MATERIALS HANDLING AND TRANSPORTATION PLAN

CSMRI SITE REMEDIATION

April 13, 2004

Prepared for:

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CSMRI Site Remediation

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CSMRI SITE REMEDIATION

1.0 INTRODUCTION

As part of the site remediation operations at the CSMRI facility (Site) located in Golden, CO, soils (with minimal building debris) in bulk quantity will be transported over public roadways to several disposal facilities. This *Materials Handling and Transport Plan* (MHTP) describes the classification of soil(s) to be transported, specifies the transportation procedures for the material(s), specifies the material handling procedures, and details the emergency response plan for material(s) in transit. The MHTP addresses activities to be performed by or under the direction of New Horizons Environmental Consultants, Inc. (New Horizons) to handle and transport the affected material to the appropriate disposal facility.

The 6-acre Site is located on the south side of Clear Creek, east of U.S. Highway 6, in the northeast quarter of the northwest quarter of Section 33, Township 3 South, Range 70 West. The main entrance to the Site is located about 475 feet northwest of the intersection of Birch and 12th Street in Golden, Colorado. A chain-link fence restricts access to the Site, except for a small area located south of 12th Street known as the Clay Pits area.

Prior cleanup activities at the Site have included the removal and stockpiling of material from a former settling pond, off-site disposal of the stockpile, building cleanup and demolition, and removal of concrete and asphalt associated with floors and foundations of the former buildings. A soil characterization study was performed during 2002 through 2003. The purpose of this SAP is to control the remediation process for the off-site disposal of the affected soils and verify that remediation goals have been met.

The MHTP is a planning document only and may be changed as necessary to meet project requirements.

2.0 MATERIAL CLASSIFICATION

Characterization data that was generated during the Remedial Investigation/Feasibility Study (RI/FS) indicated that two primary types of material (primarily soil) were located on the Site. Laboratory analysis showed that these materials could be classified technologically enhanced naturally occurring radioactive material (TENORM) and solid waste. The TENORM material has been designated Class 1 material as defined by the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) guidance and is located in a number of discrete areas around the Site. A minimal amount of this waste was above the toxicity characteristic leaching procedure (TCLP) limits, but on average the material would not be classified as hazardous waste because of metals concentrations. The remainder of the Site contains areas with elevated concentrations of metals (but below TCLP limits) and potential areas with limited radionuclide activity. This material has been classified as solid waste and because of the potential for some radionuclide activity it has been classified as Class 2 area material (MARSSIM defined Class 2 areas).

2.1 Class 1 Areas Material (TENORM)

The Class 1 areas material was generated by research activities associated with mineral research activities that included uranium leaching, separation, process developing, upgrading, or flotation. No enrichment activities were identified in the historical site data. The Class 1 area waste is located in several distinct areas on the Site. A small portion of this material (one sample) also has metals concentrations that are in excess of the TCLP limits for lead (40CFR261.24, table 1, EPA hazardous waste number - D008). The Class 1 area materials will be sent to American Ecology (Grand View, Idaho) and/or Waste Management - CSI (Henderson, Colorado). A landfill specific risk assessment must be accepted by CDPHE prior to shipment of any of this material to CSI. All of the Class 1 area material will be transported from the Site in Lift Liner™ Model Number LL106CF53 bags (volume: 106 cubic feet) loaded onto flatbed trucks.

2.2 Metals Affected / Class 2 Area Material (Solid Waste)

The metals affected / Class 2 area materials include soils contaminated with metals and a limited amount of radionuclides. The Colorado Department of Public Health and Environment (CDPHE) provided the project with a memorandum (Subject: CSMRI soil cutoff values for planning and budgeting purposes, February 25, 2004) that will allow disposal of this material without a landfill specific risk assessment. The material passed the TCLP test for metals and other contaminants and can be considered solid waste acceptable by a Subtitle D landfill. The BFI-Foothills landfill north of Golden, Colorado has been selected as the waste disposal site. The CSI site is an alternative disposal site for this material.

3.0 Material Handling Procedures

For purposes of this project, the Site (CSMRI fenced area) will be initially defined as an Exclusion Zone. The materials handling procedures are intended to allow the modification of the exclusion zone to allow efficient material transport with limited need for vehicle surveys. The exclusion zone will consist of the entire Site during the removal of the Class 1 material, but will be minimized as the Class 2 area material is removed.

The CSMRI Health and Safety Plan (HSP) details the level of protection and Site specific safety requirements that will apply during material handling operations. Air quality for both on site workers and the surrounding community will be monitored in accordance with the HSP and the CSMRI Sampling and Analysis Plan (SAP).

Class 1 area material (American Ecology facility and/or CSI) will be loaded directly into Lift Liner™ bags to ensure material containment. Specifications for the Lift Liner bags are provided in Appendix A. Procedures for loading the bags are provided in Appendix B.

The loaded bags will be transferred to an on site storage area (excavated and surveyed clean or lined with plastic) inside the exclusion zone until all of the Class 1 area material has been excavated or there are a sufficient number of bags to make transportation cost effective (see Figure 1). The storage area is referred to as the contamination reduction zone in the Task Plan. Wipes will be used to collect removable radioactive material from the bag exterior prior placement in the contamination reduction zone (see section 4.1.4 for applicable regulations). The bags will then be loaded onto the transport trucks using a mobile crane or equivalent material handling equipment. If a crane is used, crane specifications and placement will be reviewed prior to loading to ensure the lift can be made safely.

The bags will be transferred from the clean area onto trucks waiting outside the exclusion zone minimize the need for vehicle surveying. The transfer area will be surveyed periodically to ensure that it remains "clean".

The Class 2 area materials (destined for the BFI Foothills disposal facility) will be handled in a manner to minimize the need for vehicle surveys. The Site will be cleared of the Class 2 material from south to north (in general) with the intent of reducing the exclusion zone in the process. Class 2 material will be stockpiled adjacent to a clean area and then loaded directly onto long bed dump trucks that will be positioned on clean material. If trucks must access the exclusion zone, a vehicle survey will be performed to ensure non-fixed radioactive contamination is kept as low as reasonably possible. The transfer area(s) will be surveyed periodically to ensure that it remains "clean".

If the exclusion zone minimization becomes impractical, during the Class 2 removal operations, clean transportation routes may be established by excavating roadways and performing limited verification surveys. Periodic surveys of these "clean" transportation routes and exiting vehicles will be made to verify contamination has not been reintroduced to the route. For areas that can not be accessed with clean routes, vehicle surveys will be performed to ensure material does not leave the Site.

4.0 TRANSPORT PROCEDURES

This MHTP establishes procedures for the packaging and transportation of the solid waste that are intended to minimize potential occupational and public exposures. These include requirements for packaging, documentation (shipping papers), loading, transporting, and radiological protection in order to ensure that potential exposures remain as low as reasonably achievable (ALARA). General transportation guidelines established in this MHTP are listed below.

4.1 General Transportation Guidelines

The following guidelines apply to all material types and shipments.

4.1.1 Shipment Limitations

As part of the access agreement with the Colorado Department of Transportation (CDOT), truck traffic leaving the Site will be limited to non-peak traffic hours and a maximum of ten trucks per hour. New Horizons personnel will monitor shipping activities but all shipping subcontractors will be responsible for maintaining these limitations.

4.1.2 Shipping Papers

Shipping papers shall accompany each waste materials shipment that include~~s~~, at a minimum, the following information:

- The name and address of the shipper, carrier, and destination,
- Emergency contacts and a 24-hour emergency phone number for the shipper,
- A detailed description of the material,
- The total quantity of material in the shipment, and
- Certification by the shipper that the shipment conforms to DOT transportation requirements.

4.1.3 Other Guidelines

The following general guidelines will apply to all shipments:

- All initial, intermediate, and final loading and unloading operations will be carried out under the direction of New Horizons by personnel trained and appropriately equipped for the material type,
- All shipments will be by container or closed/covered transport vehicle,
- Material cannot be loose in the transport vehicle (i.e., container must be sealed and secured), or if the vehicle is the package, there must be no leakage of material from the vehicle (i.e., the cover must be functional),
- All packages will be secured during transport to prevent shifting, and
- Long-bed dump trucks carrying Class 2 area material will be sealed with plastic sheeting to limit soil escaping around the tailgate.

4.1.4 Radiation Control Limitations

The characterization data indicates on average that the TENORM and solid waste material identified on the Site are below activity levels regulated by the Department of Transportation. However, steps will be taken to ensure that the level of non-fixed (removable) radioactive contamination on the external surfaces of each package/vehicle is kept as low as reasonably achievable. Wipes will be collected from the Lift Liner™ bags and compared to the requirements presented in 49 CFR 173.443, Table 11 (General transportation requirements, Part 173 Shippers - General Requirements for Shipments and Packaging). For the purpose of shipping, the material has been classified as transportation Class 9 (miscellaneous dangerous goods). The 49 CFR 173.443 requirements are for the actual shipment of radioactive material (transportation Class 7) and can be assumed as a worst case scenario for Site material.

Contaminant	**Maximum permissible limits (decays per minute per square centimeter)**
Beta and gamma emitters and low toxicity alpha emitters	22
All other alpha emitting radionuclides	2.2

From: 49 CFR 173.443, Table 11.

Samples will be collected by wiping an area of 300 square centimeters of the appropriate surface with an absorbent material, using moderate pressure, and measuring the activity on the wipe. Sufficient measurements will be taken in the most appropriate locations to yield a representative assessment of the non-fixed contamination levels. Swipe collection methodology and analysis are described in detail in the *CSMRI Sampling and Analysis Plan*.

4.1.5 Vehicle Surveys

Materials will be handled in a manner to minimize the need for vehicle surveys. Class 1 material will be loaded directly into the Lift Liner™ bags that will be surveyed, stockpiled at the edge of the exclusion zone (see Figure 1), and then loaded directly on the flatbed trucks (trucks will remain outside the exclusion zone). The Site will be cleared of the Class 2 material from south to north (in

general) with the intent of reducing the exclusion zone in the process. Class 2 material will be stockpiled adjacent to a clean area and then loaded directly onto long bed dump trucks. If trucks must access the exclusion zone, a vehicle survey will be performed to ensure non-fixed radioactive contamination is kept as low as reasonably possible. Vehicles used for shipments may be surveyed after each use and decontaminated if necessary. Survey data will be compared to the requirements of 49 CFR 173.443 (see section 4.1.4).

4.2 Transportation Routes

Material from the Class 1 areas (bagged material) will be loaded onto a flatbed truck and transported to American Ecology by way of the CAST Transportation facility in Henderson, Colorado or to the Waste Management - CSI facility in Bennett, Colorado.

CAST operates a transloading facility (Irondale Station) at Henderson where material is transferred into MHF Logistical Solution rail cars on a Burlington Northern & Santa Fe (BNSF) rail line for shipment to Idaho. Typically three to four truckloads are required to fill a rail car. The route from the Site to the CAST facility starts at the recently constructed temporary access on U.S. Route 6 and includes Colorado Route 58 to U.S. Interstate-70 (I-70) to I-76 to the 96th Avenue Exit off I-76. The route continues east on 96th Avenue to Heinze Way to Havana Street. The total distance is about 24 miles (see Figure 2).

The route to the CSI facility would include U.S. Route 6 to Colorado Route 58 to I-70 to Exit 295 (Watkins). From the exit the trucks would head north on Colorado Route 97 and then east on Colorado Route 36. The trucks then head north on Colorado Route 25 and the east on East 88th Avenue. The total distance is about 49 miles (see Figure 3).

Trucks hauling the Class 1 area material will be loaded at a designated clean area adjacent to the Site using material handling equipment. Sealed bags will be lifted from the Site onto the waiting trucks.

Materials designated for disposal at the BFI-Foothills facility will be loaded from the stockpiles directly into long-bed dump trucks (stockpiles minimize the waiting period during transportation operations) and transported to the landfill. All trucks will be covered during material transportation operations. The route from the Site starts at the temporary access on U.S. Route 6 and continues north along State Route 93 to the landfill. The total distance is about 8 miles (see Figure 4).

5.0 EMERGENCY RESPONSE

Emergency response procedures for potential transportation accidents or material spills on the public highways are listed below. Note that this procedure does *not* include response actions for accidents and spills that occur on the Site. Response activities on the Site are covered in the project specific *Health & Safety Plan*, with New Horizons personnel considered the principal respondents for access road incidents.

The carrier of the material designed for the Subtitle C landfill has the primary responsibility for response operations in the event an accident and/or spill occurs during the transportation of materials from the Site to the disposal site. New Horizons will assist with any spills that occur between the Site and the CAST transloading site. If material is shipped to CSI, the carrier again will be responsible for emergency response.

Because of the proximity of the BFI-Foothills disposal site, New Horizons will provide emergency response assistance if an accident and/or spill occurs between the Site and the disposal area. New Horizons personnel will respond with specialized equipment and trained personnel to assist in the prompt retrieval of any material spilled at the incident site. General carrier responsibilities are listed below, followed by the New Horizons response protocols.

5.1 Carrier's Responsibilities

5.1.1 Preparation of Response Plan

The carrier must have a response plan in place for potential accidents and / or spills that may occur during material transport. The carrier is responsible for providing sufficient labor and equipment to mount an effective response to any spill, including reportable quantity spills. The carrier also must have access to external services for responding to potential spills and accidents that exceed the carrier's own internal resources. These external services must be listed in the carrier's emergency response plan. The selected carrier must submit a copy of its emergency response plan for all materials transport under this procedure.

5.1.2 Emergency Notifications

The following specific emergency notifications ONLY apply to reportable quantities of hazardous substances.

Under 40 CFR 302.6 EPA requires persons in charge of facilities (including transport vehicles, vessels and aircraft) to report any release of a hazardous substance in a quantity equal to or greater than its reportable quantity, as soon as that person has knowledge of the release. In addition to local emergency responders the carrier must make the following contacts:

- The U.S. Coast Guard, National Response Center at (800) 424-8802
- The Contractor at the Emergency Contact numbers listed on the Shipping papers and / or the "*Driver Emergency Notification Procedure*" form.

Within 30 days of the occurrence, the carrier will also report the incident to the USDOT on Form F 5800.1.

5.1.3 Emergency Response Training

The driver of any vehicle involved in a spill of material must be trained and equipped to fulfill the following requirements:

- Provide notification to internal dispatch, local authorities, and New Horizons personnel, as necessary.
- Provide area control and the preliminary containment of spilled materials.

A *Material Safety Data Sheet* (MSDS) describing the material being shipped and emergency response information relevant to that specific material is included in the emergency response information packet supplied with each shipment.

5.2 Contractor's Responsibilities

New Horizons' response to any transportation incident that involves a spill of material will proceed in three phases:

5.2.1 Emergency Notifications

The first person at the Site or disposal/transport facility that receives notification of a potential spill of material will immediately notify New Horizons Project Manager and the site Radiation Safety Officer (RSO). The New Horizons Project Manager will act as the Emergency Coordinator during transportation incidents. Alternate Emergency Coordinators include the Site Health and Safety Officer (HSO) and the RSO.

The Project Manager or RSO will immediately contact the School, and the situation will be evaluated to determine the necessity of field response operations by New Horizons or carrier personnel, and the appropriate level of government agency notification. The Project Manager will subsequently notify other officials and the agencies identified in the following table (as appropriate).

Agency	Department / Function	Telephone Number
Colorado Department of Public Health and Environment	Emergency Management Program	(877) 518-5608
Colorado Department of Public Health and Environment	Laboratory and Radiation Services Division	(303) 692-3090
Colorado Office of Emergency Management	Hazardous Materials Response	(303) 273-1622
Colorado State Patrol	Traffic Control	(303) 239-4501
Jefferson County Sheriff	Traffic Control	911
U.S. Environmental Protection Agency / U.S. Coast Guard *	National Response Center	(800) 424-8802

** For spills exceeding the applicable Reportable Quantity (RQ)*

The Project Manager will notify and assemble the appropriate technical staff personnel for field response operations, if warranted by the ongoing incident evaluation. The Project Manager and RSO will arrange for effective alternate coverage of their area of responsibility during scheduled, or unscheduled, periods of absence. The Project Manager shall ensure that the training level of alternates will be suitable to effectively discharge the duties assigned them.

5.2.2 Response Equipment and Personnel

Response operations by New Horizons personnel are limited to the performance of specialized material surveillance and monitoring activities, affected area boundary establishment, area control, and tracking and oversight functions for both New Horizons and non-New Horizons response personnel and equipment, and the general public. The transporter is committed to rendering all possible technical assistance required for the prompt retrieval of spilled material and the restoration of affected areas to a level as close to original conditions as can be reasonably achieved.

Trained personnel will be available at the site for response to transportation incidents. The following New Horizons personnel are committed for field response to any potential release of materials during transportation:

Name	Telephone Number
Robert Krumberger	(303) 647-1055
Jonathan Spencer	(303) 932-2220
Dave Barnes	(720) 313-8907

An inventory of occupational health and environmental monitoring equipment will be available at the project site. The RSO (or his designee) will be responsible for collecting and preparing for use the equipment listed below (or its equivalent) during potential field response situations.

1 Gamma Survey Meters (μR/hr)
2 Alpha Contamination Survey Meters (one fixed and one non-fixed)
1 Personnel Sampling Pumps
4 Air-Purifying Respirators (HEPA filters)
1 Case of Small Low Density Polyethylene Sample Bottles
1 50 Unit Lot Each of Small, Medium, and Large Sample Bags
1 Set of Soil Sampling Equipment
2 Rolls of Barrier Tape ("*Danger - Keep Out*")

A *Field Operations Outline*, for use by the RSO or the designated Emergency Coordinator, has been provided as *Appendix C*.

5.2.3 Incident Review

Within 48 hours of an incident response, New Horizons and the carrier will review operating methods, procedures, equipment, and training for adequacy of content and implementation. Changes will be made to any, or all, of these categories if indicated by the incident review. In addition, the field response team will review the actions taken during the incident response. This review will be documented and a report shall be issued which contains the findings and any applicable recommendations.

Within 30 days of an incident response, CSMRI, New Horizons, the carrier, and relevant State and local agencies will review the incident and subsequent operations to determine if any corrective actions in planning or implementation are necessary. This review will be documented and a report shall be issued which contains the findings and any applicable recommendations.

APPENDICES

APPENDIX A

MHF Packaging Solutions
190 Transport Drive • PO Box 12 • Sweetwater, TN 37874 • 800-603-8277 • 423-337-2184 (Fax)

Product Specification Number: 100066
Date: March 1, 2004
Revision Number: 0

Lift Liner™ Soft Sided Packaging System

PRODUCT DESCRIPTION:	106 CF Lift Liner Soft Sided Container	
MODEL NUMBER:	*LL106CF53*	
ITEM NUMBER:	11-LL7253	
DIMENSIONS:	72”X48”X53” +/- 2”	
MAXIMUM FILL HEIGHT:	53”	
BODY & FLAPS:	Double Layer 6.5 oz. coated woven polypropylene	
BOTTOM:	Four Layers 6.5 oz coated woven polypropylene	
WEIGHT CAPACITY:	16,000 LBS	
VOLUME CAPACITY:	106 CU. FT.	
CLOSURE:	Flap closure with corresponding securing straps and receiver loops	
LIFTING STRAP:	8 lifting straps with loops made of woven polyester webbing.	
EMPTY WEIGHT:	**35 lbs**	
FABRIC:	6.5 oz coated, woven polypropylene	
COLOR:	White	
CONSTRUCTION:	19.2 EPI X 12.0 PPI 18.7 x 11.6 (minimum)	
WEIGHT:	6.5 oz. per square yard	
TENSILE STRENGTH (lbs):	325 X 370 (2) 300 X 300 (minimum)	ASTM D-4632
ELONGATION (%):	23.5 X 19.5 (2)	ASTM D-4632
TRAPEZOID TEAR (lbs):	151 X 154 (2)	ASTM D-4533
PUNCTURE (lbs):	177 (2) 130 (minimum)	ASTM D-4833
MULLEN BURST (psi):	693 **(2)** 600 (minimum)	ASTM D-3786
UV RESISTANCE STRENGTH RETENTION (%):	>70% - 1200 Hrs Exposure	ASTM D-4355

Appendix B

MHF Packaging Solutions
Standard Operating Procedure

Closing Procedure
For the Lift Liner™ Model No. LL7253

Patented, US Patent Number 6079934

1.0 Scope

1.1 The procedure was written to guide the end user step by step in securing the Lift Liner™ LL7253 straps before lifting the filled package from the loading frame.

2.0 Standard Operating Procedure

2.1 When the Lift Liner™ has been loaded to approximately 48", fold flaps A & B opposing each other, making sure to pull tight to create a tuck at corner. Velcro will hold in place. Next, fold flap C over flaps A & B creating a triangular fold at junction of flaps A, B, & C.

2.2 Locate tie down strap (sewn in side seam) and secure to loop in flap C.

2.3 Fold flap D over top of all other closures and begin tying the white 1" tie straps through loops on 3 edges of flap D. (Tie with double knot to prevent vibration from loosening knot) It is optimal to begin tying D in the center of the 6 ft. edge.

NOTE: CAUTION!! Make sure that all Lift Liner™ LL7253 straps are free from all tying straps.

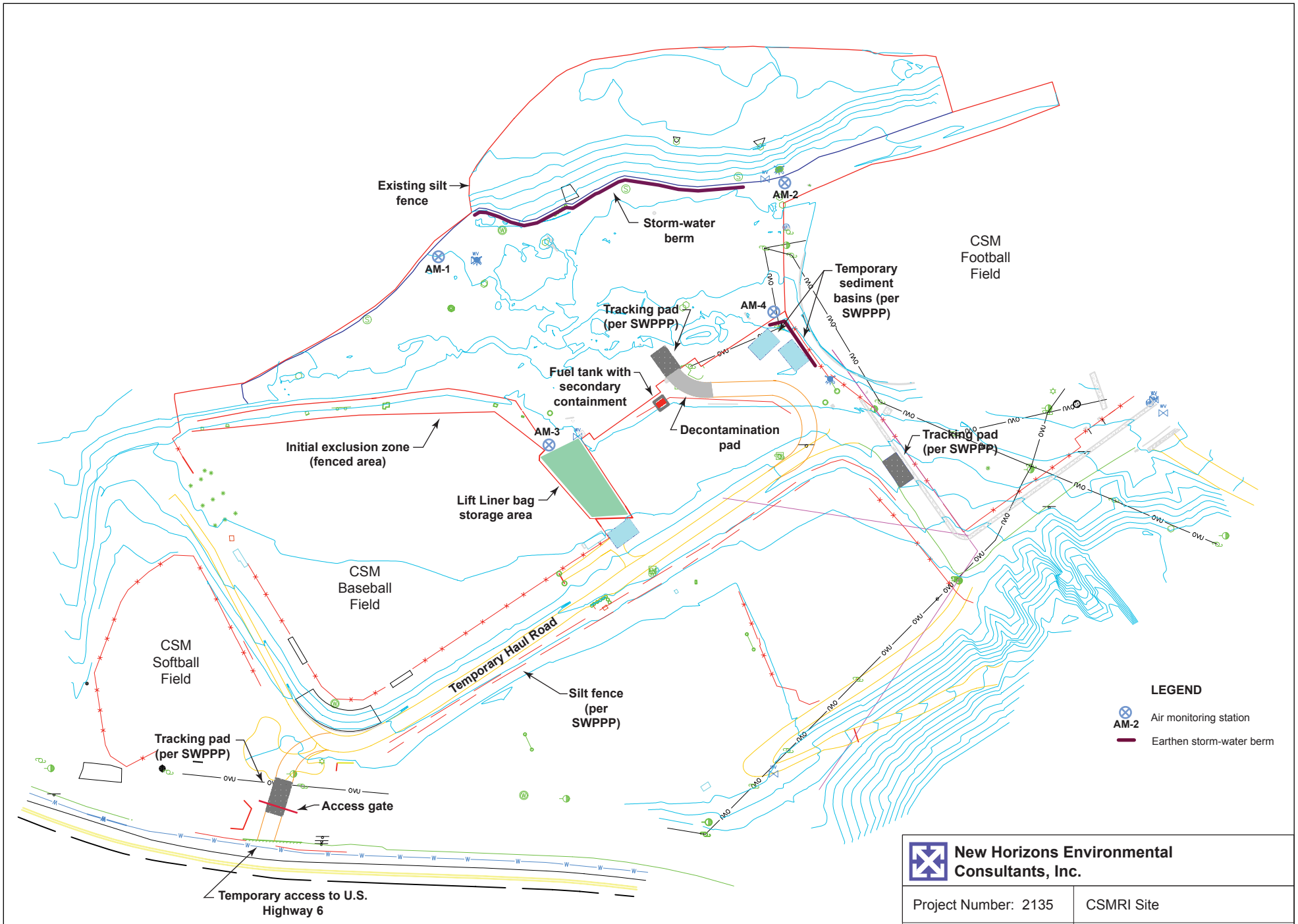
Appendix C

FIELD RESPONSE OPERATIONS OUTLINE

The following outline serves as a guideline for field response operations. Deviations from this outline may be warranted due to actual field conditions at the site.

1. Determine necessity of field response operations during ongoing incident evaluation by the Emergency Coordinator (Project Manager) and/or the RSO.
2. The Project Manager will designate field response personnel, who will collect field equipment and transportation, during the incident evaluation. Additional equipment may be collected, if field personnel deem it relevant.
3. The Emergency Coordinator will attempt to coordinate the field response efforts with any local emergency response agencies, prior to the arrival of a field response team at the incident site.
4. All assembled response personnel will proceed to the incident site and report to the local Incident Command structure, if the incident evaluation indicates a field response is necessary. The New Horizons Project Manager will assume Incident Command functions if no official command structure exists. As Incident Commander, the New Horizons Project Manager will coordinate all response activities until relieved by a higher authority. In all cases the New Horizons Project Manager will coordinate field response activities with other responding personnel and / or official agencies.
5. All New Horizons field response personnel may receive training according to applicable regulatory requirements. Training topics and material may be revised at the discretion of the site RSO.
6. Trained field response personnel may provide the following functions, where necessary.
    - Area control and assistance in material containment.
    - Exposure monitoring for contaminants of concern.
    - Definition of the potential contamination area boundary.
    - Technical assistance for material control and remediation techniques.
    - Incident-related personnel and equipment tracking.

FIGURES


Existing silt fence
Storm-water berm
AM-2
AM-1
CSM Football Field
Temporary sediment basins (per SWPPP)
AM-4
Tracking pad (per SWPPP)
Fuel tank with secondary containment
Decontamination pad
AM-3
Initial exclusion zone (fenced area)
Tracking pad (per SWPPP)
Lift Liner bag storage area
CSM Baseball Field
CSM Softball Field
Temporary Haul Road
Silt fence (per SWPPP)
Tracking pad (per SWPPP)
Access gate
Temporary access to U.S. Highway 6
LEGEND
AM-2 Air monitoring station
Earthen storm-water berm
New Horizons Environmental Consultants, Inc.
Project Number: 2135
CSMRI Site
Date: April 14, 2004
Figure 1

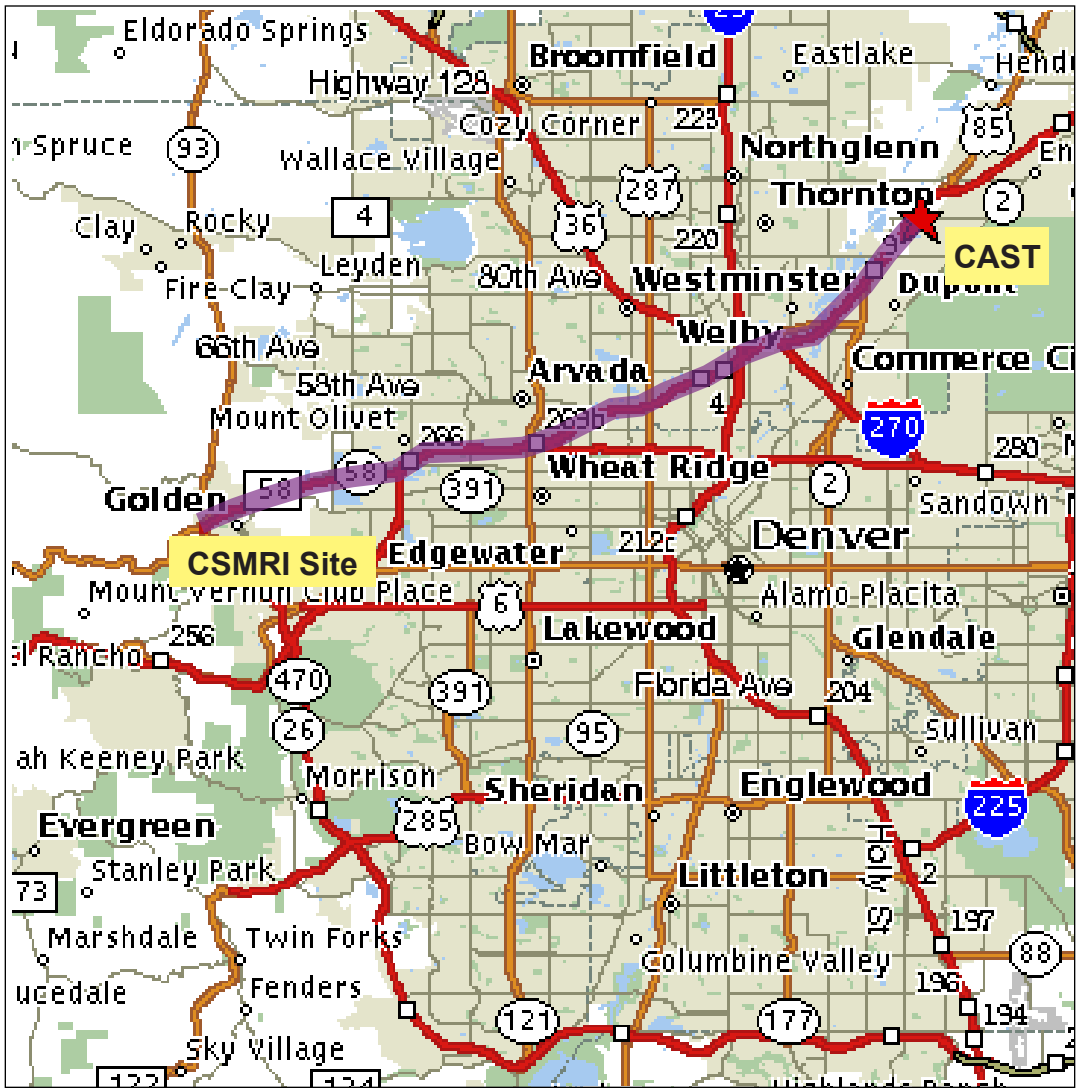


Figure 2 Route to CAST Transloading Facility
(American Ecology)

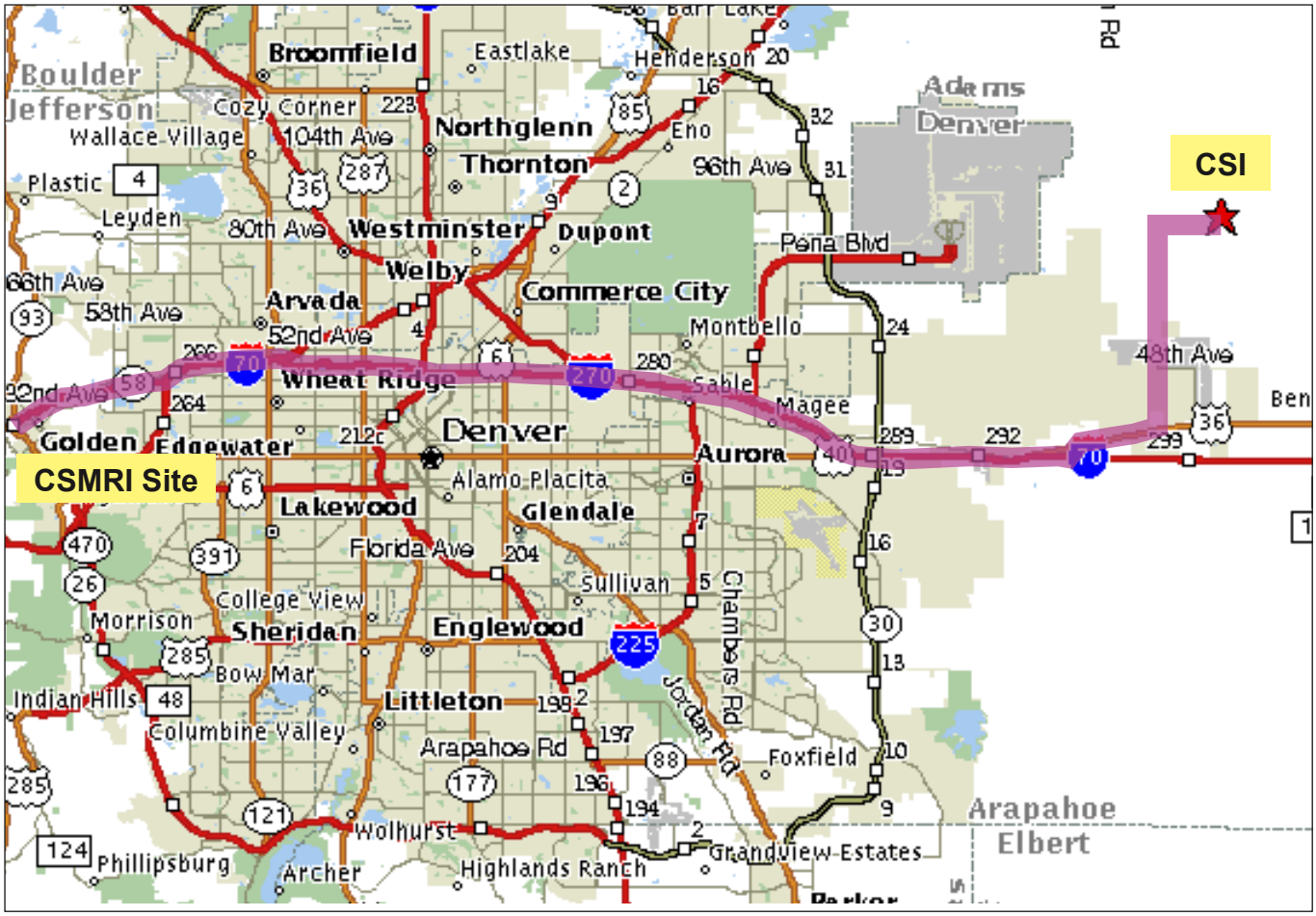


Figure 3 Route to Waste Management-CSI (Bennett, CO)

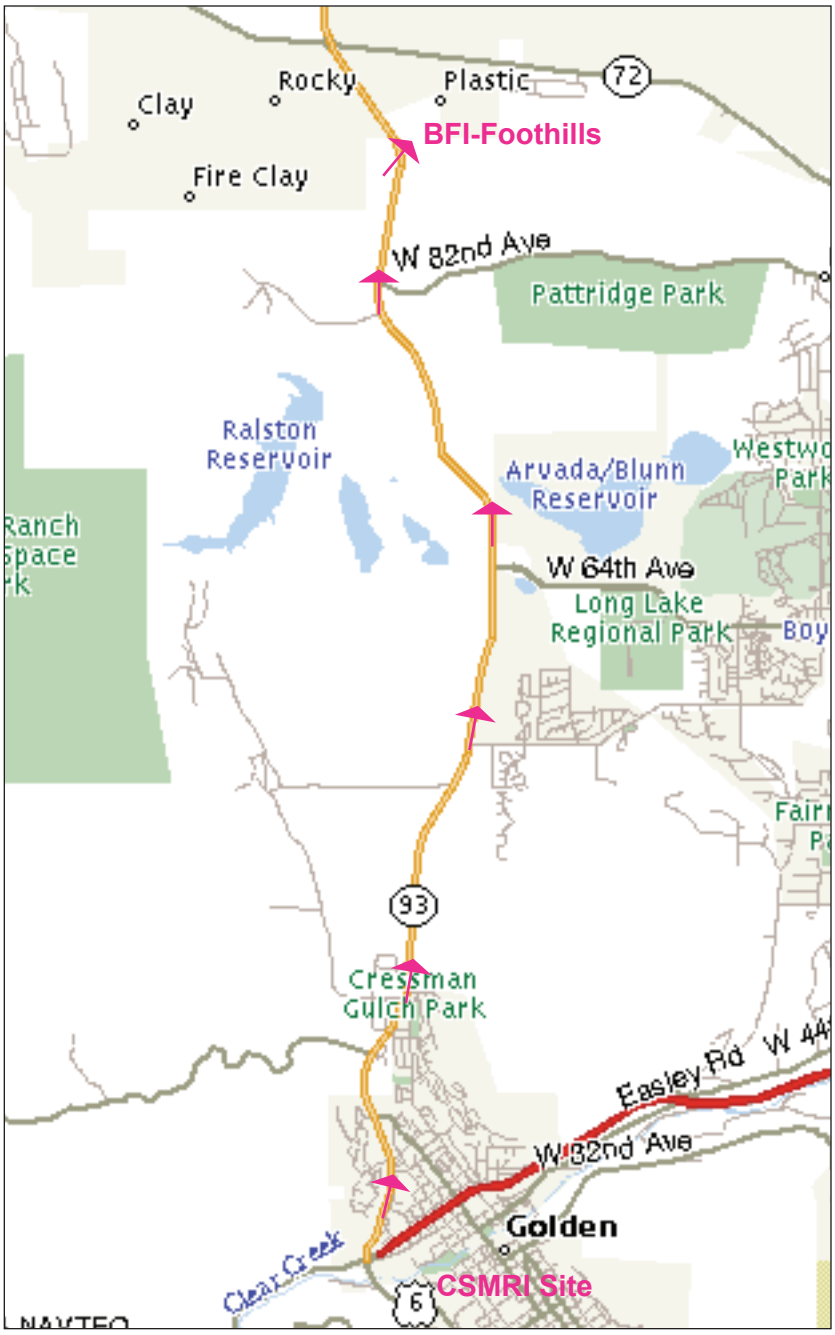


Figure 4 Route to BFI-Foothills
(State Highway 93, Golden, CO)