



COLORADO


Department of Transportation

Division of Maintenance & Operations

Regulated Asbestos-Contaminated Soil Management Standard Operating Procedure

**October 18, 2016
Revised May 5, 2025**

**Prepared by: CDOT
Property Management Section Hazardous Waste Unit
2728 West Howard Place, 5th Floor
Denver, CO 80204**



Phillip T. Kangas

**Asbestos Program Manager
Certified Building Inspector #1831**



Table Of Contents

1.0	Purpose and Scope	1-1
2.0	Primary Contacts, Roles and Responsibilities	2-1
3.0	Definitions and Abbreviations	3-1
3.1	Abbreviations	3-1
3.2	Definitions	3-2
4.0	Personnel Qualifications and Outreach	4-1
5.0	Materials and Equipment	5-1
6.0	Procedures	6-1
6.1	Unexpected Asbestos Discovery	6-1
6.1.1	Sampling RACS and/or ACM, Unexpected Asbestos Discovery	6-2
6.1.2	Assumed RACS and/or ACM, Unexpected Asbestos Discovery	6-2
6.1.3	Limited Quantity Unexpected Asbestos Discovery and Management	6-3
6.2	Excavation and Earthmoving, Known RACS (Planned Encounter) ...	6-4
6.3	Excavation and Earthmoving, Suspect RACS (Possible Encounter) ..	6-7
6.4	RACS Spill Response	6-9
7.0	Air Monitoring Requirement	7-1
7.1	Personal Air Monitoring	7-1
7.2	Perimeter Air Monitoring for Asbestos	7-1
7.3	Air Sample Analysis and Response to Detected Asbestos Fibers	7-1
8.0	documentation	8-1
9.0	Equipment and Worker Decontamination Procedures	9-1
9.1	Equipment Decontamination	9-1
9.2	Worker Decontamination	9-2
10.0	Disposal	10-1
11.0	Remaining RACS and/or ACM	11-1
12.0	Reporting	12-1



Forms

[CDPHE Notification of regulated asbestos contaminated soil \(RACS\) disturbance](#)

CDOT Field Documentation Form



1. Purpose and Scope

This Standard Operating Procedure (SOP) provides written standard operating procedures that are the minimum requirements for the proper training, handling, packaging, and disposal of regulated asbestos-contaminated soil (RACS) or asbestos-containing material (ACM) during soil disturbing activities for Colorado Department of Transportation (CDOT) properties. This SOP shall be followed whenever soil excavation or disturbance will occur in areas where asbestos is known or suspected to exist. This SOP satisfies the current Section 5.5 Regulations (Management of Regulated Asbestos Contaminated Soil (RACS) of the Colorado Solid Waste Regulation (6 CCR 1007-2, Part 1).

When using this SOP for a specific project, appropriate notification shall be provided to Colorado Department of Public Health and Environment, Hazardous Materials and Waste Management Division (CDPHE) using the CDPHE notification forms attached to this SOP (Attachment 1). Note that for existing projects, where project information has already been provided to CDPHE, notification shall be provided to the established CDPHE contact, and use of the forms in Attachment 1 may not be necessary. Specific project notification under this SOP should include the following supplemental information:

1. A general project description,
2. A description of the area that work will take place,
3. Maps of the project area,
4. Project specific contact information (phone and email) including the general contractor, the excavation contractor (if not the general), the General Asbestos Contractor (GAC)(if applicable), and the environmental consultant,
5. Types of debris/contamination (either confirmed or assumed)that have been encountered,
6. Any interim steps that have been taken,
7. Any deviations from the approved SOP (with notation that any deviations will have to be approved by the CDOT and CDPHE before being implemented).

The SOP should be used as a guideline for implementing appropriate management and disposal practices and may be supplemented with additional site specific management plans, including amended Material Management Plans for other regulated material, and/or Health and Safety Plans for site-specific safe work practices. Site specific Material Management and/or Health and Safety Plans will be appended to this SOP and submitted to the CDPHE using the same CDPHE notification requirements noted above.



COLORADO

Department of Transportation

Division of Maintenance & Operations

Regulated Asbestos-Contaminated Soil Management Standard Operating Procedure

2. Primary Contacts, Roles and Responsibilities

Colorado Department of Transportation (CDOT)

David Mendel

Property Management Section, Environmental and Hazardous Waste Management Unit Supervisor

Office: 303.512-5520

Mobile: 720.642-0537

Email: david.mendel@state.co.us

Phil Kangas

Asbestos Program Manager

Office: 303.325-6123

Mobile: 303.325-6123

Email: phillip.kangas@state.co.us

CDOT Project Management & Program Manager

Contractors

Roles and Responsibilities: Site excavation and as needed management of RACS in accordance with this SOP.

Contact Information: To be provided per project specific notification.

Environmental Consultant

Roles and Responsibilities: Soil characterization, soil removal oversight, soil spotting, air monitoring.

Contact Information: To be provided per project specific notification.



3. Definitions and Abbreviations

3.1. Abbreviations:

ACM	Asbestos-containing materials
AHERA	Asbestos Hazard Emergency Response Act
AIHA	American Industrial Hygiene Association
AMS	Asbestos Air Monitoring Specialist
APD	CDPHE Certified Asbestos Project Designer
AQCC	Air Quality Control Commission
CABI	Certified Asbestos Project Designer
CCR	Code of Colorado Regulations
CDOT	Colorado Department of Transportation
CDPHE	Colorado Department of Public Health and Environment
DOT	US Department of Transportation
EPA	US Environmental Protection Agency
f/cc	fibers per cubic centimeter
GIS	Geographic information system
GPS	Geographic positioning system
HASP	Health and Safety Plan
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NIOSH	National Institute of Occupational Safety and Health
NIST	National Institute of Standards and Technology
NVLAP	National Voluntary Lab Accreditation Program
OSHA	Occupational Safety and Health Administration
PCM	Phase Contrast Microscope
PLM	Polarized Light Microscopy
PPE	Personal Protective Equipment
QPM	Qualified Project Monitor
RACS	Regulated Asbestos-Contaminated Soil
RWA	Regulated Work Area
SOP	Standard Operating Procedure document
TEM	Transmission Electron Microscopy



3.2. Definitions:

"Air Monitoring Specialist" means a person who performs air monitoring who is certified to perform air monitoring in accordance with Air Regulation No. 8, Part B.

"Adequately wet" means sufficiently mix or penetrate with liquid to completely prevent the release of particulate material and fibers into the ambient air. If visible emissions are observed coming from asbestos-contaminated soil or asbestos-containing material, then the material has not been adequately wetted. However, the absence of visible emissions is not sufficient evidence of being adequately wet. Guidance on determining when a material is adequately wet can be found in EPA's Asbestos NESHAP Adequately Wet Guidance, EPA 340/1-90-019 (December 1990).

"Asbestos" means the asbestiform varieties of serpentinite (chrysotile), riebeckite (crocidolite), amosite (cummingtonite-grunerite), anthophyllite, and actinolite-tremolite.

"Regulated Asbestos Contaminated Soil" ("RACS") means soil, ash, or debris (plus six (6) inches in all directions of surrounding soil or other matrix material) containing:

- 1) Friable asbestos-containing materials (ACM) as determined in the field by a Certified Asbestos Building Inspector (CABI) through a RACS determination;
- 2) Previously non-friable ACM(s) that have been rendered friable as determined in the field by a CABI(s) through a RACS determination;
- 3) Non-friable ACM(s) that have a high probability of releasing fibers based on the forces expected to act upon the material during soil disturbance as determined in the field buy a CABI(s) through a RACS determination;
- 4) Deteriorated non-friable ACM(s) that are in poor condition resulting in a high probability to release fibers due to weathering, historical mechanical impact, fire damage (by evidence of ACM within an ash layer) or other factors as determined in the field by a CABI(s) through a RACS determination;
- 5) The following broken, resized, or damaged ACM(s) are RACS:
 - a) Asbestos cement materials
 - b) Plaster
 - c) Brittle caulking, glazing and sealants
 - d) Powdery Concrete Masonry Unit (CMU) sealant
 - e) Powdery floor leveling compound
 - f) Drywall/wallboard and associated joint compound material
 - g) Firebrick
 - h) Other material as determined by the Department, at the request of the owner or person disturbing debris, to have a high probability to release fibers.



- i) Soil or ash known to contain non-visible asbestos fibers based on documented evidence.

"Non-Regulated Asbestos Contaminated Soil" (Non-RACS)" means soil or debris that contains only:

- 1) Intact non-damaged, non-friable ACM; or,
- 2) Damaged non-friable ACM(s) that do not have a high probability to release fibers based on the forces expected to act upon the material during disturbance as determined in the field by a CABI(s) through a "RACS Determination". The following ACM(s) are predetermined to be Non-RACS:
 - a) Resin based materials including but not limited to phenolic-plastic (Bakelite), used in electrical and mechanical parts;
 - b) Resilient flooring (vinyl, asphalt, rubber) excluding non-tar impregnated friable felt backing on sheet vinyl flooring (linoleum);
 - c) Tar impregnated or asphaltic materials in good condition that have not become brittle;
 - d) Elastic, pliable, or rubberized materials, including but not limited to:
 - i) Pliable duct sealant(s);
 - ii) Pliable fiberglass insulation sealant;
 - iii) Pliable fire-stop caulking/sealants;
 - iv) Pliable window and door caulking.
 - e) Extremely hard materials, coatings and sealants including but not limited to:
 - i) Laboratory countertops and sinks;
 - ii) Epoxy type CMU coatings;
 - iii) Epoxy type panel adhesive;
 - iv) Duct sealant;
 - v) Ceiling tile adhesive.
 - f) Other ACM(s) as approved by the CDPHE at the request of the owner or person disturbing debris, to not have a high probability to release fibers.

"Asbestos Supervisor" means a person who has been certified as an asbestos Supervisor in accordance with Air Regulation No. 8, Part B.

"Asbestos Project Designer" or "Project Designer" means a person who has been certified as an asbestos Project Designer in accordance with Air Regulation No. 8, Part B.

"Asbestos waste" means any asbestos-containing material whether it contains friable or non- friable



asbestos, that is not intended for further use. This term includes but is not limited to asbestos mill tailings, asbestos from pollution control devices, and containers that contain asbestos.

"Asbestos-containing material" means any material that contains more than one percent (1%) asbestos by weight, area or volume.

"Certified Asbestos Building Inspector" (CABI) means a person certified in accordance with Air Regulation No. 8, Part B, to perform asbestos inspection and sampling (asbestos inspector). "Debris" means the remains of any non-earthen material that has been discarded, broken down, destroyed, or burned.

"Facility Component" means any component associated with a structure, installation, or building and includes buried utilities, tanks, structures or other installations.

"Friable" means that the material, when dry, may be crumbled, pulverized, or reduced to powder by hand pressure, and includes previously non-friable material after such previously non-friable material becomes damaged to the extent that when dry it may be crumbled, pulverized, or reduced to powder by hand pressure.

"Fugitive Dust" means visible dust leaving the work area boundary.

"Leak tight" means that solids, liquids, or gases cannot escape or spill out. It also means dust tight.

"Mechanical" means operated or produced by mechanism or machine. This may include, but shall not be limited to, an excavator, backhoe, grader and/or tiller.

"Non-friable" means material which, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure.

"Qualified Project Monitor" (QPM) means an individual who has the training and/or experience necessary to identify materials suspected of containing asbestos and who has the authority to make prompt decisions to the management of such materials, and who meets the training requirements in Colorado Solid Waste regulations Section 5.5.3.

"RACS Determination" means a determination conducted in the field by a CABI, of the friability of ACM and the probability of non-friable ACM to release fibers based on the condition of the material and the forces that are expected to act on it during disturbance. Determinations of friability shall be based on the requirements for such determination set forth in Air Quality Control Commission Regulation No. 8 (5 CCR 1001-10, Part B). Determinations of the probability for non-friable ACM to release fibers during disturbance shall be based on the following:

- 1) The condition of the material prior to disturbance, based on observations of weathering, the integrity of the material, historical mechanical impact, or fire damage;
- 2) The potential for the material to be broken, resized or damaged during planned disturbance;
- 3) The material shall be considered RACS if the planned disturbance includes any of the following:
 - a) Augers;
 - b) Rotary style trenchers;



- c) Driving on ACM lying on the surface (vehicles or equipment);
- d) Blasting or other detonation;
- e) Intentional burning;
- f) Other types of direct mechanical impact which are:
 - i) In direct contact with ACM or result in observation of ACM after disturbance, and,
 - ii) Causing damage to the ACM.

"Regulated Work Area (RWA)" means the area where soil disturbing activities involving RACS are occurring. For RACS disturbance, Regulated Work Area also means the regulated/controlled area boundary.

"Site" means the area or areas where soil-disturbing activities are occurring or will occur.

"Staging" for the purposes of Section 5.5 and this SOP, means the accumulation of RACS in the RWA for twelve (12) hours or less.

"Stockpiling" for the purposes of Section 5.5 and this SOP, means the accumulation of RACS that will exist for more than 12 hours, up to and including ten (10) calendar days.

"Storage" for the purposes of Section 5.5 and this SOP, means the accumulation of RACS greater than ten (10) days, but not exceeding six (6) months.

"Soil-disturbing activities" means excavation, grading, tilling, or any other mechanical activity used to disturb the soil.

"Visible emissions" means any emissions which are visually detectable without the aid of instruments, coming from material containing asbestos, asbestos waste, asbestos-contaminated soil, or from handling and disposal of asbestos waste, material containing asbestos or asbestos-contaminated soil.



4. Personnel Qualifications and Outreach

Community outreach shall be conducted for projects involving mechanical disturbance of RACS containing friable ACM with an adjacent receptor present. In addition, ancillary worker awareness briefing(s) shall be conducted through the dissemination of fact sheets and/or informational meetings that discuss the presence of RACS that includes friable ACM and the measures being taken to prevent emissions and cross contamination.

Personnel overseeing, directing, inspecting and/or handling soil (known or suspected of containing asbestos) shall have, at a minimum and as appropriate to the work activity, the following training and experience:

- 1) Projects involving the disturbance of debris or soil/ash containing debris shall include at least one onsite QPM during active disturbance;
- 2) Personnel inside the RWA during the disturbance of RACS shall have annual awareness training. This training requirement applies to equipment operators and drivers of trucks carrying contaminated material for offsite disposal or reuse. Truck drivers who do not complete this training are ancillary workers. Soil disturbing activities must cease if the truck driver is present in the RWA unless the driver remains in the cab of the truck, the truck windows and doors remain closed, and the air handling system remains off while the truck is in the RWA. This training shall cover information necessary to comply with Solid Waste Regulation 5.5 including:
 - a) General asbestos awareness, including health effects; and
 - b) Overview of the requirements of Section 5.5; and
 - c) Overview of suspect ACM that requires further evaluation by a CABI; and
 - d) Overview of RACS and Non-RACS; and
 - e) Worker protection, including levels of personal protection equipment (PPE) required for various activities and conditions; and
 - f) Decontamination requirements for equipment and personnel; and
 - g) Engineering controls to prevent the release of asbestos outside the RWA; and
 - h) Overview of RACS handling procedures. The training shall be conducted by a CABI who is familiar with the site-specific plan and/or the Minimum Requirements in Solid Waste Regulation Section 5.5.7. Records of this training shall be retained, by the trained individual, and be available for inspection, for a minimum of one year from the date of the training.
- 3) Per-project site-specific awareness training for disturbing RACS. This training shall cover site-specific information necessary to comply with Solid Waste Regulation Section 5.5 and the selected management approach for the project (this SOP or the minimum requirements of Solid Waste Regulation Section 5.5.7, including project chain-of-command and identification of authorized personnel with stop work authority, and identification of QPM(s), and hands on training specific to the soil disturbing activities involving RACS the individual will be performing. This training shall be provided by a CABI. Records of this training shall be retained, and be available for inspection, for the duration of the project for which the training was



conducted. Individuals performing abatement of facility components, in accordance with Section 5.5.1 (B) of the Colorado Solid Waste Regulation, shall be Colorado Certified Asbestos Workers and/or Supervisors (Air Quality Control Commission (AQCC), Regulation No. 8, Part B,). If trigger levels of facility components are exceeded (see Section 6.3.7), then AQCC Regulation No. 8, will be followed with a Certified Project Designer, developing the abatement plan and submitting the permit request;

- 4) Qualified Project Monitors shall have, at a minimum:
 - a) Annual awareness training and site-specific awareness training under Solid Waste Regulation Section 5.5.3 (A) and (B); and
 - b) Training from a CABI on identifying debris, exempted materials under Section 5.5.1 (A)(3), and the assumption of debris to be RACS as outlined in Section 5.5.1; and
 - c) Training from a CABI on how to implement the minimum requirement under Section 5.5.7 and how to perform the duties that a QPM may perform in lieu of a CABI; and
 - d) Training from a CABI on how to implement the provisions of this SOP or minimum requirements of Solid Waste Regulation Section 5.5.7 and how to perform the duties that a QPM may perform in lieu of a CABI; and
 - e) 40 verifiable hours of direct experience on projects conducted under Solid Waste Regulation 5.5.
- 5) Inspection and identification of RACS shall be conducted by a CABI (certified in accordance with AQCC Regulation No. 8 (5 CCR 1001-10, Part B)), with 40 verifiable hours of on the job asbestos in soils experience on a minimum of three (3) different asbestos in soils jobs, conducted under either AQCC Regulation No. 8 or Section 5.5. The CABI shall be independent of the general contractor (GC) and/or abatement contractor unless the CABI and the GC or abatement contractor are both direct employees of the property owner. However, the GC or abatement contractor may hire a subcontractor CABI, but the CABI shall not be a direct employee of the GC or abatement contractor.
- 6) Individuals performing air monitoring in accordance with Solid Waste Regulation Section 5.5 must have a current Air Monitoring Specialist (AMS) certification in accordance with AQCC Regulation No. 8 (5 CCR 1001-10, Part B).

All personnel working on the site shall be advised and directed to not disturb areas (unless conducting asbestos inspections under Section 6.0) where suspected or known asbestos is present. Personnel driving onto the site shall be notified of suspect or known asbestos locations and directed to not drive on or otherwise disturb those areas.



5. Materials and Equipment

The following materials may be needed during the course of discovery, inspection or excavation of ACM or RACS:

- 1) Appropriate field monitoring instruments (low flow air sampling pumps, personnel pumps, wind meters, Phase Contrast Microscopy (PCM) microscopes, etc);
- 2) Camera (35 millimeter or digital), field logbooks;
- 3) Personal Protective Equipment (PPE) and cold weather gear as required;
- 4) Tape measure and pin flags;
- 5) Garden trowels and/or rakes;
- 6) Shovels, wheelbarrow;
- 7) Garden sprayers;
- 8) Marked labels stating "Caution - Contains Asbestos. Avoid opening or breaking bag or container. Breathing asbestos may cause serious bodily harm;"
- 9) 6-mil thickness polyethylene disposal bags;
- 10) Sample bags, generator labels, and manifests;
- 11) 6-mil, or greater, polyethylene sheeting;
- 12) Soil sampling supplies (sample containers or plastic bags, labels, chains-of-custody, coolers, collection bowl, decontamination supplies);
- 13) Suitable lab/sample reading area; and,
- 14) Documentation forms.

Larger investigations or excavation projects may require additional equipment such as a backhoe, trailer-mounted sprayers, or water trucks for more extensive dust control measures, and investigation-derived waste (IDW) containers such as roll-off bins or drums with single or double plastic liner, depending on the friability of the asbestos.



6. Procedures

6.1. Unexpected Asbestos Discovery

It is possible that RACS and/or ACM may be unexpectedly encountered during any CDOT excavation project. Upon initial discovery of any unexpected asbestos (RACS or ACM) field personnel who are not CABIs shall immediately stop work and notify CDOT. Notification to CDOT shall include notification to the CDOT Project Engineer and the CDOT Asbestos Program Project Manager as provided in Section 2.0 of this SOP. The Contractor shall notify and receive approval from the CDOT Asbestos Program Project Manager prior to any work completion in any areas of unexpected RACS or ACM discovery.

Field personnel shall take actions necessary to assure that the suspect material is not disturbed while waiting for appropriately trained personnel to arrive on site. Field personnel shall stake, flag, demarcate or measure and/or mark on a map the suspect materials and warn crews to avoid that area until directed otherwise. Field personnel shall establish and take measures to manage RACS in accordance with Section 5.5 and this SOP including: taking measures to prevent access to the RWA by unauthorized persons; conducting interim surface soil stabilization to reduce emissions including:

- 1) Polyethylene sheeting with daily inspection, and inspection after storm events, and repair/replacement of sheeting as necessary to maintain stabilization; or
- 2) Chemical stabilization demonstrated to be effective in the stabilization of RACS (e.g. magnesium chloride) with weekly inspection, and inspection after storm events, and re-application of chemical stabilizer as necessary to maintain stabilization; or
- 3) Minimum of 3 inches of soil appropriate for unrestricted use; or
- 4) Other means of stabilization as approved by the CDPHE and CDOT.
- 5) Stabilization is not required if RACS is kept adequately wet. Verification of adequately wet conditions shall be conducted at least every two hours, or RACS shall be stabilized.

Equipment that was being used when encountering the suspect material is to be held unused for proper decontamination by wet or HEPA vacuum methods per Solid Waste Regulation 5.5.7 (I) until the suspect material is confirmed by lab analysis as asbestos or not.

In addition, the CDPHE will be notified within 24 hours of an unexpected RACS and/or ACM discovery. The Contractor or Consultant may notify CDPHE on the behalf of CDOT. The CDPHE can be notified by using the Notification Form attached to this plan, and mailed to: Colorado Department of Public Health and Environment, HMWMD-B2, Solid Waste Compliance Assurance Unit, 4300 Cherry Creek Drive South, Denver, CO 80246-1530, Attn: Brian Long or emailed to briant.long@state.co.us. Notification forms are provided in Attachment 1 to this plan. For emergency repair projects to utilities, etc, notification will be provided to CDPHE by the next business day. Note that for existing projects, where project information has already been provided to CDPHE, notification shall be provided to the established CDPHE contact, and use of the forms in Attachment 1 may not be necessary.

The appropriately trained CDOT CABI (see Section 4.0) shall handle activities beyond initial discovery, including but not limited to the following:

- 1) Conducting inspections to assess the presence and extent of asbestos;
- 2) Documenting, collecting, packaging, and transporting suspect asbestos; and,



- 3) Directing qualified personnel to conduct items mentioned above.

At a minimum, appropriate PPE must be worn when doing asbestos inspections or otherwise accessing an area suspected or known to contain asbestos. At a minimum, CABIs performing the inspection and/or pickup of Non-RACS (such as the ACM) must wear disposable booties and rubber gloves, which should then be discarded as asbestos waste prior to exiting the site.

Personnel completing the pickup of RACS (the piece and 6 inches in all directions of associated soil and/or debris or other matrix material) plus an additional 6 inches, in all directions, of soil and/or debris or other matrix material from the last occurrence of visible RACS (Sections 6.2 and 6.3), must wear disposable outer protective clothing, booties and rubber gloves, which should then be discarded as asbestos waste prior to exiting the site. Additional PPE requirements may be required as determined by the Contractor's Health and Safety Officer. Refer to Section 9.0 of this SOP for personnel and equipment decontamination procedures.

If the RACS and/or ACM is pervasive throughout the excavation area, other protective measures, such as additional wetting and wind fencing, shall be employed. The CABI, in consultation with the CDOT Asbestos Program Project Manager, is allowed to make judgment calls on the initiation of additional protective measures and the amount of soil to be removed (the amounts of soil to be removed listed above are minimums, CDOT may elect to remove additional soils)(Sections 6.2 and/or 6.3).

6.1.1. Sampling RACS and/or ACM, Unexpected Asbestos Discovery

Unexpected suspect ACM encountered during a project must either be sampled and laboratory analyzed for asbestos or assumed to be asbestos containing. At the request and discretion of CDOT, the CABI may collect for analysis representative samples of each type of the unexpected material(s) encountered. Sampling of suspect RACS and/or ACM will include:

- 1) Adequately wet the suspect material to be sampled and the immediately surrounding soil. Collect the suspect asbestos material and place it in appropriate sample containers such as sample bags or jars;
- 2) Submit the material(s) for analysis to a certified asbestos lab for PLM analysis using proper chain-of-custody protocol; and,
- 3) Take digital photographs of the suspect RACS and/or ACM. Complete a photographic log for each type of suspect RACS or ACM sampled. The photographic log shall contain the location, date and time of each sample, a description of the suspect RACS or ACM, degree of friability, and the laboratory results.

Once identified as known RACS and/or ACM, and if the material(s) does not meet the criteria for Limited Quantity Unexpected Asbestos Discovery and Management as described in Section 6.1.3, the RACS and/or ACM will then be managed, handled, packaged, disposed of and/or left in place as described in the applicable portions of Sections 6.2 through 11.0.

6.1.2. Assumed RACS and/or ACM, Unexpected Asbestos Discovery

As an alternative to sampling, the suspect RACS and/or ACM may be assumed to contain asbestos, with no material sample collection or laboratory analysis conducted. Assuming that suspect RACS and/or ACM contains asbestos will be at the discretion of CDOT. If suspect RACS and/or ACM is assumed to contain asbestos, the CABI will:



- 1) Take digital photographs of the suspect RACS and/or ACM; and,
- 2) Complete a photographic log for each type of suspect RACS or ACM identified. The photographic log shall contain the location, date and time of each sample, a description of the suspect RACS or ACM, and degree of friability.

Once suspect RACS and/or ACM is assumed to contain asbestos, and if does not meet the criteria for Limited Quantity Unexpected Asbestos Discovery and Management as described in Section 6.1.3, the RACS and/or ACM will be then be managed, handled, packaged, disposed of and/or left in place as described in the applicable portions of Sections 6.2 through 11.0.

6.1.3. Limited Quantity Unexpected Asbestos Discovery and Management

If soil in an area not known or suspected to have asbestos contamination is determined to contain positively identified (through sampling) or assumed RACS which has less than 25 separate pieces of asbestos in a single location that is less than 10 cubic feet (with multiple pieces of asbestos within a few inches of each other to be treated as one piece of asbestos), the CABI may, at the request and discretion of CDOT, remove these pieces of asbestos using the procedures listed below:

- 1) Use amended water (surfactant consisting of one ounce of a solution of 50% polyoxyethylene ester and 50% polyoxyethylene ether or equivalent in a 0.16 percent solution (1 ounce to 5 gallons of water) or as per manufacturer recommendations for the wetting of asbestos available to adequately wet the material and surrounding soil. This requirement may be waived by the CDPHE for emergency situations where the work must occur immediately and wetting agents are not available;
- 2) For Non-RACS, wet, gather and place the material in 6 mil bags;
- 3) For RACS, wet, gather and place material and 6 inches in all directions of associated soil and/or debris or other matrix material plus an additional 6 inches, in all directions, of soil and/or debris or other matrix material (total of 12 inches of removal in all directions) from the last occurrence of visible RACS in 6 mil bags (double bags). Continue work with extra attention to possible additional asbestos in that vicinity;
- 4) Stage waste bags in a lined drum or roll-off container. Document waste as solid waste, which contains asbestos, on CDOT Field Documentation Forms (Attachment 2);
- 5) Conduct a follow-up visual inspection of the area by repeating procedures 1 through 4 above;
- 6) If no more visible asbestos material is discovered, and at the request and discretion of CDOT, the CABI may proceed with area clearance by collecting a 10-point composite soil sample over the area (maximum area of 1,250 SF). Aliquot locations shall be representative of the entire area; however, aliquots must be placed where any visible friable asbestos material was found. Sampling shall be performed by following these procedures:
 - a) Calculate the volume of sample material to be collected at each increment sample to ensure the necessary amount of composite sample shall be obtained. For a given composite sample, the volume of each incremental sample shall be approximately one (1) tablespoon and must equal 1/10 of the required composite sample volume of between ¼ cup and 1 cup.;
 - b) Use a decontaminated stainless steel spoon to collect a surface soil sample. A stainless steel



- c) pick may be used as needed to loosen the soil. To the extent possible, eliminate gravel-size or large particles and debris based on visual observation;
 - d) Decontaminate the sampling equipment in accordance with Section 9.0; and,
 - e) Submit the material(s) for analysis using proper chain-of-custody protocol.
- 7) All samples shall be analyzed using accepted PLM methodology for asbestos bulk samples by laboratories accredited according to the provisions set forth in AQCC Regulation No. 8. Proper chain-of-custody protocols for all samples submitted shall be followed. All samples will be prepared by the laboratory in accordance with Solid Waste Regulation Section 5.5 Appendix 5A Analytical Requirements prior to sample analysis.; and,
- 8) Dispose of waste in marked 6 mil bags with affixed generator labels. Waste shall be double bagged if picked up during inspection. All waste must be disposed of in accordance with Section 5 of the Colorado Solid Waste Regulations.

If no asbestos fibers are detected in the composite sample, the area will be classified as non- RACS and the area will remain classified as no reason to know or suspect RACS. If asbestos fibers are detected in the composite soil sample, the area will be classified as known RACS. The known RACS will then be managed, handled, packaged, disposed of and/or left in place as described in the applicable portions of Sections 6.2 through 11.0. Following any discovery of RACS and/or ACM subsequent soil disturbing activities should be conducted with the understanding that further encounters with RACS are possible and that Solid Waste Regulation 5.5 will be implemented. If soil disturbing activities will last longer than two (2) days then air monitoring procedures will be performed per Section 5.5.7 (E).

6.2. Excavation and Earthmoving, Known RACS (Planned Encounter)

This section applies to soil disturbing activities in areas at which RACS have been identified.

6.2.1. Establishment and control of Regulated Work Area (RWA)

- 1) Requirements for establishment and control of a RWA are applicable to all projects subject to Solid Waste Regulation Section 5.5 and this SOP including Section 6.1.3 work stated above:
 - a) Establish a RWA that is identifiable to all persons. Haul roads between RWAs, where RACS is not present, are considered to be outside the RWA(s); however, equipment decontamination and spill responses procedures shall be followed; and
 - b) Stop all soil disturbing activities in the RWA if ancillary workers or members of the public are present within the RWA. Truck drivers who do not complete the asbestos awareness training are ancillary workers. Soil disturbing activities must cease if the truck driver is present in the RWA unless the driver remains in the cab of the truck, the truck windows are closed and the air handling system remains off while the truck is in the RWA; and
 - c) Post labeling and signage to demarcate RWA(s). The RWA shall be demarcated with a visual means that fully defines the extent of the RWA. Labeling and signage shall indicate the presence of asbestos, and that the area is off limits to unauthorized personnel.
- 2) Additional Requirements for Projects Disturbing RACS Containing Friable ACM. Establish a secure work site (e.g., fencing/locks/zip-ties/chains). Security firms, personnel, or staff



- 3) subcontracted/assigned to this duty, may be used to secure the RWA in lieu of fencing. If the RWA is located within a larger secure facility fencing of the RWA is not necessary as long as the RWA is secured.

The CDPHE will be notified at least 10-days prior to any planned soil-disturbing activity in areas of known RACS and/or ACM. The CDPHE can be notified by using the Notification Form attached to this plan, and mailed to: Colorado Department of Public Health and Environment, HMWMD-B2 Attn: Brian Long, Solid Waste Compliance Assurance Unit, 4300 Cherry Creek Drive S., Denver, CO 80246-1530 or emailed to briant.long@state.co.us. The CDPHE Notification form is provided in Attachment I to this plan. For emergency repair projects to utilities etc., notification will be provided to CDPHE by the next business day. Note that for existing projects, where project information has already been provided to CDPHE, notification shall be provided to the established CDPHE contact, and use of the forms in Attachment 1 may not be necessary.

Dust control measures shall be increased significantly during soil disturbing activities in areas of known RACS. Dust control during soil disturbing activities shall be continually assessed and modified as needed to best accommodate changing site conditions. Visible dust emissions shall not be generated at any time during any soil disturbing activities.

Important: Unless specified in the CDOT construction documents and Contractor's Health and Safety Plans, personnel shall not enter an excavation without the proper safety precautions. Substantial local, state, and federal regulations and site-specific health and safety requirements apply for entry into excavations. CDOT and/or the Contractor's Health and Safety Officer must be notified prior to any activity involving entry of personnel into excavations.

- 1) The air monitoring requirements specified under Section 7.0 shall be followed during soil disturbing activities;
- 2) Wind speed measurements will be taken with a hand held wind meter at least every 30 minutes, and during wind gusts, throughout the duration of soil removal or disturbance activities. All inspection and excavation procedures within 100 feet of friable RACS or ACM, including non-friable that have been or have the potential to be rendered friable, in this SOP must cease when any of the following wind stoppage criteria are met, in order to limit potential exposure to workers and airborne emissions of asbestos from the site. The following wind stoppage criteria shall be followed:
 - a) Any wind gust reaches or exceeds 20 miles per hour (mph) as determined by a hand-held meter;
 - b) Sustained wind speeds reach or exceed 12 mph averaged over a period of 10 minutes;
 - c) Winds produce visible emissions or create movement of dust or debris in or near the work area; or,
 - d) Winds impact the ability of engineering controls to work as designed.
- 3) Soil removal/disturbance operations may resume after all of the following four conditions have been met:
 - a) All wind gust readings, for a period of 10 minutes, drop below 20 miles per hour as determined by hand-held instruments;



- b) Sustained wind speeds are below 12 miles per hour averaged over a period of 10 minutes;
 - c) Winds are no longer producing visible emissions or creating movement of dust or debris in or near the removal/disturbance area; and,
 - d) Winds are not impacting the ability of engineering controls to work as designed.
- 4) All water used in the following procedure shall be amended water (as described in Section 6.1.3.1);
 - 5) Excavation shall be conducted as specified in the CDOT construction documents. Prior to soil disturbance, the contractor shall adequately wet the first lift of soil to prevent visible emissions. During excavation, the contractor shall use a mister on the track hoe and/or hand-operated misters/sprayers to ensure that the soil and any suspect asbestos material are adequately wet to prevent visible emissions. Use of both is size of excavation and condition (weather and/or asbestos potential) dependent;
 - 6) Carefully excavate layers of soil remaining by limiting the quantity of soil so that it can be adequately wetted and contained within each scoop of the backhoe. The CABI shall conduct a subsurface visual inspection for asbestos material as excavation proceeds and inspect the soil during removal by the Contractor;
 - 7) All excavated RACS, not direct loaded into trucks or roll-offs for disposal, shall be placed on 6-mil, or greater, polyethylene sheeting. Staging (12 hours or less), stockpiling (more than 12 hours and up to 10 calendar days) and storage (exceeding 10 calendar days not to exceed 6 months) of RACS onsite (if applicable) will be in accordance with Solid Waste Regulation 5.5.7 (H)
 - 8) During loading, the excavator or front-end loader or equivalent, moving the soils into the haul truck or roll-off shall have the sprayer bar operating to wet the material being loaded. A ground based sprayer shall also spray/wet the bucket as it is unloaded into the truck;
 - 9) The truck, or disposal container, shall be placed on 10-mil polyethylene sheeting while being loaded so that any over-spill can be picked up. Any over-spill material shall be cleaned up before the truck is allowed to leave the loading area to prevent possible cross- contamination. Additionally, the 10-mil polyethylene sheeting in the loading area shall be decontaminated (in accordance with Section 9.1) or changed as needed to prevent possible cross-contamination. The excavator operator, the person operating the spray unit, the CABI, and any other personnel in the area immediately helping the soil operation shall be in Tyvek®, respirator, and air pumps. This requirement does not apply to haul truck drivers as long as they are directed to keep their windows rolled up and shut-off all air delivery systems (fans on air conditioning and heating systems) until they leave the area of active soil disturbance;
 - 10) The anticipated total depth of excavation will be specified in the CDOT construction documents. If asbestos material is still present at the total planned depth of the excavation, the Contractor shall notify CDOT. Although not required by Section 5.5 Regulation, at CDOT's discretion, based on project and site specific conditions such as type of ACM(s) encountered and assumed limited vertical extent, the Contractor may continue excavating in 1 foot lifts to a depth where visible asbestos is no longer observed. If it appears that the ACM has a larger areal and vertical extent, the CABI, after consulting with CDOT, shall then direct activities to be conducted in accordance with Section 11 of this document;
 - 11) If no more visible RACS is discovered at the conclusion of excavation and/or earthmoving activities, and if required and at the discretion of CDOT, soil samples for asbestos analysis



- 12) shall be collected by the CABI from each excavation as follows:
- a) The CABI shall collect a separate 10-point composite soil sample from each sidewall and from the floor for every 1,250 square feet of excavation. Aliquots shall be one (1) tablespoon each but must include any locations of observed friable asbestos, after this material has been removed;
 - b) The CABI shall label and handle the sample containers using proper chain-of-custody protocol and decontaminate all non-disposable sampling equipment between samples in accordance with Section 9; and,
 - c) All samples shall be analyzed using accepted PLM methodology for asbestos bulk samples by laboratories accredited according to the provisions set forth in AQCC Regulation No. 8. All samples will be prepared by the laboratory in accordance with Solid Waste Regulation Section 5.5 Appendix 5A Analytical Requirements prior to sample analysis.
- 13) If at the conclusion of excavation and/or earthmoving activities, and at the request and/or discretion of CDOT, known or suspect RACS and/or ACM is to be left in place, the remaining RACS and/or ACM will be handled as described in Section 11.0;
- 14) Excavated RACS and ACM shall be placed in designated containers labeled for asbestos in accordance with the Colorado Solid Waste Regulations. The RACS and ACM shall be loaded using all necessary procedures to prevent visible emissions. These include misting/wetting during the loading process, keeping the bucket as close as possible to the interior of the container before dumping, and slow dumping to allow adequate wetting. Use of leak tight containers and other disposal requirements shall be in accordance with Section 5.5.8 of the Colorado Solid Waste Regulations (e.g., burrito wrap, single or double liner);
- 15) If trucks are used, soil with visible non-friable ACM, or RACS with no visible asbestos debris, shall be loaded in to single lined trucks. Soil with visible friable ACM shall be loaded into double lined trucks;
- 16) If the excavation will be left open overnight, access to the area must be restricted and any exposed portions of the excavation or soil piles containing known or suspect visible asbestos or RACS must be covered or otherwise stabilized; and,
- 17) All RACS that are stockpiled or placed in roll-offs shall be covered with 10-mil polyethylene sheeting and/or treated with a chemical stabilizing agent and inspected daily to ensure sheeting is intact.
- 18) It should be noted that while both covering with polyethylene sheeting and treating with a chemical stabilizing agent are acceptable options for stabilization, the chemical stabilization is preferential because of the fact that windy conditions can create problems with stabilization through the use of polyethylene sheeting (e.g. wind blowing poly. sheeting off stabilized materials, wind creating bellowing effect with poly. sheeting that may lead to asbestos fiber release, etc.)

6.3. Excavation and Earthmoving, Suspect RACS (Possible Encounter)

This section applies to soil disturbing work in areas at which RACS is suspected.

The CDPHE will be notified at least 10-days prior to any planned soil-disturbing activity in areas of



suspected RACS. The HMWMD can be notified by using the Notification Form attached to this plan, and mailed to: Colorado Department of Public Health and Environment, HMWMD-B2 Attn: Brian Long, Solid Waste Compliance Assurance Unit, 4300 Cherry Creek Drive S., Denver, CO 80246-1530, or emailed to briant.long@state.co.us. Notification forms are provided in Attachment 1 to this plan. For emergency repair projects to utilities, etc, notification will be provided to CDPHE by the next business day. Note that for existing projects, where project information has already been provided to CDPHE, notification shall be provided to the established CDPHE contact, and use of the forms in Attachment 1 may not be necessary.

The COOT CABI must be present during all soil disturbing activities in areas where there is a reasonable suspicion that RACS may be encountered. As the excavation advances, the CABI shall inspect the bucket for asbestos debris as the soils are removed from the excavation, and if not direct loaded, in the staging area. If the CABI discovers asbestos the following procedure shall be followed:

- 1) The air monitoring requirements specified under Section 7.0 shall be followed;
- 2) The wind stoppage criteria under Section 6.2 shall be followed;
- 3) All water used in the following procedure shall be amended water (Section 6.1.3.1)
- 4) If RACS are observed, and if does not meet the requirements for Limited Quantity Unexpected Asbestos Discovery and Management (Section 6.1.3), the CABI shall closely observe the excavation and bag (or direct load) the RACS. The excavator shall start using the sprayer bar with amended water on the excavation face. Alternatively wetting may be conducted by personnel on the ground with spraying equipment;
- 5) If in the excavation process, a significant quantity of RACS is encountered, such that hand removal of the debris and surrounding soil is not feasible (Section 6.1.3), the excavated soils from this excavation area shall be treated as described in Section 6.2. All excavated soils shall be covered by 6-mil or greater polyethylene sheeting and/or treated with a chemical stabilizing agent, unless direct loaded or containerized. These activities can be stopped when no additional asbestos is observed within a 3 linear feet, in the direction of excavation, from the last visible asbestos debris. These soils shall be disposed as non-friable RACS, as described in Section 10.0;
- 6) If RACS is observed, and not related to steam lines or other facility components which are subject to AQCC Regulation No. 8 (Section 6.3.7, below), the RACS or visible RACS shall be segregated on 10-mil polyethylene sheeting, unless direct loaded or containerized. The segregation shall continue for 3 linear feet, in the direction of excavation, after the last occurrence of RACS. As soon as friable ACM is encountered, wetting may be conducted by personnel on the ground with spraying equipment or the spray bar on the excavator shall be activated. Extra wetting support may be required by ground based personnel on the working face, as necessary to ensure that there are no visible emissions. The excavator operator, the CABI, and personnel handling the spray on the working face shall don Tyvek®, respirator, and personal air pumps for air monitoring (excluding truck drivers, as noted in Section 6.2.9). Unless direct loaded or containerized, the soils shall be placed on 6-mil or greater polyethylene sheeting, and as soon as possible tightly covered with 6-mil or greater polyethylene sheeting, and/or treated with a chemical stabilizing agent, to prevent wind dispersion of the soils. The wetting, PPE, and air monitoring shall continue until no additional asbestos is observed for 3 linear feet, in the direction of excavation, beyond the last occurrence of visible asbestos debris. The excavator bucket shall be decontaminated over the soil pile and standard excavation protocols may resume. However, if excavation equipment is driven onto RACS, more thorough decontamination, in accordance with Section 9.0, shall be conducted;



- 7) Removal of ACM on a facility component with asbestos quantities above the following trigger levels is subject to the notification, permit, and abatement requirements of AQCC Regulation No. 8, and shall not be conducted under this SOP:
- a) 260 linear feet on pipes,
 - b) 160 square feet on other surfaces, or,
 - c) The volume equivalent of a 55-gallon drum.

However, removal of asbestos-containing material on a facility component, that is below the AQCC Regulation No. 8 trigger levels, and that is located on or in soil, shall be conducted under this SOP in accordance with work practices in AQCC Regulation No. 8, Part B, Section 111.0. This removal is not subject to the notification or permit requirements of Air Regulation No. 8; and,

- 8) RACS shall be removed for disposal, or place in lined roll offs, no longer than 3 days after excavation. When loading soils with friable asbestos for disposal, the soils shall be loaded into double lined roll offs or dump trucks, or a second liner can be added to a non- friable load which already has a single liner, manifested, and disposed at a landfill permitted to accept this material. In the event that a second liner has been added, the entire load will be considered friable asbestos. The excavator or front-end loader or equivalent, moving the soils into the haul truck/roll-off shall have the sprayer bar operating to wet the material being loaded and/or a ground based sprayer shall spray/wet the bucket as it is unloaded into the truck. The truck shall be placed on 10-mil polyethylene sheeting while being loaded so that any over-spill can be picked up. The excavator operator, the person operating the spray unit, the CAB!, and any other personnel in the area immediately helping the soil operation shall be in Tyvek®, respirator, and air pumps (excluding truck drivers, as noted in Section 6.2.9). This soil shall be disposed as friable RACS, as described in Section 10.0.

6.4. RACS Spill Response

- 1) Areas where RACS is spilled are RWAs until cleanup is completed.
- 2) Spilled material shall be cleaned up immediately and not allowed to dry out or accumulate on any surface. The CDPHE Hazardous Materials and Waste Management Division shall be notified, through the spill reporting hotline, in the event that spills of RACS cannot be cleaned up within 24 hours of spill identification.
- 3) Where there are breaches in ground coverings that have the potential to allow RACS or asbestos contaminated water to impact the material below the covering, a minimum of 3 inches of soil, or other matrix material, shall be removed from beneath the breached ground coverings. Visual or measured (e.g. survey) confirmation that 3 inches of soil/or other matrix material from beneath the breached covering has been removed shall be conducted. If ground coverings are placed on top of a durable surface such as concrete or asphalt, the surface shall be decontaminated using wet methods, followed by CBI inspection that all soil and debris has been removed from the surface.
- 4) Rinsate, runoff, or any other water that has come into contact with RACS shall be considered to be asbestos contaminated water and shall be collected and filtrated to less than 5 microns and discharged to a sanitary sewer or re-applied to RACS that will be managed under this SOP.
- 5) Surfaces that are contacted by asbestos contaminated water shall be managed as RACS as per 5.5.7



- 6) (J)(3) or permanently stabilized as per 5.5.7 (K) of the Solid Waste Regulations.
- 7) If work practices in an RWA are causing an ongoing spill outside the RWA, the work practices shall cease or be modified to prevent additional releases.



7. Air Monitoring Requirements

During the removal or disturbance of RACS, the AMS will collect personnel air monitoring samples to assist in determining the adequacy of engineering and environmental controls employed at the site. The air monitoring specialist will maintain a daily air monitoring log. Depending on the size of the work area and the type of soil being removed, air monitoring may include personnel air monitoring only, or personnel monitoring and perimeter air monitoring for large open areas. In general, personnel air monitoring only (i.e., no perimeter monitoring) shall be used when RACS disturbance will not exceed a duration of two (2) days.

Perimeter monitoring shall be used when disturbing RACS during projects over 2 days in duration. In addition, if the work area is proximate to occupied buildings or areas of public access, perimeter air monitoring may be necessary to demonstrate that no asbestos fibers have left the work area.

7.1. Personal Air Monitoring

Personal air monitoring shall be performed in accordance with all OSHA requirements during all disturbance of known and suspect asbestos in soils. In addition to OSHA requirements, for all RACS excavation activities, at least two (2) different workers or 25 percent of the workers, whichever is greater, and who are expected to have the worst-case exposure to asbestos during excavation, shall be monitored to assist in determining the adequacy of engineering and environmental controls employed at the site.

7.2. Perimeter Air Monitoring for Asbestos

Perimeter monitoring shall be performed during all excavations of RACS that exceed a duration of two (2) days. Perimeter monitoring will consist of four (4) air monitoring points located at the points of the compass. Additionally, two (2) downwind floater samples shall be collected during mechanical disturbance of RACS containing friable ACM (to be moved based on prevailing wind direction and adjacent receptors). Additional perimeter monitoring points shall be added if the active area of soil disturbance is larger than approximately 1 acre in size. As general rule of thumb, one additional monitoring point should be added for each additional 200 linear feet of the active disturbance area perimeter (approximately 1 sample per additional ¼ acre increase in area). The AMS should place downwind floating samples such that they are at least 50 feet from any other sample point.

7.3. Air Sample Analysis and Response to Detected Asbestos Fibers

All the air samples shall be analyzed for total fibers using PCM analysis by submitting to an AIHA Proficiency Analytical Testing (PAT) and NIST NVLAP accredited laboratory at the end of each work day. The two samples (or 25% of the PCM samples; whichever is greater) with the highest fiber concentrations by PCM will be analyzed by TEM for asbestos fibers. In addition, any sample with fiber counts greater than 0.01 f/lee, detected by PCM analysis, shall be analyzed by TEM to determine if asbestos is present. Verbal results shall be made available to the Contractor and AMS by the start of the next business day or as soon as practical after the start of the next business day, and written results shall be made available on-site within 24 hours from the time the verbal result is received.

For active areas of soil disturbance greater than 1 acre, additional samples shall be analyzed by TEM at a rate of at least 25% of the total number of samples collected. The additional samples selected for TEM analysis should be those with the next highest PCM results; however, TEM analysis is not required if the PCM results are non-detect (based on fiber count). If asbestos is detected by TEM analysis, engineering controls shall be reviewed and appropriately changed.



After five (5) days of monitoring the same type of field operation with no asbestos detection by TEM analysis, the frequency of TEM analysis of the two highest samples (or 25% of the PCM samples; whichever is greater) can be reduced to once every 5 days with the remaining samples being analyzed by PCM. The samples submitted shall be either the first occurrence of: 1) high winds exceeding wind shut down criteria, or 2) visible emissions. In the absence of either the selected day for TEM analysis may be random as determined by the AMS. However, any sample with fiber counts greater than 0.01 f/cc, detected by PCM analysis, shall be analyzed by TEM to determine if asbestos is present.

If conditions or engineering controls change substantially or if there are any TEM detections of asbestos, the initial air monitoring procedures shall be repeated for three additional days or until air monitoring results demonstrate that the new or modified engineering controls are adequate.

The Contractor and AMS shall review the TEM analysis of personnel air monitoring samples with positive TEM Results. CDPHE shall be immediately notified should any air sample show any concentration of airborne asbestos fibers. In the event asbestos fibers are detected, the following shall occur:

- 1) Excavation shall immediately cease;
- 2) The source(s) of emissions identified;
- 3) Engineering controls will be reevaluated to ensure that additional fiber releases do not occur; and,
- 4) If asbestos fibers are detected in samples collected on subsequent days:
 - a) All soil-disturbing activities shall immediately cease,
 - b) The source(s) of emissions shall be identified;
 - c) An emission control plan, in accordance with Section 5.5.7(E)(2)(f) of the Solid Waste Regulations shall be derived and submitted to CDOT and the CDPHE for review; and,
 - d) Soil disturbance shall not continue until CDPHE provides verbal and/or written authorization to proceed.
 - e) If there are three (3) TEM detections on consecutive analysis events or ten (10) detections for a single project, consultation with CDPHE is required in accordance with Section 5.5.7(E)(2)(g) of the Solid Waste Regulations.



8. Documentation

All asbestos discoveries, excavation, handling, and disposal shall be communicated with CDPHE from discovery through completion in addition to the normal site channels.

The CABI is responsible for documenting all asbestos inspection observations and sampling activities. Detailed, complete, and accurate record shall be documented on all applicable Forms contained in this SOP during the field activities (Attachment 2) and shall include documentation as required in Section 5.5.7 (L) of the Colorado Solid Waste Regulation.

The CABI/QPM shall also be responsible for maintaining the photographic log and the project field logbook. The purpose of the field logbook is to document a semi-narrative record of the field conditions, activities, and events relevant to the field program on a daily basis. Information to be documented in the logbook includes air monitoring, wind stoppage events, decontamination procedures, ACM and/or RACS handling, sample collection, and any other pertinent information not already contained on the inspection and Sampling Forms in this SOP.



9. Equipment and Worker Decontamination Procedures

The purpose of this protocol is to specify decontamination procedures that must be followed when performing asbestos inspections, excavations and other soil disturbing activities.

IN GENERAL, EVERY EFFORT SHALL BE TAKEN TO AVOID DRIVING IN CORRIDORS OR AREAS THAT ARE KNOWN TO CONTAIN ASBESTOS OR HAVE THE POTENTIAL TO CONTAIN ASBESTOS.

9.1. Equipment Decontamination

To minimize decontamination requirements, areas of asbestos contaminated soil may be covered prior to vehicle access. Covering may consist of either 6 inches of clean fill (crushed concrete, gravel, soil, or similar type material) or 10-mil polyethylene sheeting. For haul trucks being loaded with RACS for offsite disposal, the truck may be driven onto 10-mil, or greater, polyethylene sheeting and loaded with care being taken to minimize spillage. After loading, all soil and debris that has spilled onto the polyethylene sheeting must be removed prior to the truck being allowed to roll forward. Removal of soil and debris (which should already be adequately wet) will be conducted with shovels, brooms, or squeegees. If necessary, the polyethylene sheeting may be replaced or hosed down, however, care should be taken to ensure that decontamination water does not leave the immediate work area, or that it is collected and filtered as described in 8) below. The polyethylene sheeting must be visually clean, or replaced, before the next haul truck enters the loading area.

In cases where vehicles or larger equipment (such as backhoes) must be used at the site to conduct subsurface excavations or earthmoving activities access is subject to the following conditions:

- 1) No driving is allowed on any area of known or suspect RACS during the excavation or earthmoving activities;
- 2) The CABI may do a limited clearance of an area to allow vehicle crossing. For areas containing friable asbestos, the area must be confirmed clean by soil sampling prior to allowing access;
- 3) Prior to driving in the area, the established access route must be clearly demarcated in the field using flagging, tape, stakes, signs, etc.;
- 4) Rubber-tired vehicles shall be used to the maximum extent feasible.
- 5) Vehicles entering the area shall avoid causing the release of fugitive dust. Vehicle operators shall be observant by driving in a slow, cautious manner.
- 6) The CABI must be in front of the vehicle to guide the vehicle from driving across any visible asbestos material. Should the CABI observe any suspect or known asbestos materials, the operator/driver shall alter course to avoid them;
- 7) Vehicle access routes may be required to be wetted as needed to make the ground surface damp so that fugitive dust is not generated when driven on. Determination if wetting is required is based on a case-by-case basis between the CABI and CDOT;
- 8) For the purposes of decontamination, the wheels of vehicles exiting the area shall be thoroughly rinsed as each vehicle exits the area determined to have asbestos present on the surface. The driver shall then drive onto a polyethylene tarp and re-rinse the wheels. A 60-mil or greater liner may be used multiple times, or 10-mil polyethylene sheeting may be used for a single decontamination event. If 10-mil polyethylene sheeting is used, care must be used to prevent it



- 9) from tearing. All water must be collected, filtered with 5- micron filter, and then disposed in a sanitary sewer. Subject to CDOT site-specific approval, the rinsate may be collected and placed on a known asbestos area that will be managed under this SOP (this area must be kept adequately wet or stabilized until it is managed). The water must not run-off an asbestos area onto a non-contaminated area or toward any surface water feature. The 60-mil or greater liners may be decontaminated for reuse and one-time use 10-mil polyethylene sheeting shall be disposed as asbestos waste; and,
- 10) Also for the purposes of decontamination and to the extent feasible, the excavator/front end loader or equivalent shall operate on clean areas. 10-mil polyethylene sheeting or liner material can be used to drive onto contaminated areas. When moving from one location to another, the bucket that came into contact with the RACS shall be wrapped in 10-mil polyethylene sheeting to prevent spreading fibers to non-contaminated areas. When it is finished loading, the bucket shall be decontaminated over the last dump truck prior to closing the 10-mil polyethylene sheeting liner/burrito wrap. If the excavator, or other large pieces of equipment, was required to work on contaminated soil, the piece of equipment will be decontaminated as described in 8) above.

Sampling equipment, backhoe buckets, wheelbarrows, vehicles, and other equipment that comes in contact with soil known to contain or potentially contain asbestos shall be decontaminated in accordance with water or by wet wiping between each sample, hole, or excavation to avoid potential cross-contamination, and before leaving the site. The rinsate shall be managed as stated above.

Another option to wet methods described above is to use HEPA vacuums followed by CABI inspection and verification of equipment decon before it leaves the decontamination area. All wet decon of equipment will be followed by CABI inspection and verification of equipment decontamination before it leaves the decontamination area.

9.2. Worker Decontamination

During all soil-disturbing activities in areas with friable asbestos, a fully functioning decontamination unit or trailer shall be available onsite for worker decontamination. The decontamination unit will be centrally located between the investigation areas. The decontamination unit will consist of three (3) chambers and has fully operational hot and cold running water for the shower.

At the beginning of each day, or each time the RWA is to be entered, workers that will be in the area of active RACS disturbance will don disposable protective suites (Tyvek®), disposable gloves and disposable boot covers (excluding truck drivers, as noted in Section 6.2.9). Worker decontamination shall be conducted each time a worker leaves the RWA. For most projects, worker decontamination may consist of removal of Tyvek® suites, gloves and boot covers, which should then be containerized and disposed as asbestos waste. Any non-disposable personnel items must be decontaminated with water or by wet wiping. Rinsate from the boot wash station shall be collected, filtered to less than 5 microns (or applicable local requirement) and discharged to a sanitary sewer or other CDPHE approved disposal facility, or re-applied to RACS that will be managed under this SOP (this area must be kept adequately wet or stabilized until it is managed).

The decontamination unit, as indicated in the Contractors Health and Safety Plan, may be utilized by the workers each time they exit the work area. All contaminated disposable personnel protective equipment shall be containerized and disposed as asbestos waste. Water from the decontamination unit will be filtered to 5 micron and disposed as described above.



10. Disposal

Disposal of RACS shall be conducted in accordance with the following requirements, in accordance with Section 5.5.8 of the Colorado Solid Waste Regulations:

- 1) RACS containing visible friable asbestos will be disposed of in a leak tight container as friable asbestos waste in accordance with the requirements of Section 5.3 of the Solid Waste Regulations. Documentation stating that the asbestos-contaminated soil originating from the site shall not be used as daily cover or sold as clean fill accompany each load of asbestos-contaminated soil removed from the site;
- 2) RACS containing only visible non-friable asbestos that has not been rendered friable will be packaged in a leak tight container and disposed of as non-friable asbestos in accordance with Section 5.2 of the Solid Waste Regulations. Documentation stating that the asbestos-contaminated soil originating from the site shall not be used as daily cover or sold as clean fill accompany each load of asbestos-contaminated soil removed from the site;
- 3) RACS containing no visible asbestos shall be packaged in a leak tight container and disposed as non-friable asbestos waste, as described in Section 5.2 of the Solid Waste Regulations. Documentation stating that the asbestos-contaminated soil originating from the site shall not be used as daily cover or sold as clean fill accompany each load of asbestos-contaminated soil removed from the site;
- 4) Soils that are not asbestos-contaminated, based on analysis showing no detectable amounts of asbestos, may be replaced into the disturbed area as needed, used as fill, or disposed of as solid waste; and,
- 5) The use of soils containing solid waste may be approved for reuse onsite or offsite if the soil and solid waste meet the suitability requirements of Section 5.5.8 of the Regulations and if the constituents of the solid waste are acceptable. The receipt of a beneficial reuse determination from the Materials Management Unit of the Division may also be required depending on the constituents of the solid waste. If the solid waste consists of RACS an environmental covenant may also be required prior to reuse.



11. Remaining RACS

In the event that RACS is left in place following the conclusion of excavation or earthmoving activities, the Contractor shall:

- 1) Document the condition and location of remaining RACS. Documentation will be at the discretion of CDOT, but may include GPS, land survey, photographic documentation, etc.
- 2) The remaining RACS will be treated with a soil stabilizer;
- 3) The remaining RACS will be covered with an appropriate engineered fabric; and,
- 4) The remaining RACS will be covered with geofabric, followed by 18-inches of fill suitable for unrestricted use and vegetation, or cover RACS with geofabric followed by six (6) inches of clean fill and concrete or asphalt; or, cover RACS with geofabric followed by clean fill to grade or six (6) inches, whichever is greater, for vertical excavation faces or trenches; or, alternate cover designs as approved by the CDPHE and CDOT.

The specific soil stabilizer and engineered fabric used will be dependent on site-specific information, and will be approved of by CDOT prior to application.

As noted previously (Section 6.3), the excavation and removal of ACM on a facility component below the AQCC Regulation No. 8 trigger levels is permitted under this SOP. However, in those instances when ACM on a facility component is left in place following partial excavation and removal, the Contractor shall:

Document the condition and location of the facility component and remaining ACM. Documentation will be at the discretion of CDOT, but may include ACM type, GPS, land survey, and photographic documentation.



12. Reporting

At the request and discretion of CDOT, Contractor shall periodically prepare a report documenting the RACS and/or ACM work completed. The frequency of the reporting shall be determined by CDOT. The report may include the following:

- 1) Description of known, suspect or unexpected discovery of RACS;
- 2) Description of field operations;
- 3) Containment logs (where appropriate);
- 4) Air monitoring procedures and laboratory results;
- 5) Description of RACS work completed, including inspection procedures, sampling procedures and analytical results if any;
- 6) Disposal manifests;
- 7) Description of the condition and location of remaining RACS, including GPS, land survey, photographic documentation, (see Section 11.0);
- 8) Photographs, if any, taken prior to, during and/or after RACS work completed; and,
- 9) Accreditation and Certification documentation for activities covered under this SOP.

CDOT FIELD DOCUMENT FORM - UNEXPECTED ASBESTOS DISCOVERY

Date:	Time of Discovery:
-------	--------------------

Contractor that Encountered Asbestos

Location of Discovery: (Address, Survey Marker, Mile Marker, etc.)

General Description of Area:

Field Activity that Caused the Encounter:

Type(s) of Material Identified:

Samples Collected ID:	Time:	Date:	Description:	Results:

Description of SOP Implementation Procedures:

Sketch of Area with Asbestos Location Depicted

Phil Kangas of CDOT Hazardous Waste Unit, Asbestos Program Project Manager must be notified by phone immediately. This form must be submitted and received by Mr. Kangas within 24 hrs. of unexpected discovery.
Office: 303-325-6123 Cell: 303-325-6123 Fax: 303-512-5550 Email: phillip.kangas@state.co.us