*Appendix 1*

# STATEMENT OF WORK FOR THE STIBNITE MINE REMEDIAL INVESTIGATION / FEASIBILITY STUDY Valley County ID near Yellow Pine, ID

## Purpose

This Statement of Work (SOW) sets forth the requirements for conducting a Remedial Investigation and Feasibility Study (RI/FS) at the Stibnite Mine Site (Site) located in northwest Idaho approximately 14 miles from Yellow Pine. The purpose of the RI/FS is to investigate the nature and extent of contamination at the Site and to develop and evaluate remedial alternatives, as appropriate. This SOW provides an overview of Work that will be carried out by Midas Gold Corporation (Respondent) as it implements the RI/FS at the Site.

This RI/FS SOW is attached to and is incorporated into the Settlement Agreement and Administrative Order on Consent (AOC) for the Site. Technical work described in this SOW is intended to provide more information to the Respondent for the purpose of implementing the AOC and is not intended to change the meaning of any AOC language. This SOW is also consistent with both the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. § 9601 et seq., and the National Oil and Hazardous Substances Pollution Contingency Plan, commonly called the National Contingency Plan (NCP), 40 CFR 300. The AOC and this SOW are hereafter referred to interchangeably as the "AOC." Any discrepancies between the AOC and this SOW are unintended, and whenever necessary, the AOC will control any interpretive disputes.

## Scope

The specific RI/FS activities to be conducted at the Site are set forth in seven separate tasks.

Task 1 - Scoping
Task 2 - Community Relations
Task 3 - Site characterization
Task 4 - Treatability Studies
Task 5 - Feasibility Study
Task 6 - Detailed Analysis of Remedial Alternatives



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## Oversight

Work conducted under the AOC is intended to satisfy the legal requirements for the RI/FS established under both Section 104(a)(l) of CERCLA and Idaho's Environmental Protection & Health Act, Idaho Code§§ 39-101 to 39-130; the Hazardous Waste Management Act of ldaho, Idaho Code§§ 39-4401 to 39-4432; and Idaho's Water Quality Act, Idaho Code§§ 39-3601 et seq. As such, oversight of the Respondent's Work conducted under the SOW will be carried out by EPA, the USFS, and the IDEQ (the Agencies) in a manner to assure the satisfaction of all federal and state requirements. The Respondent shall support the Agencies' initiation and conduct of activities related to the implementation of oversight activities.

Respondent shall submit all documents or deliverables required as part of this SOW to EPA, for EPA's review and approval. All work products submitted to EPA are subject to EPA approval, including but not limited to, submissions specified in the Work Plan(s) or Settlement Agreement and additional work products that may be required under Work Plan modifications. Respondent shall ensure that all plans, reports, and records are comprehensive, accurate, and consistent in content and format with the NCP and relevant EPA guidance.

Throughout the process of developing the RI/FS, the Respondent shall prepare and submit Quarterly Progress Reports to EPA to aid in project planning. These reports must document the status of all work products under development. These reports shall describe the actions and decisions taken, and problems encountered during the previous quarter, and activities scheduled during the upcoming reporting period. Progress reports shall also summarize the extent to which the procedures and dates set forth in the AOC and the Work Plan are being met. These reports shall be submitted according to the Schedule included as Attachment E.

## Schedule

Refer to Attachment E for the primary and potential secondary deliverables and associated schedules.

## Guidance

The Respondent shall conduct the RI/FS, and produce technical reports that are in accordance with the AOC, SOW, the Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (RI/FS Guidance) (U.S. EPA, Office of Emergency and Remedial Response, October 1988), and any other guidance relevant to conducting an RI/FS. A list of the pertinent guidance documents is included at the end on this SOW. Attachments A, B, C, and D include suggested document formats for the Work Plan, Sampling and Analysis Plan, RI Report, and FS Report, respectively. The RI/FS guidance describes the required report contents.

## Roles and Responsibilities

The Respondent shall furnish all necessary personnel, materials, and services needed, or incidental to, performing the RI/FS, except as otherwise specified in the AOC. At the

completion of the RI/FS, EPA will be responsible for the selection of a Site remedy and will document this selection in a Record of Decision (ROD).

### Remedy Requirements

The remedial action alternative selected by the EPA will meet the cleanup standards specified in Section 121 of CERCLA. That is, the selected remedial action will be protective of human health and the environment, will be in compliance with, or include a waiver of, applicable or relevant and appropriate requirements (ARARs) of other laws, will be cost-effective, will utilize permanent solutions and alternative treatment technologies or resource recovery technologies, to the maximum extent practicable, and will address the statutory preference for treatment as a principal element. The final RI/FS report including the baseline risk assessment (BLRA), as adopted by the EPA, will, with the administrative record, form the basis for the selection of the Site's remedy and will provide the information necessary to support the development of the ROD.

## TASK 1 - SCOPING

Scoping is the initial planning process of the RI/FS. Respondent shall document the specific project scope in the RI/FS Work Plan. During the scoping process, the Site-specific objectives of the RI/FS, including the identification of potential preliminary remediation goals (PRGs) will be proposed by the Respondent and approved by EPA. In addition to developing the Site-specific objectives of the RI/FS, Respondent shall define a general project management approach for the Site, which shall be documented by the Respondent in a draft Work Plan. Because the Work required to perform an RI/FS is not fully known at the outset and is phased in accordance with a Site's complexity and the amount of available information, it may be necessary to modify the Work Plan during the RI/FS to satisfy the objectives of the study. When scoping the specific aspects of this project, Respondent shall meet with EPA either in person or telephonically to discuss all project planning decisions and special concerns associated with the Site.

The following activities shall be performed by the Respondent as a function of the project planning process.

### *a. Site Background*

The Respondent shall gather, analyze, and present existing Site background information and shall conduct a work session to assist in planning the scope of the RI/FS.

<u>Collect and analyze existing data and document the need for additional data</u>

Before planning RI/FS activities, all existing Site data shall be thoroughly compiled and reviewed by the Respondent. Historical data shall be submitted electronically according to EPA Region 10 specifications. The Respondent shall refer to Table 2-1 of the RI/FS Guidance for a comprehensive list of data collection information sources. Specifically, this must include presently available data relating to the varieties and quantities of hazardous substances at the Site, and past disposal practices. This must also include results from any previous sampling events that



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may have been conducted. Only data that is determined by EPA to be of appropriate type and quality to support specific intended uses shall be utilized in the RI/FS. This includes data utilized to develop the BLRA, to identify additional data needs to better characterize the Site, to better define potential applicable or relevant and appropriate requirements (ARARs), and to develop a range of preliminarily identified remedial alternatives. Data Quality Objectives (DQOs) shall be established, subject to EPA's approval, which shall be used to assess the usefulness of existing data and to direct future data gathering efforts. Decisions regarding the necessary data needs and DQOs will be made by EPA.

Conduct Site Visit

The Respondent and EPA shall conduct a Site visit during the project scoping phase to assist in developing a conceptual understanding of sources and areas of contamination as well as potential exposure pathways and receptors at the Site. During the Site visit the Respondent shall observe the Site's physiography, hydrology, geology, and demographics, as well as natural resource, ecological, and cultural resources. This information shall be utilized to better scope the project and to determine the extent of additional data necessary to characterize the Site, better define potential ARARs, and assist in identifying potential remedial alternatives.

### b. *Project Planning*

Once the Respondent has collected and analyzed existing data and conducted a Site visit, the specific project scope shall be planned. Project planning activities include those tasks described below, as well as identifying data needs, developing a work plan, designing a data collection program, and identifying health and safety protocols. The Respondent shall meet with EPA's Remedial Project Manager (RPM) regarding the following activities and before drafting the scoping deliverables listed below.

Preliminary Conceptual Site Model

Information on the waste sources, pathways, receptors, cultural resources, and other information concerning the Site is used to develop a conceptual understanding of the Site which helps to evaluate potential risks to human health and the environment. The Conceptual Site Model (CSM) should include known and suspected sources of contamination, types of contamination and affected media/resources, known and potential routes of migration, and known or potential human and environmental receptors. This effort, in addition to assisting in identification of locations where sampling is necessary, will also assist in the identification of potential remedial technologies. Additional information for evaluating exposure concerns through the use of a CSM is provided in the DQO Guidance. The CSM must be updated as new information becomes available.

The preliminary CSM associated with the ecological risk assessment (ERA) must include species and their habitats that could be impacted by Site-related contamination based on information generated from a historical review and a



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cultural resource audit and will show the relationships among species and potential exposure pathways. The Respondent shall provide assistance to the RPM in collecting this information as requested. If information is not provided to the Respondent within the timeframe specified by EPA, the RPM will notify the Respondent in writing either to proceed with the preparation of the RI/FS Work Plan without the information or to delay its submittal pending receipt of the information. The preliminary CSM for the human health risk assessment (HHRA) must identify potential receptor populations and potential exposure pathways.

### Refine and document preliminary remedial action objectives and alternatives

Once existing Site information has been analyzed and an understanding of the potential Site risks have been determined, the Respondent shall review and, if necessary, refine the Remedial Action Objectives (RAOs) that have been identified by EPA for each actually or potentially contaminated medium. The revised RAOs must be documented in a technical memorandum and subject to EPA's approval. The Respondent shall then identify a preliminary comprehensive range of potential remedial action alternatives and associated technologies. The range of potential alternatives shall encompass, where appropriate, alternatives in which treatment significantly reduces the toxicity, mobility, or volume of the waste; alternatives that involve containment with little or no treatment; and a no-action alternative.

### Document the need for treatability studies

Respondent shall conduct bench and/or pilot studies as necessary to determine the suitability of various remedial technologies to Site conditions and problems. Technologies that may be suitable to the Site should be identified as early as possible to determine whether there is a need to conduct treatability studies to better estimate costs and performance capabilities. Should treatability studies be determined to be necessary, a testing plan identifying the types and goals of the studies, the level of effort needed, a schedule for completion, and the data management guidelines should be submitted to EPA for review and approval. Upon EPA approval, a test facility and any necessary equipment, vendors, and analytical services will be procured by the contractor.

When the treatability studies are completed, Respondent shall evaluate the results to assess the technologies with respect to the goals identified in the test plan. A report summarizing the testing program and its results shall be prepared by the Respondent and presented in the final RI/FS report. The Respondent shalll implement all management and quality control review activities for this task. If remedial actions involving treatment have been identified by the Respondent or EPA, treatability studies shall be required, except where the Respondent can demonstrate to the satisfaction of EPA that they are not needed. Where treatability studies are needed, initial treatability testing activities (such as research and study design) should be planned to occur concurrently with Site characterization activities.



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Begin preliminary identification of potential ARARs

The Respondent shall conduct a preliminary identification of potential ARARs (chemical-specific, location-specific, and action-specific) to assist in the refinement of the RAOs and the initial identification of remedial alternatives. ARAR identification will continue as Site conditions, contaminants, and remedial action alternatives are better defined.

### c. *Scoping Deliverables*

At the conclusion of the project planning phase, the Respondent shall submit an RI/FS Work Plan, a Sampling and Analysis Plan (SAP) consisting of a Field Sampling Plan (FSP) and Quality Assurance Project Plan (QAPP), and a Site Health and Safety Plan (HASP). These plans must be reviewed and approved by EPA prior to the initiation of field activities.

RI/FS Work Plan

A Work Plan documenting the decisions and evaluations completed during the scoping process shall be submitted to the RPM for review and approval. The Work Plan shall be developed in conjunction with the SAP and the Site HASP, although each plan may be delivered under separate cover. The Work Plan shall include a comprehensive description of the work to be performed, including the methodologies to be utilized, as well as a corresponding schedule for completion. In addition, the Work Plan shall include the rationale for performing the required activities. Specifically, the Work Plan must present a statement of the problem(s) and potential problem(s) posed by the Site and the objectives of the RI/FS. Furthermore, the plan must include a Site background summary setting forth the Site description including the geographic location of the Site, and to the extent possible, a description of the Site's physiography, hydrology, hydrogeology, geology, demographics, ecological, cultural, and natural resource features; a synopsis of the Site history and a description of previous responses that have been conducted at the Site by local, state, federal, or private parties; and a summary of the existing data in terms of physical and chemical characteristics of the contaminants identified, and their distribution among the environmental media at the Site. In addition, the plan must include a description of the Respondent's Site management strategy developed during scoping and a preliminary identification of remedial alternatives and data needs for evaluation of remedial alternatives. The plan must reflect coordination with treatability study requirements, if treatability studies are initiated. It must include a process for and manner of identifying potential ARARs (chemical-specific, location-specific, and action-specific).

Finally, the major part of the Work Plan is a detailed description of the tasks to be performed, information needed for each task and for the BLRA, information to be produced during and at the conclusion of each task, and a description of the work products that will be submitted to the RPM. This includes the deliverables set forth in the remainder of this SOW; a schedule for each of the required activities which is consistent with the RI/FS guidance; and a project management plan, including a



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data management plan (e.g., requirements for project management systems and software, minimum data requirements, data format and backup data management), monthly reports to the RPM and meetings and presentations to EPA and the Support Agencies at the conclusion of each major phase of the RI/FS. The Respondent must refer to Appendix B of the RI/FS Guidance for a comprehensive description of the contents of the required Work Plan, and a suggested format can be found in Attachment A.

## Sampling and Analysis Plan

The Respondent shall prepare a SAP to ensure that sample collection and analytical activities are conducted in accordance with technically acceptable protocols and that the data meet DQOs. The SAP provides a mechanism for planning field activities and consists of a FSP and a QAPP. A suggested format for the SAP (inclusive of the FSP and QAPP) is provided in Attachment B. The SAP, FSP, and QAPP shall be prepared in accordance with EPA DQO guidance documents (EPA 2000, 2002a, 2002b, and 2006).

The FSP must define in detail the sampling and data-gathering methods that will be used on the project. It must include sampling objectives, sample location and frequency, sampling equipment and procedures, and sample handling and analysis. The QAPP must describe the project objectives and organization, functional activities, and quality assurance and quality control (QA/QC) protocols that will be used to achieve the desired DQOs. The DQOs shall, at a minimum, reflect use of analytic methods to identify contamination and remediate contamination consistent with the levels for remedial action objectives identified in the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), pages 51425-26 and 51433 (December 21, 1988). The QAPP shall be prepared in accordance with requirements in EPA QA/R-5 *EPA Requirements for Quality Assurance Project Plans* (latest draft or revision) and EPA QA/G-5 *EPA Guidance for Quality Assurance Project Plans* (latest draft or revision), EPA QA/G-4HW Data Quality Objectives Process for Hazardous Waste Site Investigations, and EPA QA/G-4 Guidance for the Data Quality Objective Process. All sampling and analyses performed pursuant to this SOW shall conform to EPA direction, approval, and guidance regarding sampling, QA/QC, data validation, and chain-of-custody procedures. In addition, the QAPP must address the following: sampling procedures; sample custody; analytical procedures; data reduction, validation, and reporting; and personnel qualifications.

Field personnel must be trained and conduct work in accordance with EPA and OSHA requirements and guidance. The Respondent shall demonstrate, in advance and to the satisfaction of EPA, that each laboratory they may use is qualified to conduct the proposed work. This includes use of methods and analytical protocols for the chemicals of concern in the media of interest within detection and quantification limits consistent with both QA/QC procedures and DQOs approved in the QAPP for the Site by EPA. The laboratory must have and follow an approved



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QA program. If a laboratory not in the Contract Laboratory Program (CLP) is selected, methods consistent with CLP methods that would be used at this Site for the purposes proposed and QA/QC procedures approved by EPA will be used. If the laboratory is not in the CLP program, a laboratory QA program must be submitted for EPA's review and approval. EPA may require that the Respondent submit detailed information to demonstrate that the laboratory is qualified to conduct the work, including information on personnel qualifications, equipment, and material specifications. The Respondent shall provide assurances that EPA has access to laboratory personnel, equipment, and records for sample collection, transportation, and analysis.

## Potential Target Analytes

The following list of chemicals include the initial Chemicals of Potential Concern (COPCs). The initial COPC list includes, but is not limited to, the analytes listed below. The Respondent shall review this list for surface water, groundwater, sediments, soils, and vegetation analytes relative to ARARs, preliminary remediation goals (PRGs), screening levels, Site-specific risk assessment data needs, treatability study data needs, feasibility study data needs, and other potential performance standards. All metal analytes (aqueous) shall be analyzed for total and dissolved constituents unless otherwise approved by EPA. Analytes may be added and/or removed from further consideration or monitored at varying frequencies based upon Site-specific factors such as dry or wet year hydrologic cycles as approved or otherwise directed by EPA.

**Chemicals/Analytes of Potential Concern for Surface Water**

The following COPCs shall be included in the analyses for all surface water sampling stations during the first high flow (spring runoff) and the first low flow (fall) sampling events conducted following signing of the AOC. The spring runoff sampling event shall be conducted as close as possible to the peak of the spring runoff hydrograph. A minimum of two storm event sampling events shall be conducted.

Laboratory Analyses

- Alkalinity
- Aluminum
- Antimony
- Arsenic
- Barium
- Beryllium
- Boron
- Cadmium
- Calcium
- Chloride
- Chromium (III)
- Chromium (VI)



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- Cobalt
- Copper
- Hardness
- Iron
- Lead
- Magnesium
- Manganese
- Mercury
- Molybdenum
- Nickel
- Nitrogen, total Kjeldahl
- Phosphorus
- Potassium
- Selenium
- Silver
- Sodium
- Sulphate
- Thallium
- Tungsten
- Total Dissolved Solids
- Total Organic Carbon
- Total Suspended Solids
- Uranium
- Vanadium
- Zinc

Field Analyses

- Conductivity
- Dissolved Oxygen
- Flow
- pH
- Temperature

The Respondent shall review the results of the first year's surface water sampling, shall compare the analytical results for each of the COPCs against the screening levels, and shall recommend COPCs to be eliminated from the above list for subsequent surface water sampling events. Upon approval by EPA, the COPCs eliminated by this process do not need to be included in the analyses for subsequent surface water sampling events.

**Chemicals/Analytes of Potential Concern for Sediments:**

The following COPCs shall be included in the analyses for all sediment sampling stations:

Laboratory Analyses



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- Antimony
- Arsenic
- Cadmium
- Chromium
- Copper
- Lead
- Manganese
- Mercury
- Nickel
- Selenium
- Silver
- Tungsten
- Vanadium
- Zinc

**Chemicals/Analytes of Potential Concern for Soils/Waste Rock:**

The following COPCs shall be included in the analyses for all soils/waste rock sampling:

Laboratory Analyses

- Antimony
- Arsenic
- Boron
- Cadmium
- Chromium
- Cobalt
- Copper
- Lead
- Manganese
- Mercury
- Molybdenum
- Nickel
- Selenium
- Silver
- Thalium
- Tungsten
- Uranium
- Vanadium
- Zinc

**Chemicals/Analytes of Potential Concern for Vegetation:**

The following COPCs shall be included in the analyses for all vegetation sampling stations



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Laboratory Analyses

- Antimony
- Arsenic
- Boron
- Cadmium
- Chromium
- Cobalt
- Copper
- Lead
- Manganese
- Mercury
- Molybdenum
- Nickel
- Selenium
- Silver
- Thallium
- Tungsten
- Vanadium
- Zinc

**Chemicals/Analytes of Potential Concern for Groundwater**

The COPCs listed below shall be included in the analyses for all groundwater sampling stations and shall be sampled at a minimum during the first high flow (spring runoff) and the first low flow (fall) sampling events conducted following signing of the AOC. The spring runoff sampling event shall be conducted as close as possible to the peak of the spring runoff hydrograph and the low flow sampling shall be conducted at all groundwater sampling stations as close as possible to the low point of the surface water flow hydrograph.

Laboratory Analyses

- Alkalinity
- Aluminum
- Antimony
- Arsenic
- Barium
- Beryllium
- Cadmium
- Calcium
- Chloride
- Chromium III
- Chromium VI
- Cobalt
- Copper
- Hardness



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- Iron
- Magnesium
- Manganese
- Mercury
- Molybdenum
- Nickel
- Nitrate/nitrite as N
- Nitrogen (TKN)
- Orthophosphate
- Potassium
- Selenium
- Silver
- Sodium
- Sulfate
- Thallium
- Total Dissolved Solids
- Total Suspended Solids
- Total Organic Carbon
- Tungsten
- Uranium
- Vanadium
- Zinc

Field Analyses

- Conductivity
- Dissolved Oxygen or ORP
- Ferric Iron
- Ferrous Iron
- Nitrite
- pH
- Temperature

The Respondent shall review the results of the first year's groundwater sampling, shall compare the analytical results for each of the COPCs against the screening levels, and shall recommend COPCs to be eliminated from the above list for subsequent groundwater sampling events. Upon approval by EPA, the COPCs eliminated by this process do not need to be included in the analyses for subsequent groundwater sampling events.

Site Health and Safety Plan

A HASP shall be prepared in conformance with the Respondent's health and safety program, and in compliance with OSHA regulations and protocols. It should be noted that EPA does not "approve" the Respondent's health and safety plan, but



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rather EPA reviews it to ensure that all necessary elements are included, and that the plan provides for the protection of human health and the environment.

## TASK 2 - COMMUNITY RELATIONS

The development and implementation of community relations activities are the responsibility of EPA. The critical community relations planning steps performed by EPA include conducting community interviews and developing a community relations plan. Although implementation of the community relations plan is the responsibility of EPA, the Respondent may assist by providing information regarding the Site's history, participating in public meetings, and preparing fact sheets for distribution to the general public. In addition, the Respondent shall establish a community information repository, at or near the City of McCall, to house one copy of the administrative record. The extent of community relations activities involvement by potentially responsible parties (PRPs) is left to the discretion of EPA. The Respondent's community relations responsibilities, if any, are specified in the community relations plan. Any PRP-conducted community relations activities will be subject to oversight by EPA.

## TASK 3 - SITE CHARACTERIZATION

As part of the RI, the Respondent shall perform the activities described in this task, including the preparation of a Site characterization summary and a RI report. The overall objective of Site characterization is to describe areas of a Site that may pose a threat to human health or the environment. This is accomplished by first determining a Site's physiography, geology, and hydrology/hydrogeology. Surface and subsurface pathways of migration must be defined. The Respondent shall identify the sources of contamination and define the nature, extent, and volume of the sources of contamination, including their physical and chemical constituents as well as their background concentrations at incremental locations in the affected media. The Respondent shall also investigate the extent of migration of this contamination as well as its volume and any changes in its physical or chemical characteristics, to provide for a comprehensive understanding of the nature and extent of contamination at the Site. Using this information, contaminant fate and transport is then determined and projected.

During this phase of the RI/FS, the Work Plan, SAP, and HASP are implemented. Field data are collected and analyzed to provide the information required to accomplish the objectives of the study. The Respondent shall notify the RPM at least two weeks in advance of the field work regarding the planned dates for field activities, including ecological field surveys, field layout of the sampling grid, excavation, installation of wells, initiating sampling, installation and calibration of equipment, pump tests, and initiation of analysis and other field investigation activities. The Respondent shall demonstrate that the laboratory and type of laboratory analyses that will be utilized during Site characterization meet the specific QA/QC requirements and the DQOs of the Site investigation as specified in the SAP. In view of the unknown Site conditions, activities are often iterative, and to satisfy the objectives of the RI/FS, it may be necessary for the Respondent to supplement the work specified in the initial Work Plan. In addition to the deliverables below, the



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Respondent shall provide a monthly progress report and participate in weekly meetings or conference calls at major points in the RI/FS.

### a. *Field Investigation*

The field investigation shall include the gathering of data to define Site physical and biological characteristics, sources of contamination, and the nature and extent of contamination at the Site. These activities shall be performed by the Respondent in accordance with the Work Plan and SAP. At a minimum, this shall address the following:

#### Implement and document field support activities

The Respondent shall initiate field support activities following approval of the Work Plan and SAP. Field support activities may include obtaining access to the Site, scheduling, and procuring equipment, office space, laboratory services, and/or contractors. The Respondent shall notify the RPM at least two weeks prior to initiating field support activities so that EPA may adequately schedule oversight tasks. The Respondent shall also notify the RPM upon completion of field support activities.

#### Investigate and define site physical and biological characteristics

The Respondent shall collect data on the physical and biological characteristics of the Site and its surrounding areas, including the physiography, geology, and hydrology, and specific physical characteristics identified in the work plan. This information must be ascertained through a combination of physical measurements, observations, and sampling efforts, and will be utilized to define potential transport pathways and human, cultural, and ecological receptor populations. In defining the Site's physical characteristics, the Respondent shall also obtain sufficient engineering data (such as the effects of contaminated media weathering and ground and surface water contaminant loading) to aid in the projection of contaminant fate and transport, and the development and screening of remedial action alternatives, including information to assess treatment technologies.

#### Define sources of contamination

The Respondent shall locate each source of contamination and define the areal extent and depth of contamination associated with each source in all media. The physical characteristics and chemical constituents and their concentrations must be determined for all known and discovered sources of contamination. The Respondent shall conduct sufficient sampling to define the boundaries of the contaminant sources consistent with the QAPP and DQOs.

Defining the source of contamination must include analyzing the potential for contaminant release (e.g., long term leaching from soil), contaminant mobility and persistence over time, and characteristics important for evaluating remedial actions, including information to assess treatment technologies.



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Describe the nature and extent of contamination

The Respondent shall gather information to describe the nature and extent of contamination as a final step during the field investigation. To describe the nature and extent of contamination, the Respondent must utilize the information and site physical and biological characteristics and sources of contamination to give a preliminary estimate of the contaminants that may have migrated. The Respondent shall then implement an iterative monitoring program and any study program identified in the work plan or SAP such that by using analytical techniques sufficient to detect and quantify the concentration of contaminants, the migration of contaminants through the various media at the Site can be determined. In addition, the Respondent shall gather data for calculations of contaminant fate and transport. This process must be continued until the area and depth of contamination are known. This information will be used to determine the level of risk presented by the Site and to help develop appropriate remedial action alternatives for evaluation.

### b. *Data Analyses*

Evaluate Site characteristics

The Respondent shall analyze and evaluate the data to describe: (1) Site physical and biological characteristics; (2) contaminant source characteristics; (3) nature and extent of contamination; and (4) contaminant fate and transport. Results of the Site physical characteristics, source characteristics, and extent of contamination analyses are utilized in the analysis of contaminant fate and transport. The evaluation must include the actual and potential magnitude of releases from the sources, and horizontal and vertical spread of contamination as well as mobility and persistence of contaminants. Where modeling is appropriate, such models shall be identified to EPA in a technical memorandum prior to their use. All data and programming, including any proprietary programs, shall be made available to EPA together with a sensitivity analysis. The RI data shall be presented in a format (i.e., computer disc or equivalent) to facilitate the preparation of the BLRA. The validated data, along with QA/QC information and data validation summaries, shall be submitted in electronic format within 90 calendar days from the date of collection of the last sample from each sampling event. The Respondent shall then collect any data required to address data gaps identified by EPA as needed to complete the BLRA. This evaluation shall also provide information relevant to Site characteristics necessary to evaluate the need for remedial action in the BLRA and to aid in the development and evaluation of remedial alternatives. Analyses of data collected for Site characterization must meet the DQOs developed in the QA/QC plan stated in the SAP (or as revised during the RI).

### c. *Data Management Procedures*

The Respondent shall consistently document the quality and validity of field and laboratory data compiled during the RI.



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### Document field activities

Information gathered during Site characterization shall be consistently documented and adequately recorded by the Respondent in well-maintained field logs and laboratory reports. The method(s) of documentation must be specified in the work plan and/or the SAP. Field logs must be utilized to document observations, measurements, and significant events that have occurred during field activities. Laboratory reports must document sample custody, analytical responsibility, analytical results, adherence to prescribed protocols, nonconformity events, corrective measures, and/or data deficiencies.

### Maintain sample management and tracking

The Respondent shall maintain field reports, sample shipment records, analytical results, and QA/QC reports to ensure that only validated analytical data are reported and utilized in the development and evaluation of remedial alternatives. Analytical results developed under the Work Plan must not be included in any Site characterization reports unless accompanied by or cross-referenced to a corresponding QA/QC report. In addition, the Respondent shall establish a data security system to safeguard chain-of-custody forms and other project records to prevent loss, damage, or alteration of project documentation.

### Data Validation Management

All validated data shall be made available to EPA in electronic format. The validated data, along with QA/QC information and data validation summaries, shall be submitted in electronic format within 90 calendar days from the date of collection of the last sample from each sampling event. Field and validated analytical data results for all media sampled shall be submitted to EPA by uploading the data to the Water Quality Exchange (WQX) using the Central Data Exchange (CDX). Field and laboratory samples must include information on the sampling locations which will also be submitted to WQX via CDX. (See www.epa.gov/storet/wqx.hmtl)

## *d. Site Characterization Deliverables*

The Respondent shall prepare the preliminary Site characterization summary and the RI report.

### Data Summary Reports

After completing each annual field season's sampling and analysis (i.e., at the end of the field season each calendar year), the Respondent shall prepare a concise Site characterization Data Summary Report (DSR). This report must review the investigative activities that have taken place and describe and display Site data documenting the location and characteristics of surface and subsurface features and contamination at the Site, including the affected media, locations, types, physical state, concentrations of contaminants and quantities. In addition, reports shall document the location, dimensions, physical condition and varying concentrations of each contaminant for each source and the extent of contaminant migration



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through each of the affected media. Each DSR must also evaluate data gaps and identify additional and/or modified sampling and analysis that shall be included in modifications to the SAP for each subsequent field season. If acceptable to EPA, the DSR following the final field season of data collection can be eliminated as a separate deliverable, and the information collected during the final field season can be presented in the RI report.

## Remedial Investigation Report (RI)

The Respondent shall prepare and submit a draft RI report to the RPM for review and approval. This report shall summarize results of field activities to characterize the Site, sources of contamination, nature and extent of contamination, and the fate and transport of contaminants. The Respondent shall refer to the RI/FS Guidance for an outline of the report format and contents, and a suggested format for the RI report can be found in Attachment C. Following comment by EPA, the Respondent shall prepare a final RI report satisfactorily addressing the comments.

## Baseline Risk Assessment (BLRA)

The Respondent shall conduct a BLRA to assess the potential human health, and environmental risks posed by the Site in the absence of any remedial action. This effort will involve four components: contaminant identification, exposure assessment, toxicity assessment, and risk characterization.

**Contaminant Identification** – The Respondent shall review available information on all hazardous substances present at the Site and identify the major contaminants of concern. Contaminants of concern should be selected based on their intrinsic toxicological properties because they are present in large quantities, and/or because they are currently in, or potentially may migrate into, critical exposure pathways (e.g., drinking water).

**Exposure Assessment** – The Respondent shall identify actual or potential exposure pathways, characterize potentially exposed populations, and evaluate the actual or potential extent of exposure.

**Toxicity Assessment** – The Respondent shall provide a toxicity assessment of those chemicals found to be of concern during Site investigation activities. This will involve an assessment of the types of adverse health or environmental effects associated with chemical exposures, the relationship between magnitude of exposures and adverse effects, and the related uncertainties for contaminant toxicity, (e.g., weight of evidence for a chemical's carcinogenicity).

**Risk Characterization** – The Respondent shall integrate information developed during the exposure and toxicity assessments to characterize the current or potential risk to human health and/or the environment posed by the Site. This characterization should identify the potential for adverse health or environmental effects for the chemicals of concern and identify any uncertainties associated with contaminant(s), toxicity(ies), and /or exposure assumptions.



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## TASK 4 - TREATABILITY STUDIES

If potential remedial actions involving treatment have been identified by Respondent or EPA, Respondent shall conduct treatability studies except where Respondent can demonstrate to the satisfaction of EPA that they are not needed. The following activities shall be performed by the Respondent to support all treatability studies.

### *a. Determination of Candidate Technologies and of Need for Testing*

The Respondent shall identify in a technical memorandum, subject to EPA review and approval, candidate technologies for a treatability studies program during project planning (Task 1). The listing of candidate technologies must cover the range of technologies required for the development and analysis of alternatives (Task 5 and 6) The specific data requirements for the testing program will be determined and refined during site characterization and the development and screening of remedial alternatives (Tasks 3, 5, and 6).

#### Conduct literature survey and determine the need for treatability testing

The Respondent shall conduct a literature survey to gather information of performance, relative costs, applicability, removal efficiencies, operation and maintenance (O&M) requirements, and implementability of candidate technologies. If practical candidate technologies have not been sufficiently demonstrated or cannot be adequately evaluated for this Site based on available information, treatability testing must be conducted. Where it is determined by EPA that treatability testing is required, and unless the Respondent can demonstrate to EPA's satisfaction that it is not needed, the Respondent shall submit a SOW to the RPM outlining the steps and data necessary to evaluate and initiate the treatability testing program.

#### Evaluation of treatability studies

Once a decision has been made to perform treatability studies, the Respondent and EPA will decide the types of treatability testing to utilize (e.g., bench and/or pilot). Because of the time required to design, fabricate, and install pilot scale equipment as well as perform testing for various operating conditions, the decision to perform pilot testing should be made as early in the process as possible to minimize potential delays of the FS. To assure that a treatability testing program is completed on time, and with accurate results, the Respondent shall either submit to the RPM a treatability testing work plan or an amendment to the original Site work plan for EPA's review and approval.

### *b. Treatability Testing and Deliverables*

The deliverables that are required, in addition to the memorandum identifying candidate technologies, where treatability testing is conducted, include a work plan, a sampling and analysis plan, and a final treatability evaluation report. EPA may also require a treatability study health and safety plan, where appropriate.

### Treatability testing work plan

The Respondent shall prepare a treatability testing work plan or amendment to the original Site Work Plan for EPA's review and approval, describing the Site background, remedial technology(ies) to be tested, test objectives, experimental procedures, treatability conditions to be tested, measurements of performance, analytical methods, data management and analysis, health and safety, and residual waste management. The DQOs for treatability testing must be documented as well. If pilot scale treatability testing is to be performed, the pilot scale work plan will describe pilot plant installation and start-up, pilot plant operation and maintenance procedures, operating conditions to be tested, a sampling plan to determine pilot plant performance, and a detailed health and safety plan. If testing is to be performed off-site, permitting requirements must be addressed.

### Treatability study SAP

If the original QAPP or FSP does not address activities to be performed during the treatability tests, a separate treatability study SAP or amendment to the original Site SAP must be prepared by the Respondent for EPA's review and approval. Task 1, Item c. of this statement of work provides additional information on the requirements of the SAP.

### Treatability study HASP

If the original HASP is not adequate for defining the activities to be performed during the treatment tests, a separate or amended HASP must be developed by the Respondent. Task 1, Item c, of this SOW provides additional information on the requirements of the health and safety plan. EPA does not "approve" the treatability study HASP.

### Treatability study evaluation report

Following completion of treatability testing, the Respondent shall analyze and interpret the testing results in a technical report to EPA. Depending on the sequence of activities, this report may be a part of the RI/FS report or a separate deliverable. The report must evaluate each technology's effectiveness, implementability, cost, and actual results as compared with predicted results. The report must also evaluate full scale application of the technology, including a sensitivity analysis identifying the key parameters affecting full-scale operation.

## TASK 5 - FEASIBILITY STUDY

The Feasibility Study is comprised of two primary activities: (1) the development and screening of alternatives, and (2) the detailed analysis of alternatives. The alternatives surviving the screening process will be subject to the detailed analysis process. The FS Report must document the results of these two components of FS. Interim deliverables associated with these activities will be identified in the RI/FS Work Plan. The RI and FS are interactive and will be conducted concurrently, to the extent practicable, in a manner that allows information and data collected during the RI to influence the development of



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remedial alternatives during the FS, which in turn affect additional information and data needs and the scope of any necessary treatability studies and risk assessments.

### a. *Remedial Alternative Development*

The Respondent shall develop and evaluate a range of appropriate waste management options that, at a minimum, will remediate or control any contaminated media (soil, surface water, ground water, sediments) remaining at the Site, as deemed necessary in the RI to ensure protection of human health and the environment and comply with ARARs, concurrent with the RI site characterization task.

A range of remedial alternatives must be developed to identify and provide a variety of waste management options which then can be evaluated. This range of alternatives must include, as appropriate, options in which treatment is used to reduce the toxicity, mobility, or volume of wastes, but which varies in the types of treatment, the amount treated, and the manner in which long-term residuals or untreated wastes are managed. Options involving containment with little or no treatment must be included, as well as options involving both treatment and containment, and a no-action alternative. The following activities shall be performed by the Respondent during the development of remedial alternatives.

Refine and document remedial action objectives

Based on the BLRA, the Respondent shall review, and if necessary, modify the Site-specific remedial action objectives (RAOs) and the list of applicable preliminary remediation goals (PRGs). The modified PRGs shall be documented in a technical memorandum that will be reviewed and approved by EPA. These modified PRGs must specify the contaminants and media of interest, exposure pathways and receptors, and an acceptable contaminant level or range of levels (at particular locations for each exposure route).

Develop general response actions

The Respondent shall develop a range of general response actions for each medium of interest addressing containment, treatment, excavation, pumping, or any other actions, singly or in combination, that may be utilized to satisfy the remedial action objectives for the Site.

Identify areas or volumes of media

The Respondent shall identify volumes and/or areas of media to which general response actions might be applied, taking into account the requirements for protectiveness as identified in the RAOs and the chemical and physical characterization of the Site.

Identify, screen, and document remedial technologies

The Respondent shall identify and evaluate potential remedial technologies applicable to each general response action. The Respondent shall identify various



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alternatives for implementing each remedial technology. These alternatives must be evaluated and screened based upon their effectiveness, implementability, and cost factors. Generally, this screening is only necessary when there are many feasible alternatives available for detailed analysis. If necessary, the screening of alternatives shall be conducted to assure that only the alternatives with the most favorable composite evaluation of all factors are retained for further analysis. As appropriate, the screening must preserve the range of treatment and containment alternatives that was initially developed insuring that the alternatives will meet RAOs, ARARs and all other identified performance standards. The range of remaining alternatives must include options that use treatment technologies and permanent solutions to the maximum extent practicable. The Respondent shall prepare a technical memorandum summarizing the results and reasoning employed in screening and arraying alternatives that remain after screening. In addition, a description of the remedial technology alternatives which were eliminated from further consideration as well as the reasons for eliminating the alternatives must be included in the memorandum.

Assemble and document alternatives

The Respondent shall assemble selected representative technologies into a range of alternatives for each affected medium or operable unit. Together, all of the alternatives will represent treatment and containment combinations that will address either all of the Site or operable units. A summary of the assembled alternatives and their related action-specific ARARs must be prepared for EPA by the Respondent for inclusion in a technical memorandum.

## TASK 6 - DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES

The detailed analysis of alternatives shall be conducted by the Respondent to provide EPA with the information needed to allow for the selection of a Site remedy. This analysis is the final task to be performed by the Respondent during the FS.

### *a. Detailed Analysis of Alternatives*

The Respondent shall conduct a detailed analysis of alternatives which must consist of an analysis of each option against a set of nine evaluation criteria and a comparative analysis of all options using the same evaluation criteria as a basis for comparison. EPA has developed the nine evaluation criteria to address the statutory requirements and preferences of CERCLA

Apply nine criteria and document analysis

The Respondent shall apply nine evaluation criteria to the assembled remedial alternatives to ensure that the selected remedial alternative will be protective of human health and the environment; will be in compliance with, or include a waiver of, ARARs; will be cost-effective; will utilize permanent solutions and alternative treatment technologies, or resource recovery technologies, to the maximum extent practicable; and will address the statutory preference for treatment as a principal element. The evaluation criteria include: (1) overall protection of human health



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and the environment; (2) compliance with ARARs; (3) long-term effectiveness and permanence; (4) reduction of toxicity, mobility, or volume; (5) short-term effectiveness; (6) implementability; (7) costs; (8) state (or support agency) acceptance; and (9) community acceptance. (Note: Criteria 8 and 9 are considered after the RI/FS report has been released to the general public). For each alternative, the Respondent must provide: (1) a description of the alternative that outlines the waste management strategy involved and identifies the key ARARs associated with each alternative; and (2) a discussion of the individual criterion assessment.

Compare alternatives against each other and document the comparison of alternatives

The Respondent shall perform a comparative analysis between the remedial alternatives. That is, each alternative must be compared against the others using the evaluation criteria as a basis of comparison. Identification and selection of the preferred alternative are reserved by EPA. The Respondent shall prepare a technical memorandum summarizing the results of the comparative analysis.

### b. *Detailed Analysis Deliverables*

In addition to the technical memorandum summarizing the results of the comparative analysis, the Respondent shall submit a draft FS report to the RPM for review and approval. Once EPA's comments have been addressed by the Respondent to the satisfaction of EPA, the final FS report may be bound with the final RI report.

Feasibility Study report

The Respondent shall submit a draft FS report for EPA and the Support Agencies' review and comment. This report, as ultimately adopted or amended by EPA, provides a basis for remedy selection by EPA, and documents the development and analysis of remedial alternatives. The Respondent shall refer to the RI/FS Guidance for an outline of the report format and the required report content, and a suggested format for the report can be found in Attachment D. The Respondent shall prepare a final FS report which satisfactorily addresses the comments.



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## REFERENCES FOR CITATION

The following list, although not comprehensive, comprises many of the regulations and guidance documents that apply to the RI/FS process.

The (revised) National Oil and Hazardous Substance Pollution Contingency Plan (NCP).

"Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA", U.S. EPA, Office of Emergency and Remedial Response, October 1988, OSWER Directive No. 9355.3-01.

"Guidance on Oversight of Potentially Responsible Party Remedial Investigations and Feasibility Studies", U.S. EPA, Office of Waste Programs Enforcement, OSWER Directive No. 9835.3.

"Interim Guidance on Potentially Responsible Party Participation in Remedial Investigation and Feasibility Studies", U.S. EPA, Office of Waste Programs Enforcement, Appendix A to OSWER Directive No. 9355.3-01.

"A Compendium of Superfund Field Operations Methods", Two Volumes, U.S. EPA, Office of Emergency and Remedial Response, EPA/540/P-87/001a, August 1987, OSWER Directive No. 9355.0-14.

U.S. EPA, NEIC Policies and Procedures Manual", May 1978, revised November 1984, EPA -330/9-78-991-R.

"Data Quality Objectives for Remedial Response Activities", U.S. EPA, Office of Emergency and Remedial Response and Office of Waste Programs Enforcement, EPA/540/G-87/003, March 1987, OSWER Directive No. 9335.0-7B.

"Guidelines and Specifications for the Lead Agency(ies) Quality Assurance Project Plans", U.S. EPA, Office of Research and Development, Cincinnati, Ohio, QAMS-004/80, December 29, 1980.

"QA/R-5 *EPA Requirements for Quality Assurance Project Plans* (latest draft or revision) and EPA QA/G-5 *EPA Guidance for Quality Assurance Project Plans* (latest draft or revision), EPA QA/G-4HW Data Quality Objectives Process for Hazardous Waste Site Studies, and EPA QA/G-4 Guidance for the Data Quality Objective Process"

"Interim Guidelines and Specifications for the Lead Agency(ies) Quality Assurance Project Plans", U.S. EPA, Office of Emergency and Remedial Response, QAMS-005/80, December 1980.

"Users Guide to the Lead Agency(ies) Contract Laboratory Program:, U.S. EPA, Sample Management Office, August 1982.

"Interim Guidance on Compliance with Applicable or Relevant and Appropriate Requirements", U.S. EPA, Office of Emergency and Remedial Response, July 9, 1987, OSWER Directive No. 9234.0-05.

"CERCLA Compliance with Other Laws Manual", Two Volumes, U.S. EPA, Office of Emergency and Remedial Response, August 1988 (draft), OSWER Directive No. 9234.1-01 and -02.

"Guidance on Remedial Actions for Contaminated Groundwater at Superfund Sites", U.S. EPA, Office of Emergency and Remedial Response, (draft), OSWER Directive No. 9283.1-2.

"Draft Guidance on the Lead Agency(ies) Superfund Decision Documents", U.S. EPA, Office of Emergency and Remedial Response, March 1988, OSWER Directive No. 9355.3-02.

"Risk Assessment Guidance for Superfund--Volume I, Human Health Evaluation Manual (Part A)", December 1989, EPA/540/1-89/002.

"Risk Assessment Guidance for Superfund--Volume II Environmental Evaluation Manual", March 1989, EPA /540/1-89/001.

"Guidance for Data Usability in Risk Assessment", October 1990, EPA /540/G-90/008.

"Performance of Risk Assessments in Remedial Investigation/ Feasibility Studies (RI/FSs) Conducted by Potentially Responsible Parties (PRPs)", August 28, 1990, OSWER Directive No. 9835.15.

"Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions", April 22, 1991, OSWER Directive No. 9355.0-30.

"Health and Safety Requirements of Employees Employed in Field Activities", U.S. EPA, Office of Emergency and Remedial Response, July 12, 1981, EPA Order No. 1440.2.

OSHA Regulations in 29 CFR 1910.120 (Federal Register 45654, December 19, 1986).

"Interim guidance on Administrative Records for Selection of CERCLA Response Actions", U.S. EPA, Office of Waste Programs Enforcement, March 1, 1989, OSWER Directive No. 9833.3A.

"Community Relations in Superfund: A Handbook", U.S. EPA, Office of Emergency and Remedial Response, June 1988, OSWER Directive No. 9320.0-03B.

"Community Relations During Enforcement Activities and Development of the Administrative Record", U.S. EPA, Office of Waste Programs Enforcement, November 1988, OSWER Directive No. 9836.0-1A.

## *Attachments*

### *Attachment A*

### *Suggested RI/FS Work Plan Format*

Executive Summary

1. Introduction

2. Site Background and Setting

3. Initial Evaluation
   - Types and volumes of waste present
   - Potential pathways of contaminant migration/preliminary public health and environmental impacts
   - Preliminary identification of operable units
   - Preliminary identification of response objectives and remedial action alternatives

4. Work Plan Rationale
   - DQO needs
   - Work Plan approach

5. RI/FS Tasks

6. Cost and Key Assumptions

7. Schedule

8. Project Management
   - Staffing
   - Coordination

9. References

Appendices



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***Attachment B***

## ***Suggested Format for SAP (FSP and QAPP)***

FSP

1. Site Background
2. Sampling Objectives
3. Sample Location and Frequency
4. Sample Designation
5. Sampling Equipment and Procedures
6. Sample Handling and Analysis

QAPP

Title Page

Table of Contents

1. Project Description
2. Project Organization and Responsibilities
3. QA Objectives for Measurement
4. Sampling Procedures
5. Sample Custody
6. Calibration Procedures
7. Analytical Procedures
8. Data Reduction, Validation, and Reporting
9. Internal Quality Control
10. Performance and Systems Audits
11. Preventative Maintenance
12. Data Assessment Procedures



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13. Corrective Actions

14. Quality Assurance Reports



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***Attachment C***

## ***Suggested RI Report Format***

Executive Summary

1. Introduction
    - 1.1 Purpose of Report
    - 1.2 Site Background
        - 1.2.1 Site Description
        - 1.2.2 Site History
        - 1.2.3 Previous Investigations
    - 1.3 Report Organization

2. Study Area Investigation
    - 2.1 Includes field activities associated with site characterization. These may include physical and chemical monitoring of some, but not necessarily all, of the following:
        - 2.1.1 Surface Features (topographic mapping, etc.) (natural and manmade features)
        - 2.1.2 Contaminant Source Investigations
        - 2.1.3 Meteorological Investigations
        - 2.1.4 Surface-Water and Sediment Investigations
        - 2.1.5 Geological Investigations
        - 2.1.6 Soil and Vadose Zone Investigations
        - 2.1.7 Ground-Water Investigations
        - 2.1.8 Human Population Surveys
        - 2.1.9 Ecological Investigations
    - 2.2 If technical memoranda documenting field activities were prepared, they may be included in an appendix and summarized in this report chapter.

3. Physical Characteristics of the Study Area
    - 3.1 Includes results of field activities to determine physical characteristics. These may include some, but not necessarily all, of the following:
        - 3.1.1 Surface Features
        - 3.1.2 Meteorology
        - 3.1.3 Surface-Water Hydrology
        - 3.1.4 Geology
        - 3.1.5 Soils
        - 3.1.6 Hydrogeology
        - 3.1.7 Demography and Land Use
        - 3.1.8 Ecology

4. Nature and Extent of Contamination
    - 4.1 Presents the results of Site characterization, both natural and chemical components and contaminants in some, but not necessarily all, of the following media:



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4.1.1 Sources (lagoons, sludges, tanks, etc.)
4.1.2 Soils and Vadose Zone
4.1.3 Ground Water
4.1.4 Surface Water and Sediments
4.1.5 Air

5. Contaminant Fate and Transport
5.1 Potential Routes of Migration (i.e., air, groundwater, etc.)
5.2 Contaminant Persistence
5.2.1 If they are applicable (i.e., for organic contaminants), describe estimated persistence in the study area environment and physical, chemical, and/or biological factors of importance for the media of interest.
5.3 Contaminant Migration
5.3.1 Discuss factors affecting contaminant migration for the media of important (e.g., sorption onto soils, solubility in water, movement of ground water, etc.)
5.3.2 Discuss modeling methods and results, if applicable.

6. Baseline Risk Assessment
6.1 Human Health Evaluation
6.1.1 Exposure Assessment
6.1.2 Toxicity Assessment
6.1.3 Risk Characterization
6.2 Environmental Evaluation

7. Summary and Conclusions
7.1 Summary
7.1.1 Nature and Extent of Contamination
7.1.2 Fate and Transport
7.1.3 Risk Assessment
7.2 Conclusions
7.2.1 Data Limitations and Recommendations for Future Work
7.2.2 Recommended Remedial Action Objectives

Appendices

A. Technical Memorandum on Field Activities (if available)
B. Analytical Data and QA/QC Evaluation Results
C. Risk Assessment Methods



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***Attachment D***

## ***Suggested Format for Feasibility Study Report***

Executive Summary

1. Introduction
1.1 Purpose and Organization Report
1.2 Background Information (Summarized from RI Report)
    1.2.1 Site Description
    1.2.2 Site History
    1.2.3 Nature and Extent of Contamination
    1.2.4 Contaminant Fate and Transport
    1.2.5 Baseline Risk Assessment

2. Identification and Screening of Technologies
    2.1 Introduction
    2.2 Remedial Action Objectives – Presents the development of remedial action objectives for each medium of interest (i.e., ground water, soil, surface water, air, etc.) For each medium, the following should be discussed:
        Contaminants of interest
        Allowable exposure based on risk assessment (including ARARs)
        Development of remediation goals
    2.3 General Response Actions – For each medium of interest, describes the estimation of areas or volumes to which treatment, containment, or exposure technologies may be applied.
    2.4 Identification and Screening of Technology Types and Process Options – For each medium of interest, describe:
        2.4.1 Identification and Screening of Technologies
        2.4.2 Evaluation of Technologies and Selection of Representative Technologies

3. Development and Screening of Alternatives
    3.1 Development of Alternatives – Describes rationale for combination of technologies/media into alternatives. Note: This discussion may be by medium or for the Site as a whole.
    3.2 Screening of Alternatives (if conducted)
        3.2.1 Introduction
        3.2.2 Alternative 1
            3.2.2.1 Description
            3.2.2.2 Evaluation
        3.2.2 Alternative 2
            3.2.2.1 Description
        3.2.2.2 Evaluation
        3.2.3 Alternative 3
        3.2.3.1 Description
        3.2.3.2 Evaluation



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4. Detailed Analysis of Alternatives
    4.1 Introduction
    4.2 Individual Analysis of Alternatives
        4.2.1 Alternative 1
            4.2.1.1 Description
            4.2.1.2 Evaluation
        4.2.2 Alternative 2
            4.2.2.1 Description
        4.2.2.2 Evaluation
        4.2.3 Alternative 3
        4.2.3.1 Description
        4.2.3.2 Evaluation
    4.3 Comparative Analysis



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***Attachment E***

## ***Stibnite Mine Remedial Investigation and Feasibility Study (RI/FS) Statement of Work (SOW) Schedule***

RI/FS Work Plan/Sampling and Analysis Plan (WP/SAP):

- Draft due within 120 days after the Effective Date of the Settlement Agreement/CO.
- Final Work Plan due within 90 days of receipt of consolidated Agency comments.

Data Summary Reports (DSRs):

- Draft DSRs due within 120 days completion of each season's field work or within 90 days of the receipt of final laboratory data, whichever is earlier. Within 5 days of the completion of each season's field work, Respondent shall provide written notification to EPA identifying the completion date. Within 5 days of the receipt of final laboratory data for the preceding field season, Respondent shall provide written notification to EPA identifying the receipt date of final laboratory data.
- Final DSRs due within 30 days of receipt of consolidated Agency comments.

Remedial Investigation Report (RI):

- Submit draft RI within 120 days after receipt of laboratory data from the final field season. Within 5 days of receipt of final laboratory data, Respondent shall provide written notification to EPA identifying receipt date of final laboratory data.
- Final RI due within 60 days of receipt of consolidated Agency comments.

Baseline Risk Assessment Report (BLRA):

- Submit draft BLRA within 60 days after submittal of Final RI.
- Final BLRA due within 60 days of receipt of consolidated Agency comments.

Feasibility Study (FS):

- Submit draft FS within 120 days after submittal of BLRA Report.
- Final FS due within 90 days of receipt of consolidated Agency comments.

Data Validation Summaries (DVSs):

- DVSs due within 120 days from the date of collection of the last sample from each sampling event. Within 5 days of the completion of each season's field work, Respondent shall provide written notification to EPA identifying the date of collection of the last sample from each sampling event.

Interim Deliverables

- Draft Interim Deliverables (i.e., Technical Memoranda for Treatability Studies Preliminary Remedial Goals, Remedial Action Objectives, etc.) as identified in the SOW, or as required by EPA, shall be due within 30 days receipt of notice by Respondent that said Deliverable is required.

- Final Interim Deliverables due within 60 days of receipt of consolidated Agency comments.

Quarterly Progress Reports

- Quarterly Progress Reports shall be due 15 days after the end of the previous calendar quarter.

[1]Documents may initially be released as "draft final" pending final resolution of issues



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