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IN REPLY REFER TO

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From: Chief of Naval Operations
To: Commander, Naval Facilities Engineering Command

Subj: NAVY/MARINE CORPS POLICY ON VAPOR INTRUSION

Encl: (1) Navy/Marine Corps Policy on Vapor Intrusion

1. Enclosure (1) is provided in response to concerns received from the field to clarify Navy policy on the evaluation and remediation of the Vapor Intrusion (VI) pathway in the Environmental Restoration program. Enclosure (1) describes how to consider VI in the program by 1) determining whether to evaluate the VI pathway for a site; 2) planning and implementing a VI pathway evaluation; 3) addressing background chemical issues; 4) evaluating risk for human health exposures associated with the VI pathway; 5) evaluating remedial alternatives; and 6) considering previously transferred property.

2. My staff point of contact is Ms. Wanda L. Holmes, N453 at (703) 602-2571 or DSN 332-3571 or email Wanda.Holmes@navy.mil.

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NAVY/MARINE CORPS POLICY ON VAPOR INTRUSION

BACKGROUND

Many Navy installations have received requests from regulators to evaluate vapor intrusion (VI) at cleanup sites before promulgated regulatory policy or guidance has been finalized. Regulatory guidance is required to determine the necessity for these VI evaluations or the selection of appropriate methods to use in evaluating the VI pathway. Within the environmental community, there are differing opinions on 1) whether the VI pathway should be considered as part of a site investigation, 2) approaches for characterizing the VI pathway, 3) appropriate risk evaluation criteria related to VI, and 4) VI site remediation alternatives.

In November 2002, the United States Environmental Protection Agency (EPA), Office of Solid Waste and Emergency Response (OSWER), released the *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils* (Draft EPA VI Guidance). The Draft EPA VI Guidance attempted to provide a national benchmark for consistent evaluation of whether the subsurface VI pathway to indoor air pathway is complete. However, the science on this issue is still rapidly evolving, and EPA has not released final guidance. As a result, the Navy has developed this policy to assist in the evaluation of the VI pathway and the implementation of response actions for Environmental Restoration (ER) sites.

APPLICABILITY

Policies and procedures contained herein apply to all response actions funded under Environmental Restoration, Navy (ER,N) and Base Realignment and Closure (BRAC) accounts.

DEFINITIONS

Vapor Intrusion (VI) - VI is the migration of vapor of sufficiently volatile chemical compounds from the subsurface environment (soil, soil gas, or groundwater) into indoor air of overlying buildings. Examples of such chemical compounds include volatile organic compounds (VOCs), e. g., trichloroethylene (TCE); semi-volatile organic compounds (SVOCs), e.g., naphthalene; and volatile metals, e.g., elemental mercury.

Industrial Settings - Facilities where one or more chemical compounds are used or stored as part of the business operation of the facility, such as plating facilities, maintenance shops, manufacturing facilities, hangars, welding shops, etc. Offices within an industrial setting, such as a foreman's office in a plating shop, are also considered to be part of the industrial area.

Residential and Commercial Settings - Housing units and businesses which do not use substantial amounts of chemical compounds as part of the business operation, such as single family homes, condominiums, apartments, hospitals, nursing homes, offices, stores, banks, exchanges, etc.

POLICY

1. **Determining whether to evaluate the VI pathway for a site** - The ER site must meet all of the criteria for a site under the Defense Environmental Restoration Program (DERP) and must be contaminated with a chemical compound(s) that is sufficiently volatile to have the potential to migrate into current buildings. The VI pathway evaluation can be made at any point in the response process (e.g., investigations, remediation, 5 year reviews, etc.).

2. **Planning and implementing a VI pathway evaluation** - All VI pathway investigations and response actions shall be consistent with Navy policies on risk assessment and background chemical levels (this includes establishing and eliminating background chemicals as contaminants of potential concern during the screening steps of an investigation). There are many ways to evaluate whether vapors from an area contaminated with potentially volatile compounds are migrating into indoor air. Therefore, the conceptual site model (CSM) and Data Quality Objectives (DQO) shall be used to determine the proper sampling methodology. Before initiating a VI pathway evaluation, the CSM shall be developed/updated to clearly outline the contamination locations and types, the potential pathways, and the applicable receptors. The CSM may include information on the building structure and local geology with relevant information on air mechanics and factors which are pertinent to potential vapor intrusion (e.g. air exchangers, conduits, windows, vapor barriers, slab on grade or crawl space, soil characteristics, etc.). DQOs for the investigation specific to the VI evaluation shall be developed. The DQO process

will layout the proper steps for determining what sampling data should be collected during the investigation.

3. **Addressing background chemical issues** - The role of background concentrations of contaminants in indoor air and outdoor ambient air at sites where VI is of concern shall be consistent with Navy Policy on the Use of Background Chemical Levels, 30 January 2004. Additionally, ER,N or BRAC funds shall not be used to address indoor air contamination due to background sources.

   A site investigation shall be performed with the assistance of someone knowledgeable about the structural information of the building regarding air flow (e.g., mechanical engineer). Potential background indoor air contaminants shall be identified during the site investigation including household cleaners and solvents, paints, carpets, pesticides, etc.

4. **Evaluating risk for human health exposures associated with the VI pathway** - Risk-based methodologies, including the use of site-specific exposure scenarios, will be used to evaluate the VI pathway for all residential and commercial settings. The potential exposure duration on site will be significantly different for each scenario (residential versus commercial); therefore, it is necessary to ensure the use of appropriate risk-based cleanup objectives. When applicable, Occupational Safety and Health Administration (OSHA) standards and workplace requirements will be considered and incorporated into the CSM when evaluating potential exposures related to the VI pathway for industrial settings.

5. **Evaluating remedial alternatives** - There are a number of active, passive, and containment alternatives to address VI. Some alternatives involve source treatment (e.g., groundwater remediation or soil vapor extraction); passive remedy (e.g., bioventing or monitored natural attenuation); or an engineered containment remedy (e.g., positive ventilation system in a building or vapor barrier below a building). Many remedial alternatives may also require land use controls (LUCs). The selected remedy must be protective of human health in existing buildings and allow for continued land use at active installations. To the extent practicable, the remedy should also be appropriate for the reasonably anticipated future land use at BRAC installations.

6. **Considering previously transferred property** - In cases where the Navy has conveyed property, the Navy will only become re-involved at the site, pursuant to CERCLA section 120(h), if

the current landowner or regulatory agency demonstrates the existence of a complete VI pathway from a former Navy ER source area. For the Navy to become re-involved at the site and take action, the incremental risk must be above risk-based levels, or OSHA standards where appropriate, based either upon existing Navy land use at the time of transfer or according to Navy imposed LUCs on the property.

CONCLUSION

In conclusion, careful thought must go into the planning and design of VI investigations and response actions. When evaluating the VI pathway, follow the appropriate DOD/DON policies as they relate to different elements of the cleanup program.