

EXPLORATION & PRODUCTION (E&P) WASTE MANAGEMENT

901. INTRODUCTION

a. **General.** The rules and regulations of this series establish the permitting, construction, operating and closure requirements for pits, methods of E&P waste management, procedures for spill/release response and reporting, and sampling and analysis for remediation activities. The 900 Series rules are applicable only to E&P waste, as defined in §34-60-103(4.5), C.R.S., or other solid waste where the Colorado Department Of Public Health And Environment ("CDPHE") has allowed remediation and oversight by the Commission.

b. **COGCC reporting forms.** The reporting required by the rules and regulations of this series shall be made on forms provided by the Director. Alternate forms may be used where equivalent information is supplied and the format has been approved by the Director.

c. **Additional requirements.** Whenever the Director has reasonable cause to believe that an operator, in the conduct of any oil or gas operation, is performing any act or practice which threatens to cause or causes a violation of Table 910-1 and with consideration of water quality standards or classifications established by the Water Quality Control Commission ("WQCC") for waters of the state, the Director may impose additional requirements, including but not limited to, sensitive area determination, sampling and analysis, remediation, monitoring, permitting and the establishment of points of compliance. Any action taken pursuant to this Rule shall comply with the provisions of Rules 324A. through D. and the 500 Series rules.

d. **Alternative compliance methods.** Operators may propose for prior approval by the Director alternative methods for determining the extent of contamination, sampling and analysis, or alternative cleanup goals using points of compliance or risk-based approaches.

e. **Sensitive area determination.** Operators shall make a sensitive area determination using the Sensitive Area Determination Decision Tree, Figure 901-1 to evaluate the potential for impact to ground water and submit data evaluated and analysis used in the determination to the Director for the following operations or remediation activities:

- (1) Construction of drilling pits designed for use with fluids containing hydrocarbon concentrations exceeding 20,000 parts per million ("ppm") total petroleum hydrocarbon ("TPH") or chloride concentrations at total well depth exceeding 15,000 ppm.
- (2) Construction of production and special purpose pits;
- (3) Construction of centralized E&P waste management facilities;
- (4) Management and remediation of spills/releases exceeding twenty (20) barrels net loss of E&P waste; or
- (5) When the operator or Director has data that indicate an impact or threat of impact to ground water.

f. **Sensitive area operations.** Operations in sensitive areas shall incorporate adequate measures and controls to prevent significant adverse environmental impacts and ensure compliance with the allowable concentrations and levels in Table 910-1, with consideration to WQCC standards and classifications. Unlined production and special purpose pits in sensitive areas are generally not approved.

902. PITS - GENERAL AND SPECIAL RULES

a. Pits used for exploration and production of oil and gas shall be constructed and operated to protect the waters of the state from significant adverse environmental impacts from E&P waste, except as permitted by applicable laws and regulations.

b. Topsoil and subsoil removed in the construction of the pit shall be segregated and stockpiled in a manner described in Rule 1002. and used for reclamation of the site.

c. Pits shall be constructed and operated to provide for a minimum of two (2) feet of freeboard between the top of the pit wall and the fluid level of the pit.

d. Any accumulation of oil in a pit shall be removed within twenty-four (24) hours of discovery. This requirement is not applicable to properly permitted and properly fenced or netted skim pits.

e. Where necessary to protect public health, safety and welfare or to prevent significant adverse environmental impacts resulting from access to a pit by wildlife, migratory birds, domestic animals, or members of the general public, operators shall install appropriate netting or fencing.

f. **Multi-well pits.** Production and special purpose pits used for treatment or disposal of E&P waste generated from more than one well may be permitted in accordance with Rule 903. as a multi-well pit, subject to Director approval.

g. Unlined drilling pits shall not be constructed on fill material.

h. Produced water shall be treated in accordance with Rule 907. before being placed in a production pit.

903. PIT PERMITTING/REPORTING REQUIREMENTS

a. Drilling pits, production pits, and special purpose pits shall be permitted or reported as follows:

(1) Pit Construction Report/Permit, Form 15, shall be submitted for prior Director approval for the following:

A. Drilling pits designed for use with fluids containing hydrocarbon concentrations exceeding 20,000 ppm TPH or chloride concentrations at total well depth exceeding 15,000 ppm in sensitive areas or 50,000 ppm outside sensitive areas.

B. Production pits and unlined special purpose pits in sensitive areas.

C. Unlined production pits and special purpose pits outside sensitive areas, excluding those pits permitted in accordance with Rule 903.a.(2).B.

(2) Pit Construction Report/Permit, Form 15, shall be submitted within thirty (30) days after construction for the following:

A. Lined production pits outside sensitive areas.

B. Unlined production pits outside sensitive areas receiving produced water at an average daily rate of five (5) or less barrels per day calculated on a monthly basis for each month of operation.

C. Lined special purpose pits.

D. Flare pits where there is no risk of condensate accumulation.

(3) Pit Construction Report/Permit, Form 15, shall not be required for drilling pits using water-based bentonitic drilling fluids with concentrations of TPH and chloride below those referenced in Rule 903.a.(1).A.

b. The Pit Construction Report/Permit, Form 15, shall be completed in accordance with the instructions in Appendix I. Failure to complete the form in full may result in delay of approval or return of form.

c. The Director shall endeavor to review any properly completed Pit Construction Report/Permit, Form 15, within thirty (30) days after receipt. In order to allow adequate time for pit permit approval, operators should submit required Form 15 pit construction permit requests for approval with an Application for Permit to Drill, Form 2. The Director may condition permit approval upon compliance with additional terms, provisions or requirements necessary to protect the waters of the state, public health, or the environment.

904. PIT LINING REQUIREMENTS AND SPECIFICATIONS

a. Pit lining requirements. The following pits shall be lined:

(1) Drilling pits designed for use with fluids containing hydrocarbon concentrations exceeding 20,000 ppm TPH or chloride concentrations at total well depth exceeding 15,000 ppm in sensitive areas or 50,000 ppm outside sensitive areas.

(2) Production pits in sensitive areas.

(3) Special purpose pits, except emergency pits constructed during initial response to spills/releases, or flare pits where there is no risk of condensate accumulation.

(4) Skim pits.

b. The following specifications shall apply to pits that are required to be lined:

(1) Materials used in lining pits shall be impervious, weather resistant and resistant to deterioration when in contact with hydrocarbons, aqueous acids, alkali, fungi or other substances in the produced water.

(2) Soil liners shall have a minimum thickness of six (6) inches after compaction, shall cover the entire bottom and interior sides of the pit, and shall be constructed so that the hydraulic conductivity of the liner shall not exceed 1.0×10^{-6} cm/sec. Bentonite liners shall be constructed to provide equivalent protection. Operators shall perform post-construction tests either in a laboratory or in the field. All test results shall be filed with the Director.

(3) Synthetic or fabricated liners shall have a minimum thickness of twelve (12) mils and shall be resistant to deterioration by ultraviolet light, weathering, chemicals, punctures and tearing, and designed for the life of the well. The foundation for the liner shall be constructed to prevent punctures from soils or other materials beneath the liner. The synthetic or fabricated liner shall cover the bottom and interior sides of the pit with the edges secured with at least a twelve (12) inch deep anchor trench around the pit perimeter.

(4) In Sensitive Areas, the Director may require a leak detection system for the pit or other equivalent protective measures, including but not limited to, increased record-keeping requirements, monitoring systems and underlying gravel fill sumps and lateral systems. In making such determination, the Director shall consider the surface and subsurface geology, the use and quality of potentially-affected ground water, the quality of the produced water, and the hydraulic conductivity of the surrounding soils and the type of liner.

905. CLOSURE OF PITS, AND BURIED OR PARTIALLY BURIED PRODUCED WATER VESSELS.

a. Unlined production and special purpose pits, except emergency pits constructed during initial response to spills/releases, shall be closed in accordance with an approved Site Investigation and Remediation Workplan, Form 27. The workplan shall be submitted for prior Director approval and shall include a description of the proposed investigation and remediation activities in accordance with Rule 909.

b. Lined pits and buried or partially buried produced water vessels:

(1) Operators shall ensure that soils and ground water meet the allowable concentrations of Table 910-1.

(2) Pit evacuation. Prior to backfilling and site reclamation, E&P waste shall be treated or disposed in accordance with Rule 907.

(3) Liners shall be disposed as follows:

A. **Synthetic liner disposal.** On irrigated crop land, liner material shall be removed and disposed in accordance with applicable solid waste rules. On non-irrigated crop land and on non-crop land, liner material may be left in place with surface owner approval.

B. **Constructed soil liners.** Constructed soil liner material may be removed for treatment or disposal, or, where left in place, the material shall be ripped and mixed with native soils in a manner to alleviate compaction and prevent an impermeable barrier to infiltration and ground water flow.

c. **Discovery of a spill/release during closure.** When a spill/release is discovered during closure operations operators shall report the spill/release on the Spill/Release Report, Form 19, in accordance with Rule 906. Leaking pits and buried or partially buried produced water vessels shall be closed and remediated in accordance with Rules 909. and 910.

d. **Emergency pits.** Emergency pits constructed during initial response to contain and mitigate spills/releases shall not be subject to lining requirements. These pits shall be closed and remediated in accordance with Rule 906.

e. **Unlined drilling pits.** Unlined drilling pits shall be closed and reclaimed in accordance with the 1000 Series rules.

906. SPILLS AND RELEASES

a. **General.** Spills/releases of E&P waste, including produced fluids shall be controlled and contained immediately upon discovery. Impacts resulting from spills/releases shall be investigated and cleaned up as soon as practicable. The Director may require additional activities to prevent or mitigate threatened or actual significant adverse environmental impacts on any air, water, soil or biological resource, or to the extent necessary to ensure compliance with the allowable concentrations and levels in Table 910-1, with consideration to WQCC ground water standards and classifications.

b. **Reporting.**

(1) Spills/releases of E&P waste or produced fluid exceeding five (5) barrels, including those contained within unlined berms, shall be reported on COGCC Spill/Release Report Form, 19. Such report shall include information relating to initial mitigation, site investigation and remediation, and shall be submitted to the Director within ten (10) days of discovery of the spill/release.

(2) In addition, spills/releases which exceed twenty (20) barrels of an E&P waste shall be verbally reported to the Director within twenty-four (24) hours of discovery.

(3) In addition, spill/releases of any size which impact or threaten to impact any waters of the state, residence or occupied structure, livestock or public byway, shall be verbally reported to the Director as soon as practicable after discovery.

c. **Surface owner notification and consultation.** The operator shall make good faith efforts to notify and consult with the surface owner prior to commencing operations to remediate E&P waste from a spill/release in an area not being utilized for oil and gas operations.

d. **Remediation of spills/releases.**

(1) **Remediation workplan.** When threatened or actual significant adverse environmental impacts on any air, water, soil or biological resource from a spill/release exists or when necessary to ensure compliance with the allowable concentrations and levels in Table 910-1, with consideration to WQCC ground water standards and classifications, the Director may require operators to submit a Site Investigation and Remediation Workplan, Form 27.

(2) **Remediation requirements.** Spills/releases shall be remediated to meet the allowable concentrations in Table 910-1. Spills/releases exceeding twenty (20) barrels net loss of E&P waste shall be remediated in accordance with Rules 909. and 910.

e. **Spill/release prevention.**

(1) **Secondary containment.** Secondary containment shall be constructed or installed around tanks containing crude oil, condensate or produced water with greater than 10,000 milligrams per liter (mg/l) total dissolved solids (TDS). Operators are also subject to crude oil tank and containment requirements under Rules 603. and 604. This requirement shall not apply to water tanks with a capacity of one hundred (100) barrels or less.

(2) **Spill/release evaluation.** Operators shall determine the cause of a spill/release, and to the extent practicable, shall implement measures to prevent spills/releases due to similar causes in the future. For reportable spills, operators shall submit this information to the Director on the Spill/Release Report, Form 19 within ten (10) days after discovery of the spill/release.

907. MANAGEMENT OF E&P WASTE

a. **General requirements.**

(1) **Operator obligations.** Operators shall ensure that E&P waste is properly stored, handled, transported, treated, recycled or disposed to prevent threatened or actual significant adverse environmental impacts to air, water, soil or biological resources or to the extent necessary to ensure compliance with the allowable concentrations and levels in Table 910-1, with consideration to WQCC ground water standards and classifications.

(2) E&P waste management activities shall be conducted, and facilities constructed and operated, to protect the waters of the state from significant adverse environmental impacts from E&P waste, except as permitted by applicable laws and regulations.

(3) **Reuse and recycling.** To encourage and promote waste minimization, operators may propose plans for managing E&P waste through beneficial use, reuse and recycling by submitting a written management plan to the Director for approval. Such plans shall describe the proposed use of the waste, method of waste treatment, product quality assurance, and shall include a copy of any certification or authorization that may be required by other laws.

b. **Waste transportation.**

(1) E&P waste, when transported off-site within Colorado for treatment or disposal, shall be transported to facilities authorized by the Director or waste disposal facilities approved to receive E&P waste by the CDPHE.

(2) **Waste generator requirements.** Generators of E&P waste shall maintain, for not less than three (3) years, copies of each invoice, bill or ticket and such other records as necessary to document the following information from a transporter or disposal site, describing the disposal of E&P waste from each location:

- A. The date of the transport;
- B. The identity of the waste generator;
- C. The identity of the waste transporter;
- D. The location of the waste pickup site;
- E. The type and volume of waste; and
- F. The name and location of the treatment or disposal site.

Such records shall be made available for inspection by the Director during normal business hours and copies thereof shall be furnished to the Director upon request.

c. **Produced water.**

(1) Treatment of produced water. Produced water shall be treated prior to placement in a production pit to prevent crude oil and condensate from entering the pit.

(2) Produced water disposal. Produced water may be disposed as follows:

- A. Injection into a Class II well, permitted in accordance with Rule 325.;
- B. Evaporation/percolation in a properly permitted lined or unlined pit;
- C. Disposal at permitted commercial facilities; or
- D. Disposal by roadspraying on lease roads outside sensitive areas for produced waters with less than 5,000 mg/l TDS when authorized by the surface owner. Roadspraying shall not result in pooling or runoff of produced waters and the adjacent soils shall meet the allowable concentrations in Table 910-1.
- E. Discharging into state waters, in accordance with the Water Quality Control Act and the rules and regulations promulgated thereunder. Produced water discharged pursuant to this subsection

(2)E. may be put to beneficial use in accordance with applicable state statutes and regulations governing the use and administration of water.

(3) **Produced water reuse and recycling.** Produced water may be reused for enhanced recovery, drilling, and other uses in a manner consistent with existing water rights and in consideration of water quality standards and classifications established by the WQCC for waters of the state, or any point of compliance established by the Director pursuant to Rule 324D.

(4) **Mitigation.** Water produced during operation of an oil or gas well may be used to provide an alternate domestic water supply to surface owners within the oil or gas field, in accordance with all applicable laws, including, but not limited to, obtaining the necessary approvals from the WQCD for constructing a new "waterworks," as defined by section 25-1-107(1)(X)(II)(A), C.R.S. Any produced water not so used shall be disposed of in accordance with subsection (2) or (3). Provision of produced water for domestic use within the meaning of this subsection (4) shall not constitute an admission by the operator that the well is dewatering or impacting any existing water well. The water produced shall be to the benefit of the surface owner within the oil and gas field and may not be sold for profit or traded.

d. **Drilling fluids.**

(1) Drilling pit fluid recycling. Drilling pit contents may be recycled to another drilling pit consistent with Rule 903.

(2) Drilling fluids treatment and disposal. Drilling fluids may be treated or disposed as follows:

A. Injection into a Class II well permitted in accordance with Rule 325.;

B. Disposal at a commercial solid waste disposal facility; or

C. Land treatment or land application at a centralized E&P waste management facility permitted in accordance with Rule 908.

(3) Additional authorized disposal of water-based bentonitic drilling fluids. Water-based bentonitic drilling fluids may be disposed as follows:

A. Drying and burial in drilling pits on non-crop land; or

B Land application as follows:

i. Applicability. Acceptable methods of land application include, but are not limited to, production facility construction and maintenance, lease and farm road maintenance, or lining of stock ponds and irrigation ditches.

ii. Land application requirements. The average thickness of water-based bentonitic drilling fluid waste applied shall be no more than three (3) inches prior to incorporation. The waste shall be applied to prevent ponding or erosion and shall be incorporated as a beneficial amendment into the native soils as soon as practicable. The resulting concentrations shall not exceed those in Table 910-1.

iii. Surface owner approval. Operators shall obtain written authorization from the surface owner prior to land application of water-based bentonitic drilling fluids.

iv. Operator obligations. Operators with control and authority over the wells from which the water-based bentonitic drilling fluid wastes are obtained retain responsibility for the land application operation, and shall diligently cooperate with the Director in responding to complaints regarding land application of water-based bentonitic drilling fluids.

v. Approval. Prior Director approval is not required for reuse of water-based bentonitic drilling fluids for land application as a soil amendment or lining material.

e. **Oily waste.** Oily waste includes those materials containing crude oil, condensate or other hydrocarbon-containing E&P waste, such as soil, frac sand, drilling fluids, workover fluids, pit sludge, tank bottoms, pipeline pigging wastes, and natural gas gathering, processing and storage wastes.

(1) Oily waste may be treated or disposed as follows:

A. Disposal at a commercial solid waste disposal facility;

B. Land treatment onsite or with prior written surface owner approval, offsite land treatment; or

C. Land treatment at a centralized E&P waste management facility permitted in accordance with Rule 908.

(2) Land treatment requirements:

A. Free oil shall be removed from the oily waste prior to land treatment.

B. Oily waste shall be spread evenly to prevent pooling, ponding or runoff.

C. Contamination of ground water or surface water shall be prevented.

D. Biodegradation shall be enhanced by disking, tilling, aerating, addition of nutrients, microbes, water or other amendments, as appropriate.

E. Land-treated oily waste incorporated in place shall not exceed the allowable concentrations in Table 910-1.

F. When a threatened or significant adverse environmental impact from onsite land treatment exists, the Director may require operators to submit a Site Investigation And Remediation Workplan, Form 27. Treatment shall thereafter be completed in accordance with the workplan and Rules 909. and 910.

G. When land treatment occurs in an area not being utilized for oil and gas operations, operators shall obtain prior written surface owner approval.

908. CENTRALIZED E&P WASTE MANAGEMENT FACILITIES

a. **Applicability.** Operators may establish non-commercial, centralized E&P waste management facilities for the treatment, disposal, recycling or beneficial reuse of E&P waste. This rule applies only to non-commercial facilities, which means the operator does not represent itself as providing E&P waste management services to third parties, except as part of a unitized area or joint operating agreement or in response to an emergency. Centralized facilities may include components such as land treatment or land application sites, pits and recycling equipment.

b. **Permit requirements.** An application for permit including the following information shall be submitted to the Director for prior approval along with a filing and service fee established by the Commission (Appendix III):

- (1) The name, address, phone and fax number of the operator, and a designated contact person.
- (2) The name, address and phone number of the surface owner of the site, if not the operator, and the written authorization of such surface owner.
- (3) The legal description of the site.
- (4) A general topographic, geologic and hydrologic description of the site, including immediately adjacent land uses, a topographic map of a scale no less than 1:24,000 showing the location, and the average annual precipitation and evaporation rates at the site.
- (5) Centralized facility siting requirements.
 - A. A site plan showing drainage patterns and any diversion or containment structures, and facilities such as roads, fencing, tanks, pits, buildings, and other construction details.
 - B. Scaled drawings of entire sections containing the proposed facility. The field measured distances from the nearer north or south and nearer east or west section lines shall be measured at ninety (90) degrees from said section lines to facility boundaries and referenced on the drawing. A survey shall be provided including a complete description of established monuments or collateral evidence found and all aliquot corners.
 - C. Appropriate measures to limit access to the centralized facility by wildlife, domestic animals, and members of the general public shall be implemented.
 - D. Centralized facilities shall have a fire lane of at least ten (10) feet in width around the active treatment areas and within the perimeter fence. In addition, a buffer zone of at least ten (10) feet shall be maintained within the perimeter fire lane.
 - E. Surface water diversion structures, including, but not limited to, berms and ditches, shall be constructed to accommodate a one hundred (100) year, twenty four (24) hour event.
- (6) **Waste profile.** For each type of waste, the amounts to be received and managed by the facility shall be estimated on a monthly average basis. For each waste type to be treated, a characteristic waste profile shall be completed.
- (7) **Facility design and engineering.** Facility design and engineering data, including plans and elevations, design basis, calculations, and process description.
- (8) **Operating plan.** An operating plan, including, but not limited to, a detailed description of the method of treatment, loading rates, application of nutrients and soil amendments, dust and moisture control, sampling, inspection and maintenance, emergency response, record-keeping, site security, hours of operation, and final disposition of waste. Where treated waste will be beneficially reused, a description of reuse and method of product quality assurance shall be included.

(9) **Ground water monitoring.**

A. The Director may require ground water monitoring for the purpose of preventing and mitigating threatened or actual significant adverse environmental impact or to ensure compliance with the allowable concentrations and levels in Table 910-1, with consideration to WQCC standards and classifications by establishing points of compliance.

B. Where monitoring is required, the direction of flow, ground water gradient and quality of water shall be established by the installation of a minimum of three (3) monitor wells, including an up-gradient well and two (2) down-gradient wells that will serve as points of compliance, or other methods authorized by the Director.

c. **Permit approval.** The Director shall endeavor to approve or deny the properly completed permit within thirty (30) days after receipt and may condition permit approval as necessary to prevent any threatened or actual significant adverse environmental impact on air, water, soil or biological resources or to the extent necessary to ensure compliance with the allowable concentrations and levels in Table 910-1, with consideration to WQCC ground water standards and classifications.

d. **Financial assurance.** The operator of a land treatment facility shall submit for the Director's approval such financial assurance as required by Rule 704.

e. **Facility modifications.** Throughout the life of the facility the operator shall submit proposed modifications to the facility design, operating plan, permit data, or permit conditions to the Director for prior approval.

f. **Annual permit review.** To ensure compliance with permit conditions and the 900 Series rules, the facility permit shall be subject to an annual review by the Director.

g. **Closure.** A preliminary plan for closure shall be submitted with the centralized facility permit. A Site Investigation and Remediation Workplan, Form 27 shall be submitted sixty (60) days prior to closure for approval by the Director. The workplan shall describe the final closure plan.

h. Operators may be subject to local requirements for zoning and construction of facilities and shall provide copies of notifications to local governments or other agencies to the Director.

909. SITE INVESTIGATION, REMEDIATION AND CLOSURE

a. **Applicability.** This section applies to the closure and remediation of pits other than drilling pits constructed pursuant to Rule 903.a.(3).; investigation, reporting and remediation of spills/releases; permitted waste management facilities including treatment facilities; plugged and abandoned wellsites; sites impacted by E&P waste management practices; or other sites as designated by the Director.

b. **General site investigation and remediation requirements.**

(1) **Sensitive Area Determination.** Operators shall complete a sensitive area determination in accordance with Rule 901.e.

(2) **Sampling and analyses.** Samples and analysis of soil and ground water shall be conducted in accordance with Rule 910. to determine the horizontal and vertical extent of any contamination in excess of the allowable concentrations in Table 910-1.

(3) **Management of E&P waste.** E&P waste shall be managed in accordance with Rule 907.

(4) **Pit evacuation.** Prior to backfilling and site reclamation, E&P waste shall be treated or disposed in accordance with Rule 907. and the 1000 Series rules.

(5) **Remediation.** Remediation shall be performed in a manner to mitigate, remove or reduce contamination that exceeds the allowable concentrations in Table 910-1 in order to ensure protection of public health, safety and welfare, and to prevent and mitigate significant adverse environmental impacts. Soil that does not meet allowable concentrations in Table 910-1 shall be remediated. Ground water that does not meet allowable concentrations in Table 910-1 shall be remediated in accordance with a Site Investigation and Remediation Workplan, Form 27.

(6) **Reclamation.** Remediation sites shall be reclaimed in accordance with the 1000 Series rules for reclamation.

c. **Site Investigation And Remediation Workplan, Form 27.** Operators shall prepare and submit for prior Director approval a Site Investigation and Remediation Workplan, Form 27 for the following operations and remediation activities:

- (1) Unlined pit closure when required by Rule 905.
- (2) Remediation of spills/releases in accordance with Rule 906.
- (3) Land treatment of oily waste in accordance with Rule 907.e.(2).F.
- (4) Closure of centralized E&P waste management facilities in accordance with Rule 908.g.
- (5) Remediation of impacted ground water in accordance with Rule 910.b.(4).

d. **Multiple sites.** Remediation of multiple sites may be submitted on a single workplan with prior Director approval.

e. **Closure.**

(1) Remediation and reclamation shall be complete upon compliance with the allowable concentrations in Table 910-1, or upon compliance with an approved workplan.

(2) **Notification of completion.** Within thirty (30) days after conclusion of site remediation and reclamation activities operators shall provide the following notification of completion:

A. Operators conducting remediation operations in accordance with Rule 909.b. shall submit to the Director a Site Investigation and Remediation Workplan, Form 27, containing information sufficient to demonstrate compliance with these rules.

B. Operators conducting remediation under an approved workplan shall submit to the Director, by adding or attaching to the original workplan, information sufficient to demonstrate compliance with the workplan.

f. **Release of financial assurance.** Financial assurance required by Rule 706. may be held by the Director until the required remediation of soil and/or ground water impacts is completed in accordance with the approved workplan, or until cleanup goals are met.

910. ALLOWABLE CONCENTRATIONS AND SAMPLING FOR SOIL AND GROUND WATER

a. **Soil and ground water allowable concentrations.** The allowable concentrations for soil and ground water are in Table 910-1. Ground water standards and analytical methods are derived from the ground water standards and classifications established by WQCC.

b. **Sampling and analysis.**

(1) **Existing workplans.** Sampling and analysis for sites subject to an approved workplan shall be conducted in accordance with the workplan and the sampling and analysis requirements described in this rule.

(2) **Methods for sampling and analysis.** Sampling and analysis for site investigation or confirmation of successful remediation shall be conducted to determine the nature and extent of impact and confirm compliance with appropriate allowable concentrations.

A. **Field analysis.** Field measurements and field tests shall be conducted using appropriate equipment, calibrated and operated according to manufacturer specifications, by personnel trained and familiar with the equipment.

B. **Sample collection.** Samples shall be collected, preserved, documented, and shipped using standard environmental sampling procedures in a manner to ensure accurate representation of site conditions.

C. **Laboratory analytical methods.** Laboratories shall analyze samples using standard methods (such as EPA SW-846 or API RP-45) appropriate for detecting the target analyte. The method selected shall have detection limits less than or equal to the allowable concentrations in Table 910-1.

D. **Background sampling.** Samples of comparable, nearby, non-impacted, native soil, ground water or other medium may be required by the Director for establishing background conditions.

(3) **Soil sampling and analysis.**

A. **Applicability.** If soil contamination is suspected or known to exist as a result of spills/releases or E&P waste management, representative samples of soil shall be collected and analyzed in accordance with this rule.

B. **Sample collection.** Samples shall be collected from areas most likely to have been impacted, and the horizontal and vertical extent of contamination shall be determined. The number and location of samples shall be appropriate to the impact.

C. **Sample analysis.** Soil samples shall be analyzed for contaminants listed in Table 910-1 as appropriate to assess the impact or confirm remediation.

D. **Reporting.** Soil Analysis Report, Form 24 shall be used when the Director requires results of soil analyses.

E. **Soil impacted by produced water.** For impacts to soil due to produced water, samples from comparable, nearby non-impacted, native soil shall be collected and analyzed for purposes of establishing background soil conditions including pH and electrical conductivity (EC). Where EC of the impacted soil exceeds the allowable level in Table 910-1, the sodium adsorption ratio (SAR) shall also be determined.

F. **Soil impacted by hydrocarbons.** For impacts to soil due to hydrocarbons, samples shall be analyzed for TPH.

(4) **Ground water sampling and analysis.**

A. **Applicability.** Operators shall collect and analyze representative samples of ground water in accordance with these rules under the following circumstances:

- i. Where ground water contamination is suspected or known to exceed the allowable concentrations in Table 910-1;
- ii. Where impacted soils are in contact with ground water; or
- iii. Where impacts to soils extend down to the high water table.

B. **Sample collection.** Samples shall be collected from areas most likely to have been impacted, downgradient or in the middle of excavated areas. The number and location of samples shall be appropriate to determine the horizontal and vertical extent of the impact. If the concentrations in Table 910-1 are exceeded, the direction of flow and a ground water gradient shall be established, unless the extent of the contamination and migration can otherwise be adequately determined.

C. **Sample analysis.** Ground water samples shall be analyzed for benzene, toluene, ethylbenzene, xylene, and API RP-45 constituents, or other parameters appropriate for evaluating the impact.

D. **Reporting.** Water Analysis Report, Form 25 shall be used when the Director requires results of water analyses.

E. **Impacted ground water.** Where ground water contaminants exceed the allowable concentrations listed in Table 910-1, operators shall notify the Director, and submit to the Director for prior approval a Site Investigation and Remediation Workplan, Form 27, for the investigation, remediation, or monitoring of ground water to meet the required allowable concentrations.

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911. PIT, BURIED OR PARTIALLY BURIED PRODUCED WATER VESSEL, BLOWDOWN PIT, AND BASIC SEDIMENT/TANK BOTTOM PIT MANAGEMENT REQUIREMENTS PRIOR TO DECEMBER 30, 1997.

a. **Applicability.** This rule applies to the management, operation, closure and remediation of drilling, production and special purpose pits, buried or partially buried produced water vessels, blowdown pits, and basic sediment/tank bottom pits put into service prior to December 30, 1997 and unlined skim pits put into service prior to July 1, 1995.

For pits constructed after December 30, 1997 and skim pits constructed after July 1, 1995, operators shall comply with the requirements contained in Rules 901. through 910.

b. **Inventory.** Operators were required to submit to the Director no later than December 31, 1995, an inventory identifying production pits, buried or partially buried produced water vessels, blowdown pits, and basic sediment/tank bottom pits that existed on June 30, 1995. The inventory required operators to provide the facility name, a description of the location, type, capacity and use of pit/vessel, whether netted or fenced, lined or unlined, and where available, water quality data. Operators who have failed to submit the required inventory are in continuing violation of this rule.

c. **Sensitive area determination.**

(1) For unlined production and special purpose pits constructed prior to July 1, 1995 and not closed by December 30, 1997, operators were required to determine whether the pit was located within a sensitive area in accordance with the Sensitive Area Determination Decision Tree, Figure 901-1, (now Rule 901.e.), and submit data evaluated and analysis used in the determination to the Director on a Sundry Notice, Form 4.

(2) For steel, fiberglass, concrete, or other similar produced water vessels that were buried or partially buried and located in sensitive areas prior to December 30, 1997, operators were required to test such vessels for integrity, unless a monitoring or leak detection system was put in place.

d. The following permitting/reporting requirements applied to pits constructed prior to December 30, 1997:

(1) A Sundry Notice, Form 4, including the name, address, and phone number of the primary contact person operating the production pit for the operator, the facility name, a description of the location, type, capacity and use of pit, engineering design, installation features and water quality data, if available, was required for the following:

A. Lined production pits and lined special purpose pits constructed after July 1, 1995.

B. Unlined production pits constructed prior to July 1, 1995 which are lined in accordance with Rule 905. by December 30, 1997.

(2) An Application For Permit For Unlined Pit, Form 15 was required for the following:

A. Unlined production pits and special purpose pits in sensitive areas constructed prior to July 1, 1995, and not closed by December 30, 1997.

B. Unlined production pits outside sensitive areas constructed after July 1, 1995 and not closed by December 30, 1997.

(3) An Application For Permit For Unlined Pit, Form 15 and a variance under Rule 904.e.(1). (repealed, now Rule 502.b.) was required for unlined production pits and unlined special purpose pits in sensitive areas constructed after July 1, 1995.

(4) A Sundry Notice, Form 4 was required for unlined production pits outside sensitive areas receiving produced water at an average daily rate of five (5) or less barrels per day calculated on a monthly basis for each month of operation constructed prior to December 30, 1997.

e. The Director may have established points of compliance for unlined production pits and special purpose pits and for lined production pits in sensitive areas constructed after July 1, 1995.

f. **Closure requirements.**

(1) Operators of production or special purpose pits existing on July 1, 1995 which were closed before December 30, 1997, were required to submit a Sundry Notice, Form 4, within thirty (30) days of December 30, 1997. The Sundry Notice, Form 4 shall include a copy of the existing pit permit, if a permit was obtained and a description of the closure process.

(2) Pits closed prior to December 30, 1997 were required to be reclaimed in accordance with the 1000 Series rules. Pits closed after December 30, 1997 shall be closed in accordance with the 900 Series rules and reclaimed in accordance with the 1000 Series rules.

(3) Operators of steel, fiberglass, concrete or other similar produced water vessels buried or partially buried and located in sensitive areas were required to repair or replace vessels and tanks found to be leaking. Operators shall repair or replace vessels and tanks found to be leaking. Operators shall submit to the

Director a Sundry Notice, Form 4, describing the integrity testing results and action taken within thirty (30) days of December 30, 1997.

(4) Closure of pits and steel, fiberglass, concrete or other similar produced water vessels, and associated remediation operations conducted prior to December 30, 1997 are not subject to Rules 905., 906., 907., 909. and 910.

912. VENTING OR FLARING NATURAL GAS

a. The unnecessary or excessive venting or flaring of natural gas produced from a well is prohibited.

b. Except for gas flared or vented during an upset condition, well maintenance, well stimulation flowback, purging operations, or a productivity test, gas from a well shall be flared or vented only after notice has been given and approval obtained from the Director on a Sundry Notice, Form 4, stating the estimated volume and content of the gas. The notice shall indicate whether the gas contains more than one (1) ppm of hydrogen sulfide. If necessary to protect the public health, safety or welfare, the Director may require the flaring of gas.

c. Gas flared, vented or used on the lease shall be estimated based on a gas-oil ratio test or other equivalent test approved by the Director, and reported on Operator's Monthly Production Report, Form 7.

d. Prior to flaring of any gas, operators shall construct a special purpose pit in compliance with Rule 903.

e. Operators shall notify the local emergency dispatch or the local governmental designee of any natural gas flaring. Notice shall be given prior to flaring when flaring can be reasonably anticipated, or as soon as possible but in no event more than two (2) hours after the flaring occurs.

**Table 910-1
ALLOWABLE CONCENTRATIONS AND LEVELS**

Contaminant of Concern	Allowable Concentrations
Organics in Soil: EPA Method 8015 (modified)	
TPH-Non-Sensitive Area	10,000 mg/kg
TPH-Sensitive Area	1,000 mg/kg
Organics in Ground Water: EPA Method 8020 ¹	
Benzene	5 µg/l ¹
Toluene	1,000 µg/l ¹
Ethylbenzene	700 µg/l ¹
Xylenes (Total)	1,400 to 10,000 µg/l ⁵
Inorganics in Soils ⁴	
Electrical Conductivity (EC)	<4 mmhos/cm or 2x background
Sodium Adsorption Ratio (SAR)	<12
pH	6-9
Inorganics in Ground Water	
Total Dissolved Solids (TDS)	<1.25 x background ¹
Chlorides	<1.25 x background ¹
Sulfates	<1.25 x background ¹
Total Metals in Soils: EPA Method 3050 ⁴	
Arsenic	41 mg/kg ²
Barium (LDNR True Total Barium)	180,000 mg/kg ²
Boron (Hot Water Soluble)	2 mg/l ²
Cadmium	26 mg/kg ²
Chromium	1,500 mg/kg ²
Copper	750 mg/kg ²
Lead	300 mg/kg ²
Mercury	17 mg/kg ²
Molybdenum	³
Nickel	210 mg/kg ²
Selenium	³
Silver	100 mg/kg ²
Zinc	1,400 mg/kg ²

¹Concentrations taken from CDPHE-WQCC

²Concentrations taken from API Metals Guidance: Maximum Soil Concentrations

³Concentrations are dependent on site-specific conditions

⁴Consideration shall be given to background levels in native soils

⁵For this range of standards, the first number in the range is a strictly health-based value, based on the WQCC's established methodology for human health-based standards. The second number in the range is a maximum contaminant level (MCL), established under the Federal Safe Drinking Water Act which has been determined to be an acceptable level of this chemical in public water supplies, taking treatability and laboratory detection limits into account. The WQCC intends that control requirements for this chemical be implemented to attain a level of ambient water quality that is at least equal to the first number in the range except as follows: 1) where ground water quality exceeds the first number in the range due to a release of contaminants that occurred prior to September 14, 2004 (regardless of the date of discovery or subsequent migration of such contaminants) clean-up levels for the entire contaminant plume shall be no more restrictive than the second number in the range or the ground water quality resulting from such release, whichever is more protective, and 2) whenever the WQCC has adopted alternative, site-specific standards for the chemical, the site-specific standards shall apply instead of these statewide standards.

**Figure 901-1
SENSITIVE AREA DETERMINATION
Decision Tree**

OUTSIDE SENSITIVE AREAS

-New E&P waste management facilities shall be allowed outside Sensitive Areas. Points of Compliance shall be established as appropriate.

-Where complaints are made, Points of Compliance may be established for existing facilities.

BOX 1: Is discharge water or waste:
>1.25 x background ppm TDS
>250 mg/l Chloride or 1.25 x background
>250 mg/l Sulfate or 1.25 x background
> 5 µg/l Benzene
> 1000 µg/l Toluene
> 700 µg/l Ethylbenzene
> 1,400 µg/l Total Xylenes

NO

YES

BOX 2: Is the site underlain by an unconfined aquifer or recharge zone?

NO

YES

BOX 3: is the hydraulic conductivity of the underlying soils and geologic material less than or equal to 10^{-6} cm/sec?

YES

NO

BOX 4: Is the site within an area classified for domestic use by WQCC, or a local (water supply) wellhead protection area (WHPA)?

YES

NO

BOX 5: Is the location within 1/8 mi. of a domestic water well, or 1/4 mi. of a public water supply well, using the same aquifer?

YES

NO

BOX 6: Is the depth to the average high ground water table <20', from the deeper of the ground surface, pit bottom or from the point of spill/release? (*see footnote)

NO

YES

INSIDE SENSITIVE AREAS

-E&P waste management facilities shall not be allowed unless the operator demonstrates no potential for significant adverse environmental impact.

-Facilities which are permitted may have Points of Compliance established.

** Additional requirements may be imposed by the Director in accordance with Rule 901.c.*