pathway From Groundwater and Soils*, Nov 2002, page 4.

[3] RCRA corrective action is not applicable at all Army sites, for example, Formerly Used Defense Sites (FUDS). Certain issues -- such as petroleum products and pesticides applied in accordance with their label -- are specifically excluded from CERCLA. Depending on the facts, other legal drivers could come into play, such as RCRA's UST regulations or spill compliance measures. If installation representatives are unsure of the legal drivers at issue, they should contact their Environmental Law Specialist.

[4] The term "release" is defined in CERCLA at 42 U.S.C. sec. 9601(22).

existing buildings, the investigation and any necessary response would be limited to the risk posed by an Army's release or a DoD release at a FUDS of volatile chemicals and would not include emissions arising solely from indoor sources. This is because indoor emissions are not "releases" to the "environment." The U.S. Environmental Protection Agency (EPA) has interpreted "ambient air", referenced in CERCLA's definition of "environment"[5], to exclude air that is "completely enclosed in a building or structure."[6] In addition, CERCLA excludes response actions addressing releases from products which are part of a structure and result in exposure within buildings, limiting authority to undertake a cleanup in such cases.[7]

3. Federal and State Vapor Intrusion Guidance:

Federal and State guidance on vapor intrusion is under development, but these documents may be of limited assistance or applicability. In 2002, EPA published the *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway From Groundwater and Soils (Subsurface Vapor Intrusion Guidance).*[8] The draft guidance states that it "does not impose any requirements or obligations on EPA, states, or the regulated community"[9] and the draft guidance "is not designed" to assist in "a more detailed (e.g., site-specific) assessment of current and future risks."[10] Additionally, the EPA draft guidance "...is not designated to be used during the process for determining whether, and to what extent, cleanup action is warranted."[11] The EPA has not finalized this guidance. Meanwhile, several States have issued or are in the process of issuing vapor intrusion guidance. While the federal and State guidances may be a useful resource, they do not qualify as an Applicable or Relevant and Appropriate Requirements under CERCLA or as a "media cleanup standard" under RCRA corrective action.

4. Vapor Intrusion Modeling Tools:

Vapor Intrusion modeling based on soil gas and groundwater samples can indicate whether a potential risk exists. When volatile chemicals are located in media near the surface, a conservative model may be used to screen out sites where such vapors are *not* problematic using appropriate screening levels. Army components are discouraged from using model output to derive quantitative risk estimates. If "risk" is calculated using the output of models, such as the Johnson and Ettinger model, this

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[5] 42 U.S.C. 9601(8), emphasis added: The term "environment" means (A) the navigable waters, the waters of the contiguous zone, and the ocean waters. . . and (B) any other surface water, ground water, drinking water supply, land surface or subsurface strata, or *ambient air* within the United States. . . .

[6] 50 FR 13456 (April 4, 1985) [Final rule on CERCLA release reporting]. Several court cases have upheld that "environment" referred to in CERCLA does not include "air within a building." For example, *Stevens Creek Assoc v. Barclays Bank of California*, 915 F. 2d 1355, 1360 (9th Cir 1990).

[7] 42 USC 9604(a)(3)(B).

[8] 67 Federal Register 71169 (Nov. 29, 2002).

[9] USEPA, *Draft Guidance for Evaluating The Vapor Intrusion to Indoor Air Pathway From Groundwater and Soils (Subsurface Vapor Intrusion Guidance),* Nov 2002, page 2.

[10] *Id.* page 10.

[11] *Id.* page 10.

finding merely indicates the potential for risk and it is not meant to demonstrate an actual risk, nor should it be construed to be a highly certain estimate.

5. Actions Relating to Existing Buildings:

As a matter of Army policy, at existing buildings on active[12] installations and FUDS properties, the Army will conduct vapor intrusion modeling under the following circumstances:

(1) Volatile chemicals are found in subsurface soils and/or groundwater due to an Army release or a DoD release at a FUDS,

(2) Site specific geologic conditions support volatile chemical migration through subsurface soil into existing buildings,

(3) Building use and operation conditions support a complete vapor intrusion exposure pathway. Site specific circumstances may dictate soil gas sampling is necessary on some projects to confirm modeling results that indicate little or no potential for vapor intrusion.

If the modeling results exceed screening levels, then further investigation may be required and the Army will conduct a vapor intrusion study that includes, as site conditions dictate, near-slab or sub-slab soil vapor sampling, and groundwater sampling. In most cases, this sampling should be used as the basis to indicate whether indoor air and ambient/background sampling is appropriate. The Army then will conduct a site-specific risk assessment[13] which considers values in EPA's Integrated Risk Information System as a component of the risk/hazard calculation[14], as well as EPA guidance for toxicity value identification, to estimate risk to human receptors.[15] In addition, a risk assessor should identify in the risk characterization, alternate sources of indoor air quality problems, in addition to vapor intrusion. Air quality concerns may be due to internal activities or building conditions that are unrelated to vapor intrusion. Near-slab or sub-slab sampling data should be used to differentiate equipment-related chemicals, chemicals released from building products, and other indoor air emissions unrelated to vapor intrusion. This differentiation will require a properly designed

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[12] This policy also extends to existing buildings adjacent to Army installations where vapor intrusion is caused by an Army release that migrate off-post.

[13] Risk assessment would likely focus upon issues of chronic exposure. In the unlikely event that an acute risk is posited due to an Army release, representatives would act in accordance with NCP requirements governing emergency responses or time-critical removals.

[14] In general, the Army should follow the principles of USEPA, OSWER Directive 9285.7-53, *Human Health Toxicity Values in Superfund Risk Assessments*. This guidance does not recommend the use of draft toxicity values. Though not specifically addressed in the EPA guidance, following the guidance to identify toxicity values for trichloroethylene leads the user to identify California EPA toxicity values as the appropriate source. For the inhalation pathway, toxicity values derived from inhalation studies are preferred over route extrapolated values.

[15] OSWER Directive 9285.7-53, *Human Health Toxicity Values in Superfund Risk Assessments.*

sampling plan that is implemented following approved Quality Assurance/Quality Control procedures.

A response action will be conducted if the potential for fate and transport of volatile chemicals exists and a site-specific risk assessment indicates an unacceptable risk due to contamination which is an Army or DoD responsibility under FUDS. If the response action is on a FUDS property, the property owner must concur. Depending on the facts, a diverse set of measures may be used to address the site with a focus on ventilation systems.

Some unique considerations exist for properties being addressed by the Army in the FUDS program since the government does not own the property. Property owners at FUDS retain the right to make improvements on their property and buildings. Right of entry must be given by the property owner prior to sampling on the property or inside buildings. If volatile chemicals being addressed under FUDS are commingled with waste from other Potentially Responsible Parties, per FUDS policy[16], the Army would not pursue unilateral investigation.

6. Actions Relating to Future Buildings:

If it is likely that future building construction may take place at sites where volatile chemicals are located in subsurface media, the Army may choose to conduct vapor intrusion modeling for the future building. If this modeling indicates a potential risk at an active installation, the Army may chose to amend its installation master plan, file a deed notice in accordance with State law, or utilize other appropriate land use controls, such as dig restrictions or a construction review process. Such forms of notice would inform Army employees, contractors and others that the issue of vapor intrusion must be considered if a building were to be constructed on the site in question. As a matter of Army policy, the Army will include these sites in a CERCLA Five-Year Review.

Vapor intrusion modeling addressing buildings which are planned or may be constructed in the future is not typically conducted at Base Realignment and Closure (BRAC) or excess sites or at FUDS properties due to the uncertainty associated with future construction projects, especially outside the control of the Service. Appropriate notice of potential vapor intrusion risks, however, will be provided to the current landowner or expected transferee. At BRAC or excess installations, such forms of notice will be memorialized in Army transfer documents ensuring that subsequent property owners and developers are aware of potential vapor intrusion issues when planning future structures. At FUDS, the Army will provide notice to the property owner(s) and the lead regulator that the design and construction of future buildings by the property owner(s) should consider mitigation measures.

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[16] U.S. Army Corps of Engineers, Engineer Regulation 200-3-1, FUDS Program Policy.

7. Technical Vapor Intrusion Guidance is Under Development:

The Tri-Service Environmental Risk Assessment Working Group, composed of technical experts from the DoD components, is developing technical guidance for the assessment of the vapor intrusion pathway and will be proposed for issuance within the year.

8. CERCLA Five-Year Review:

If an existing CERCLA Record of Decision or Decision Document does not evaluate potential vapor intrusion risks in existing buildings consistent with paragraph 5 or for future buildings consistent with paragraph 6, these risks will be evaluated as part of the CERCLA Five-Year Review. An industrial hygiene survey can be conducted at any time for indoor air concerns at active Army installations.

9. Army Point of Contact:

Technical questions concerning this policy shall be referred to the Office of the Director of Environmental Programs, Assistant Chief of Staff for Installation Management. Requests for deviations to this policy shall be referred through the appropriate chain of command to the Deputy Assistant Secretary of the Army, Environment, Safety and Occupational Health.