MEMORANDUM

SUBJECT: Region 3 Request for Concurrence on Proposed Nationally Significant or Precedent-Setting Removal Action at the Crozet Township Orchard Site, Crozet Township Orchard Site, Crozet Township, Albermarle County, VA

FROM: Abraham Ferdas, Director
Hazardous Site Cleanup Division
Region 3

TO: Deborah Y. Dietrich, Director
Office of Emergency Management

This memorandum requests your concurrence on the attached Region 3 draft Action Memorandum, which requests funding for a removal action at the Crozet Township Orchard Site, Crozet Township, Albermarle County, VA. Re-delegation of Authority R14-2 gives you the authority to concur on nationally significant or precedent-setting removal actions.

My staff have discussed this proposed removal action with your staff in the Program Operations and Coordination Division, Office of Emergency Management. Your staff have advised us that this removal is considered nationally significant or precedent setting because the proposed action mitigates pesticide contamination arising from the lawful application of pesticides.

The draft action memorandum is attached for your review. My approval awaits your concurrence.

Concur:

[Signature]
Director, Office of Emergency Management

[Date]

According to the OSWER re-delegation, authority to non-concur remains with the Assistant
MEMORANDUM

SUBJECT: Region 3 Request for Concurrence on Proposed Nationally Significant or Precedent Setting Removal Action at the Crozet Township Orchard Site, Crozet Township Orchard Site, Albermarle, VA - TRANSMITTAL

FROM: Gilberto Irizarry, Director
Program Operations and Coordination Division

TO: Deborah Y. Dietrich, Director
Office of Emergency Management

This memorandum requests your concurrence on the attached Region 3-draft Action Memorandum, which requests funding for a removal action at the Crozet Township Orchard Site, Crozet Township, Albemarle County, VA. The proposed Action Memorandum is considered nationally significant or precedent setting because the proposed action mitigates pesticide contamination arising from the lawful application of pesticides.

During a private party Phase I investigation, commonly required for new construction, arsenic was discovered at elevated levels on a nearby property. This finding led County officials to request EPA assistance to perform additional testing in the area. An assessment was performed by the Site Assessment Manager, who then referred the Site to the Removal Program when high levels of arsenic, lead, and pesticides, including 4′4″-DDT and 4″4″ DDE were discovered.

The OSC performed a removal assessment that identified a threat to public health or welfare or the environment due to the uncontrolled presence of hazardous substances, pollutants, or contamination at the Site. The Site encompasses an area of Crozet Township which includes a former orchard area and two residential properties. In the 1940s and 1950s, much of the property was used agriculturally as orchards. During that time, application of pesticides, such as 4′4″-DDT, 4″4″-DDE, and also application of arsenic-containing compounds were common. These pesticides were routinely applied in agriculture prior to a ban invoked by EPA which outlawed their use in 1972.

The purpose of the proposed action is to stabilize and/or remove arsenic and pesticide-contaminated soil from two residences where the contaminated soil may pose an imminent and substantial threat to the residents living there at this time. In the case of one resident, the OSC has determined that excavation of the soils is the most appropriate response action. In the second case, the contamination is spread over a much larger area, where excavation may not be
practicable in which case the OSC will evaluate cleanup options for this second residence. The former orchard area is thickly vegetated, which prevents exposure to the contaminated soil. The former orchard area will have additional sampling as part of this action. EPA has determined that the Site meets the criteria for a removal action under Section 300.415 of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

I recommend that you approve the Region 3 request for concurrence. The proposed action address a threat to public health and the environment as a result of arsenic, lead, and pesticides found in surface soils. The action memo requests $197,520 of which $160,320 is from the Regional Removal allowance. Please indicate your decision on the attached concurrence memorandum.

Attachment
SUBJECT: Request for Funding a Removal Action at the Crozet Township Orchard Site
Crozet Township, Albermarle County, Virginia

FROM: Christine Wagner, On-Scene Coordinator
Removal Response Section (3HS31)

TO: Abraham Ferdas, Director
Hazardous Site Cleanup Division (3HS00)

I. PURPOSE

The purpose of this Action Memorandum is to request and document approval for a time-critical Removal Action to immediately initiate actions to mitigate the release of arsenic, lead, and pesticides found in surface soils on three properties, named the Crozet Township Orchard Site (Site), in Crozet Township, Albermarle County, VA. The three properties of the Site consist of two residential properties and a former orchard area. The two residential properties will have immediate action. The former orchard area is thickly vegetated, which prevents exposure to the contaminated soil. The former orchard area will have additional sampling as part of this action. During a private party Phase I investigation, commonly required for new construction, arsenic was discovered at elevated levels on a nearby property. This finding led County officials to request EPA assistance to perform additional testing in the area. An assessment was performed by the Site Assessment Manager, who then referred the Site to the Removal Program when high levels of arsenic, lead, and pesticides, including 4’4-DDT and 4’4 DDE were discovered. A removal assessment performed by the OSC in accordance with the National Oil and Hazardous Substance Pollution Contingency Plan (NCP), 40 CFR Section 300.410 has identified a threat to public health or welfare or the environment due to the uncontrolled presence of hazardous substances, pollutants, or contaminants at the Site.

II. SITE CONDITIONS AND BACKGROUND

A. SITE DESCRIPTION

1. Removal Site Evaluation

At this time, the Site encompasses an area of Crozet Township which includes a former orchard area and two residential properties. The entire area of the Site has not yet been determined but may encompass over three square miles. In the 1940s and 1950s, much of the
property was used agriculturally as orchards. During that time, application of pesticides, such as 4,4'-DDT, 4,4'-DDE, and also application of arsenic-containing compounds were common. These pesticides were routinely applied in agriculture prior to a ban invoked by EPA which outlawed their use in 1972.

In the summer of 2002, the EPA Region III Site Assessment Section of the Superfund Removal Branch was contacted by Albemarle County officials. A portion of Crozet Township was being proposed for residential development. As part of an environmental assessment performed in planning the development, the contractor for the developer performed a limited amount of sampling. This sampling revealed elevated levels of arsenic. The history of the Site suggests that the former orchards may be the possible source of this contamination. The developer made Albemarle County officials aware of the sample results. Albemarle County requested additional sampling assistance from the Virginia Department of Environmental Quality ("VA DEQ"). However, VA DEQ did not have the financial resources necessary to perform this volume of sampling. Albemarle County then contacted EPA for assistance. An initial assessment was performed by the EPA Region III Site Assessment Section.

In the fall of 2002, EPA's contractor for the assessment performed surface soil sampling of residential areas and in the area of the former orchard. A total of thirty-three properties, including a playground, were sampled. The Site Assessment Manager tasked the EPA contractor to perform a human health risk assessment on the data collected. Based on the conclusions of the risk assessment and also the OSC's findings of how the contaminated properties are used, the OSC has determined the need for removal action at two residential properties to mitigate the threat of direct exposure and incidental ingestion of arsenic, lead, and pesticides. The former orchard area is presently not a threat due to the thick growth of trees and vegetation covering the soil and will be further sampled as part of this action.

2. Physical Location/Site Characteristics

The Site, by definition, includes the source of contamination and any areas in which this contamination has come to be located. Since the initial sampling indicated elevated levels of hazardous substances over several square miles, the OSC has made the determination that for the purposes of this action memo, the Site shall include the former orchard Area and the two residences which have elevated levels of arsenic and/or pesticide contamination.

The Site is located in Crozet Township to the west of the town of Crozet. The residents affected by contamination from the orchard live to the north and east of the suspected source area. The area surrounding the Site is a combination of agricultural and residential populations. Residential developments are growing rapidly throughout the area. Approximately 3000 residents live in the Crozet area. The town of Crozet is approximately ten miles west of the City of Charlottesville, Virginia, home to the University of Virginia and many historical sites, including Monticello, the former home of the late U.S. President Thomas Jefferson.
Mint Springs Valley Park, a popular recreational area, is located within one mile of the Site. Mint Springs Valley Park offers such amenities as fishing and swimming, as well as playground areas, hiking trails, and a picnic area.

Both residential wells and a public water supply provide drinking water to residents in the area. Several groundwater wells were sampled as part of the initial assessment. However, no contaminants of concern were detected above background levels.

3. Quantities and Types of Substances Present

Sampling performed by the Site Assessment section identified elevated levels of arsenic, lead, and pesticides on several properties. However, only two of the affected properties, the residential properties, are used by the residents in a manner which may present a risk of exposure. The former orchard area property revealed the highest levels of contamination. However, the samples were collected in areas which are not used for recreation, planting, or other activities which would put residents at risk.

Surface soil samples collected at one of the residences affected revealed arsenic in levels ranging from 50.4 mg/kg to 103 mg/kg. Lead levels at this residence ranged up to a maximum of 431 mg/kg, although QA/QC of the data indicated that this particular sample was biased low, suggesting that the actual value may be higher. Pesticides including 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT were also detected at this residence in levels ranging above 3400 micrograms/kilogram. As a point of reference, pesticide levels from samples taken at the unaffected properties generally had levels of 3-400 microgram/kilogram of these contaminants. Several small children live in this home and there is a backyard playground on the property as well.

The second residence of concern also had high elevated levels of arsenic, up to 1600 mg/kg, and lead (594 mg/kg), but did not exhibit elevated levels of pesticides.

A third residence showed elevated levels of lead, but not of arsenic or pesticides. The proposed scope of work for this residence is limited at this time to additional sampling and investigation. Based on this sampling event alone, the OSC cannot make the determination that the elevated levels of lead are directly related to the hazardous substances used at the orchard.

4,4'-DDD (1,1 dichloro-2,2-bis(p-chlorophenyl)ethane), 4,4'-DDE (1,1 dichloro-2,2-bis(p-chlorophenyl)ethylene), and 4,4'-DDT (1,1,1-trichloro-2,2-bis(p-chlorophenyl)ethane) belong to the same family of organochlorine pesticides originally introduced in the 1940s as low-cost insecticides, used primarily in the tobacco and cotton industries. Organochloride pesticides have been linked to liver and kidney damage. These compounds are also likely to be excreted in the milk of lactating women, and therefore, could be ingested by infants. Organochlorides such as DDT and DDD are classified for carcinogenicity as B2, probable human carcinogens.

These pesticides were banned in 1972 by EPA due to their long-term persistence in soil, low-water solubility, and high lipophilicity, resulting in their accumulation in the fat of wildlife.
Chronic absorption of DDT results in fat storage of this compound and its metabolites. DDT is also resistant to destruction by light and oxidation. This unusual stability creates difficulties in residue removal from water, soil, and food stuffs.

DDD and DDE are metabolites of DDT. In humans, the degradation of DDT proceeds by dehydrochlorination to DDE and is further metabolized through a series of intermediates to DDD. Each of these compounds is generally not soluble in body tissues and water. DDD will eventually metabolize to DDA, which is relatively water-soluble and will be excreted in the urine.

Arsenic is a known human carcinogen for lung and skin cancers and possibly for angiosarcoma of the liver and stomach cancer. Typically, there is a 15 to 30 year latency before development of the cancers. Arsenic is an “indirect carcinogen”, meaning that the cancer generates from a generalized induction of genes, rather than mutation of specific genes. Arsenic is one of the rare cases where the evidence in humans for its carcinogenic effects is much stronger than in animals.

Populations at special risk to exposure to arsenic include individuals with diseases of the skin, blood, liver, kidneys, and/or the central nervous system. Children and persons with existing diabetes or cardiovascular disease are also more susceptible to the risks of exposure (HSDB 1999).

A literature search performed by the OSC suggests that the smallest recorded lethal dose of arsenic is approximately 130 mg (Bingham et al, 2001, OHM/TADS, 2001), and as little as 20 mg of arsenic may produce life-threatening toxicity (Hutton & Christians, 1983)(Schoolmester & White, 1980)(Zaloga et al, 1970).

4. National Priorities List

The Site is not on the CERCLA National Priorities List (NPL). The OSC will coordinate with the Site Assessment Manager for Virginia in the event the Site is deemed NPL caliber. The OSC will make every effort to obtain sufficient information for the Site Assessment Manager to perform a Hazard Ranking System (HRS) evaluation.

5. State and Local Authorities’ Roles

The OSC is coordinating with the Virginia Department of Environmental Quality and Albermarle County on all aspects of the Site investigation, risk assessment, and planned removal actions. The VA DEQ has identified a hazardous waste facility in the Crozet Township area. However, discussions between EPA and VA DEQ have not indicated any impact from this facility on the Site.

6. Release or Threatened Release into the Environment of a Hazardous Substance, Pollutant, or Contaminant
The elevated levels of lead, arsenic, and pesticides detected in the surface soils of residential properties suggest the historic use of pesticides, which have now been banned by EPA. Based on historical use of the Site, EPA has reason to believe that the contamination is a result of airborne deposition resulting from the application of pesticides in the 1940s and 1950s.

7. Maps, Pictures, and other Graphic Representations

An overflight map is attached to this document. Because residential property owners and addresses are to remain confidential, the affected residences are not identified.

B. OTHER ACTIONS TO DATE

1. Previous Actions

There have been no prior environmental enforcement actions at the Site since the orchard is not considered an operational facility. The first environmental sampling performed in 2002 was a direct result of the inquiry by County officials and residents of the community.

2. Current Actions

No current cleanup or mitigation actions are being performed.

III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

Section 300.415 of the National Contingency Plan (NCP) lists the factors to be considered in determining the appropriateness of a response action. At this time, the following subsections apply:

§ 300.415(b)(2)(i) Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous substances or pollutants or contaminants;

Elevated levels of arsenic and the pesticides 4,4'-DDD, 4,4'-DDE, and 4,4-DDT have been detected in surface soils of at least two residences. The children in these residences use the contaminated properties as play areas. The arsenic-contaminated soils could possibly be accidentally ingested by small children and pets. One of the residents has a large dog who regularly digs in the yard where the contaminated soils were found. By nature, children are at higher risk than adults of exposure to hazardous substances and suffering adverse health effects. A child’s breathing zone is closer to the ground and because of a child’s tendency to mouth breath, they are more vulnerable than adults to taking in dust and other particulates. If the actions proposed in this memorandum are approved, the soil contaminated with arsenic above 23 parts per million will be replaced with non-contaminated soil appropriate for residential use.
§ 300.415(b)(2)(iv) High levels of hazardous substances or pollutants or contaminants in soils largely at or near the surface that may migrate:

Arsenic contamination was found in residential soils in concentrations up to 111 mg/kg. The average background of arsenic in soil is estimated to range from 0.4 mg/kg to 8.1 mg/kg. Therefore, concentrations up to 13 times background can be considered high. Arsenic, 4,4'-DDD, and 4,4-DDT are all listed hazardous substances under 40 CFR Section 302.4. Inorganic arsenic compounds are known human carcinogens. The samples referenced in this document were all collected in the 0-6 inches below surface range. Therefore, these concentrations are known to exist near the surface where they could be easily disturbed.

§ 300.415(b)(2)(v) Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released:

The areas of concern addressed in this action memo are residential properties. Therefore, they are likely regularly disturbed for residential activities such as child play, pet activity, and recreational activities. Weather may naturally cause the contaminants to migrate onto other properties, furthering the expanse of the Site.

§ 300.415(b)(2)(vii) The availability of other appropriate federal or state response mechanisms to respond to the release;

The OSC has coordinated with state and local agencies who have informed EPA that they do not have the resources to undertake this response action.

IV. ENDANGERMENT DETERMINATION

Actual and threatened releases of hazardous substances, pollutants and contaminants from this Site, if not addressed by implementing the response action selected in this Action Memorandum, may present an imminent and substantial endangerment to public health, or welfare, or the environment.

V. PROPOSED ACTIONS AND ESTIMATED COSTS

A. Proposed Actions

1. Proposed Action Description

The purpose of the proposed action is to stabilize and/or remove arsenic and pesticide-contaminated soil from two residences where the contaminated soil may pose an imminent and substantial threat to the residents living there at this time. In the case of one resident, the OSC has determined that excavation of the soils is the most appropriate response action. In the second case, the contamination is spread over a much larger area,
where excavation may not be practicable in which case the OSC will evaluate cleanup options for this second residence. The former orchard area will have additional sampling. The cleanup levels for this action are 23 parts per million (ppm) for arsenic and 190 ppm for 4,4-DDT and 4,4-DDE.

a. Excavate, remove, transport, and offsite dispose of the top six inches of contaminated soil to the cleanup goals from two residential properties and, if the soil remains above the cleanup goals after excavating the top six inches of soil, then excavate until the cleanup goal is reached or to a maximum of two feet, which will create a depth of clean soil that has been identified as protective of human health. Additional sampling performed at these residences indicate the contamination is approximately nine inches below surface grade. The offsite transportation and disposal of soil will comply with the EPA Offsite Rule and will comply with all local, state, and federal laws at the time of transportation and disposal.

b. During removal operations, provide temporary relocation services to the residents so that they are not exposed to possible contaminated dust generated during the operation;

c. Replace the removed soil with non-contaminated soil, similar in composition to indigenous soils in the area and revegetate with indigenous plants;

d. Perform restoration of property (e.g., fences, plants, pet shelters,) disturbed during the removal action;

e. If excavation is impracticable for the second residential property, identify additional methods of stabilization or removal for second property that meet the cleanup levels as stated above. These methods will be considered in a future decision for the action to be taken on the second property;

f. Perform additional sampling of adjacent properties and the Orchard Area to determine what further action, if any, is needed.

2. Contribution to Remedial Performance

These proposed actions will contribute to any future remedial actions which may be necessary at the Site.

3. Applicable or Relevant and Appropriate Requirements (ARARs)

The proposed removal action will attain or exceed all ARARs to the extent practicable. Two factors will be applied to determine whether the identification and attainment of ARARs is practicable: (1) the exigencies of the situation; and (2) the scope of the removal action to be taken.
Federal ARARs

The following is a summary of federal ARARs identified to date that may be applicable to the proposed removal action:


State ARARs

The OSC prepared a letter to the Virginia Department of Environmental Quality (VADEQ) outlining the proposed response actions and requested that any State ARARs be provided in writing. VADEQ responded by letter dated January 21, 2005, with the State ARARs, which EPA will follow for this action memo.

B. Estimated Costs

The proposed distribution of funding is as follows:

<table>
<thead>
<tr>
<th>Extramural Costs</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regional Allowance Costs</td>
<td>$133,600</td>
</tr>
<tr>
<td>(This cost category includes estimates for ERRS contractors, subcontractors, letter contracts, orders for services, notices to proceed, alternative technology contracts, and inter-agency agreements with other Federal Agencies)</td>
<td></td>
</tr>
<tr>
<td>Other Extramural Costs Not Funded from the Regional Allowance</td>
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<tr>
<td>START Contractor</td>
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<td>Total CLP</td>
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<tr>
<td>Local Rental Agreements</td>
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<tr>
<td>Subtotal, Extramural Costs</td>
<td>$164,600</td>
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<tr>
<td>Extramural Costs Contingency (20% of Subtotal, Extramural Costs)</td>
<td>$32,920</td>
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<tr>
<td><strong>TOTAL REMOVAL ACTION</strong></td>
<td><strong>$197,520</strong></td>
</tr>
<tr>
<td><strong>PROJECT CEILING</strong></td>
<td></td>
</tr>
</tbody>
</table>
VI. EXPECTED CHANGE IN SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

If the proposed actions at the Site are not implemented or are delayed, there exists the possibility of human exposure of children and adults living in the residences.

VII. OUTSTANDING POLICY ISSUES

The removal involves a nationally significant and precedent setting issue because it involves property that was contaminated with legally applied pesticides.

VIII. ENFORCEMENT

Based on the information now available, it is recommended that Superfund monies be allocated to complete the removal activities at the Crozet Township Orchard Site. A confidential enforcement addendum has been prepared and is included as an attachment to this document.

The total EPA costs for this removal action based upon full-cost accounting practices that will be eligible for cost recovery are estimated below as follows:

<table>
<thead>
<tr>
<th>Description</th>
<th>Amount</th>
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<tr>
<td>Direct Extramural Cost</td>
<td>$197,520</td>
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<tr>
<td>Direct Intramural Cost</td>
<td>$40,000</td>
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<td>Indirect Costs (55.07%)</td>
<td>$130,800</td>
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<tr>
<td>Estimated EPA Costs for the Removal Action</td>
<td>$368,320</td>
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IX. Recommendation

Because conditions at the Crozet Township Orchard Site meet the Removal Action requirements of the NCP Section 300.415(b), I recommend your approval of the proposed Removal Action. The total Removal Action Project Ceiling if approved will be $197,520. Of this, an estimated $160,320 comes from the Regional Removal Allowance. Please indicate your approval or disapproval on the next page.
Action by the Approving Official:

I have reviewed the above-stated facts and based upon those facts and the information compiled in the documents described above, I hereby determine that the release or threatened release of hazardous substances at and/or from the Site presents or may present an imminent and substantial endangerment to the public health or welfare or to the environment. I concur with the recommended removal action as outlined.

APPROVED  Abraham Ferdas  8/17/05
Division Director
Hazardous Site Cleanup Division

Attachments:

Overhead Photo
Enforcement Confidential Memo
1. Lewis, 1998; Sittig, 1991
2. Hathaway et al, 1996
3. Budavari, 1996
5. EOSH, 1982
6. "Widespread Arsenic Contamination of Soils in Residential Areas and Public Spaces: An Emerging Regulatory or Medical Crisis?", D.A. Belluck, et al.,
7. As required by OSWER 9360.0-42, this footnote is included herein: Direct Costs include direct extramural costs and direct intramural costs. Indirect Costs are calculated based on an estimated indirect cost rate expressed as a percentage of site-specific direct costs, consistent with the full cost accounting methodology effective October 2, 2000. These estimates do not include pre-judgment interest, do not take into account other enforcement costs, including Department of Justice costs, and may be adjusted during the course of a Removal Action. The estimates are for illustrative purposes only and their use is not intended to create any rights for responsible parties. Neither the lack of a total cost estimate nor deviation of actual total costs from this estimate will affect the United States' right to cost recovery.