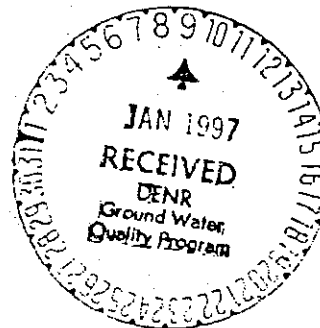


October 29, 1996

Byron Shark  
Contracting Officer's Representative  
USFS  
P.O. Box 25127  
Lakewood, CO 80225-0127



Re: Nemo Work Station, Activity III Work Plan for Contamination Survey/  
Hydrogeologic Characterization, Work Order No. 3

Dear Mr. Shark:

Please find enclosed the work plan to perform the extended contamination survey and hydrogeologic characterization of the Nemo Work Station and surrounding area. The objectives of the Activity III scope of work proposed under Work Order Number 3; are to identify and evaluate groundwater quality as well as the hydrogeologic and geologic conditions influencing the migration of Ethylene Dibromide (EDB) from the Nemo work station to drinking water wells located to the north, east, and south of the site. Preliminary review of well logs and geologic maps describing conditions in the Nemo area, indicate the shallow subsurface is dominated by fractured Precambrian bedrock which is partially overlain by alluvium and/or thin soils. Groundwater is reported to sporadically occur in both the shallow alluvium and the fractured bedrock.

The potential for groundwater migration between the fractured bedrock and the alluvial sediments is not clear from the existing data. Also, the concentrations of EDB reported from existing drinking water systems do not display a consistent trend indicating the potential for multiple sources of EDB and/or a complex groundwater flow regime. EnviroSearch proposes to perform a site specific geological and geophysical survey in conjunction with exploratory drilling and monitoring well installation to evaluate concentrations of EDB in the groundwater and model potential pathways for past and future contaminant transport. The following Scope of Work is divided into six tasks which outline the proposed work necessary to achieve the above described objectives.

## **SCOPE OF WORK**

### **Task 1 - Data Collection/Design Contamination Survey**

An extended survey of suspected contamination is proposed to identify the distribution of soil and groundwater contamination. Prior to implementing an investigative program, additional data collection will be required to evaluate site specific conditions and include:

- land ownership and access constraints;
- information regarding land use or modification.;
- expected drilling conditions;
- distribution of observed contamination;
- site layout as shown by existing maps or aerial photographs;
- controlling geologic conditions such as location of bedrock outcrops;
- location of existing utility lines;
- historical and current aerial photos;
- geologic maps illustrating structural features and faults;
- applicable soil surveys;
- hydrologic and climatological information; and
- characteristics of surrounding landforms.

A general literature search will be conducted to identify published geologic and hydrologic information relevant to the Nemo site. Most of this task will entail collecting pertinent information from USFS and local, State, and University sources.

Some of this information is expected to be available through published geologic and hydrologic reports, however additional field data collection efforts are expected to be required. Much of this data was collected during the initial site visit however, selected data will be required to be collected prior to initiating investigative field efforts.

### **Task 2 - Geologic Mapping and Geophysical Investigation**

EnviroSearch will inspect the site and correlate reported data with field conditions and identify any modifications to the initial hydrogeologic and geologic factors influencing contaminant transport from the Nemo site. Distinctive site features observed through aerial photo interpretation will be verified through collection of site specific geologic field data. Field work will include:

geologic mapping; field identification of major controlling hydrologic features; and an electromagnetic geophysical survey.

Geologic mapping will be conducted within the Nemo area and include visual inspection and identification of exposed bedrock and measurement of structural elements. The location of bedrock outcrops will be plotted on a topographic base map. The geometric relationships between bedrock units will be interpreted from surface location, structural character of the exposed rock, descriptions of relative age provided by US Geological Survey, and professional experience in structural geology. Structural cross-sections will be constructed from these same field data to provide baseline information to calibrate geophysical responses.

A geophysical survey will be conducted to evaluate subsurface bedrock and groundwater conditions affecting transport of EDB and locate additional buried metal objects (possible buried pesticide containers) in the vicinity of the Nemo site. This survey will consider observed site conditions and will be directed toward identification of the nature and geometry of groundwater and configuration of bedrock contained in the shallow subsurface. The survey will consist of electromagnetic geophysical techniques which are calibrated to identify presence or absence of groundwater and the configuration of the controlling bedrock topography. These techniques have proven effective for similar geologic environments in the past. Also, the geophysical survey will attempt to identify additional buried metal objects (possible buried pesticide containers) in the shallow subsurface near reported former dump sites.

### **Task 3 - Monitoring Well Installation**

Compilation of geologic and geophysical data will allow refinement of the subsurface model so that a limited number of exploratory borings and monitoring wells locations will be necessary to further define the nature and extent of EDB impacted groundwater. Eight boring and monitoring well locations are proposed and include: four immediately downgradient from known source areas; three downgradient from impacted residence wells; and one upgradient from areas of known contamination in a potential groundwater divide. Proposed boring locations are displayed on the attached map.

Rotary air drilling techniques will be used to advance exploratory borings through thin soil, alluvium and bedrock. The wells will be completed with 4-inch PVC casing and screen to total depths ranging from 45 to 65 feet below ground surface (BGS). Soil samples will be collected from all borings at 5 foot intervals from drill cuttings for classification of soil and rock materials. EnviroSearch does not anticipate encountering extensive EDB contaminated soil during exploratory

drilling; however, if impacts are observed, up to one composite soil sample per boring, may be submitted for laboratory analysis of EDB, Lindane and benzene, toluene, ethylbenzene, xylenes, and naphthathlene (BTEXN) by EPA Methods 8080 and 8020. Soil samples will also be collected in areas reportedly used to store and mix pesticides. Five soil samples will also be collected in areas identified by USFS personnel and analyzed for EDB and Lindane.

Installation of monitoring wells in the shallow aquifer will be used to determine the limits of contamination and the hydrogeologic conditions affecting contaminant migration and remediation. The proposed wells are to be constructed using 4 inch diameter casing to facilitate future cleanup if appropriate. The groundwater investigation program would include measuring water levels in new wells and incorporating water levels from existing wells, if possible, to develop a water table map delineating the directions of groundwater flow. The gross hydraulic characteristics of the aquifer are proposed to be evaluated using slug tests to evaluate the potential rates contaminant migration and possible pumping rates required for plume capture and groundwater extraction.

#### Task 4 - Groundwater Sampling

All new monitoring wells will be sampled according to US EPA standard practices. Development and purge water from sampling will be containerized and profiled for future disposal. Actual disposal costs and requirements will be determined once actual characteristics of the groundwater and costs are known. After development and purging, water samples will be collected from each well and submitted for laboratory analysis of EDB and Lindane by EPA Method 8080 and BTEXN by EPA Method 624. The groundwater sample containing the highest concentration of EDB will also be analyzed for the complete range of pesticides and volatile organic compounds to ensure other pesticides are not present in conjunction with EDB in groundwater. A duplicate sample and field blank will be included with each ten groundwater samples for quality assurance purposes. Static water level and field parameter data (pH, specific conductivity, and temperature) will also be collected from all wells.

#### Task 5 - Reporting

EnviroSearch will document all investigative findings and project results in a comprehensive report. The Site Characterization Report will document investigative methods and results of the field program. The report will be submitted in Draft form to the USFS prior to submitting a final to the required agencies as appropriate. The report will include contaminant distribution maps,

bedrock topography maps, well logs, analytical laboratory reports, and all other pertinent investigative data.

## **Task 6      Project Management**

EnviroSearch will be available to interact with the regulating agencies as appropriate in conjunction with the USFS personnel to convey the specific investigative approach and cleanup requirements, as well as interact with the local community members regarding site access and coordination.

EnviroSearch proposes to utilize Craig Scola as Project Manager to direct the well installation and groundwater sampling activities. Mr. Scola has directed multiple CERCLA and RCRA site investigations as will be supported by specialists in the area of geophysical scientists and Professional Geologists to perform the geophysical survey. Mr. Richard Kelsey, P.E. has a wide range of experience with design and implementation of site characterization and remediation programs utilizing multidisciplinary teams of scientists and will provide oversight as Program Manager. Mr. Kelsey will act as a liaison between USFS and private parties interested in site activities. Derrick D. Crowther is a Professional Geologist registered in three states and specializes in mapping and interpreting complex geologic provinces and is proposed to direct Task 2. Mr. Crowther has performed multiple environmental and geologic investigations for attorneys in support of litigation and is well aware of the nature and sensitivity of performing work on sites where concerned private parties may be involved.

## **WORK ORDER ESTIMATED COSTS**

The majority of work is proposed to be conducted by the Project Manager, Chemist/Staff Geologist, and Technician utilizing standard contract rates for professional services under Activity III; however, certain specialized activities will require utilization of professional scientists with experience in hydrogeologic, geologic and geophysical site characterization and remedial engineering. EnviroSearch proposes to provide technical support for specific tasks with these professionals utilizing rates not previously established under the existing contract. The proposed personnel and rates along with total estimated costs to complete the tasks associated with this work order are presented in the attached spreadsheet.

Key assumptions associated with the estimated costs include:

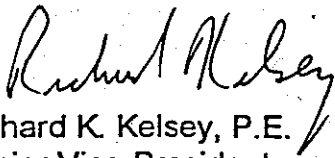
- site access will not be delayed by inclement weather;
- monitoring well locations will be prepared for drill rig access by USFS;

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- snow cover will not preclude observation of bedrock outcrops;
- soil and bedrock conditions will be conducive to Rotary Air techniques;
- access to private land will be obtained by USFS; and
- buried utility locations will be obtained by USFS.

We appreciate the opportunity to submit this proposal and associated cost estimate for Contamination Survey/Hydrogeologic Characterization to the USFS under Activity III. Please feel free to call myself or Derrick Crowther at 208-345-8292 if you have any questions or desire additional information.

Sincerely,



Richard K. Kelsey, P.E.  
Senior Vice-President

RKK/dh

Enc.

cc: Bill Schleining, On-Site Coordinator

P811.doc

North

10/22/96

- ▼ Proposed Monitoring Wells
- \* Sampled Wells
- ★ Dump Sites

Legend

