

**STATEMENT OF WORK:
TIME-CRITICAL REMOVAL, INVESTIGATION, AND EVALUATION OF ASBESTOS
AT THE NORTH RIDGE ESTATES SITE,
KLAMATH FALLS, OREGON**

May 19, 2003

1. INTRODUCTION

The site on which North Ridge Estates resides was originally developed by the United States Government to receive and care for marines who had contracted tropical diseases while fighting in the Pacific theater in World War II. More than 80 buildings were originally constructed to house, feed, and provide routine services and medical care to the troops.

As was common at the time that this site was first developed, various asbestos-containing materials were employed in the construction of buildings at the Site. These may have included (but may not be limited to): transite siding, roofing materials, floor tiles, the mastic used to secure floor tiles and roofing materials, and steam pipe insulation.

Over the years buildings at the Site were damaged, demolished and scavenged, and asbestos-containing material (ACM) was scattered in the vicinity. ACM can be found in several burial locations constructed to bury waste and is observed on the Site. It is not currently known to what extent such ACM can be found in local soils. It is also not known whether all of the areas used as burial sites have been identified.

In addition to asbestos, which is ubiquitous at the Site, other hazardous materials may also have been used to construct or operate facilities at the original site and, therefore, may also be present in site soils or other environmental matrices. Such materials may include (and may not be limited to): lead (from paint), various hydrocarbon fuels (from storage areas), and perchloroethylene (from the facility drycleaner). The nature and extent to which such other hazardous materials may be present is not currently known.

Currently, the Site is being developed as a residential community. 23 homes have already been constructed on the Site (of which, 22 are currently occupied) and several additional lots are slated for development. Therefore, the hazards potentially posed to current and future residents by the presence of ACM (and, potentially, other hazardous materials) must be evaluated and mitigated. Thus, an assessment of asbestos-related risks (and risks from any other hazardous materials that may ultimately be found on the Site) will be conducted and will be supported by a field investigation designed to provide the required data.

A removal action consisting of a field operation to physically remove visible ACM or ACM-containing debris piles near residences; to delineate the location of potential

buried, insulated steam pipes; and to undertake a fast-track sampling program to better define potential hazards.

The time-critical removal action and the field investigation/risk assessment will be conducted on separate but parallel tracks. This Statement Of Work is designed to address potential health-related concerns associated with the Site including:

- the need to address potential imminent health threats expeditiously (by conducting a time-critical removal action); and
- the need to characterize the Site and impacts from the Site adequately to design and implement an appropriate permanent remedy (by conducting a field investigation and risk assessment).

Track A of the Statement Of Work reflects the work that will be performed to complete the time-critical removal action and Track B indicates the work that will be performed to complete the field investigation and companion risk assessment.

Tasks incorporated into the statement of work (along with estimates of their times to completion) are summarized in the following two tables. Table 1 reflects the tasks to be performed to complete the time-critical removal (Track A). Table 2 reflects the tasks to be performed to complete the field investigation and risks assessment (Track B).

The work is to be conducted under an Administrative Order on Consent. The times listed in Tables 1 and 2 reflect calendar days from the effective date of the Order on Consent.

TABLE 1: TRACK A TASKS OF THE TIME-CRITICAL REMOVAL		
Task Number	Task Title	Time to Complete
1A	Submit draft Surficial Removal Work Plan	14 days after effective date
2A	Submit Health and Safety Plan for Site Activities	15 days after effective date
3A	Conduct Surficial Removal Action	Begin 7 days after work plan approval
4A	Submit draft Burial Location Work Plan	32 days after effective date
5A	Compile a Site History by Conducting a Formal Preliminary Assessment	Completed 32 days after effective date
6A	Submit draft Sampling and Analysis Plan (SAP) for a Fast-Track Sampling Program	32 days after effective date

7A	Create Digital GIS Site Map with Multiple Layers to Present Relevant Site Features and Results of All Sampling and Analysis	Ongoing
8A	Conduct Geophysical Analysis to Locate Abandoned Steam Pipes on Residential Properties	Begin 5 days after SAP approval
9A	Conduct Sampling of Residential Soils and Preliminary Sampling of Homes and Ambient Environment	Begin 5 days after SAP approval
10A	Create Database for Managing Data, Including Relevant EPA Data	Ongoing
11A	Stabilize/Secure Burial Locations	Begin 15 days after SAP approval
12A	Submit Plan to Stabilize Site While Track B work is Completed	Depends on SAP Sampling Results

**TABLE 2:
TRACK B TASKS OF THE
FIELD INVESTIGATION AND RISK ASSESSMENT**

Task Number	Task Title	Time to Complete
1B	Submit draft Work Plan for Streamlined Risk Assessment (SRA)	45 days after effective date
2B	Submit draft Phased Sampling and Analysis Plan (SAP) to Support SRA and Site Risk-Management Decisions	30 days after approval of SRA Work Plan
3B	Meet with Residents and Other Stakeholders	As soon as can be scheduled
4B	Conduct Phased Field Investigation	Begin 10 days after SAP approval
5B	Submit Draft SRA	60 days after completion of Phased Field Investigation

2.0 STATEMENT OF WORK

The tasks for supporting both the time-critical removal action and the comprehensive field investigation/risk assessment are separately described below.

2.1 Track A Tasks for the Time-Critical Removal Action

2.1.1 Task 1A: Submit Work Plan for Surficial Removal

Under this task, Respondents shall develop a work plan to conduct an action to remove visible asbestos-containing material (ACM) located on the surface of soils and fill within or from the Site. Priority will be given to the 22 residential properties that are currently occupied and to areas with heavy concentrations.

2.1.2 Task 2A: Submit a Health and Safety Plan for Site Activities

Under this task, Respondents shall to develop a site-wide health and safety plan that will address all of the ranges of conditions potentially associated with project-related work. This includes potential safety issues as well as health risks. Requirements for appropriate personnel protective equipment will be described, including clothing, safety equipment, and respiratory protection. Methods of monitoring for potential personnel exposure will be described, such as use of various field sampling devices.

Each individual contractor working onsite will be responsible for OSHA-required personnel exposure monitoring. In addition, environmental monitoring will be conducted to assure that adequate dust control measures are taken. Samples collected in ambient environments (outdoors) and analyzed by phase contrast microscopy (PCM) may be verified by use of TEM to re-analyze samples for which PCM measurements indicate asbestos concentrations in excess of OSHA target limits. This is to confirm that asbestos is indeed present before requiring any actions based on the analytical results from such samples.

2.1.3 Task 3A: Conduct a Surficial Removal Action

As defined in the Work Plan that will be developed under Task 1A, Respondents shall remove ACM from the surface of soils and fill within or from the Site. A small crew of licensed asbestos abatement workers will cross the areas of concern in a systematic manner, removing pieces of ACM approximately 1 inch in largest diameter or greater from the soil surface. This will be closely supervised to ensure thoroughness and consistency. ACM will be properly bagged and disposed in combination with materials removed in Task 4A.

2.1.4 Task 4A: Submit a Work Plan for Burial Location Response

Under this task, Respondents shall develop a work plan for stabilizing, consolidating, or otherwise addressing the five burial locations that have been identified at the Site.

Respondents shall excavate and remove the three smaller burial locations for consolidation at a secure on-site location owned by Respondents. The two larger burial locations (the old swimming pool and the one on the Cornachione property) shall be stabilized to eliminate structural hazards and to mitigate potential emissions while a long-term remedy for these locations are considered.

2.1.5 Task 5A: Compile a Site History by Conducting a Preliminary Assessment

A Preliminary Assessment (PA) in accordance with EPA guidelines will be conducted under this task to identify and retrieve relevant historical information describing past activities and land use at the Site. All available information from the agencies and property owners will be assembled to reconstruct the former facility, to determine the former locations and construction of buildings, to determine if other potentially hazardous substances were stored and used onsite, to estimate the location of the buried steam lines and potentially additional burial locations, etc. This may include recent and historic maps, aerial photographs, notes and field logs from various agencies conducting work at the Site, interviews, and city/county historical records. A final PA report (including site history) will be produced as the result of this task.

2.1.6 Task 6A: Submit a Sampling and Analysis Plan (SAP) for a Fast-Track Sampling Program

A focused sampling and analysis plan (SAP) will be developed under this task to rapidly address questions concerning the range of specific hazards potentially posed by asbestos originating at the Site. Note that the plan will include both a Field Investigation Plan (FIP) and a companion Quality Assurance Project Plan (QAPP).

When ACM degrades (weathers) in soils, it may release asbestos fibers to the surrounding soil matrix. If impacted, soil is subsequently disturbed by natural or anthropogenic activities and the free fibers can become airborne where they can potentially be inhaled and contribute to disease.

Fibers that may be present in site soils can be tracked into houses on shoes and clothing so that re-entrainment of settled dust (containing such asbestos) can occur in association with common household activities. Thus, potential exposure to asbestos can occur indoors.

To evaluate the potential exposure pathways listed above, the SAP to be developed under this task will include first soil sampling in residential yards and then a carefully designed indoor-outdoor air sampling campaign. The plan may be revised to reflect the results obtained during implementation of the plan and additional phases of sampling and analysis may also be considered.

2.1.7 Task 7A: Create a Digital GIS Site Map with Multiple Layers

Under this task a multi-layered site map will be developed to document the locations of relevant site features, the locations of relevant site activities, all sample collection locations, and the locations of the resulting analytical measurements. The location of all features will be tied to Geographic Information System (GIS) coordinates. Development of this map will be ongoing, to include site data collected by EPA and Respondents, and will be continually updated as the project proceeds. The initial pages of the map (presenting the location of relevant site features) will be prepared and ready for use prior to submission of the Preliminary Assessment (Task 5A) and the Burial Locations Work Plan (Task 4A).

2.1.8 Task 8A: Conduct a Geophysical Analysis of Residential Properties

A geophysical survey of currently-occupied residential properties will be conducted under this task. The primary purpose of this effort will be to build upon available data and locate any buried piping or unidentified buried material that may exist on these properties.

The specific geophysical tools to be employed during this survey will be defined as part of the final design, but are likely to include magnetometer and ground-penetrating radar equipment. Formal design of the grid to be employed for the survey and the selection of tools will be defined pending the implications of the Site History (to be complied under Task 5A).

2.1.9 Task 9A: Conduct Sampling of Residential Soils, Homes, and the Ambient Environment

Once approved, the SAP developed in Task 6A will be implemented under this task. As indicated in Table 1, it is anticipated that work on field sampling can begin within five days of approval of the plan. It is further anticipated that (subject to access to the inside of residential dwellings) sampling can likely be completed within six to eight weeks. All residences where occupants grant permission will be sampled.

Note that soil sampling and the initial phases of air sampling will be completed over a much shorter time frame (i.e., one to two weeks). Correspondingly, results from the initial phases of sampling will also be available much sooner than the complete data set from the sampling campaign. However, it is important that data from this study is sufficiently robust to delineate the kinds of trends in concentrations that will be required to identify and evaluate the exposure pathways of concern. Therefore multiple sampling of individual homes spaced out over a period of days or weeks may be required, depending on weather.

2.1.10 Task 10A: Create a Database for Data Management

A database for managing all of the sampling and analytical data that will be acquired under this project will be developed. The shell of the database will first be constructed during development of the SAP and the other work plans for this project. Data entry and customization of the database will then be ongoing over the course of the study. Software compatible with EPA requirements will be utilized. EPA GIS points, sampling data, and other relevant information collected by EPA and its contractors will also be included in the database. Available software at this time include Excel and Microsoft Access.

2.1.11 Task 11A: Stabilize/Address Burial Locations

Within 15 days after approval of the work plan for this activity (which will have been developed under Task 4A), the burial locations that have been identified on the Site will be stabilized. At this point in time, it is anticipated that the three smaller mapped ACM burial locations will be excavated, removed, and consolidated at a secure on-site cell to be constructed on Respondents' property. The larger burial locations (located at the old swimming pool and on the Cornachione property) will be evaluated for structural integrity and any structural issues will be addressed. These locations will also be stabilized and secured to minimize the potential for air emissions due either to wind or unintended anthropogenic activities by trespassers.

2.1.12 Task 12A: Submit a Plan to Stabilize Site While Track B Work is Completed

Pending the results of investigations to be conducted under the various tasks described above, it may or may not prove necessary to further stabilize the Site (to minimize potential opportunities for exposure) while a more formal and comprehensive site investigation/risk assessment is completed. To the extent that activities will be required to further stabilize the Site while the longer term evaluation is conducted, such activities will be performed under this task. However, the scope of activities to be conducted under this task cannot be defined at this time.

2.2 Track B Tasks for the Field Investigation/Risk Assessment

2.2.1 Task 1B: Submit Work Plan for Streamlined Risk Assessment (SRA)

Under this task, Respondents shall develop a work plan for a site-wide Streamlined Risk Assessment (SRA). The SRA will be comprehensive in that it will address all complete or potentially complete exposure pathways relevant to the Site. The results of the SRA will also serve to support the risk-management decisions that will be required to address development of a permanent remedy for the Site.

Exposure pathways to be addressed in the SRA will likely include (and may not be limited to):

- inhalation of asbestos fibers following release of such fibers from site soils (or other environmental matrices) due to disturbance by wind or anthropogenic activities (including such activities as walking, riding, gardening, or playing) that may be conducted within such matrices;
- inhalation of fibers released during excavation or construction activities that might be conducted in contaminated soils or other environmental matrices;
- transport of asbestos (either as visible ACM or as free fibers) from contaminated soils or other bulk matrices to new environmental matrices (by natural or anthropogenic processes) with subsequent disturbance and inhalation of released fibers; and
- transport of asbestos from environmental matrices to the inside of houses by wind or “track-in” with subsequent re-entrainment indoors and inhalation of airborne fibers.

Provision may also be made for evaluating effects associated with other hazardous materials (to the extent that the presence of such materials at levels which may pose a risk is confirmed during the field investigation).

2.2.2 Task 2B: Submit a Phased Sampling and Analysis Plan

Under this task, Respondents shall develop a sampling and analysis plan (SAP) detailing a field investigation capable of supporting both the SRA and the risk-management decisions required to define a permanent remedy for the Site. The plan will be comprised of two parts: a field sampling plan (FSP) and a quality assurance project plan (QAPP).

To assure that needs for supporting risk-management decisions regarding remediation are properly addressed (in addition to the SRA), a preliminary version of the decision logic that will lead to selection and design of a permanent remedy for this Site will be developed so that appropriate decisions can be identified and formally addressed as part of this SAP. This is required so that the SAP can be developed per the logic of EPA’s data quality objectives (DQO) process.

Due to the complexity of the project, the plan will be phased. The initial phases of the plan (which will be defined in detail) will likely address:

- evaluating the Site history (to be developed under Task 5A) to identify the nature and locations where buried ACM and other wastes might exist on-site;
- conducting geophysical analyses (or applying other kinds of screening tools) to better locate and define the extent of buried hazardous materials (including, for example, buried pipe that might be wrapped in asbestos insulation). Note that

the focus of these activities will be the portions of the Site not originally addressed under Task 8A (i.e. areas other than the occupied residential properties);

- applying various screening tools (including visual surveys) to better assess the nature and extent of surface contamination (on portions of the Site not addressed by the physical removal action to be conducted under Task 3A) and the depth of contamination;
- using newly developed sampling and analytical methods for the determination of asbestos to characterize the nature and extent of asbestos contamination in site soils and other environmental matrices, which will be combined with a modeling effort to predict exposure and risk; and
- using various screening procedures to prioritize later data collection efforts that may be required to support evaluation of release and transport of asbestos from secondary sources (including, specifically, indoor sources), which may also be combined with a modeling effort to predict exposure and risk.

Pending results obtained from implementing earlier phases, later phases of the plan may involve simulations (i.e., conducting sampling efforts during controlled conditions designed to simulate activities associated with exposure pathways of interest) and other data collection efforts that may be required to:

- validate or better characterize uncertainties associated with the initial modeling efforts; and/or
- better quantify and characterize exposure attributable to release and transport from secondary sources (including indoor sources).

Importantly, because the scope of these later phases cannot be entirely defined until the earlier phases of the project are completed, developing a detailed plan for these later phases of work must will be deferred until the earlier phases are completed.

It should also be noted that specific analytical techniques and methods are not specified under this task at this time. Such methods will be selected and specified in the FSP and QAPP, based on the known capabilities and limitations of available methods and their particular applicability to each specific objective for sampling and analysis. In the early phases of the plan, for example, may rely on bulk measurements using the Superfund Method for the Determination of Asbestos in Soils and Bulk Materials (Berman and Kolk 1997) or the revised version of this method (Berman and Kolk 2000), which offers the distinct advantage of providing results that can be combined with published dust emission models to predict airborne asbestos exposure concentrations with reasonable accuracy (Berman 2000). Such predictions may be further reinforced with limited and focused studies in later phases of the investigation.

2.2.3 Task 3B: Meet with Residents and Other Stakeholders

Under this task, in coordination with regulators, Respondents shall assist with meetings with residents and other stakeholders to assure effective communication regarding this work. Among other things, for example, Respondents shall provide information on how asbestos exposure occurs to facilitate an understanding of the removal action and SRA.

Procedures for facilitating rapid dissemination of new information (as it is developed) will also be formalized.

2.2.4 Task 4B: Conduct a Phased Field Investigation

Once the FSP and QAPP (both developed under Task 2B) for the field investigation are approved, any investigation to be completed under this task shall begin within 10 days following approval. It is expected that sampling and analysis activities will continue for between six and nine months.

2.2.5 Task 5B: Submit a Draft SRA

Assuming early approval of the SRA work plan, it is anticipated that the risk assessment will be completed in phases paralleling completion of the various phases of the field investigation (Task 4B). In this manner, preliminary results and conclusions will be made available before all the components of the field investigation are completed in their entirety. Moreover, by completing the risk assessment in phases, as field investigation work progresses, it will be possible to complete the remaining components of the entire SRA more rapidly, once field investigation work is completed.

REFERENCES

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