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July 2, 2004

Via E-Mail and U.S. Mail
W.R. "Bud" Withrow
Co West Insurance Associates, LLC
1720 S. Bellaire Street, Suite 325
Denver, CO 80222

Re: *CSMRI Site Clean Up*

Dear Mr. Withrow:

As promised, this letter responds to your June 18, 2004 letter to me regarding the New Horizons Phase I and Phase II contracts for the CSMRI Site Assessment and Response. On behalf of Colorado School of Mines (School) we appreciate your efforts as a somewhat interested observer.

As the School informed New Horizons Environmental Consultants (NHEC) and you at the June 23 meeting, the School believes that there is a valid claim on the sureties for non-performance. While there are many reasons supporting the School's view, it may be helpful to identify a few of them now because we were informed by NHEC at the June 23 meeting that there is little time to try to resolve this dispute from NHEC's perspective and it will take a considerable amount of time to marshal a comprehensive list of the reasons.

On January 22, 2002, the School issued a Request For Proposal (RFP). The RFP explained the history of the re-procurement of environmental services and the July 23, 2001 Characterization Survey Work Plan (CSWP), prepared by URS Corporation. The RFP explained that the School sought to retain a "Design-Build Contractor" to develop a "complete project design for remaining portions of the Phase I work and provide all required services in accordance with this project plan, this RFP, [the CSWP], CSM standards, and all applicable codes and regulations." Exh. 1 (the relevant pages are attached here as exhibits for your convenience). The RFP further explained that NHEC was to "provide all design and construction services to implement the goals of the project" and "oversee the complete design and remediation processes." Exh. 1.

The CSWP, which was an attachment to the RFP, states that data quality objectives for the characterization work include: "determine the nature and concentrations of residual radioactive material," "approximately define the lateral and vertical extent of residual radioactive material" above background or cleanup goals, "estimate the volumes of impacted material," and "provide data for potential use in a radiation dose assessment and/or a [CERCLA] baseline risk assessment, treatability study, and **feasibility study,**" among other objectives. Exh. 2, at 1-1 to 1-2 (emphasis added).

The CSWP provides for general methods to characterize surface soils, concrete and asphalt, and subsurface soils. The CSWP does not prescribe a number of samples to be taken, and it consistently states that "engineering judgment" and "discretion" will be applied by the contractor to determine the nature and extent of the impacted soils to meet data quality objectives. Exh. 2, at 4-5 to 4-12. The contractor was therefore responsible for deciding in the field how many samples were necessary to accurately characterize the nature and extent of contamination.

The cost proposal referenced by Mr. Finn during the June 23 meeting, cited as evidence by Mr. Finn that the School specified the number of samples, boreholes, and trenches for NHEC to take during the Site investigation, refers to a "variable quantities bid amount." The statement on the variable quantities amount bid worksheet states as follows:

> ** Quantities estimated by CSM for bid comparison purposes only. Final item quantities to be completed will be dependent on site conditions.

Exh. 3. The listed quantities, therefore, provided uniform bidding so that the School could fairly compare competing bids with each other. (The Task Plan prepared later by NHEC reflects that.)

The Phase I contract, Article 3.4, clearly assigns to NHEC the design responsibilities for the Site investigation. For example, NHEC reviewed alternative design approaches. Art. 3.4.6. In conjunction with the CSWP, NHEC submitted "a preliminary design technical proposal for the work." Art. 3.4.7. "In preparation for performing the field work [NHEC led] a final Design Development review which [resolved] outstanding issues with the preliminary design and [fixed] all design elements of the project." Art. 3.4.7. "All remaining issues regarding design and implementation of the CSWP [were] resolved at this stage." Art. 3.4.7.

The "final Design Development review" performed by NHEC consisted of at least 32 items listed in Article 3.4.9 of the Phase I contract. Many of these demonstrate NHEC's design responsibilities that form the heart of NHEC's inaccurate volumetric estimate. For example, NHEC was to explain how the CSWP would be followed or modified. Art. 3.4.9.9. NHEC was to propose how overall costs can be minimized during the investigation while still meeting data quality objectives. Art. 3.4.9.14. NHEC was to propose methods for surveying the surface soil, for performing the surface soil sampling, and performing subsurface soil characterization. Art. 3.4.9.21, 23, & 26. All of these design items were the responsibility of NHEC's under the express terms of the Phase I contract.

After execution of the Phase I contract, NHEC designed its own workplans for the Phase I investigation. NHEC stated that it would "prepare a comprehensive set of work plans which will detail the assessment and response activities. Ex. 4, p. 1. NHEC adopted some portions of the CSWP and rejected some portions of the CSWP. For example, the July 19, 2002 Task Plan states:

> New Horizons will follow the approved CSWP unless explicitly superseded by procedures identified in the New Horizons work plans. Specific sections of the CSWP that ***will be adopted and followed by New Horizons*** include, but are not limited to the following:
>
> - Data Quality Objectives
> - Tentative [DCGLs], CERCLA, and MARSSIM
> - Regulations
> - Guidance
>
> ...
>
> - Surface Soil Sampling
> - Subsurface Soil Characterization
>
> ...

Ex. 4, p. 2 (emphasis added). NHEC used its own professional engineering judgment to design the Phase I investigation as it saw fit, it adopted portions of the CSWP that it believed were sound, NHEC rejected portions of the CSWP that it believed were not sound, and it prepared its own workplans that designed the Phase I investigation. NHEC made many changes to the CSWP, so it clearly used its own judgment to rely on any part of the CSWP that it believed was appropriate. Moreover, NHEC was the architect during the Phase I work for the Class I and Class II soils distinction that is a major issue in this matter.

Under the Phase I contract, NHEC agreed, among other things, to "Provide radionuclide field study and laboratory data of sufficient quality *to estimate the volumes of impacted material* that exceed background concentrations and/or tentative DCGLs [Derived Concentration Guideline Levels]." This requirement was set forth in the Characterization Survey Work Plan that was part of the School's Request for Proposal that is one of the contract documents. NHEC specifically adopted this requirement in its Task Plan dated July 19, 2002. A common meaning of the word "estimate" is, "To calculate, approximately (the amount, extent, magnitude, or value of something)." American Heritage Dictionary, Third Edition (2000). A common meaning of the word "approximate" is, "Almost exact or correct." *Id.* Thus the contract required NHEC to calculate almost exactly (i.e., estimate) the volumes of impacted materials. NHEC did not meet this performance requirement.

CERCLA guidance provides an alternative standard of performance that NHEC failed to meet. CERCLA guidance for conducting remedial investigations (RI) and feasibility studies (FS) states that the "accuracy of cost estimates" made during the FS "are expected to provide an accuracy of +50 percent to -30 percent and are prepared using data available from the RI." Exh. 5. NHEC relied on this guidance in preparing the RI/FS for this Site. Moreover, CERCLA guidance provides that NHEC's cost estimates during the remedial design phase (i.e. the Phase II contract) should have been +15% and -10% of the actual final costs of the remedial action. Exh. 5 (Exhibit 2-3). NHEC failed to meet these CERCLA performance standards under the Phase I and Phase II contracts.

Other EPA CERCLA guidance similarly confirms that the "objective of representative [soil] sampling is to ensure that a sample or group of samples accurately characterizes site conditions." Exh. 6 (emphasis in original).

The School's Change Order No. 8 under the Phase I contract added the task of preparing an RI/FS instead of preparing a "characterization survey report." Exh. 7. The preparation of an RI/FS was contemplated as a possibility at the outset of the Phase I contract with NHEC. The requirement to accurately describe the nature and extent of the contamination remained the same regardless of whether NHEC wrote an RI/FS or a characterization survey report. The data quality objective of gathering enough data to prepare a "feasibility study" demonstrates this. In fact, although NHEC requested numerous change orders for additional expenditures throughout the Phase I work, NHEC did not request any additional funding for more samples, boreholes, or trenches to characterize the nature and extent of the contamination. NHEC believed it had sufficient data to prepare an RI/FS. The RI/FS change order does not include any requests by NHEC for additional investigation field work.

Therefore, it is clear that NHEC was obligated under the contract to perform an RI/FS that presented an accurate estimate of the nature and extent of the contamination. Whether it is defined as a reasonably reliable estimate, an estimate within a cost accuracy rate of +50% to - 30%, or an estimate of +15% to -10% of the actual costs of the remedial action, the results of the Phase II work demonstrate that NHEC did not perform under the Phase I contract or the Phase II contract.[1]

Furthermore, Mr. Finn referenced the need for experts to show negligence on the part of NHEC. It is important to point out critical contract provisions in this regard. Both of the Phase I and Phase II contracts are strict liability contracts. Exh. 8, Phase I section 8.1.1, Phase II contract, supplementary general conditions, Para. 4. They are not contracts based on negligence. Exh. 9. Thus, the School only needs to prove causation and damages. That is a relatively straight forward

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[1] Mr. Havelick's letter of March 8 regarding NHEC's performance for Phase I work was written before the Phase II field work demonstrated NHEC's incorrect volumes; so there was no knowledge on March 8 of NHEC's inaccurate volumetric estimate. The letter is relevant only to demonstrate the School's reliance on NHEC's expertise.

proposition in this matter. In particular, but for the inaccurate estimate in the RI/FS, the School would not have procured the services described in the Phase II contract in its current form.

Moreover, as we proceed in our discussions to resolve this matter amicably, and as NHEC and the School consider the issue of whether to continue together in a contractual relationship to complete the Phase I and Phase II contracts, trust is an important issue. The School is particularly concerned about some statements from NHEC during our last two meetings in which NHEC denied several facts that are clear in the School's view. For example, NHEC said that the 10,000 cubic yard estimate in the RI/FS was *not* a conservative maximum estimate, and that NHEC was not expected to accurately estimate the volume and toxicity of the contamination as part of its contract.

We look forward to continuing our discussions to resolve these matters. We also look forward to NHEC's submittal of all of the lab data to Mr. Havelick, as promised by NHEC during the June 23 meeting. Moreover, the School had requested copies of the insurance policies for the Phase I and Phase II contracts, but has not received copies yet. Would you please forward complete copies of the insurance policies.

Therefore, the School believes it has valid claims against the sureties and the insurers. It is prudent for the School to place these entities on notice at this time so that the School's interests would not be prejudiced. Please do not hesitate to call me if you have any questions. We welcome your constructive participation in this matter. Thank you.

Very truly yours,

Maki Iatridis

Asimakis (Maki) P. Iatridis

API/api
Enclosure
cc: Linn Havelick
Dave Harmon
Anne Walker
Jon Spencer
John Finn

22003.wpd

COLORADO SCHOOL OF MINES

REQUEST FOR PROPOSAL

CSMRI Site Environmental Assessment and Response

January 22, 2002

Environmental Health & Safety Department
1015 14th Street, Chauvenet Hall
Room 194
Golden, Colorado 80401

Project P9574

Exh. 1

PLA 7720

Table of Contents

I. Background 2
II. Design-Build Procurement and Contract 3
III. Detailed Scope of Work 4
A. Phase I Tasks 4
B. Phase II 6
IV. Organization of the Design-Build Team (DBT) 6
V. School Principal Representative and Environmental Attorney 7
VI. Evaluation of Proposals and Selection of Contractor – RFP Part One. 8
A. Approach 8
B. Experience 9
C. Cost Approach 10
D. Other 10
E. RFP Part One Selection Criteria 11
VII. Background Information and Reference Material 12
VIII. Site Tour and Conference 12
IX. General Project Schedule 12

Attachments

- *Characterization Survey Work Plan, Colorado School of Mines Research Institute Site, Golden, Colorado*, July 23, 2001, URS Corporation
- *Analytical Results Report, CSMRI Site, Golden, Colorado,* May 1999, URS Corporation

**REQUEST FOR PROPOSALS:
COLORADO SCHOOL OF MINES RESEARCH INSTITUTE SITE
ENVIRONMENTAL ASSESSMENT AND RESPONSE
REQUEST FOR PROPOSALS**

The Colorado School of Mines (the School) is soliciting proposals for accomplishing various environmental assessment and response actions at the Colorado School of Mines Research Institute (CSMRI) Site in Golden, Colorado.

I. Background

Numerous industrial mineral research projects involving materials that contained natural radionuclides and metals were undertaken on the Site from 1912 until about 1985. Sixteen buildings once occupied the six-acre Site that is located on the south bank of Clear Creek near the campus of the Colorado School of Mines. Some materials may have been placed in a nearby area called the Claypits.

In 1992 a City water main broke and released water into an inactive settling pond on the Site. This prompted the U.S. Environmental Protection Agency (EPA) to undertake an emergency removal action pursuant to the "Comprehensive Environmental Response, Compensation, and Liability Act" (CERCLA). This activity involved the excavation of 22,000 cubic yards of soil from the vicinity of the pond. The material was later disposed as a "special solid waste" at a local solid waste landfill. The EPA removal action ended in 1997.

All of the above-ground structures on the Site have been removed. Numerous concrete slabs and asphalt-paved areas remain. The Site is encircled by an eight-foot chain link fence. The Colorado Department of Public Health and Environment (CDPHE) has issued a Radioactive Materials License for the Site. The License authorizes storage of "naturally occurring, source, and byproduct radionuclides."

Numerous environmental assessments of the CSMRI Site have been accomplished. Some assessments show that material with levels of radionuclides above background may remain in subsurface locations at the CSMRI Site and in the nearby Claypits. If these materials are present, they will be derivatives of natural radioactive decay chains. The School intends to accomplish additional assessment to characterize and quantify this remaining material and determine whether the remaining material poses any risk to public health or the environment.

The School contracted with New Horizons Environmental Consultants Inc. to produce a subsurface Sampling and Analysis Plan (SAP) and URS Corporation to produce a Characterization Survey Work Plan (CSWP). CDPHE has approved the SAP and the CSWP. URS completed the initial SAP and the initial portion of the CSWP. The portions of the CSWP previously completed include background characterization, surface survey of concrete and asphalt, bulk sampling and analysis of concrete and asphalt, laboratory analysis of the bulk samples, data reduction, and reporting of the completed work.

The CSWP identified demolition of concrete and asphalt materials as an integral portion of the Site characterization process. After characterization of the concrete and asphalt, it became apparent that the cost of their demolition would be significantly beyond the initial cost estimates for implementation of the CSWP. To obtain competitive pricing on the expanded CSWP, CSM decided to reopen the procurement process.

II. Design-Build Procurement and Contract

The Design-Build Contract centers on utilization of a Design-Build Contractor (DBC) who assembles and leads a Design-Build Team (DBT) composed of the environmental engineer, health physicist, geologist/hydrologist, and other consultants and services as required (industrial hygienist, analytical laboratories), construction trade Contractors (all under contract to or under the Design-Build Contractor) as well as CSM representatives. Other design-build team structures may also be acceptable.

During the pre-construction/design phase, the DBC provides required documents and utilizes the team's skills and knowledge of environmental remediation to manage the design prices and provide pre-construction services (i.e., develop schedules, prepare construction cost models/estimates, bid trade packages, etc.) During the concrete/asphalt demolition phase, the DBT will coordinate with its health physicist and environmental engineer in the provision of technical services as well as provide construction services and manage the project (including the award and management of all trade contracts throughout the construction phase).

The Design-Build Team will provide the necessary services/work that includes but are not limited to the following:

1. Develop a complete project design for remaining portions of the Phase I work and provide all required services in accordance with the project plan, this RFP, the CDPHE-approved Characterization Survey Work Plan, CSM standards, and all applicable codes and regulations;

2. Provide all design and construction services to implement the goals of the project, including but not limited to environmental, health physics, civil, and any required specialty design consultants as required; construction services including scheduling, administration and management;

3. Oversee the complete design and remediation processes;

CHARACTERIZATION SURVEY WORK PLAN

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE SITE GOLDEN, COLORADO

Corrected Copy PLA 7734

JAN 30 2002

Prepared for
Colorado School of Mines
Environmental Health & Safety
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July 23, 2001

URS

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Exh. 2

Project No. 6800044318.40

PLA 7735

1.0 INTRODUCTION

1.1 Purpose

The purposes of the proposed site characterization are to obtain data to (1) evaluate risks, if any, that may be posed to human health and the environment by any release or threat of release of residual metals and radioactive materials that may be found in the soils within the Fenced Area and the Clay Pits Area at the Colorado School of Mines Research Institute (CSMRI) Site (Site) located in Golden, Colorado (Figures 1 and 2); (2) develop alternative response plans to eliminate, reduce or control such risks, if necessary; and (3) return the Site to beneficial use. This Characterization Survey Work Plan (CSWP) describes the approach for characterizing site soil conditions and the extent and type of releases or threats of releases of residual metals and radioactive material that may be in the soils within the Fenced Area and the Clay Pits Area at the Site.

This investigation focuses on two areas: the Fenced Area and the Clay Pits Area. These two areas may pose an adverse risk to human health and the environment. These two areas are the remaining areas at the Site that potentially contain risks and that have not yet been determined by the Colorado Department of Public Health and Environment (CDPHE) to be released from the Site's Radioactive Materials License.

1.2 Data Quality Objectives

The development of data quality objectives (DQOs) is intended to optimize the data collection necessary to attain the purposes detailed in Section 1.1 and meet the applicable decision criteria. To determine the project DQOs, a series of planning steps are used, in accordance with the *Guidance for Data Quality Objectives Process* (EPA QA/G-4).

The DQOs for the characterization survey at the Fenced Area and the Clay Pits Area of the Site are:

- Provide radiological field survey and laboratory data of sufficient quality to establish site-specific Derived Concentration Guideline Levels (DCGL) for the radionuclides of interest..
- Verify and/or establish appropriate background levels.
- Provide radiological field survey and laboratory data of sufficient quality to determine the nature and concentrations of residual radioactive material in soil that are present above background levels and/or tentative DCGLs.
- Provide radionuclide field survey and laboratory data of sufficient quality to approximately define the lateral and vertical extent of residual radioactive material in soil at concentrations that exceed background levels and/or tentative DCGLs.
- Provide radionuclide field survey and laboratory data of sufficient quality to estimate the volumes of impacted material that exceed background concentrations and/or tentative DCGLs.
- Define impacted concrete and asphalt and possible response action alternatives for the impacted concrete and asphalt.
- Define possible response action alternatives for the soils.
- Define possible response action alternatives for the groundwater after combining data from the groundwater investigation at the Site with the data from the soils investigation.
- Provide data to classify the Site according to Multi-Agency Radiation Site Survey and Investigation Manual (MARSSIM, 2000) into Class 1, Class 2, and Class 3 areas.
- Determine whether the Site is a candidate for unrestricted or restricted release and license termination and determine what fraction of the characterization survey would qualify as the Final Status Survey.
- Provide laboratory data of sufficient quality to determine whether select metals are present in soil at concentrations that may pose a risk to human health and the environment and to compare these levels to the CDPHE Proposed Soil Remediation Objectives Policy Document (CDPHE, 1997) and EPA's

Soil Screening Guidance; and, if elevated levels are found, the vertical and lateral extent and volume of such soils.

- Provide laboratory data of sufficient quality to determine whether investigation-derived waste (IDW) and remaining residual material that may be removed off site meet waste acceptance criteria (WAC) for off site disposal.
- Provide data for potential use in a radiation dose assessment and/or a Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) baseline risk assessment, treatability study, and feasibility study.

1.3 Tentative Derived Concentration Guideline Levels, CERCLA, and MARSSIM

Characterization activities described in this CSWP are consistent with the protocols developed in MARSSIM (2000). MARSSIM is consistent with CERCLA. Much of the guidance presented in MARSSIM for designing surveys and assessing survey results is taken directly from the corresponding CERCLA or Resource Conservation and Recovery Act (RCRA) guidance. According to MARSSIM, a characterization survey is "a type of survey that includes facility or site sampling, monitoring, and analysis activities to determine the extent and nature of contamination. Characterization surveys provide the basis for acquiring necessary technical information to develop, analyze, and select appropriate cleanup techniques." Adapting the MARSSIM process to the Site represents an integral step toward assessing risks (if any) developing management plans for risk (if necessary) returning the Site to unrestricted use, and terminating the Site's Radioactive Materials License.

Previous investigative work at the Site has not directly referenced MARSSIM methodology or nomenclature. That is not surprising since MARSSIM was first issued in 1997. However, a reevaluation of this prior work in the context of MARSSIM indicates that requirements for a Historical Site Assessment (HSA) and Scoping Survey at the Site have been satisfied. This CSWP provides brief summaries of some of the previous work performed at the Site as it relates to MARSSIM and its applicability to the HSA and Scoping Survey.

Background reference values and tentative DCGLs for the Site were identified in the *Background Characterization Report* (URS, 2000). These values are used in this CSWP as guidance and for comparative purposes. Additional soil background information will be available from the *Supplementary Background Characterization* (URS, 2001) to support background comparisons. Following evaluation of the data collected during the characterization survey, the tentative DCGLs will be reassessed. Site-specific data may be used as input data into a dose assessment model (e.g., RESRAD and/or DandD) to determine appropriate site-specific DCGLs. As stated in MARSSIM, "the development of DCGLs is often an iterative process" and DCGLs "are modified as additional site-specific information is obtained from subsequent surveys."

1.4 Site History

The Site is located on the western side of the city of Golden. The five-acre site is directly south of Clear Creek, approximately one-half mile east of the intersection of U.S. Highway 6 and Highway 58 near the west end of 12th Street (Figure 1).

Industrial mineral research projects using materials that contained natural radionuclides and metals were conducted on the Site from 1912 until about 1985. Research activities involving radioactive material were performed in 16 buildings that once occupied portions of the Site. These 16 buildings were demolished and removed between 1993 and 1996. Some slabs-on-ground remain. Footprints of the building slabs and identification numbers of the buildings are designated on Figure 2. An eight-foot chain link fence currently surrounds this portion of the Site and this area is referred to as the Fenced Area. The Fenced Area perimeter is demarcated by a thick border in bold on Figure 2.

4.3 Surface Characterization of the Site

Surface characterization of the site will be accomplished using surface scanning methods that meet MARSSIM requirements. MARSSIM has specific requirements for the amount of area requiring scanning for a final status survey. However, for characterization surveys, MARSSIM does not prescribe requirements for the size of area that requires scanning. The surface area to be scanned during characterization is based upon engineering judgement and the need to meet DQOs. The site will be grubbed prior to surface surveys to remove weeds, brush, Russian Olives, etc. that could alter radiation readings or hamper accessibility.

For purposes of characterization, small areas of elevated activity with gamma activity greater than twice the $\mu_{bkg} + 2\sigma_{bkg}$ criterion will be designated as impacted. Larger areas (>100 m^2) that exceed the $\mu_{bkg} + 2\sigma_{bkg}$ criterion will also be considered elevated. Class 1 areas will be scanned for 100 percent coverage while Class 3 areas will be scanned for about 10 percent coverage. Currently there are no Class 2 areas. However, should any area be re-classified as Class 2, 100 percent scanning will be conducted in the re-classified area. Scanning data will be recorded as average readings for a given count time over a specific measured area. Concrete and asphalt surfaces will be scanned for gamma radiation in the same manner as soil surfaces; however, they will comprise separate survey units.

One of two different gamma ray scanning survey methods will be used. Method A involves establishing a reference grid over the entire site, scanning each grid element to measure average and maximum gamma radiation, and recording the radiation measurements and grid locations in a field notebook. Method B utilizes a Global Positioning System (GPS) connected to the gamma survey meter to automatically store gamma radiation measurements and latitude and longitude coordinates on a time scale of every two seconds or longer. The requirements for site grid layout, data recording, and data transcription are minimized in Method B, which requires only that the surveyor walk at a suitable velocity and cover all of the site area. Method B will be used in all areas except those where high vertical walls or steep slopes require Method A because of GPS signal attenuation or difficulty in accessing the area with the GPS-based survey system.

4.3.1 Method A for Performing Gamma Radiation Scanning Surveys

In Method A, 10-meter by 10-meter grids will be established throughout the Clay Pits Area and the Fenced Area. For convenience, the two areas will have separate coordinate systems. The grids will be labeled using an alphabetic scale in one dimension and a numeric scale in the other dimension, referenced to the lowest corner as shown in Figure 10. For example, the shaded cell in the Class 3 Clay Pits example corresponds to grid 10-A. For the Class 1 Fenced Area, the 10-meter by 10-meter grids will be further subdivided into nine 3.3-meter by 3.3-meter subgrids, as shown in Figure 10. The directions and actual overlay of the grids will be based upon engineering judgement and site conditions. The grids will be tied to fixed reference points at the site, if possible. The major grid axes within both the Clay Pits Area and Fenced Area will be staked and marked so that the grid systems can be used throughout the characterization survey and potentially for a final status survey.

The Clay Pits Area has been initially classified as a Class 3 area. It is expected that the characterization survey data will confirm that there are no areas within the Clay Pits Area that exhibit levels of radionuclides that are close to or exceed the $\mu_{bkg} + 2\sigma_{bkg}$ criterion. By definition, a Class 3 area does not have the potential for small areas of elevated activity.

The Clay Pits Area scanning survey will consist of one-minute scans along each of the major (10-meter spacing) grid lines. The surveyor will suspend the gamma detector as close to the ground surface as practical (approximately 15 cm), and walk along the grid axis approximately 0.17 meters per second to cover the entire 10-meter distance in a one-minute interval. The surveyor will move the detector from side to side while walking, so that the detector follows an approximate one-meter wide serpentine pattern, as shown in Figure 10 for the Clay Pits Area. In the same manner, one-minute readings will be recorded for each 10-meter grid segment line in both alphabetic and numeric directions. The average reading, a digital output on the ratemeter/scaler, for each one-minute scan will be recorded. In addition, if any small areas of elevated activity are detected (greater than $\mu_{bkg} + 2\sigma_{bkg}$), the maximum elevated reading for each small area will also be recorded.

The ratemeter/scalers discussed in Section 4.1 (Ludlum models 2220 and 2221) provide digital one-minute output readings. The location of the maximum reading will be obtained by watching the analog ratemeter. This maximum ratemeter reading will be recorded in a field logbook and mapped. If any areas of elevated activity are detected within the Clay Pits Area, the area may require re-classification and additional surveying.

If an impacted spot is found within the Clay Pits Area, then all or parts of the area will require re-classification as either a Class 2 or a Class 1 survey unit. If part of the Clay Pits Area is upgraded to either a Class 2 or Class 1 survey unit, then the procedure outlined below for the Fenced Area will apply to the upgraded survey unit.

The Fenced Area has been designated as a Class 1 area. As a result of the Class 1 designation, the goal of the characterization survey is to delineate any potential small areas of elevated activity as well as determine the areal extent of any impacted areas. Therefore a 100 percent scanning survey of the area will be conducted using a smaller grid system. As discussed above, the 10-meter by 10-meter grid cells will be subdivided into nine 3.3-meter by 3.3-meter subgrids. The subgrids do not need to be permanently marked, but may be marked using chalk, paint or other means. A one-minute reading will be recorded for each of the nine subgrids within each grid cell. The detector will be held approximately 15 cm from the ground surface and the surveyor will walk over the entire subgrid in a serpentine pattern, as shown above for subgrid A.3 – 3.3 of the Fenced Area diagram. The surveyor will ensure that the scanning speed is sufficient to include the entire subgrid area during one minute. In addition to the one-minute average reading, the surveyor will also record the maximum reading from the ratemeter for each subgrid.

4.3.2 Method B for Performing Gamma Radiation Scanning Surveys

In Method B, a field grid system will not be established. Instead, the survey will utilize a 2x2-inch or 3x3-inch scintillation detector connected to a rate meter (Ludlum model 2221 or equivalent) and backpack-mounted GPS system (Trimble Pro-XRS or equivalent) that has sub-meter accuracy. The detector-GPS system records electronically the gamma radiation intensity at two-second intervals and the latitude-longitude coordinates at one-second intervals. Locations of individual radiation readings are subsequently interpolated between the coordinates recorded just before and just after each radiation reading. After each radiation reading is recorded, the system automatically starts another count-and-record sequence. The surveyor is primarily concerned with walking a serpentine path that covers the site in relatively uniform spacing and suitable velocity. The following estimates of survey parameters are examples based on equivalence to the Method A surveys. They may be modified to satisfy the $\mu_{bkg} + 2\sigma_{bkg}$ detection criterion once the results of the SBC are available.

The surveyor controls his position on the traverses by marking his path with small paint sprays approximately every 3 to 5 meters. On subsequent serpentine traverses, he controls his position by visually-estimating his spacing from the previous traverse using a spacing rod as necessary. He is free to stop or slow down and examine any area in greater detail if he suspects an impacted spot; however, he otherwise continues walking at a pace less than a maximum prescribed velocity. Extra time spent investigating potentially impacted spots merely adds to the amount of recorded survey data characterizing the spot. The surveyor's detailed trajectory is recorded by the sequence of coordinate locations. In event of any uncertainty in position or velocity, he errs toward closer survey spacing and slower velocity to assure that the minimum survey coverage is attained. The actual survey coverage is plotted after downloading the data to illustrate any "holes" in the survey coverage. Any holes exceeding the prescribed survey coverage are eliminated by subsequent re-survey of the hole areas. Summary statistics for each survey unit will be determined from the count rate *per unit area* using a mathematical system of grids superimposed on the survey unit. In this way, the additional survey time in a given area will only increase the precision for the given area but will not bias the overall average.

Survey coverage is designed to be at least as complete as that planned for the Method-A surveys. For the Clay Pits Area, the minimum (Class 3) coverage is 2 minutes survey time per 100 m^2 using the 2x2-inch detector (or about 1 minute per 100 m^2 with the 3x3-inch detector). For the Fenced Area, the minimum (Class 1) coverage is 9 minutes survey time per 100 m^2 using the 2x2-inch detector (or 4 minutes per 100 m^2 with the 3x3-inch detector). The Clay Pits Area will therefore be surveyed with approximately 2.5-m serpentine traverse spacing at a velocity of 0.33 meters per second with the 2x2-inch detector. The Fenced Area will be surveyed with approximately 1.7 meter spacing between traverses and a velocity of 0.11 meters per second with the 2x2-inch detector.

The position of the detector for the scanning surveys is approximately 31 cm above the ground. This elevation provides a field of view (defined as 50% of observed radiation contained in the field of view) of approximately a 1.7 meter diameter circle, according to calculations with MicroShield v. 5.01 (Grove, 2000). This elevation provides adequate sensitivity for detection of impacted spots whose diameter is on the order of 2/3 of the diameter of the field of view (US DOE, 1998). A two-point moving average of adjacent gamma measurements or equivalent criteria will be used to compare the GPS-logged data to the $DCGL_{emc}$.

4.4 Surface Soil Sampling

Surface soil samples will be taken at potentially impacted areas in the Clay Pits Area and the Fenced Area. Under MARSSIM definitions, surface soil is considered the top 15 cm (six inches) of soil. An off-site contracted laboratory will analyze these samples for uranium, radium, thorium, and for the eleven metals identified in Section 3.2.1. The results of the surface soil sampling will determine levels of Ra-226, isotopic uranium, isotopic thorium, and metals above background, if any, and will assist in determining if there is a consistent relationship between the concentrations of uranium and radium in any impacted areas. If a relationship exists between the parent (U-238) and the decay product (Ra-226), one DCGL may be appropriate for addressing both radionuclides.

In order to determine the number of surface sampling points, a methodology will be employed similar to the calculational methods required for a final status survey. Assumptions must be made regarding the DCGL, lower bound of the gray region (LBGR), variation of activity across survey units, and decision error percentiles. Since this is a characterization effort, the soil $\mu_{bkg} + 2\sigma_{bkg}$ criterion for Ra-226 will be used for estimating the number of surface sampling points, the LBGR will be estimated as half the soil $\mu_{bkg} + 2\sigma_{bkg}$ criterion, and the standard deviation will be estimated as the standard deviation for background Ra-226 measurements (as provided by the SBC results).

Under MARSSIM, a gray region is defined to estimate the range of values where the consequences of making a decision error are relatively small. The gray region is bounded by a lower bound (LBGR) and an upper bound, which is equivalent to the DCGL. The width of the gray region, called the shift (Δ), is therefore equal to the difference between the DCGL and LBGR (Δ= DCGL - LBGR). The characterization DCGL for soil is defined for this site characterization as $\mu_{bkg} + 2\sigma_{bkg}$. The shift is more useful when defined as a *relative shift*, Δ/σ, where σ is an estimate of the expected standard deviation of measurements in a survey unit. The relative shift is defined as:

$$relative\ shift(\Delta/\sigma) = \frac{DCGL - LBGR}{\sigma} \quad (4)$$

The lower the value of the relative shift, the more data points are required.

MARSSIM optimizes a relative shift between one and three. This optimization is done by varying the LBGR. Initially, the LBGR is set as one-half the characterization DCGL, which is in turn estimated to be $\mu_{bkg} + 2\sigma_{bkg}$ for Ra-226 in soil. Using the mean and standard deviation of the ten background Ra-226 measurements that will be reported in the SBC Report (URS, 2001), a relative shift will be calculated. Present preliminary information, based on Ra-226 analyses of sample splits, suggests a relative shift of 2.0, which is being used for preliminary planning purposes. It is also assumed that a Type I decision error level (α) of 0.05 and a Type II decision error level (β) of 0.10 will be applied. The number of sample points required are presented as tabulated information in MARSSIM, and may be based on either the Sign Test or the Wilcoxon Rank Sum Test. The selection of the test depends on whether background concentrations will be accounted for. Because the radionuclides being considered are present in the background, the sample size will be based upon the Wilcoxon Rank Sum Test (Table 5.3 in MARSSIM). Given this, MARSSIM recommends that ten data points be taken for each survey unit.

MARSSIM does not restrict the size of an outdoor Class 3 survey unit. Therefore, the entire Clay Pits Area will be classified as one Class 3 unit and ten surface soil samples will be taken in the Class 3 unit. The sampling locations will be randomly selected from the survey grids if Method A is used and from sequential GPS records if Method B is used. Additional samples may also be collected, biased toward any areas that exhibit elevated activity in the scanning survey but were not selected in the random selection of sampling points.

MARSSIM does not specify sizes for Class 1 characterization survey units. However, MARSSIM does specify that a single outdoor Class 1 final status survey unit be no greater than 2,000 square meters. The Fenced Area, excluding the settling pond area, is approximately 24,000 square meters, equating to 12 Class 1 survey units. For characterization, the Fenced Area will be divided into approximately 12 survey units of approximately 2,000 square meters, four of which are covered by concrete slabs and another of which is covered by asphalt pavement. Ten surface soil samples will be taken in each unit and additional samples will be taken from the concrete and asphalt covers as described in Section 4.5. The locations of the samples will be selected randomly from the survey grids under Method A or the GPS records under Method B. Additional samples may also be collected with bias given to areas that exhibit elevated activity in the scanning survey but were not selected in the random selection of sampling points.

4.5 Concrete and Asphalt Characterization and Removal

All concrete and asphalt will be removed to provide access to characterize the underlying soils. Many concrete surface areas were previously surveyed and found free of impacted materials (EEI, 1993b) or were free-released for unrestricted use by CDPHE (1995 a,b,c). These previously released slabs (excluding any areas marked by red paint) will be removed without further characterization to provide access for characterizing the underlying soils. All other concrete and asphalt pavements (shown in Figure 11) will be surveyed and sampled. Areas shown by surveys and sample analysis to be clean will be removed as demolition debris. Areas shown by surveys and sample analysis to be impacted will be stored on site or removed to an appropriate landfill.

The survey and sampling of concrete and asphalt not released previously will include initial scans for gamma radiation using Method A or B as described in Section 4.3 to provide a baseline map of any elevated gamma activity in the concrete or asphalt (Ra-226 dominated) for purposes of selecting core sampling locations. Elevated areas will be identified by the same criterion as described for the soil area surveys (because MicroShield [Grove, 2000] calculations indicate less than 3% increase in count rate is caused by a density change from 1.6 g/cm^3 for soil to 2.0 g/cm^3 for concrete).

The not-previously-released concrete and asphalt surfaces will also be surveyed for elevated beta activity by five or more counts in the visually-identified worst areas of each 3.3-m x 3.3-m subgrid (Figure 10) for purposes of selecting core sampling locations. Individual grids will be marked on each slab to guide the beta scanning. The beta measurements will consist of 10-second or longer counts with a GM pancake detector (Ludlum model 44-9). Beta counting of uranium on concrete surfaces has a 10-second detection limit of approximately 3,700 dpm/100 cm^2 based on an efficiency of 0.19 count/disintegration and related parameters and equations from NRC (1997). The beta measurements will be used to select the most conservative locations for core sampling of the slab. .

After gamma and beta screening, all not-previously-released concrete and asphalt areas will be sampled. Sampling of the in-situ concrete and asphalt will utilize core samples at random locations at a frequency of at least one sample per 100 m^2 of slab area. Small areas by drains, red-painted surfaces, or other evidence of potentially impacted materials will be sampled approximately ten times more frequently, including samples from worst-case locations. Sampling will utilize a core drill or pneumatic hammer to obtain a sample representative of the complete profile through the slab over an area of at least 7 cm diameter. When a sample is to represent a slab crack or joint, the core sample will be centered on the crack or joint. The samples will be analyzed for the same radiological and metal parameters as determined in the soil samples.

Areas determined to be clean compared to the soil $\mu_{bkg} + 2\sigma_{bkg}$ limit by laboratory analyses (for U-238, Th-230, Ra-226, and Th-232) will be removed as demolition debris. Any landfill sizing requirements will be satisfied.

Slabs exhibiting localized impacts may be divided into clean and impacted areas to facilitate disposal. Separated debris exhibiting any impacted materials will be disposed of at an appropriate facility or stored on site. Concrete exceeding the soil $\mu_{bkg} + 2\sigma_{bkg}$ limit may be either disposed of as impacted material or may be re-evaluated under a concrete-specific DCGL to be determined. On-site storage may utilize barrels, B-25 boxes, or covered roll-off bins. On-site routes used for moving impacted materials will be gamma-surveyed and sampled after removal of the slabs.

After removal of each concrete or asphalt region, the underlying soil will be surveyed by the gamma scanning procedures in Section 4.3. Additional gamma and beta surveys may also be performed in areas formerly beneath slab cracks, trenches, or other potential areas of impacted material. Soils within the removed slab footprints will be bored and sampled for sub-surface activity as were those in site open areas that were not covered by slabs.

4.6 Subsurface Soil Characterization

Subsurface soil samples will be taken at potentially impacted areas in the Clay Pits Area and the Fenced Area. The subsurface (below the top 15 cm of soil) at the Site will be characterized by soil borings with a drill rig. Based on characterization information, the principal field investigator may also decide to trench with a backhoe as an alternative to drilling.

PLA 7759

4.6.1 Borings

4.6.1.1 Rationale and Location

Selection of boring locations within the Clay Pits Area and the Fenced Area depends upon results of the surface scanning surveys and maps of utility locations. The utility maps showing drain lines will be used as the primary basis for selecting boring locations. Where no utility lines occur, maps will be made that show the surface survey readings from the scanning surveys (plotted by grid under Method A or by coordinate under Method B). Areas within each site survey unit that exhibit external gamma radiation levels above background will be identified on the maps. These areas may be selected by the principal field investigator for subsurface sampling. The number of borings used to characterize a specific area will be based on the size of the area. A minimum of one boring per survey unit will be drilled to characterize the subsurface material for potentially impacted material. Survey data collected during each boring along with engineering judgement will be applied to determine the need for additional borings to characterize both the subsurface lateral and vertical extent of residual radioactive material.

4.6.1.2 Gamma Survey of Borehole

All borings will continue to a depth of at least one meter beneath the depth at which external gamma readings within the boreholes approximate background levels. The approximation of background levels will be defined when the borehole gamma count is less than the $\mu_{bkg} + 2\sigma_{bkg}$ criterion, where the criterion is based on the supplementary background study results converted into counts per minute using the detector efficiency and microshield-calculated values of the exposure rate in the borehole. Tables of background and $\mu_{bkg} + 2\sigma_{bkg}$ criterion count rates will be utilized in the field for determining borehole endpoints.

The borehole surveys are accomplished by lowering the NaI detector, attached to an appropriately long cable, into the borehole. If the borehole diameter exceeds twice the detector diameter, the detector may require shielding. If necessary, boreholes will be cased with plastic pipe to maintain their integrity for the survey. Count rates will be measured at one-foot increments of depth. The in-hole survey provides supporting data as to the vertical extent of residual radioactivity and will be compared to subsurface soil analyses. The gamma survey readings will be deconvoluted using published mathematical algorithms. A field portable gamma spectrometer may be used to analyze soils related to the field surveys.

A log sheet for the data obtained from each borehole will be maintained. Recorded data will include the location of the borehole, survey ratemeter/scaler model and serial number, detector model and serial number, gamma reading in units of cpm, and depth of gamma reading. These data will be correlated with surface scanning data for each core, as discussed in Section 4.6.1.3.

4.6.1.3 Surface Scanning of Cores

Split-spoon core samples will be collected while drilling the boreholes where practical. The cores will be logged in accordance with the Unified Soil Classification System (USCS) (ASTM D 2488). The on-site geologist will complete the geologic logs. Core samples will be packaged and archived on site. Where split-spoon sampling cannot penetrate rocky strata, augering will be attempted. For augered holes, the geologist will log the cuttings as accurately as he can estimate their depths of origin.

Surface scans of the core samples or compacted cuttings from estimated depths will be performed with a Ludlum 44-9 pancake detector. These scans will help to qualitatively determine the presence of U-238 in the subsurface soils. The pancake detector is mainly sensitive to beta radiation in this application. Direct one-minute readings at appropriate intervals (approximately 30 cm) on the core will be taken and recorded. A log sheet will be maintained for the data collected from each core. Data recorded will include the location of the core, survey instrument model and serial number, detector model and serial number, beta reading in units of cpm, and corresponding location of the reading on the core or cuttings.

4.6.1.4 Soil Sampling for Radionuclide Analysis

The surficial 15 cm (six inches) of material at the location of the borehole will be sampled prior to drilling and will be analyzed for radiological constituents and metals. Sampling the core at greater depths will be based on instrument readings from the core, borehole scans, and engineering judgement. Typically, samples will be taken from the core at locations corresponding to high radiation levels. In the event that there is insufficient volume for a sample, another core will be taken from an area immediately adjacent to the original core. Equivalent sections of both cores will be combined to create sufficient sample volumes. Samples will be analyzed off site for Ra-226, U-238, Th-230, and Th-232. The analyses will be conducted to satisfy the radionuclide DQOs that are summarized in Table 1.

4.6.1.5 Soil Sampling for Metals Analysis

All soils sampled and analyzed for radiological constituents will also be sampled and analyzed for RCRA-regulated metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) and common ore-associated metals (molybdenum, vanadium and zinc). All surface and subsurface soil samples for metals analysis will be placed in an eight-ounce glass or polyethylene jar or equivalent, sealed, and placed into a cooler. Ice should be used to maintain a temperature within the cooler of about 4 degrees Celsius. No preservative additives will be required. The samples will be sent to the approved laboratory within the maximum holding time requirements of six months for all metals except mercury, which is 28 days. The metal DQOs are summarized below.

Element	Detection Limit (mg/kg)	Analytical Method
Arsenic (As)	4	SW 846 6020 or CLP ILM04.0
Barium (Ba)	20	SW 846 6010 or CLP ILM04.0
Cadmium (Cd)	0.8	SW 846 6010 or CLP ILM04.0
Chromium (Cr)	2	SW 846 6010 or CLP ILM04.0
Lead (Pb)	1	SW 846 6020 or CLP ILM04.0
Mercury (Hg)	0.05	SW 846 7471 or CLP ILM04.0
Selenium (Se)	1	SW 846 6020 or CLP ILM04.0
Silver (Ag)	3	SW 846 6010 or CLP ILM04.0
Molybdenum (Mo)	0.5	SW 846 6020 or CLP ILM04.0
Vanadium (V)	5	SW 846 6010 or CLP ILM04.0
Zinc (Zn)	2	SW 846 6010 or CLP ILM04.0

Accuracy. An acceptance criterion of 75 – 125 percent recovery will be adopted for the laboratory control sample and matrix spikes/matrix spike duplicates and can be replaced by laboratory historical data after procurement of a laboratory, assuming the laboratory limits are found to be acceptable for project DQOs.

Precision. For laboratory duplicates and field duplicates, precision criteria of Relative Percent Difference (RPD) <25 percent and RPD <50 percent, respectively should be adopted. RPD criteria should be used only in the situation where both the sample and duplicate concentrations are >5 times the sample quantitation limit (SQL). If either or both the sample and duplicate concentrations are < or = 5 times the SQL, results should agree within 3 times the SQL.

4.6.2 Trenches

Trenches may be used as an alternative method for characterizing the subsurface of impacted areas in the Fenced Area. Trenching will be performed at the discretion of the principal field investigator. If used, trenches will be excavated using 2-foot lifts at a maximum. Trenches may not be more than four feet deep. Material excavated from trenches will be sampled and logged.

4.6.3 Removal of Impacted Soil

Small amounts of impacted soil, if encountered, will be removed during the soil survey and sampling work and disposed at an appropriate facility or stored on site pending disposal. However, if large volumes of soil (>5 m^3) appear impacted in a given area, they may be left in place for subsequent characterization.

4.7 Quality Control Samples

For every 10 soil (surface and subsurface) sampling locations, a blind duplicate Quality Control (QC) sample will be collected and sent to the laboratory for analysis. A rinsate blank will be collected each day from a final cleanup rinsate to evaluate the effectiveness of cleanup procedures.

4.8 Sample Control

Radionuclide and chemical sample holding times, volumes, preservation, and type of container requirements are identified for each parameter in Table 2. Archived samples will be kept at the Site.

4.9 Documentation

4.9.1 Field Logbook

A bound field logbook will be used to document all field operations and will contain sufficient data and information to reconstruct field activities for a specific day. Pages in the logbook will be bound and numbered. All entries will be recorded legibly in indelible ink. At the end of each day, the last page will be signed and dated by the author(s) and a line drawn through the remainder of the page. At a minimum, the daily log will contain:

- Date and time the field work started
- Names and titles of the survey and sampling personnel
- Purpose of the survey and/or sampling
- Daily instrument response checks and battery/high voltage checks
- Location and description of the sample and sample site
- Date and time each sample was taken
- Any deviations from the CSWP
- Meteorological conditions at the start of sampling and changes in these conditions
- Record of any field measurements taken
- The number and type of samples taken and the sample numbers
- Packaging information
- Sample destination

PLA 7762

VARIABLE QUANTITIES BID AMOUNT**

No.	Description	Unit	Est. Quant.**	$/unit	Item $ Subtotal
14	Soil Scanning Survey w/GPS	Acre	5.8	13,576	78,741
15	Surface Soil Sampling	Sample	130	73.15	9,510
16	Borings (including scanning)	Bore	26	575.20	14,955
17	Survey Boreholes/Cores/Trenches (4.6.1.2 and 4.6.1.3)	Borehole, Core, or Trench	36	350.06	12,602
18	Subsurface Soil Sampling	Sample	100	36.61	3,661
19	Soil, Radionuclide Analysis	Sample	350	373.24	130,634
20	Soil, Metals Analysis	Sample	350	145.50	50,925
21	Exploratory Trenching, including equipment operation and soil survey to identify impacted material	Cubic Yard	200	38.16	7,832
22	Excess (over 225 CY) Impacted Concrete and Asphalt Removal, Shipping, and Disposal	Cubic Yard	200	107.32	21,464
23	Impacted Soil Removal	Cubic Yard	100	27.83	2,783
24	Impacted Soil Shipping	Cubic Yard	100	15.94	1,594
25	Impacted Soil Disposal	Cubic Yard	100	120.20	12,020
27	**SUBTOTAL (VARIABLE QUANTITIES AMOUNT)**				**346,721**

** Quantities estimated by CSM for bid comparison purposes only. Final item quantities to be completed will be dependent on site conditions.

GRAND TOTAL BID AMOUNT
(FIXED PRICE PLUS VARIABLE QUANTITIES AMOUNT)

28	**GRAND TOTAL (LINES 13 + 27)**	**$ 677,709**

Exh. 3

TASK PLAN

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE
SITE ENVIRONMENTAL ASSESSMENT

July 19, 2002

Prepared for:

Colorado School of Mines
Golden, CO 80401

Prepared by:

New Horizons Environmental Consultants, Inc.
6585 S. Wright Street
Littleton, CO 80127

Exh. #4

TASK PLAN

COLORADO SCHOOL OF MINES RESEARCH INSTITUTE
SITE ENVIRONMENTAL ASSESSMENT

1.0 BACKGROUND / INTRODUCTION

The Colorado School of Mines (School) issued a Request for Proposal (RFP) in December 2001 to accomplish various environmental assessment and response actions at the Colorado School of Mines Research Institute (CSMRI) site in Golden, CO (Site). Environmental assessments of the Site have been previously accomplished. Some of these assessments show that material with levels of radionuclides above background may remain in subsurface locations at the Site, including the nearby Claypits. URS Corporation (URS) prepared a Characterization Survey Work Plan (CSWP) that identified demolition of concrete and asphalt materials as an integral portion of the Site characterization process. "Characterization Survey Work Plan, Colorado School of Mines Research Institute Site, Golden, Colorado", July 23, 2001. The CSWP was approved by the Colorado Department of Public Health and Environment (CDPHE). URS then surveyed, sampled and analyzed the concrete and asphalt and presented its results in a report ("Colorado School of Mines Research Institute Concrete and Asphalt Characterization, Golden, Colorado, Draft Final Report" URS Corporation, February 11, 2002).

In April 2002, New Horizons Environmental Consultants, Inc. (New Horizons) was selected by the School to characterize and quantify the concrete, asphalt and soil at the Site to determine whether any of this material poses any adverse risk to public health or the environment. This *Task Plan* provides details of the activities that will be conducted by New Horizons as part of the characterization effort.

CDPHE issued a Colorado radioactive materials license (No. 617-01) to CSMRI for NORM, source and byproduct materials that were located at the Site (the "License"). CSMRI submitted a decommissioning plan to CDPHE for the Site pursuant to the License on June 30, 2000 (the "Decommissioning Plan"). The License is not issued to the School, who is performing the activities described in this task plan. Nonetheless, this task plan is consistent with the Decommissioning Plan.

2.0 PROJECT WORK PLANS

New Horizons will prepare a comprehensive set of work plans which will detail the assessment and response activities to be conducted at the Site. In addition to this *Task Plan*, the following documents will be prepared:

- *Health & Safety Plan* (HSP)

- *Sampling and Analysis Plan* (SAP)
- *Materials Transport Plan* (MTP)

All work plans will be performed in accordance with the CDPHE-approved *Quality Assurance Program Plan* (QAPP) included as *Appendix A* of the CSWP. New Horizons will follow the approved CSWP unless explicitly superseded by procedures identified in the New Horizons work plans. Specific sections of the CSWP that will be adopted and followed by New Horizons include, but are not limited to the following:

- Data Quality Objectives
- Tentative Derived Concentration Guideline Levels, CERCLA, and MARSSIM
- Regulations
- Guidance
- Historical Site Assessment
- Scoping Survey
- Background Radioactivity Levels
- Surface Soil Sampling
- Subsurface Soil Characterization
- Quality Control Samples
- Sample Control
- Characterization Survey Report

3.0 OBTAIN CONSULTANT RADIOACTIVE MATERIALS LICENSE

New Horizons will obtain a site-specific consultant *Radioactive Materials License* (RML) to be issued by CDPHE pursuant to the Radiation Control Act Title 25, Article 11, *Colorado Revised Statutes* and the State of Colorado *Rules and Regulations Pertaining to Radiation Control*, Part 3. The RML will be obtained to authorize New Horizons to transfer, receive, possess and use Site radioactive materials that are subject to the CSMRI License, if any, in accordance with the applicable rules, regulations, and orders now or hereafter in effect by the CDPHE.

4.0 STORM WATER MANAGEMENT PLAN

Some stormwater discharges are regulated under the National Pollutant Discharge Elimination System (NPDES) program as part of the Clean Water Act [40 CFR 122.26]. In Colorado, the Stormwater program is administered by CDPHE's Water Quality Control Division.

The stormwater regulations mandate, among other things, that small construction projects which clear, grade or excavate and result in the disturbance of greater than 1 acre of land or more develop and implement a *Storm Water Management Plan* (SWMP). The SWMP is designed to identify possible pollutant sources to stormwater and to set out Best Management

EPA/540/G-89/004
OSWER Directive 9355.3-01
October 1988

Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA

Interim Final

Office of Emergency and Remedial Response
U.S. Environmental Protection Agency
Washington, D.C. 20460

Exh. 5

residents. (Since cost estimates for relocations can be complicated, FEMA authorities and EPA Headquarters should be consulted in estimating these costs.)

- Disposal costs – Costs of transporting and disposing of waste material such as drums and contaminated soils

Indirect capital costs may include:

- Engineering expenses – Costs of administration, design, construction supervision, drafting, and treatability testing
- License or permit costs – Administrative and technical costs necessary to obtain licenses and permits for installation and operation of offsite activities
- Startup and shakedown costs – Costs incurred to ensure system is operational and functional
- Contingency allowances – Funds to cover costs resulting from unforeseen circumstances, such as adverse weather conditions, strikes, or contaminant not detected during site characterization

Annual O&M Costs. Annual O&M costs are post-construction costs necessary to ensure the continued effectiveness of a remedial action. The following annual O&M cost components should be considered:

- Operating labor costs – Wages, salaries, training, overhead, and fringe benefits associated with the labor needed for post-construction operations
- Maintenance materials and labor costs – Costs for labor, parts, and other resources required for routine maintenance of facilities and equipment
- Auxiliary materials and energy – Costs of such items as chemicals and electricity for treatment plant operations, water and sewer services, and fuel
- Disposal of residues – Costs to treat or dispose of residuals such as sludges from treatment processes or spent activated carbon
- Purchased services – Sampling costs, laboratory fees, and professional fees for which the need can be predicted
- Administrative costs – Costs associated with the administration of remedial O&M not included under other categories
- Insurance, taxes, and licensing costs – Costs of such items as liability and sudden accidental insurance; real estate taxes on purchased land or rights-of-way; licensing fees for certain technologies; and permit renewal and reporting costs
- Maintenance reserve and contingency funds – Annual payments into escrow funds to cover costs of anticipated replacement or rebuilding of equipment and any large unanticipated O&M costs
- Rehabilitation costs – Cost for maintaining equipment or structures that wear out over time
- Costs of periodic site reviews – Costs for site reviews that are conducted at least every 5 years if wastes above health-based levels remain at the site

The costs of potential future remedial actions should be addressed, and if appropriate, should be included when there is a reasonable expectation that a major component of the alternative will fail and require replacement to prevent significant exposure to contaminants. Analyses described under Section 6.2.3.3, "Long-term Effectiveness and Permanence," should be used to determine which alternatives may result in future costs. It is not expected that a detailed statistical analysis will be required to identify probable future costs. Rather, qualitative engineering judgment should be used and the rationale documented in the FS report.

Accuracy of Cost Estimates. Site characterization and treatability investigation information should permit the user to refine cost estimates for remedial action alternatives. It is important to consider the accuracy of costs developed for alternatives in the FS. Typically, these "study estimate" costs made during the FS are expected to provide an accuracy of +50 percent to -30 percent and are prepared using data available from the RI. It should be indicated when it is not realistic to achieve this level of accuracy. *

Present Worth Analysis. A present worth analysis is used to evaluate expenditures that occur over different time periods by discounting all future costs to a common base year, usually the current year. This allows the cost of remedial action alternatives to be compared on the basis of a single figure representing the amount of money that, if invested in the base year and disbursed as needed, would be sufficient to cover all costs associated with the remedial action over its planned life.

In conducting the present worth analysis, assumptions must be made regarding the discount rate and the period of performance. The Superfund program recommends that a discount rate of 5 percent before taxes and after inflation be assumed. Estimates of costs in each of the planning years are

US Army Corps
of Engineers

EPA US Environmental
Protection Agency

EPA 540-R-00-002
OSWER 9355.0-75
www.epa.gov/superfund
July 2000

A Guide to Developing and Documenting Cost Estimates During the Feasibility Study

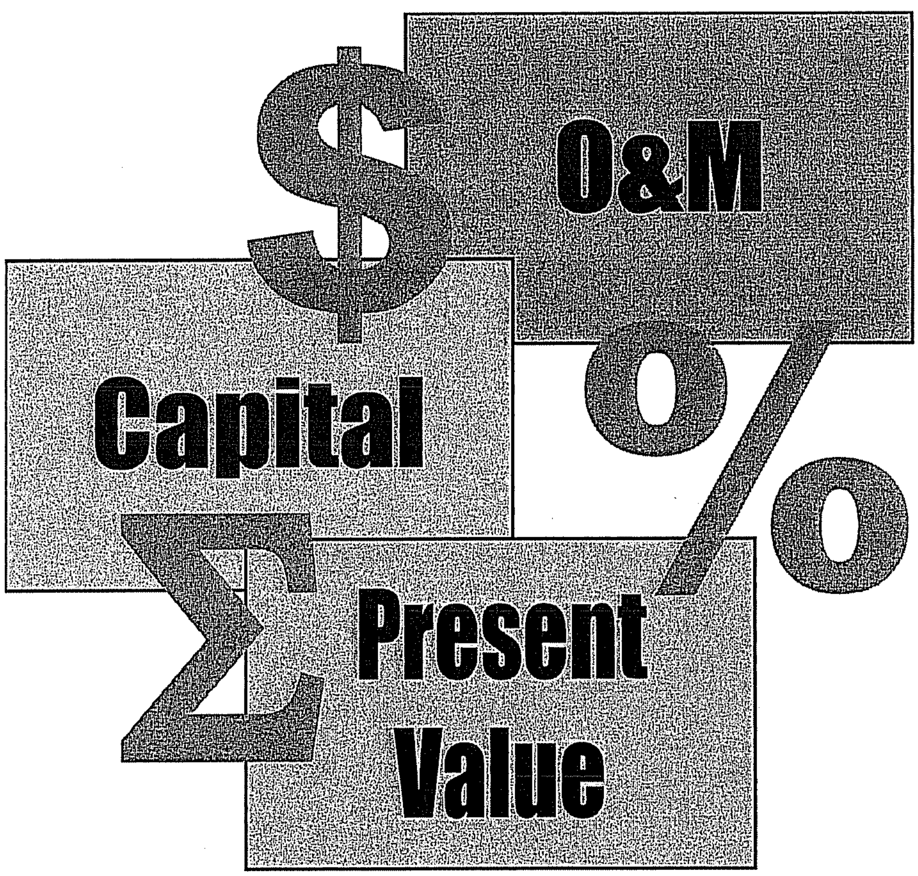
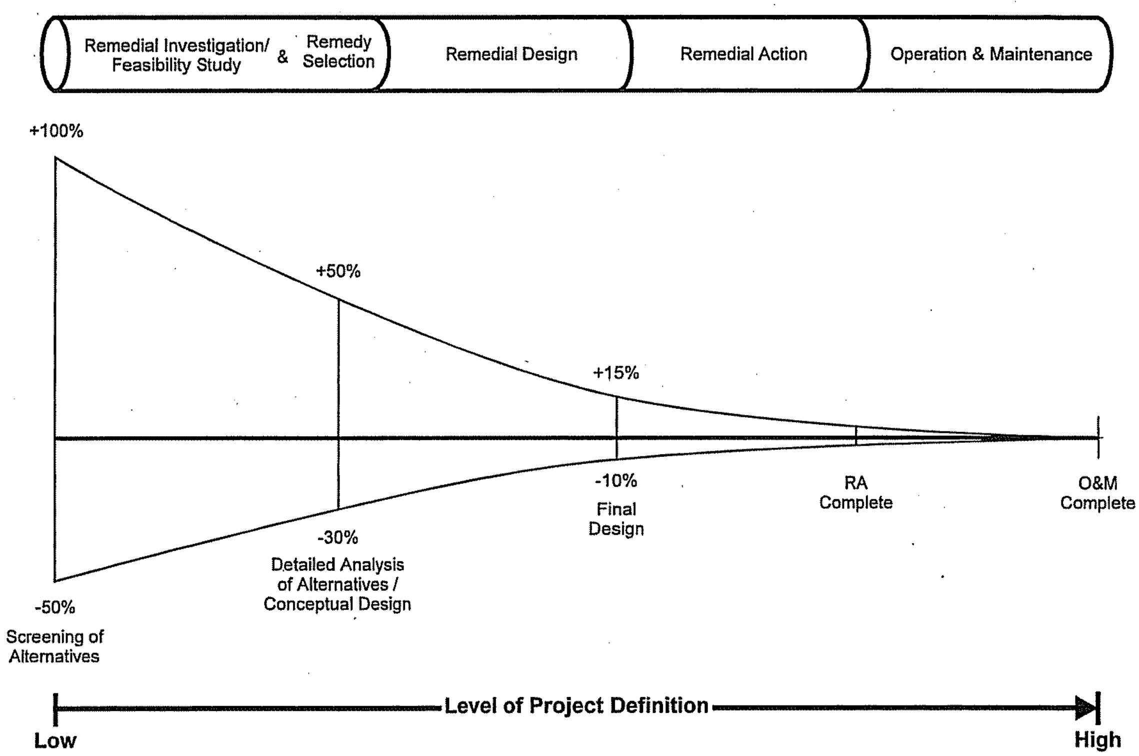


Exhibit 2-3
Expected Cost Estimate Accuracy Along the Superfund Pipeline



2.4 Cost Estimating During the Feasibility Study

During the FS, cost estimates are developed for each remedial action alternative for comparison purposes. The accuracy of these estimates is linked to the quality of the RI data, which helps define the scope of each alternative. Because the RI/FS cannot remove all uncertainty no matter how good the data may be, the expected accuracy of cost estimates during the FS is less than that of estimates developed during later stages of the Superfund process.

Cost estimates are developed at both the "screening of alternatives" and "detailed analysis of alternatives" phases of the FS, with expected accuracy ranges of –50 to +100 percent and –30 to +50 percent, respectively, as shown in Exhibit 2-3.[4] Cost estimates developed during these two phases are further described in the following paragraphs.

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[4] If the number of viable alternatives developed during the FS process is limited, the "screening of alternatives" step is not always performed, nor is it required (Section 4.1.2.1 of RI/FS guidance [USEPA 1988]). However, the "detailed analysis of alternatives" is performed regardless to evaluate each alternative against the NCP evaluation criteria.

OSWER Directive 9360.4-10
EPA 540/R-95/141
PB96-963207
December 1995

SUPERFUND PROGRAM

REPRESENTATIVE SAMPLING GUIDANCE

VOLUME 1: SOIL

Interim Final

Environmental Response Team

Office of Emergency and Remedial Response
Office of Solid Waste and Emergency Response
U.S. Environmental Protection Agency
Washington, DC 20460

Exh. 6

1.0 INTRODUCTION

1.1 OBJECTIVE AND SCOPE

This is the first volume in a series of guidance documents that assist Superfund Program Site Managers, On-Scene Coordinators (OSCs), Remedial Project Managers (RPMs), and other field staff in obtaining representative samples at Superfund sites. The objective of representative sampling is to ensure that a sample or a group of samples accurately characterizes site conditions. This document specifically addresses representative sampling for soil. The information presented here is valid throughout the Superfund program, but focuses on the objectives of early action activities and emergency responses. Topics covered in the document include: assessing available information; selecting an appropriate sampling approach; selecting and utilizing geophysical, analytical screening, and sampling equipment; utilizing proper sample preparation techniques; incorporating suitable types and numbers of Quality Assurance/Quality Control (QA/QC) samples; and interpreting and presenting the analytical and geophysical data.

In the Superfund program, representative sample data collected during emergency responses or early actions may form the basis of remedial response. Longer, more complex responses require a variety of sampling objectives, including identifying threat, delineating sources and extent of contamination, and confirming the achievement of clean-up standards. Many important and potentially costly decisions are based on the sampling data, making it very important that OSCs and field personnel understand how accurately the sampling data characterize the actual site conditions. In keeping with this strategy, this document emphasizes analytical screening and geophysical techniques as cost effective approaches to characterize the site and to select sampling locations.

1.2 Conceptual Site Model

A conceptual site model is a useful tool for selecting sampling locations. It helps ensure that sources, pathways, and receptors throughout the site have been considered before sampling locations are chosen. The conceptual model assists the Site Manager in evaluating the interaction of different site features. Risk assessors use conceptual models to help plan for risk assessment activities. Frequently, a conceptual model is created as a site map (see Figure 1) or it may be developed as a flow diagram which describes potential migration of contaminants to site receptors (see Appendix A).

A conceptual model follows contaminants from their sources, to pathways (e.g., air, surface water), and eventually to the assessment endpoints. Consider the following when creating a conceptual model:

- The state(s) of each contaminant and its potential mobility
- Site topographical features
- Meteorological conditions (e.g., wind direction/speed, average precipitation, temperature, humidity)
- Human/wildlife activities on or near the site

The conceptual site model on the next page is an example created for this document. The model assists in identifying the following site characteristics:

Potential Sources:

Site (waste pile); drum dump; agricultural activities

Potential Exposure Pathway (Soil):

Leachate from the waste pile or drum dump; contaminated soil from direct contact with the waste pile or drum dump; agricultural activities such as pesticide application onto cropland

NOTE: Soil is described as an *exposure* pathway rather than a *migration* pathway because, unlike other media (e.g., air), contact between contaminated soil and a receptor is initiated by the receptor.

Potential Exposure Routes:

Ingestion -- Soil particles from the waste pile, drum dump or area of agricultural activity

Absorption/direct contact -- Soil near the waste pile, drum dump or area of agricultural activity

CHANGE ORDER **Number** 8 **Date** July 9, 2003

To:	
New Horizons Environmental Consultants, Inc. **Contractor**	**Project Number** P9574 **Fund Number** 461
6585 S. Wright St. **Address**	CSMRI Environmental Assessment and Response (Phase 1) **Project Title**
Littleton, CO 80127 **City State Zip**	Colorado School of Mines **Institution or Agency**

Your proposal, dated See attached is hereby being designated for approval of the following work:

(Note: If more space is needed for description of work, attach additional 8-1/2" x 11" sheets hereto.)

COP#14 $114,469.00

This change order was originated by the Contractor (X), Architect/Engineer ( ), State ( ), and I/We do hereby recommend acceptance and approval of the change to the contract with an increase (X), a decrease ( ) no change ( ), of $114,469.00

Contract completion date is extended 120 calendar days (X), is not extended ( ).

New completion date is November (Month) 28 (Day) 2003 (Year)

NA Architect/Engineer Firm	NA Signature	Date
New Horizons Environmental Consultants, Inc. Contractor (Name of Firm)	[signature] Signature	7-9-03 Date
Colorado School of Mines Institution or Agency	[signature] Authorized Signature	7-16-03 Date

CONTRACT STATUS

ORIGINAL CONTRACT VALUE	$ 677,709.00
Previous Increases by C.O.	$ 268,477.00
Previous Decreases by C.O.	$
VALUE AFTER PRIOR C.O.'s	$ 946,186.00
This C.O. Increase ( ) Decrease (X)	$ 114,469.00
CURRENT CONTRACT VALUE	$ 1,060,655.00

APPROVAL BY STATE OFFICIALS

[signature] State Buildings and Real Estate Programs	7/22/03 Date
[signature] State Controller	7/30/03 Date

(Verification)

Exh. 7

State Form SC-6.31
Rev. 2/2000

CSM 0269

CHANGE ORDER BULLETIN

NO.: Fourteen

DATE: June 6, 2003

PROJECT NO.: P9574

PROJECT DESCRIPTION: CSMRI Environmental Assessment and Response–Phase One

TO: New Horizons Environmental Consultants, Inc.

This bulletin is issued to define the scope of revision in drawings and/or specifications for a contemplated change order. The work called for by these revisions shall be in accordance with the requirements of the original contract documents.

Please prepare and submit a proposal for the changes described below. For pricing use State Form SC-6.312. A formal change order State Form SC-6.31 will be issued after approval of your proposal by the Principal Representative and the Architect. Your proposal shall include a statement as to the effect this change will have on the time for completion of the project.

This bulletin is **NOT** an authorization to proceed.

DESCRIPTION OF CHANGE:

Provide additional data analysis and reporting services related to development of a formal remedial investigation/feasibility study report. The report shall meet the following requirements:

1. The report will be compliant with National Contingency Plan (NCP) requirements found at 40 CFR 300.430.
2. The report shall be of sufficient detail to allow for use in public meetings and/or submittal to the Colorado Department of Public Health and Environment (CDPHE).
3. The report must include remedial alternatives.
4. Each remedial alternative shall be presented in sufficient detail to allow CDPHE review.
5. Contractor shall attend up to eight public meetings with interested or affected parties to answer questions regarding investigation results and potential remedial alternatives.
6. Contractor shall meet with CSM and CDPHE as necessary to assist in report planning and drafting and remedy selection and to obtain approval for performance of the selected remedy.
7. Contractor shall make revisions and modifications as necessary to the report based on comments received during public hearings, CSM review, and CDPHE review.
8. Contractor shall attend one to two meetings with the City of Golden to confer on approaches to redevelopment of the existing utility corridor that crosses the impacted portions of the site.

SPECIFICATION REVISIONS:

The completion date for other work on the project schedule is NOT extended.

STATUS OF EXISTING WORK:

Existing work on the original contract has been completed, with the following exceptions:

1. Four to five yards of impacted concrete remains on the site. The contractor shall leave the impacted concrete on the site to be dealt with along with other impacted materials during Phase II.
2. Two quarters of groundwater monitoring and three quarters of reporting on groundwater analyses have not been completed. Contract shall continue with groundwater monitoring under the previously approved change orders.

DISTRIBUTION: Linn Havelick, Johnathan Spencer, Cathy Leyva

PREPARED BY: ______________________
ARCHITECT/ENGINEER OR CONTRACTOR

APPROVED BY: ______________________
AGENCY/INSTITUTION

CHANGE ORDER
PROPOSAL -
(COST/PRICE DATA SUMMARY)

Bulletin
Number: 14 Dated 06/24/03

New Horizons Environmental Consultants, Inc.
Contractor

P9574 — Project No.
CSMRI Environmental — Project Title

Assessment & Response (Phase I)

Change Order Bulletin - Description of Changes:
Provide additional data analysis and reporting services related to development of a formal RI/FS report and attend meetings as necessary.

(Before completing this form, read instructions on reverse side.)

PART I - WORK PERFORMED BY CONTRACTOR

Line 1.	Direct Labor Costs	$	
Line 2.	Labor Overhead (Payroll Taxes and Insurance) (______% X Line 1)	$	
Line 3.	Total Contractor's Labor Costs (see attached breakdown)		$ 98,700.00
Line 4.	Direct Materials Cost	$	
Line 5.	Materials Overhead (Delivery, Handling, etc.) (______% X Line 4)	$	
Line 6.	Total Materials Cost (see attached breakdown)		$ 5,033.00
Line 7.	Total Equipment Costs		$
Line 8.	PART I TOTAL - Contractor's L, M & E Costs (Lines 3, 6 and 7)		$ 103,733.00
PART II - WORK PERFORMED BY SUBCONTRACTOR			
Line 9.	Direct Labor Costs (see attached breakdown)	$ 2,500.00	
Line 10.	Labor Overhead (Payroll Taxes and Insurance) (______% X Line 9)	$	
Line 11.	Subcontractor's Profit (____% X Line 9)	$	
Line 12.	Total Subcontractor's Labor Cost (Lines 9, 10, and 11)		$ 2,500.00
Line 13.	Direct Materials Cost	$	
Line 14.	Materials Overhead (____% X Line 13)	$	
Line 15.	Subcontractor's Profit (____% X Line 13)	$	
Line 16.	Total Subcontractor's Materials Cost		$
Line 17.	Total Equipment Costs		$
Line 18.	PART II TOTAL - Subcontractor's L, M & E Costs (Lines 12, 16 and 17)		$ 2,500.00
PART III - TOTAL CONTRACTOR'S PROFIT (__________% X Part I Total)			$
PART IV - TOTAL CONTRACTOR'S MARKUP ON SUBCONTRACTOR (10 % X Part II Total)			$ 250.00
PART V - SUBTOTAL C.O. PROPOSAL (Parts I and II and III and IV)			$ 106,483.00
PART VI - CONTRACTOR'S BOND COST (4.0 % X Part V) & Project Insurance @ 3.0%			$ 7,986.00
PART VII - GRAND TOTAL CHANGE ORDER PROPOSAL (Sum of Totals: Parts V and VI)			$ 114,469.00

PART VIII - CONTRACT TIME COMPLETION DATE (IS) (~~IS NOT~~) EXTENDED 120 CALENDAR DAYS AS A RESULT OF THIS PROPOSAL.

s

CONTRACTOR'S CERTIFICATE:
This is to certify that, to the best of my knowledge and belief, the cost/price data submitted in response to the listed C.O. Bulletin, are accurate, complete and current as of June 24 20 03.

Firm: New Horizons Environmental Consultants, Inc.

Name & Title: Jonathan Spencer, President

Signature: [signature]

*Date: 6/24/03

ARCHITECT/ENGINEER'S CERTIFICATE:
This is to certify that I have analyzed the proposal and find, to the best of my knowledge and belief, that the proposal represents current, fair, factual and competitive cost/price data.

Firm:

Name & Title:

Signature:

Date:

*The proposal shall remain in full force and effect for a period of 45 calendar days from date of signature.

AUTHORITY FOR INSTITUTION OR AGENCY:
[signature] Date 6/27/03

STATE BUILDINGS AND REAL ESTATE PROGRAMS
[signature] Date 7/22/03

State Form SC-6.312 (Rev. 2/2000) 395-61-01-6328

CSM 0272

New Horizons Environmental Consultants, Inc. Bid Worksheet	
NHECI Project #	2112 - COP 14.
NHECI Project Name	CSMRI Feasibility Study / NCP Compliance / Meetings

Insurance:	3.50%
Bonding:	4.00%
Contingency:	5.00%

#	Labor Category	Designated Individual	Rev / Hr	Task 1 Feasibility Study Hrs	Task 1 Revenue	Task 2 Meetings Hrs	Task 2 Revenue	Task 3 Risk Assessments Hrs	Task 3 Revenue	Task 4 Report Preparation Hrs	Task 4 Revenue	Task 5 Cost Estimates Hrs	Task 5 Revenue	Totals
1	Project Principal	JRS	$90.00	40	$3,600	40	$3,600	8	$720	60	$5,400	12	$1,080	
2	Project Manager	RGK	$85.00	240	$20,400	80	$6,800	40	$3,400	80	$6,800	40	$3,400	
3	Project Engineer	SMC	$75.00	240	$18,000	80	$6,000	80	$6,000	80	$6,000	0	$0	
4	Health Physicist	PNT	$85.00	0	$0	0	$0	40	$3,400	40	$3,400	0	$0	
5	Administrative	KRS	$35.00	4	$140	4	$140	4	$140	4	$140	4	$140	
	Total Hours			524		204		172		264		56		
	Labor Revenues			$42,140		$16,540		$13,660		$21,740		$4,620		$98,700

#	Subcontractor	Unit	Unit Rate	Mark-up	Task 1 Qty	Task 1 Revenue	Task 2 Qty	Task 2 Revenue	Task 3 Qty	Task 3 Revenue	Task 4 Qty	Task 4 Revenue	Task 5 Qty	Task 5 Revenue	Totals
16	Drafting / CAD	LS	500	10%	2	$1,100	1	$550	0	$0	2	$1,100	0	$0	
	Subcontractor Costs					$1,000		$500		$0		$1,000		$0	$2,500
	Mark-up on Subcontractors					$100		$50		$0		$100		$0	$250
	Subcontractor Revenues					$1,100		$550		$0		$1,100		$0	$2,750

#	Equipment & Supplies	Unit	Unit Cost	Mark-up	Task 1 Qty	Task 1 Revenue	Task 2 Qty	Task 2 Revenue	Task 3 Qty	Task 3 Revenue	Task 4 Qty	Task 4 Revenue	Task 5 Qty	Task 5 Revenue	Totals
31	Mileage	miles	0.45	10%	1000	$495	1000	$495	250	$124	250	$124	0	$0	
32	Communications	LS	150	10%	2	$330	2	$330	2	$330	2	$330	2	$330	
33	Postage & courier	LS	75	10%	2	$165	2	$165	2	$165	2	$165	2	$165	
34	Copies	LS	150	10%	1	$165	1	$165	1	$165	4	$660	1	$165	
	Revenue from Equipment & Supplies					$1,155		$1,155		$784		$1,279		$660	$5,033
	Total Project Revenues					$44,395		$18,245		$14,444		$24,119		$5,280	$106,483
	Insurance					$1,554		$639		$506		$844		$185	$3,727
	Bonding					$1,776		$730		$578		$965		$211	$4,259
	Total w/o Contingency					$47,725		$19,613		$15,527		$25,928		$5,676	$114,469
	Total w/ Contingency					$50,111		$20,594		$16,303		$27,224		$5,960	$120,192

Total w/o contingency	$114,469
Total w/ contingency	$120,192

CSM 0273

Agency: Colorado School of Mines

Fund: 461
Contract: C574038

The State of Colorado

DESIGN-BUILD AGREEMENT

Project NAME & NO.: CSMRI Site Environmental Assessment and Response: Phase I - 9574

THIS AGREEMENT made this 13th day of May in the year Two Thousand Two (2002) between the State of Colorado, acting by and through the Board of Trustees of the Colorado School of Mines, hereinafter called the "Principal Representative", and New Horizons Environmental Consultants, Inc. having its offices at 6585 S. Wright Street., Littleton, Colorado 80127-4806, engaged to serve as the Design/Build Entity, hereinafter referred to as the "Design/Build Entity" or "Contractor."

WITNESSETH that whereas the Principal Representative, in the interest of the protection of human health and the environment, intends to accomplish a project to assess the risks, if any, and respond to such risks regarding materials located at the Colorado School of Mines Research Institute Site (the "CSMRI Site" or the "Site") at the west end of 12th Street in Golden, Colorado, hereinafter called the "Project"; and

WHEREAS, the Project is divided into two phases. Phase I is the assessment of the Site, an evaluation of alternative response actions, and the selection of the response action. The assessment of the Site includes the following design and construction activities: preparing operational plans for field work, removing and transporting from the Site all concrete and asphalt to allow further access to soils, performing surface and subsurface soil characterization, removing and transporting investigation derived materials from the Site, and maintaining Site control. Phase II is the implementation of the response action. Phase II work will include the design work for the response action, obtaining regulatory approval of the design, and implementation of the response action. This Agreement covers Phase I only. Phase II will be covered under a separate agreement after the conclusion of Phase I and additional negotiations between the Parties; and

WHEREAS, authority exists in the Law, and Funds have been budgeted, appropriated, and otherwise made available, and a sufficient unencumbered balance thereof remains available for payment in the appropriations identified herein below; and

FUNDING SOURCE	PROJECT ELEMENT DESCRIPTION	FUND	AGENCY	APPR CODE
Capital Construction Funds Exempt	CSMRI Site Environmental Assessment and Response: Phase I	461	GLA	574

Exh. 8

said coverage at the signing of this Agreement and also any notices of renewals of the said policy as such renewals occur.

7.8 POLLUTION/LEGAL ENVIRONMENTAL IMPAIRMENT LIABILITY

7.8.1 The Design/Build Entity shall purchase and maintain pollution/legal environmental impairment liability with limits of not less than $1,000,000 each occurrence to cover the risks associated with the materials and substances at the Site with a deductible or self-insured retention amount of not less than $100,000.

ARTICLE 8

INDEMNIFICATION

8.1.1 To the fullest extent permitted by law, the Design/Build Entity shall indemnify and hold harmless the Principal Representative, its agents and employees from and against all claims, damages, liability, losses and court awards including costs, expenses and attorney fees incurred as a result of any act or omission by the Contractor, or its employees, agents, subcontractors, or assignees pursuant to the terms of this Agreement. This provision is to be interpreted broadly and includes, but is not limited to, any matter related to, directly or indirectly, any direction, request, or voluntary act to test for, monitor, clean up, remove, remediate, contain, treat, detoxify or neutralize any materials involved in this Project. Insurance obtained by Contractor to cover its responsibilities pursuant to this Article 8 does not in any way relieve the Contractor of its responsibilities to the Principal Representative pursuant to this Article 8. Such obligations in this Article 8 shall not be construed to negate, abridge, or otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any party or person described in this Article 8.

8.1.2 In addition to the preceding article, to the fullest extent authorized by law, the Contractor shall indemnify, save and hold harmless the Principal Representative, its employees and agents, against any and all claims, damages, liability, losses and court awards including costs, expenses and attorney fees incurred as a result of any and all matters resulting from the transport of any materials to a disposal facility. This provision is to be interpreted broadly and includes, but is not limited to, any matter related to, directly or indirectly, any direction, request, or voluntary act to test for, monitor, clean up, remove, remediate, contain, treat, detoxify or neutralize any materials involved in this Project. Insurance obtained by Contractor to cover its responsibilities pursuant to this Article 8 does not in any way relieve the Contractor of its responsibility to the Principal Representative pursuant to this Article 8.

8.1.3 In any and all claims against the Principal Representative, its agents or employees, by any employee of the Design/Build Entity, any subcontractor of any tier, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation under this Article 8 shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for the Design/Build Entity or any

STATE OF COLORADO

CONTRACTOR'S AGREEMENT
DESIGN/BID/BUILD *STANDARD FORMAT*
(STATE FORM SC-6.21)

Agency I.D. No.: GLA Contract Routing No.: NA Project No. IH04-010C

THIS AGREEMENT is between the **STATE OF COLORADO**, acting by and through the Board of Trustees of Colorado School of Mines, hereinafter called the PRINCIPAL REPRESENTATIVE, and New Horizons Environmental Consultants, Inc. having its offices at 6585 S. Wright Street., Littleton, Colorado 80127-4806, hereinafter called the CONTRACTOR.

WHEREAS, the Principal Representative, in the interest of the protection of human health and the environment, intends to accomplish a project to assess the risks and respond to such risks regarding materials located at the Colorado School of Mines Research Institute Site (the "CSMRI Site" or the "Site") at the west end of 12th Street in Golden, Colorado, hereinafter called the "Cleanup"; and

WHEREAS, the Cleanup is divided into two phases. Phase I is the assessment of the Site, an evaluation of alternative response actions, and the selection of the response action. The assessment of the Site includes the following design and construction activities: preparing operational plans for field work, removing and transporting from the Site all concrete and asphalt to allow further access to soils, performing surface and subsurface soil characterization, removing and transporting investigation derived materials from the Site, and maintaining Site control; and

WHEREAS, Phase II is the implementation of the response action. Phase II work includes the design work for the response action of removing impacted soils to an off-site disposal facility and restoring the Site to unrestricted uses, obtaining regulatory approval of the design, and implementation of the response action. This Agreement covers Phase II only. Phase I was covered under a separate agreement dated May 13, 2002, which is hereby incorporated by reference; and

Hereinafter called the "Project"; and

WHEREAS, authority exists in Law and Funds have been budgeted, appropriated, and otherwise made available, and a sufficient unencumbered balance thereof remains available for payment in Fund Number 371, Account Number 7-71045, Contract Encumbrance Number ______________, and

WITNESSETH, that the State of Colorado and the Contractor agree as follows:

ARTICLE 1. PERFORMANCE OF THE WORK
The Contractor shall furnish all the work, labor and materials, and shall perform, to the satisfaction of the Principal Representative and its Architect/Engineer, all of the work required for the complete and prompt execution of everything described or shown in, or reasonably implied from the Contract Documents, including The General Conditions of the Contract and the Drawings and Specifications for the above Project.

ARTICLE 2. PROVISIONS OF THE CONTRACT DOCUMENTS
The Contractor agrees to do the work in a first class, substantial and workmanlike manner to the satisfaction of the State of Colorado and its Architect/Engineer in strict accordance with the provisions of the Contract Documents, including The General Conditions of the Contract and the Drawings and Specifications.

ARTICLE 3. TIME OF COMPLETION
The Contractor agrees to substantially complete the entire Project within 102 calendar days from the date of the Notice to Proceed, or the date of CDPHE approval of project work plans whichever is later, and, if applicable, the Contractor agrees to complete the final punch list and finally complete the Project within 192 calendar days. The Contractor shall prosecute the work with due diligence to completion.

STATE OF COLORADO

SUPPLEMENTARY GENERAL CONDITIONS OF THE CONTRACT (DESIGN/BID/BUILD)

These provisions supplement the General Conditions of the Contract (Design/Bid/Build) as follows:

1. General Conditions, Article 25. Delete Sub-Article 25(C) – Builder's Risk Insurance.

2. All references to Architect/Engineer in the General Conditions shall mean Principal Representative.

3. Pollution/Legal Environmental Impairment Liability: In addition to the insurance required in Article 25 of the General Conditions, the Contractor shall purchase and maintain pollution/legal environmental impairment liability with limits of not less than $1,000,000 each occurrence to cover the risks associated with the materials and substances at the Site and removed from the Site with a deductible or self-insured retention amount of not less than $100,000.

4. INDEMNIFICATION: In addition to Article 52(c) of the General Conditions, to the fullest extent permitted by law, the Contractor shall indemnify and save and hold harmless the Principal Representative, its officials, agents and employees from and against any and all claims, damages, liability, losses and court awards including costs, expenses and attorney fees incurred as a result of any act or omission by the Contractor, or its employees, agents, subcontractors, or assignees pursuant to the terms of this Agreement. This provision is to be interpreted broadly and includes, but is not limited to, any matter related to, directly or indirectly, any direction, request, or voluntary act to test for, monitor, clean up, remove, remediate, contain, treat, detoxify or neutralize any materials involved in this Project. Insurance obtained by Contractor to cover its responsibilities pursuant to this Article 16 does not in any way relieve the Contractor of its responsibilities to the Principal Representative pursuant to this Article 16. Such obligations in this Article 16 shall not be construed to negate, abridge, or otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any party or person described in this Article 16.

   In addition to the preceding article, to the fullest extent authorized by law, the Contractor shall indemnify, save and hold harmless the Principal Representative, its employees and agents, against any and all claims, damages, liability, losses and court awards including costs, expenses and attorney fees incurred as a result of any and all matters resulting from the transport of any materials to a disposal facility. This provision is to be interpreted broadly and includes, but is not limited to, any matter related to, directly or indirectly, any direction, request, or voluntary act to test for, monitor, clean up, remove, remediate, contain, treat, detoxify or neutralize any materials involved in this Project. Insurance obtained by Contractor to cover its responsibilities pursuant to this Article 16 does not in any way relieve the Contractor of its responsibility to the Principal Representative pursuant to this Article 16.

   In any and all claims against the Principal Representative, its agents or employees, by any employee of the Contractor, any subcontractor of any tier, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation under this Article 16 shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for the Contractor or any subcontractor of any tier under workers' compensation acts, disability benefit acts or other employee benefit acts.

   The Contractor shall be liable to the Principal Representative for damages resulting from the Contractor's errors or omissions. If the Contractor utilizes any method that is unreasonable, Contractor shall be liable for such action. The Contractor shall take all steps necessary to prevent contaminants of concern from moving from their current locations to other areas and structures on the Site, unless expressly authorized in writing by the Principal Representative. The Contractor shall be responsible for all costs (including attorneys' fees and consultants) and damages associated with the unauthorized movement of such contaminants and/or the remediation of such contaminants.

Office of Legal Services
Colorado School of Mines
Golden, CO 80401-1887
303/384-2056

Asimakis P. Iatridis
Attorney

COLORADO SCHOOL OF MINES
GOLDEN, COLORADO 80401-1887

CSMRI
9.1

MEMORANDUM

To: Prospective Contractors

From: Bob MacPherson and Maki Iatridis

Re: CSMRI Site / Response To Questions for Revised Request For Proposals: Colorado School of Mines Research Institute Site Environmental Assessment and Response

Date: August 14, 1998

This memorandum responds to the oral and written questions asked by prospective contractors regarding the "Request For Proposals: Colorado School of Mines Research Institute Site Environmental Assessment and Response" (the RFP). The written questions are attached with this memorandum. This memorandum also transmits a revised Agreement (without the General Conditions and Supplementary Conditions) to reflect the changes from the RFP to the Revised RFP.

Parsons Engineering Science, Inc.'s July 24, 1998 letter

Indemnity: All four recommendations on Articles 17, 19, 20, and 36 are not acceptable. As explained at the Site Tour on July 22nd, the "negligence" concept will not be added as a limitation on the relevant provisions. The contractor should insure the project accordingly. Moreover, the State is neither the owner nor the generator of materials that may be sent off-site, if any, pursuant to this project.

Insurance: The recommendations on Article 12 are also not acceptable for similar reasons.

Warranty: The recommendations on Articles 20, 21, and 10 are not acceptable, except for replacing the phrase "first-class" with the word "professional" in Article 10.

Payment: The recommendation for Article 26, line 7 is not acceptable. The new paragraph requested is unnecessary primarily because the current billing system allows for the method sought by the new paragraph. While the State will attempt to pay promptly, the State cannot contractuall
receipt of the invoice.

Exh. 9