VOLUNTARY CLEAN-UP ROADMAP

A How-To Guide

Hazardous Materials and Waste Management Division
Colorado Department of Public Health and Environment

Colorado Department
of Public Health
and Environment

for further information call:

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(includes updates related to fee schedule)

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BACKGROUND AND PURPOSE

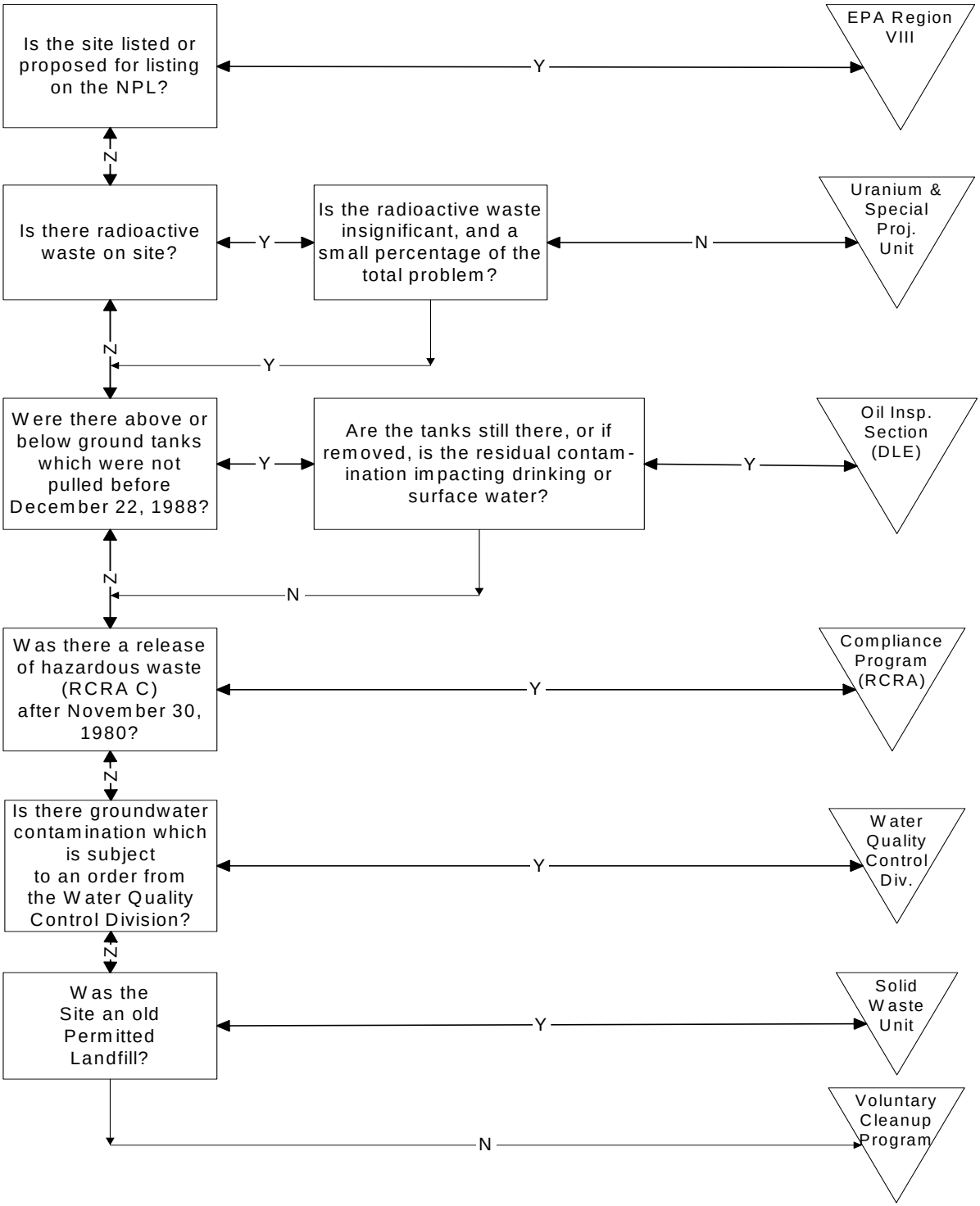
The State of Colorado contains thousands of sites where soils and ground water have been contaminated by past uses. These sites range in size from small spills involving a few square feet of surface contamination, to sites like the Rocky Mountain Arsenal, where millions of gallons of contaminants have impacted several square miles of land. In most cases, these sites are currently within the proper regulatory framework to assure appropriate clean-up and protection of human health and the environment. For example, a given manufacturing facility may have a RCRA (Resource Conservation and Recovery Act) permit to properly manage hazardous waste and a discharge permit under the Clean Water Act. Or a facility with known contamination may be under a RCRA Corrective Action Order to insure appropriate clean-up.

For some other sites, a regulatory framework may not exist, or the proper regulatory authority may not be aware of the facility or problem. For example, an inactive facility whose contamination predates the RCRA statute would not fall under RCRA authority. The owners of these properties may wish to perform clean-ups to facilitate land transfers or for other reasons. Or, they may want a letter from the state that indicates that the property does not have a significant contamination problem and that no action is required. From the state's perspective, there is a benefit to the citizens and the environment in having such owners come forward. In addition to removing contamination from the environment, such activities promote the redevelopment of previously contaminated sites, as opposed to utilization (and potential contamination) of new sites.

As a result of this mutual benefit to landowners and the state, several state programs developed informal mechanisms for reviewing, approving and overseeing these voluntary clean-up-up efforts. In addition, in 1994 the General Assembly passed the Voluntary Clean-up and Redevelopment Act, which formalized this process for certain types of sites. The purpose of this document is to provide a resource to landowners who would like to propose a voluntary clean-up effort or receive a no-action determination. The document attempts to describe the various programs under which voluntary clean-up efforts occur and to provide a ROADMAP for which program is most appropriate for the site in question. It includes a detailed description of what to expect in each program regarding the degree of state involvement and the time frame for reviews, the type of information you will be required to provide and the type of clean-up you might be expected to propose.

It is the goal of the state to encourage as many voluntary clean-up proposals as possible, and to remove any barriers landowners might have in coming forward. Traditionally, such barriers have included fear of prosecution or being forced to do more clean-up than they wanted. It is our feeling that such barriers hurt us all, and we have tried to address these issues in this document so that you will have some certainty regarding how the state will act, and what will be expected, before you come forward. Ultimately we would like all the voluntary programs to be consistent in their requirements and cooperative in their approach so that landowners don't need to worry about which program they might fall under.

PROGRAM IDENTIFICATION FLOWCHART



COMING FORWARD WITH CONTAMINATED SITES

LEGAL REPORTING REQUIREMENTS

Most state reporting or notification requirements under environmental statutes involve two types of situations. First, notification is required prior to the person undertaking activity involving the emission of air pollutants, the discharge of water pollutants, the management of hazardous waste, solid waste, or radioactive materials or the operation of an underground storage tank. Second, all of the state environmental statutes have reporting or notification requirements regarding contamination resulting from spills that occur due to some activity after the person takes control of the property, or by his predecessor, if the new owner is continuing the same activity. In other words, most state reporting requirements relate to current activities and spills. A good summary of these requirements is contained in the pamphlet "Reporting Chemical Spills in Colorado," issued in May 1995 by the Colorado Department of Public Health and Environment.

However, most voluntary clean-up situations involve contamination that occurred in the past. Under these situations state environmental laws do not require notification, with the exception of past releases from underground storage tanks.

CUSTOMER NEEDS

The landowners must also assess their own needs regarding the property in question. In terms of coming to the state, often the need is to receive a letter approving a clean-up, saying the property is already clean, or saying that the owner will not be held responsible for contamination coming onto their property from another property. These letters are often required in property transactions. If you don't need the state concurrence, then you may not need to apply (unless you are otherwise required to do so by law).

Depending on the contamination you are dealing with, you may be able to perform the clean-up on your own, and simply keep adequate documentation for use as needed. You do run the risk that if a governmental agency has jurisdiction, and requires clean-up at a later date, your clean-up may not be deemed sufficient. By coming forward before performing the clean-up, you obtain certainty that the clean-up is considered adequate by the agency. In addition, it should be noted that if the contamination is defined by statute as a RCRA hazardous waste, the treatment or disposal of this waste might require a permit.

WHERE TO GO

The following sections discuss the various programs where voluntary clean-ups occur within the Colorado Department of Public Health and Environment. It is designed to assist a property owner in determining the proper program to contact, based on the type of site in question. Most often, "type of site" refers to regulatory definitions, rather than the type of contamination or the kind of business on the site. The section then gives an outline of each program, so that the owner can determine how long the review will take, what information is necessary, how the adequacy of the clean-up plan will be determined and what kind of "sign-off" the owner will receive. The document emphasizes the formal Voluntary Clean-up and Redevelopment Program, but other programs are also discussed in detail. The flow chart at the beginning of the document depicts the decision criterion that determines which program a given site should use to obtain state approval for a voluntary clean-up action.

VOLUNTARY CLEAN-UP AND REDEVELOPMENT PROGRAM

LEGISLATIVE AUTHORITY

Authority for the Voluntary Clean-up Program is derived from the Voluntary Clean-up and Redevelopment Act (the Act) (C.R.S. 25-16-301) passed in 1994. The purpose of the Act is to "Provide for the protection of human health and the environment and to foster the transfer, redevelopment and reuse of facilities that had been previously contaminated with hazardous substances or petroleum products." The Act is intended to permit and encourage voluntary clean-ups by providing a method to determine clean-up responsibilities in planning reuse of a property. The program is tasked to operate quickly and with a minimum of administrative processes and costs. Accordingly, no regulations have been promulgated in relation to the Voluntary clean-up and Redevelopment Act. A copy of the Act is included in Appendix A.

UNIVERSE OF SITES

Generally, the Voluntary Clean-up Program was intended for sites that were not covered by existing regulatory programs. Historically, owners might have proposed clean-ups on these sites, but because they didn't fall under any program's authority, the proposals languished. The Voluntary Clean-up Act was passed to address sites not covered by existing regulatory programs and provide a mechanism to approve clean-up plans. The Act specifically recognizes existing regulatory programs and excludes sites covered by these programs from participation in the Voluntary Clean-up Program. These exclusions are:

1) **Property that is listed or proposed for listing on the National Priorities List of Superfund sites established under the Federal Act.** The Voluntary Clean-up Program is allowed to accept sites the United States Environmental Protection Agency is working on related to Superfund, as long as that process has not gone as far as proposing (or listing) the site as a Superfund site. However, there have been valid concerns from owners on these sites regarding whether the Environmental Protection Agency will require additional work, despite approval from the state under the Voluntary Clean-up Program. In order to address this issue, the state signed a Memorandum of Agreement with the Environmental Protection Agency. The Agreement provides assurance that the Environmental Protection Agency will not take action on sites approved by the Voluntary Clean-up Program unless under exceptional circumstances there is a substantial threat to human health or the environment. The Agreement also addresses Environmental Protection Agency involvement in "NPL Caliber" sites, which are those sites that are significant enough to become Superfund sites, but which have not yet been proposed for the National Priorities List. Additional public notification and state review of construction certification are required to obtain this Environmental Protection Agency assurance under the Memorandum of Agreement. A copy of the Memorandum of Agreement is in Appendix B.

2) **A facility that has or should have a permit or hold interim status pursuant to Part 3 of Article 15 (C.R.S. 25-15-301 et. seq.) for the treatment, storage or disposal of hazardous waste.** Facilities with a RCRA permit or interim status are

excluded from the Voluntary Clean-up Program and should be handled by the Colorado Department of Public Health and Environment's Compliance Program. In addition, any facility with a release of a RCRA hazardous waste after 1980 is deemed to have illegally disposed of hazardous waste without a permit and is excluded from the Voluntary Clean-up Program under this section.

In some cases there may be insufficient information to determine whether the site falls under RCRA authority. The Compliance Program may defer such questionable sites without further consideration if the following conditions are met:

- The volume of impacted soil is relatively small and contained on the property.
- Ground water has not been impacted, or contamination does not exceed state standards at the site boundary. Mobility and potential biodegradation of the contaminants will also be evaluated.
- Surface water has not been impacted.
- A non-aqueous phase is not present.
- All releases can be remediated within 24 months with a high probability of success. No long-term monitoring is required.

It may not be necessary to meet all of the above criteria in order for the Compliance Program to refer sites to the Voluntary Clean-up Program, if site-specific conditions in some way diminish the severity of the release, and threats to human health and the environment are minimal. The Compliance Program, in consultation with the Voluntary Clean-up Program and the facility representatives, will decide under which program the state environmental concerns would best be handled.

3) **Property that is the subject of corrective action under orders or agreements issued pursuant to the provisions of Part 3 of C.R.S. 25-15-301 et. seq. or the Federal "Resource Conservation and Recovery Act of 1976," as amended**. If the property is under a RCRA order or other agreement to perform clean-up, the clean-up should proceed under that authority.

4) **Property that is subject to an order issued by or an agreement with the Water Quality Control Division pursuant to C.R.S. 25-8-601 et. seq**. The Colorado Water Quality Control Act and regulations say that any property with ground water contamination for which the owner/operator is responsible is subject to an order. These owners should pursue clean-up with the Water Quality Control Division. However, the Water Quality Control Division may choose to defer to the Voluntary Cleanup Program if the contamination does not present an imminent threat to human health (i.e., low concentrations confined to the applicant's property). Contamination that was created by a previous owner is not subject to an order, and therefore is eligible for the voluntary clean-up program. In addition, any site that has a continuous discharge to waters of the state (i.e., draining mine adits) should be permitted under the water quality regulations. There is no variance from these permitting requirements, which remain as long as there is a discharge.

5) **Property that is subject to the provisions of C.R.S. 8-20.5201. seq.** Underground Storage Tank sites should be handled by the Department of Labor and Employment (phone

303.620.4209.) Sites that are generally excluded under this provision include registered underground and above ground storage tanks, which contain petroleum product or "regulated substances." A regulated substance is any substance defined in section 101 of CERCLA, but not including any substance regulated as a hazardous waste under RCRA. The Voluntary Clean-up Program can handle old tank sites if the tanks were removed prior to December 22, 1988, and any residual contamination that exists is not impacting surface water or a source of drinking water.

HOW TO APPLY/ INFORMATION REQUIREMENTS

The Voluntary Clean-up Program is designed to be a one-time interaction with the Department, although there is usually contact between the Department and the applicant during the review process. Therefore, the application must include all necessary information up front, as opposed to a more iterative approach with several sequential submittals.

First, a detailed site history should be compiled to assess whether there might be any sources of contamination on the site. A discussion of site characterization efforts should then be included. This site characterization should be linked to the site history and indicate that the right constituents were sampled for in the right places, given the historical uses of the site. Sampling and analytical methodologies should be included. Next, the site characterization data should be presented and compared to established state standards if they exist. In addition to summary tables of the data, raw data and borehole logs should be included. Lastly, a plan of action should be prepared to either remediate the site or for no action. In either case, justification for the plan must be based on either meeting state standards (you will clean up to standards, or you already meet them) or an analysis of risk based on your proposed land use.

The Department has prepared a guidance document that details the information requirements for the Voluntary Clean-up Program application. The document also compares the program information requirements with the information normally provided in the standard Phase I and Phase II Environmental Assessments in order to assist owners with completed Phase I or II reports in identifying any additional information requirements. This document is included as Appendix C.

REVIEW TIME FRAME AND COSTS

The statute requires that the state approve or deny an application within 45 days of submittal. For complete applications, we have been able to meet this time frame. Where additional information is required, the Act allows the Department and the applicant to negotiate an extension to a specific date. About half the applications received to date have required such extensions. If the Department receives more than eight applications in one month, the statute allows these applications to move to the next month's schedule (providing an extra 30 days of review time).

The applicant must submit a check for $2,000, payable to the Colorado Department of Public Health and Environment, with the application. The state then bills against the fee at the rate of $75 per hour for reviewing the application.

If the state incurs more than $2,000 in review costs, it may bill the applicant for up to an additional $1000. If the application is of such size or complexity that the review is anticipated to cost more than $3000, the state must notify the applicant. The applicant may then withdraw the application, or sign a written agreement with a new dap on review charges. Conversely, if there is money left from the $2000 application fee at the end of the review, the applicant receives a refund within 30 days. It has been our experience with the program since 1994 that approximately 85 percent of all applicants receive refunds, 10 percent will incur up to an additional $1000 in charges, and

5 percent will need to negotiate a written agreement.

It should be noted that the state does not provide any funding for the cleanup activities. It is the owner's responsibility to bear these costs. However, the state does have a Brownfields Revolving Loan Program that provides low interest loans for cleanups. For more information on this program, contact Dan Scheppers at 303-692-3398.

CLEAN-UP STANDARDS AND RISK

The program requires applicants to meet existing state surface and ground water standards. The compliance point is the property boundary. For sites where a groundwater plume migrates off the property in excess of state standards, the applicant is encouraged to perform remedial actions to reduce contaminant levels to below state standards at the property line. The applicant may treat the entire plume, or may perform remedial actions only within the property boundary, and rely on monitored natural attenuation for the remainder of the plume. Active remediation should be based on source characterization, contaminant concentrations, contaminant fate and transport, and ground water depth and flow characteristics. Remedial actions may include source removal, mass reduction, or other treatment alternatives.

If the entire plume is not treated, an evaluation of monitored natural attenuation must be made. This evaluation should include the geochemical reactions that influence contaminant concentrations, the time expected until compliance with state standards, and the expected land uses and exposure pathways that may exist during the attenuation period. The applicant must show that the attenuation timeframe is reasonable, given the expected land use scenarios. The use of institutional controls may be considered in this evaluation. An additional important consideration will be whether a ground water plume may adversely impact the quality of hydrologically connected surface water.

If after considering these issues the proposed cleanup is determined to be adequate, the Department will approve the voluntary clean-up proposal even though ground water standards may be exceeded at the property boundary at the conclusion of active cleanup.

If the applicant proposes "No Action" in situations where a groundwater plume migrates off the property in excess of state standards, the applicant must first obtain a site-specific standard, site-specific point of compliance, or site-specific variance from the Department's Water Quality Control Commission as provided in the Commission's Basic Standards for Groundwater, Regulation #41.

For soils, no state numeric standards exist. Risk-based guidance developed by the State of Colorado, the federal government or by other states is accepted for soil clean-up levels, if the applicant proposes to meet those standards. All clean-up standards or guidance can be modified based on an assessment of risk at the site.

The Voluntary Clean-up Program encourages applicants to use as simplified an approach to risk as possible. Only for the most complex sites is a full baseline risk assessment (Environmental Protection Agency Risk Assessment Guidance approach) expected. For most sites, a narrative description of the exposure pathways (and lack of completed pathways) is sufficient. For example, if the land use (a paved parking lot) will interrupt exposure to contaminated soil, then as long as that soil is not a source of ground water contamination, an acceptable level of risk has been demonstrated. However, even in those cases, the Department encourages the removal of source contamination whenever possible. Only in cases where there are completed pathways is a risk calculation needed. In these cases, the goal of the program is to approach a 10^{-6} (1 in 1,000,000) additional risk, based on the actual exposure scenario for the anticipated land use. Potential exposure or potential land uses are not considered.

It should be noted that in July 2001 the General Assembly passed a law regarding environmental covenants. This amendment to the RCRA statute requires an environmental

covenant to run with the land for any clean-up decision that does not provide unrestricted use. The covenant would describe any land use limitations, engineered remedy components that must be maintained, monitoring requirements or other restrictions. These covenants are not required for the Voluntary Clean-up and Redevelopment Program. However, landowners may voluntarily record a covenant for their protection against future misuse of the property by others, if they desire.

In determining appropriate health-based standards for workers, Occupational Exposure Limits for protecting the health of workers who are knowingly exposed to hazardous chemicals in their line of work should be used, rather than exposure through general environmental pollution pathway.

STATE OVERSIGHT IN CONSTRUCTION AND CERTIFICATION

Under the Voluntary Clean-up Program, the state provides no construction oversight or certification. The applicant is responsible for providing a self-certification that the remediation has been completed in accordance with the plan. This self-certification must be submitted to the state within 45 days after completion of the clean-up plan. However, in order to receive the Environmental Protection Agency's assurances that they will not take Superfund action (as specified in the Memorandum of Agreement), the applicant must submit a completion report as a new application for no action under the program, so that the state can independently review and concur that the plan has been completed and approved.

BROWNFIELD TAX CREDIT

In the year 2000, the General Assembly passed HB-1306, which created an income tax credit for redeveloping contaminated properties under the Voluntary Clean-up Program. A credit of up to $100,000 on the first $300,000 of clean-up costs may be earned. Properties must be located in municipalities with populations greater than 10,000 in order to qualify for the tax credit. In order to get this credit, the applicant must submit a construction verification report in the form of a new application for no action under the program, so the state can review and concur that the plan has been completed as approved. In addition, the report must include an accounting of clean-up costs. The state will then issue a letter verifying both the project completion and the costs, which can be used to obtain the tax credit. The enabling statute for this tax credit is presented in Appendix F. Information can also be obtained at our web site: http://www.cdphe.state.co/hm/bftaxhowto.asp>

ENFORCEMENT AUTHORITY

There is no formal agreement that binds the parties under the Voluntary Clean-up Program, and the state has no enforcement authority under the Act. Assuming the site is eligible for the program, we cannot make you perform clean-up you don't want to do, and we cannot make you complete a clean-up you have proposed. The applicant can "walk away" at any time, with the only consequence being that any approval received from the state would be void. If a clean-up had been started, the state might utilize RCRA authority to require removal of any piles that had been left, or otherwise require the owner to properly manage any waste that had been generated from the incomplete clean-up. This authority would not be used to force completion of the clean-up. The owner/applicant would be responsible for closing up the site to protect public safety and insure that environmental problems were not exacerbated (i.e., leaving a dangerous hole that would collect surface runoff and contribute to ground water contamination).

PUBLIC PARTICIPATION

The Act has no formal requirements for public participation or review of applications. However, all files are public documents and available for public review upon request. Also, the Department routinely contacts the local health departments to see if there is any knowledge or interest in the site and will try to

make a copy of the application available for local review if requested.

In order to receive the Environmental Protection Agency's assurances that they will not take action under CERCLA (as per the Memorandum of Agreement), the applicant must provide public notice, within 30 days of the approval, that the clean-up plan or no further action determination has been approved by the state. In some cases where public interest in the property is high, the Department may require that the applicant provide additional public information.

STATE APPROVAL

The state provides an approval letter upon completion of the application review. The letter says that, based on the information you have given us about the contamination and the proposed land use, if you complete your plan as proposed (either clean-up or no action), no further action is necessary on the site. It is our assurance to you that as long as the land use stays the same, the state will not require any additional clean-up. There is no covenant not to sue in the letter. If the property is subsequently sold, the approval runs with the land, provided the land use stays the same. A sample letter is included in Appendix E.

In instances where a petition or clean-up plan is denied, the denial letter will include specific reasons for the denial.

If the applicant should choose to withdraw an eligible site, there is no authority that can compel any further action at the site. A withdrawn application does remain part of the public record.

For further information contact:
Mark Walker, Voluntary Clean-up
(303) 692-3449
mark.walker@state.co.us

SOLID WASTE UNIT

LEGISLATIVE AUTHORITY

The authority for the solid waste program comes from C.R.S. 30-20-100.5 et. seq, passed in 1967. The purpose of the Act is to establish minimum standards and methods for the management of solid waste. Regulations for the program are contained in 6 CCR 1007-2, Part 1.

UNIVERSE OF SITES

By regulatory definition, anything that is not a hazardous waste (as defined in RCRA Subpart C) is a solid waste over which the unit has jurisdiction. Many of these sites, such as old landfills, tire recyclers and medical facilities, require Certificates of Designation under the statute. These sites can all apply to the Solid Waste Unit for approval of a voluntary clean-up plan. There are some types of sites that are, by statute, exempt from the requirement to obtain a Certificate of Designation. Some of these exempted sites can also apply to the Solid Waste Unit for approval of a voluntary clean-up plan. These include transfer stations and sludge farms. Other sites are exempted because they fall under other permitting authority, either from the Department of Natural Resources Division of Minerals and Geology (mining operations with solid waste landfills), the Department of Labor Oil and Gas Conservation Commission (permitted exploration and production sites), the Department of Public Health and Environment Water Quality Control Division or Laboratory and Radiation Services Division (any site with radioactive waste). Any plans to clean up these types of properties should be handled through the appropriate permitting agency.

Most of the sites that come into the unit involve non-Underground Storage Tank petroleum contamination and heavy metals. Since there is not a specific exclusion in the Voluntary Clean-up and Redevelopment Act regarding solid waste, the Department has determined that solid waste sites can apply to either program. However, former landfill sites are strongly encouraged to submit clean-up plans to the Solid Waste Unit, due to the landfill expertise that exists within the unit.

HOW TO APPLY/INFORMATION REQUIREMENTS

Anyone wishing to perform a voluntary clean-up of a solid waste site should contact the Solid Waste Unit of the Colorado Department of Public Health and Environment. The technical staff will review the application, meet with the applicant, and the process will go from there. Typically there is an initial report(s) that delineates the problem and states the clean-up strategy. This report should include a full characterization of the site, including the nature and extent of contamination and the media impacted. The proposed land use should also be included in the report.

The Department has prepared a guidance document that details the information requirements for a voluntary clean-up application. These requirements are applicable to voluntary clean-ups approved within the Solid Waste Unit. The document also compares the information requirements with the information normally provided in the standard Phase I and Phase II environmental assessments in order to assist owners with Phase I or II reports in identifying any additional information requirements. This document is available from the Department and is included as Appendix C.

REVIEW TIME FRAME AND COSTS

Review times vary with the complexity of the site and the need to obtain additional information from the applicant. Times from receipt of an application to program approval of a clean-up plan have ranged from as little as three days to as much as one year. Depending on the current workload of the Unit, review

times may be negotiated to meet customer needs.

The program charges approximately $75 per hour for review. Recent data indicates an average of 12-15 hours, with a range of 3-30 hours. Accounts are often kept open until the remediation is complete, to allow for any required oversight or review of completion reports and data.

CLEAN-UP STANDARDS AND RISK

The program utilizes readily available state standards and guidance, such as the Underground Storage Tank owner/operator petroleum contaminated soils guidelines, metal standards from RCRA and state water quality standards. The applicant can adjust these levels based on a site-specific risk analysis.

The Solid Waste Unit has used the Department's guidance titled "Interim Final Policy and Guidance on Risk Assessment for Corrective Action at RCRA Facilities" (November 16, 1993) to determine appropriate risk-based clean-up levels. Risk-based numbers produced by other state and federal entities also may be accepted in lieu of a site-specific risk assessment. The program will also accept a narrative description regarding the interruption of contaminant pathways.

EXTENT OF STATE OVERSIGHT IN CONSTRUCTION AND CERTIFICATION

The Solid Waste Unit will review construction reports and may utilize an occasional site visit or telephone conversations during construction to insure that plans are being followed. The state does not provide independent certification of the remediation, but does require such certification and a completion report from the applicant.

ENFORCEMENT AUTHORITY

No formal agreement is used to bind the parties to the voluntary clean-up plan. However, the Solid Waste Unit will use its enforcement authority under the solid waste act to insure completion of the clean-up. Failure to complete the clean-up is considered illegal disposal of solid waste. The current owner is responsible for all clean-up activities.

PUBLIC PARTICIPATION

There is no provision for public participation in voluntary clean-ups that proceed under the Solid Waste Unit. However, the local governing body/local health department is kept informed about the plans for remediation and the status of the site.

STATE APPROVAL

The applicant receives a letter at the end of remediation, which states that no further action is required at this time, and is conditioned on existing information being accurate. This letter is based on receipt of a completion report from the applicant, which certifies that the clean-up plan has been completed as approved. A sample copy is included in Appendix E.

For further information contact:
Glenn Mallory, Solid Waste Unit
(303) 692-3445
glenn.mallory@state.co.us

RCRA VOLUNTARY CORRECTIVE ACTION PROCESS

LEGISLATIVE AUTHORITY

The first federal solid waste law, the Solid Waste Disposal Act, was passed in 1965. In 1976, Congress amended this law by replacing its language entirely with the Resource Conservation and Recovery Act, commonly known as RCRA. RCRA established the framework for managing both solid and hazardous waste. This framework consists of 10 subtitles, including Subtitle C, which gives authority, funding and directives to the U.S. Environmental Protection Agency to develop the hazardous waste regulations. These regulations were promulgated on May 19, 1980, and are designed for the identification, notification, and management of hazardous waste in ways that protect human health and the environment.

On November 2, 1984, the State of Colorado was authorized by the Environmental Protection Agency to administer the hazardous waste management programs in lieu of the Federal RCRA program. The laws governing the management of hazardous waste in this State are contained in the Colorado Hazardous Waste Act (Sections 25-15-301 to 316, C.R.S.) and the Colorado Hazardous Waste Regulations (6 CCR 1007-3).

UNIVERSE OF SITES

There are two categories of facilities at which corrective actions to remediate releases of hazard waste occur. The first category includes interim status and permitted facilities that have formally notified the state that they treat, store or dispose (TSD) of hazardous waste. Detailed procedures governing the closure of regulated hazardous waste management units and corrective actions at solid waste management units at TSDs are contained within the Colorado Hazardous Waste Regulations. The remediation of hazardous waste releases at TSD facilities must therefore be performed in accordance with these regulations.

The second category of facilities where corrective actions may take place are non-TSD facilities where hazardous waste is simply generated. Generator sites where hazardous waste has been released into the environment after November 19, 1980, are considered to be unpermitted disposal facilities subject to RCRA regulation with regard to the clean-up of such a release. The Colorado Hazardous Waste Regulations defines disposal as "the discharge, deposit, injection, dumping, spilling, leaking or placing of any solid waste or hazardous waste into or on any land or water so that such solid waste or hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including ground waters."

The remediation of hazardous waste releases at generator sites is eligible for voluntary clean-up under the Corrective Action Plan Rule (6 CCR 1007-3, §100.26). Although an owner/operator of a hazardous waste facility with a permit (TSD operating or post-closure permit) is specifically prohibited from addressing releases under this rule, they are encouraged to employ a similar method to streamline the remediation process using the authority and procedures available to them through their permit.

HOW TO APPLY/INFORMATION REQUIREMENTS

The Corrective Action Plan Rule establishes a framework whereby a facility may voluntarily initiate the characterization and/or clean-up of hazardous waste releases. The corrective action plan that is submitted for review and approval by the Department may consist of either a single, comprehensive

document that integrates the site characterization data with the proposed remedial alternative, or it may provide for a phased approach to investigate and remediate the release. This rule also establishes timeframes by which the Department must review the corrective action plan and notify the facility whether it is approved, approved with modifications or disapproved.

In general terms, the RCRA corrective action process consists of three primary activities: characterizing the release, selecting an alternative to remediate the release and implementing the selected remedy until the desired remediation goals are achieved. This process is outlined in the "RCRA Integrated Corrective Action Plan Application Guidance Document and Checklist" (January 2000). The U.S. Environmental Protection Agency has prepared a large number of other guidance documents that describe the RCRA corrective action process, including the "Interim Final, RCRA Facility Investigation (RFI) Guidance, Volumes I through VI" (Environmental Protection Agency 530/SW-89-031, May 1989) and the "RCRA Corrective Action Plan" (OSWER Directive 9902.3-2A, May 31, 1994). These may be relied upon as well in preparing a corrective action plan. Each of these primary activities is discussed in the paragraphs below.

Once it is determined that a release of hazardous waste has occurred, it is the responsibility of the facility owner/operator to define the nature, magnitude, rate of migration and full horizontal and vertical extent of the release, including contamination that may have migrated off-site. The source or sources of the release must be identified and characterized, along with all affected environmental media (soil, surface water, ground water and air).

An effort must be made to identify all potential nearby receptors of contamination, including surface water bodies, municipal and private ground-water users and nearby residential properties where homeowners may be exposed to surface contamination and/or air emissions. The investigation should also determine whether contamination might be migrating along preferential pathways, such as buried utilities or geologic structures. In summary, sufficient representative data should be collected to allow both the facility and Department to decide whether remedial actions are necessary, and if so, to use the data to select and design a remedy. Under the corrective action plan process, data generated during this phase of the corrective action process may be submitted to the Department either at the completion of the investigation when a remedy is being considered (integrated corrective action plan) or while the investigation is ongoing (multiple phased corrective action plan).

After the source of contamination has been identified and the associated release of hazardous waste and hazardous constituents have been characterized, the facility owner/operator, with the assistance of the Department, would then decide whether remedial actions are necessary. Generally, clean-up of impacted environmental media may be required if 1) the release poses, or has the potential to pose a threat to human health or the environment, on site or off site, based on current and proposed future land uses, 2) the State ground water standards are exceeded beyond the facility boundary, 3) contaminant concentrations are at hazardous waste levels, and/or 4) contaminant concentrations have the potential to degrade water quality in excess of established standards. Clean-up standards would be negotiated with and approved by the Department.

If it is decided that remediation is necessary, all available corrective measures should be reviewed in order to select an alternative to efficiently, effectively and economically clean-up the source and associated environmental contamination, including contamination that may have migrated beyond the facility boundary. The results of this corrective measure selection process, along with a design for the remedial alternative chosen, should be submitted to the Department for review and approval in the corrective action plan.

Once approved by the Department, the facility owner/operator will then implement the

selected remedial alternative. While cleaning up the release, monitoring data should be collected to verify that the selected remedial alternative is operating as designed, that contaminant removal rates are maximized and that progress is being made towards achieving the clean-up objectives. Remedial activities will continue until 1) the clean-up standards have been achieved, 2) a clear and convincing demonstration, supported with actual field data, is made that the standards will be achieved without further active remediation (in which case the facility may simply monitor the residual contamination at the site), or alternate clean-up criteria are subsequently established that do not require active remediation.

Under the Corrective Action Plan Rule, a proposal to terminate the corrective action program must be submitted to the Department, in the form of a completion report, for review and approval. This final report should document the facility owner/operators success at achieving the established clean-up standards, through confirmation soil samples and/or ground water monitoring data.

REVIEW TIME FRAME AND COSTS

The Corrective Action Plan Rule establishes timeframes within which the Department shall use its best efforts to review the corrective action plan and notify the facility of its approval. The regulation states that the Department will review the corrective action plan within 60 days of its receipt, spending no more than 40 hours to review a simple corrective action plan and 100 hours to review a complex corrective action plan. If a phased process is used, the Department will also complete the review within 60 days, but spending no more than 40 hours in its review. Completion reports are expected to be reviewed within 30 days of their receipt, with no more than 20 hours spent reviewing it.

Facility owner/operators that submit a corrective action plan application shall pay an hourly charge of $100 for departmental staff and administrative time involved in reviewing, processing and rendering a decision on the corrective action plan proposal. Since this fee is subject to change, please check the Colorado Hazardous Waste Regulations, §100.32(b) for the most current hourly charge.

CLEAN-UP STANDARDS AND RISK

In an effort to standardize the method for developing clean-up criteria, the Department has prepared a document entitled "Interim Final Policy and Guidance on Risk Assessments for use During Corrective Action at RCRA Facilities." The Environmental Protection Agency's "Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual" (Environmental Protection Agency/540/1-89/002) may also be used for this purpose. A similar document, entitled "Proposed Soil Remediation Objectives Policy Document" (December 1997) describes procedures for generating clean-up standards for soil that are protective of direct exposure and ground water quality. Both these documents describe procedures for establishing clean-up standards for both water and soil pathways, each of which is discussed briefly in the paragraphs below.

If contaminant concentrations in ground water or surface water exceed state and/or federal water quality standards, no evaluation of the water pathways in the risk assessment would be required. In these cases, the contamination in the water above the standard would need corrective action, particularly if the contaminated water has migrated off site. Depending on the characteristics of the site and the behavior of the contamination, the corrective action necessary to address such a release may vary from a combined program of source control and monitoring to active treatment of the contaminated water, both on site and off site.

Soil clean-up standards not only take risk into account, but also potential future degradation of ground water resources. For a RCRA corrective action site to be completely released from regulatory control, it is necessary to clean the site to a level that supports unrestricted use (background levels or residential exposure scenario). If the site can be cleaned up to a level that does not present

unacceptable risk to current and future workers (industrial or commercial exposure scenario), even though it is not clean enough to support unrestricted use, further clean-up of the site may be deferred to a time when use changes. In this case, the statute requires that the property owner sign an environmental covenant and file it with the property record at the County Clerk and Recorder's office. This covenant will describe any land use restrictions, operation and maintenance of engineering controls, monitoring or other requirements that run with the property.

For those contaminants that are relatively mobile and have the potential to migrate through the vadose zone and degrade ground water quality in the underlying aquifer, an analysis should be performed (leach testing, soil/water partition coefficient calculations, etc.) to determine whether the protection of ground water would be the driving force when establishing a clean-up standard. This is typically the case for volatile organic compounds that are highly mobile and have low water quality standards. For these compounds, soil clean-up standards designed to protect ground water quality will be significantly lower than a standard calculated by evaluating the direct exposure pathway (ingestion, inhalation and dermal contact).

It is recommended that the facility owner/operator meet with the Department to discuss and negotiate the methodology used to calculate clean-up standards so that prior agreement on the approach taken can be reached before time and effort is spent calculating site specific standards.

STATE OVERSIGHT OF THE CORRECTIVE ACTION PROCESS

Oversight activities may include interaction and negotiation with the facility owner/operators, review and approval of facility workplans and reports and site visits. The appropriate level of oversight will be dependent upon the type of activity, complexity of the site, level of contamination, site priority and compliance history. The level of oversight is also dependent upon whether the facility owner/operator has chosen an integrated (minimal oversight) or phased approach (multi-step review and approval) to remediate their site. For low levels of oversight, the Department's role is minimal and primarily consists of approving the site characterization effort, approving the remediation proposal, approving clean-up standards and verifying that these standards have been achieved. For high levels of oversight, the Department may be asked by the facility owner/operator (or we will request) to review and approve workplans and reports for all phases of the corrective action program with a high degree of interaction with the owner/operator. This decision is in part dependent upon the facility's confidence and comfort proceeding down the corrective action pipeline with or without close Department involvement.

It should be noted that the RCRA corrective action program provides the most complete state oversight of the voluntary clean-up programs discussed in this document. The advantage of this approach is that the state is then able to certify completion of the remedial action. Independent state certification is not provided in any other program, although the Solid Waste Unit does concur on the owner's certification. In the Voluntary Clean-up Program the applicant self-certifies, and therefore does not receive state concurrence that the remediation is complete, unless (pursuant to the Environmental Protection Agency agreement) the owner reapplies for a no action determination after completing the clean-up.

ENFORCEMENT AUTHORITY

Sites that are being remediated under a Department approved corrective action plan have, in effect, received a permit to implement their voluntary clean-up proposal. The use of available enforcement authorities is unnecessary, unless the facility owner/operator fails to implement the approved corrective action plan, fails to complete the work required under the plan or fails to complete the work in a timely manner. If this was to occur, the Department has the authority to issue the

facility a unilateral Compliance Order to compel the facility to perform the work the Department believes is necessary to protect human health or the environment. The terms of such an order are not negotiable and go into effect a short time after it is received by the facility. Penalties may be assessed at the time the order is issued, and/or penalties may be assessed if the facility owner/operator fails to comply with the requirements of the order.

PUBLIC PARTICIPATION

The Colorado Hazardous Waste Regulations do not normally require public notification or participation in the RCRA voluntary corrective action process. In all cases, the local health department and/or local government are notified of corrective actions occurring within their area of jurisdiction by either providing them with copies of our correspondence or contacting them directly in order to discuss the situation. We strongly recommend that the facility owner/operator also keep the local authorities informed of their activities (copies of reports and correspondence).

Depending on the circumstances, the facility owner/operator may be encouraged to voluntarily notify the public of its activities, through a newsletter or a public meeting, particularly if corrective action activities are conducted off-site in or adjacent to residential areas. The Department will strongly urge the facility owner/operator to notify the public, or may do so independently of the facility, in cases where there is a potential for the surrounding public to be exposed to contamination derived from the facility. This includes cases where private domestic use or irrigation wells are located within the suspected path of the ground-water plume and there is a reasonable likelihood that the contamination has migrated that far. This also includes cases where an effort must be made to locate and perhaps sample registered and unregistered wells in the path, or suspected path, of the ground water contaminant plume.

Notification of the public will always be required in cases where people are exposed to levels of contamination that we feel may pose a threat to their health. Examples include ground-water contamination that has degraded the quality of a known drinking water supply aquifer or where surface contamination has migrated onto nearby residential properties. The Department may also require public participation in the corrective action process depending on the remedial alternative selected.

STATE APPROVAL

Once the facility owner/operator has completed the obligations to be performed under the Department-approved corrective action plan, the owner/operator should prepare a completion report for our review and approval documenting that the plan was fully implemented and verifying that the clean-up objectives were met. The Department shall review this completion report and respond accordingly. If the facility owner/operator has completed all obligations satisfactorily under the approved plan, and the clean-up standards have been achieved, the Department shall send the facility a letter saying so and stating that no further action is necessary. An example of this letter is included in Appendix E

For further information contact:
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Hazardous Waste Corrective Action Unit
(303) 692-3362
walter.avramenko@state.co.us

URANIUM AND SPECIAL PROJECTS UNIT

LEGISLATIVE AUTHORITY

The legislative authority for the Uranium and Special Projects Unit to participate in voluntary clean-up efforts is derived from the Radiation Control Act, C.R.S.25-11-100, which was enacted in 1963. The state assumed authority over most Atomic Energy Act (AEA) materials in 1968. The main purpose of the Colorado Act is to protect public health, safety and the environment with respect to radioactive materials. The unit has regulations to implement the Act that can be found in 6 CCR 1007-1.

UNIVERSE OF SITES

The Uranium and Special Projects Unit has jurisdiction over any site that manages radioactive material. The Laboratory and Radiation Services Division inspect equipment, like x-ray machines, which contain radioactive sources. "Radioactive material" means any material, solid, liquid or gas that emits ionizing radiation spontaneously. Some typical types of radioactive material include: uranium, thorium and radium. Some typical classifications of radioactive material include: special nuclear, transuranic, source material, naturally occurring radioactive material ("NORM"), AEA 11.e (1) by-product material, 11.e (2) by-product material, low-level radioactive waste and mixed waste (a combination of hazardous and radioactive waste).

Generally, the Uranium and Special Projects Unit will handle any site with radioactive contamination. However, upon consultation, the Department may defer to the Voluntary Clean-up and Redevelopment Program if the radiological hazard is small, a minor portion of the overall site risk, and the material does not need to be licensed.

HOW TO APPLY/INFORMATION REQUIREMENTS

If you have identified the presence of radioactive material on your property that you would like to remediate, contact the Uranium and Special Projects Unit by either a phone call at 303-692-3036 or by writing a formal letter requesting a meeting with the staff. Have as much information available as possible to share with the unit; a written report or summary is very helpful to begin the process.

Basic information should include such things as: site location and boundaries, current uses of the site, intended future uses of the site, history and past uses, current ownership, responsibility for the contamination, ownership and uses of the adjacent and neighboring properties. A description of how the contamination or problem was identified, what environmental media are affected, the extent of the contamination and the chemical, physical and radiological composition of the contamination should be included. Any available reports on site characterization or past site investigations, as well as any available radiological surveys of the site, should be included (or referenced if the state has access to the reports). An assessment of any immediate threat to human health and/or the environment should be made. Finally, the clean-up and final disposal strategy should be detailed. Applicants are generally asked to follow these steps:

- determine background concentrations for the area
- perform a radiological investigative survey to determine the extent of contamination
- perform a radiological risk assessment based on the intended remedial action
- conduct contaminant removal
- verify that clean-up goals and standards are met

Frequent coordination and communication between the applicant and the Uranium and Special Projects Unit is strongly recommended. The unit will work with the applicant to provide assistance, make recommendations, approve plans, review reports and verify that the site is clean.

REVIEW TIME FRAME AND COSTS

Review times vary with the complexity of the site, the need to obtain additional information from the applicant, necessary meetings, and site visits. Time frames for the approval of a "plan" can vary from 14 to 90 days. Time frames for the entire project can vary from 30 days to as much as two years.

Fees for services are specified in Part 12 of the Radiation Control Regulations (C.R.S.25-12-101 et seq.). Review and approval of clean-up actions are defined as "Special Projects." The unit charges an hourly rate for services on special projects. The hourly rate is currently $119 per hour for professional services.

CLEAN-UP STANDARDS AND RISK

The Uranium and Special Projects Unit use the following standards.

- U.S. Environmental Protection Agency's 40 CFR 192 standards for radium-226 (also see 6 CCR 1007-1, Part 18, Appendix A)
- U.S. Environmental Protection Agency's 40 CFR 61, Subpart T standards for radon-222 emissions
- Standards for Protection against Radiation specified in 6 CCR 1007-1, Part 4
- Criteria relating to the operation of mills and disposition of radioactive tailings or wastes specified in 6 CCR 1007-1, Part 18, Appendix A
- Colorado water quality standards for surface and ground water
- Site-specific Risk Assessment developed and negotiated standards

A site-specific radiological risk assessment is usually required. Estimates of short-term and long-term exposures and risks to both workers and the public are needed. Exposure pathways need to be identified. Descriptive procedures for minimizing potential exposures, handling, packaging, transportation and disposal are needed. Land use scenarios need to be factored in. The risk assessment should follow appropriate U.S. Nuclear Regulatory Commission and Environmental Protection Agency Guidance.

STATE OVERSIGHT IN CONSTRUCTION AND CERTIFICATION

The degree of state oversight is dependent on the current workload of the unit, the requested involvement by the applicant, the complexity of the site and situation and the potential to create a new problem. Applicants will frequently request the Uranium and Special Projects Unit oversight to expedite the final verification process. The Uranium and Special Projects Unit involvement usually includes telephone conversations, review of reports, as-needed on-site visits, meetings and public meetings with other government agencies.

ENFORCEMENT AUTHORITY

The Colorado Radiation Control Act describes the powers and duties of the Uranium and Special Projects Unit. With the exception of nuclear power plants and federal facilities, the unit and the Laboratory & Radiation Services Division have complete (not delegated) responsibility for the licensing of radioactive material in the State of Colorado. Under some circumstances the Division may require licensing of the site, and remediation would occur under these license conditions. In general, the unit works with applicants and licensees to achieve compliance and resolve problems. However, if the owner fails to complete the clean-up, enforcement action may be taken.

PUBLIC PARTICIPATION

Opportunities for formal public hearings and public involvement are specific to the situation. All non-confidential information is available for review by the public under the Colorado Open Records Act. The Uranium and Special Projects Unit staff is always available to explain situations and projects to the public and other interested parties.

STATE APPROVAL

After completion and verification that the remedial efforts have achieved the intended goals and standards, the applicant receives a letter from the Unit stating this and that the project is complete. The letter will state if the site has achieved standards for "unrestricted use" or "restricted use." A sample letter is included in Appendix E.

For further information, contact:
Warren Jacobi
Uranium and Special Projects Unit
303-692-3036
jake.jacobi@state.co.us

WATER QUALITY CONTROL DIVISION

LEGISLATIVE AUTHORITY

Authority for clean-ups within the Water Quality Control Division comes from the Colorado Water Quality Control Act (C.R.S. 25-8-100), passed in 1987. The purpose of this statute is to prevent injury to beneficial uses of state waters, to achieve a maximum practical degree of water quality, including the protection, maintenance and improvement of water quality for: public water supplies; wildlife and aquatic life; and domestic, agricultural, industrial and recreational uses. The statute also is designed to prevent, abate and control new or existing water pollution. Implementing regulations are found in 5 CCR 1002-41 and 5 CCR 1002-42.

UNIVERSE OF SITES

Senate Bill 89-181 set a regulatory structure whereby other state environmental programs are required to implement the water quality regulations. These "implementing agencies" include the Department of Natural Resources's State Engineers Office and the Division of Minerals and Geology, the Oil and Gas Conservation Commission, the Department of Labor and Employment, and the Colorado Department of Public Health and Environment's Hazardous Materials and Waste Management Division. Sites that normally fall under the jurisdiction of these agencies are handled by the appropriate agency. The Water Quality Control Division will handle only sites that do not fall under the jurisdiction of these agencies, and at which the current owner is responsible for the contamination.

HOW TO APPLY/INFORMATION REQUIREMENTS

The applicant should assemble sufficient information to characterize the site. These requirements are set forth in the Water Quality Control Division applications. They include a map and sketch of the facility or property, a description of local geology and hydrogeology, including aquifer characteristics and potentiometric surface, and a description of the nature and extent of contamination. The applicant also should be prepared to discuss a remediation plan and implementation schedule. The applicant should then set up a meeting with a representative from the Assessment Unit to discuss the situation. An appropriate mechanism to administer the clean-up (either a Clean-up Order or a Control Regulation) will then be determined.

Surface water or ground water discharges would be controlled under a discharge permit.

REVIEW TIME FRAME AND COSTS

Since there has been no experience in reviewing voluntary clean-up applications, no estimate for review time is available. Review time will vary with the complexity of the site and the completeness of information provided in the application.

The Water Quality Control Division does not charge for review of voluntary clean-up applications.

CLEAN-UP STANDARDS AND RISK

The Water Quality Control Division strictly uses the ground water standards as contained in 5 CCR 1002-41. No risk calculations or land use scenarios are evaluated. The applicant may use a risk-based argument to petition the Water Quality Control Commission to change the applicable standard. No specific risk methodology or risk target is required in this process. Similarly, surface discharges must comply with appropriate stream standards.

STATE OVERSIGHT

If wastewater treatment facilities are required as part of the remediation, the Division may review plans and specifications. The facility may need to be permitted, and the operator may need to be licensed.

ENFORCEMENT AUTHORITY

Most voluntary clean-ups will proceed under a Clean-up Order or Control Regulation. The Water Quality Control Division has the authority to promulgate and enforce conditions of this Order and require the applicant to complete the clean-up.

PUBLIC PARTICIPATION

Remediation of these sites requires issuance of a control regulation that is approved by the Water Quality Control Commission. This approval is a public process. In addition, if the applicant needs to appear before the Water Quality Control Commission (i.e., to petition for a change in standards). This is also a public process.

STATE APPROVAL

If an Order has been issued, a letter is given that releases the applicant from the Order and compliance schedules. A similar letter could be given if no Order is written, however, no examples are available. Any approval is contingent on current information being accurate.

For further information contact:
George Moravec, Water Quality Control Division
303-692-3584
george.moravec@state.co.us

COLORADO DEPARTMENT OF PUBLIC HEALTH
AND ENVIRONMENT
HAZARDOUS MATERIALS AND WASTE MANAGEMENT DIVISION

APPENDICES

APPENDIX A

Enabling Legislation

CRS 25-16-301

PART 3

VOLUNTARY CLEAN-UP AND REDEVELOPMENT ACT

25-16-301. Short title. This part 3 shall be known and may be cited as the "Voluntary Clean-up and Redevelopment Act".

Source: L. 94: Entire part added, p. 1948, § 1, effectived July 1.

Law reviews. For article, "Brownfield Developments and Environmental Risk Assessments," see 25 Colo. Law. 53 (April 1996).

25-16-302. Legislative declaration. (1) The general assembly hereby declares that the purpose of this part 3 is to provide for the protection of human health and the environment and to foster the transfer, redevelopment, and reuse of facilities and sites that have been previously contaminated with hazardous substances or petroleum products. The general assembly further declares that this program is intended to permit and encourage voluntary clean-ups of contaminated property by providing persons interested in redeveloping existing industrial sites with a method of determining what the clean-up responsibilities will be when they plan the reuse of existing sites. It is the further intent of the general assembly that this voluntary program operate in such a way as to:

(a) Eliminate impediments to the sale or redevelopment of previously contaminated property;

(b) Encourage and facilitate prompt clean-up activities; and

(c) Minimize administrative processes and costs.

Source: L. 94: Entire part added, p. 1948, § 1, effective July 1.

25-16-303. Voluntary clean-up and redevelopment program - general provisions - fees - access to property during reviews. (1) The program established in this part 3 shall be voluntary and may be initiated by:

(a) The submission to the department of an application for approval of a voluntary clean-up plan pursuant to section 25-16-304 for properties where remediation may be necessary to protect human health and the environment in light of the current or proposed use of the property; or

(b) The submission to the department of a no action petition pursuant to section 25-16-307 for properties where remediation is complete or not necessary to protect human health and the environment in light of the current or proposed use of the property.

(2) no person, financial institution, or other entity financing a commercial real estate transaction shall require a purchaser to participate in the voluntary program contained in this part 3, and no entity of Colorado state government regulating any person, financial institution, or other entity financing a commercial real estate transaction shall require evidence of participation in this program to be a component of standard real estate loan documentation.

(3) (a) The program contained in this part 3 is voluntary and may only be initiated by the owner of the subject real property.

(b) The provisions of this part 3 shall not apply to the following:

(I) Property that is listed or proposed for listing on the national priorities list of superfund sites established under the federal act;

(II) Property that is the subject of corrective action under orders or agreements issued pursuant to the provisions of part 3 of article 15 of this title or the federal "Resource Conservation and Recovery Act of 1976", as amended;

(III) Property that is subject to an order issued by or an agreement with the water quality control division pursuant to part 6 of article 8 of this title;

(IV) A facility which has or should have a permit or interim status pursuant to part 3 of article 15 of this title for the treatment, storage, or disposal of hazardous waste; or

(V) Property that is subject to the provisions of part 5 of article 20 of title 8, C.R.S.

(4) (a) Each application for approval of a voluntary clean-up plan and each petition for a no action determination shall be accompanied by a filing fee determined by the department at a level sufficient to cover the direct and indirect costs of the department in processing applications for approval of voluntary clean-up plans and petitions for no action under this part 3, but such filing fee shall not exceed two thousand dollars.

(b) (I) The department shall establish and publish hourly rates for review charges performed by the department in connection with applications for approval of voluntary clean-up plans and petitions for no action under this part 3. Within thirty days after the department's approval or denial of a voluntary clean-up plan or no action petition, the department shall bill an applicant or petitioner for all direct and indirect charges of review of applications and petitions under this part 3 in accordance with the hourly rate structure established pursuant to this subparagraph (I). The department's charges shall be billed against the application fee paid pursuant to this subsection (4) in accordance with subparagraph (II) of this paragraph (b).

(II)(A) If the department bills charges in an amount less than the application fee, the department shall return any unused balance to the applicant or petitioner after the department’s final determinations in the matter has been made.

(B) If the department bills charges that exceed the application fee, the department may bill the applicant or petitioner for direct and indirect charges that the department incurs in excess of the application fee, up to a maximum of an additional one thousand dollars.

(C) If the department determines that review of the application cannot be completed in three thousand dollars or less due to the size or complexity of the site, the department shall contact the applicant or petitioner prior to incurring additional charges. The applicant or petitioner shall then be given the opportunity to either negotiate an agreement containing an upper limit on the department’s charges and complete the review, or withdraw the application and receive a refund of the unbilled balance of fees already paid to he department. Agreements negotiated pursuant to this subparagraph (C) shall be in writing and shall be signed by authorized representatives of the parties.

(D) The department shall make its best efforts to determine whether the application review will exceed three thousand dollars within the first ten hours of review or, if the applicant or petitioner requests a pre-application conference, within ten business days after such conference.

(c) All moneys collected pursuant to this subsection (4) shall be transmitted to the state treasurer, who shall credit the same to the hazardous substance response fund, created in section 25-16-104.6 (1). Moneys collected pursuant to this subsection (4) shall be subject to annual appropriation by the general assembly only to defray the direct and indirect costs of the department in processing voluntary clean-up plans and petitions for no action determination as specified in this part 3.

(5) During the time allocated for review of applications for voluntary clean-up plans and petitions for no action determination under this part 3, the department shall, upon reasonable notice to the property owner, have access at all reasonable times to the subject real property.

Source: L. 94: Entire part added, p. 1949, § 1, effective July 1**. L. 95:** (3)(b)(V) amended, p. 420, § 9, effective July 1.

25-16-304. Voluntary clean-up plan. (1) any person who owns real property which has been contaminated with hazardous substances or petroleum products may submit an application for the approval of a voluntary clean-up plan to the department under the provisions of this section.

(2) A voluntary clean-up plan shall include:

(a) An environmental assessment of the real property which describes the contamination, if any, on the property and the risk the contamination currently poses to public health and the environment;

(b) A proposal, if needed, to remediate any contamination or condition which has or could lead to a release which poses an unacceptable risk to human health or the environment, considering the present and any differing proposed future use of the property and a timetable for implementing the proposal and for monitoring the site after the proposed measures are completed;

(c) A description of applicable promulgated state standards establishing acceptable concentrations of constituents in soils, surface water, or groundwater and, for constituents present at the site for which such state standards do not exist, a description of proposed clean-up levels and any current risk to human health or the environment based upon the current or proposed use of the site.

Source:L. 94: Entire part added, p. 1950, § 1, effective July 1.

25-16-305. Remediation alternatives. (1) remediation alternatives shall be based on the actual risk to human health and the environment currently posed by contaminants on the real property, considering the following factors:

(a) The present or proposed uses of the site;

(b) The ability of the contaminants to move in a form and manner which would result in exposure to humans and the surrounding environment at levels which exceed applicable promulgated state standards or, in the absence of such standards, which represent an unacceptable risk to human health or the environment;

(c) The potential risks associated with proposed clean-up alternatives and the economic and technical feasibility and reliability of such alternatives.

Source: L. 94: Entire part added, p. 1951, § 1, effective July 1.

25-16-306. Approval of voluntary clean-up plan - time limits - contents of notice - conditions under which approval is void - expiration of approval. (1) (a) The department shall provide formal written notification that a voluntary clean-up plan has been approved or disapproved within no more than forty-five days after a request by a property owner, unless the property owner and the department agree to an extension of the review to a date certain. Such review shall be limited to a review of the materials submitted by the applicant and documents or information readily available to the department. If the department fails to act on an application within the time limits specified in this subsection (1), the voluntary clean-up plan shall be deemed approved. If the department has received eight applications for review of voluntary clean-up plans or no action petitions in a calendar month, the department may notify any additional applicants in that month that their plan or petition will be considered the following month, and the forty-five day period for department review shall begin on the first day of the month following receipt of the plan or petition.

(b) The department shall approve a voluntary clean-up plan if, based on the information submitted by the property owner, the department concludes that the plan will:

(I) Attain a degree of clean-up and control of hazardous substances or petroleum products, or both, that complies with all promulgated applicable state requirements, regulations, criteria, or standards;

(II) For constituents not governed by subparagraph (I) of this paragraph (a), reduce concentrations such that the property does not present an unacceptable risk to human health or the environment based upon the property's current use and any future uses proposed by the property owner.

(c) In the event that a voluntary clean-up plan is not approved by the department, the department shall promptly provide the property owner with a written statement of the reasons for such denial. If the department disapproves a voluntary clean-up plan based upon the applicant's failure to submit the information required by section 25-16-304, the department shall notify the applicant of the specific information omitted by the applicant.

(d) The approval of a voluntary clean-up plan by the department applies only to conditions on the property and state standards that exist as of the time of submission of the application.

(2) Written notification by the department that a voluntary clean-up plan is approved shall contain the basis for the determination and the following statement:

> "Based upon the information provided by [insert name(s) of property owner(s)] concerning property located at [insert address], it is the opinion of the Colorado Department of Public Health and Environment that upon completion of the voluntary clean-up plan no further action is required to assure that this property, when used for the purposes identified in the voluntary clean-up plan, is protective of existing and proposed uses and does not pose an unacceptable risk to human health or the environment at the site."

(3) (a) Failure of a property owner to materially comply with the voluntary clean-up plan approved by the department pursuant to this section shall render the approval void.

(b) Submission of materially misleading information by the applicant in the context of the voluntary clean-up plan shall render the department approval void.

(4) (a) If a voluntary clean-up plan is not initiated within twelve months and completed within twenty-four months after approval by the department, such approval shall lapse; except that the department may grant an extension of the time limit for completion of the voluntary clean-up plan.

(b) A property owner desiring to implement a voluntary clean-up plan after the time limits permitted in paragraph (a) of this subsection (4) shall submit a written petition for reapplication accompanied by written certification of a qualified environmental professional that the conditions on the subject real property are substantially similar to those that existed at the time of the original approval.

(c) reapplications pursuant to paragraph (b) of this subsection (4) shall be subject to limited review by the department, which shall complete such review within thirty days of receipt of a petition 'for reapplication; except that any reapplication that involves real property, the condition of which has substantially changed since approval of the original voluntary clean-up plan, shall be treated as a new application and shall be subject to all the requirements of this part 3.

(5) (a) Within forty-five days after the completion of the voluntary clean-up described in the voluntary clean-up plan approved by the department, the property owner shall provide to the department a certification from a qualified environmental professional that the plan has been fully implemented.

(b) If the owner is applying for the tax credit provided in section 39-22-526, C.R.S., the owner shall submit to the department the certification along with an application pursuant to section 25-16-303. The certification shall, in addition to certifying that the plan has been fully implemented, disclose the costs of implementation and include supporting documentation of those costs. The department shall then certify the accuracy of the costs and issue the property owner a certificate stating that the clean-up has occurred and the costs of such clean-up. The property owner may submit this certificate to the department of revenue to claim a tax credit under section 39-22-526(2) C.R.S.

Source: L. 94: Entire part added, p. 1951, § 1, effective July 1. **L. 2000:** (5) amended, p. 891, § 1, effective January 1, 2001.

25-16-307. No action determinations. (1) A property owner may file with the department a written petition to request a no action determination pursuant to this section. The department shall provide formal written notification that a no action petition has been approved or disapproved within no more than forty-five days after a request by a property owner, unless the property owner and the department agree to an extension of the review to a date certain. Such review shall be limited to a review of the materials submitted by the applicant and documents or information readily available to the department. If the department fails to act on a petition within the time limits specified in this subsection (1), the no action petition shall be deemed approved. If the department has received eight applications for review of voluntary clean-up plans or no action petitions in a calendar month, the department may notify any additional applicants in that month that their plan or petition will be considered the following month, and the forty-five day period for department review shall begin on the first day of the month following receipt of the plan or petition.

(2) (a) The department shall issue a written determination approving a no action petition when:

(I) The environmental assessment described in 25-16-308 performed by a qualified environmental professional indicates the existence of contamination which does not exceed applicable promulgated state standards or contamination which does not pose an unacceptable risk to human health and the environment; or

(II) The department finds that contamination or a release or threatened release of a hazardous substance or petroleum product originates from a source on adjacent or nearby real property if a person or entity responsible for such a source of contamination is or will be taking necessary action, if any, to address the contamination.

(b) The department shall provide formal written notification of a no action determination, which shall contain the basis for the determination and the following statement:

> "Based upon the information provided by [insert name(s) of property owner(s)] concerning property located at [insert address], it is the opinion of the Colorado Department of Public Health and Environment that no further action is required to assure that this property, when used for the purposes identified in the no action petition, is protective of existing and proposed uses and does not pose an unacceptable risk to human health or the environment at the site."

(c) The approval of a no action petition by the department applies only to conditions on the property and state standards that exist as of the time of submission of the petition.

(3) Submission of materially misleading information by the applicant in the context of a no action petition shall render the department approval void.

(4) In the event that a no action petition is not approved by the department, the department shall promptly provide the property owner with a written statement of the reasons for such

denial. If the department disapproves a no action petition based upon the applicant's failure to submit required information, the department shall notify the applicant of the specific information omitted.

Source: L. 94: Entire part added, p. 1553, § 1, effective July 1.

25-16-308. Environmental assessment - requirements. (1) The department may only accept environmental assessments under this part 3 that are prepared by a qualified environmental professional. A qualified environmental professional is a person with education, training, and experience in preparing environmental studies and assessments.

(2) The environmental assessment described in section 25-16-304 (2) (a) shall include the following information:

(a) The legal description of the site and a map identifying the location and size of the property;

(b) The physical characteristics of the site and areas contiguous to the site, including the location of any surface water bodies and ground water aquifers;

(c) The location of any wells located on the site or on areas within a one-half mile radius of the site and a description of the use of those wells;

(d) The current and proposed use of on-site groundwater;

(e) The operational history of the site and the current use of areas contiguous to the site;

(f) The present and proposed uses of the site;

(g) Information concerning the nature and extent of any contamination and releases of hazardous substances or petroleum products which have occurred at the site including any impacts on areas contiguous to the site;

(h) Any sampling results or other data which characterizes the soil, groundwater, or surface water on the site; and

(i) A description of the human and environmental exposure to contamination at the site based upon the property's current use and any future use proposed by the property owner.

Source: L. 94: Entire part added, p. 1954, § 1, effective July 1.

25-16-309. Coordination with other laws. (1) Nothing in this part 3 shall absolve any person from obligations under any other law or regulation, including any requirement to obtain permits or approvals for work performed under a voluntary clean-up plan.

(2) If the United States environmental protection agency indicates that it is investigating a site which is the subject of an approved voluntary clean-up plan or no action petition, the department shall actively pursue a determination by the United States environmental protection agency that the property not be addressed under the federal act or, in the case of property being addressed through a voluntary clean-up plan, that no further federal action be taken with respect to the property at least until the voluntary clean-up plan is completely implemented.

Source: L. 94: Entire part added, p. 1955, § 1, effective July 1.

25-16-310. Enforceability of voluntary clean-up plans and no action determinations. (1) voluntary clean-up plans are not enforceable against a property owner; except that, if the department can demonstrate that a property owner who initiated a voluntary clean-up under an approved plan has failed to fully and properly implement that plan, the department may require further action if the action is authorized by other laws or regulations of this state.

(2) Information provided by a property owner to support a voluntary clean-up plan or no action petition shall not provide the department with an independent basis to seek penalties

from the property owner pursuant to state environmental statutes or regulations. If, pursuant to other state statutes or regulations, the department initiates an enforcement action against the property owner subsequent to the submission of a voluntary clean-up plan or no action petition regarding the contamination addressed in the plan or petition, the voluntary disclosure of the information in the plan or petition shall be considered by the enforcing authority to reduce or eliminate any penalties assessed to the property owner.

Source: L. 94: Entire part added, p. 1955, § 1, effective July 1.

25-16-311. Repeal of part. (Repealed)

Source: L. 94: Entire part added, p. 1956, § 1, effective July 1. L. 99: Entire section repealed, p. 265, § 1, effective April 9.

COLORADO DEPARTMENT OF PUBLIC HEALTH
AND ENVIRONMENT
HAZARDOUS MATERIALS AND WASTE MANAGEMENT DIVISION

APPENDIX B

Memorandum Of Agreement
Between
US Environmental Protection Agency
and the
Colorado Department of Public Health
and Environment

MEMORANDUM OF AGREEMENT
BETWEEN THE
COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT AND THE
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, REGION VIII

I. Purpose

The purpose of this Memorandum of Agreement(MOA)is to define the roles and responsibilities of the Colorado Department of Public Health and Environment(CDPHE) and the United States Environmental Protection Agency Region VIII (EPA) (collectively, the Parties) with respect to activities conducted under the authority of the Voluntary Cleanup and Redevelopment Act.

II. Background

EPA and CDPHE believe that the proper reutilization of contaminated or potentially contaminated industrial and commercial(often referred to as "Brownfields" will provide a significant benefit to both the environment and the economy of the local communities. Proper reutilization of "brownfields" is also a key element of Colorado's Smart Growth concept. To the extent possible, EPA and CDPHE seek to facilitate the productive re-use of these properties by working with the private sector to eliminate impediments to financing, transfer, and redevelopment. Due to limited resources, the need to prioritize sites, and the need to expedite cleanup action, EPA and CDPHE seek to encourage participation in the Voluntary Cleanup and Redevelopment Program to protect human health and the environment while fostering the transfer, redevelopment, and reuse of facilities that have been previously contaminated with hazardous substances or petroleum products.

III. Responsibilities

1. CDPHE will implement Title 25-16-301, et seq. (known as the Voluntary Cleanup and Redevelopment Act and referred to herein as "the Act") to allow owners of contaminated properties to voluntarily propose cleanup actions or petition for no further action determinations for eligible sites. CDPHE and EPA agree that this Voluntary Cleanup Program (VCUP) will include the specific elements as described in Attachment A.

2. Once an application to clean up a site in accordance with the VCUP has been submitted to CDPHE, EPA will not plan and does not anticipate undertaking any federal action under the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. SS 9601, et seq. (CERCLA or Superfund), at such a site, unless: (1) the site is an "NPL Caliber" site or the site poses an imminent and substantial endangerment to public health, welfare or the environment and exceptional circumstances warrant EPA action; (2) CDPHE's approval of the cleanup plan becomes void; or (3) the applicant fails to complete or materially comply with the cleanup plan as approved by CDPHE.

3. In accordance with the VCUP Description contained in Attachment A, if requested by the applicant, CDPHE may provide written notice to the applicant of its determination that performance of the cleanup is complete and in compliance with the cleanup plan as approved or modified. Written notification of CDPHE'S certification of completion shall also be forwarded to EPA. EPA will then remove the site from its CERCLIS database if the site was previously identified in the CERCLIS database.

4. Failure to complete or materially comply with the cleanup plan, submission of materially misleading information, or the discovery of significant new information different than that submitted to CDPHE with the VCUP application, renders CDPHE'S approval of the cleanup plan and EPA's assurances void. Further, EPA reserves the right to take all appropriate response and enforcement actions under Superfund in the event a cleanup plan or no action determination is deemed "approved" as a result of a failure of CDPHE to review and approve or deny an application prior to the expiration of the 45 day time limit, as provided in Sections 25-16-306(l)(a) and 25-16-307(1) of the Act.

5. Nothing in this MOA shall be construed to abrogate EPA'S responsibility under Section 105 (d) of CERCLA, 42 U.S. C. SS 9605(d), to perform a preliminary assessment when requested by a citizen petition.

6. EPA will assist and may provide technical support to CDPHE in further developing and expanding the use of VCUP. Similarly, CDPHE will assist and support efforts to promote and implement EPA'S Economic Redevelopment initiatives.

This MOA has been developed by mutual cooperation and consent of the Parties, and becomes effective upon execution of the signatures below. EPA and CDPHE will conduct an annual review of the VCUP and the terms of this MOA and determine if this MOA should remain in effect as is, be amended or be terminated. This MOA may be terminated unilaterally by either party with 30 days notice. Any amendment to this MOA must be made in writing and by mutual consent of the parties.

Patti Shwayder, Executive Director
Colorado Department of Public Health and Environment

Jack W. McGraw, Acting Regional Administrator
U.S. Environmental Protection Agency

ATTACHMENT A

VOLUNTARY CLEANUP AND REDEVELOPMENT PROGRAM DESCRIPTION

Purpose

The State of Colorado's authority for the Voluntary Cleanup Program (VCUP) is derived from the Voluntary Cleanup and Redevelopment Act (C.R.S. 25-16-301, et seq.) passed in 1994. The purpose of the Act is to "[p]rovide for the protection of human health and the environment and to foster the transfer, redevelopment, and reuse of facilities that have been previously contaminated with hazardous substances or petroleum products." The Act is intended to permit and encourage voluntary cleanups by providing a method to determine cleanup responsibilities in planning reuse of a property. The VCUP is tasked to operate quickly and with a minimum of administrative processes and costs. Accordingly, no regulations have been promulgated to implement this Act.

Site Screening and Communication

After receiving an application under the VCUP, the State will conduct a site screening. Site screening in the VCUP is two-fold. First, sites are screened for eligibility. Section 25-16-303(3)(b) excludes: (I) sites listed or proposed for listing on the NPL; (II) sites under a RCRA corrective action order; (III) sites subject to an order or agreement issued by the Water Quality Control Division; (IV) sites that have or should have a RCRA permit or interim status for treatment, storage, or disposal of hazardous waste; and (V) sites regulated by the UST program. After an initial review of the site history, the lead reviewer discusses the site with each of the above State programs to determine whether the site is excluded under one of the listed criteria.

If the site qualifies for the VCUP, a second screening occurs to determine existing actions proposed by EPA and EPA's level of potential interest in the site. The purpose of this communication is to avoid duplication of effort between the two agencies. First, the State reviewer will determine whether the site is listed on CERCLIS. If the site is listed in EPA'S CERCLIS database, the State reviewer will contact appropriate EPA staff to discuss the site status and proposed EPA actions. Second, the State reviewer will determine whether the site is subject to an EPA CERCLA Administrative Order. If the site is subject to an EPA CERCLA Administrative Order, the State reviewer will review the application as required by C.R.S. 25-16-306, but EPA'S agreement to forbear from planning or undertaking any action under CERCLA as contained Section III, Paragraph 2 of the MOA is void.

1. CERCLIS Sites

If all or a portion of the site is on CERCLIS, the State will comply with the requirements of C.R.S. 25-16-309(2) and request that EPA suspend activities to allow the cleanup to proceed under the VCUP. Should EPA decide to proceed with its planned actions, the State may choose to deny the application, or may process the application and coordinate approval of the application with EPA.

For a CERCLIS site for which EPA has planned but will agree to suspend investigatory or response action activities in lieu of the owner's compliance with the Act and VCUP, CDPHE will keep EPA informed of the owner's progress toward completion of the remedial action. CDPHE will also notify EPA of the owner's completion or failure to complete the remedial action. In the

event the owner implements the cleanup plan completely and to the satisfaction of CDPHE, EPA shall remove the site from its CERCLIS database.

2. Non-CERCLIS Sites

If the site is not on CERCLIS, the State will evaluate the information submitted by the applicant to determine whether the site might be considered "NPL Caliber."

EPA has generally defined "NPL Caliber" to mean sites where significant human exposure to hazardous substances has been documented or where sensitive environments have become contaminated. Examples of what EPA considers "NPL Caliber" site characteristics are sources of contamination that may have contributed to the following:

- Public drinking water supplies or private wells are contaminated with a hazardous substance above the concentration listed in the Risk-Based Concentration Table for tap water, January 1995;

- Soils on school, day care center, or residential properties are contaminated by a hazardous substance significantly above background levels and are above concentrations for soil ingestion (residential) listed in the Risk-Based Concentration Table, January 1995*;

- Soils on school, day care center, or residential properties are contaminated by lead concentrations significantly above background levels and the lead soil concentration is above 400 ppm;

- A hazardous substance is detected in an off-site-air release in a populated area and the release is above the concentration listed in the Risk-Based Concentration Table for ambient air;

- A highly toxic hazardous substance known to persist and bioaccumulate in the environment (e.g., PCBS, mercury, dioxin, PAHs), is discharged into surface waters;

- A highly toxic hazardous substance known to be mobile in the subsurface (e.g., vinyl chloride, trichloroethylene, acetone, phenol, cadmium, mercury), is discharged to significant useable aquifers.

- Sensitive environments are contaminated with a hazardous substance significantly above background levels and water quality standards where appropriate and;

* If this document is modified, use the most recent version.

Even though the application for VCUP may not address off-site problems, if releases from the applicant's property has contributed to off-site exposure to hazardous substances, EPA considers the sources of hazardous substance contamination as well as the areas where contamination has migrated to be an "NPL Caliber" site.

If CDPHE determines a site to be of "NPL Caliber," CDPHE will notify the applicant of its determination as early in the 45-day review period as possible. CDPHE and the applicant will then jointly decide whether to inform EPA of CDPHE'S determination and to request EPA'S review of and concurrence on the cleanup plan and application. If CDPHE and the applicant jointly decide to seek EPA'S review and approval, EPA will provide its comments on the application as quickly as possible. If CDPHE and the applicant jointly decide not to solicit EPA'S review and approval of the application, CDPHE may either approve or deny the application. In the event CDPHE approves the application for the "NPL Caliber" site without EPA'S review and concurrence, the applicant may still implement the cleanup plan, but EPA'S forbearance not to plan or undertake any action under CERCLA as contained in Section III, Paragraph 2 of the MOA is void.

Resources and Capabilities

CDPHE utilizes trained environmental professionals to review voluntary cleanup applications. The specialty of these individuals may vary, but includes: geology, hydrology, engineering, risk analysis, and chemistry. These environmental professionals have applied this expertise to UST remediation, RCRA corrective action, solid waste facility permitting, and Superfund remedial action. On an as-needed basis, the appropriate expertise can be utilized to assist the State's lead reviewer. The maximum number of applications which can be reviewed per month is set by statute, in order to insure that authorized staff have sufficient time to review applications in sufficient detail.

Standards and Risk Analysis

CDPHE will implement a risk-based cleanup approach based on the proposed land use and will utilize applicable standards and remediation objectives in cleanup decisions. CDPHE will take under consideration site-specific cleanup standards if they are based on risk and utilize appropriate land use assumptions. Although a site-specific risk assessment prepared using EPA'S RAGS document can be submitted by the applicant at his/her option, the 45 day time period available for review of an application containing such a risk assessment may be insufficient and need to be extended.

Therefore, CDPHE will use relevant standards derived from applicable statutes, regulations, guidance, and the application of the risk-derived numbers developed by EPA, CDPHE or other governmental entities. In all cases, an analysis of the risk entails an evaluation of targets and receptors and the potential for pathways of exposure to be realized. In all application evaluations, the CDPHE reviewers will examine the proposed cleanup standards, the proposed remedial method and the proposed land use in concert to ensure that protection of health and the environment is achieved by the implementation of the cleanup plan.

Public Participation

The Act has no requirements for public participation or review of applications. However, all files are public documents and available for public review upon request. Also, CDPHE routinely contacts the local health department to see if there is any knowledge of or interest in the site, and will make a copy of the application available for local review if requested. Local governments may have additional public participation requirements related to the redevelopment of property (i.e., zoning hearings) which are applicable to these sites.

Notwithstanding any local government public participation procedures or requirements for redevelopment of these sites, in order to obtain EPA'S forbearance not to plan or undertake any action under CERCLA as contained Section III, Paragraph 2 of the MOA, within 30 days of approval of its VCUP application, the applicant will provide adequate public notice of its cleanup plan. "Adequate public notice" will be determined on a site-specific basis and should include publication of the availability of the cleanup plan in a local newspaper or posting of any public notice plan required by building permit or zoning ordinance procedures. For large sites or sites where public interest is likely due to publicity or proximity to Superfund sites, CDPHE may request that the applicant hold a public meeting to explain its cleanup plan.

COLORADO DEPARTMENT OF PUBLIC HEALTH
AND ENVIRONMENT
HAZARDOUS MATERIALS AND WASTE MANAGEMENT DIVISION

APPENDIX C

Voluntary Clean-up Program Application Guidance Document And Checklist

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INTRODUCTION

The Voluntary Clean-up and Redevelopment Act (HB 94-1299) became effective July 1, 1994. The program administered under this Act is intended to encourage voluntary clean-ups of previously contaminated properties by providing a framework for determining site-specific clean-up responsibilities and a streamlined review and approval process that can meet the short time frames often required by property transactions.

The purpose of this guidance document is to assist owners of eligible sites in preparing the necessary information so that the Colorado Department of Public Health and Environment can meet the short time frames this Act requires. To date, over one-half of all applications have required time extensions due to the need for additional information. This document contains a summary of the necessary information that should be gathered to produce a complete application under the Voluntary Clean-up Program. The guidance contains a narrative description of the information requirements and an application checklist (Appendix D) that should be submitted with the application.

This guidance document is consistent with HB 94-1299 and does not supersede any part of the statute. The preparation of this guidance was the result of coordination with the Hazardous Materials and Waste Management Division (HMWMD) personnel, the Voluntary Clean-up CHANGE group and Grant Environmental. The guidance document may also be useful for submitting information regarding clean-ups under the HMWMD Solid Waste and Hazardous Waste Compliance Programs, although all specifics may not be the same in these programs.

Questions regarding this document may be answered by calling Mark Walker at (303) 692-3449.

PROGRAM INCLUSION

The following section is designed to determine whether the applicant meets the criteria for eligibility under the Act. An answer "no" to question 1 or "yes" to any of questions 2-6 will result in a determination that the application is not eligible for the Voluntary Clean-up Program. Any applicant that is ineligible may still wish to perform clean-up under the regulatory program that has authority over that site. The submission of misleading information will render any approval given by the Department void.

1. Is the applicant the owner, or the owner's designated representative, of the property?
2. Is the property listed or proposed for listing on the National Priorities List of Superfund sites established under the federal act (CERCLA)?
3. Is the property the subject of corrective action under orders or agreements issued pursuant to the provisions of Part 3 of Article 15 of this Title or the federal "Resource Conservation and Recovery Act of 1976," as amended?
4. Is the property subject to an order issued by or an agreement (including permits) with the Water Quality Control Division pursuant to Part 6 of Article 8 of this Title? If yes, please list order or permit number.
5. Is the property a facility that has or should have a permit or interim status pursuant to part 3 of Article 15 of this Title (RCRA Subtitle C) for treatment, storage or disposal of hazardous waste?

NOTE: Properties that do not have a permit or interim status, but at which hazardous waste (as defined in the Colorado Hazardous Waste Act and implementing regulations) was treated, stored or disposed of any time after 1980, are considered by the Department to have required a permit or interim status.

6. Is the property subject to the provisions of Colorado Revised Statutes, Part 5, Article 20 of Title 8 (Underground Storage Tank – State Oil Inspector)?

SITE HISTORY

The first major component of the application is a thorough investigation of the site history. The Department strongly considers the correlation between historical uses and characterization efforts in reviewing the application. We believe that this historical knowledge is needed in order to identify all potential contaminant sources. An evaluation of past land uses and waste-handling practices should be conducted at least 50 years into the historical record. It may be appropriate to review facility records going further back in cases where wastes of a more persistent nature (e.g., metals, polyaromatic hydro-carbons) were handled on site. If records do not go back that far, it should be stated as such.

Submissions of any prior environmental assessments conducted by qualified environmental professionals performed on the site are critical inclusions. These assessments should include the following: operational history of the property, description of all businesses/activities on property, history of releases of petroleum products or hazardous substances on the property, history of management activities of hazardous substances at the property, notifications to county emergency response personnel pursuant to Emergency Planning and Community Right-to-Know statutes, notifications made to state and/or federal agencies as reporting of spills/accidental releases, list of all permits obtained from state and federal agencies related to activities at the property and brief descriptions of current land uses, zoning and zoning restrictions of all areas contiguous to the property.

SITE CHARACTERIZATION

The second major component of the application is a description of the site characterization efforts and a presentation and discussion of the data collected. It is important to tie your site characterization to the historical information you have gathered to insure you were looking for the right contaminants in the right places. The intent of a site assessment is to define the full area extent of contamination in all environmental media. In a case where the contamination is derived exclusively from an upgradient, off-site source, determination of the full extent of that contamination is not warranted. **Impact from an upgradient source does not negate the need for investigating potential sources on the applicant's site or documenting that the applicant's site could not serve as a source of contamination.** (Note: it is possible to get a letter absolving you of liability for cleaning up an upgradient source without characterizing your site; you just can't get a clean bill of health for your site without it.) In any case where soil contamination has the potential to contaminate ground or surface water, these media should be assessed. A qualified environmental professional should prepare site assessments. A qualified environmental professional is a person possessing a formal education in a suitable technical field and a minimum of five years of experience in the preparation of environmental studies and assessments.

A. General Sampling & Analytical Methods

All sources of hazardous substances or petroleum products that have the potential to impact health or the environment must be addressed. The sample plan should utilize the knowledge gained from the site historical search in order to identify potential sources. A narrative should explain the reasoning behind each sample location, as well as any justification for eliminating assessment of any source areas. If adequate historical documentation is lacking, then random sampling locations may be appropriate, in addition to an evaluation of conditions at the upgradient and downgradient property boundaries. In addition to any summary tables, borehole logs, field screening results and lab sheets should be included as attachments.

In some cases the Department has preferred analytical methods. In order to avoid disagreements during the review of the application, it is suggested that, where appropriate, these preferred methods are used. Guidance for selection of the appropriate analytical methods is provided in Appendix D of this document.

Since approval of the Application applies only to conditions on the property at the time of submission of the application, recent data is required. Ground water data that is older than one year at the time of receipt of the application normally will not be considered as indicative of current conditions. This does not prevent the applicant from making a case as to why this data should be considered as indicative of current conditions. Additionally, data that is older than one year should be submitted if it is coupled with more recent data in order to indicate conditions with the passage of time. Exceptions may be made for soil data or in some cases where the applicant only desires absolution from the responsibility of dealing with contamination from an upgradient source, as in a contaminated aquifer determination.

1. Soil Sampling Locations

When it is appropriate to demonstrate background levels in soil, a minimum of three samples should be collected to account for natural constituent occurrences and inherent variability. Sample locations for background should be in areas that have not been impacted by the release of concern or any on-site activities. In all cases, an explanation of the sampling method employed is useful for those reviewing the application.

One should sample for contaminants that tend to group heterogeneously in the subsurface in the following manner: in fines and silts, sample the interfaces with larger grains; in clays, sample the sand lenses; in medium sands or larger grains, sample the sidewalls near the excavation floor. Lithologies containing precipitates or excess organic carbon should be sampled. To characterize a site where contaminants have been deposited in a homogeneous manner, such as air deposition, one should use a simple random sampling method to collect a suitable number of samples.

To characterize a site with numerous discrete sources, such as mine waste piles, submission of a composite sample from each pile would be appropriate.

2. Water Sampling

The wells installed should be capable of defining the ground water gradient, particularly the direction of flow to verify that water quality downgradient of any sources is being monitored. The wells should also have a screened interval appropriate for the contaminant. Use of pre-existing wells and/or existing data may be appropriate if it adds to the overall understanding of the site. If ground water is present in an excavation, or it is anticipated to be in close vertical proximity to the bottom of an excavation, it should be sampled and analyzed appropriately

3. Indoor Air

Indoor air levels should be evaluated when there is a potential for impact to structures. An evaluation of the hydrogeology, contaminant volatility and magnitude should factor into the decision for sampling indoor air. The HMWMD web site contains a detailed discussion on sampling analytical methods for the indoor air pathway.

B. Attachments

Multiple maps, drawn to scale, are necessary for the reviewer to adequately place the site within its surroundings and also detail site-specific conditions and environmental concerns. One map should show the site's location within the city or county. A second map would detail the natural and manmade concerns (e.g., drainage ditches, schools, surface waters) as well as potential additional sources in close proximity to the site. A third map would indicate site-specific conditions (e.g., ground water flow direction, sampling locations, utilities, structures, etc.).

The data should be summarized in the narrative of the report, and raw data such as boring logs and well construction diagrams must be provided as an addendum to the report. Boring logs and well construction diagrams should include: blow counts, weather conditions at the time of drilling, field screening readings, lithology, screened interval, drilling date and driller's name, sampling intervals, ground water level (initially and after stabilization) and all other pertinent information. When the ground water has been assessed, a potentiometric map should be prepared that details the direction of ground water flow. Pre-existing offsite wells may be used in calculating ground water flow direction, if necessary.

Materials Safety Data Sheets (MSDS) would be an appropriate inclusion relative to the contaminant of concern. A history of management activities with regard to handling of hazardous substances at the property would document the possible presence of sources at the site.

For complex sites and those sites where timing is critical, the Department recommends using the checklist/application form in Appendix C to insure that the application is complete. Submission of all the information contained on the checklist is not always necessary; the applicant should determine which submittals apply to the site in question. Submission of the checklist is not a requirement of the application. The checklist also compares the information normally contained in Phase I & II Environmental Audits to what the Voluntary Clean-up Program may need. If a Phase I or Phase II audit has been performed on your property, this comparison should help you determine what additional information (if any) is required for the voluntary clean-up application.

The Voluntary Clean-up Application should evaluate all Recognized Environmental Conditions, as defined by the American Society of Testing and Materials. This evaluation would consist of either sampling data or an explanation of the risk posed by the Recognized Environmental Condition.

C. Site Visits

In most instances, the applicant should plan on a site visit by the Colorado Department of Public Health and Environment project manager. Site visits are intended to assist in application review. Every effort should be made on the part of the applicant to preserve the site in its operating state or locate a person knowledgeable about the site operations and arrange for them to attend the site visit.

PREPARATION OF REMEDIATION PLANS OR NO ACTION DETERMINATIONS

The third major component of the application is a plan for addressing any contamination found, whether it is presentation of a Voluntary Clean-up Plan or a request for a No Action Determination. During the course of implementing remediation plans, be aware that the Act does not absolve applicants of their obligations for meeting all other applicable regulations (e.g., proper handling and disposal of wastes generated, acquisition of permits).

The Voluntary Clean-up Program has determined that any action proposed at a site after our review will categorize the petition as a Voluntary Clean-up Plan. This is extended to categories of petitions such as ground water monitoring plans or contaminated material handling plans.

A. Clean-up Levels

Clean-up levels may be based either on promulgated state standards or utilizing a risk-based approach. In general, your justification for either the clean-up plan or the request for no action must show that you either meet the promulgated standard or that the risk is acceptable, given the proposed land use.

If the site has ground water contamination and the proposal is to demonstrate that the current contamination does not pose a risk, or that contaminant source removal is an adequate option, then a monitoring plan that demonstrates one or both of the following should be included.

1. Exceedence of a given level (likely the Colorado Basic Ground Water Standards) at a Point of Compliance (POC) will not occur; and/or

2. The plume is contained within certain bounds and in-situ degradation processes will result in a decrease to a pre-determined level within the time frame of the monitoring program.

A suitable ground water monitoring program might include a description of the upgradient sampling point, the downgradient POC, the frequency and duration of the monitoring plan, the proposed laboratory analyses, as well as conditions under which the program might be terminated. A POC (as defined in 5 CCR 1002-8) is a monitoring well or system of wells beyond the downgradient extent of the contamination or at the property boundary (depending on site specifics), which is capable of monitoring the migration or potential migration of contaminants from the site. A POC should be selected with care as any exceedence of state ground water standards here may negate the applicant's assessment of risk as presented in the application and potentially result in a negation of the state's certification.

B. Standards

State standards exist for ground water and surface water quality, but not for soils. However, soil clean-up levels generated by entities other than Colorado, such as the Environmental Protection Agency or other states, may be applicable if the applicant details the relevance of the proposed standard with respect to conditions at their site (i.e., similar geology, the standard is health-based and applicable to a similar land use). The application must have a discussion that identifies any Colorado standard that exists for the contaminant of concern. This discussion should then include whether the proposed plan will meet these standards. If it will not, or if no applicable standard exists, the application will then go on to use a risk-based approach to clean-up. Exceedence of a standard at the property line when the site is the source of the contamination cannot result in approval of a No Action Determination.

C. Risk-Based Assessment

A site-specific risk assessment prepared using standard Environmental Protection Agency policy or a calculation of appropriate clean-up levels, using the Department Hazardous Materials and Waste Management Division's "**Interim Final Policy and Guidance on Risk Assessment for Corrective Action at RCRA Facilities**" (November 16, 1993) is an option for any applicant. Site-specific risk assessments entail substantial resources on the part of the applicant and the Department. This approach may be necessary if the applicant's proposed clean-up levels deviate from the established standards, if the site is complex or if there are receptors (completed pathways), and the applicant is proposing less than complete removal of the contamination.

However, in many cases, a less rigorous approach to risk assessment is adequate. Such an approach would include a narrative description presenting a summary of all the site-specific information and contaminant levels, along with a determination regarding the likelihood of impacting targets or completing exposure pathways. Factors to consider are detailed below in this section.

1. **Ground Water & Surface Water Usage** – A water well search listing the locations of any wells located on the site or in areas within a one-half mile radius of the site and a description of the use of those wells should always be provided. An explanation is needed for the current and proposed use of on-site ground water. A similar summary of local usage of surface water should be prepared. In many cases, a listing of wells from the State Engineer's Records may not fully document ground water usage locally. If the contamination exists in an older section of an urban area, there may exist unregistered wells warranting a door-to-door survey to assess exposure.

2. **Vapor Migration** - If the contaminant is of a volatile and/or flammable nature, the application should indicate how the proposed land use would not present a hazardous situation or promote the migration of already existing contamination. Examples of exposure might be construction of a building basement where a volatile contaminant exists in close vertical proximity and may infiltrate the foundation.

3. **Geology & Hydrogeology** – An evaluation of the ability of the site's geology and hydrogeology to immobilize contaminants or minimize migration may be warranted to determine the extent of the overall clean-up effort. Factors to consider might be: grain size, fractures, carbon content, depth to ground water, transmissivity, areal extent of the aquifer and any other items that may limit development of the aquifer as a drinking water source. If actions of the applicant might promote migration of existing contamination along preferred pathways

(such as newly-installed utilities) measures to prevent this occurrence should be mentioned in the overall evaluation of risk.

4. **Ground Water Monitoring** – A proposal to monitor the ground water might be utilized as a means to ensure that the proposed actions do not present an unacceptable risk. The intent of any ground water monitoring program, where the site is the source of the contamination, should be to verify that the plume has stabilized and will diminish with time or that the current state does not pose a risk to human health and the environment. Additional discussion of this point is provided in another section of this document under "Site Characterization."

5. **Other Exposure Pathways –** Assessment of other exposure pathways may be appropriate on a site-specific basis. Evaluation of the pathway should take into account the proposed land use and the ability for the contaminant to impact targets in excess of levels considered protective of health and the environment.

6. **Proposed Land Use –** Declaration of a proposed land use is necessary in all applications, as the applicant's evaluation of the risk is contingent upon this parameter, as is the Department's approval. In most cases a site's zoning designation will suffice, but additional specificity may be needed. For example, a situation where the site is proposed as industrial may not suffice if the working conditions are such that worker populations may be exposed to unacceptable levels. In this case the applicant might provide specifics as to any controls that have been installed for worker protection. In some cases, (e.g., residential construction) the Department may need additional assurances that future owners of the site will be protected from any contamination remaining on the site, especially if there is a potential that future residents may disturb this contamination.

   Submission of the architect's conceptual plans may be appropriate to state the proposed land use. These plans will be evaluated to get a general idea of the protectiveness of the final site design. Approval can be contingent on the applicant building out the site "substantially similar" to the plan.

   It may be appropriate to leave the contamination in place, if the proposed land use is such that the extant contamination will not present a potential threat to human health or the environment. It is necessary for the applicant to evaluate the risk of leaving any contamination in place as this action relates to the proposed land use. Breaking completed pathways (i.e., capping the contamination) is one action that may warrant leaving contamination in place. The reviewer will use information presented on (potential or completed) pathways to determine if the proposed action or clean-up levels are adequate to ensure that the site will not pose a threat to human health or the environment.

D. Remediation Plans

The remediation plan should demonstrate how state standards or appropriate risk reduction would be achieved. It should include clean-up techniques, clean-up levels, verification sampling, material handling plans and any other information that would lead the state to accept that the remedy is protective of human health and the environment. The remediation plan should be described in sufficient detail to evaluate whether or not the applicant will be capable of remediating all contamination identified at the property within 24 months. In cases where technical constraints prevent complete remediation of ground water contamination in less than 24 months, the Colorado

Department of Public Health and Environment will consider that statutory obligations have been met if the remediation system is constructed and operating within two years of plan approval. Attainment of proposed standards throughout the site in ground water need not be accomplished within the specified two years, though no further degradation of this medium should occur within the clean-up timeframe. On a site-specific basis, timeframes for completion of the remediation can be extended.

Provision of a map indicating areas to be remediated, the location of confirmatory samples, locations of monitoring wells and areas where contamination may not be remediated is necessary. At sites where capping is the remediation choice, the map should show areas of capped and exposed soil.

A contingency plan for dealing with unexpected types of contamination may be warranted when intrusive activities are planned. Included within this contingency plan would be a provision for notification of the Department should unexpected contamination be encountered. If in the course of remediation the applicant encounters conditions different from those presented in the remediation plan (e.g., additional sources or substantially greater quantities of contamination), the applicant should contact the Department, and all efforts will be made to address any needed modifications in a timely manner. If conditions are found to be substantially different and the applicant is unwilling to perform remediation, the approval of the remediation plan would need to be amended, or it would become void.

If Operation and Maintenance is needed, a plan should be included that describes how the system will be operated to ensure that it functions as designed without interruptions. The plan should also include all sampling and analytical methods to be utilized, as well as a description of the monitoring plan implemented to verify attainment of appropriate standards or risk levels.

E. No Action Determinations When the Site is the Source

The site assessment should include a full site characterization and a determination of the potential to impact targets. For example, if volatile soil contamination is present, consider what measures should be instituted such that the contamination will not present a hazard to future users of the property. If the contamination has migrated off site, then consider what potential there might be for impact to off site wells, utility corridors, or other targets. Assessment activities should determine if future activities might promote movement of a contaminant plume or pose threats to future users of the site, others downgradient, and surface and ground water quality in the future. Ultimately, the plan must show that no action is necessary to protect public health and the environment, given the proposed land use.

An applicant cannot receive a No Action Determination if ground water contamination originating on their property exceeds state ground water standards at the property boundary. In this case, in accordance with state water quality rules and regulations, the applicant may petition the state Water Quality Control Commission for a variance from the standard, a change in the point of compliance, or a change in ground water classification.

F. No Action Determination When the Site is Not the Contaminant Source

The applicants must demonstrate that they are being impacted by an off-site source and must fully characterize their property to insure that there are no additional contaminant sources. This is necessary because the statutory language included in the state's approval letter says that the site in question does

not pose a risk. Without a site characterization, the state cannot make that conclusion. In the case of ground water contamination, the assessment should determine ground water flow direction and document a contaminant concentration gradient. If possible, document usage of the contaminant found on the site in a near upgradient location. Include ground water samples as well as soil samples taken from the same or multiple borings, which verifies that the contaminant has been transported via the ground water and that the on-site soil is not a source.

A chronology of the historical activities that have occurred on the site is useful. Sampling may not be necessary if the site history shows no potential for impact. Expansion of the search to surrounding areas to locate potential past or present sources is also useful. An assessment of the likelihood of a change in ground water flow direction should be made. In addition, assessment activities should consider how the proposed use of the site may promote movement of the plume or cause a threat to future users of the site or others in downgradient locations.

Specifically, the applicant should demonstrate that the proposed land use is protective considering potential indoor air issues. An evaluation of the geology, building construction, depth to ground water, and contaminant levels should factor into the risk evaluation. Installation of foundation venting systems coupled with monitoring (in some cases) of the indoor air is usually necessary when volatile contaminants are entering the site from upgradient.

An assessment geared toward demonstrating only that the applicant's site has been impacted by an off-site source is not enough to warrant a No Action Determination for the site. However, under this circumstance, we can write a letter that absolves the applicant from clean-up liability related to the upgradient source. The assessment would be more limited, requiring only a demonstration that the applicant's site is within the current hydrologic bounds of the other's contamination.

PREPARATION OF COMPLETION REPORTS

A. General

The emphasis in preparing completion reports is highly dependent on the type of contamination present at the site and the various media that have been remediated. The guidance provided below is grouped according to the type of remediation that has occurred at the site. In all cases, the framework of the completion report (e.g., location and number of confirmatory samples, proposed monitoring program, etc.) should be presented in the application and submitted for approval by the Department. Any deviations from the original plan should be mentioned as well as any conditions encountered that were different from the original understanding of the site.

B. Soil Contamination: Remediation by Excavation Only

One confirmation sample per 500 ft^2 as measured at the base of the excavation OR two confirmatory samples, whichever method results in the collection of the most samples. In addition, one composite sample from each wall of the excavation is necessary. In excavations of an irregular shape, one composite sample for every 100 lineal feet of wall would suffice. For larger excavations (greater than 5000 ft^2) preparation of a grid for randomization of sampling may be appropriate. If contamination is to be left in place, an additional sample should be collected from the area of the highest contamination, as verified visually or with a field-screening instrument.

Compositing of samples is not recommended for volatile compounds; discrete samples should be collected instead. Explanation of the sampling method should be provided in the narrative as well as any modifications to the preceding used to better characterize the remedial efforts. Depth of samples collected should always be noted. Waste disposal manifests are appropriate inclusions.

C. In-Situ Soil Remediation

In order to determine if the soil remediation has met the proposed remedial goals, it is recommended the applicant install a minimum of two completion borings. For sites with larger source areas, one boring per 10,000 ft^2 of former plume area should suffice to determine the effectiveness of the remedial efforts. In all cases, one boring should have been drilled in the area previously identified as possessing the highest levels of contamination. Completion of the borings should employ a field-screening device (when appropriate), and the boring should be logged. The soil sample submitted for laboratory analysis (from each boring) would be that sample with the highest field screening reading or if the field screening is non detect, then submission of the soil sample located at the ground water interface is appropriate.

D. Ground Water Remediation

Monitoring should continue after active remediation has ceased such that two questions can be addressed: 1) has the ground water that was most severely impacted by the source had a chance to flow past the POC during the monitoring period? 2) If there is contamination remaining, is it mobile at levels that it may present a risk in the future?

In order to determine the length of the monitoring period, calculate the velocity of the ground water. For example, if the POC is located 100 feet from the source area and ground water flows at 50 feet/yr, then monitoring should continue for a minimum of two years. Other factors to take into consideration when deciding on a frequency and length of monitoring are as follows: aquifer and contaminant characteristics such as gradient, partition coefficients, original contaminant levels and all other pertinent information. At each regular monitoring event, a map showing ground water flow direction, depth to ground water and sampling locations should be prepared. Tabular presentation of data, grouped by individual monitoring wells, is encouraged. The completion report should verify that the specific goals proposed in the approved voluntary clean-up application have been met.

VOLUNTARY CLEAN-UP AND REDEVELOPMENT ACT
CHECKLIST AND INFORMATION COMPARISON TABLE

This table provides a checklist of information that may be included in a Voluntary Clean-up Program application. Although not all information requirements apply to all sites, the applicant should review this list carefully and include in the application any information that is relevant to the property in question. The table should be submitted in the application, with the page numbers in the application where this information can be found inserted into the last column. This is not an application requirement, but it does greatly assist the reviewer.

This table may also be used to compare the information normally contained in Phase I and Phase II Environmental Audits, with the requirements of the Voluntary Clean-up Program application. Since these audits are commonly performed, the table will assist owners in determining any additional information that may be needed, if you have already performed a Phase I or Phase II audit.

DIRECTIONS FOR COMPARISON TABLE INTERPRETATION

The table that follows is organized like the one below.

P I	P II	VC	I. General Information	Page

The first three columns provide the comparison between the information requirements of Phase I (PI) and Phase II (P II) Environmental Audits and the Voluntary Clean-up Program application (VC). In each column you will either see a blank space, a zero (0), a plus sign (+) or a minus sign (-). These can be interpreted as follows:

\+ means requirements are more detailed than other documents

\- means requirements are less detailed than other documents

0 means requirements are similar to other documents

a blank means that the requirement does not exist for that document

So, for example, if you saw a (+) in the VC column, it means that there are additional information requirements for the Voluntary Clean-up Program application in comparison to the audit reports for that item. If there was a (0) in the VC column, then the information contained in the Phase I or Phase II audit is adequate for the Voluntary Clean-up Program application.

The fourth column provides the checklist of information items required in the Voluntary Clean-up Program application.

The fifth column provides a place for you to insert the page number from the Voluntary Clean-up Program application that pertains to this informational item. If the applicant fills this portion out and returns the table with the application, it greatly assists the reviewer in finding information within the application.

VOLUNTARY CLEAN-UP, ASTM PHASE I, ASTM PHASE II COMPARISON

P I	P II	VC	I. GENERAL INFORMATION	Page
0	0	0	Name and address of owner	
0	0	0	Contact person and phone number	
0	0	0	Location of property	
-	+	+	Type and source of contamination	
		+	Voluntary Clean-up (VC) or No Action Determination (NAD)	
0		0	Current Land Use	
		+	Proposed Land Use. Proposed future land use is not covered in a Phase I or II assessment. A voluntary clean-up approval is contingent upon this item.	

P I	P II	VC	II. PROGRAM INCLUSION	Page
-		+	Is the applicant the owner of the property for the submitted VC or NAD? In a Phase I assessment, the owner is not always the party preparing the assessment. The Voluntary Clean-up Program requires owner/designated representative to complete the submittal.	
-		+	Is the property submitted for the VC or NAD the subject of corrective action under orders or agreements issued pursuant to provisions of Part 3 of Article 15 of this Title or the federal RCRA 1976 as amended? Although Phase I assessments review state records for RCRA corrective actions, the Voluntary Clean-up Program requires details of a corrective action for an eligibility determination.	
-		+	Is the property submitted for the VC or NAD subject to an order issued by or an agreement with the Water Quality Control Division pursuant to Part 6 of Article 8 of this Title? Although Phase I assessments review state records, detail is not discussed. If Water Quality has issued a permit, the applicant is ineligible.	
-		+	Is the property submitted for the VC or NAD a facility that has or should have a permit or interim status pursuant to Part 3 of Article 15 of this Title for treatment, storage or disposal of hazardous waste? Although Phase I assessments review state records, detail is not discussed. For the Voluntary Clean-up Program, details of permits or interim status are necessary for an eligibility determination. Based on the site specifics of the permitted facility, the applicant may qualify for the program.	
-		+	Is the property submitted for the VC or NAD subject to the provisions of Part 5 of Article 20 of Title 8 (Underground Storage Tanks) CRS or of Article 18 of this Title (RCRA)? Although Phase I assessments review state records, detail is not discussed. For the Voluntary Clean-up Program details of Underground Storage Tank or RCRA requirements are necessary to make an evaluation. In some cases (e.g., tanks were removed prior to 12/22/88), the applicant may be eligible for the program.	
-		+	Is the property submitted for the VC or NAD listed or proposed for listing on the National Priorities List of Superfund sites established under the federal act (CERCLA)? Although Phase I assessments review state records, detail is not discussed. For the Voluntary Clean-up Program, details of CERCLA action are necessary to make an evaluation. In some cases, the applicant may not be eligible for the program.	

P I	P II	VC	III. ENVIRONMENTAL ASSESSMENT	Page
0	0	0	Qualified environmental professionals must submit environmental assessments. The applicant must submit documentation, in the form of a statement of qualifications or resume.	
0	0	0	The applicant should provide the address and legal description of the site and a map of appropriate scale identifying the location and size of the property.	
0		0	The applicant should describe the operational history of the property in detail, including the most current use of the property.	
0		0	A description of all business/activities that occupy or occupied the site as far back as record/knowledge allows.	
-		+	A brief description of all operations that may have resulted in the release of hazardous substances or petroleum products at the site, both past and present, including the dates activities occurred at the property and dates during which the contaminants were released into the environment. Although Phase I & II assessments may reveal the release of hazardous substances or petroleum products, the exact dates and quantities may not be discussed. For the Voluntary Clean-up Program, the dates of activities, releases, etc., are necessary for an evaluation of eligibility.	
-		+	A list of all site-specific notifications made as a result of any management activities of hazardous substances conducted at the site, including any and all Environmental Protection Agency ID numbers obtained for management of hazardous substances at the site from either the state or the Environmental Protection Agency. The Phase I assessment will reveal whether a facility has an Environmental Protection Agency ID number, but will not list the notifications made as a result of management activities of hazardous substances. This information is necessary for a Voluntary Clean-up Program evaluation.	
0		0	A list of all notifications to county emergency response personnel for the storage of reportable quantities of hazardous substances required under Emergency Planning and Community Right-to-Know statutes.	
0		0	A list of all notifications made to state and/or federal agencies, such as reporting of spills and/or accidental releases, including notifications to the State Oil Inspection Section (OIS) required under 8-20-506 and 507 and 25-18-104 CRS 1989 as amended and 6 CCR 1007-5 subpart 280.50 Part 3 of the OIS regulations, etc.	
-	-	+	A list of all known hazardous substances used at the site with volume estimates and discussion of relative toxicities. A Phase I & II assessment does not require such detail, however, the hazardous substances used, volumes and toxicities are important for a VC in the overall evaluation of risk and sampling efforts.	
-		+	A list of all wastes generated by current activities conducted at the site and manifests for shipment of hazardous wastes off site. A Phase I & II assessment does not require such detail, however, the manifest information is important for a VC evaluation, as in the above item.	
		+	A list of all permits obtained from state or federal agencies required as a result of activities conducted at the site. A listing of all permits is beyond a Phase I or II assessment. These are important for the Voluntary Clean-up Program so the Department can evaluate what potential sources may be at the site.	
0		0	A brief description of the current land uses, zoning and zoning restrictions of all areas contiguous to the site.	

P I	P II	VC	III. ENVIRONMENTAL ASSESSMENT	Page
			The applicant shall describe the physical characteristics of the site, including a map to scale, and an accompanying narrative showing and describing the following, utilizing historic knowledge as well as current data:	
0	0	0	• Topography	
0	-	0	• All surface water bodies and waste water discharge points	
0	-	0	• Ground water monitoring and supply wells	
0	-	0	• Facility process units and loading docks	
0		0	• Chemical and/or fuel transfer and pumping stations	
0		0	• Railroad tracks and rail car loading areas	
0		0	• Spill collection sumps and/or drainage collection areas	
0		0	• Wastewater treatment units	
0		0	• Surface and storm water runoff retention ponds and discharge points	
0		0	• Building drainage or wastewater discharge points	
0		0	• All above or below ground storage tanks	
0		0	• Underground or above ground piping	
0		0	• Air emission control scrubber units	
0		0	• Water cooling systems or refrigeration units	
0		0	• Sewer lines	
0		0	• French drain system	
0		0	• Water recovery sumps and building foundations	
0		0	• Surface impoundments	
0		0	• Waste storage and/or disposal areas/pits, landfills	
0		0	• Chemical or product storage areas	
0		0	• Leach fields	
0		0	• Dry wells or waste disposal sumps	
			If ground water contamination exists or the release has the potential to impact ground water, the applicant should provide the following information for areas within a one-half mile radius of the site:	
	0	0	• The state engineers office listing of all wells within one-half mile radius of the site, together with a map to scale showing the locations of these wells.	
	0	0	• Documentation of due diligence in verifying the presence or absence of unregistered wells supplying ground water for domestic use, when the potential for such wells is deemed likely as in older residential neighborhoods, or in rural areas.	
	0	0	• A statement about each well within the half-mile radius of the site, stating whether the well is used as a water supply well or ground water monitoring well.	
	0	0	• Lithologic logs for all on-site wells; copies of field log notes may be appropriate.	
	0	0	• Well construction diagrams for all on-site wells showing screened interval, casing type and construction details including gravel pack, interval, bentonite seal thickness and cemented interval.	

P I	P II	VC	III. ENVIRONMENTAL ASSESSMENT	Page
	0	0	• Description of the current and proposed use of on-site ground water in sufficient detail to evaluate human health and environmental risk pathways. In addition, the applicant will provide a discussion of any state and/or local laws that restrict the use of onsite ground water.	
			The applicant should provide information concerning the nature and extent of any contamination and releases of hazardous substances or petroleum products that have occurred at the site, including but not limited to:	
	-	+	• Identification of the chemical nature and extent, both onsite and offsite, of contamination that has been released into soil, ground water or surface water at the property, and/or releases of substances from each of the source areas identified, including estimated volumes and concentrations of substances discharged at each area, discharge point, or leakage point as per Section 25.16.308(2)(b). Although Phase II assessments identify the nature of contamination, the extent is not always fully defined. For Voluntary Clean-up Program purposes, the source, nature, extent and estimated volumes of the release are important in the overall evaluation of risk and eligibility.	
	0	0	• A map to scale showing the depth to ground water across the site, direction and rate of ground water movement across the site using a minimum of three measuring points.	
	0	0	• A discussion of all hydraulic tests performed at the site to characterize the hydrogeologic properties of any aquifers onsite and in the area.	
	0	0	• All reports and/or correspondence, which detail site soil, ground water and/or surface water conditions at the site, including analytical laboratory reports for all samples and analyses.	
	0	0	• A discussion of how all environmental samples were collected, including rationale involved in sampling locations, parameters and methodology, a description of sampling locations, sampling methodology and analytical methodology and information on well construction details and lithologic logs. All sample analyses performed and presented as part of the environmental assessment should be appropriate and sufficient to fully characterize all constituents of all contamination that may have impacted soil, air, surface water and/or ground water on the property. The applicant should use Environmental Protection Agency approved analytical methods when characterizing the soil, air, surface water and/or ground water.	

P I	P II	VC	IV. APPLICABLE STANDARDS/RISK DETERMINATION	Page
	-	+	The applicant should provide a description of any applicable standards/guidance (federal, state, or other) establishing acceptable concentrations of constituents in soils, surface water, or ground water, for the proposed land use. Although a Phase II assessment evaluates applicable regulations for the current land use, it does not cover the proposed land use that may be different (e.g., the current land use is industrial and the proposed land use is residential, which likely has more conservative levels for contaminant concentrations).	

P I	P II	VC	IV. APPLICABLE STANDARDS/RISK DETERMINATION	Page
	-	+	The applicant should provide a description of the human and environmental exposure to contamination at the site based on the property's current use and any future use proposed by the property owner, including:	
	0	0	• A table or list for site contaminants indicating which media are contaminated and the estimated vertical and areal extent of contamination in each medium.	
	-	+	• A table or list of site contaminants, indicating the maximum concentrations of each contaminant detected onsite in the area where contaminant was discharged to the environment, and/or where the worst effects of the discharge are believed to exist. A Phase II assessment will evaluate the extent of site contaminants, not the maximum point or worst effects. The Voluntary Clean-up Program requests this item so that an understanding of the source and nature of the contaminants can be made as it relates to risk.	
	-	+	• A table or list for site contaminants indicating whether the contaminant has a promulgated state standard, the promulgated standard and the medium the standard applies to. A Phase II assessment will not necessarily compare the site contaminants with state standards. This is important to evaluate whether the remedy will meet risk-based clean-up objectives.	
	-	+	• A description and list of potential human and/or environmental exposure pathways pertinent to the present use of the property. A risk determination is not usually completed as part of a Phase II assessment; the VC will use risk as part of the overall evaluation.	
		+	• A description and list of potential human and/or environmental exposure pathways pertinent to the future use of the property. (A risk determination is not usually completed as part of a Phase II assessment; the Voluntary Clean-up Program will use risk as noted above. Phase II assessments also do not evaluate future use of the property.)	
	-	+	• A list and map defining all source areas, areas of contamination or contaminant discharge areas. Phase II assessments do not always show source areas. The Voluntary Clean-up Program requires that these areas be defined to indicate the proximity of contaminant with respect to receptors and sampling efforts.	
	-	+	• A discussion of contaminant mobilities, including estimates of contaminants to be transported by wind, volatilization, or dissolution in water. For those contaminants that are determined to be mobile and have the potential to migrate and contaminate the underlying ground water resources, the applicant should also evaluate the leach ability/mobility of the contaminants. This evaluation should consider, but not be limited to the following: leachability/mobility of the contamination, health-based ground water standards for the contamination; geological characteristics of the vadose zone that would enhance or restrict contaminant migration to ground water, including but not limited to grain size, fractures and carbon content; and depth to ground water. This evaluation, and any supporting documentation, should be included in the plan submitted. A Phase II assessment usually does not include a risk determination. However, the Voluntary Clean-up Program will evaluate the risk involved with the proposed clean-up in order to evaluate the application.	

P I	P II	VC	IV. APPLICABLE STANDARDS/RISK DETERMINATION	Page
		+	The applicant should then provide, using the information contained in the application, a risk-based analysis of all exposure pathways, which details how the proposed remediation will obtain acceptable risk levels. A Phase II assessment usually does not include a risk analysis, however, the Voluntary Clean-up Program requires this analysis to show that the remediation propose will attain an acceptable risk or break pathways.	
		+	The Voluntary Clean-up Program includes remediation whereas a Phase I or II assessment does not. Usually remediation is considered a Phase III assessment. The following are the requirements for the clean-up proposal.	
		+	• A detailed description of the remediation alternative, or alternatives selected, which will be used to remove or stabilize contamination released into the environment or threatened to be released into the environment	
		+	• A map identifying areas to be remediated, the area where the remediation system will be located if it differs from the contaminated areas, the locations of confirmation samples, the locations of monitoring wells, areas where contaminated media will temporarily be stores/staged and areas where contamination will not be remediated.	
		+	• Remediation system design diagrams showing how the system will be constructed in the field.	
		+	• A remediation system operation and maintenance plan that describes, at a minimum, how the system will be operated to ensure that it functions as designed without interruptions and a sampling program that will be used to monitor its effectiveness in achieving the desired goal.	
		+	• The plan should describe the sampling program that will be used to verify that treatment of the contaminated media has resulted in attainment of the proposed clean-up goals.	
		+	• The plan should include a schedule of implementation	
		+	The clean-up completion report is necessary to demonstrate that the remediation was completed according to the application. Again, since remediation is involved, the report is beyond the scope of a Phase I or II assessment. The following items should be included in the completion report.	
		+	• A final list of all site contaminants, along with the remaining concentrations, and any deviations from the original plan.	
		+	• A final list defining which media are contaminated and the estimated vertical and areal extent of contamination to each medium.	
		+	• A final list and map defining all source areas, areas of contamination or contaminant discharge areas.	
			Soil Contamination: Remediation by Excavation Only:	
		+	• One confirmation sample per 500 ft^2 as measured at the base on the excavation OR two confirmatory samples, whichever method results in the collection of the most samples.	

P I	P II	VC	IV. APPLICABLE STANDARDS/RISK DETERMINATION	Page
		+	• One composite sample from each wall of the excavation. In excavations of an irregular shape, one composite sample for every 100 lineal feet of wall. For excavations grater than 5000 ft^2, preparation of a grid for randomization of sampling.	
		+	• Explanation of the sampling method in the narrative as well as any modifications to 1 and 2 above used to better characterize the remedial efforts.	
		+	• If contamination is to be left in place, an additional sample should be collected from the area of the worst contamination, as verified or with a field-sampling device.	
		+	• Depth of samples collected	
		+	• Provision of waste disposal manifests	
			In-Situ Soil Remediation	
		+	• Completion of a minimum of two soil borings, with at least one completed in the area identified in the site assessment as the area of highest contamination. For larger areas of contamination, one boring per 10,000 ft^2 of plume area.	
		+	• Completion of the borings should employ a field-screening device and borings should be logged.	
		+	• Soil sample submitted for analysis from each boring would be the sample with the highest field screening or one located at the ground water interface for each boring.	
		+	Ground Water Remediation	
		+	• Field testing should include aquifer and contaminant characteristics such as gradient, partition coefficients, original contaminant levels, etc.	
		+	• At each regular monitoring event, a map showing ground water flow direction, depth to ground water and sampling locations	
		+	• Tabular presentation of data collected	
		+	Summary of Voluntary Clean-up Program participation	
		+	Summary of field activities, remedial activities, any deviations from original plans	
		+	Pertinent figures and drawings of remedial system	
		+	Conclusions made after remedial activities are completed	

COLORADO DEPARTMENT OF PUBLIC HEALTH
AND ENVIRONMENT
HAZARDOUS MATERIALS AND WASTE MANAGEMENT DIVISION

APPENDIX D

Analytical Methodologies

A. Analytical Methodology

Eligibility in the Voluntary Clean-up Program typically begins with the realization that some material is present in the environment, and the candidate is either the cause, or a contributor to, the problem. Released materials must be identified and their concentrations in soil and ground water known in order to evaluate the impact of the release and to minimize it. Information about the types of materials managed on the property can provide an excellent starting point in making selections related to analytical methodology. Material Safety Data Sheets (MSDS), product composition data or supplier use instructions can complement any effort. An intimate understanding of the facility's material handling locations and procedures, along with knowledge of the site's drainage patterns and geology, can assist in piecing together the facts associated with a site.

Chemical analysis supports the information gathered as suggested above. Chemical analysis should be interpreted with respect to the individual site with an understanding of the peculiarities of target contaminants, other contaminants, properties of soil/ground water and inherent strengths and/or weaknesses of analytical measurement systems. General guidance is offered here, but defining a detailed investigation is beyond the scope of this section. If more site-specific or contaminant-specific information is needed, consult with Division staff.

B. Organics

1. Petroleum contamination

Releases of petroleum products into the environment are complicated by the existence of many individual hydrocarbon constituents in a product. Petroleum fuels are blended to meet performance criteria; therefore, the compositions of individual components may vary widely. These performance criteria vary seasonally (winter-summer); as a consequence, composition of petroleum fuels also vary seasonally. One further complication is the fate of the individual components once released into the environment, which may include escape into the atmosphere, propulsion into the soil by subsequent rainfall depending upon the component's solubility in water, hydrolysis, adsorption, oxidation, reduction and bacterial decomposition. Generally, the objective of analysis is to determine: (1) the presence of product, (2) the type of product involved, (3) the relative concentration of petroleum product, or (4) concentrations of individual hydrocarbons.

The presence of gross amounts of hydrocarbon product in soil or ground water can be determined readily by sensory information (smell, sight). This is due to the physical properties of the material such as the fact that hydrocarbons are less dense than water and as such will form a separate floating phase. This kind of field observation can best be followed by analytical techniques employed to determine the relative concentration of hydrocarbon in soil/ground water. The analytical methods used in such determinations are "proximate" methods, which measure a physical property irrespective of the chemical composition.

From these proximate data, one may infer that the amount of hydrocarbon is either directly comparable or proportional. Typically, Environmental Protection Agency method 418.1[1] (Total Petroleum Hydrocarbons, Infrared), and 413.2 (Total Recoverable Oil and Grease, Infrared) are useful for making a relative concentration determination.

These techniques utilize procedures to extract the petroleum product into a solvent, and measuring the absorbance of infrared light by the resulting extract performs the determination. These methods, when performed together, provide very good estimates of oil/grease/light fuels, but losses and underestimates of volatile hydrocarbons (gasoline) must be expected. While these methods are subject to interferences, the extent of interference is minimal and is typically confined to naturally occurring organic substances such as humic acids. Some applications utilize a silica gel clean-up, which removes the polar humic substances, but caution must be exercised if polar organics such as glycol ethers (brake fluid, hydraulic oils) are targets, because the clean-up will remove the target analyte. Environmental Protection Agency method (Total Recoverable Oil and Grease, Gravimetric) 413.11 can also be used effectively. This technique is performed by extracting a sample with a solvent, and after evaporation of the solvent, the weight of the residue represents the oil/grease fraction. This is a relatively nonspecific technique, but it does exploit the nonvolatile nature of oil/grease/heavy fuels. Volatile hydrocarbons are lost, and interferences certainly include non-organic components in addition to colloidal solids present in the extract. Modifications to this technique include centrifugation to remove these solids.

If minor concentrations of petroleum hydrocarbons are suspected to be present, qualitative analyses need to be accomplished to identify the product type. Unlike gross contamination that can be observed, minor concentrations do not exhibit such readily observable properties as floating phases. This is further complicated by the fact that aromatic constituents can partition and dissolve in ground water. Even if the component cannot dissolve into ground water, it may be present in the ground water as a colloidal suspension. Because of this behavior, no single approach to identify petroleum product, or mixtures of product is entirely satisfactory, and several techniques exist to help resolve distillate fractions of petroleum, both colloidal and dissolved. For example, purge and trap techniques, such as 8015[2] (and modified 8015[2]) will resolve petroleum ether ($C_5 - C_6$), light naphtha ($C_6 - C_7$), gasoline ($C_5 - C_{12}$), but will not entirely resolve all of the components of kerosene, jet and diesel fuels ($C_{12} - C_{37}$), which include non-purgable paraffins. To overcome this shortcoming, these methods provide options to the analyst regarding how the sample is presented to the analytical instrument. Direct injection of sample extracts can provide qualitative information out to paraffinic waxes, but most certainly does not demonstrate a lubricating oil ($C_{20} - C_{55}$) fraction, and losses of volatile components must be expected using direct injection. These problems require innovative approaches, and some trade-off is necessary between what is absolutely required and what is technically possible.

Gas Chromatographic analyses that utilize the equipment in a simulated distillation mode (e.g., ASTM D2887 or equivalent) can provide product differentiation for the petroleum products except the heavier fractions. This information is most useful when the age, or weathering of the product, must be determined.

Other applications are firmly centered on our present understanding of product composition, and the propensity of components to partition into a dissolved phase in contact with ground water. Aromatics such as benzene, toluene, ethyl benzene and xylenes (BTEX) exhibit enough polarity that they tend to selectively extract into water as a dissolved phase. Most applications utilize purge and trap presentation and photo ionization detection to identify and resolve these aromatic gasoline constituents that are either very similar to Environmental Protection Agency method 8020[2] or a modified version of 8020.

If contamination by petroleum product is suspected, the combined use of methods 418.1/4131[1] provide reasonable data on both colloidal and dissolved hydrocarbon at modest expense. The numerical sum of each method gives the petroleum concentration in the sample. If the presence of dissolved aromatic components is of interest, then method 8020, or equivalent, ought to be accomplished.

Method 1665, a recently developed approach to eliminate the use of chlorofluorocarbons employed in 418/413 methods, is an approved alternative method. Method 1665 employs hexane rather than a freon used in 418/413 methods.

Finally, inorganic contamination associated with petroleum needs to be evaluated due, in part, to the historic profile use of leaded fuels (see inorganic section).

2. Organic solvent contamination

Organic solvents are liquids that are used to dissolve substances, to act as a carrier and/or vehicle of substances either in a dissolved form or dispersed in solution. Everything that was discussed about petroleum contamination regarding dissolved and colloidal suspensions is also applicable to evaluating solvent releases. Organic solvents have varying degrees of purity depending on their use; that is, minor concentrations of other substances is the rule for "rough" solvents. 1,1.1-trichloroethene frequently contains minor concentrations of tetrachloroethane, tetrachloroethene and dichloro-substituted constituents. Analytical, or reagent grade 1,1,1-trichloroethane contains no, or low trace impurities. Aside from these compositional differences, solvents also exhibit solubility similar to BTEX, except that solvents containing chlorine (chlorinated) will dissolve in water to the point of saturation then separate into a sinking phase or heavier-than-water phase. Solvents in the environment, like petroleum, may include escape into the atmosphere, propulsion into the soil by subsequent rainfall depending upon the component's solubility in water, hydrolysis, adsorption, oxidation, reduction and bacterial decomposition. Generally, the objective of analysis is to determine: (1) the presence of product, (2) the type of product involved, (3) the relative concentration of solvent, or (4) concentrations of individual hydrocarbons or (5) presence and concentration of degradation daughters.

There are proximate analyses available for these solvent compounds. The best known and most widely used of these are Total Organic Carbon (TOC) and Total Organic Halides (TOX). As the name implies, TOC is a measure of the organic carbon present in a sample. Measuring the total carbon and the inorganic carbon and simply taking the difference obtain this value. TOC does not differentiate between synthetic, and naturally occurring sources of organic carbon, which presents a problem if the matrix contains a large organic component (such as raw waste waters). TOC, as an infrared analytical technique, typically employs preparative techniques such as purge and trap, headspace, shake out, sonication and soxlet extraction to prepare the sample. Preparation of soils and water for solvent analysis takes advantage of the physicochemical properties of solvents to both separate these substances from other organic materials that might be present, and the matrix that may contain them.

When definitive data on individual contaminants is needed, such as evaluating compliance with state ground water standards, Gas Chromatographic (GC) methodologies are cheaper and provide data that can be used to identify and measure the amount of the contaminant in the

sample matrix. Cautions are that significant interferences are possible, which may obscure the contaminant, or be measured as the contaminant when the contaminant is not present. Key to selecting a technique for demonstrating solvent contamination is placing the target compound into an analyze class. Some methods are:

Method	Analyte Class
8010	Chlorinated solvents such as freons, dry cleaning and degreasing liquids
8015	Non-chlorinated solvents such as carbon disulfide, ethers, MEK, MIBK
8020	Aromatic solvents such as benzene, toluene

Gas Chromatographic/Mass Spectral methods are more expensive, but are able to operate in the presence of significant interferences and provide elaborate identification information where these data are necessary.

B. Inorganics

Contamination resulting from deposition of elemental metals, and their salts, can be demonstrated effectively by use of either Atomic Absorption Spectrophotometry (AAS or GFAAS) or Atomic Emission Spectrometry (ICP). Selecting either approach ought to be based entirely upon knowledge of the matrix, the desired detection limit and the presence of potential interferences.

By and large, AAS and GFAA are the most sensitive techniques with the least potential for interferences. Since each metal must be determined individually and must include its own quality control, costs for this approach are also the highest. These higher costs can be offset somewhat by producing usable data with good detection limits, in the presence of matrix effects and interferences. Some quality control mechanisms to illustrate interferences and compensate for their effects are necessary and should not be assumed.

The use of ICP techniques provide simultaneous or sequential determination of as many as 30 elements (limited only by the number of available channels). The advantage of obtaining the elemental composition of a sample from a single analysis ought to be apparent from both a cost and a productivity standpoint. However, this technique does suffer from a higher detection limit and interferences. The practical utility of this approach is when detection limit is not a driver (e.g., waste samples being evaluated for regulated elemental concentrations), when interferences are not a problem (determining arsenic when low, or that no chromium is present), or when several elements are of interest from a single sample. One cautionary note is that while mercury does have emission spectra, its measurement by ICP is severely limited. As a consequence, mercury determinations typically are conducted via a cold vapor Atomic Absorption technique.

Similar to the organic analyses, there are some surrogate or proximate methods of analysis that can help define inorganic contamination. Specific conductivity, total dissolved solids, pH, eH, alkalinity and anion +analyses are all used in this fashion.

Footnotes

[1] Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, 1983

[2] Test Methods for Evaluating Solid Waste, SW-846, 3rd Ed., Update I and II, EPA

GUIDANCE FOR ANALYSIS OF INDOOR AIR SAMPLES

Colorado Department of Public Health and Environment

Hazardous Materials and Waste Management Division
(303) 692-3300

Revised April 2000

Purpose of this Guidance

This is intended as general guidance for generators of hazardous waste and is meant to assist in compliance with the hazardous waste regulations. The guidance is not meant to modify or replace the promulgated regulations that undergo periodic revisions. In the event of a conflict between this guidance and promulgated regulations, the regulations govern. Some portions of the hazardous waste regulations are complex and this guidance does not go into details of these complex situations. If a regulatory situation is not described in the guidance or clarification is desired, an official interpretation of a specific hazardous waste regulation can be requested by writing to the Hazardous Materials and Waste Management Division at the address on page 6.

We would appreciate any comments or suggestions for making improvements in future editions. Suggestions or comments can be sent to the address on page 6.

This document was revised to correct the isotope ratios on page one, paragraph three.

GUIDANCE FOR ANALYSIS OF INDOOR AIR SAMPLES

The Hazardous Materials and Waste Management Division ("HMWMD") of the Colorado Department of Public Heath and Environment, in consultation with US EPA Region VIII, have evaluated analysis protocols being employed to ascertain the inhalation exposure pathway for domiciles impacted by volatile organic compounds (e.g., chlorinated solvents and their degradation products) released to the environment, and specify minimal acceptable requirements.

The impact to residential communities by volatile organic compounds via the respiratory exposure pathway is being assessed by regulated industries with oversight from the agency. The purpose of these investigations is to acquire data to be used as inputs into a risk assessment process employed by agency toxicologists, and to provide a tool with which to establish remediation and response activities. These types of investigations are Category 1 Projects that the agency considers to be the highest priority effort with potentially large negative public health impacts. In order to maximize the usability of these data and minimize the cost of these investigations, the agency is here defining the minimal acceptable technical thresholds and attributes for these data.

The minimal acceptable tuning requirements for GC/MS-SIM instruments

GC/MS instruments operated to meet Compendium Methods TO-14, TO-14a, TO-15, and TO-16 Scan mode, must meet specified tuning requirements for operation. SIM tuning and data acquisition requirements are not specified. Presently, instruments may be tuned in any manner at the discretion of the laboratory, and may include tuning to scan mode requirements with an accompanying loss in sensitivity. The agency notes that tuning algorithms which are designed to maximize the 69 atomic mass unit ("amu") ion for the tuning compound perfluorotributylamine ("PFTBA") inherently produce a better signal to noise ratio, and a lower detection limit. These tuning algorithms are typically referred to as the "Autotune" instrument option. The agency will require that tuning be accomplished by way of Autotune protocols, and the following conditions must be met: (1) The operator must confirm that the 69/70, 219/220, and 502/503 isotope ratios occur at the proper ratios of 1 percent (+/- 50 %), 5 percent (+/-25 %), 10 percent (+/- 10 %) respectively; (2) The peak width at half height for the 502, 219, and 69 PFTBA isotopes be 0.5 amu +/- 0.2 amu: and (3) The operator must confirm the correct mass assignment of these isotopes to a tolerance of 0.1 amu (e.g., 69.0 amu +/- 0.1 amu).

Once tuned, these instruments have acceptable electronic drift; such that, operators must verify that the tuning is stable at a minimum of once per operating day to insure correct mass axis alignment, and eliminate data accumulated with contaminated ion sources. These instrument-tuning requirements specify the minimum acceptable performance goals that are easily verified.

The minimal acceptable data acquisition requirements for GC/MS-SIM instruments

GC/MS instruments operated to meet Compendium Methods in the SIM mode must be tuned and operated to acquire data with 1 amu of resolution. Presently, there are no tuning criteria for the SIM mode in these methods. The agency evaluated data produced with low resolution (between 1.4 and 1.8 amu) and high resolution (1 amu) approaches on a linear quadrapole instrument. The data produced with high resolution show a demonstrable improvement in signal to noise ratio, less interference, and a lower detection limit for all compounds of interest. Furthermore, actual data accumulated for an indoor air quality assessment was examined, and all samples analyzed by a low-resolution approach exhibited detrimental interferences. Only two samples demonstrated the absence of interference. These samples were found to have been acquired with a high-resolution approach (1 amu of resolution). Data acquired with 1 amu of resolution met required detection limits for the compounds of interest.

The agency requires that GC/MS-SIM data be acquired with 1 amu of resolution, and that the following conditions must be met: (1) the operator must demonstrate compliance with the tuning specifications; (2) the operator must confirm that the software method used to collect calibrant and sample data be set to the high resolution option (1 amu); (3) the ion dwell times must have been optimized to obtain a minimum of 10 scans per peak; and (4) the electron multiplier voltages must be set to meet the detection limits of the project (conveniently accomplished by setting EM voltages at +300 volts relative to the tune voltage).

The minimal acceptable requirements for ion selection for GC/MS-SIM and GC/MS-Scan

GC/MS instruments operated to meet Compendium Methods in the SIM and Scan modes report the air concentration of contaminants by using prominent and unique fragmentation ions in the contaminant's mass spectra. The magnitude of these so-called "characteristic" ions, operate in both the SIM and Scan modes as the means to measure the concentration of the contaminant present in the sample. In the SIM mode, the characteristic ions function additionally to provide the identity to the contaminant found in the sample. The Compendium Methods are an assemblage of known analytical approaches that are peer reviewed, documented, and made available for general use. These methods are not offered as absolute, or infallible approaches. There is an assumption that knowledgeable and proficient scientists will operate on data resulting from these methods, and will take actions to meet the data quality objectives of specific projects.

The Compendium Methods have tabular attachments that list the contaminant and its characteristic ions. EPA and HMWMD chemists have independently come to the identical conclusion that the chlorinated solvents characteristic ions used in these methods are substantially different from those tabular lists in methods for other EPA programs (water and hazardous waste). For the typical suite of nine solvent contaminants and degradation products accumulated for indoor air samples, four of these targets have different characteristic ions in equivalent methods (EPA method 8260B, EPA method 624, and EPA method 524). The agency is aware that a significant amount of thought and consultation occurred for the adoption of the characteristic ions for these contaminants into these equivalent methods, and there is no discernible distinction for the media sampled for these contaminants because all analytical approaches ultimately utilize a gas phase for analysis. The Agencies believe that the selection of characteristic ions for this analysis is another critical element for the correct application of indoor air sampling. The agency desires to point out that the selection of characteristic ions is not a simple matter of consulting water and waste analytical methodologies, but is driven by the careful consideration of library mass spectra for the contaminant of interest, and the presence/influence of

interference. Absolutely, all available information should be consulted, but sampling and analysis to illuminate environmental impacts must include a minimal iterative performance examination of the data resulting from a particular technique. If early data sets demonstrate intolerable interference on particular ions, then subsequent analysis certainly ought to recognize other more appropriate characteristic ions that eliminate, and minimize the influence of interference.

Interferences occur in Scan and SIM data, and if these interferences occur in conjunction with characteristic ions of target contaminants, the actual concentrations may be overestimated. The agency has detected that characteristic ions used quantitatively in either mode with interference may significantly overestimate the air concentration of contaminants, regardless of the risk assessment objective (chronic or acute exposure). A dogmatic selection of quantitation ions and the presence of coeluting interferants can cause overestimates of the actual risk to impacted populations. Obviously, overestimating the impact involves unnecessarily alarming citizens to the impact of these solvent releases, and the over commitment of resources to dubious problems. More importantly, the agency's toxicologists rely on accurate data to generate a reasonable risk assessment. Funding for these remedial activities rely on private and public money, and the agency prefers to expend resources based upon the best available information to achieve needed remediation, when it is necessary. The agency prefers to use characteristic ions found in equivalent EPA methodology for GC/MS-Scan applications, and has formulated suggested ions for GC/MS-SIM based upon best professional judgment, after accounting for detrimental interferences observed in three projects, as follows:

Contaminant	Compendium Characteristic Ions[1]	Agency preferred GC/MS-Scan Equivalent Method Characteristic Ions[2]	GC/MS-SIM Suggested Ions
1,1-DCE	61[3], 96	96, 61, 63	96, 98[5]
1,2-DCA	62, 64	62, 98	62, 98[5] or 62, 64
Methylene Cl	49[3], 84[4], 86	84, 86, 49	84, 86
TCE	130, 95[4]	95, 130, 132	130, 132

(1) EPA Air Compendium Methods T0-14, T0-14a,T0-15, and TO-16 . Primary (quantitation ion) listed first.

(2) EPA method(s) 8260B (SW-846), 624 (Clean Water), and 524 (Drinking Water). Primary ion listed first.

(3) Interference detected on the primary (quantitation) ion, evaluation of 3 projects. Data from two laboratories using GC/MS-Scan and GC/MS-SIM.

(4) Interference detected on the secondary (confirming) ion, evaluation of 3 projects. Data from two laboratories using GC/MS-Scan and GC/MS-SIM.

(5) The selection of the 98 ion reflects the prominence of this ion for this compound, and observed interferences.

Interferences that have occurred in SIM data tend to obscure the identity of target compounds. The SIM approach uses a combination of retention time for characteristic ions and the characteristic ion abundance ratio to identify a contaminant. If interferences occur with target contaminants, both identification criteria may fail, and have failed. Laboratories operating this technique are reduced to "estimating" the identity and the concentration of the suspect contaminant where interferants occur in these data. This has been accomplished by assigning a "J" qualifier to the reported result. These actions are justified by the chromatographic retention time of a single characteristic ion in a single chromatographic column. The Agencies understand this approach, but are concerned about the potential for misidentification by relying solely upon a one dimensional datum.

Chromatographic behavior is a useful tool in the determination of solvent contaminants because this behavior provides a probability that a particular contaminant is present, but chromatographic behavior also includes a finite probability that the identification is incorrect. The agency is also concerned about the manner in which these qualifications apply to these data. By convention, the "J" qualification applies only to the quantitative result for the contaminant, not the identity of the contaminant. The agency will allow this approach only if such identifications additionally report that the contaminant was detected but not confirmed, along with the reason for this determination (retention time for characteristic ions, or ion ratio out of range). The agency firmly believes that the frequency of occurrence for this problem will become minor when appropriate tuning, data acquisition, and selection of characteristic ions are fully and completely implemented with a timely, iterative performance evaluation on the resulting data.

The agency and regulated facilities should not feel unreasonably constrained by Compendium methods to accomplish prudent and necessary steps to insure the adequacy of data. EPA's Office of Solid Waste and Emergency Response ("OSWER"), has established a performance based approach to the collection of data for all of its programs, and HMWMD has likewise announced, in the preamble to the adoption of Update III to SW-846, its commitment to allow, or require analytical methodology with performance which meets the data quality objectives of a project.

The agency is aware that there are ongoing projects affected by this decision. Because of this, the agency will allow data previously accumulated that does not meet these minimal requirements, but will examine these data to determine if the data quality objectives were met. Based on these examinations, the agency may require additional sampling and analysis. Projects that require this type of sampling and analysis proceed only by approval of the agency, and the agency will only approve of plans that specify those minimum requirements discussed here. Regulated facilities involved in sampling indoor air should amend their sampling and analysis plans immediately to reflect these minimal requirements.

To assist in this endeavor, Attachment 1 to this document specifies in tabular form the minimal acceptable requirements for analysis of indoor air samples.

Attachment 1
Minimal acceptable requirement for analysis of indoor air samples

Activity	Specifications	Documentation needed
GC/MS-SIM Tuning	Autotune or equivalent. Acceptable Isotopic ratios (1, 5, 10 %) Peak width at half height (0.5 amu +/- 0.2) Correct mass assignment (+/- 0.1 amu)	Printout of tune report
GC/MS-SIM Data Acquisition	Meet tune specifications Optimize ion dwell time Set electron multiplier voltage to achieve required detection limits. Collect calibrant and sample analysis data with the high resolution option (1 amu)	Printout of instrument method 10 scans/peak minimum. Printout of Extracted Ion Chromatogram Data Quality Objectives Printout of instrument method. Raw Sample Data
Ion Selection		**Reference**
GC/MS-SIM	Select primary ions from 8260B tabular data, or at least two ions, justified from Library Spectra, that meet data quality objectives. (Free from interferences) Consecutively evaluate ion selection. Adjust as necessary.	Method 8260B, Library Spectra Library Spectra, Raw Sample Data
GC/MS-SCAN	Select primary ions from 8260B tabular data, or at least two ions, justified from Library Spectra that meet data quality objectives. (Free from interferences) Consecutively evaluate ion selection. Adjust as necessary.	Method 8260B, Library Spectra Library Spectra, Raw Sample Data

GC/MS-SIM Reporting Requirements

Confirmed Positive detections: (REPORT: Concentration, qualify quantitative estimates with a "J")

- ion relative retention time tracks that of standards ***(+/- 0.10 RRT)***
- characteristic ion abundance ratio tracks ratio of standards (+/- 25 %)
- characteristic ions maximize within +/- one scan

Unconfirmed detections: (REPORT: Detected not confirmed, specify reason. Qualify quantitative estimates with a "J")

- ion relative retention time tracks that of standards ***(+/- 0.10 RRT)***
- characteristic ion abundance ratio fails to track ratio of standards (+/- 25 %)
- characteristic ions do not maximize within +/- one scan

CONTACT INFORMATION

24-hour Emergency Response Line	(877) 518-5608
***New* statewide toll-free**	
Colorado Department of Public Health and Environment	(303) 692-2000
(CDPHE) toll-free	(800) 886-7689
Hazardous Materials and Waste Management Division	(303) 692-3300
(HMWMD) toll-free	(888) 569-1831
HMWMD Technical Assistance Line	(303) 692-3320

CDPHE Website	http://www.cdphe.state.co.us/
HMWMD Website	http://www.cdphe.state.co.us/hm/
Downloadable Regulations	http://www.cdphe.state.co.us/regulate.asp
HMWMD Internet e-mail	comments.hmwmd@state.co.us

Other Phone Numbers:

National Response Center	(800) 424-8802
RCRA/Superfund Hotline	(800) 424-9346

Send questions in writing to:

Colorado Department of Public Health and Environment
Hazardous Materials and Waste Management Division
Technical Assistance
4300 Cherry Creek Drive South
Denver, CO 80246-1530

OR

FAX (303) 759-5355

Please provide as much detail as possible regarding your question and the waste or process to which it applies.

COLORADO DEPARTMENT OF PUBLIC HEALTH
AND ENVIRONMENT
HAZARDOUS MATERIALS AND WASTE MANAGEMENT DIVISION

APPENDIX E

Sample Letters

STATE OF COLORADO

Bill Owens, Governor
Jane E. Norton, Executive Director

Dedicated to protecting and improving the health and environment of the people of Colorado

4300 Cherry Creek Dr. S.
Denver, Colorado 80246-1530
Phone (303) 692-2000
Located in Glendale, Colorado

Laboratory and Radiation Services Division
8100 Lowry Blvd.
Denver CO 80220-6928
(303) 692-3090

http://www.cdphe.state.co.us

Colorado Department
of Public Health
and Environment

May 1, 2000

RCRA
COMPLETION OF CORRECTIVE ACTION REQUIREMENTS

Theodore O. Meiggs Ph.D.
FOREMOST Solutions, Inc.
350 Indiana Street, Sutie 415
Golden, Colorado 80401

Re: Cleanup of Chromium Contamination
EIMCO / Glenwood Industrial, LLC Site
2222 Deveruex Road, Glenwood Springs
COD981544786

Dear Mr. Meiggs:

I have received your April 17, 2000 semiannual groundwater report in which sampling data are presented and the progress of the cleanup effort is described. My review of your report suggests that the combined chemical and biochemical treatment system has converted the highly water soluble hexavalent chromium to insoluble trivalent chromium, thereby stabilizing the contamination and preventing continued leaching to ground water at the Glenwood Springs facility. Test results confirm that ground water quality has improved with the reduction of chromium concentrations to below the State standard for this contaminant in all wells.

Based on the information provided in the April 17th report, the treatment of both the source area and ground water appears to have been successful. Unless new data is generated proving otherwise, the Department does not intent to have the owners or tenants of the 2222 Deveruex Road facility pursue this matter any further. No further corrective action is required with regard to this past release. We also concur with your proposal to close the five ground water monitoring wells in accordance with procedures established by the State Engineers Office (Department of Natural Resources, Division of Water Resources). I thank you and your client, Glenwood Industrial, for having chosen to pursue this matter to its successful conclusion.

Please feel free to call me at (303) 692-3362 if you have any questions regarding this letter.

Sincerely,

Walter Avramenko, Unit Leader
Hazardous Waste Corrective Action Unit
Compliance Program

cc: Gary Schultz – Glenwood Industrial, LLC
Valois Shea – USEPA Region VIII / UIC Program
Kathleen Wahlberg – CDPHE / HMWMD

STATE OF COLORADO

Bill Owens, Governor
Jane E. Norton, Executive Director

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Colorado Department
of Public Health
and Environment

May 5, 1998

SOLID WASTE
NO FURTHER ACTION
LETTER

Mr. Robert McPeek
10584 Weld County Road 31
Fort Luption, Colorado 80621

RE: Former Road 31 Disposal Site, Fort Lupton

Dear Mr. McPeek:

The Solid Wate Unit of the Hazardous Materials and Waste Management Division (the Division) has reviewed the April 15, 1998 letter prepared by Mr. Michael Meschke. On your behalf, Mr. Meschke is requesting approval for closure of the above referenced site. We concur with Mr. Meschke's conclusions, that all conditions contained withing the Corrective Action Plan for this site have been adequately addressed.

As part of the closure process, a site visit was conducted by Mr. Trevor Jiricek of Weld County Health Department (WCHD) and myself on May 4, 1998. Based on my observations it appears that the remedial activities have been completed. Therefore, based on the information contained in the April 15 letter, and discussions with you during the site visit, the Division considers this site closed, and no further action is required.

Please be aware, the Division's letter of April 21, 1997 to yourself restricted the end use of the biobed soil to the south pond area. Prior to any usage of biobed soils, outside of the south pond, a written request must be submitted to the Division and WCHD for review and approval.

Should you have any questions regarding this letter, contact me at (303) 692-3437.

Sincerely,

Roger Doak
Solid Waste Unit
Compliance Program

cc: Trevor Jiricek, Weld County Health Department
Michael Meschke
Weld County Commissioners
Weld County Planning Department

sw/wld/31 1a

STATE OF COLORADO

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Jane E. Norton, Executive Director

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Colorado Department
of Public Health
and Environment

VOLUNTARY CLEANUP PLAN APPROVAL LETTER

April 30, 2001

Ms. Victoria Sorenson
City of Fort Morgan
710 E Railroad Ave
Fort Morgan, CO 80701

Re: Voluntary Cleanup Plan Approval, former Fort Morgan Power Plant, 1600 N Main, Ft. Morgan, Colorado

Dear Ms. Sorenson:

The Colorado Department of Public Health and Environment (the "Department") has reviewed the voluntary cleanup plan submitted on behalf of The City of Fort Morgan (the Applicant) concerning the property identified in the application and located at 1600 N Main, Ft. Morgan, Colorado (the site). This review was limited to the materials submitted by the Applicant, and a site visit on April 25, 2001, as well as those materials required by §25-16-304(2).

Based on this review the Department has concluded that, if fully and properly implemented, the plan will attain a degree of cleanup and control of hazardous substances and petroleum products, such that the property does not present an unacceptable risk to human health or the environment based on the property's proposed future use which is as a parks and recreation maintenance facility.

In accordance with the Voluntary Cleanup and Redevelopment Act §§ 25-16-301 to 311, C.R.S., the Department hereby approves the voluntary cleanup plan submitted by the Applicant for the property identified in the application and located at 1600 N Main, Ft Morgan, Colorado. It is the opinion of the Colorado Department of Public Health and Environment that upon completion of the voluntary cleanup plan no further action is required to assure that this property, when used for the purposes identified in the voluntary cleanup plan (parks and recreation maintenance facility), is protective of existing and proposed uses and does not pose an unacceptable risk to human health or the environment at the site.

The approval of the voluntary cleanup plan by the Department, and the Department's conclusions and opinions relating thereto, apply only to conditions on the property and state standards that exist at the time of submission of, and which were addressed in the voluntary cleanup plan application. The submission of any materially misleading information by the Applicant in the context of a voluntary cleanup plan shall render the Department's approval of the plan void. Also, failure of the Applicant to materially comply with the voluntary cleanup plan shall render the Department's approval of the plan void.

Further, if the voluntary cleanup plan is not initiated within twelve months after approval by the Department, or completed within twenty-four months after approval or within a Department approved extension for completion of the voluntary cleanup plan, the approval shall lapse, and reapplication and Department approval pursuant to § 25-16-306(4), C.R.S. is required prior to implementation of the lapsed voluntary cleanup plan.

Within forty-five days after completion of the voluntary cleanup described in the plan approved by the Department, the Applicant shall provide to the Department a certification from a qualified environmental professional that the voluntary cleanup plan has been fully implemented. Any person who fails after initiation of an approved voluntary cleanup plan, to fully and properly implement the plan, may be required by the Department to take further action, provided such action is authorized or required under applicable state laws and regulations.

The Applicant shall comply with all applicable federal, state, and local laws or regulations and shall obtain all necessary approvals or permits to conduct the activities required by the voluntary cleanup plan. The Department makes no representation with respect to approvals or permits required by federal or local laws or regulations or state laws or regulations other than the Voluntary Cleanup and Redevelopment Act.

Further, the Department shall not be liable for any injuries or damages to persons or property resulting from acts or omissions of the Applicant or those acting for or on behalf of the Applicant, including its officers, employees, agents, successors, representatives, contractors, or consultants in carrying out the activities required by the voluntary cleanup plan. Nothing in the Department's approval of the voluntary cleanup plan, or the Department's conclusions or opinions relating thereto, shall constitute an expression of implied waiver of sovereign immunity otherwise applicable to the Department, its employees, agents, or representatives.

Nothing in this letter shall be construed to limit the Department's authority, and the Department reserves all rights and authorities to bring any action pursuant to applicable state laws or regulations.

If you have any questions, please call me at (303) 692-3449.

Sincerely,

Mark E. Walker
Voluntary Cleanup Program

cc: RV010316-1
Roger Hosea; Northeast Colorado Health Dept.

STATE OF COLORADO

Bill Owens, Governor
Jane E. Norton, Executive Director

Dedicated to protecting and improving the health and environment of the people of Colorado

4300 Cherry Creek Dr. S.
Denver, Colorado 80246-1530
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Located in Glendale, Colorado

Laboratory and Radiation Services Division
8100 Lowry Blvd.
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Colorado Department
of Public Health
and Environment

August 10, 1999

VOLUNTARY CLEANUP
NO ACTION DETERMINATION
WITH UPGRADIENT SOURCE

Mr. Rick Kahm, President
Englewood Environmental Foundation Inc.
3400 S Elati Street
Englewood, CO 80110

Re: No Action Determination Approval, NE Quadrant of former Cinderella City Mall, Between South Elati & Galapago and West Floyd & Englewood Parkway, Englewood, Colorado

Dear Mr. Kahm:

On June 25, 1999 a No Action Petition (the Petition) was submitted on behalf of Englewood Environmental Foundation (the Applicant) to the Colorado Department of Public Health and Environment (the Department) pursuant to C.R. S 25-16-307(2) of the Colorado Voluntary Cleanup and Redevelopment Act. The Petition was submitted for the applicant's property identified in the legal description contained in the Petition and generally described as the NE Quadrant of the former Cinderella City Mall, Between South Elati & Galapago and West Floyd & Englewood Parkway, in Englewood, Colorado ("the property").

The Department conducted a review of the environmental data collected on the above-referenced property. Based on this review and pursuant to C.R.S. 25-16-307(), the Department approves the applicant's Petition and makes the following determinations:

1) The environmental assessment submitted by the applicant and performed by qualified environmental professionals indicates that there is no evidence of contamination released into the environment present from the applicant's operations on the property which exceeds applicable promulgated state standards or which poses an unacceptable risk to human health and the environment.

2) Contamination is present in the groundwater (chlorinated solvents) for which there are applicable and promulgated state standards. The contamination appears to originate from a source upgradient of the site and the applicant is not responsible for this contamination.

Based on the information provided by the applicant concerning property identified in the legal description contained in the Petition and generally described as the NE Quadrant of the former Cinderella City Mall, between South Elati & Galapago and West Floyd & Englewood Parkway, Englewood, Colorado, it is the opinion of the Colorado Department of Public Health and Environment that no further action is required to assure that this property, when used for the purposes identified in the no action petition (commercial facility), is protective of existing and proposed uses and does not pose an unacceptable risk to human health or the environment at the site.

The approval of the applicant's Petition by the Department applies only to conditions on the property and state standards that exist as of the time of submission of the Petition. In addition, this approval applies only for the land use specified in the application, which is as a commercial facility. This approval shall be considered void if it is determined that materially misleading information has been submitted by the applicant. Nothing in this letter shall be construed to limit the Department's authority to take actions under existing statues as necessary, should new information come to the attention of the Department.

If you have any questions, please contact me at (303) 692-3449.

Sincerely,

Mark E. Walker
Voluntary Cleanup Program

cc: RV990625-1
Paul Casey, Spectrum Environmental
Warren Brown, Tri-County Health Dept.

STATE OF COLORADO

Bill Owens, Governor
Jane E. Norton, Executive Director

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Colorado Department
of Public Health
and Environment

January 14, 1994

RADIATION CONTROL DIVISION CLEANUP APPROVAL LETTER

Rich D. Ziegler
Executive Vice President and General Manager
Cotter Corporation
12596 west Bayaud Avenue, Suite 350
Lakewood, CO 80228

Dear Mr. Ziegler:

Radiation Control Division staff have reviewed Cotter Corporation's January 11, 1994 report on the Atchison, Topeka, and Santa Fe Railroad Depot Project.

Cotter Corporation's objectives were to (1) meet the U.S. Environmental Protection Agency (USEPA) health-based soil standard and (2) conduct clean up the site as low as is reasonably achievable toward background range.

The final report presents surveys which confirm Cotter's objectives were met and that radioactive material was removed in a manner consistent with RH 3.16.4.1.2 of Colorado's *Rules and Regulations Pertaining to Radiation Control*. The site-wide average of randomly-chosen final verification samples was less than 3 picoCuries of Radium-226 per gram of soil, well below the USEPS standard applicable to this site, which is 6.3 picoCuries of Radium-226 per gram of soil. Independent analyses conducted by the Department's laboratory on the final verification sample set confirm Cotter's results.

Based upon the information presented in the January 11, 1994 report, as wwll as upon staff technical evaluation of the radiuma nd thorium data and staff monitoring of cleanup progress during site visits, the Division finds that cleanup of the Atchison, Topeka, and Santa Fe Railroad depot site is complete and satisfactory and that the area cleaned up is suitbalbe for unrestricted use.

If you have any questions regarding this letter, please contact Ken Weaver of the Division at 692-3030.

Respectfully,

Robert M. Quillin, Director
Radiation Control Division

xc: D. Link, USEPA

COLORADO DEPARTMENT OF PUBLIC HEALTH
AND ENVIRONMENT
HAZARDOUS MATERIALS AND WASTE MANAGEMENT DIVISION

APPENDIX F

Brownfields Legislation

HB 00-1306

HOUSE BILL 00-1306

BY REPRESENTATIVES McPherson, Smith, Clapp, Fairbank, Hagedorn, Hefley, Hoppe, Lee, Miller, Mitchell, Nunez, Paschall, Spence, Stengel, Taylor, T. Williams, and Young;
also SENATORS Teck, Blickensderfer, Hernandez, Lamborn, Martinez, Matsunaka, Pascoe, Perlmutter, Reeves, Sullivant, and Tebedo.

CONCERNING INCENTIVES FOR REDEVELOPMENT OF CONTAMINATED LAND, AND MAKING AN APPROPRIATION IN CONNECTION THEREWEITH.

Be it enacted by the General Assembly of the State of Colorado:

SECTION 1. 25-16-306(5), Colorado Revised Statutes, is amended to read:

15-16-306. Approval of voluntary clean-up plan – time limits– contents of notice–conditions under which approval is void – expiration of approval. (5) (a) Within forty-five days after the completion of the voluntary clean-up described in the voluntary clan-up plan approved by the department, the property owner shall provide to the department a certification from a qualified environmental professional that he plan has been fully implemented.

(b) IF THE OWNER IS APPLYING FOR THE TAX CREDIT PROVIDED IN SECTION 39-22-526, C.R.S., THE OWNER SHALL SUBMIT TO THE DEPARTMENT

Capital letters indicate new material added to existing statutes; dashes through words indicate deletions from existing statutes and such materials not part of act.

THE CERTIFICATION ALONG WITH AN APPLICATION PURSUANT TO SECTION 25-16-303. THE CERTIFICATION SHALL, IN ADDITION TO CERTIYING THAT THE PLAN HAS BEEN FULLY IMPLEENTED, DISCLOSE THE COSTS OF IMPLEMENTATION AND INCLUDE SUPPORTING DOCUMENTAITON OF THOSE COSTS. THE DEPARMENT SHALL THEN CERTIFY THE ACCURACY OF THE COSTS AND ISSUE THE PROPERTY OWNER A CERTIFICATE STATING THAT THE CLEAN-UP HAS OCCURRED AND THE COSTS OF SUCH CLEAN-UP. THE PROPERTY OWNER MAY SUBMIT THIS CERTIFICATE TO THE DEPARTMENT OF REVENUE TO CLAIM A TAX DRECIT UNDRE SECTION 39-22-526(2), C.R.S.

SECTION 2. Part 5 of article 22 of title 39, Colorado Revised Statutes, is amended BY THE ADDITION OF A NEW SECTION to read:

39-22-526. Credit for redevelopment of contaminated land – repeal. (1) FOR TAX YEARS 2000 TO 2005, THERE SHALL BE ALLOWED TO ANY PERSON WHO MEETS THE FOLLOWING REQUIREMENTS A CREDIT AGAINST THE INCOME TAXES IMPOSED BY THIS ARTICLE FOR ANY APPROVED ENVIRONMENTAL REMEDIATION FOR THE PURPOSE OF REDEVELOPMENT:

(a) THE PROPERTY WHERE THE ENVIRONMENTAL REMEDIATION TAKES PLACE AND WHICH IS PROPOSED FOR REDEVELOPMENT MUST BE LOCATED WITHIN A MUNICIPALITY THAT HAS A POPULATION OF TEN THOUSAND OR MORE PERSONS.

(b) THE PERSON SEEKING THE CREDIT MUST POSSESS A CERTIFICATE ISSUED BY THE COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT PURSUANT TO SECTION 25-16-306(5), C.R.S.

(2) THE TAX CREDIT ALLOWED UNDER THIS SECTION SHALL NOT EXCEED FIFTY PERCENT OF THE FIRST ONE HUNDRED THOUSAND DOLLARS EXPENDED FOR THE APPROVED REMEDIATION, THIRTY PERCENT OF THE NEXT ONE HUNDRED THOUSAND DOLLARS EXPENDED FOR THE APPROVED REMEDIATION AND TWENTY PERCENT OF THE NEXT ONE HUNDRED THOUSAND DOLLARS EXPENDED FOR THE APPROVED REMEDIATION. UNDER NO CIRCUMSTANCES SHAL A TAX CREDIT BE ALLOWED FOR EXPENDITURES EXCEEDING THREE HUNDRED THOUSAND DOLLARS ON ANY INDIVIDUAL PROJECT.

(3) IF THE CREDIT ALLOWED BY THIS SECTION EXCEEDS THE TAX OTHERWISE DUE, THE EXCESS MAY BE CARRIED FORWARD AND SHALL BE

CLAIMED ON THE EARLIEST POSSIBLE SUBSEQUENT TAX RETURN FOR A PERIOD NOT TO EXCEED FIVE YEARS.

(4) THIS SECTION IS REPEALED, EFFECTIVE DECEMBER 31, 2010.

SECTION 3. 25-16-104.6 (2) (b), Colorado Revised Statutes, is amended, and the said 25-16-104.6(2) is further amended BY THE ADDITION OF THE FOLLOWING NEW PARAGRAPHS, to read:

25-16-104.6. Fund established–administration-revenue sources -use. (2) The general assembly may appropriate up to two and one-half percent of the money in the hazardous substance response fund for the department's costs of administration and its costs of collection of fees or civil penalties pursuant to section 25-16-104.5. In addition, the department is authorized, subject to appropriation by the general assembly, to use the moneys in the fund for the following purposes:

(b) To supply such state matching funds as may be needed to perform response actions at any site ~~on the national priority list established~~ WHERE ACTION IS BEING TAKEN pursuant to the federal act;

(e) TO PROVIDE SUCH STATE MATCHING FUNDS AS MAY BE NEEDED TO PERFORM REMEDIATION ACTIVITIES AT SITES SUBJECT TO REMEDIATION UNDER THE FEDERAL "WATER POLLUTION CONTROL ACT", 33 U.S.C. SEC. 1251 ET SEQ., WHERE SUCH REMEDIATION ACTIVITIES WOULD KEEP THE SITE FROM BEING ADDED TO THE NATIONAL PRIORITIES LIST ESTABLISHED PURSUANT TO THE FEDERAL ACT;

(f) TO REMEDIATE SITES:

(I) THAT DO NOT HAVE A RESPONSIBLE PARTY THAT WILL PERFORM A REMEDIATION;

(II)THAT HAVE BEEN DETERMINED TO PRESENT A THREAT TO HUMAN HEALTH OR THE ENVIRONMENT; AND

(III) WHERE THE REMEDIATION WILL ALLOW THE REDEVELOPMENT OF THE PROPERTY FOR THE PUBLIC GOOD.

SECTION 4. Appropriation. In addition to any other

appropriation, there is hereby appropriated, out of the hazardous substance response fund, to the department of public health and environment, for the fiscal year beginning July 1, 2000, the sum of two hundred fifty thousand dollars ($250,000), or so much thereof as may be necessary, for the implementation of this act. In addition to said appropriation, the general assembly anticipates that, for the fiscal year beginning July 1, 2000, the department of public health and environment will receive the sum of nine hundred seventy-five thousand dollars ($975,000) in federal funds for the implementation of this act. Although the federal funds are not appropriated in this act, they are noted for the purpose of indicating the assumptions used relative to these funds in developing the state appropriation amounts.

SECTION 5. Effective date. This act shall take effect January 1, 2001.

SECTION 6. Safety clause. The general assembly hereby finds, determines, and declares that this act is necessary for the immediate preservatio of the public peace, health, and safety.

Russell George SPEAKER OF THE HOUSE OF REPRESENTATIVES	Ray Powers PRESIDENT OF THE SENATE
Judith M. Rodrigue CHIEF CLERK OF THE HOUSE OF REPRESENTATIVES	Patricia K. Dicks SECRETARY OF THE SENATE

APPROVED_____

Bill Owens
GOVERNOR OF THE STATE OF COLORADO