

STATE OF NEVADA

Department of Conservation & Natural Resources

DIVISION OF ENVIRONMENTAL PROTECTION

Jim Gibbons, Governor

Allen Biaggi, Director

Leo M. Drozdoff, P.E., Administrator

January 2009

Guidance for Mine-Site Petroleum-Contaminated Soil (PCS) Management Plans

Revision 1

TABLE OF CONTENTS

Introduction	Page	2
Background		3
Program Transition and Plan Submittal		3
Initial Characterization		4
Hazardous Waste Determinations		4
Screening Analyses		4
Interim Management Options		5
Segregation by PCS Source Type		5
Temporary Holding Pads and Treatment Cells		6
Provisional Placement		7
Treatment Methods		8
Long-Term Management Options		8
Disposal Locations		8
Risk Assessments		9
Contingency Plans		11
Monitoring and Reporting		12
Monitoring		12
Reporting		13
Sample Collection Protocol		13
References		14
Appendices		15
Appendix 1. PCS Management Flow Chart		16
Appendix 2. Checklist for PCS Management Plans		20

Introduction

The State of Nevada Division of Environmental Protection (the Division) prepared this guidance document to describe the procedure and requirements necessary to obtain approval of a mine-site Petroleum-Contaminated Soil (PCS) Management Plan (Plan). This guidance supersedes the April 1995 guidance document entitled, "Mining Sites, Hydrocarbon Contaminated Soil Definitions and Guidelines." PCS may not be treated or disposed of at a mine site without an approved Plan. Operators who do not have an approved Plan must dispose of PCS at an off-site facility authorized to receive such material. An exception to this requirement is PCS from an accidental petroleum release that has remained unexcavated (e.g., due to depth, proximity to structures, etc.) and for which the Division has approved a formal "A-K" proposal for no further corrective action, pursuant to Nevada Administrative Code (NAC) 445A.227.2.A-K.

A Plan provides a convenient integrated approach for addressing requirements pertaining to PCS that are stipulated in several different regulatory programs administered by the Division, including solid waste, hazardous waste, corrective actions, and water pollution control. If on-site disposal is authorized, a Plan shall fulfill solid waste requirements pursuant to NAC 444.731.3. Any consultant who prepares a Plan must be a Nevada Certified Environmental Manager (CEM), pursuant to NAC 459.970 – 459.9729.

A Plan describes required actions that will be taken to ensure that PCS will not pose a threat to human health, the environment, or waters of the State. A Plan shall list all PCS sources that will be managed under the Plan, and include a hazardous waste determination for each source. Hazardous waste must be handled separately from the Plan in accordance with applicable regulations. If on-site disposal of PCS is proposed, the Plan must include a risk assessment pursuant to NAC 445A.22705 to determine maximum acceptable constituent concentrations (screening levels) for each proposed on-site disposal location. A Plan must also provide a description of how and where the PCS will be temporarily stored on a temporary holding pad or treatment cell, or provisionally placed at an on-site disposal location, while screening analyses are performed. Finally, a Plan shall include contingency plans that will be followed in the event that the established screening levels are exceeded.

In accordance with solid waste regulations (NAC 444.731.3), each mine-site PCS disposal location must be on land controlled by the mine operator, and must receive PCS that is incidental to the mining operation only.

Liquid petroleum is not applicable for management under a Plan; any liquid petroleum that may drain from the PCS must be separated, collected, and managed or disposed pursuant to applicable regulations and/or authorizations. Treatment of PCS via unevaluated processes, such as the use of PCS as a blast-hole stemming material, will not be accepted unless it is adequately demonstrated that such practices will not degrade waters of the State, pose an unacceptable risk to public health or the environment, or result in objectionable aesthetic impacts.

Please refer to Appendix 1 for a flowchart illustrating how PCS is managed pursuant to a Plan. A checklist of items to include in a Plan is provided in Appendix 2.

Background

In April 1995, the Division issued the guidance document entitled, "Mining Sites, Hydrocarbon Contaminated Soil Definitions and Guidelines," along with statewide General Mining Bioremediation Facility Permit GNV041995, which authorized construction, operation, and closure of standardized bioremediation cells for mine-site treatment of PCS. Shortly thereafter, the Division also began issuing Individual Hydrocarbon Permits, which authorized other means of mine-site treatment of PCS, such as blast-hole stemming, roasting, and non-standardized bioremediation. The objective of both types of hydrocarbon permit was to reduce Total Petroleum Hydrocarbon (TPH) concentrations to below the 100 mg/kg State action level via approved treatment methods followed by on-site disposal of the resultant bioremediated material. The program had several shortcomings, including difficulties in reducing TPH concentrations below the action level via bioremediation, and a failure to quantify the environmental risk (or lack thereof) posed by the PCS.

Program Transition and Plan Submittal

In October 2008, the Division issued this guidance document, replacing the previous hydrocarbon-permit program with the current program. The guidance was revised and reissued in January 2009. Previously issued General and Individual Hydrocarbon permits will be phased out and replaced by Plans. Each operator who holds a mine-site hydrocarbon permit (General and/or Individual) at the time of issuance of this guidance document must submit by July 1, 2009 a proposed Plan for review and approval, or state that all PCS will be disposed at an authorized off-site facility.

Failure to submit a proposed Plan by the July 1, 2009 deadline will result in suspension of the operator's hydrocarbon permit(s) and a requirement to dispose of PCS at an authorized facility off-site. Operators may continue to operate under previously issued hydrocarbon permit(s) while their Plan is under review. Operators that do not hold a mine-site hydrocarbon permit may apply for a Plan at any time. A Plan is not required for operators that dispose all of their PCS at an authorized facility off-site.

A proposed Plan may be submitted in one of the following ways: as an Engineering Design Change (EDC) modification to an existing Water Pollution Control (WPC) permit; as part of another modification or a renewal of an existing WPC permit; or as part of an original application for a WPC permit. The appropriate application fee must be included with the application pursuant to the current WPC fee schedule.

Upon Division approval, the Plan will take effect and any previous hydrocarbon permit(s) for the mine site will be terminated. The Plan and this guidance document will be incorporated by reference into the WPC permit. No annual fees will be associated with the Plan, other than the required annual review and services fee for the WPC permit.

Initial Characterization

Initial characterization results must be included in the Plan. The Plan shall list all PCS sources that will be managed under the Plan (e.g., each washbay sump, each existing bioremediation cell, each oil/water skimmer, each truckshop/fuelbay sump, each petroleum product used on-site that could potentially produce PCS, used oil, etc.). A hazardous waste determination must be performed on each source pursuant to 40 CFR 262.11. Screening analyses of each PCS source type are also recommended as part of the initial characterization submitted with the Plan. All analyses must be performed by a laboratory certified by the State of Nevada to perform those analyses.

Hazardous Waste Determinations

Hazardous waste must not be managed under the Plan or placed on temporary holding pads, treatment cells, or disposal locations, even while it is being analyzed. Hazardous waste and waste that is undergoing analysis as part of a hazardous waste determination must be managed in accordance with applicable regulations. Failure to comply with hazardous waste regulations will result in required remedial action (e.g., removal and proper disposal) and possible enforcement as appropriate. Therefore, hazardous waste determinations must be performed at the source prior to management under the Plan.

A Plan must include a copy (the original must be maintained at the site) of a hazardous waste determination performed on each PCS source to be managed under the Plan. Determinations must be performed in accordance with 40 CFR 262.11 using operator knowledge and/or applicable analytical testing methods described in EPA publication SW-846 (EPA, 2008). Operator knowledge used as part of a determination must be adequately described and sufficient to justify the determination.

After the Plan is approved, an additional hazardous waste determination must be performed pursuant to 40 CFR 262.11, and a copy of the determination submitted with the next monitoring report, whenever: 1) A change is suspected in the character of a waste stream managed under the Plan; 2) A new source of PCS is proposed for management under the Plan; or 3) A hazardous contaminant is detected during a screening analysis at a concentration suggestive of hazardous waste. The PCS from any changed or new sources may not be managed under the Plan until the new determination is completed and confirms that it is not hazardous waste.

If an operator discovers that hazardous waste was managed under the Plan, the hazardous waste must be removed from the PCS management system, and be properly managed, documented, and reported in accordance with applicable regulations and permit conditions.

Screening Analyses

It is recommended, though not required, that the initial characterization, and the Plan, include separate analyses of each PCS source type for potentially toxic constituents of concern (COCs). Such analyses, referred to herein as screening analyses, provide useful information for

performing the required risk assessment. Screening analyses are required later after Plan approval as part of the periodic monitoring to ensure compliance with screening levels at on-site disposal locations.

Unlike the hazardous waste determinations, which are performed on each individual source, the screening analyses are performed on representative composite samples of PCS from groups of similar sources called PCS source types. Common groupings include: PCS with gasoline, truck washbay sediment, PCS from fuel and oil releases, and sump and skimmer sludge (see the section below on Segregation by PCS Source Type).

Unless otherwise approved, the Division requires that screening analyses be performed using EPA Methods 8260B for total Volatile Organic Compounds (VOCs) and 8270D for total Semi-Volatile Organic Compounds (SVOCs). When possible, laboratory minimum reporting limits for COCs must be lower than the corresponding screening levels established in the risk assessment. Otherwise, if a non-detect result is obtained it will be inconclusive whether the screening level is met or exceeded. If the risk assessment has not yet been performed (i.e., during initial characterization), use of the lowest available minimum reporting limits is recommended.

Interim Management Options

Interim management of PCS is generally required while periodic screening analyses are underway to determine the PCS's suitability for the approved long-term management method. In most cases, interim management consists of either storage on a temporary holding pad, or provisional placement in an approved on-site disposal location, until the screening results are received. Interim management may also include treatment methods approved as contingency plans in the event that screening levels are not met initially. Regardless of how the PCS is managed, it must be segregated by PCS source type.

Segregation by PCS Source Type

PCS from different source types may pose different levels of risk to human health, the environment, and waters of the State, and consequently must be characterized separately. Based on the characterization results, certain PCS source types may require separate management. For this reason, the Division requires that PCS be physically segregated by source type while it is present on temporary holding pads and treatment cells, or while it is provisionally placed in an on-site disposal location awaiting screening results. Each segregated PCS source type must be separately sampled and analyzed to determine if it meets the screening levels established for the disposal location(s). Temporary holding pads, treatment cells, and provisional disposal locations must be divided into separate areas with each area designated, and clearly labeled (e.g., using signage), for one PCS source type. Site personnel and contractors must be trained to comply with the segregation requirement.

Segregation based on the following PCS source-type groupings is suggested: 1) PCS that may contain any gasoline; 2) Truck washbay sediment; 3) Accidental releases of diesel, hydraulic oil, used motor oil, unused oils, antifreeze, etc.; 4) Sludge from miscellaneous sumps and oil/water separators; and 5) Other PCS sources (specify). Alternative source-type groupings may be used if approved by the Division. Note that gasoline-contaminated PCS may be managed under the Plan only if it is not hazardous waste.

Temporary Holding Pads and Treatment Cells

Temporary holding pads are engineered containment structures approved by the Division for temporary storage of PCS while screening analyses are performed (see Option A on page 2 of Appendix 1). A mine site may have several small temporary holding pads, each dedicated to a single source type of PCS, and/or larger temporary holding pads used for multiple source types of PCS (with each PCS source type in a separate labeled area as described in the section above).

Temporary holding pads require double-handling of PCS before disposal, but offer certain advantages over provisional placement in on-site disposal locations (e.g., no quarterly screening analyses until PCS removal is planned, and no oral reporting requirement in the event of screening level exceedances). Most PCS from routine waste streams (truck washbays, sumps, etc.) must be double-handled anyway, because the PCS is typically saturated and must be placed on a pad to drain prior to transport and disposal. A small, suitably constructed temporary holding pad may be able to serve the dual purpose of allowing drainage before transport and allowing temporary storage while screening analyses are performed.

Design plans for all temporary holding pads (and treatment cells, if any), and proposed modifications thereto, must be submitted to the Division for review and approval prior to construction. Temporary holding pads may be constructed of concrete, or feature a synthetic or soil liner system. Liners must meet the minimum design criteria established in NAC 445A.438. Existing bioremediation cells that comply with the minimum design requirements of the previous hydrocarbon program may be acceptable for use as temporary holding pads provided that the containment system remains functional pursuant to the original design and has not reached the end of its design life. As-built plans and a summary of the quality control procedures that were carried out during construction must be submitted to the Division within 30 days after completing construction of, or modifying, a temporary holding pad or treatment cell.

The Plan must specify the design capacity (in cubic yards) and maximum depth of PCS (in feet) for each temporary holding pad (and treatment cell). At maximum depth and capacity it must be possible, using the approved sample collection protocol, to obtain representative samples of the PCS that take into account variations with depth. Therefore, the Division requires a maximum depth that is suitable for the sample collection protocol used. A maximum depth of six feet or less is recommended. Adequate set-back of PCS from the outer berms of the pad or cell must be maintained to prevent spillage outside of containment. If fluid is present in a temporary holding pad or treatment cell, a minimum freeboard of two feet above fluid level must be maintained at all times.

Temporary holding pads (and treatment cells) may not be used for long-term storage of PCS. They are intended for temporary storage until the PCS is cleared for removal based on the results of screening analyses. Such removal based on screening results is required when the pad reaches full capacity, to create room for additional PCS that may be generated. Once the pad is full, a reasonable amount of time (e.g., a few weeks) will be allowed for the performance of screening analyses, and if appropriate, performance of a more detailed risk assessment (e.g., 30 days), before the PCS must be removed. Based on these results, the PCS shall be removed either to an approved disposal location or, in the event of screening level exceedances, to another location pursuant to the approved contingency plans (e.g., an approved treatment cell or an authorized off-site disposal facility). If the operator desires, PCS may also be removed from a temporary holding pad at any time prior to full capacity, but screening analyses must first be performed to determine where the PCS may go.

Provisional Placement

PCS that has not yet undergone screening analysis may be placed provisionally in an on-site disposal location until screening results are obtained (Option B on page 2 of Appendix 1) under the following conditions: 1) Previous screening analyses of PCS from the same source type have not exceeded screening levels; 2) The PCS will be segregated, labeled, and sampled by source type; 3) Screening analyses will be obtained and the results reported to the Division in a timely fashion pursuant to approved monitoring and reporting requirements; and 4) If the PCS exceeds the screening levels established for the disposal location, the Permittee will report the exceedance to the Division (Bureau of Mining Regulation and Reclamation) pursuant to Part II.B.4 of the WPC Permit (see the Monitoring and Reporting section below), and commit to removal of the PCS from the disposal location unless it is demonstrated in a timely fashion (e.g., within 30 days) that based on a more site-specific risk assessment the PCS meets revised screening levels.

Provisionally placed PCS must, therefore, be retrievable until it is shown to meet screening levels. As used herein, “retrievable” means that the location of the PCS is known and demarcated with labels, it is not covered, and it is situated such that it can be practicably accessed by available equipment for removal, if necessary. For example, a labeled placement on an accessible flat bench of a waste rock dump is retrievable (as long as it remains demarcated and uncovered), whereas a placement on a typical angle-of-repose slope of an active waste rock dump is not considered retrievable in a practical sense, even if it has not yet been overdumped by additional waste rock. Beyond this required temporary retrievability, operators are encouraged to consider maintaining some degree of accessibility to the PCS even after cover is applied. This conservative practice may protect the operator by providing remedial options in the event of unanticipated problems, such as an unintentional placement of hazardous waste.

Authorized provisional placement of PCS in an on-site disposal location is not considered disposal until the results of screening analyses are received (or are due), and the operator has had sufficient time to take appropriate action pursuant to the approved Plan. An alternative to provisional placement in an on-site disposal location is placement on approved containment at a temporary holding pad while screening analyses are performed (see the Temporary Holding Pads section above, and Option A on page 2 of Appendix 1).

Treatment Methods

A Plan may include a treatment method as an interim contingency plan to bring constituent concentrations down to acceptable levels for on-site disposal (e.g., limited bioremediation), or as a long-term management option (e.g., roasting). Treatment methods may require permits or authorizations from other federal, state, or local agencies (e.g., for roasting, a permit may be required from the Division's Bureau of Air Pollution Control).

Any proposed treatment method must be described in the Plan, including the following information as applicable: 1) Any restrictions on the type of PCS applicable for the treatment method (e.g., for bioremediation, PCS containing petroleum fractions heavier than diesel is considered unacceptable by the Division); 2) The location and engineered design plans for any treatment cells; 3) Any activities and/or additives that will be used to enhance the treatment process; 4) A proposed monitoring plan; 5) The proposed time frame for successful treatment; 6) A description of performance criteria that will be used to evaluate the success of the treatment; and 7) A description of actions that will be taken after treatment, whether successful or unsuccessful. If the treatment is unsuccessful, an alternative disposal method will be required. Please also see the section below on Contingency Plans, and page 3 of Appendix 1.

Long-Term Management Options

Long-term management options for PCS include proper off-site disposal at a facility authorized to receive PCS, on-site disposal at an approved disposal location, and some on-site treatment methods (e.g., roasting, but not bioremediation). For treatment methods please refer to the preceding section. Each on-site disposal location must be evaluated via a risk assessment to establish maximum allowable concentrations (screening levels) for constituents of concern.

Disposal Locations

The Plan must describe all proposed on-site disposal locations. In accordance with solid waste regulations (NAC 444.731.3), each mine-site PCS disposal location must be on land controlled by the mine operator, and must receive PCS that is incidental to the mining operation only. The Plan must include a description of each proposed on-site disposal location, the land ownership status, and the estimated total volume (cubic yards) of PCS to be placed at each location. Nevada Revised Statutes (NRS) 445A.465 prohibits disposal of PCS directly into waters of the State, into a drainage where surface water will flow, or into a location where the PCS could be carried into surface waters. On-site disposal locations must utilize appropriate Best Management Practices to preclude stormwater run-on and to properly manage stormwater run-off.

Unless otherwise approved, each batch of PCS disposed at an on-site disposal location shall be regraded and covered with an interim cover pursuant to the Plan within one year after placement. The annual interim cover shall have a recompacted thickness of at least two feet. The Plan must describe all closure and reclamation activities, materials, specifications, and time frames. Once the final batch of PCS is placed at an on-site disposal location, the PCS must be regraded to a

slope of no less than three percent to drain surface water, and a final cover designed to promote revegetation, and minimize infiltration, erosion, and ecological risk (i.e., risk posed to terrestrial, aquatic, and avian life), must be installed. Unless otherwise approved by the Division, the final cover must achieve at least an equivalent reduction in infiltration, and an equivalent protection from wind and water erosion, to that of a two-foot thickness of material having an overall recompacted, in-place permeability of 1×10^{-5} cm/sec, whose uppermost six inches are capable of sustaining the growth of native plants.

If an on-site disposal location is located on public land, the land management agency may have additional requirements beyond those recorded herein. The Permittee is responsible for compliance with all applicable federal, state, and local requirements.

Risk Assessments

The Division requires the owner or operator to provide the information specified at NAC 445A.227.2.A-K and to include a risk assessment pursuant to NAC 445A.22705 for each on-site disposal location proposed in the Plan. The purpose of the risk assessment is to establish for each proposed on-site PCS disposal location maximum allowable concentrations, or screening levels, for potentially toxic Constituents of Concern (COCs) that may be present in the PCS without causing an unacceptable health risk. The established screening levels will then be compared against the results of periodic screening analyses to determine if the PCS may be disposed at a particular disposal location (see Appendix 1).

NAC 445A.22705 states that the risk assessment, "...must be conducted using Method E1739-95, adopted by the American Society for Testing and Materials [ASTM], as it exists on October 3, 1996, or an equivalent method approved by the Division." For Plans, the Division approves any of the methods described in the following references: ASTM Method E1739-95 (ASTM 1997), the U.S. Environmental Protection Agency (EPA) Risk Assessment Guidance for Superfund (EPA 1989, 1991), the EPA Soil Screening Guidance (EPA 1996a, 1996b, 2002), the EPA Region 9 Preliminary Remediation Goals (PRG) Guidance (EPA Region 9, 2004), and the EPA/Oakridge National Laboratory Screening Levels for Chemical Contaminants (EPA/Oakridge, 2008). Use of any other method must be approved in advance by the Division. Of the listed references, the most recent, and the only one that offers simple on-line calculations, is Screening Levels for Chemical Contaminants (EPA/Oakridge, 2008).

Each risk assessment must identify and evaluate all human exposure pathways at the site that have a potential to exceed toxicity thresholds (such as risk-based screening levels). For each exposure pathway describe a source, a transport route, and a receptor or point of exposure (e.g., [1] PCS on a waste rock dump, migration of leachate through unsaturated soil to the water table, ingestion by a resident via drinking water from a future well screened at the water table beneath the waste rock dump; or [2] PCS on a waste rock dump, volatilization and dispersion in the atmosphere, inhalation by an industrial worker employed at the site). In addition to any other relevant exposure pathways, the Division requires that all risk assessments evaluate the exposure pathway of soil leachate migrating to groundwater followed by ingestion in drinking water, because this pathway is of particular concern and commonly corresponds to the lowest screening

levels. The Division considers all groundwater to be potential drinking water unless demonstrated otherwise.

COCs are commonly identified via initial screening analyses (i.e., any potentially toxic constituent detected in the screening analyses is a COC), but if the laboratory's minimum reporting limits are too high, this may be difficult, because the analyses may not detect COCs that are present. A conservative approach to this problem, and also a good way to perform a generic risk assessment while at the same time determining what laboratory minimum reporting limits are required, is to consider all VOCs and SVOCs typically reported under EPA Methods 8260B and 8270D as potential COCs, and then calculate a screening level for each one. The laboratory method, sample size, and possibly other factors, should then be discussed with the laboratory, and fine-tuned, if possible, to ensure that the minimum reporting limit for each constituent is lower than its screening level. Any resultant changes to the sample collection protocol or laboratory methods must be proposed in the Plan. With suitably low minimum reporting limits, the actual COCs will be the list of potentially toxic constituents that are detected in the screening analyses.

Screening levels (a.k.a., PRGs, SSLs, SLs, or RBSLs, depending on the risk assessment method and exposure pathway) must be established for all potentially toxic COCs detected in the PCS, or if screening analyses have not yet been performed, all COCs that may be detected in the future (e.g., all constituents typically reported in the VOC and SVOC analyses). Screening levels may be obtained either by calculation using formulas provided in the appropriate reference, or by reading generic conservative screening levels published in tables (e.g., EPA/Oakridge, 2008). The Division recommends the use of calculated screening levels rather than generic screening levels for the following reasons:

- Generic screening levels for certain exposure pathways are commonly not available for some or all of the COCs detected in the screening analyses. For those COCs screening levels must be calculated anyway (if the risk assessment must evaluate that exposure pathway);
- Generic screening levels are based on many simplifying assumptions and default values that may or may not be applicable to the site;
- If desired, calculated screening levels may still employ appropriate conservative simplifying assumptions and/or default values provided that they are noted and justified (e.g., for the soil leaching to groundwater pathway, a conservative simplifying assumption that may be appropriate is that the PCS is already at the groundwater interface, thus eliminating the need to calculate attenuation during transport through the vadose zone);
- Calculated screening levels are generally more site-specific and therefore more accurate;
- Calculated screening levels are typically higher, because they are more accurate and less conservative – therefore they are less likely to be exceeded.

If generic screening levels are employed in the risk assessment the applicability of the underlying assumptions and default values to the proposed disposal sites must be reviewed and justified in the Plan. The data necessary to calculate screening levels is available on-line for most VOCs and SVOCs. If neither a generic screening level nor sufficient chemical-specific data to

calculate a screening level are available for a detected COC, list the data sources that were searched and report that a screening level is unavailable for that COC.

If the PCS exceeds a screening level, either disposal of the PCS will not be allowed at that on-site location, or the operator must demonstrate via a more detailed, site-specific risk assessment (if the previous risk assessment employed conservative assumptions and/or default values) that the PCS meets higher, revised screening levels calculated for the disposal site (see also page 3 of Appendix 1, and the section below on Contingency Plans). Such site-specific risk assessments may be required to incorporate actual measured values for physical properties of the affected materials, multiple successive transport steps (e.g., transport via leaching in the vadose zone followed by groundwater transport), and/or other factors, to model the natural processes more accurately.

During periodic screening analyses, if a COC is detected for which a screening level was not previously established, a new screening level must be calculated or read from a table of generic values (any underlying assumptions must be noted and justified as applicable to the site) for each identified exposure pathway at each on-site disposal location. All newly determined or revised screening levels must be reported in the next monitoring report.

Contingency Plans

The Plan must include proposed contingency plans describing actions that will be taken in the event of a problem with the approved long-term management option. In the case of on-site disposal, contingency plans come into play when screening levels are exceeded, whether the PCS is on a temporary holding pad or provisionally placed at an on-site disposal location (see page 3 of Appendix 1). Passive storage without treatment or assessment is not an acceptable contingency plan.

Options include, but may not be limited to, the following: 1) Disposal at another approved on-site disposal location that has higher screening levels; 2) Temporary storage of the PCS (for a specified period of time; e.g., 30 days) while a more detailed and accurate risk assessment is performed to determine if the PCS will meet revised screening levels; 3) Placement of PCS in an approved treatment cell to reduce constituent concentrations (see the section above on Treatment Methods); or 4) Removal of the PCS from the mine site for disposal at an authorized off-site disposal location (followed by submittal of shipping manifests, certificates of disposal, or similar, if required by the Division). In the event of discovery of hazardous waste on a temporary holding pad, treatment cell, or on-site disposal location, off-site disposal in accordance with applicable regulations is the only acceptable contingency plan.

Monitoring and Reporting

Unless otherwise approved, each Plan will be subject to the monitoring and reporting requirements below. The monitoring and reporting requirements will be incorporated into the WPC permit. The Permittee may request a reduction in the number of elements and/or frequency of analyses after four (4) quarters of complete monitoring based on justification other than cost. Such reductions will be considered modifications to the permit.

Screening analyses must be performed periodically on each source type of PCS managed under the Plan for the purpose of determining if the PCS meets or exceeds the screening levels established for the on-site disposal location(s).

Monitoring		
<u>Identification</u>	<u>Parameter</u>	<u>Frequency</u>
1. <u>PCS Screening Analyses</u> Each temporary holding pad and treatment cell, by PCS source type; Each approved on-site disposal location, by PCS source type	VOCs ⁽¹⁾ , SVOCs ⁽²⁾ , TPH ⁽³⁾ ; VOCs ⁽¹⁾ , SVOCs ⁽²⁾ , TPH ⁽³⁾	Quarterly, prior to removal ⁽⁴⁾ ; Quarterly, after provisional placement ⁽⁴⁾
2. <u>PCS Hazardous Waste Determinations</u> Each PCS source	Hazardous waste determination ⁽⁵⁾	When required ⁽⁵⁾
3. <u>PCS Management</u> Each temporary holding pad, treatment cell, and disposal location, by PCS source type	PCS volume added, volume removed and destination, total volume present (cubic yards)	Quarterly

NOTES:

- (1) Volatile Organic Compounds (VOCs) analyzed by EPA Method 8260B.
- (2) Semi-Volatile Organic Compounds (SVOCs) analyzed by EPA Method 8270D.
- (3) Total Petroleum Hydrocarbons (TPH) analyzed by EPA Method 8015 Modified. If any gasoline-range petroleum is suspected, or if the source-type is unknown, both TPH-P (purgeable) and TPH-E (extractable) are required. Otherwise, only TPH-E is required.
- (4) Each segregated source type of PCS must be sampled separately pursuant to the approved sample collection protocol. For temporary holding pads and treatment cells, analyses are required only in quarters when PCS removal from the pad is anticipated. Removal to an on-site disposal location is authorized if PCS meets screening levels. For approved on-site

disposal locations, analyses are required only in quarters when PCS has been provisionally placed subject to screening results.

- (5) A hazardous waste determination is required: a) Initially, for each PCS source prior to management under the Plan; b) When a PCS waste stream is suspected to have changed character since the last determination; and c) When a hazardous constituent is detected during screening analyses at a concentration suggestive of hazardous waste. Determinations must be performed pursuant to 40 CFR 262.11 using operator knowledge and/or applicable analytical testing methods described in EPA publication SW-846. Operator knowledge must be adequately described and sufficient to justify the determination.

Reporting

1. The Permittee shall submit quarterly reports (included as part of the WPC quarterly monitoring reports), which are due to the Division on or before the 28th day of the month following the quarter and must contain the following: quarterly monitoring and analytical results identified above and/or in the approved Plan; an updated list of all PCS sources managed under the Plan, with any new or changed sources highlighted; current screening levels for each on-site disposal location; and a detailed explanation of any revisions to screening levels.
2. The Permittee shall report pursuant to Part II.B.4 of the WPC Permit if any PCS placed at an on-site disposal location exceeds screening levels. An oral report to the Division (BMRR) is required by 5:00 PM of the next working day after discovery, followed by a written report within 10 days. The written report shall include a plan and schedule for removal of the affected PCS pursuant to the approved contingency plans, unless it is demonstrated to the Division in a timely fashion that the PCS meets revised screening levels.

Sample Collection Protocol

PCS samples must be representative of the larger mass of PCS from which the samples are collected. Representativity is largely dependent on the sample size, the number and distribution of samples, and the degree and scale of heterogeneity in the PCS. Segregation of PCS by source type may help to reduce heterogeneity. For screening analyses, each sample must be a composite sample created by combining multiple subsamples. The Division recommends that each composite sample be collected from no more than 700 cubic yards of PCS. The sampling protocol must account for potential variations with depth in the PCS pile. The samples must also be properly contained and shipped per laboratory instructions so as to preserve any volatile constituent concentrations. The Plan must specify the sample collection and preservation protocol that will be used to ensure representativity.

References

American Society for Testing and Materials (ASTM), 1997, Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites, ASTM Designation: E 1739-95, pp. 185-235, *in* ASTM Standards Related to Environmental Site Characterization, 1410 pp.

U.S. Environmental Protection Agency (EPA), 1989, Risk Assessment Guidance for Superfund: Volume I – Human Health Evaluation Manual (Part A, Baseline Risk Assessment), EPA540/I-89/002 (<http://www.epa.gov/oswer/riskassessment/ragsa/>)

EPA, 1991, Risk Assessment Guidance for Superfund: Volume I – Human Health Evaluation Manual (Part B, Development of Risk-Based Preliminary Remediation Goals), EPA540/R-92/003 (<http://www.epa.gov/oswer/riskassessment/ragsb/>)

EPA, 1996a, Soil Screening Guidance: User's Guide, 2nd Edition, EPA540/R-96/018 (<http://www.epa.gov/superfund/health/conmedia/soil/index.htm#user>)

EPA, 1996b, Soil Screening Guidance: Technical Background Document, 2nd Edition, EPA540/R-95/128 (<http://www.epa.gov/superfund/health/conmedia/soil/introtbd.htm>)

EPA, 2002, Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites, OSWER 9355.4-24 (http://www.epa.gov/superfund/health/conmedia/soil/pdfs/ssg_main.pdf)

EPA, 2008, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Third Edition, EPA SW-846 (<http://www.epa.gov/epaoswer/hazwaste/test/main.htm>)

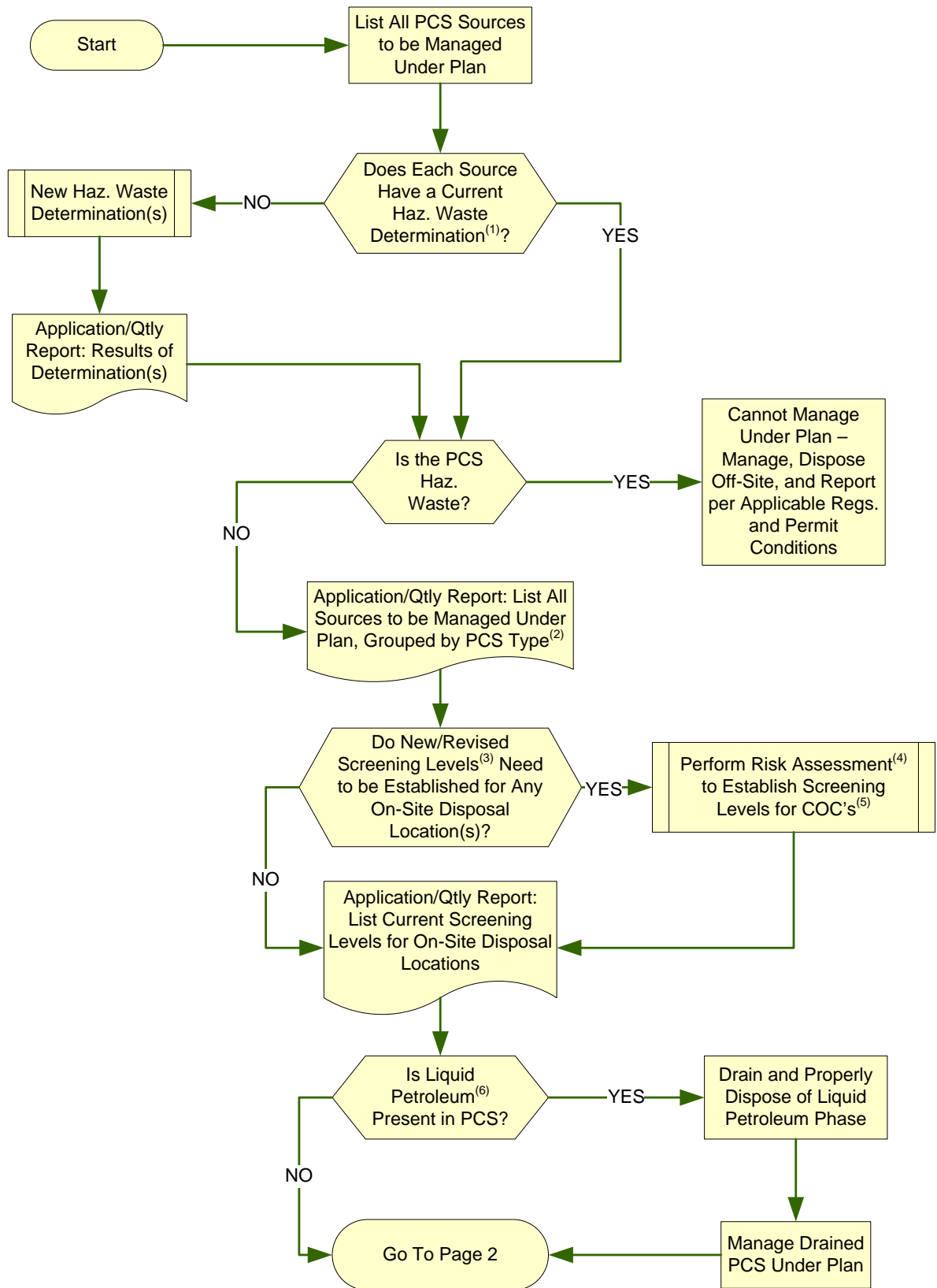
EPA Region 9, 2004, User's Guide and Background Technical Document for USEPA Region 9's Preliminary Remediation Goals (PRG) Table (<http://www.epa.gov/region09/waste/sfund/prg/files/04usersguide.pdf>)

EPA Regions 3, 6, and 9 / Oakridge National Laboratory, 2008, Screening Levels for Chemical Contaminants (<http://epa-prgs.ornl.gov/chemicals/index.shtml>)

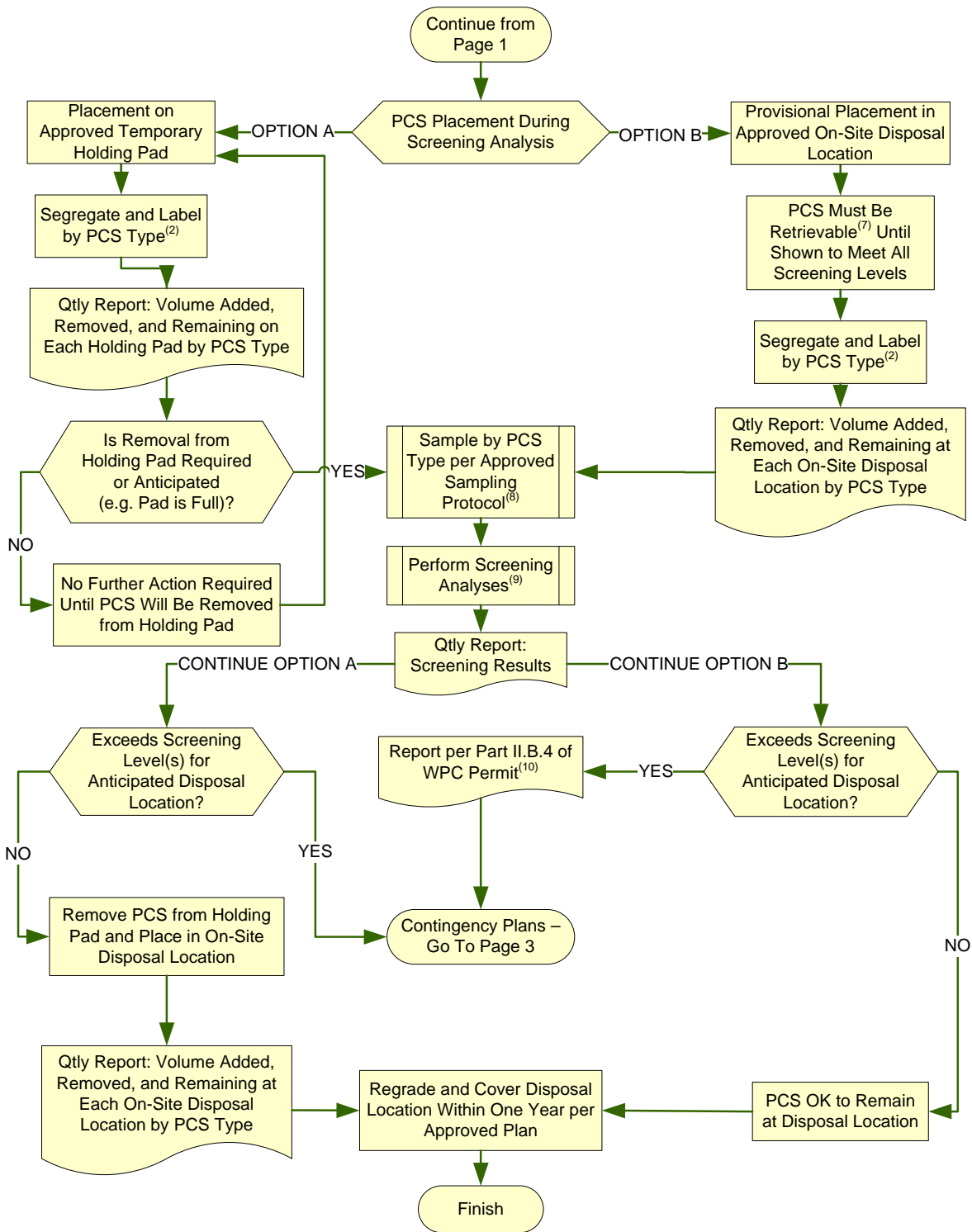
Appendices

Appendix 1. PCS Management Flow Chart

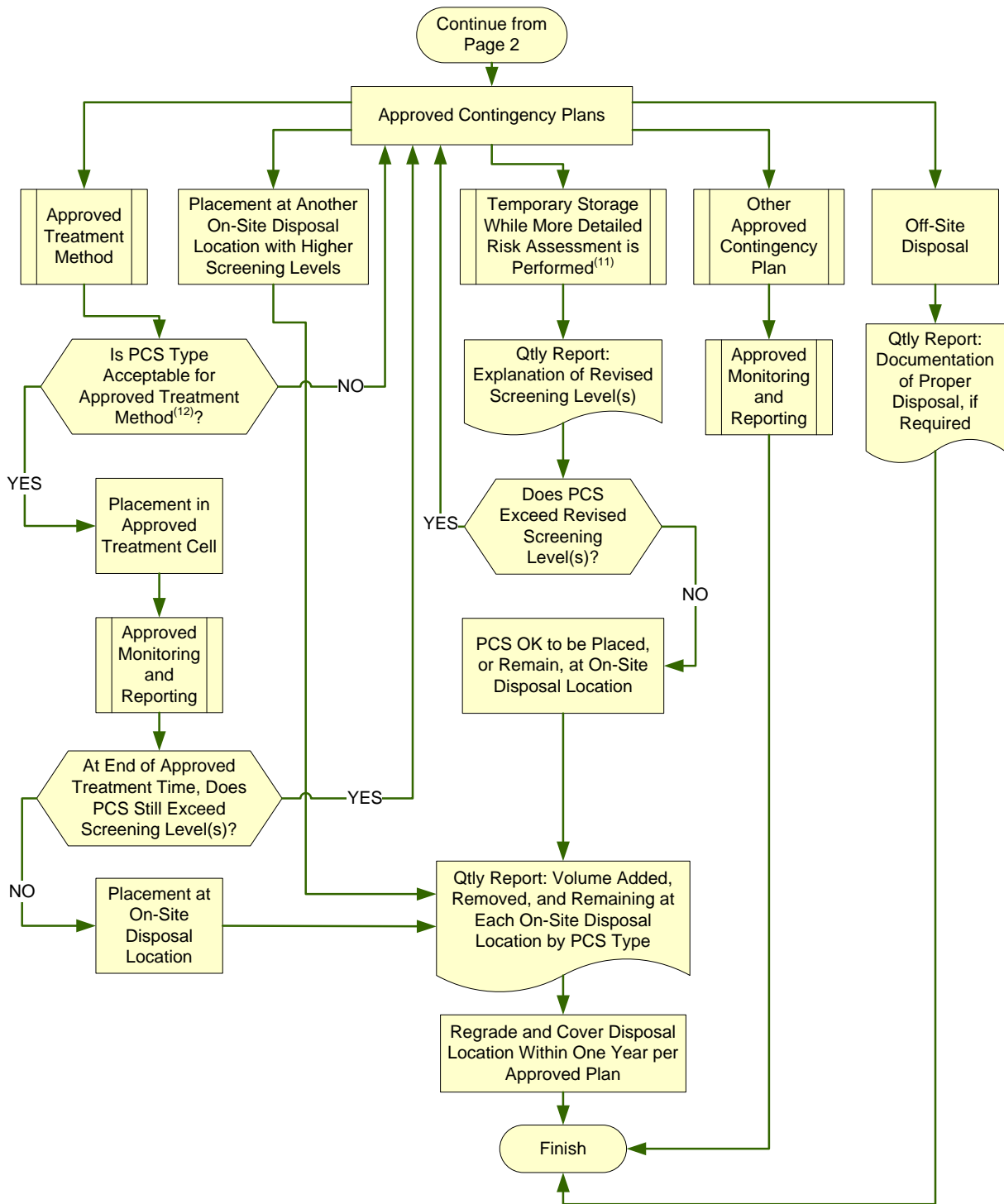
Appendix 2. Checklist for PCS Management Plans



Appendix 1. PCS Management Flow Chart – Page 1 of 4.



Appendix 1. PCS Management Flow Chart – Page 2 of 4.



Appendix 1. PCS Management Flow Chart – Page 3 of 4.

Flowchart Key:



Flowchart Notes:

- (1) An initial hazardous waste determination is required for each potential PCS source to be managed under the Plan, followed by an additional determination whenever the character of a waste stream is suspected to change, a new source is proposed for management under the Plan, or a concentration suggestive of hazardous waste is obtained during screening analyses. Determinations must be performed pursuant to 40 CFR 262.11. Any analyses must be performed by a laboratory certified by the State of Nevada to perform them.
- (2) PCS placed in holding pads, treatment cells, and provisionally placed in on-site disposal locations, must be segregated by PCS type. Unless otherwise approved the required PCS types are: 1) PCS that may contain any gasoline; 2) Truck washbay sediment; 3) Accidental releases of diesel, hydraulic oil, used motor oil, unused oils, antifreeze, etc.; 4) Sludge from miscellaneous sumps and oil/water separators; and 5) Other PCS sources (specify).
- (3) Screening Levels are the maximum allowable concentrations of Constituents of Concern (COCs) in PCS at a particular on-site disposal location, as established by risk assessment.
- (4) A risk assessment is used to establish screening levels for COCs at each on-site disposal location. Unless otherwise approved, use one of the following risk assessment methods: ASTM Method E1739-95 (also known as "RBCA"), EPA Risk Assessment Guidance for Superfund, EPA Soil Screening Guidance, EPA Region 9 Preliminary Remediation Goals (PRG) Guidance, or EPA/Oakridge National Laboratory Screening Levels for Chemical Contaminants.
- (5) COCs: Constituents of Concern.
- (6) Liquid petroleum means a separate petroleum phase that may drain from the PCS.
- (7) PCS is retrievable if its location is known and demarcated with labels, it is not covered, and it is situated such that it can be practicably accessed by available equipment for removal if necessary.
- (8) A sampling protocol is used to ensure that samples are representative of the PCS type sampled. No less than one composite sample per each 700 cubic yards is recommended.
- (9) Screening analyses must be performed by a Nevada-certified laboratory on each PCS type sampled. Unless otherwise approved, they must include the following constituents and methods: Volatile Organic Constituents (VOCs) by EPA Method 8260B, Semi-Volatile Organic Constituents (SVOCs) by EPA Method 8270D, and Total Petroleum Hydrocarbons (TPH) by EPA Method 8015 Modified. If a hazardous constituent is detected during screening analyses at a concentration suggestive of hazardous waste, a new hazardous waste determination must be performed, and a copy of the determination submitted with the next WPC monitoring report.
- (10) Part II.B.4 of the Water Pollution Control (WPC) permit requires oral reporting to the Division (BMRR) by 5:00 PM of the first working day after discovery, followed by a written report within 10 days. The written report must include a plan and schedule for removal of the affected PCS pursuant to the approved contingency plans, unless it is demonstrated to the Division in a timely fashion that the PCS meets revised screening levels.
- (11) If the original risk assessment was conservative and generic, a more detailed risk assessment may be performed using more site-specific data to calculate higher, but more accurate, screening levels.
- (12) For bioremediation, only PCS containing diesel or lighter petroleum fractions is acceptable (e.g., no truckwash sediment, or PCS containing used-oil or hydraulic oil). Treatment via blast-hole stemming is unacceptable unless adequately demonstrated to be protective of public health, the environment, and waters of the state, and to not result in objectionable aesthetic impacts. Treatment via roasting may be a viable long-term disposal method rather than a contingency plan. A separate air quality permit may be required for roasting.

Appendix 1. PCS Management Flow Chart – Page 4 of 4.

Appendix 2. Checklist for Petroleum-Contaminated Soil (PCS) Management Plans

An application for a PCS Management Plan must include the following items:

1. EDC application fee, unless Plan is included as part of another permit modification, renewal, or original application.
2. A list of all PCS sources that will be managed under the Plan (e.g., each washbay sump, each existing bioremediation cell, each oil/water skimmer, each truckshop/fuelbay sump, each petroleum fuel and oil product used on site, used oil, etc.). Group the sources by PCS source type.
3. A copy of a hazardous waste determination (analyses and/or operator knowledge) performed on each PCS source listed above.
4. Recommended, but not required, initial screening analyses of each PCS source type for total VOCs, total SVOCs, and TPH. These are composite analyses of source type groupings, not analyses of individual sources.
5. A description of how and where each PCS source type will be collected, transported, held during screening, treated if applicable, and disposed.
6. A map showing the location of all proposed temporary holding pads, treatment cells, and on-site disposal locations, relative to the major components of the mining operation.
7. Design plans for all temporary holding pads and treatment cells. Include design capacity (cubic yards of PCS), proposed maximum depth of PCS, and minimum setback of PCS from the outer berm crest.
8. A description of each proposed on-site disposal location including the following: location, land status, proximity to surface water bodies or drainages, estimated total volume of PCS that will be placed there, plus the information required pursuant to NAC 445A.227.2.A-K for each disposal location.
9. A risk assessment pursuant to NAC 445A.22705 for each proposed on-site disposal location to establish screening levels for all potentially toxic VOC and SVOC constituents of concern detected during screening analyses (or that may be detected, if screening analyses have not yet been performed). Any exposure pathways that have a potential to exceed toxicity thresholds must be identified and evaluated. All risk assessments must evaluate the pathway of soil leaching to groundwater. Any assumptions and default values used in the screening level calculations must be justified, even if the screening levels are obtained from a table of generic values.
10. Contingency plans for management and disposal of PCS in the event of problems with the approved long-term management (e.g., exceedance of screening levels). Must include time limits, performance criteria, and any restrictions, as applicable.
11. A description of any proposed treatment methods, including the following as applicable: a) Any restrictions on PCS type (e.g., diesel or lighter for bioremediation); b) Activities/additives to enhance treatment; c) Proposed monitoring plan; d) Proposed treatment time; e) Performance criteria to evaluate treatment success; and f) Post-treatment management if treatment is successful/unsuccessful.
12. Closure and reclamation plans for all on-site disposal locations, including the final cover.
13. Monitoring and reporting plan, if different from that specified in the guidance.
14. A sample collection protocol.
15. Any other information necessary to describe the proposed Plan fully.