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PART 36 PERMIT APPLICATION

Volume 1

1 of 3

REVISED APPLICATION

October 3, 2019

Terracon

OCT 03 2019 PM03:35

August 27, 2019

New Mexico Energy, Minerals and Natural Resources Department
Oil Conservation Division
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

Attention: Mr. Jim Griswold, Environmental Bureau Chief

RE: Form C-137, Application for Surface Waste Management Facility
Proposed North Ranch Surface Waste Management Facility
NGL Waste Services, LLC
Lea County, New Mexico

Dear Mr. Griswold:

Terracon Consultants, Inc, on behalf of NGL Waste Services, LLC, is pleased to submit the enclosed permit application package. The permit application is for a proposed surface waste management facility and has been prepared in compliance with the Form C-137 (provided in **Appendix A** of the package) and with the applicable provisions of New Mexico Administrative Code, Title 19, Chapter 15, Part 36.

If you should have any questions or comments regarding this application, please feel free to contact me at Michael.bradford@terracon.com or (501) 943-1011 at any time.

Sincerely,
Terracon Consultants, Inc.

Michael P. Bradford, P.E.
Senior Solid Waste Engineering Manager

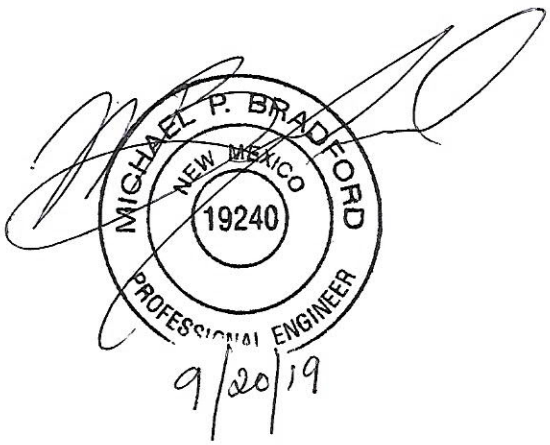
F. Owen Carpenter, P.E., P.G
Senior Solid Waste Engineer

Attachments: Three (3) Hard Copies and one (1) electronic copy of Permit Application for Surface Waste Management Facility, North Ranch Surface Waste Management Facility

Permit Application For
Surface Waste Management Facility

North Ranch Surface Waste Management Facility
Lea County, New Mexico

September 2019
Project No. 35187378



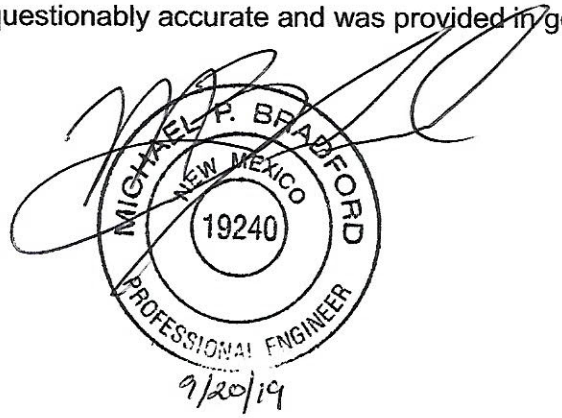
Prepared for:
NGL Waste Services, LLC
3773 Cherry Creek Dr., Suite 1000
Denver, CO 80209
303-815-1010

Prepared by:
Terracon Consultants, Inc.
25809 Interstate 30 South
Bryant, Arkansas 72022
(501) 847-9292

Volume 1 of 2

PROFESSIONAL ENGINEER'S CERTIFICATION

"I certify to the best of my professional judgment that this document and all attachments properly adhere to established, sound engineering practices. This certification is contingent on the fact that all information supplied to the signatory authority, up to the date of this certification, is unquestionably accurate and was provided in good faith."



Michael P. Bradford, P.E.
New Mexico Professional Engineer No. 19240

Date

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1.0 INTRODUCTION AND OVERVIEW

This document constitutes the permit application narrative and general requirements for the new North Ranch Surface Waste Management Facility (SWMF) located in Lea County in the State of New Mexico and is provided on behalf of the applicant NGL Waste Services, LLC. The proposed facility includes an Oil Field Waste Landfill, a leachate evaporation pond, and associated infrastructure. The information of this document is intended to comply with the requirements set forth in the *New Mexico Administrative Code (NMAC) Title 19 Natural Resources and Wildlife, Chapter 15 Oil and Gas, Part 36* (19.15.36), issued by the New Mexico Energy, Minerals and Natural Resources Department, Oil Conservation Division (NMOCD, Division, or OCD) and the Form C-137 "Application for Surface Waste Management Facility." The landfill design is illustrated on a set of drawings prepared by Terracon, referred to hereinafter as the Permit Drawings.

1.1 Background

The site for the proposed North Ranch SWMF (previously known as McCloy Ranch) is located 16 miles west of Jal, New Mexico and is approximately 303 acres in size. More specifically, the North Ranch SWMF site is located within Section 9 and 10 of T25S, R34E, see **Figure 1** Site Location Map. The primary waste accepted by the landfill exempt or non-hazardous oil field waste as provided in Subsection F of 19.15.36.13 NMAC. Acceptable wastes that may need to be dried out prior to disposal in an active cell will be placed over a concrete pad and managed until it is dry enough to meet the criteria for disposal as outlined in Section 2.10 of the Operating Plan in **Appendix D.**

The facility design is split into Phase 1 and Phase 2, with a centrally located road running between the phases. Each phase is divided into cells ranging from 9.6 acres to 28.2 acres in size. A final fill phase will be developed in the valley between Phases 1 and 2 and "piggyback" waste onto the first two phases to comprise the overall landfill fill capacity. This proposed disposal area design is expected to yield approximately 40,264,324 cubic yards of waste disposal airspace. An associated leachate evaporation pond is planned to be located near the site entrance which will be located in the northeast corner of the property. Three areas of the site have been designated for the North, West and East Stormwater Ponds, each sized to retain a 25-year 24-hr storm event.

1.2 Document Organization

This permit narrative document is arranged to demonstrate compliance with the *NMAC 19.15.36*. In **Section 2.0**, NMAC 19.15.36.8, 9, 10, 11, 12, 13, 14, 17, 18,19, and 20 are discussed and a demonstration is presented regarding North Ranch SWMF compliance with the requirements.

Section 3.0 presents a discussion of the Form C-137 application for Surface Waste Management Facilities that outlines specific requirements for waste disposal permits issued by the NMOCD. A copy of the completed C-137 Application Form can be found in **Appendix A** of this report.

Section 4.0 presents site and boundary information unique to the permitting of the SWMF within NGL owned properties in the vicinity. **Section 5.0** presents an introduction to the landfill and evaporation pond designs for the SWMF, **Section 6.0** discusses landfill and evaporation pond operations. **Section 7.0** discusses site safety concerns for the Facility.

1.3 Project Correspondence

A Work Plan dated October 17, 2018 with proposed subsurface investigation goals and methods was presented to the NMOCD. Approval was given via letter dated October 24, 2018 from NMOCD. Personnel representing the New Mexico Abandoned Mine Land Program issued a statement regarding no known underground mines active or abandoned near the Facility. Project correspondence is included in **Appendix B**.

2.0 NEW MEXICO ADMINISTRATIVE CODE

The applicant proposes to permit, construct and operate an Oil Field Waste Landfill and an associated leachate evaporation pond and appurtenances. Oil and gas surface waste management facilities are regulated by the OCD and requirements are set forth in the NMAC 19.15.36. Sections 8, 9, 10, 11, 12, 13, 14, 17, 18,19, and 20 of Part 36 are provided below in italics font and the applicant's demonstration of compliance follows each section.

2.1 NMAC 19.15.36.8 - SURFACE WASTE MANAGEMENT FACILITY PERMITS AND APPLICATION REQUIREMENTS:

2.1.1 NMAC 19.15.36.8.A – Permit Required

No person shall operate a surface waste management facility (other than a small landfarm registered pursuant to Paragraph (1) of Subsection A of 19.15.36.16 NMAC) except pursuant to and in accordance with the terms and conditions of a division-issued surface waste management facility permit. The applicant for a permit or permit modification, renewal or transfer shall be the operator of the surface waste management facility. The operator is responsible for the actions of the operator's officers, employees, consultants, contractors and subcontractors as they relate to the operation of the surface waste management facility. Any person who is involved in a surface waste management facility's operation shall comply with 19.15.36 NMAC and the permit.

This narrative and its appendices constitute an application for a permit to be issued by the NMOCD. NGL Waste Services, LLC is the applicant and facility operator.

2.1.2 NMAC 19.15.36.8.B – Permitting Requirements

Except for small landfarms registered pursuant to Paragraph (1) of Subsection A of 19.15.36.16 NMAC, new commercial or centralized facilities prior to commencement of construction, and existing commercial or centralized facilities prior to modification or permit renewal, shall be permitted by the division in accordance with the applicable requirements of Subsection C of 19.15.36.8 NMAC and 19.15.36.11 NMAC.

Prior to commencement of facility construction and operations, the applicant will be in receipt of a permit from the NMOCD authorizing the work to proceed and will have posted financial assurance as required.

2.1.3 NMAC 19.15.36.8.C – Application requirements for new facilities, major modifications and permit renewals.

An applicant or operator shall file an application, form C-137, for a permit for a new surface waste management facility, to modify an existing surface waste management facility or for permit renewal with the environmental bureau in the division's Santa Fe office. The application shall include: Items (1) through (17).

NMAC 19.15.36.8.C Items 1 through 17 are covered in **Section 3.0 Form C-137 Application Requirements** below in this permit application narrative. The Form C-137 application is included in **Appendix A** of this permit narrative.

2.1.4 NMAC 19.15.36.8.D – Application requirements for minor modifications.

Before making a minor modification, the operator of an existing surface waste management facility shall file a form C-137A with the environmental bureau in the division's Santa Fe office describing the proposed change. Minor modifications are not subject to Subsection C of 19.15.36.8 NMAC. If the division denies the application for a minor modification, the operator may request a hearing pursuant to Subsection B of 19.15.36.10 NMAC.

Does not apply - the Facility is applying for a new permit pursuant to this permit application narrative. Should a modification become necessary in the future, the applicant will submit a Form C-137A application to the Environmental Bureau.

2.2 NMAC 19.15.36.9 - APPLICATION PROCESS AND NOTICE REQUIREMENTS FOR NEW SURFACE WASTE MANAGEMENT FACILITIES, MAJOR MODIFICATIONS OR RENEWALS AND ISSUANCE OF A FINAL DECISION:

2.2.1 NMAC 19.15.36.9.A

Submittal of application. The applicant shall submit three copies (two paper copies and one electronic copy) of the application to the division's Santa Fe office for consideration of approval. Upon receipt of an application for a new surface waste management facility, or a renewal or major modification of an existing permit, the division shall post a notice on the division's website that lists the type of facility, type of application, county or municipality where the facility is located and name of the applicant, and provides information on where the application can be viewed and whom to contact to be placed on a mailing list for notice regarding a proposed decision.

NGL has complied with this section.

2.2.2 NMAC 19.15.36.9.B

Division review: Within 90 days after the receipt of an application, the division shall review the application and determine if the application is approvable, approval with conditions or not approvable.

(1) Upon completion of the division's review, if the division determines the application is approvable, the division shall, within 30 days following such determination, prepare a proposed decision, which may include conditions, and mail notice of the proposed approval, together with a copy of the proposed decision, by certified mail, return

receipt requested, to the applicant. The division shall post the proposed decision on the division's website.

No response required.

(2) *Upon completion of the division's review, if the division determines the application is not approvable, the division shall, within 60 days of such determination, mail a deficiency letter by certified mail, return receipt requested, to the applicant. The deficiency letter shall identify and address all of the division's concerns regarding the application in specific detail allowing the applicant the opportunity to correct the deficiencies by submitting a revised application.*

No response required.

(3) *If the division issues a deficiency letter, the applicant shall have 60 days from the division's issuance of the deficiency letter to submit a revised application. The applicant may request, in writing, additional time to submit a revised application. The division shall grant additional time for good cause. The applicant may notify the division that it will not submit a revised application. Within 10 days of receipt of the notification the division shall deny the application without prejudice. If the applicant fails to timely submit a revised application or notify the division that it will not submit a revised application, the division shall deny the application without prejudice within 10 days after the 60 day time limit for the applicant to respond to the deficiency letter has expired.*

No response required at this time.

(4) *If the applicant timely submits a revised application, within 90 days of the receipt of the revised application the division shall review the revised application and determine if the revised application is approvable, approvable with conditions or not approvable. The division shall mail notice of denial or the proposed approval with or without conditions, together with a copy of the decision to deny or the proposed decision to approve with or without conditions, by certified mail, return receipt requested, to the applicant. A denial letter shall identify and address all of the division's reasons for denial of the revised application. The division shall post the decision to deny the application or the proposed decision to approve the application with or without conditions on the division's website.*

No response required.

(5) The process provided in Subsection B of 19.15.36.9 NMAC is not intended to limit informal informational exchanges during the application review period or prior to submission of an application. The process also does not prohibit an applicant from withdrawing an application and submitting a new application under Subsection A of 19.15.36.9 NMAC.

No response required.

2.2.3 NMAC 19.15.36.9.C *Upon receipt of a proposed decision to approve an application with or without conditions, the applicant shall provide a division-approved notice of the proposed approval by:*

(1) giving written notice, by certified mail, return receipt requested, of the division's proposed decision to approve the application with or without conditions to the surface owners within one-half mile of the surface waste facility;

(2) publishing in a newspaper of general circulation in the county or counties where the surface waste management facility is or will be located;

(3) mailing notice by first class mail or e-mail to persons, as identified to the applicant by the division, who have requested notification of applications generally, or of the particular application, and who have provided a legible return address or e-mail address; and

(4) mailing notice by first class or e-mail to affected local, state, federal or tribal governmental agencies, as determined and identified to the applicant by the division.

Notice of the divisions decision to approve of this section will be provided to surface owners within one-half mile, division specified recipients, and affected local, state, federal or tribal government agencies conforming with the requirements of this section, upon receipt of the Division's proposed decision to approve an application with or without conditions.

Publications will be made in the Albuquerque Journal and the Hobbs News Sun, publications with statewide and county-wide circulation respectively. Content of the notice will include that required by 19.15.36.9.D below.

Table 1 below presents the current recipients list for the required notification.

TABLE 1 PERMIT APPLICATION NOTICE LIST	
NOTICE RECIPIENT	**MAILING ADDRESS**
AE & J Royalties LLC (surface owner within ½ mile)	P.O. Box 1693 Taos, NM 87571
State of New Mexico (State Trust Land) (surface owner within ½ mile)	The New Mexico State Land Office P.O. Box 1148 Santa Fe, NM 87504
Lea County Commission (affected government body)	100 N. Main Street Lovington, NM 88260
Bureau of Land Management, New Mexico (affected government body)	Pecos District Office 2909 West Second Street Roswell, NM 88201-2019

2.2.4. NMAC 19.15.36.9.D

This notice issued pursuant to Subsection C of 19.15.36.9 NMAC shall include:

(1) the applicant's name and address;

(2) the surface waste management facility's location, including a street address if available, and sufficient information to locate the surface waste management facility with reference to surrounding roads and landmarks;

(3) a brief description including the type of facility (i.e. landfarm, landfill, treating plant, etc.) of the proposed surface waste management facility;

(4) the depth to, and TDS concentration of, the ground water in the shallowest aquifer beneath the surface waste management facility site;

(5) a statement that the division's proposed decision to approve the application with or without conditions is available on the division's website, or, upon request, from the division clerk, including the division clerk's name, address and telephone number;

(6) a division-approved description of alternatives, exceptions or waivers that may be under consideration in accordance with Subsection F of 19.15.36.18 NMAC or 19.15.36.19 NMAC;

(7) a statement of the procedures for requesting a hearing on the application pursuant to 19.15.4 NMAC.

Content of the notice to the recipients defined in **19.15.36.9.C** will include the information required in this section.

2.2.5. NMAC 19.15.36.9.E

The applicant shall mail notice that is required to be mailed on or before publication of the notice that is published in a newspaper of general circulation in the county or counties where the surface waste management facility is or will be located.

No response required.

2.2.6. NMAC 19.15.36.9.F

The applicant shall provide the division with proof that the public notice requirements of Subsections C and D of 19.15.36.9 NMAC have been met prior to the division scheduling a hearing pursuant to 19.15.36.10 NMAC or issuing the permit.

Proof of compliance with the public notice requirements of **19.15.36.9.C** and **19.15.36.9.D** will be provided to the Division prior to scheduling the hearing.

2.2.7. NMAC 19.15.36.9.G

If after the applicant provides notice as required herein, no requests for hearing are timely filed with the division as provided by 19.15.36.10 NMAC, or any such requests for hearing are filed by persons the division determines lack standing, and the division does not otherwise schedule a hearing pursuant to 19.15.36.10 NMAC, the division's proposed decision to approve the application with or without conditions shall become final and the division shall issue the permit upon the applicant providing financial assurance as provided in 19.15.36.10 NMAC.

No response required.

2.3 NMAC 19.15.36.10 - COMMENTS AND HEARING ON APPLICATION

2.3.1 NMAC 19.15.36.10.A

A person who wishes to comment or request a hearing shall file comments or request a hearing on the proposed approval of an application with the division clerk within 90 days after the date of the newspaper publication provided in Subsection C of 19.15.36.9 NMAC. A request for a hearing shall be in writing and shall state specifically the reasons why a hearing should be held. The

director may deny a request for hearing if the director determines the person requesting the hearing lacks standing.

No response required.

2.3.2 NMAC 19.15.36.10.B

If the division denies an application pursuant to Paragraphs (3) or (4) of Subsection B of 19.15.39.9 NMAC, the applicant may request a hearing within 30 days of the receipt of the notice of denial and the division shall schedule a hearing.

No response required.

2.3.3 NMAC 19.15.36.10.C

In addition to the requests for hearing provided in Subsections A and B of 19.15.36.10 NMAC, the division shall schedule a hearing on the application if:

(1) the division's proposed decision to approve the application includes conditions not expressly required by rule, and the applicant requests a hearing within 90 days of receipt of the notice of proposed approval;

(2) the director determines that there is significant public interest in the application;

(3) the director determines that comments have raised objections that have probable technical merit; or

(4) approval of the application requires that the division make a finding, pursuant to Paragraph (3) of Subsection F of 19.15.2.7 NMAC, whether a water source has a present or reasonably foreseeable beneficial use that contamination would impair.

No response required.

2.3.4 NMAC 19.15.36.10.D

If the division schedules a hearing on an application, the hearing shall be conducted according to 19.15.4 NMAC.

No response required.

2.4 NMAC 19.15.36.11 - FINANCIAL ASSURANCE REQUIREMENTS:

2.4.1 NMAC 19.15.36.11.A – Centralized facilities

Centralized facilities. Upon notification by the division that it has approved a permit but prior to the division issuing the permit, an applicant for a new centralized facility permit shall submit acceptable financial assurance in the amount of $25,000 per centralized facility, or a statewide "blanket" financial assurance in the amount of $50,000 to cover all of that applicant's centralized facilities, unless such applicant has previously posted a blanket financial assurance for centralized facilities.

Does not apply – the Facility is a commercial facility.

2.4.2 NMAC 19.15.36.11.B - New commercial facilities or major modifications of existing commercial facilities.

New commercial facilities or major modifications of existing commercial facilities. Upon notification by the division that it has approved a permit for a new commercial facility or a major modification of an existing commercial facility but prior to the division issuing the permit, the applicant shall submit acceptable financial assurance in the amount of the commercial facility's estimated closure and post closure cost, or $25,000, whichever is greater. The commercial facility's estimated closure and post closure cost shall be the amount provided in the closure and post closure plan the applicant submitted pursuant to Paragraph (9) of Subsection C of 19.15.36.8 NMAC unless the division determines that such estimate does not reflect a reasonable and probable closure and post closure cost to implement the closure and post closure plan, in which event, the division shall determine the estimated closure and post closure cost and shall include such determination in its proposed decision. If the applicant disagrees with the division's determination of estimated closure and post closure cost, the applicant may request a hearing as provided in 19.15.36.10 NMAC. If the applicant so requests, and no other person files a request for a hearing regarding the proposed decision, the hearing shall be limited to determination of estimated closure and post closure cost.

The applicant will submit financial assurance conforming to **19.15.36.11.C** and **E** for the total costs estimated for closure and post-closure care included in the Closure and Post-Closure Care Plan presented in **Appendix H** of this permit narrative. The closure cost estimate includes the cost for closing the facility after the first 10-year permit term, developing approximately 38 acres of disposal area or the first 2.5 cells of Phase 1. The post-closure cost estimate includes 30 years of post-closure care for this area and includes three years post-closure care for the leachate evaporation pond.

2.4.3 NMAC 19.15.36.11.C - Terms of financial assurance.

The financial assurance shall be on division-prescribed forms, or forms otherwise acceptable to the division, payable to the energy, minerals and natural resources department, oil conservation

division and conditioned upon the surface waste management facility's proper operation, site closure and post closure operations in compliance with state of New Mexico statutes, division rules, applicable division orders and the surface waste management facility permit terms. The division may require proof that the individual signing for an entity on a financial assurance document or any amendment thereto has the authority to obligate that entity.

Financial assurance will be submitted on Division provided or approved forms payable to the NM OCD. Proof of signatory authority will be provided upon Division request.

2.4.4 NMAC 19.15.36.11.D - Forfeiture of financial assurance.

The division shall give the operator 20 days notice and an opportunity for a hearing prior to forfeiting financial assurance. All forfeitures the division demands pursuant to 19.15.36 NMAC shall be made payable to the energy, minerals and natural resources department, oil conservation division upon demand by the division.

No response required.

2.4.5 NMAC 19.15.36.11.E - Forms of financial assurance.

The division may accept the following forms of financial assurance.

(1) Surety bonds. A surety bond shall be executed and notarized by the applicant and by a corporate surety licensed by the superintendent of insurance to do business in the state. All surety bonds shall be non-cancelable and payable to the energy, minerals and natural resources department, oil conservation division within 45 days after demand is made by the division. All surety bonds shall be governed by the laws of the state of New Mexico.

(2) Letters of credit. A letter of credit shall be issued by a national or state-chartered banking association, shall be irrevocable for a term of not less than five years and shall provide for automatic renewal for successive, like terms upon expiration, unless the issuer has notified the division in writing of non-renewal at least 120 days before its expiration date. All letters of credit shall be governed by the laws of the state of New Mexico. If a letter of credit is not replaced by an approved financial assurance within 30 days of notice of non-renewal provided to the division, the division may demand and collect a letter of credit.

(3) Cash accounts. An operator may provide financial assurance in the form of a federally insured or equivalently protected cash account or accounts in a financial institution, provided that the operator and the financial institution shall execute as to each such account a collateral assignment of the account to the division, which shall provide that only the division may authorize withdrawals from the account. In the event of forfeiture pursuant to 19.15.36 NMAC, the division may, at any time and from time to time, direct payment of all or part of the balance of such account (excluding interest accrued on the account) to itself or its designee for the surface waste management facility's

closure and post closure. Any assignment of cash collateral shall be governed by the laws of the state of New Mexico and shall be on division-prescribed forms.

The applicant will submit financial assurance in accordance with this section and acceptable to the NMOCD upon approval of this permit application and closure and post-closure cost estimates.

2.4.6 NMAC 19.15.36.11.F - Replacement of financial assurance.

(1) The division may allow an operator to replace existing forms of financial assurance with other forms of financial assurance that provide equivalent coverage.

(2) The division shall not release existing financial assurance until the operator has submitted, and the division has approved, an acceptable replacement.

(3) Any time an operator changes the corporate surety, financial institution or amount of financial assurance, the operator shall file updated financial assurance documents on division-prescribed forms within 30 days. Notwithstanding the foregoing, if an operator makes other changes to its financial assurance documents, the division may require the operator to file updated financial assurance documents on division-prescribed forms within 45 days after notice to the operator from the division.

The applicant will maintain effective financial assurance at all times until released of the obligation or part of the obligation by the NMOCD. If changes are made to the financial assurance as defined in this section, updated financial assurance documents will be filed with the Division as required.

2.4.7 NMAC 19.15.36.11.G - Review of adequacy of financial assurance.

The division may at any time not less than five years after initial acceptance of financial assurance for a commercial facility, or whenever the operator applies for a major modification of the commercial facility's permit, and at least once during every successive five-year period, initiate a review of such financial assurance's adequacy. Additionally, whenever the division determines that a landfarm operator has not achieved the closure standards specified in Paragraph (3) of Subsection G of 19.15.36.15 NMAC, the division may review the adequacy of the landfarm operator's financial assurance, without regard to the date of its last review. Upon determination, after notice to the operator and an opportunity for a hearing, that the financial assurance is not adequate to cover the reasonable and probable cost of a commercial facility's closure and post closure operations, the division may require the operator to furnish additional financial assurance sufficient to cover such reasonable and probable cost.

Upon Division review, as defined in this section, of the Facility financial assurance, if required the applicant will provide an updated financial assurance cost estimate based on NMOCD comments or annual cost adjustments and enter the revised cost estimates into the permanent operating record (POR). If required, the applicant will provide additional financial assurance to cover such reasonable and probable costs for the Facility closure and post-closure care.

2.4.8 NMAC 19.15.36.11.H – Duty to Report

Duty to report. Any operator who files for bankruptcy shall provide notice to the division, through the process provided for under the rules of the United States bankruptcy court, and the New Mexico attorney general.

In the event the operator files bankruptcy, notice shall be provided to the Division in accordance with the rules of United States Bankruptcy court and the New Mexico attorney general.

2.5 NMAC 19.15.36.12 - PERMIT APPROVAL, DENIAL, REVOCATION, SUSPENSION, MODIFICATION OR TRANSFER:

2.5.1 NMAC 19.15.36.12.A – Granting of permit

(1) The division may issue a permit for a new surface waste management facility or major modification upon finding that an acceptable application has been filed, that the conditions of 19.15.36.9 NMAC and 19.15.36.11 NMAC have been met and that the surface waste management facility or modification can be constructed and operated in compliance with applicable statutes and rules and without endangering fresh water, public health, and the environment.

(2) Each permit the division issues for a new surface waste management facility shall remain in effect for 10 years from the date of its issuance. If the division grants a permit for a major modification of a surface waste management facility, the permit for that surface waste management facility shall remain in effect for 10 years from the date the division approves the major modification.

(a) A surface waste management facility permit may be renewed for successive 10-year terms. If the holder of a surface waste management facility permit submits an application for permit renewal at least 120 days before the surface waste management facility permit expires, and the operator is not in violation of the surface waste management facility permit on the date of its expiration, then the existing surface waste management facility permit for the same activity shall not expire until the division has approved or denied an application for renewal. If the division has not notified the operator of a violation, if the operator is diligently pursuing procedures to contest a violation or if the operator and the division have signed an agreed compliance order providing for remedying the violation, then the surface waste management facility permit in effect shall continue as above provided notwithstanding the surface waste management facility permit violation's existence. A surface waste management facility permit continued under this provision remains fully effective and enforceable.

(b) An application for permit renewal shall include and adequately address the information necessary for evaluation of a new surface waste management facility materials may be included by reference provided they are current,

readily available to the division and sufficiently identified so that the division may retrieve them.

(c) Upon receipt of a proposed decision to approve a renewal application, The operator shall give public notice of the renewal application in the manner prescribed by 19.15.36.9 NMAC. The division shall grant an application for renewal if the division finds that an acceptable application has been filed, that the conditions of 19.15.36.9 NMAC and 19.15.36.11 NMAC have been met and that the surface waste management facility can be operated in compliance with applicable statutes and rules and without endangering fresh water, public health, and the environment.

(3) The division shall review each surface waste management facility permit at least once during the 10-year term, and shall review surface waste management facility permits to which Paragraph (2) of Subsection A of 19.15.36.12 NMAC does not apply at least every five years. The review shall address the operation, compliance history, financial assurance and technical requirements for the surface waste management facility. The division, after notice to the operator and an opportunity for a hearing, may require appropriate modifications of the surface waste management facility permit, including modifications necessary to make the surface waste management facility permit terms and conditions consistent with statutes, rules or judicial decisions.

The applicant acknowledges that the term of the initial permit shall be for 10 years. At least 120 days before the surface waste management facility permit expires, an application for permit renewal will be submitted to the NMOCD in compliance with the section **19.15.36.12.A** requirements above. Public notice will be given at the time of the renewal application in the manner discussed in section 2.2 above. The applicant acknowledges that upon review of the facility permit and after opportunity for a hearing, the NMOCD may require appropriate modifications, including modifications to make the permit terms and conditions consistent with statutes, rules or judicial decisions.

2.5.2 NMAC 19.15.36.12.B - Denial of permit.

The division may deny an application for a surface waste management facility permit or modification of a surface waste management facility permit if it finds that the proposed surface waste management facility or modification may be detrimental to fresh water, public health, and the environment. The division may also deny an application for a surface waste management facility permit if the applicant, an owner of 25 percent or greater interest in the applicant or an affiliate of the applicant has a history of failure to comply with division rules and orders or state or federal environmental laws; is subject to a division or commission order, issued after notice and hearing, finding such entity to be in violation of an order requiring corrective action; or has a penalty assessment for violation of division or commission rules or orders that is unpaid more than 70 days after issuance of the order assessing the penalty. An affiliate of an applicant, for

purposes of Subsection B of 19.15.36.12 NMAC, shall be a person who controls, is controlled by or under is common control with the applicant or a 25 percent or greater owner of the applicant.

No response required.

2.5.3 NMAC 19.15.36.12.C - Additional requirements.

The division may impose conditions or requirements, in addition to the operational requirements set forth in 19.15.36 NMAC, that it determines are necessary and proper for the protection of fresh water, public health, and the environment. The division shall incorporate such additional conditions or requirements into the surface waste management facility permit.

The applicant will comply with the conditions and requirements of the SWMF permit.

2.5.4 NMAC 19.15.36.12.D - Revocation, suspension or modification of a permit.

The division may revoke, suspend or impose additional operating conditions or limitations on a surface waste management facility permit at any time, for good cause, after notice to the operator and an opportunity for a hearing. The division may suspend a surface waste management facility permit or impose additional conditions or limitations in an emergency to forestall an imminent threat to fresh water, public health, and the environment, subject to the provisions of NMSA 1978, Section 70-2-23, as amended. If the division initiates a major modification it shall provide notice in accordance with 19.15.36.9 NMAC. Suspension of a surface waste management facility permit may be for a fixed period of time or until the operator remedies the violation or potential violation. If the division suspends a surface waste management facility's permit, the surface waste management facility shall not accept oil field waste during the suspension period.

The applicant acknowledges that for good cause and after notice to the operator and an opportunity for a hearing, the NMOCD may revoke, suspend or impose additional operating conditions or limitations on the Facility permit and that during a suspension the Facility will cease to accept oil field wastes.

2.5.5 NMAC 19.15.36.12.E - Transfer of a permit.

The operator shall not transfer a permit without the division's prior written approval. A request for transfer of a permit shall identify officers, directors and owners of 25 percent or greater in the transferee. Unless the director otherwise orders, public notice or hearing are not required for the transfer request's approval. If the division denies the transfer request, it shall notify the operator and the proposed transferee of the denial by certified mail, return receipt requested, and either the operator or the proposed transferee may request a hearing with 10 days after receipt of the notice. Until the division approves the transfer and the required financial assurance is in place, the division shall not release the transferor's financial assurance.

The applicant will seek Division approval prior to transferring the SWMF permit. The transferal request will be made in accordance with **19.15.36.12.E**.

2.6 NMAC 19.15.36.13 - SITING AND OPERATIONAL REQUIREMENTS APPLICABLE TO ALL PERMITTED SURFACE WASTE MANAGEMENT FACILITIES:

Except as otherwise provided in 19.15.36 NMAC.

2.6.1 NMAC 19.15.36.13.A

Depth to ground water

(1) No landfill shall be located where ground water is less than 100 feet below the lowest elevation of the design depth at which the operator will place oil field waste.

(2) No landfarm that accepts soil or drill cuttings with a chloride concentration that exceeds 500 mg/kg shall be located where ground water is less than 100 feet below the lowest elevation at which the operator will place oil field waste. See Subsection A of 19.15.36.15 NMAC for oil field waste acceptance criteria.

(3) No landfarm that accepts soil or drill cuttings with a chloride concentration that is 500 mg/kg or less shall be located where ground water is less than 50 feet below the lowest elevation at which the operator will place oil field waste.

(4) No small landfarm shall be located where ground water is less than 50 feet below the lowest elevation at which the operator will place oil field waste.

(5) No other surface waste management facility shall be located where ground water is less than 50 feet below the lowest elevation at which the operator will place oil field waste.

The North Ranch SWMF has a maximum excavated depth of 48.15 feet below ground surface. The excavation plan is presented on Sheet 5 of the Permit Drawings presented in **Appendix K**. Depth to groundwater is discussed in Attachment A to the Hydrogeological Report presented in **Appendix I**. No groundwater was encountered during the advancement of seven (7) borings drilled to a depth of approximately 165 feet below the ground surface in the landfill footprint area. Therefore, groundwater is greater than 100 feet below the lowest elevation of the design depth of oil field waste placement and below the bottom of the leachate evaporation pond. **Figure 5** in the Hydrogeological Report illustrates the approximate depth to groundwater in the vicinity of the North Ranch SWMF.

The North Ranch SWMF is not a landfarm or “other” type of surface waste management facility thus subsections (2), (3), (4), and (5) of this section do not apply to this facility.

2.6.2 NMAC 19.15.36.13.B

No surface waste management facility shall be located:

(1) within 200 feet of a watercourse, lakebed, sinkhole or playa lake;

(2) within an existing wellhead protection area or 100-year floodplain;

(3) within, or within 500 feet of, a wetland;

(4) within the area overlying a subsurface mine;
(5) within 500 feet from the nearest permanent residence, school, hospital, institution or church in existence at the time of initial application; or
(6) within an unstable area, unless the operator demonstrates that engineering measures have been incorporated into the surface waste management facility design to ensure that the surface waste management facility's integrity will not be compromised.

The following figures demonstrate compliance with the siting criteria of this section: **Figure 2** – Distance to Wetlands and Waters of the United States; **Figure 3** – FEMA Flood Insurance Rate Map; **Figure 4** – Subsurface Mine Distance Compliance; **Figure 5** – Karst Topography Map; and **Figure 6** – Recent Faults Map; **Figure 9 -** Water Wells and Dwellings within ½ Mile; **Figure 10 -** Land Owners within ½ Mile

2.6.3 NMAC 19.15.36.13.C

No surface waste management facility shall exceed 500 acres.

The North Ranch SWMF is comprised of approximately 303 permitted acres, see Plat Map in Appendix C.

2.6.4 NMAC 19.15.36.13.D

The operator shall not accept oil field wastes transported by motor vehicle at the surface waste management facility unless the transporter has a form C-133, authorization to move liquid waste, approved by the division.

The applicant does not intend to accept liquid wastes.

2.6.5 NMAC 19.15.36.13.E

The operator shall not place oil field waste containing free liquids in a landfill or landfarm cell. The operator shall use the paint filter test, as prescribed by the EPA (EPA SW-846, method 9095) to determine conformance of the oil field waste to this criterion.

The Facility will not place any oil field waste containing free liquids in the landfill, as confirmed by the paint filter test. Acceptable wastes that do not pass the paint filter test upon receipt shall be placed over the concrete drying pads and managed until they are dry enough to meet the disposal criteria as discussed in in Section 2.10 of the Operating Plan presented in **Appendix D** and in the Operating Plan Attachment B – Hazardous and Unauthorized Waste Exclusion Plan Section 2.0.

2.6.6 NMAC 19.15.36.13.F

Surface waste management facilities shall accept only exempt or non-hazardous waste, except as provided in Paragraph (3) of Subsection F of 19.15.36.13 NMAC. The operator shall not accept hazardous waste at a surface waste management facility. The operator shall not accept wastes containing NORM at a surface waste management facility except as provided in 19.15.35 NMAC.

The operator shall require the following documentation for accepting oil field wastes, and both the operator and the generator shall maintain and make the documentation available for division inspection.

(1) Exempt oil field wastes. The operator shall require a certification on form C-138, signed by the generator or the generator's authorized agent, that represents and warrants that the oil field wastes are generated from oil and gas exploration and production operations, are exempt waste and are not mixed with non-exempt waste. The operator shall have the option to accept such certifications on a monthly, weekly or per load basis. The operator shall maintain and shall make the certificates available for the division's inspection.

(2) Non-exempt, non-hazardous, oil field wastes. The operator shall require a form C-138, oil field waste document, signed by the generator or its authorized agent. This form shall be accompanied by acceptable documentation to determine that the oil field waste is non-hazardous.

(3) Emergency non-oil field wastes. The operator may accept non-hazardous, non-oilfield wastes in an emergency if ordered by the department of public safety. The operator shall complete a form C-138, oil field waste document, describing the waste, and maintain the same, accompanied by the department of public safety order, subject to division inspection.

Eligible oil field solid wastes that will be accepted at the Facility are discussed in Section 2.15.4 of the Operating Plan presented in **Appendix D**.

2.6.7 NMAC 19.15.36.13.G

The operator of a commercial facility shall maintain records reflecting the generator, the location of origin, the location of disposal within the commercial facility, the volume and type of oil field waste, the date of disposal and the hauling company for each load or category of oil field waste accepted at the commercial facility. The operator shall maintain such records for a period of not less than five years after the commercial facility's closure, subject to division inspection.

Records compliant with this section will be entered into the Facility Permanent Operating Record as required within Section 2.11 of the Operating Plan presented in **Appendix D**.

2.6.8 NMAC 19.15.36.13.H

Disposal at a commercial facility shall occur only when an attendant is on duty unless loads can be monitored or otherwise isolated for inspection before disposal. The surface waste management facility shall be secured to prevent unauthorized disposal.

In accordance with Section 2.1.2 of the Operating Plan presented in **Appendix D**, the Facility will be constructed with access restrictions. A Facility attendant will be present to receive wastes per Section 2.1 of Attachment A – Management Plan for Approved Oil Field Wastes included in the Operating Plan presented in **Appendix D**.

2.6.9 NMAC 19.15.36.13.I

To protect migratory birds, tanks exceeding eight feet in diameter, and exposed pits and ponds shall be screened, netted or covered. Upon the operator's written application, the division may grant an exception to screening, netting or covering upon the operator's showing that an alternative method will protect migratory birds or that the surface waste management facility is not hazardous to migratory birds. Surface waste management facilities shall be fenced in a manner approved by the division.

This Facility proposes an alternative to netting or screening over the evaporation pond. Section 3.1.3 of the Operating Plan presented in **Appendix D** documents the proposed alternative for Division approval.

2.6.10 NMAC 19.15.36.13.J

Surface waste management facilities shall have a sign, readable from a distance of 50 feet and containing the operator's name; surface waste management facility permit or order number; surface waste management facility location by unit letter, section, township and range; and emergency telephone numbers.

Section 2.1.2 of the Operating Plan presented in **Appendix D** documents compliance with this section.

2.6.11 NMAC 19.15.36.13.K

The operators shall comply with the spill reporting and corrective action provisions of 19.15.30 NMAC or 19.15.29 NMAC.

Sections 4.5 and 3.2 of the Operating Plan presented in **Appendix D** document compliance with this section.

2.6.12 NMAC 19.15.36.13.L

Each operator shall have an inspection and maintenance plan that includes the following:

- *(1) monthly inspection of leak detection sumps including sampling if fluids are present with analyses of fluid samples furnished to the division; and maintenance of records of inspection dates, the inspector and the leak detection system's status;*
- *(2) semi-annual inspection and sampling of monitoring wells as required, with analyses of ground water furnished to the division; and maintenance of records of inspection dates, the inspector and ground water monitoring wells' status; and*
- *(3) inspections of the berms and the outside walls of pond levees quarterly and after a major rainfall or windstorm, and maintenance of berms in such a manner as to prevent erosion.*

The Facility Inspection and Maintenance Plan conforming to this section is presented in **Appendix E**.

2.6.13 NMAC 19.15.36.13.M

Each operator shall have a plan to control run-on water onto the site and run-off water from the site, such that:

(1) the run-on and run-off control system shall prevent flow onto the surface waste management facility's active portion during the peak discharge from a 25-year storm; and

(2) run-off from the surface waste management facility's active portion shall not be allowed to discharge a pollutant to the waters of the state or United States that violates state water quality standards.

The Facility has been designed with run-on and run-off controls sized to accommodate the 25-year return frequency storm event. Stormwater design calculations are presented in **Appendix J** - Engineering Design Report, and stormwater conveyance features are illustrated in the Permit Drawings included in **Appendix K**. Sections 2.9 and 4.0 in the Operating Plan, presented in **Appendix D**, discuss surface water management and quality.

2.6.14 NMAC 19.15.36.13.N

Contingency plan. Each operator shall have a contingency plan. The operator shall provide the division's environmental bureau with a copy of an amendment to the contingency plan, including amendments required by Paragraph (8) of Subsection N of 19.15.36.13 NMAC; and promptly notify the division's environmental bureau of changes in the emergency coordinator or in the emergency coordinator's contact information. The contingency plan shall be designed to minimize hazards to fresh water, public health, and the environment from fires, explosions or an unplanned sudden or non-sudden release of contaminants or oil field waste to air, soil, surface water or ground water. The operator shall carry out the plan's provisions immediately whenever there is a fire, explosion or release of contaminants or oil field waste constituents that could threaten fresh water, public health, and the environment; provided that the emergency coordinator may deviate from the plan as necessary in an emergency situation. The contingency plan for emergencies shall:

(1) describe the actions surface waste management facility personnel shall take in response to fires, explosions or releases to air, soil, surface water or ground water of contaminants or oil field waste containing constituents that could threaten fresh water, public health, and the environment;

(2) describe arrangements with local police departments, fire departments, hospitals, contractors and state and local emergency response teams to coordinate emergency services;

(3) list the emergency coordinator's name; address; and office, home and mobile phone numbers (where more than one person is listed, one shall be named as the primary emergency coordinator);

(4) include a list, which shall be kept current, of emergency equipment at the surface waste management facility, such as fire extinguishing systems, spill control equipment,

communications and alarm systems and decontamination equipment, containing a physical description of each item on the list and a brief outline of its capabilities;

(5) include an evacuation plan for surface waste management facility personnel that describes signals to be used to begin evacuation, evacuation routes and alternate evacuation routes in cases where fire or releases of wastes could block the primary routes;

(6) include an evaluation of expected contaminants, expected media contaminated and procedures for investigation, containment and correction or remediation;

(7) list where copies of the contingency plan will be kept, which shall include the surface waste management facility; local police departments, fire departments and hospitals; and state and local emergency response teams;

(8) indicate when the contingency plan will be amended, which shall be within five working days whenever:

(a) the surface waste management facility permit is revised or modified;

(b) the plan fails in an emergency;

(c) the surface waste management facility changes design, construction, operation, maintenance or other circumstances in a way that increases the potential for fires, explosions or releases of oil field waste constituents that could threaten fresh water, public health, and the environment or change the response necessary in an emergency;

(d) the list of emergency coordinators or their contact information changes; or

(e) the list of emergency equipment changes;

(9) describe how the emergency coordinator or the coordinator's designee, whenever there is an imminent or actual emergency situation, will immediately;

(a) activate internal surface waste management facility alarms or communication systems, where applicable, to notify surface waste management facility personnel; and

(b) notify appropriate state and local agencies with designated response roles if their assistance is needed;

(10) describe how the emergency coordinator, whenever there is a release, fire or explosion, will immediately identify the character, exact source, amount and extent of released materials (the emergency coordinator may do this by observation or review of surface waste management facility records or manifests, and, if necessary, by chemical analysis) and describe how the emergency coordinator will concurrently assess possible hazards to fresh water, public health, and the environment that may result from the release, fire or explosion (this assessment shall consider both the direct and indirect hazard of the release, fire or explosion);

(11) describe how, if the surface waste management facility stops operations in response to fire, explosion or release, the emergency coordinator will monitor for leaks, pressure buildup, gas generation or rupture in valves, pipes or the equipment, wherever this is appropriate;

(12) describe how the emergency coordinator, immediately after an emergency, will provide for treating, storing or disposing of recovered oil field waste, or other material that results from a release, fire or explosion at a surface waste management facility;
(13) describe how the emergency coordinator will ensure that no oil field waste, which may be incompatible with the released material, is treated, stored or disposed of until cleanup procedures are complete; and
(14) provide that the emergency coordinator may amend the plan during an emergency as necessary to protect fresh water, public health, and the environment.

The Facility Contingency Plan that indicates emergency responses required by this section is included in **Appendix F**.

2.6.15 NMAC 19.15.36.13.O

Gas safety management plan. Each operator of a surface waste management facility that includes a landfill shall have a gas safety management plan that describes in detail procedures and methods that will be used to prevent landfill-generated gases from interfering or conflicting with the landfill's operation and protect fresh water, public health, and the environment. The plan shall address anticipated amounts and types of gases that may be generated, an air monitoring plan that includes the vadose zone and measuring, sampling, analyzing, handling, control and processing methods. The plan shall also include final post closure monitoring and control options.

As indicated in Section 5.3 of the Operating Plan (**Appendix D**), the landfill wastes are not expected to generate and mobilize enough gas to impact operations. Wastes disposed at this facility will contain little to no organics and will be largely non-putrescible and are not anticipated to generate landfill gasses in quantities sufficient to impact operations warranting a gas safety management plan. The Facility is requesting an exemption from this requirement for these reasons as listed in Section 2.10 of this narrative. However, the potential hazards associated with hydrogen sulfide gases inherent to oil field waste management are discussed in the Hydrogen Sulfide Prevention and Contingency Plan component of the Contingency plan in **Appendix F**.

2.6.16 NMAC 19.15.36.13.P

Training program. Each operator shall conduct an annual training program for key personnel that includes general operations, permit conditions, emergencies proper sampling methods and identification of exempt and non-exempt waste and hazardous waste. The operator shall maintain records of such training, subject to division inspection, for five years. [19.15.36.13 NMAC - 19.15.9.711 NMAC, 2/14/2007; A, 12/1/08

The training and recordkeeping requirements of this section are addressed in sections 2.4 and 9.1 of the Operating Plan (**Appendix D**) and in the attachments thereto.

2.7 NMAC 19.15.36.14 - SPECIFIC REQUIREMENTS APPLICABLE TO LANDFILLS

2.7.1 NMAC 19.15.36.14.A – General operating requirements

(1) The operator shall confine the landfill's working face to the smallest practical area and compact the oil field waste to the smallest practical volume. The operator shall not use equipment that may damage the integrity of the liner system in direct contact with a geosynthetic liner.

(2) The operator shall prevent unauthorized access by the public and entry by large animals to the landfill's active portion through the use of fences, gates, locks or other means that attain equivalent protection.

(3) The operator shall prevent and extinguish fires.

(4) The operator shall control litter and odors.

(5) The operator shall not excavate a closed cell or allow others to excavate a closed cell except as approved by the division.

(6) The operator shall not excavate a closed cell or allow others to excavate a closed cell except as approved by the division.

(7) For areas of the landfill that will not receive additional oil field waste for one month or more, but have not reached the final waste elevation, the operator shall provide intermediate cover that shall be:

(a) approved by the division;

(b) stabilized with vegetation; and

(c) inspected and maintained to prevent erosion and manage infiltration or leachate during the oil field waste deposition process.

(8) When the operator has filled a landfill cell, the operator shall close it pursuant to the conditions contained in the surface waste management facility permit and the requirements of Paragraph (2) of Subsection D of 19.15.36.18 NMAC. The operator shall notify the division's environmental bureau at least three working days prior to a landfill cell's closure.

The Operating Plan sections 2.1.1 through 2.1.8 (**Appendix D**) document compliance with this section.

2.7.2 NMAC 19.15.36.14.B - Ground water monitoring program.

If fresh ground water exists at a site, the operator shall, unless otherwise approved by the division, establish a ground water monitoring program, approved by the division's environmental bureau, which shall include a ground water monitoring work plan, a sampling and analysis plan, a ground water monitoring system and a plan for reporting ground water monitoring results. The ground water monitoring system shall consist of a sufficient number of wells, installed at appropriate locations and depths, to yield ground water samples from the uppermost aquifer that:

(1) represent the quality of background ground water that leakage from a landfill has not affected; and

(2) represent the quality of ground water passing beneath and down gradient of the surface waste management facility.

As demonstrated in 2.6.1 above, fresh groundwater was not encountered at the site during the approved site investigation activities. Therefore, per section 5.1 of the Operating Plan (**Appendix D**), groundwater monitoring is not proposed for the Facility. However, the Facility will monitor the vadose zone per the Vadose Zone Monitoring Plan provided as **Attachment B of Appendix E.**

2.7.3 NMAC 19.15.36.14.C - Landfill design specification.

New landfill design systems shall include a base layer and a lower geomembrane liner (e.g., composite liner), a leak detection system, an upper geomembrane liner, a leachate collection and removal system, a leachate collection and removal system protective layer, an oil field waste zone and a top landfill cover.

(1) The base layer shall, at a minimum, consist of two feet of clay soil compacted to a minimum 90 percent standard proctor density (ASTM D-698)(Copyright ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428. This document is available for public viewing at the New Mexico state records center and archives and may not be reproduced, in full or in part. A copy of this publication may be obtained from ASTM International, www.astm.org.) with a hydraulic conductivity of 1 x 10^{-7} cm/sec or less. In areas where no ground water is present, the operator may propose an alternative base layer design, subject to division approval.

(2) The lower geomembrane liner shall consist of a 30-mil flexible PVC or 60-mil HDPE liner, or an equivalent liner approved by the division.

(3) The operator shall place the leak detection system, which shall consist of two feet of compacted soil with a saturated hydraulic conductivity of 1 x 10^{-5} cm/sec or greater, between the lower and upper geomembrane liners. The leak detection system shall consist of a drainage and collection system placed no more than six inches above the lower geomembrane liner in depressions and sloped so as to facilitate the earliest possible leak detection at designated collection points. Drainage piping shall be designed to withstand chemical attack from oil field waste and leachate and structural loading and other stresses and disturbances from overlying oil field waste, cover materials, equipment operation, expansion or contraction, and to facilitate clean-out maintenance. The material placed between the pipes and laterals shall be sufficiently permeable to allow the transport of fluids to the drainage pipe. The slope of the landfill sub-grade and drainage pipes and laterals shall be at least two percent grade; i.e., two feet of vertical drop per 100 horizontal feet. The piping collection network shall be comprised of solid and perforated pipe having a minimum diameter of four inches and a minimum wall thickness of schedule 80. The operator shall seal a solid drainage pipe to convey collected liquids to a corrosion-proof sump or sumps located outside the landfill's perimeter for observation, storage, treatment or disposal. The operator may install alternative designs as approved by the division.

(4) The operator shall place the upper geomembrane liner, which shall consist of a 30-mil flexible PVC or 60-mil HDPE liner, or an equivalent liner approved by the division, over the leak detection system.

(5) The operator shall place the leachate collection and removal system, which shall consist of at least two feet of compacted soil with a saturated hydraulic conductivity of 1 x 10^{-2} cm/sec or greater, over the upper geomembrane liner to facilitate drainage. The leachate collection and removal system shall consist of a drainage and collection and removal system placed no more than six inches above the upper geomembrane liner in depressions and sloped so as to facilitate the maximum leachate collection. Piping shall be designed to withstand chemical attack from oil field waste or leachate and structural loading and other stresses and disturbances from overlying oil field waste, cover materials, equipment operation, expansion or contraction and to facilitate clean-out maintenance. The material placed between the pipes and laterals shall be sufficiently permeable to allow the transport of fluids to the drainage pipe. The slope of the upper geomembrane liner and drainage lines and laterals shall be at least two percent grade; i.e., two feet of vertical drop per 100 horizontal feet. The piping collection network shall be comprised of solid and perforated pipe having a minimum diameter of four inches and a minimum wall thickness of schedule 80. The operator shall seal a solid drainage pipe to convey collected fluids outside the landfill's perimeter for storage, treatment and disposal. The operator may install alternative designs as approved by the division.

(6) The operator shall place the leachate collection and removal system protection layer, which shall consist of a soil layer at least one foot thick with a saturated hydraulic conductivity of 1 x 10^{-2} cm/sec or greater, over the leachate collection and removal system.

(7) The operator shall place oil field waste over the leachate collection and removal system protective layer.

(8) The top landfill cover design shall consist of the following layers (top to bottom): a soil erosion layer composed of at least 12 inches of fertile topsoil re-vegetated in accordance with the post closure provisions of Subparagraph (b) of Paragraph (2) of Subsection D of 19.15.36.18 NMAC; a protection or frost protection layer composed of 12 to 30 inches of native soil; a drainage layer composed of at least 12 inches of sand or gravel with a saturated hydraulic conductivity of 1 x 10^{-2} cm/sec or greater and a minimum bottom slope of four percent, a hydraulic barrier-layer-geomembrane (minimum of a 30-mil flexible PVC or 60-mil HDPE liner, or an equivalent liner approved by the division); and a gas vent or foundation layer composed of at least 12 inches of sand or gravel above oil field waste with soils compacted to the minimum 80 percent Standard Proctor Density. The operator shall install the top landfill cover within one year of achieving the final landfill cell waste elevation. The operator shall ensure that the final landfill design elevation of the working face of the oil field waste is achieved in a timely manner with the date recorded in a field construction log. The

operator shall also record the date of top landfill cover installation to document the timely installation of top landfill covers. The operator shall provide a minimum of three working days notice to the division in advance of the top landfill cover's installation to allow the division to witness the top landfill cover's installation.

(9) Alternatively, the operator may propose a performance-based landfill design system using geosynthetics or geocomposites, including geogrids, geonets, geosynthetic clay liners, composite liner systems, etc., when supported by EPA's "hydrologic evaluation of landfill performance" (HELP) model or other division-approved model. The operator shall design the landfill to prevent the "bathtub effect". The bathtub effect occurs when a more permeable cover is placed over a less permeable bottom liner or natural subsoil.

(10) External piping, e.g., leachate collection, leak detection and sump removal systems shall be designed for installation of a sidewall riser pipe. Pipes shall not penetrate the liner with the exception of gas vent or collection wells where the operator shall install a flexible clamped pipe riser through the top landfill cover liner that will accommodate oil field waste settling and will prevent tears.

The design requirements set forth in this section are demonstrated in the Engineering Design Report presented in **Appendix J**, and illustrated in the Permit Drawings included in **Appendix K**. The applicant proposes an alternate bottom liner system and final cover system.

The proposed alternative base liner consists of a reinforced geosynthetic clay liner (GCL) and the lower geomembrane (GM) is planned to be 60-mil, double-sided, textured HDPE. The bottom GM will be covered by a 200-mil, double-sided geocomposite (GC) drainage layer. A 60-mil, double-sided, textured HDPE GM will be placed above the drainage GC as the upper liner. A 200-mil, double-sided GC drainage layer, leachate collection components and a two-feet thick protective soil cover and drainage layer will be placed above the upper GM.

The proposed 42-inch thick alternative final cover system will consist of a 12-inch erosion/vegetation layer, a low permeability 36-inch thick infiltration barrier layer, and 12-inches of low permeability intermediate cover soil.

2.7.4 NMAC 19.15.36.14.D - Liner specifications and requirements.

(1) General requirements.

(a) Geomembrane liner specifications. Geomembrane liners shall consist of a 30-mil flexible PVC or 60-mil HDPE liner, or an equivalent liner approved by the division. Geomembrane liners shall have a hydraulic conductivity no greater than 1 x 10^{-9} cm/sec. Geomembrane liners shall be composed of impervious, geosynthetic material that is resistant to petroleum hydrocarbons, salts and acidic and alkaline solutions. Liners shall also be resistant to ultraviolet light,

or the operator shall make provisions to protect the material from sunlight. Liner compatibility shall comply with EPA SW-846 method 9090A.

(b) Liners shall be able to withstand projected loading stresses, settling and disturbances from overlying oil field waste, cover materials and equipment operations.

(c) The operator shall construct liners with a minimum of two percent slope to promote positive drainage and to facilitate leachate collection and leak detection.

(2) Additional requirements for geomembranes.

(a) Geomembranes shall be compatible with the oil field waste to be disposed. Geomembranes shall be resistant to chemical attack from the oil field waste or leachate. The operator shall demonstrate this by means of the manufacturer's test reports, laboratory analyses or other division-approved method.

(b) Geosynthetic material the operator installs on a slope greater than 25 percent shall be designed to withstand the calculated tensile forces acting upon the material. The design shall consider the maximum friction angle of the geosynthetic with regard to a soil-geosynthetic or geosynthetic-geosynthetic interface and shall ensure that overall slope stability is maintained.

(c) The operator shall thermally seal (hot wedge) field seams in geosynthetic material with a double track weld to create an air pocket for non-destructive air channel testing. In areas where double-track welding cannot be achieved, the operator may propose alternative thermal seaming methods. A stabilized air pressure of 35psi, plus or minus one percent, shall be maintained for at least five minutes. The operator shall overlap liners four to six inches before seaming, and shall orient seams parallel to the line of maximum slope; i.e., oriented along, not across, the slope. The operator shall minimize the number of field seams in corners and irregularly shaped areas. The operator shall use factory seams whenever possible. The operator shall not install horizontal seams within five feet of the slope's toe. Qualified personnel shall perform all field seaming.

The design requirements set forth in this section are demonstrated in the Engineering Design Report presented in **Appendix J** and illustrated in the Permit Drawings included in **Appendix K**. Geomembranes used for the purposes of this section will be 60-mil, double-sided, textured HDPE GM, which are proven for the application required. Demonstrations related to **19.15.36.14.D.2** above will be made during construction of the Facility. The stability of the materials to be used during lining of the 3:1 bottom liner slope is demonstrated in the Slope Stability section of the Engineering Design Report presented in **Appendix J**. The design appendix also includes the Construction Quality Control (CQA) Plan that specifies dual-track fusion welding of HDPE GM seams.

2.7.5 NMAC 19.15.36.14.E - Requirements for the soil component of composite liners.

(1) The operator shall place and compact the base layer to 90 percent standard proctor density on a prepared sub-grade.

(2) The soil surface upon which the operator installs a geosynthetic shall be free of stones greater than one half inch in any dimension, organic matter, local irregularities, protrusions, loose soil and abrupt changes in grade that could damage the geosynthetic.

(3) The operator shall compact a clay soil component of a composite liner to a minimum of 90 percent standard proctor density, which shall have, unless otherwise approved by the division, a plasticity index greater than 10 percent, a liquid limit between 25 and 50 percent, a portion of material passing the no. 200 sieve (0.074 mm and less fraction) greater than 40 percent by weight; and a clay content greater than 18 percent by weight.

The applicant proposes the use of a basal GCL, so the requirements in this section do not apply to the Facility.

2.7.6 NMAC 19.15.36.14.F

The leachate collection and removal system protective layer and the soil component of the leak detection system shall consist of soil materials that shall be free of organic matter, shall have a portion of material passing the no. 200 sieve no greater than five percent by weight and shall have a uniformity coefficient (Cu) less than 6, where Cu is defined as D60/D10. Geosynthetic materials or geocomposites including geonets and geotextiles, if used as components of the leachate collection and removal or leak detection system, shall have a hydraulic conductivity, transmissivity and chemical and physical qualities that oil field waste placement, equipment operation or leachate generation will not adversely affect. These geosynthetics or geocomposites, if used in conjunction with the soil protective cover for liners, shall have a hydraulic conductivity designed to ensure that the liner's hydraulic head never exceeds one foot.

The Facility is proposing an alternative base liner system that will use geocomposite drainage nets as the transmissive component of the leachate and leak detection systems in lieu of drainage soils. Therefore, although there will be a 2-foot thick protective soil layer over the drainage net, the no. 200 and Cu criteria are not applicable. Geocomposite drainage nets have a manufacturer's stated hydraulic conductivity of approximately 10 cm/s. These materials have been incorporated into the HELP modeling provided in Appendix J, which demonstrates that one foot of head over the liner is not exceeded. The proposed alternative liner is illustrated in the Permit Drawings included in **Appendix K**.

***2.7.7 NMAC 19.15.36.14.G* - Landfill gas control systems.**

If the gas safety management plan or requirements of other federal, state or local agencies require the installation of a gas control system at a landfill, the operator shall submit a plan for division approval, which shall include the following:

(1) the system's design, indicating the location and design of vents, barriers, collection piping and manifolds and other control measures that the operator will install (gas vent or collection wells shall incorporate a clamped and seamed pipe riser design through the top cover liner);

(2) if gas recovery is proposed, the design of the proposed gas recovery system and the system's major on-site components, including storage, transportation, processing, treatment or disposal measures required in the management of generated gases, condensates or other residues;

(3) if gas processing is proposed, a processing plan designed in a manner that does not interfere or conflict with the activities on the site or required control measures or create or cause danger to persons or property;

(4) if gas disposal is proposed, a disposal plan designed:

(a) in a manner that does not interfere or conflict with the activities on the site or with required control measures;

(b) so as not to create or cause danger to persons or property; and

(c) with active forced ventilation, using vents located at least one foot above the landfill surface at each gas vent's location;

(5) physical and chemical characterization of condensates or residues that are generated and a plan for their disposal;

(6) means that the operator will implement to prevent gas' generation and lateral migration such that

(a) the concentration of the gases the landfill generates does not exceed 25 percent of the lower explosive limit for gases in surface waste management facility structures (excluding gas control or recovery system components); and

(b) the concentration of gases does not exceed the lower explosive limit for gases at the surface waste management facility boundary; and

(7) a routine gas monitoring program providing for monitoring at least quarterly; the specific type and frequency of monitoring to be determined based on the following:

(a) soil conditions;

(b) the hydrogeologic and hydraulic conditions surrounding the surface waste management facility; and

(c) the location of surface waste management facility structures and property lines.

The applicant does not intend to install a gas control system at the facility as indicated above in section 2.6.15. Wastes disposed at this facility will contain little to no organics and will be largely non-putrescible and are not anticipated to generate landfill gasses in quantities sufficient to warrant a landfill gas control system. However, The Facility proposes to monitor for methane in structures in accordance with sections **19.15.36.14.G.6** and **7** above. Monitoring of hydrogen sulfide gases will be in accordance with the Contingency plan in **Appendix F**.

2.7.8 NMAC 19.15.36.14.H - Landfill gas response.

If gas levels exceed the limits specified in Paragraph (6) of Subsection G of 19.15.36.14 NMAC, the operator shall:

(1) immediately take all necessary steps to ensure protection of fresh water, public health, safety and the environment and notify the division;

(2) within seven days of detection, record gas levels detected and a description of the steps taken to protect fresh water, public health and the environment;

(3) within 30 days of detection, submit a remediation plan for gas releases that describes the problem's nature and extent and the proposed remedy; and

(4) within 60 days after division approval, implement the remediation plan and notify the division that the plan has been implemented.

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If routine explosive gas monitoring indicates exceedances consistent with**19.15.36.14.G.6** above, then the applicant will implement the requirements set forth in this section.

PLEASE NOTE THAT THIS FACILITY IS NOT PROPOSING ANY LANDFARM OPERATIONS THUS THE REQUIREMENTS OF NMAC 19.15.36.15 AND NMAC 19.15.36.16 ARE NOT APPLICABLE AND THUS NOT INCLUDED IN THIS PERMIT APPLICATION.

2.8 NMAC 19.15.36.17 – SPECIFIC REQUIREMENTS APPLICABLE TO EVAPORATION, STORAGE, TREATMENT AND SKIMMER PONDS:

2.8.1 NMAC 19.15.36.17.A – Engineering design plan

An applicant for a surface waste management facility permit or modification requesting inclusion of a skimmer pit; an evaporation, storage or treatment pond; or a below-grade tank shall submit with the surface waste management facility permit application a detailed engineering design plan, certified by a registered profession engineer, including operating and maintenance procedures; a closure plan; and a hydrologic report that provides sufficient information and detail on the site's topography, soils, geology, surface hydrology and ground water hydrology to enable the division to evaluate the actual and potential effects on soils, surface water and ground water. The plan shall include detailed information on dike protection and structural integrity; leak detection, including an adequate fluid collection and removal system; liner specifications and compatibility; freeboard and overtopping prevention; prevention of nuisance and hazardous odors such as H2S; an emergency response plan, unless the pit is part of a surface waste management facility that has an integrated contingency plan; type of oil field waste stream, including chemical analysis; climatological factors, including freeze-thaw cycles; a monitoring and inspection plan; erosion control; and other pertinent information the division requests.

The applicant proposes to install and operate a leachate evaporation pond. Requirements for the pond are integrated into the Facility plans that also address the landfill design, operations, and closure.

2.8.2 NMAC 19.15.36.17.B - Construction standards.

(1) In general. The operator shall ensure each pit, pond and below-grade tank is designed, constructed and operated so as to contain liquids and solids in a manner that will protect fresh water, public health and the environment.

(2) Liners required. Each pit or pond shall contain, at a minimum, a primary (upper) liner and a secondary (lower) liner with a leak detection system appropriate to the site's conditions.

(3) Liner specifications. Liners shall consist of a 30-mil flexible PVC or 60-mil HDPE liner, or an equivalent liner approved by the division. Synthetic (geomembrane) liners shall have a hydraulic conductivity no greater than 1 x 10^{-9} cm/sec. Geomembrane liners shall be composed of an impervious, synthetic material that is resistant to petroleum hydrocarbons, salts and acidic and alkaline solutions. Liner materials shall be resistant to ultraviolet light, or the operator shall make provisions to protect the material from sunlight. Liner compatibility shall comply with EPA SW-846 method 9090A.

(4) Alternative liner media. The division may approve other liner media if the operator demonstrates to the division's satisfaction that the alternative liner protects fresh water, public health and the environment as effectively as the specified media.

(5) Each pit or pond shall have a properly constructed foundation or firm, unyielding base, smooth and free of rocks, debris, sharp edges or irregularities, in order to prevent rupture or tear of the liner and an adequate anchor trench; and shall be constructed so that the inside grade of the levee is no steeper than 2H:1V. Levees shall have an outside grade no steeper than 3H:1V. The levees' tops shall be wide enough to install an anchor trench and provide adequate room for inspection and maintenance. The operator shall minimize liner seams and orient them up and down, not across a slope. The operator shall use factory seams where possible. The operator shall ensure field seams in geosynthetic material are thermally seamed (hot wedge) with a double track weld to create an air pocket for non-destructive air channel testing. A stabilized air pressure of 35 psi, plus or minus one percent, shall be maintained for at least five minutes. The operator shall overlap liners four to six inches before seaming, and orient seams parallel to the line of maximum slope, i.e., oriented along, not across, the slope. The operator shall minimize the number of field seams in corners and irregularly shaped areas. There shall be no horizontal seams within five feet of the slope's toe. Qualified personnel shall perform field seaming.

(6) At a point of discharge into or suction from the lined pit, the liner shall be protected from excessive hydrostatic force or mechanical damage, and external discharge lines shall not penetrate the liner.

(7) Primary liners shall be constructed of a synthetic material.

(8) A secondary liner may be a synthetic liner or an alternative liner approved by the division. Secondary liners constructed with compacted soil membranes, i.e., natural or processed clay and other soils, shall be at least three feet thick, placed in six-inch lifts and compacted to 95 percent of the material's standard proctor density, or equivalent. Compacted soil membranes used in a liner shall undergo permeability testing in conformity with ASTM standards and methods approved by the division before and after construction. Compacted soil membranes shall have a hydraulic conductivity of no greater than 1 x 10^{-8} cm/sec. The operator shall submit results of pre-construction testing to the division for approval prior to construction.

(9) The operator shall place a leak detection system between the lower and upper geomembrane liners that consists of two feet of compacted soil with a saturated hydraulic conductivity of 1 x 10^{-5} cm/sec or greater to facilitate drainage. The leak detection system shall consist of a properly designed drainage and collection and removal system placed above the lower geomembrane liner in depressions and sloped so as to facilitate the earliest possible leak detection. Piping used shall be designed to withstand chemical attack from oil field waste or leachate; structural loading from stresses and disturbances from overlying oil field waste, cover materials, equipment operation or expansion or contraction; and to facilitate clean-out maintenance. The material placed between the pipes and laterals shall be sufficiently permeable to allow the transport of fluids to the drainage pipe. The slope of the interior sub-grade and of drainage lines and laterals shall be at least a two percent grade, i.e., two feet vertical drop per 100 horizontal feet. The piping collection system shall be comprised of solid and perforated pipe having a minimum diameter of four inches and a minimum wall thickness of schedule 80. The operator shall seal a solid sidewall riser pipe to convey collected fluids to a collection, observation and disposal system located outside the perimeter of the pit or pond. The operator may install alternative methods as approved by the division.

(10) The operator shall notify the division at least 72 hours prior to the primary liner's installation so that a division representative may inspect the leak detection system before it is covered.

(11) The operator shall construct pits and ponds in a manner that prevents overtopping due to wave action or rainfall, and maintain a three foot freeboard at all times.

(12) The maximum size of an evaporation or storage pond shall not exceed 10 acre-feet.

The design requirements set forth in this section are demonstrated in the Engineering Design Report presented in **Appendix J**, and illustrated in the Permit Drawings included in **Appendix K**. The Facility proposes primary and secondary 60-mil double-sided, textured HDPE geomembrane with appropriate UV stabilizers. However, the leak detection layer will consist of an alternative 200-mil geocomposite drainage net, which has a hydraulic conductivity of approximately 10 cm/s, in lieu of the prescriptive 2-feet of compacted soil. Operations, inspections and maintenance will

be in accordance with Section 3.0 of the Operating Plan located in **Appendix D** and the Facility Inspection and Maintenance Plan presented in **Appendix E**.

2.8.3 NMAC 19.15.36.17.C - Operating standards.

(1) The operator shall ensure that only produced fluids or non-hazardous waste are discharged into or stored in a pit or pond; and that no measurable or visible oil layer is allowed to accumulate or remain anywhere on a pit's surface except an approved skimmer pit.

(2) The operator shall monitor leak detection systems pursuant to the approved surface waste management facility permit conditions, maintain monitoring records in a form readily accessible for division inspection and report discovery of liquids in the leak detection system to the division within 24 hours.

(3) Fencing and netting. The operator shall fence or enclose pits or ponds to prevent unauthorized access and maintain fences in good repair. Fences are not required if there is an adequate perimeter fence surrounding the surface waste management facility. The operator shall screen, net, cover or otherwise render non-hazardous to migratory birds tanks exceeding eight feet in diameter and exposed pits and ponds. Upon written application, the division may grant an exception to screening, netting or covering requirements upon the operator's showing that an alternative method will adequately protect migratory birds or that the tank or pit is not hazardous to migratory birds.

(4) The division may approve spray systems to enhance natural evaporation. The operator shall submit engineering designs for spray systems to the division's environmental bureau for approval prior to installation. The operator shall ensure that spray evaporation systems are operated so that spray-borne suspended or dissolved solids remain within the perimeter of the pond's lined portion.

(5) The operator shall use skimmer pits or tanks to separate oil from produced water prior to water discharge into a pond. The operator shall install a trap device in connected ponds to prevent solids and oils from transferring from one pond to another unless approved in the surface waste management facility permit.

Compliance with this section is documented in Sections 3.1.1 through 3.1.5 of the Operating Plan located in **Appendix D.** The Facility is proposing alternatives to the bird screening/netting of the pond. The Facility is not proposing any spray or natural evaporation enhancements. The proposed pond will not accept or treat produced water and will not have any interconnections, thus no oil traps are proposed.

2.8.4 NMAC 19.15.36.17.D - Below-grade tanks and sumps.

(1) The operator shall construct below-grade tanks with secondary containment and leak detection. The operator shall not allow below-grade tanks to overflow. The operator

shall install only below-grade tanks of materials resistant to the tank's particular contents and to damage from sunlight.

(2) The operator shall test sumps' integrity annually, and shall promptly repair or replace a sump that does not demonstrate integrity. The operator may test sumps that can be removed from their emplacements by visual inspection. The operator shall test other sumps by appropriate mechanical means. The operator shall maintain records of sump inspection and testing and make such records available for division inspection.

The proposed leachate evaporation pond shall be constructed to include a leak detection sump equipped with a riser pipe for inspections. Inspections of the pond are addressed in the Inspection and Maintenance Plan provided in **Appendix E**.

2.8.5 NMAC 19.15.36.17.E - Closure required.

The operator shall properly close pits, ponds and below-grade tanks within six months after cessation of use.

Closure of the evaporation pond is discussed in section 2.4 of the Closure Plan presented in **Appendix H**.

2.9 NMAC 19.15.36.18 – CLOSURE AND POST CLOSURE:

2.9.1 NMAC 19.15.36.18 A - Surface waste management facility closure by operator.

(1) The operator shall notify the division's environmental bureau at least 60 days prior to cessation of operations at the surface waste management facility and provide a proposed schedule for closure. Upon receipt of such notice and proposed schedule, the division shall review the current closure and post closure plan (post closure is not required for oil treating plants) for adequacy and inspect the surface waste management facility.

(2) The division shall notify the operator within 60 days after the date of cessation of operations specified in the operator's closure notice of modifications of the closure and post closure plan and proposed schedule or additional requirements that it determines are necessary for the protection of fresh water, public health or the environment.

(3) If the division does not notify the operator of additional closure or post closure requirements within 60 days as provided, the operator may proceed with closure in accordance with the approved closure and post closure plan; provided that the director may, for good cause, extend the time for the division's response for an additional period not to exceed 60 days by written notice to the operator.

(4) The operator shall be entitled to a hearing concerning a modification or additional requirement the division seeks to impose if it files an application for a hearing within

10 days after receipt of written notice of the proposed modifications or additional requirements.

(5) *Closure shall proceed in accordance with the approved closure and post closure plan and schedule and modifications or additional requirements the division imposes. During closure operations the operator shall maintain the surface waste management facility to protect fresh water, public health, and the environment.*

(6) *Upon completion of closure, the operator shall re-vegetate the site unless the division has approved an alternative site use plan as provided in Subsection G of 19.15.36.18 NMAC. Re-vegetation, except for landfill cells, shall consist of establishment of a vegetative cover equal to 70 percent of the native perennial vegetative cover (un-impacted by overgrazing, fire or other intrusion damaging to native vegetation) or scientifically documented ecological description consisting of at least three native plant species, including at least one grass, but not including noxious weeds, and maintenance of that cover through two successive growing seasons.*

Applicable requirements of this section are discussed in the Facility Closure and Post-Closure Care Plan presented in **Appendix H**.

2.9.2 NMAC 19.15.36.18 B - Release of financial assurance.

(1) *When the division determines that closure is complete it shall release the financial assurance, except for the amount needed to maintain monitoring wells for the applicable post closure care period, to perform semi-annual analyses of such monitoring wells and to re-vegetate the site. Prior to the partial release of the financial assurance covering the surface waste management facility, the division shall inspect the site to determine that closure is complete.*

(2) *After the applicable post closure care period has expired, the division shall release the remainder of the financial assurance if the monitoring wells show no contamination and the re-vegetation in accordance with Paragraph (6) of Subsection A of 19.15.36.18 NMAC is successful. If monitoring wells or other monitoring or leak detection systems reveal contamination during the surface waste management facility's operation or in the applicable post closure care period following the surface waste management facility's closure the division shall not release the financial assurance until the contamination is remediated in accordance with 19.15.30 NMAC and 19.15.29 NMAC, as applicable.*

(3) *In any event, the division shall not finally release the financial assurance until it determines that the operator has successfully re-vegetated the site in accordance with Paragraph (6) of Subsection A of 19.15.36.18 NMAC, or, if the division has approved an alternative site use plan, until the landowner has obtained the necessary regulatory approvals and begun implementation of the use.*

No response required.

2.9.3 NMAC 19.15.36.18 C - Surface waste management facility and cell closure and post closure standards.

The following minimum standards shall apply to closure and post closure of the installations indicated, whether the entire surface waste management facility is being closed or only a part of the surface waste management facility.

(1) Oil treating plant closure. The operator shall ensure that:

(a) tanks and equipment used for oil treatment are cleaned and oil field waste is disposed of at a division-approved surface waste management facility (the operator shall reuse, recycle or remove tanks and equipment from the site within 90 days of closure);

(b) the site is sampled, in accordance with the procedures specified in chapter nine of EPA publication SW-846, test methods for evaluating solid waste, physical/chemical methods, for TPH, BTEX, major cations and anions and RCRA metals, in accordance with a gridded plat of the site containing at least four equal

(c) sections that the division has approved; and

(2) Landfill cell closure.

(a) The operator shall properly close landfill cells, covering the cell with a top cover pursuant to Paragraph (8) of Subsection C of 19.15.36.14 NMAC, with soil contoured to promote drainage of precipitation; side slopes shall not exceed a 25 percent grade (four feet horizontal to one foot vertical), such that the final cover of the landfill's top portion has a gradient of two percent to five percent, and the slopes are sufficient to prevent the ponding of water and erosion of the cover material.

(b) The operator shall re-vegetate the area overlying the cell with native grass covering at least 70 percent of the landfill cover and surrounding areas, consisting of at least two grasses and not including noxious weeds or deep rooted shrubs or trees, and maintain that cover through the post closure period.

(3) Landfill post closure. Following landfill closure, the post closure care period for a landfill shall be 30 years.

(a) A post closure care and monitoring plan shall include maintenance of cover integrity, maintenance and operation of a leak detection system and leachate collection and removal system and operation of gas and ground water monitoring systems.

(b) The operator or other responsible entity shall sample existing ground water monitoring wells annually and submit reports of monitoring performance and data collected within 45 days after the end of each calendar year. The operator shall report any exceedance of a ground water standard that it discovers during monitoring pursuant to 19.15.29 NMAC.

(4) Landfarm closure. The operator shall ensure that:

(a) disking and addition of bioremediation enhancing materials continues until soils within the cells are remediated to the standards provided in Subsection F of 19.15.36.15 NMAC, or as otherwise approved by the division;
(b) soils remediated to the foregoing standards and left in place are re-vegetated in accordance with Paragraph (6) of Subsection A of 19.15.36.18 NMAC;
(c) landfarmed soils that have not been or cannot be remediated to the standards in Subsection F of 19.15.36.15 NMAC are removed to a division-approved surface waste management facility and the landfarm remediation area is filled in with native soil and re-vegetated in accordance with Paragraph (6) of Subsection A of 19.15.36.18 NMAC;
(d) if treated soils are removed, the cell is filled in with native soils and re-vegetated in accordance with Paragraph (6) of Subsection A of 19.15.36.18 NMAC;
(e) berms are removed;
(f) buildings, fences, roads and equipment are removed, the site cleaned-up and tests conducted on the soils for contamination;
(g) annual reports of vadose zone and treatment zone sampling are submitted to the division's environmental bureau until the division has approved the surface waste management facility's final closure; and
(h) for an operator who chooses to use the landfarm methods specified in Subsection H of 19.15.36.15 NMAC, that the soil has an ECs of less than or equal to 4.0 mmhos/cm (dS/m) and a SAR of less than or equal to 13.0.

Applicable requirements of this section are discussed in the Facility Closure and Post-Closure Care Plan presented in **Appendix H**. Landfill cell closure is discussed in section 2.3 of the Facility Closure and Post-Closure Care Plan.

2.9.4 NMAC 19.15.36.18 D - Pond and pit closure.

The operator shall ensure that:

(1) liquids in the ponds or pits are removed and disposed of in a division-approved surface waste management facility;
(2) liners are disposed of in a division-approved surface waste management facility;
(3) equipment associated with the surface waste management facility is removed;
(4) the site is sampled, in accordance with the procedures specified in chapter nine of EPA publication SW-846, test methods for evaluating solid waste, physical/chemical methods for TPH, BTEX, metals and other inorganics listed in Subsections A and B of 20.6.2.3103 NMAC, in accordance with a gridded plat of the site containing at least four equal sections that the division has approved; and
(5) sample results are submitted to the environmental bureau in the division's Santa Fe office.

Leachate evaporation pond closure requirements are discussed in section 2.4 of the Facility Closure and Post-Closure Care Plan presented in **Appendix H**.

2.9.5 NMAC 19.15.36.18 E - Landfarm and pond and pit post closure.

The post-closure care period for a landfarm or pond or pit shall be three years if the operator has achieved clean closure. During that period the operator or other responsible entity shall regularly inspect and maintain required re-vegetation. If there has been a release to the vadose zone or to ground water, then the operator shall comply with the applicable requirements of 19.15.30 NMAC and 19.15.29 NMAC.

Leachate evaporation pond post-closure requirements are discussed in section 3.0 of the Facility Closure and Post-Closure Care Plan presented in **Appendix H**. Post-closure management is also discussed in section 6.0 of the Leachate Management Plan provided in **Appendix G**.

2.9.6 NMAC 19.15.36.18 F - Alternatives to re-vegetation.

If the landowner contemplates use of the land where a cell or surface waste management facility is located for purposes inconsistent with re-vegetation, the landowner may, with division approval, implement an alternative surface treatment appropriate for the contemplated use, provided that the alternative treatment will effectively prevent erosion. If the division approves an alternative to re-vegetation, it shall not release the portion of the operator's financial assurance reserved for post-closure until the landowner has obtained necessary regulatory approvals and begun implementation of such alternative use.

The current planned use of the Facility after final closure is open range-land. If the applicant considers an alternative land-use that requires an alternative surface treatment of closed cells, the NMOCD will be notified and approval of the alternative capping requested.

2.9.7 NMAC 19.15.36.18 G - Surface waste management facility closure initiated by the division.

Forfeiture of financial assurance.

(1) For good cause, the division may, after notice to the operator and an opportunity for a hearing, order immediate cessation of a surface waste management facility's operation when it appears that cessation is necessary to protect fresh water, public health or the environment, or to assure compliance with statutes or division rules and orders. The division may order closure without first having a hearing in the event of an emergency, subject to Section 70-2-23 NMSA 1978, as amended.

(2) If the operator refuses or is unable to conduct operations at a surface waste management facility in a manner that protects fresh water, public health and the environment; refuses or is unable to conduct or complete an approved closure and post closure plan; is in material breach of the terms and conditions of its surface waste management facility permit; or the operator defaults on the conditions under which the

division accepted the surface waste management facility's financial assurance; or if disposal operations have ceased and there has been no significant activity at the surface waste management facility for six months the division may take the following actions to forfeit all or part of the financial assurance:

(a) send written notice by certified mail, return receipt requested, to the operator and the surety, if any, informing them of the decision to close the surface waste management facility and to forfeit the financial assurance, including the reasons for the forfeiture and the amount to be forfeited, and notifying the operator and surety that a hearing request or other response shall be made within 20 days of receipt of the notice; and

(b) advise the operator and surety of the conditions under which they may avoid the forfeiture; such conditions may include but are not limited to an agreement by the operator or another party to perform closure and post closure operations in accordance with the surface waste management facility permit conditions, the closure and post closure plan (including modifications or additional requirements imposed by the division) and division rules, and satisfactory demonstration that the operator or other party has the ability to perform such agreement.

(3) The division may allow a surety to perform closure and post closure if the surety can demonstrate an ability to timely complete the closure and post closure in accordance with the approved plan.

(4) If the operator and the surety do not respond to a notice of proposed forfeiture within the time provided, or fail to satisfy the specified conditions for non-forfeiture, the division shall proceed, after hearing if the operator or surety has timely requested a hearing, to declare the financial assurance's forfeiture. The division may then proceed to collect the forfeited amount and use the funds to complete the closure and post closure, or, at the division's election, to close the surface waste management facility and collect the forfeited amount as reimbursement.

(a) The division shall deposit amounts collected as a result of forfeiture of financial assurance in the oil and gas reclamation fund.

(b) *In the event the amount forfeited and collected is insufficient for closure and post closure, the operator shall be liable for the deficiency. The division may complete or authorize completion of closure and post closure and may recover from the operator reasonably incurred costs of closure and post closure and forfeiture in excess of the amount collected pursuant to the forfeiture.*

(c) In the event the amount collected pursuant to the forfeiture was more than the amount necessary to complete closure and post closure, including remediation costs, and forfeiture costs, the division shall return the excess to the operator or surety, as applicable, reserving such amount as may be reasonably necessary for post closure operations and re-vegetation in accordance with Paragraph (6) of Subsection A of 19.15.36.18 NMAC. The division shall return excess of the amount retained over the actual cost of post closure operations and re-vegetation to the

operator or surety at the later of the conclusion of the applicable post closure period or when the site re-vegetation in accordance with Paragraph (6) of Subsection A of 19.15.36.18 NMAC is successful.

(5) If the operator abandons the surface waste management facility or cannot fulfill the conditions and obligations of the surface waste management facility permit or division rules, after notice and an opportunity for hearing, the state of New Mexico, its agencies, officers, employees, agents, contractors and other entities designated by the state shall have all rights of entry into, over and upon the surface waste management facility property, including all necessary and convenient rights of ingress and egress with all materials and equipment to conduct operation, termination and closure of the surface waste management facility, including but not limited to the temporary storage of equipment and materials, the right to borrow or dispose of materials and all other rights necessary for the surface waste management facility's operation, termination and closure in accordance with the surface waste management facility permit and to conduct post closure operations.

No response required.

2.10 NMAC 19.15.36.19 - EXCEPTIONS AND WAIVERS:

2.10.1 NMAC 19.15.36.19.A

In a surface waste management facility permit application, the applicant may propose alternatives to requirements of 19.15.36 NMAC, and the division may approve such alternatives if it determines that the proposed alternatives will provide equivalent protection of fresh water, public health and the environment.

Below is a summary of the alternatives to the requirements of 19.15.36 NMAC proposed under this permit application.

- NMAC 19.15.36.13(I) and NMAC 19.15.36.17(C)(3) – The Facility proposes alternative means of migratory bird control/protection for the proposed leachate evaporation pond in lieu of netting or screening over the pond. Section 3.1.3 of **Appendix D** discusses this request for exemption in greater detail.

- NMAC 19.15.36.14(A)(7)(b) – The Facility request a waiver to the stabilized vegetation requirement for intermediate cover. Due to the arid climate of the Facility's location, wastes underlying the intermediate cover, and site soil types it is unlikely that vegetation will grow and establish over intermediate slopes. The Facility proposes to maintain the intermediate soil cover on temporary slopes via routine inspection and erosion repair.

- NMAC 19.15.36.14(B) – The Facility proposes an exemption from developing and implementing a groundwater monitoring program. Terracon conducted a subsurface investigation and groundwater was not encountered within 115-feet below the proposed lowest depth of the landfill indicating that fresh groundwater does not exist at the facility. However, the Facility will monitor the vadose zone per the Vadose Zone Monitoring Plan provided as Attachment B of Appendix E.

- NMAC 19.15.36.14(C)(1) and NMAC 19.15.36.14(E)(3) – The Facility proposes an alternative base layer consisting of a geosynthetic clay liner (GCL) in lieu of 2-feet of compacted clay with a hydraulic conductivity of $1x10^{-7}$ cm/s or less. GCL has a proven performance in landfill application as an equivalent replacement for compacted clay exhibiting hydraulic conductivities of $1x10^{-9}$ or less. HELP modeling is provided in **Appendix J.**

- NMAC 19.15.36.14(C)(3) and NMAC 19.15.36.14(F) – The Facility proposes a leak detection layer consisting of a 200-mil double-sided geocomposite drainage net (Geocomposite) in lieu of 2-feet of soil with a hydraulic conductivity of $1x10^{-5}$ cm/s or greater with a collection piping network. The geocomposite blankets the entire area providing greater liquids collection coverage than a piping network and a hydraulic conductivity of up to 10 cm/s. Geocomposites have proven performance in landfill application as an equivalent replacement for drainage sands and gravels. HELP modeling and geonet compression calculations are provided in **Appendix J.**

- NMAC 19.15.36.14(C)(5) and NMAC 19.15.36.14(F) – The Facility proposes a leachate collection and removal system (LCRS) consisting of a geocomposite in lieu of 2-feet of soil with a hydraulic conductivity of $1x10^{-2}$ cm/s or greater with a collection piping network. The geocomposite blankets will act as the lateral collection component of the LCRS blanketing the entire cell floor area providing greater liquids collection coverage than a piping network and a hydraulic conductivity of up to 10 cm/s. Geocomposites have proven performance in landfill application as an equivalent replacement for drainage sands and gravels. HELP modeling and geonet compression calculations are provided in **Appendix J.**

- NMAC 19.15.36.14(C)(6) – The Facility proposes a 2-feet of general protective cover soil with no hydraulic conductivity specification over the LCRS as geocomposite is being installed in lieu of drainage sand or rock. HELP modeling and geonet compression calculations are provided in **Appendix J.**

- NMAC 19.15.36.14(C)(8) – Due to the arid climate of The Facility's location, a 60-inch thick soil only, evapotranspiration (ET) final cover system is proposed in lieu of the prescriptive final cover. Soil testing at the facility indicates that site soils have hydraulic conductivity ranging from $6.56x10^{-6}$ to $1.1x10^{-7}$ cm/s meeting New Mexico Environmental

Departments (NMED) baseline criteria for an ET cap. **Appendix J** includes a HELP model performance demonstration of the proposed ET cap performed in accordance with the April 1, 1998 NMED Guidance Document for Alternative Cover Designs using HELP Modeling.

- NMAC 19.15.36.14(G) – The Facility is proposing to not install a landfill gas control system. Wastes disposed at this facility will contain little to no organics and will be largely non-putrescible and are not anticipated to generate landfill gasses in quantities sufficient to warrant a landfill gas control system.

- NMAC 19.15.36.17(B)(9) – The Facility proposes to install an alternative leak detection layer that will consist of a 200-mil geocomposite drainage net, in lieu of the prescriptive 2-feet of compacted soil and drainage piping network. The geocomposite blankets the entire area providing greater liquids collection coverage than a piping network and a hydraulic conductivity of up to 10 cm/s. Geocomposites have proven performance in landfill application as an equivalent replacement for drainage sands and gravels.

2.10.2 NMAC 19.15.36.19.B

The division may grant exceptions to, or waivers of, or approve alternatives to requirements of 19.15.36 NMAC in an emergency without notice or hearing. The operator requesting an exception or waiver, except in an emergency, shall apply for a surface waste management facility permit modification in accordance with Subsection C of 19.15.36.8 NMAC. If the requested modification is a major modification, the operator shall provide notice of the request in accordance with 19.15.36.9 NMAC.

No emergency exists under this permit application, thus no response required.

2.10.3 NMAC 19.15.36.20 TRANSITIONAL PROVISIONS:

Existing permitted facilities. Surface waste management facilities in operation prior to the effective date of 19.15.36 NMAC pursuant to division permits or orders may continue to operate in accordance with such permits or orders, subject to the following provisions.

A. Existing surface waste management facilities shall comply with the financial assurance, operational, monitoring, waste acceptance and closure and post closure requirements provided in 19.15.36 NMAC, except as otherwise specifically provided in the applicable permit or order, or in a specific waiver, exception or agreement that the division has granted in writing to the particular surface waste management facility.

B. The division shall not require financial assurance for a commercial facility permitted prior to the effective date of 19.15.36 NMAC that exceeds $250,000 until such time as

(1) the division reviews the commercial facility's permit pursuant to Paragraph (3) of Subsection A of 19.15.36.12 NMAC, at which time the division may require the operator

to submit a closure and post closure plan; which shall include a responsible third party contractor's cost estimate to complete closure and post closure of the surface waste management facility pursuant to the requirements of Subsections A through F of 19.15.36.18 NMAC;

(a) if the division determines that such estimate does not reflect a reasonable and probable closure and post closure cost, the division shall determine the estimated closure and post closure cost and shall provide its determination of estimated closure and post closure cost to the operator;

(b) if the operator disagrees with the division's determination of estimated closure and post closure cost, the operator may request a hearing, which shall be conducted according to 19.15.4 NMAC; or

(2) the commercial facility applies for a major modification.

C. Major modification of an existing surface waste management facility and a new landfarm cells constructed at an existing surface waste management facility shall comply with the requirements provided in 19.15.36 NMAC.

The Facility is not an existing facility; thus, the requirements of this section do not apply. No action required.

3.0 FORM C-137 APPLICATION REQUIREMENTS

Form C-137 Application for Surface Waste Management Facility and **19.15.36.8.C** outline specific requirements for surface waste facility permits issued by the NMOCD. A copy of the Form C-137 Application can be found in **Appendix A** of this report. According to Form C-137 and **19.15.36.8.C**, all applications for solid waste disposal facilities shall contain at least the following information, bolded below. Underneath each of the required items is the corresponding information, and/or the location of where the applicable information can be found throughout the Permit Application.

1. **Application:** New - this application is for permitting a new facility

2. **Type:** Landfill, Evaporation Pond, and Mud Dry-Out Area
   Proposed facility is an Oil Field Waste Landfill, associated leachate evaporation pond, and waste drying pads.

3. **Facility Status:** The proposed facility meets the criteria of a "Commercial Facility" as outlined in **19.15.36.7.A**.

4. **Operator:** NGL Waste Services, LLC
   Address: 3773 Cherry Creek Dr., Suite 1000, Denver, CO 80209
   Contact Person: Doug White, NGL Executive Vice President, (303) 815-1010 x 3179

5. **Location:** SW/4 NE/4, SE/4 NE/4, NW/4 SE/4, NE/4 SE/4, and SE/4 SE/4 of Section 9, Township 25S, Range 34E
   NW/4 NW/4, NE/4 NW/4, NW/4 NE/4, SW/4 NW/4, SE/4 NW/4, SW/4 NE/4, NW/4 SW/4, NE/4 SW/4, NW/4 SE/4, SW/4 SW/4, SE/4 SW/4, and SW/4 SE/4 of Section 10, Township 25S, Range 34E

6. **Is this an existing facility?** No, this application is for a new facility.

7. **Attach the names and addresses of the applicant and principal officers and owners of 25 percent or more of the applicant. Specify the office held by each officer and identify the individual(s) primary responsible for overseeing management of the facility.**
   A list of principal officers and owners of 25 percent or more of NGL Waste Services, LLC and their primary individuals responsible for overseeing management of the Facility is included in **Appendix A**. Although the land being permitted is Owned by NGL Water Solutions Permian, LLC, the Facility will be operated by NGL Waste Services, LLC. Documentation of NGL Water Solutions Permian, LLC permitting NGL Waste Services, LLC to operate this landfill on their land is provided in **Appendix C**.

8. **Attach a plat and topographic map showing the surface waste management facility's location in relation to governmental surveys (quarter-quarter section, township and range); highways or roads giving access to the surface waste management facility site; watercourses; fresh water sources, including wells and springs; and inhabited buildings within one mile of the site's perimeter.**
   Figure 7 shows the proposed facility's boundaries, contours generated from a topographic survey of the area, Section, township, and range. **Figure 8** shows the facility proposed layout and the road used to access the facility.

9. **Attach the names and addresses of the surface owners of the real property on which the surface waste management facility is sited and surface owners of the real property within one mile of the site's perimeter.** Table 2 below lists the names and addresses of the surface owners of the real property on which the surface waste management facility is sited and surface owners of the real property within one mile of the site's perimeter, see also **Figure 10**.

TABLE 2
SURFACE LANDOWNER LIST

NORTH RANCH SWMF PROPERTY OWNER	MAILING ADDRESS
NGL Water Solutions Permian, LLC	3773 Cherry Creek Dr., Suite 1000, Denver, CO 80209
NORTH RANCH SWMF OPERATOR	**MAILING ADDRESS**
NGL Waste Services, LLC	3773 Cherry Creek Dr., Suite 1000, Denver, CO 80209
ADJACENT LANDOWNERS	**MAILING ADDRESS**
AE & J Royalties LLC	P.O. Box 1693 Taos, NM 87571
Bureau of Land Management, New Mexico	Pecos District Office 2909 West Second Street Roswell, NM 88201-2019
State of New Mexico (State Trust Land)	The New Mexico State Land Office P.O. Box 1148 Santa Fe, NM 87504

10. **Attach a description of the surface waste management facility with a diagram indicating the location of fences and cattle guards, and detailed construction/installation diagrams of pits, liners, dikes, piping, sprayers, tanks, roads, fences, gates, berms, pipelines crossing the surface waste management facility, buildings and chemical**

storage areas. The surface waste management facility consists of an approximately 205-acre oil field waste landfill and a 2.2 acre leachate evaporation pond. The facility has been designed to accept all eligible oil field wastes as outlined in **19.15.36.13**. A Site Development Plan diagram is attached as **Figure 9**. Detailed construction and installation diagrams of the Facility's features are included in the Permit Drawings attached in **Appendix K**.

11. **Attach engineering designs, certified by a registered professional engineer, including technical data on the design elements of each applicable treatment, remediation and disposal method and detailed designs of surface impoundments.**
The landfill design is demonstrated in the Engineering Design Report presented in **Appendix J**, and illustrated in the Permit Drawings included in **Appendix K**.

12. **Attach a plan for management of approved oil field wastes that complies with the applicable requirements contained in 19.15.36.13, 19.15.36.14, 19.15.36.15 and 19.15.36.17 NMAC.** The Management Plan – Approved Oil Field Wastes is included as Attachment A to the Operating Plan provided in **Appendix D**.

13. **Attach an inspection and maintenance plan that complies with the requirements contained in Subsection L of 19.15.36.13 NMAC.** The Inspection and Maintenance Plan is included as **Appendix E**.

14. **Attach a hydrogen sulfide prevention and contingency plan that complies with those provisions of 19.15.3.118 NMAC that apply to surface waste management facilities.** The Hydrogen Sulfide Prevention and Contingency Plan is included as Attachment A to the Contingency Plan provided in **Appendix F**.

15. **Attach a closure and post closure plan, including a responsible third-party contractor's cost estimate, sufficient to close the surface waste management facility in a manner that will protect fresh water, public health and the environment (the closure and post closure plan shall comply with the requirements contained in Subsection D of 19.15.36.18 NMAC).** The Closure and Post-Closure Care Plan is included as **Appendix H**.

16. **Attach a contingency plan that complies with the requirements of Subsection N of 19.15.36.13 NMAC and with NMSA 1978, Sections 12-12-1 through 12-12-30, as amended (the Emergency Management Act).** The Contingency Plan is provided in **Appendix F**.

17. **Attach a plan to control run-on water onto the site and run-off water from the site that complies with the requirements of Subsection M of 19.15.36.13 NMAC.** The Facility has been designed with run-on and run-off controls sized to accommodate the 25-year return frequency storm event. Stormwater design calculations are presented in **Appendix J** - Engineering Design Report, and stormwater conveyance features are illustrated in the Permit Drawings included in **Appendix K**. Sections 2.9 and 4.0 in the Operating Plan, presented in **Appendix D**, discuss surface water management and quality.

18. **In the case of an application to permit a new or expanded landfill, attach a leachate management plan that describes the anticipated amount of leachate that will be generated and the leachate's handling, storage, treatment and disposal, including final post closure options.** The Leachate Management Plan is provided in **Appendix H**.

19. **In the case of an application to permit a new or expanded landfill, attach a gas safety management plan that complies with the requirements of Subsection O of 19.15.36.13 NMAC.** The plan for gas safety management is incorporated into Section 5.3 of the Operating Plan (**Appendix D**), and potential hydrogen sulfide gases are discussed in the Hydrogen Sulfide Prevention and Contingency Plan component of the Contingency plan in **Appendix F**. The landfill wastes are not expected to generate and mobilize enough gas to impact operations.

20. **Attach a best management practice plan to ensure protection of fresh water, public health and the environment.** Best management practices are integral to the Operating Plan (**Appendix D**), and the Closure Plan (**Appendix H**), and Stormwater Pollution Prevention Plan (**Appendix L**).

21. **Attach a demonstration of compliance with the siting requirements of Subsections A and B of 19.15.36.13 NMAC.** The North Ranch SWMF has a maximum excavated depth of 48.15 feet below ground surface. No groundwater was encountered during the advancement of seven (7) borings drilled to a depth of approximately 165 feet below the ground surface in the landfill and evaporation pond footprint area. Therefore, groundwater is greater than 100 feet below the lowest elevation of the design depth of oil field waste placement and below the bottom of the leachate evaporation pond. **Figure 5 of Appendix I** illustrates the approximate depth to groundwater in the vicinity of the North Ranch SWMF. The following figures demonstrate compliance with the siting criteria of this section: **Figure 2** – Distance to Wetlands and Waters of the United States; **Figure 3** – FEMA Flood Insurance Rate Map; **Figure 4** – Subsurface Mine Distance Compliance; **Figure 5** – Karst Topography Map; and **Figure 6** – Recent Faults Map; **Figure 9 -** Water Wells and Dwellings within ½ Mile; **Figure 10 -** Land Owners within ½ Mile

22. Attach geological/hydrological data including:

- **a. a map showing names and location of streams, springs or other watercourses, and water wells within one mile of the site;**
- **b. laboratory analyses, performed by an independent commercial laboratory, for major cations and anions; benzene, toluene, ethyl benzene and xylenes (BTEX); RCRA metals; and total dissolved solids (TDS) of ground water samples of the shallowest fresh water aquifer beneath the proposed site;**
- **c. depth to, formation name, type and thickness of the shallowest fresh water aquifer;**
- **d. soil types beneath the proposed surface waste management facility, including a lithologic description of soil and rock members from ground surface down to the top of the shallowest fresh water aquifer;**
- **e. geologic cross-sections;**
- **f. potentiometric maps for the shallowest fresh water aquifer; and**
- **g. porosity, permeability, conductivity, compaction ratios and swelling characteristics for the sediments on which the contaminated soils will be placed.**

Geological/hydrological data are included in the Hydrogeological Report presented in **Appendix I**. Note that groundwater was not encountered at the site so that specimens for laboratory analyses of groundwater were not submitted.

23. In the case of an existing surface waste management facility applying for a minor modification, describe the proposed change and identify information that has changed from the last C-137 filing.

This application is for permitting a new facility.

24. The division may require additional information to demonstrate that the surface waste management facility's operation will not adversely impact fresh water, public health, and the environment and that the surface waste management facility will comply with division rules and orders.

Additional information will be provided upon request.

4.0 FACILITY SITE SPECIFIC BOUNDARY INFORMATION

The permit boundary depicted in **Figure 8** - Site Development Plan was established by offsetting from existing gas lines with easements in the vicinity. Based on locations of existing gas lines provided by Prewitt Land Surveying, the North Ranch SWMF permit boundary was offset 100 feet to the site interior. Waste handling facilities were then offset from the permit boundary as shown. The constructed permit boundary is contained within NGL Water Solutions Permian, LLC surface ownership only.

5.0 LANDFILL AND EVAPORATION POND DESIGN

Landfill and evaporation pond designs have been completed for the North Ranch SWMF in accordance with the requirements of **19.15.36,** Sections **14** and **17**. Section **19.15.36.14** indicates specific requirements of landfill design and **19.15.36.17** indicates specific requirements of evaporation pond design. Information related to the construction elements utilized in the design is presented in **Appendix J** Design and Construction Plan.

The Design and Construction Plan Attachment A contains calculations and exhibits related to stormwater conveyance and management systems, including sizing of elements to handle a 25-year return frequency storm. Attachment B provides an estimate of erosion potential of site soils based on the Revised Universal Soil Loss Evaluation (RUSLE) formula. Attachment C presents leachate evaporation pond sizing calculations. Attachment D presents the results of HELP model runs constructed to determine the relative performance of landfill construction elements, including liners and lateral drainage layers, and to confirm the expected limitations of hydraulic head on the bottom liner system.

Attachments E and F to the Design and Construction Plan address liner system and leachate collection piping design. Attachment G contains an evaluation of slope stability based on the landfill design configuration and components, including interactions of geosynthetics interfaces in the liner and cover systems. Attachment H presents the Construction Quality Assurance (CQA) plan that is proposed to be followed to provide adequate confidence that items or services meet contractual and regulatory requirements and will perform satisfactorily in service.

Drawings depicting the landfill and evaporation pond design is presented in **Appendix K**.

6.0 LANDFILL OPERATIONS

A comprehensive Operating Plan (OP) for the Facility is included in **Appendix D**. Facility operators should use the OP as a governing document, with the understanding that other attached and referenced plans within the permit narrative are to be used in conjunction with the OP.

The OP includes the following attachments that should be used concurrently with the OP: Attachment A Management Plan of Approved Oil Field Wastes; Attachment B Hazardous and Unauthorized Waste Exclusion Plan; and, Attachment C Referenced Regulations.

The Inspection and Maintenance Plan provided in **Appendix E** should be used for guidance in routine Facility Inspections. Forms and inspections sheets used during operations will be kept in the Facility Permanent Operating Record (POR) as indicated in the OP. The Contingency Plan in **Appendix F** should be referenced if an emergency, safety hazard or environmental release occurs at the Facility.

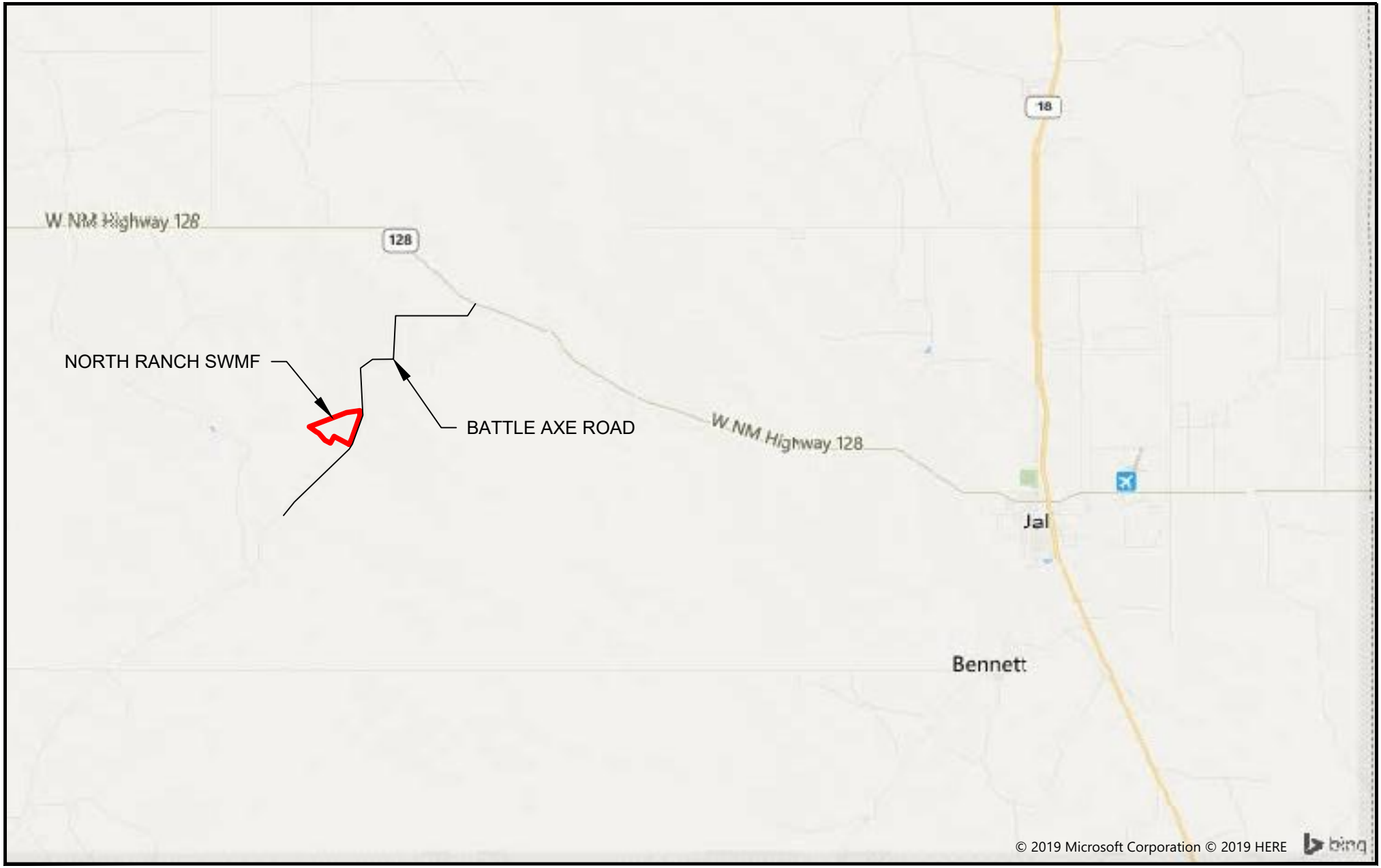
The Leachate Management Plan in **Appendix G** details the collection, handling, storage, treatment and disposal of leachate generated during landfill operations. The Closure and Post-Closure Care Plan presented in **Appendix H** outlines steps that will be taken to close each Facility closure area, a general schedule for closure, a description of the landfill final cover system and the methods used to install the cover, and a description of post-closure care activities.

7.0 SITE SAFETY

It is paramount to the NMOCD and NGL to protect fresh water, public health, safety and the environment. Site safety requirements are discussed throughout the Appendix materials referenced in Section 6.0 above. Safety considerations are incorporated into the design of the Facility features, such as limiting finished slopes of the landfill to 4:1 and providing netting to protect migratory birds from landing in the evaporation pond. Speed limit observation, waste and hazardous gas screening and other measures will be implemented at the site in consideration of employee and public safety.

All personnel that will be on-site at the North Ranch SWMF shall become familiar with and observe the safety language incorporated into the Operation Plan, including Section 8.0, and reasonably convey such safety observations to any visitor at the Facility. Training regarding safety will include hazards awareness for all phases of landfill operations. The safety goal of the Facility will be to remain incident and injury free, through a culture of safety awareness and training, throughout the permitted life of the SWMF.

Figures



REV.	DATE	BY	DESCRIPTION

Terracon
Consulting Engineers and Scientists
25809 I-30 SOUTH BRYANT, AR 72022
PH. (501) 847-9292 FAX. (501) 847-9210

SITE LOCATION MAP

PERMIT APPLICATION FIGURE

SURFACE WASTE MANAGEMENT FACILITY

NORTH RANCH

LEA COUNTY NEW MEXICO

FIG. 1

DESIGNED BY:	-
DRAWN BY:	DEW
APPVD. BY:	MPB
SCALE:	1" = 100'
DATE:	SEPTEMBER 2019
JOB NO.	35187378
ACAD NO.	572/002
SHEET NO.:	1 OF 1

N:\GEC\ARCHIVE\CAD\572\002\MCCLOY\PERMIT TEXT FIGURES\PERMIT NARRATIVE\FIG 1 - SITE LOCATION MAP.DWG

N

PROPOSED LANDFILL PERMIT BOUNDARY

200' SEPARATION BOUNDARY LINE

500' SEPARATION BOUNDARY LINE

WATER WELLS:
CO2314 AND CO2315
DEPTH=175 FEET

COMPLIANCE NOTES:

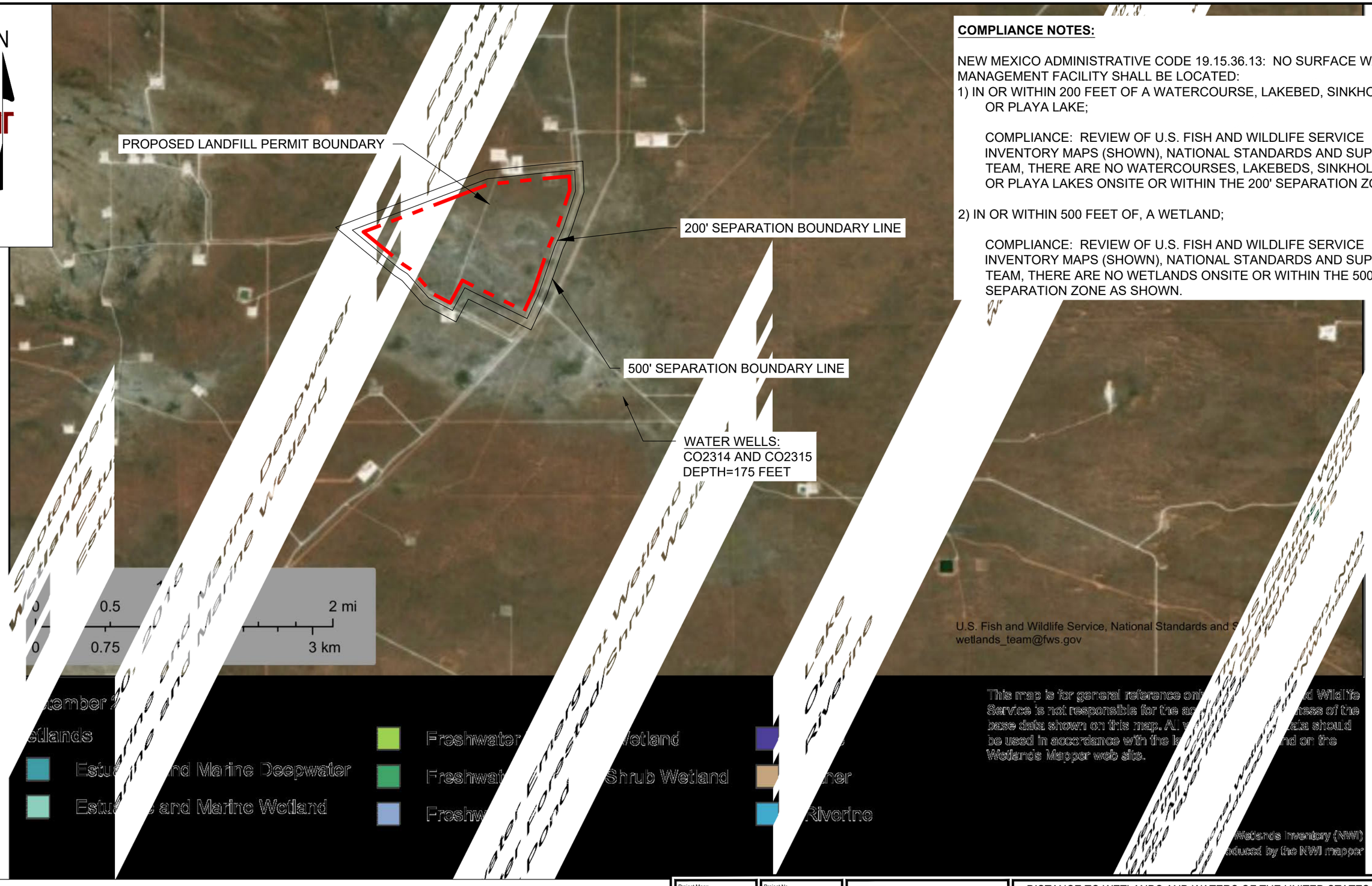
NEW MEXICO ADMINISTRATIVE CODE 19.15.36.13: NO SURFACE WASTE MANAGEMENT FACILITY SHALL BE LOCATED:

1) IN OR WITHIN 200 FEET OF A WATERCOURSE, LAKEBED, SINKHOLE OR PLAYA LAKE;

COMPLIANCE: REVIEW OF U.S. FISH AND WILDLIFE SERVICE INVENTORY MAPS (SHOWN), NATIONAL STANDARDS AND SUPPORT TEAM, THERE ARE NO WATERCOURSES, LAKEBEDS, SINKHOLES, OR PLAYA LAKES ONSITE OR WITHIN THE 200' SEPARATION ZONE.

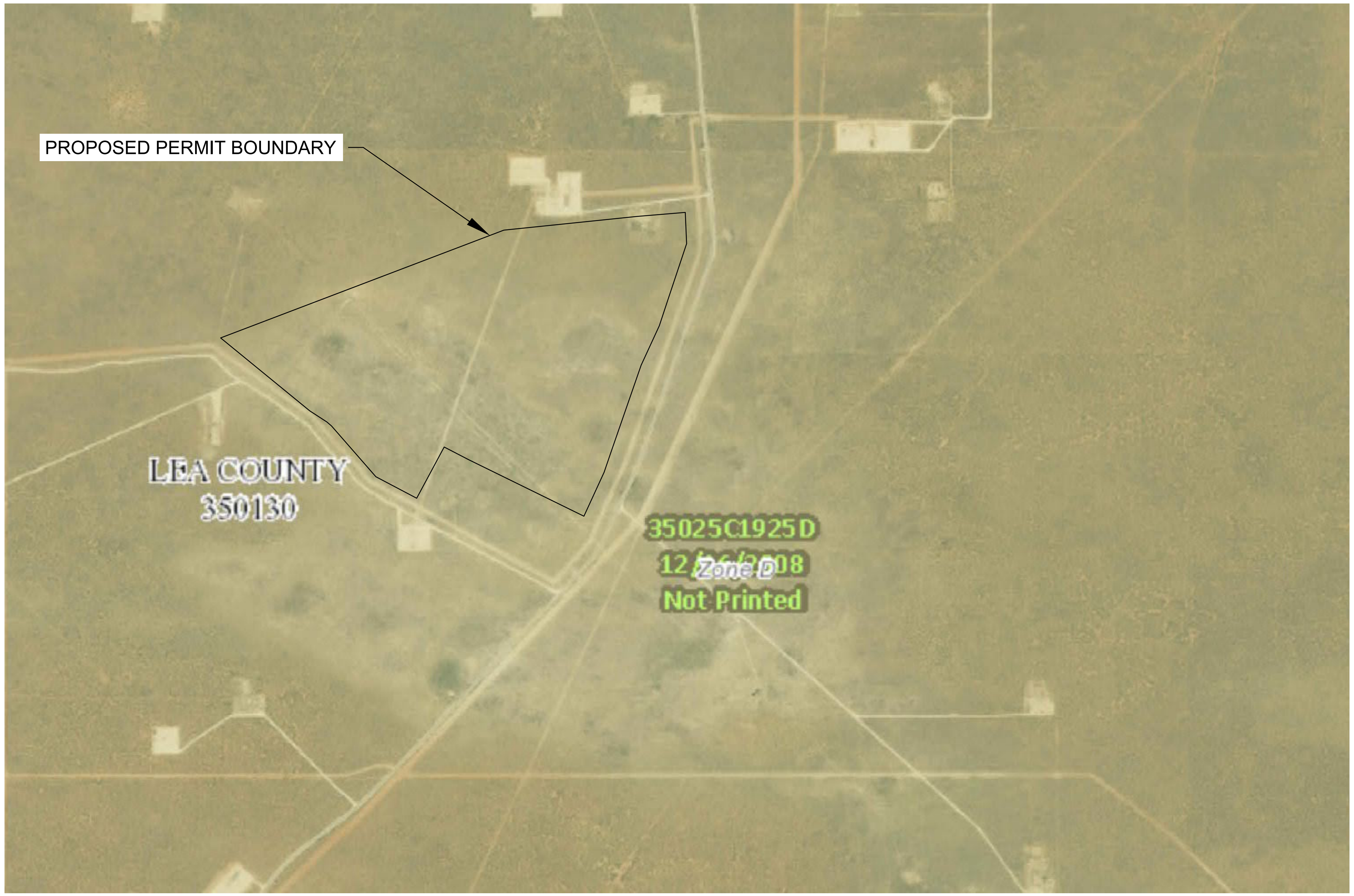
2) IN OR WITHIN 500 FEET OF, A WETLAND;

COMPLIANCE: REVIEW OF U.S. FISH AND WILDLIFE SERVICE INVENTORY MAPS (SHOWN), NATIONAL STANDARDS AND SUPPORT TEAM, THERE ARE NO WETLANDS ONSITE OR WITHIN THE 500' SEPARATION ZONE AS SHOWN.



Project Mngr: MPB	Project No. 35187378	Terracon Consulting Engineers and Scientists	DISTANCE TO WETLANDS AND WATERS OF THE UNITED STATES	FIG. No.
Drawn By: DEW	Scale: N.T.S.	25809 I-30 SOUTH BRYANT, AR 72022	PERMIT APPLICATION	2
Checked By: MPB	File No. 572-002	PH. (501) 847-9292 FAX. (501) 847-9210	NGL WASTE SERVICES, LLC	
Approved By: FOC	Date: APRIL 2019		NORTH RANCH SURFACE WASTE MANAGEMENT FACILITY	
			LEA COUNTY NEW MEXICO	

N:\GEOGRAPHIC\GIS\GIS2020\MXD\LOW\PERMIT TEXT FIGURES\PERMIT NARRATIVE\FIG 1 - WETLANDS MAP.DWG



CITATION: IMAGE SOURCE, FEDERAL EMERGENCY MANAGEMENT AGENCY, FLOOD MAP SERVICE CENTER FIRMETTE FOR MAP 350251925D

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 9/8/2019 at 1:00:10 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Project Mngr: MPB	Project No. 35187378	Terracon Consulting Engineers and Scientists	FEMA FLOOD INSURANCE RATE MAP		FIG. No.
Drawn By: DEW	Scale: N.T.S.		PERMIT APPLICATION		3
Checked By: MPB	File No. 572-002	25809 I-30 SOUTH BRYANT, AR 72022	NGL WASTE SERVICES, LLC		
Approved By: FOC	Date: SEPTEMBER 2019	PH. (501) 847-9292 FAX. (501) 847-9210	NORTH RANCH SURFACE WASTE MANAGEMENT FACILITY LEA COUNTY	NEW MEXICO	

N

Indian Flats

Livingston Ridge

Oil Field

Grama Ridge Field

San Simon Oil Field

San Simon Ridge

MONU JAL FI

31

Salt Lake

REGISTERED SUBSURFACE POTASH MINE (NASH DRAW MINE)

COUNTY LINE

~29 MILES

PROPOSED LANDFILL LOCATION

REGISTERED SURFACE AGGREGATE & STONE MINE (PIT C0-1101-0)

~6.5 MILES

~6.5 MILES

~35 MILES

Big Sinks

Paduca Oil Field

Woodley Flat

REGISTERED SALT MINE SURFACE AND OTHER METHODS (SUN WEST SALT MINE)

REGISTERED SURFACE AGGREGATE & STONE MINE (PIT C0-637)

Javalina Bas

Salado Draw Oil Field

STATE LINE

285

North Mason Oil Field

El Mar Oil Field

mi

Ford Geraldine

COMPLIANCE NOTES:

NEW MEXICO ADMINISTRATIVE CODE 19.15.36.13: NO SURFACE WASTE MANAGEMENT FACILITY SHALL BE LOCATED

4) WITHIN THE AREA OVERLYING A SUBSURFACE MINE.

COMPLIANCE: IMAGES SHOWN ARE FROM REGISTERED MINED WEB MAP PROVIDED BY NEW MEXICO MINING AND MINERALS DIVISION. NEAREST REGISTERED MINE IS A SURFACE AGGREGATE MINE LOCATED APPROXIMATELY 6.5 MILES BOTH EAST AND WEST OF THE PROPOSED LANDFILL. THE NEAREST REGISTERED SALT MINE IS LOCATED APPROXIMATELY 35 MILES NORTHWEST OF THE PROPOSED LANDFILL.. THE NEAREST REGISTERED SUBSURFACE MINE IS A POTASH MINE LOCATED APPROXIMATELY 29 MILES NORTH WEST OF THE PROPOSED LANDFILL.

Project Mngr:	MPB
Drawn By:	DEW
Checked By:	MPB
Approved By:	FOC

Project No.	35187378
Scale:	N.T.S.
File No.	572-002
Date:	APRIL 2019

Terracon
Consulting Engineers and Scientists
25809 I-30 SOUTH BRYANT, AR 72022
PH. (501) 847-9292 FAX. (501) 847-9210

SUBSURFACE MINE DISTANCE COMPLIANCE

PERMIT APPLICATION FIGURE

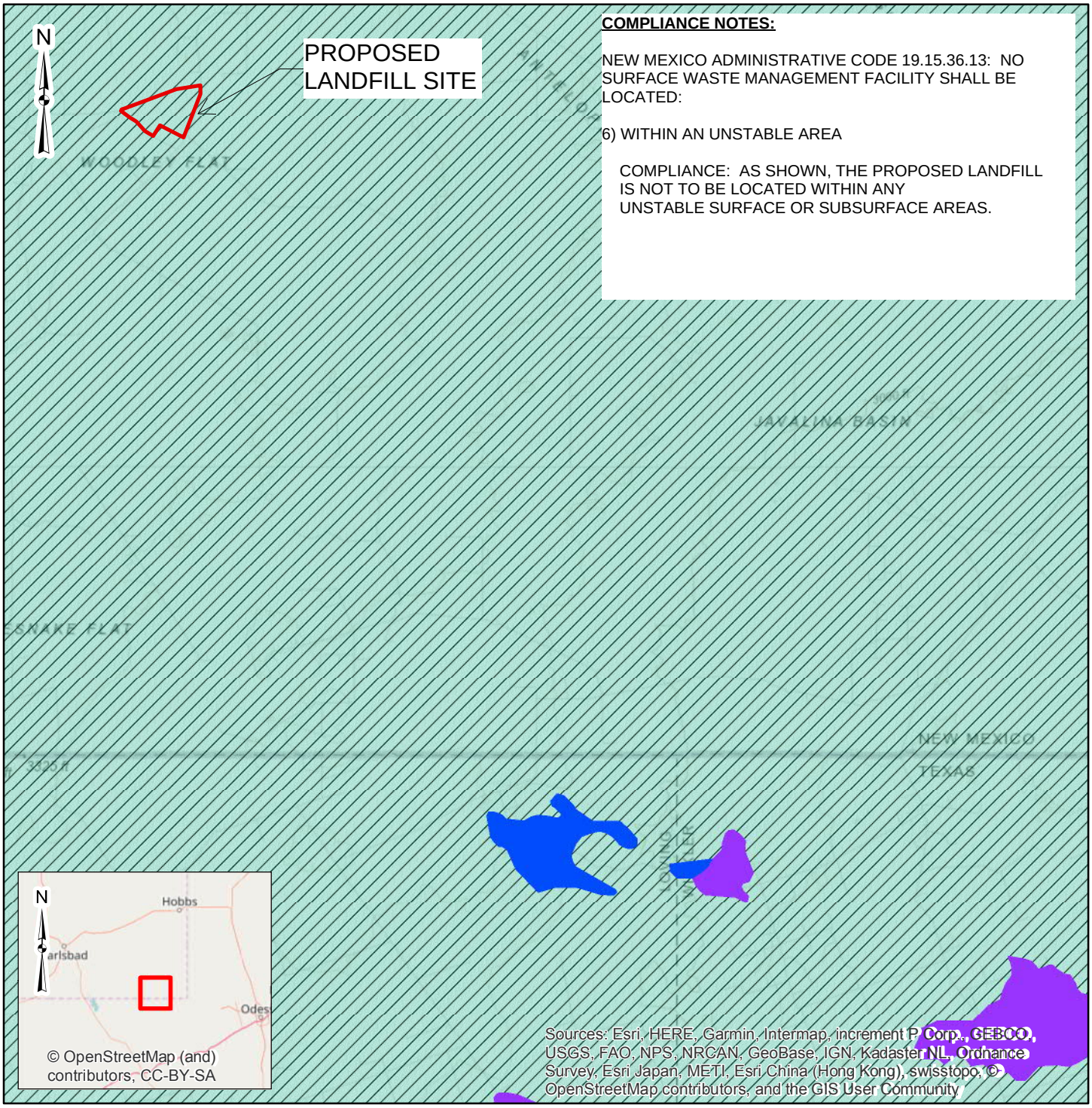
NGL WASTE SERVICES, LLC

NORTH RANCH SURFACE WASTE MANAGEMENT FACILITY

LEA COUNTY NEW MEXICO

FIG. No. 4

N:\SEARCH\NTEGAD\572000MCC\LOY\PERMIT TEXT FIGURES\PERMIT NARRATIVE\FIG 4 - SUBSURFACE MINE DISTANCE.DWG



North Ranch SWMF

Carbonate rocks at or near the land surface in a dry climate

Evaporite rocks at or near the land surface in a dry climate

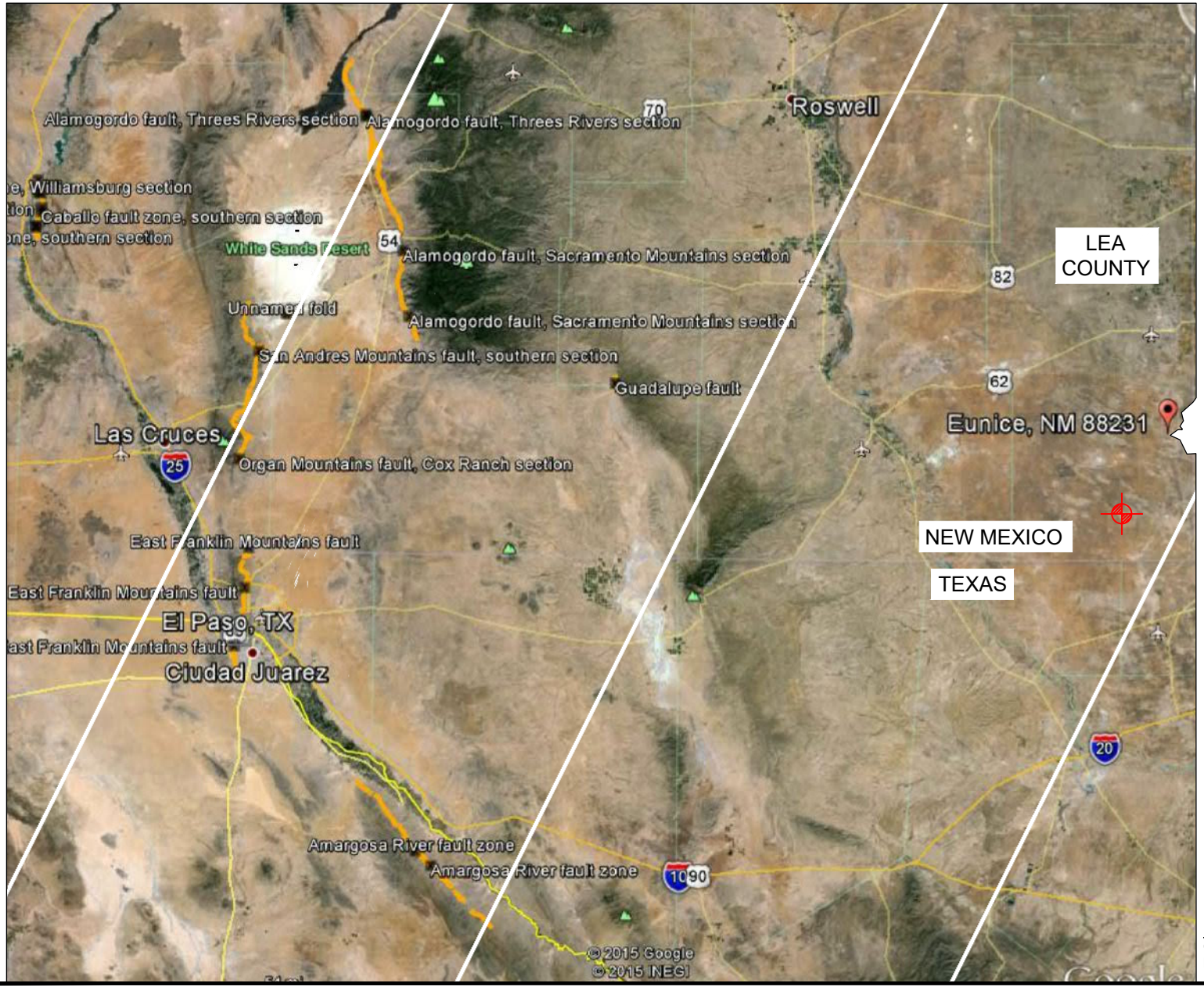
Evaporite basins

Gypsum extent

0 7,000 14,000 28,000 Feet

DATA SOURCES:
ESRI WMS - World Aerial Imagery, OpenStreetMap

Project No.: 35187378 Date: Apr 2019 Drawn By: CG Reviewed By: GH	Terracon 11555 Clay Road, Suite 100 Houston, TX 77043 PH. (713) 690-8989 terracon.com	**Karst Topography Map** North Ranch Surface Waste Management Facility Lea County, New Mexico	**FIGURE** **5**



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LEGEND

SITE LOCATION

IMAGE SOURCE: GOOGLE EARTH WITH USGS, QUATERNARY FAULTS & FOLDS IN THE US KMZ FILE OVERLAIN

REV.	DATE	BY	DESCRIPTION

Terracon
Consulting Engineers and Scientists
25809 I-30 SOUTH BRYANT, AR 72022
PH. (501) 847-9292 FAX. (501) 847-9210

RECENT FAULTS MAP

PERMIT APPLICATION FIGURE

NGL WASTE SERVICES, LLC

NORTH RANCH SURFACE WASTE MANAGEMENT FACILITY

LEA COUNTY NEW MEXICO

FIG. 6

DESIGNED BY:	DEW
DRAWN BY:	DEW
APPVD. BY:	FOC
SCALE:	1" = 100'
DATE:	APRIL 2019
JOB NO.	35187378
ACAD NO.	572-002
SHEET NO.:	OF

N:\GEOARCHIVE\CAD\572\002\MCCLOY\PERMIT TEXT FIGURES\PERMIT NARRATIVE\FIG 6 - RECENT FAULTS MAP.DWG

LEGEND:

- 3300 — EXISTING GRADE CONTOURS (2' CONTOURS)
- PERMIT BOUNDARY AND SECURITY FENCELINE
- OE — OVERHEAD ELECTRIC
- G — EXISTING GAS LINES / GAS EASEMENT
- W — EXISTING WATER LINE
- EXISTING CENTERLINE
- BH # — SITE INVESTIGATION GEOTECHNICAL BOREHOLE LOCATIONS
- 3000 — SPOT ELEVATIONS
- N: E: — PERMIT BOUNDARY CORNERS
- 30-02-30458 (PLUGGED) — EXISTING WELLS
- NGL PROPERTY LINE
- SURVEY SECTION LINE
- QUARTER SECTION LINE

T25S R34E, SEC 9 | T25S R34E, SEC 10

NW 1/4 | NE 1/4 | SW 1/4 | SE 1/4

EXISTING WELL PAD
30-025-42382 (CANCELLED)
30-025-42383 (CANCELLED)
EXISTING TANK PAD
30-02-30458 (PLUGGED)
30-025-29127 (PLUGGED)
N:419526.18 E:813513.83
N:419281.43 E:813526.49
N:419295.16 E:811946.18
N:418825.22 E:813489.27
BH 1
BH 2
T25S, R34E SEC. 10
3342.55
3342.64
3342.96
3340
GAS & OHE TO BE RELOCATED BY OWNER PRIOR TO CELL CONSTRUCTION IN THIS AREA
BH 7
BH 8
3336.77
3337.58
BATTLE AXE ROAD (HWY 2)
N:417601.86 E:807487.96
BH 3
3339.74
N:417020.33 E:808329.76
N:416843.79 E:808597.23
3336.65
3336.65
N:416502.69 E:810363.47
3336.66
T25S, R34E SEC. 9
N:416176.17 E:812569.06
N:415983.97 E:809369.36
3335.63
N:415729.21 E:809851.19
BH 4
30-025-20906 (PLUGGED)
EXISTING TANK PAD
30-025-43651 (ACTIVE)
EXISTING WELL PAD
30-025-43650
BH 5
N:415486.09 E:812251.42
30-025-44175 (ACTIVE)
30-025-44175 (ACTIVE)
EXISTING WELL PAD

N

500 0 250 500

SCALE IN FEET

FOR PERMITTING PURPOSES ONLY

N:\GEC\ARCHIVE\DAD\07.2020\MCCLOY\PERMIT TEXT FIGURES\PERMIT NARRATIVE\FIG 7 - EXISTING SITE CONDITIONS.DWG

REV.	DATE	BY	DESCRIPTION
1	9/19	KHJ	UPDATED PER JIM JORDAN COMMENTS

EXISTING SITE CONDITIONS

NORTH RANCH SURFACE WASTE MANAGEMENT FACILITY

NGL WASTE SERVICES, LLC

PERMIT APPLICATION DRAWING

LEA COUNTY NEW MEXICO

Terracon
Consulting Engineers and Scientists
BRYANT, AR 72022
25809 I-30 SOUTH
PH: (501) 847-9292
FAX: (501) 847-9210

FIG 7

DESIGNED BY:	MPB
DRAWN BY:	DEW
APPVD. BY:	MPB
SCALE:	SEE SCALEBAR
DATE:	SEPT. 2019
JOB NO.	35187378
ACAD NO.	572-002
SHEET NO.:	OF

T25S R34E, SEC 9 | T25S R34E, SEC 10

LEGEND:

- 3300 — EXISTING GRADE CONTOURS (11-30-2018, 2' CONTOURS)
- PERMIT BOUNDARY AND SECURITY FENCELINE
- OE — OVERHEAD ELECTRIC
- G — EXISTING GAS LINES / GAS EASEMENT
- BH # — W — EXISTING WATER LINE
- EXISTING ROAD CENTERLINE
- BOREHOLE LOCATIONS
- NGL PROPERTY LINE
- SURVEY SECTION LINE
- CELL BOUNDARIES
- PHASE BOUNDARIES
- 40' WIDE CELL ACCESS ROAD

PHASE 1
PHASE 2
PHASE 3
CELL E-1 (9.6 AC.)
CELL E-2 (9.6 AC.)
CELL E-3 (28.2 AC.)
CELL E- (18. AC.)
CELL E-5 (18.6 AC.)
CELL E-6 (21.6 AC.)
CELL W-1 (15.3 AC.)
CELL W-2 (11.8 AC.)
CELL W-3 (15.2 AC.)
CELL W- (23.9 AC.)
CELL W-5 (2 .7 AC.)
NORTH STORMWATER POND
WEST STORMWATER POND
EAST STORMWATER POND
LEACHATE EVAP POND
SCALES AND SCALEHOUSE
SITE ENTRANCE
ENTRANCE GATE
PAVED DRIVEWAY
PROPOSED DRYING PAD
PROPOSED WASH PAD
EMERGENCY SECONDARY ACCESS GATE
BATTLE AXE ROAD (HWY 2)
BH 1
BH 2
BH 3
BH 4
BH 5
BH 7
3340
82 999.818 IRS "#20666"
84 999.818 IRS "#20666"
4 3334.647 CP
83
85 [illegible]

N

SCALE IN FEET: 500 0 250 500

REV	DATE	BY	DESCRIPTION

SITE DEVELOPMENT
PERMIT APPLICATION FIGURE
SURFACE WASTE MANAGEMENT FACILITY
NORTH RANCH
LEA COUNTY NEW MEXICO

Terracon
Consulting Engineers and Scientists
25809 I-30 SOUTH BRYANT, AR 72022
PH. (501) 847-9232 FAX: (501) 847-9210

FIGURE 8

DESIGNED BY:	MPB
DRAWN BY:	DEW
APPVD. BY:	MPB
SCALE:	SEE SCALEBAR
DATE:	APRIL 2019
JOB NO.	35187378
ACAD NO.	572/002
SHEET NO.:	OF

N:\GEC\ARCHIVE\CAD\572\002\MCCLOY\PERMIT TEXT FIGURES\PERMIT NARRATIVE\FIG 8 - NEW SITE DEVELOPMENT MAP.DWG

N

PROPOSED PERMIT BOUNDARY

1/2-MILE OFFSET OF FACILITY PERIMETER

1-MILE OFFSET OF FACILITY PERIMETER

WATER WELLS:
CO2314 AND CO2315
DEPTH=175 FEET

NOTE:
1. WATER WELL INFORMATION OBTAINED FROM NEW MEXICO OFFICE OF THE STATE ENGINEER POD LOCATION GIS APPLICATION.
2. NO PERMANENT RESIDENCE, SCHOOL, HOSPITAL, INSTITUTION OR CHURCH EXIST WITHIN 200-FEET OF THE PROPOSED FACILITY.
3. SHOWN TOWNSHIP 25S RANGE 34 E, SECTIONS AS LABELED

Project Mngr:	MPB
Drawn By:	JBM
Checked By:	MPB
Approved By:	MPB

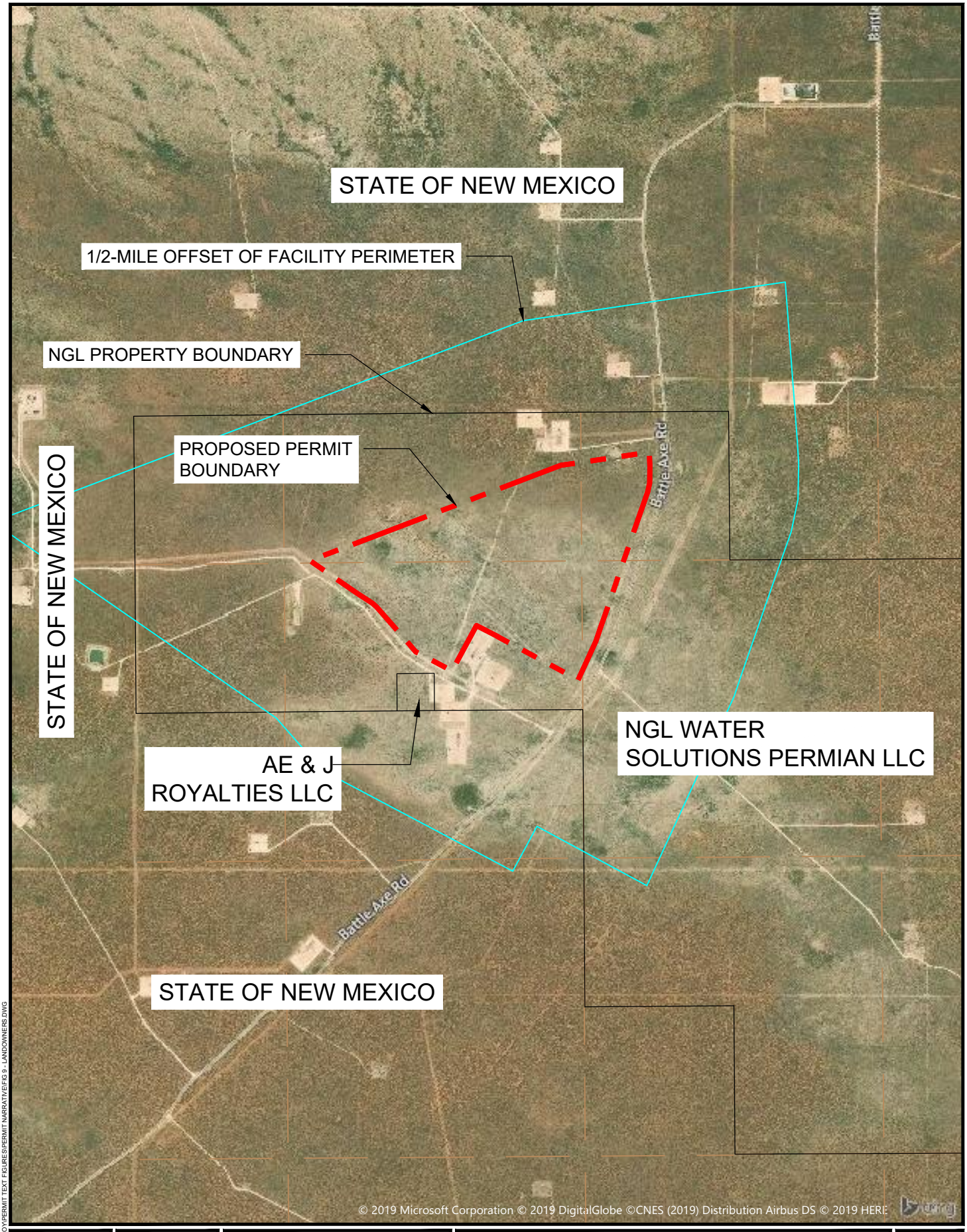
Project No.	35187378
Scale:	1"=2000'
File No.	572-002
Date:	APRIL 2019

Terracon
Consulting Engineers and Scientists
25809 I-30 SOUTH BRYANT, AR 72022
PH. (501) 847-9292 FAX. (501) 847-9210

WATER WELLS AND DWELLINGS WITHIN 1/2 MILE
PERMIT DRAWING
SURFACE WASTE MANAGEMENT FACILITY
NORTH RANCH
LEA COUNTY NEW MEXICO

FIG. No. 9

N:\DESIGN\VEGA25\72000\MCGLOY\PERMIT_TEXT FIGURES\PERMIT_NARRATIVE\FIG # MCGLOY WATER WELL MAP.DWG



N:\GEOARCHIVE\CAD\572\002\MCCLOY\PERMIT TEXT FIGURES\PERMIT NARRATIVE\FIG 9 - LANDOWNERS.DWG

Project Mngr:	MPB
Drawn By:	DEW
Checked By:	MPB
Approved By:	FOC

Project No.	35187378
Scale:	NTS
File No.	572/002
Date:	JANUARY 2019

Terracon
Consulting Engineers and Scientists
25809 INTERSTATE 30 S BRYANT, ARKANSAS 72022
PH. (501) 847-9292 FAX. (501) 847-2910

LANDOWNERS WITHIN 1/2 MILE

PERMIT APPLICATION FIGURE

SURFACE WASTE MANAGEMENT FACILITY

NORTH RANCH

LEA COUNTY NEW MEXICO

FIG. No. 10

Appendix A
Permit Application Form C-137

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

For State Use Only:

Form C-137
Revised August 1, 2011

Submit 1 Copy to Santa Fe Office

APPLICATION FOR SURFACE WASTE MANAGEMENT FACILITY

A meeting should be scheduled with the Division's Santa Fe office Environmental Bureau prior to pursuing an application for a surface waste management facility in order to determine if the proposed location is capable of satisfying the siting requirements of Subsections A and B of 19.15.36.13 NMAC for consideration of an application submittal.

1 Application: ☒ New ☐ Modification ☐ Renewal

2. Type: ☒ Evaporation ☐ Injection ☐ Treating Plant ☒ Landfill ☐ Landfarm ☒ Other :WASTE DRYING PADS

3. Facility Status: ☒ Commercial ☐ Centralized

4. Operator: NGL WASTE SERVICES, LLC

Address: 3773 CHERRY CREEK Dr., SUITE 1000, DENVER, CO 80209

Contact Person: DOUG WHITE Phone: (303) 815-1010 x3179

5. Location: _____/4 _____/4 Section 9 & 10 Township 25S Range 34E

6. Is this an existing facility? ☐ Yes ☒ No If yes, provide permit number _____

7. Attach the names and addresses of the applicant and principal officers and owners of 25 percent or more of the applicant. Specify the office held by each officer and identify the individual(s) primary responsible for overseeing management of the facility.

8. Attach a plat and topographic map showing the surface waste management facility's location in relation to governmental surveys (quarter-quarter section, township and range); highways or roads giving access to the surface waste management facility site; watercourses; fresh water sources, including wells and springs; and inhabited buildings within one mile of the site's perimeter.

9. Attach the names and addresses of the surface owners of the real property on which the surface waste management facility is sited and surface owners of the real property within one mile of the site's perimeter.

10. Attach a description of the surface waste management facility with a diagram indicating the location of fences and cattle guards, and detailed construction/installation diagrams of pits, liners, dikes, piping, sprayers, tanks, roads, fences, gates, berms, pipelines crossing the surface waste management facility, buildings and chemical storage areas.

11. Attach engineering designs, certified by a registered professional engineer, including technical data on the design elements of each applicable treatment, remediation and disposal method and detailed designs of surface impoundments.

12. Attach a plan for management of approved oil field wastes that complies with the applicable requirements contained in 19.15.36.13, 19.15.36.14, 19.15.36.15 and 19.15.36.17 NMAC.

13. Attach an inspection and maintenance plan that complies with the requirements contained in Subsection L of 19.15.36.13 NMAC.

14. Attach a hydrogen sulfide prevention and contingency plan that complies with those provisions of 19.15.3.118 NMAC that apply to surface waste management facilities.

15. Attach a closure and post closure plan, including a responsible third party contractor's cost estimate, sufficient to close the surface waste management facility in a manner that will protect fresh water, public health, safety and the environment (the closure and post closure plan shall comply with the requirements contained in Subsection D of 19.15.36.18 NMAC).

16 Attach a contingency plan that complies with the requirements of Subsection N of 19.15.36.13 NMAC and with NMSA 1978, Sections 12-12-1 through 12-12-30, as amended (the Emergency Management Act).

17. Attach a plan to control run-on water onto the site and run-off water from the site that complies with the requirements of Subsection M of 19.15.36.13 NMAC.

18. In the case of an application to permit a new or expanded landfill, attach a leachate management plan that describes the anticipated amount of leachate that will be generated and the leachate's handling, storage, treatment and disposal, including final post closure options.

19. In the case of an application to permit a new or expanded landfill, attach a gas safety management plan that complies with the requirements of Subsection O of 19.15.36.13 NMAC

20. Attach a best management practice plan to ensure protection of fresh water, public health, safety and the environment.

21. Attach a demonstration of compliance with the siting requirements of Subsections A and B of 19.15.36.13 NMAC.

22. Attach geological/hydrological data including:

(a) a map showing names and location of streams, springs or other watercourses, and water wells within one mile of the site;

(b) laboratory analyses, performed by an independent commercial laboratory, for major cations and anions; benzene, toluene, ethyl benzene and xylenes (BTEX); RCRA metals; and total dissolved solids (TDS) of ground water samples of the shallowest fresh water aquifer beneath the proposed site;

(c) depth to, formation name, type and thickness of the shallowest fresh water aquifer;

(d) soil types beneath the proposed surface waste management facility, including a lithologic description of soil and rock members from ground surface down to the top of the shallowest fresh water aquifer;

(e) geologic cross-sections;

(f) potentiometric maps for the shallowest fresh water aquifer; and

(g) porosity, permeability, conductivity, compaction ratios and swelling characteristics for the sediments on which the contaminated soils will be placed.

23. In the case of an existing surface waste management facility applying for a minor modification, describe the proposed change and identify information that has changed from the last C-137 filing.

24. The division may require additional information to demonstrate that the surface waste management facility's operation will not adversely impact fresh water, public health, safety or the environment and that the surface waste management facility will comply with division rules and orders

25. CERTIFICATION

I hereby certify that the information submitted with this application is true, accurate and complete to the best of my knowledge and belief.

Name: Douglas W. White Title: EVP

Signature: Date: 4/16/19

E-mail Address: Doug.white@NuEP.com

Appendix B
Project Correspondence

State of New Mexico
Energy, Minerals and Natural Resources Department

Susana Martinez
Governor

Ken McQueen
Cabinet Secretary

Matthias Sayer
Deputy Cabinet Secretary

Heather Riley, Division Director
Oil Conservation Division

October 24, 2018

Michael Bradford
Terracon Consultants, Inc.
25809 I-30 South
Bryant, Arkansas 72022

RE: Siting and Subsurface Investigation Work Plan
Centralized Surface Waste Management Facility
NGL Energy Partners LP – Proposed McCloy Ranch Landfill Site
Facility Location: Sections 9 and 10, Township 25 South, Range 34 East NMPM
Lea County, New Mexico

Dear Mr. Bradford:

The Oil Conservation Division (OCD) has received Terracon Consultants, Inc.'s boring plan proposal submitted on the behalf of NGL Energy Partners LP, dated October 17, 2018 and received by OCD via email on October 18, 2018, to investigate and characterize the uppermost aquifer and subsurface geology for a proposed centralized surface waste management facility permit (McCloy Ranch Landfill site) located in Sections 9 and 10, Township 25 South, Range 34 East NMPM, Lea County, New Mexico. The OCD has reviewed the proposal and determined that is adequate to proceed with the site investigation.

The OCD agrees that the proposed the eight (8) boring/monitoring well locations appear adequate. However, if the hydrogeologic conditions cannot be determined, additional borings or monitoring wells may be needed. It should be understood if a monitoring well is constructed, it shall be bailed until fully developed.

The OCD appreciates your cooperation in providing a boring plan for review, to determine if the proposed site is suitable for pursuing a permit. If there are any questions regarding this matter, please do not hesitate to contact me at (505) 476-3487 or brad.a.jones@state.nm.us.

Sincerely,

Brad A. Jones
Environmental Engineer

BAJ/baj

Cc: OCD District I Office, Hobbs

Bradford, Michael P

From: Tompson, Mike, EMNRD <Mike.Tompson@state.nm.us>
Sent: Thursday, October 11, 2018 5:46 PM
To: Bradford, Michael P
Cc: Shepherd, Holland, EMNRD
Subject: RE: [EXT] Abandoned/Inactive Mine Verification - Proposed Landfill Sites

Mr. Bradford,

The New Mexico Abandoned Mine Land Program knows of no abandoned mines in the three sections you listed. To complete the search for sand & gravel and other operations not tracked by the Abandoned Mine Land Program, you can go to this link: http://www.emnrd.state.nm.us/MMD/mmdonline.html.

Please let me know if you have any other questions.

Mike Tompson
New Mexico Mining & Minerals Division
(505) 476-3427

From: Bradford, Michael P <Michael.Bradford@terracon.com>
Sent: Thursday, October 11, 2018 3:20 PM
To: Tompson, Mike, EMNRD <Mike.Tompson@state.nm.us>; Shepherd, Holland, EMNRD <holland.shepherd@state.nm.us>
Subject: [EXT] Abandoned/Inactive Mine Verification - Proposed Landfill Sites

Good Afternoon,

I am working on two proposed landfill sites in Lea County, NM. One of our siting requirements is a verification that our proposed sites do not sit over any active or abandoned/inactive subsurface mines. We have verified via your bureau's GIS mapping that we do not conflict with any registered/active mines, but there is not an online mechanism of verifying conflicts with abandoned/inactive mines. I was directed to you as the person who can provide us with that verification for our permitting.

Our sites Southwest of Jal in Lea County and are located at:

- T25S R34E, Section 9 and 10; and,
- T26S R36 E, Section 27

If you could provide us with written or map verification of any conflicts or verification that we are not in conflict it would be greatly appreciated. Email response is sufficient.

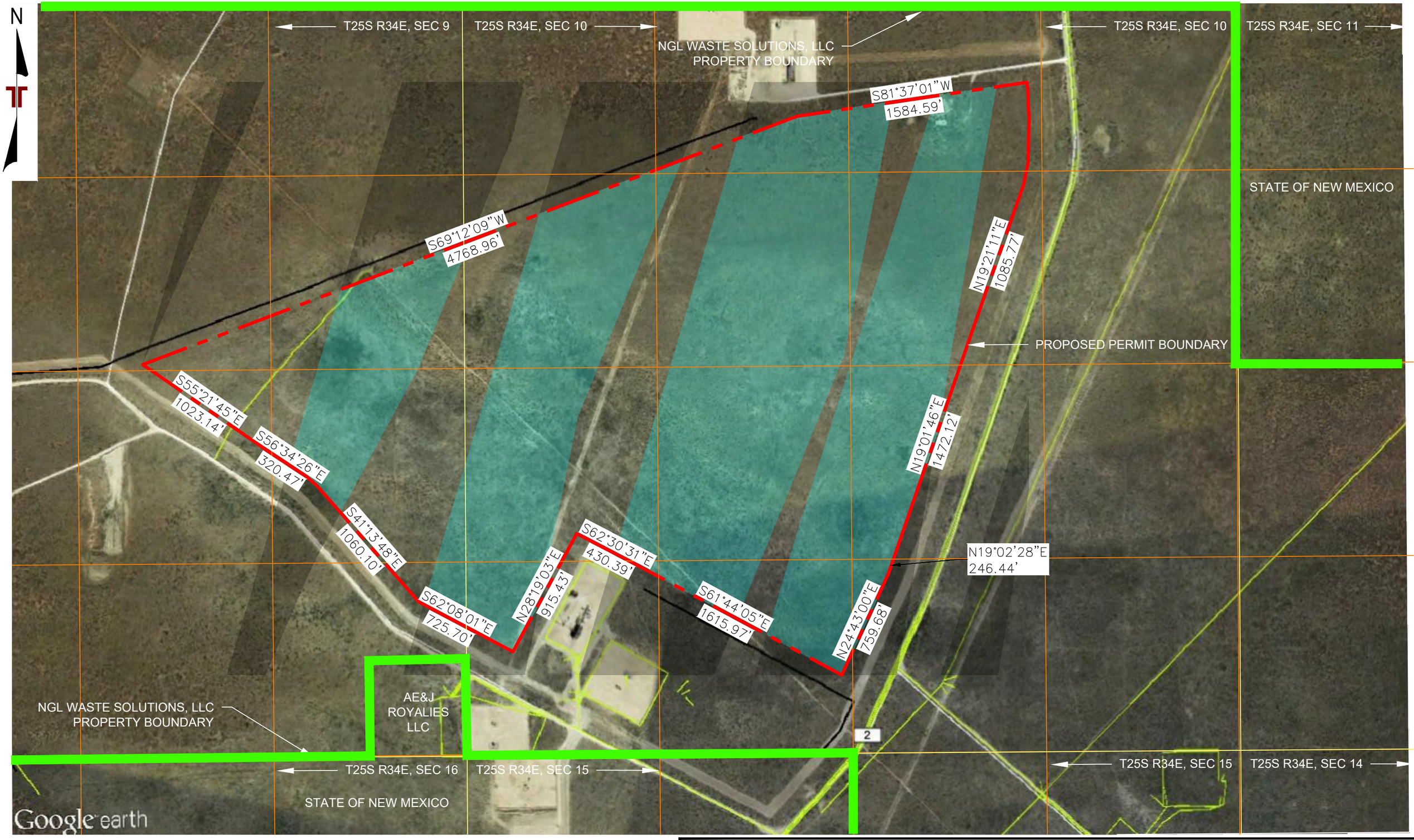
Feel free to write or call me with any questions.

Thank you in advance for your time,

Michael Bradford, P.E.
Senior Project Manager I Solid Waste Engineering Department
Terracon
25809 Interstate 30 South I Bryant, Arkansas 72022

Appendix C

Survey, Ownership and Site Information



Project Mngr: MPB	Project No. 35187312	Terracon Consulting Engineers and Scientists	PERMIT BOUNDARY PLAT MAP	FIG. No.
Drawn By: MPB	Scale: 1"=600'	25809 I-30 SOUTH BRYANT, AR 72022	PERMIT APPLICATION FIGURE	1
Checked By: MPB	File No. 572-002	PH. (501) 847-9292 FAX. (501) 847-9210	SURFACE WASTE MANAGEMENT FACILITY	
Approved By: MPB	Date: SEPTEMBER 2019		NORTH RANCH	
			LEA COUNTY NEW MEXICO	

N:\GEC\ARCHIVE\CAD\37XXX\MCCLOY\PERMIT TEXT FIGURES\APPENDIX C\NO CONTOURS FIG1 MCCLOY+DESIGN+ SECTION, TOWNSHIP, RANGE.DWG

NGL Water Solutions Permian, LLC

Officer's Certificate

I, the undersigned, being a duly authorized officer of NGL Water Solutions Permian, LLC, a Colorado limited liability company ("**NGL Permian**"), do hereby certify the following:

1. NGL Waste Services, LLC, a New Mexico limited liability company ("**NGLWS**"), is a wholly-owned direct subsidiary of NGL Permian.
2. As of the date of this certificate, NGL Permian acknowledges it has agreed to grant such rights and execute such instruments as necessary to permit NGLWS to permit and operate a Surface Waste Management Facility on approximately 303 acres of deeded land in Lea County, New Mexico owned by NGL Permian, the metes and bounds of which are located within the following sections:

   SW4NE4, SE4NE4, NW4SE4, NE4SE4, ANB SE4SE4 OF SECTION 9, TOWNSHIP 25S, RANGE 34E; and

   NW4NW4, NE4NW4, NW4NE4, SW4NW4, SE4NW4, SW4NE4, NW4SW4, NE4SW4, NW4SE4, SW4SW4, SE4SW4, AND SW4SE4 OF SECTION 10, TOWNSHIP 25S, RANGE 34E.

Certified and executed as of this 25th day of July, 2019.

NGL WATER SOLUTIONS PERMIAN, LLC

By: _____

Name: Douglas W. White

Title: Executive Vice President

LIMITED LIABILITY COMPANY AGREEMENT

OF

NGL WASTE SERVICES, LLC

a New Mexico limited liability company

This LIMITED LIABILITY COMPANY AGREEMENT ("***Agreement***") of NGL Waste Services, LLC ("***Company***"), effective April 16, 2019, is adopted, executed and agreed to by the sole Member (as defined below).

1. *Formation.* The Company has been organized as a New Mexico limited liability company under and pursuant to the New Mexico limited liability company Act (as amended from time to time, the "***Act***"). The business of the Company shall be conducted under the name NGL WASTE SERVICES, LLC or such other names that comply with applicable law as the Member may from time to time deem necessary or desirable.

2. *Member.* NGL Water Solutions Permian, LLC, a Colorado limited liability company shall be the sole member of the Company ("***Member***").

3. *Contributions.* Without creating any rights in favor of any third party, the Member may, from time to time, make contributions of cash or property to the capital of the Company, but shall have no obligation to do so.

4. *Units.* Ownership in the Company shall be represented by membership units ("***Units***"). Such Units shall not be represented by written certificates unless otherwise approved by the Member. The Member is the record and beneficial owner of 1,000 Units, representing all the issued and outstanding Units of the Company.

5. *Distributions.* The Member shall be entitled (a) to receive all distributions (including without limitation liquidating distributions) made by the Company and (b) to enjoy all other rights, benefits and interests in the Company.

6. *Management.* The powers of the Company shall be exercised by or under the authority of, and the business and affairs of the Company shall be managed under the direction of, the Member, which shall make all decisions and take all actions for the Company. Notwithstanding the foregoing, the Member may designate one or more persons, who may or may not be members of the Company, as officers ("***Officers***") of the Company. Officers shall have such rights and duties as may be designated by the Member.

7. *Indemnification.*

a. For purposes of this Agreement, "***Person***" shall mean an individual or a corporation, firm, limited liability company, partnership, joint venture, trust, unincorporated organization, association, government agency or political subdivision thereof or other entity.

b. For purposes of this Agreement "***Indemnitee***" shall mean: (i) the Member; (ii) any Person who is or was a director, officer, fiduciary, trustee, manager (as such term is defined in the Act) or managing member of the Company or the Member, (iii) any Person who is or was serving at the request of the Member as a director, officer, fiduciary, trustee, manager (as such term is defined in the Act) or managing member of another Person owing a fiduciary duty to the Company or the Member; provided, that a Person shall not be an "***Indemnitee***" by reason of providing, on a fee-for-services basis, trustee, fiduciary or custodial services; (iv) any Person that controls the Member; and (v) any Person the Member designates as an "***Indemnitee***" for purposes of this Agreement.

c. To the fullest extent permitted by law but subject to the limitations expressly provided in this Agreement, each Indemnitee shall be indemnified and held harmless by the Company from and against any and all losses, claims, damages, liabilities, joint or several, expenses (including legal fees and expenses), judgments, fines, penalties, interest, settlements or other amounts arising from any and all threatened, pending or completed claims, demands, actions, suits or proceedings, whether civil, criminal, administrative or investigative, and whether formal or informal and including appeals (collectively, any "***Proceeding***"), in which any Indemnitee may be involved, or is threatened to be involved, as a party or otherwise, by reason of its status as an Indemnitee and acting (or refraining to act) in such capacity; provided, that the Indemnitee shall not be indemnified and held harmless pursuant to this Agreement if there has been a final and non-appealable judgment entered by a court of competent jurisdiction determining that, in respect of the matter for which the Indemnitee is seeking indemnification pursuant to this Agreement, the Indemnitee acted in bad faith or engaged in fraud, willful misconduct or, in the case of a criminal matter, acted with knowledge that the Indemnitee's conduct was unlawful. Any indemnification pursuant to this Section shall be made only out of the assets of the Company, it being agreed that the Member shall not be personally liable for such indemnification and shall have no obligation to contribute or loan any monies or property to the Company to enable it to effectuate such indemnification.

d. To the fullest extent permitted by law, expenses (including legal fees and expenses) incurred by an Indemnitee who is indemnified pursuant to Section 7(c) in defending any claim, demand, action, suit or proceeding shall, from time to time, be advanced by the Company prior to a final and non-appealable judgment entered by a court of competent jurisdiction determining that, in respect of the matter for which the Indemnitee is seeking indemnification pursuant to this Section, the Indemnitee is not entitled to be indemnified upon receipt by the Company of any undertaking by or on behalf of the Indemnitee to repay such amount if it shall be ultimately determined that the Indemnitee is not entitled to be indemnified as authorized by this Section.

e. The indemnification provided by this Section shall be in addition to any other rights to which an Indemnitee may be entitled under any agreement, pursuant to the consent of the Member, as a matter of law, in equity or otherwise, both as to actions in the Indemnitee's capacity as an Indemnitee and as to actions in any other capacity, and shall continue as to an Indemnitee who has ceased to serve in such capacity and shall inure to the benefit of the heirs, successors, assigns and administrators of the Indemnitee.

f. The Company may purchase and maintain insurance, on behalf of the Company, its affiliates, the Indemnitees and such other Persons as the Company shall determine, against any liability that may be asserted against, or expense that may be incurred by, such person in connection with the Company's or any of its affiliate's activities or such Person's activities on behalf of the Company or any of its affiliates, regardless of whether the Company would have the power to indemnify such Person against such liability under the provisions of this Agreement.

g. For purposes of this Section, the Company shall be deemed to have requested an Indemnitee to serve as fiduciary of an employee benefit plan whenever the performance by it of its duties to the Company also imposes duties on, or otherwise involves services by, it to the plan or participants or beneficiaries of the plan; excise taxes assessed on an Indemnitee with respect to an employee benefit plan pursuant to applicable law shall constitute "*fines*" within the meaning of Section 7(c); and action taken or omitted by it with respect to any employee benefit plan in the performance of its duties for a purpose reasonably believed by it to be in the best interest of the participants and beneficiaris of the plan shall be deemed to be for a purpose that is in the best interests of the Company.

h. In no event may an Indemnitee subject the Member to personal liability by reason of the indemnification provisions set forth in this Agreement.

i. An Indemnitee shall not be denied indemnification in whole or in part under this Section because the Indemnitee had an interest in the transaction with respect to which the indemnification applies if the transaction was otherwise permitted by the terms of this Agreement.

j. The provisions of this Section are for the benefit of the Indemnitees and their heirs, successors, assigns, executors and administrators and shall not be deemed to create any rights for the benefit of any other persons.

k. The Company's obligation to indemnify and to prepay expenses under sub-paragraphs (c) and (d) of this Section shall arise, and all rights granted to the Indemnitees hereunder shall vest, at the time of the occurrence of the transaction or event to which a Proceeding relates, or at the time that the action or conduct to which such Proceeding relates was first taken or engaged in (or omitted to be taken or engaged in), regardless of when such Proceeding is first threatened, commenced or completed. No amendment, modification or repeal of this Section or any provision hereof shall in any manner terminate, reduce or impair the right of any past, present or future Indemnitee to be indemnified by the Company, nor the obligations of the Company to indemnify any such Indemnitee under and in accordance with the provisions of this Section as in effect immediately prior to such amendment, modification or repeal with respect to claims arising from or relating to matters occurring, in whole or in part, prior to such amendment, modification or repeal., regardless of when such claims may arise or be asserted.

8. *Limitation of Liability.*

a. Notwithstanding anything to the contrary set forth in this Agreement and to the full extent permitted by applicable law, no Indemnitee shall be liable for monetary damages to the Company, the Member or any other persons who have acquired ownership interests in the Units, for losses sustained or liabilities incurred as a result of any act or omission of an Indemnitee unless there has been a final and non-appealable judgment entered by a court of competent jurisdiction determining that, in respect of the matter in question, the Indemnitee acted in bad faith or engaged in fraud, willful misconduct or, in the case of a criminal matter, acted with knowledge that the Indemnitee's conduct was criminal.

b. To the extent that, at law or in equity, an Indemnitee has duties (including fiduciary duties) and liabilities relating thereto to the Company or the Member, the Indemnitee acting in connection with the Company's business or affairs shall not be liable to the Company or the Member for such Indemnitee's good faith reliance on the provisions of this Agreement.

c. Any amendment, modification or repeal of this Section or any provision hereof shall be prospective only and shall not in any way affect the limitations on the liability of the Indemnitees under this Section as in effect immediately prior to such amendment modification or repeal with respect to claims arising from or relating to matters occurring, in whole or in part, prior to such amendment, modification or repeal, regardless of when such claims may arise or be asserted.

d. The Member, in its management capacity of the Company, may rely upon, and shall be protected in acting or refraining from acting upon, any resolution, certificate, statement, instrument, opinion, report, notice, request, consent, order, bond, debenture or other paper or document believed by it to be genuine and to have been signed or presented by the proper party or parties.

e. The Member, in its management capacity of the Company, may consult with legal counsel, accountants, appraisers, management consultants, investment bankers and other consultants and advisers selected by it, and any act taken or omitted to be taken in reliance upon the advice or opinion (including an opinion of counsel) of such persons as to matters that the Member, in its management capacity of the

Company, reasonably believes to be within such person's professional or expert competence shall be conclusively presumed to have been done or omitted in good faith and in accordance with such advice or opinion.

9. *Dissolution.* The Company shall dissolve, and its affairs shall be wound up upon: (a) the consent of the Member; or (b) the entry of a decree of judicial dissolution under the Act. No other event will cause the Company to dissolve.

10. *Creditors.* None of the provisions of this Agreement shall be for the benefit of, or shall be enforceable by, a creditor of the Company.

11. *Invalidity of Provisions.* If any provision or part of a provision of this Agreement is or becomes for any reason, invalid, illegal or unenforceable in any respect, the validity, legality and enforceability of the remaining provisions and part thereof contained herein shall not be affected thereby and this Agreement shall, to the fullest extent permitted by law, be reformed and construed as if such invalid, illegal or unenforceable provision, or part of a provision, had never been contained herein, and such probision or part reformed so that it would be valid, legal and enforceable to the maximum extent possible.

12. *Amendment.* This Agreement may be amended by the Member; provided, that any amendment to this Agreement must be in writing and signed by the Member.

13. *Governing Law.* This Agreement is governed by and shall be construed in accordance with the laws of the State of New Mexico.

IN WITNESS WHEREOF, the Member has adopted, executed and agreed to this Agreement effective as of the date first set forth above.

SOLE MEMBER

NGL WATER SOLUTIONS PERMIAN, LLC

Kurston P. McMurray
Executive Vice President, General Counsel and Secretary

Appendix D
Facility Operating Plan

Surface Waste Management Facility Operating Plan

North Ranch Surface Waste Management Facility
Lea County, New Mexico

September 2019
Project No. 35187378

Prepared for:
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3773 Cherry Creek Dr., Suite 1000
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303-815-1010

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1.0 INTRODUCTION

1.1 Purpose, Scope, and Applicability

The following document comprises the Operating Plan for the NGL Waste Services, LLC (NGL) North Ranch Surface Waste Management Facility (Facility) located near Jal, Lea County, New Mexico. The site was formerly known as McCloy Ranch in relevant correspondence with the Energy, Minerals and Natural Resources Department, Oil Conservation Division (NMOCD or Division). Throughout this Operating Plan the references to *New Mexico Administrative Code (NMAC)* are noted as **19.15.36.XX**. This document is intended to comply with applicable requirements of **19.15.36.13** through **13.15.36.17** of the rules. This Operating Plan presents site specific methods and procedures by which the Facility will maintain and document compliance, and address the regulatory requirements applicable to the construction, operation and maintenance of the North Ranch Landfill and associated Leachate Evaporation Pond.

This Operating Plan has been prepared to assist in the operation and maintenance of the Oil Field Waste Landfill and Evaporation Pond. This document discusses and/or includes documentation and procedures for the following:

- Site development;
- Waste disposal, and if needed dry out;
- Operating requirements & procedures;
- Surface water management;
- Groundwater, Vadose Zone, & Explosive Gas Monitoring
- Leachate Collection & Transmission
- Inspection and maintenance;
- Health and safety;
- Emergency response and contingency action; and
- Recordkeeping and reporting.

1.1.1 Relationship to Other Facility Documents

This document and its attachments, including the Management Plan of Approved Oil Field Wastes and the Hazardous and Unauthorized Waste Exclusion Plan, will serve as a guide for the construction, operation and maintenance of the Oil Field Waste Landfill, waste drying pad, Evaporation Pond. It should be used in conjunction with the following supporting documents to ensure efficient and effective operation of the Oil Field Waste Landfill and Evaporation Pond:

- Current *New Mexico Administrative Code Rules* (Energy, Minerals and Natural Resources Department, Oil Conservation Division (NMOCD or Division), effective date June 30, 2016)
- Permit Narrative **Appendix E** Inspection and Maintenance Plan

- Permit Narrative **Appendix F** Contingency Plan
- Permit Narrative **Appendix G** Leachate Management Plan
- Permit Narrative **Appendix H** Closure and Post-Closure Care Plan

1.1.2 Existing Operating Documentation

The NMOCD issued an approval letter regarding the Siting and Subsurface Investigation Work Plan proposed for the North Ranch Surface Waste Management Facility (formerly known as McCloy Ranch Landfill Site) dated October 24, 2018. Personnel representing the New Mexico Abandoned Mine Land Program issued a statement regarding no known underground mines in the vicinity of the Facility. Project correspondence is included in **Appendix B** of the permit narrative.

1.2 Facility Description and Design

The North Ranch Landfill and Evaporation Pond Facility ownership consists of approximately 303 total acres. The combined property includes designated areas for combined Oil Field Waste and fluids disposal, waste handling, and scalehouse/administrative facilities.

1.2.1 Waste Disposal Area

The Oil Field Waste landfill area will be developed in phases as shown on the Permit Drawings. The landfill, as permitted, will consist of a 205-acre landfill footprint resulting in a design minimum waste capacity of 40,264,324 cubic yards (cy)

2.0 LANDFILL OPERATING PROCEDURES

This Operating Plan presents site specific methods and procedures by which the Facility will maintain and document compliance, and address the regulatory requirements applicable to the construction, operation and maintenance of the Facility. The Operating Plan will be updated as required to reflect current operations and regulations. This Operating Plan for the Facility is prepared in accordance with the requirements of **NMAC 19.15.36**.

2.1 General Operating Requirements

All operations at the landfill Facility shall be conducted in accordance with the Operating Plan for the Facility, the permit drawings/specifications, the surface waste management Facility permit conditions, and the operational standards outlined in **19.15.36**. The following sections address the specific requirements of Sections **8, 13, 14 and 17** of **NMAC 19.15.36** in relation to the Landfill and the associated leachate evaporation pond. Oil Field Waste will be disposed of within the North Ranch Oil Field Waste Landfill as described in the permit application (PA).

2.1.0 Conformance with Permit Documents

The operations that are proposed by this Operating Plan are in accordance with the requirements of **NMAC 19.15.36**, except where alternates/exceptions are approved in this Operating Plan and the permit narrative. Changes or deviations from the design and/or

operational standards described herein may require approval from the NMOCD. Depending on the extent of the changes and/or improvements, the NMOCD may require notification and a permit modification.

2.1.1 Working Face Size

In accordance with **19.15.36.14.A(1)** the Facility will limit waste disposal to the smallest practical (e.g. 50-ft x 50-ft x 5-ft) area and compact the oil field waste to the smallest practical volume. The operator will supervise the unloading and dumping at the site. One working face will be used for the placement of wastes. The operator shall not use equipment that may damage the integrity of the liner system in direct contact with a geosynthetic liner.

2.1.2 Access Requirements

19.15.36.14.A(2) outlines specific requirements and standards for landfill operations in relation to public and large animal access control. Specifically, owners and/or operators of surface waste management facilities must prevent unauthorized access by the public and entry by large animals to the landfill's active portion through the use of fences, gates, locks, cattle guards, or other means that attain equivalent protection. The North Ranch landfill has only one public access for vehicular traffic located at the northeastern corner of the site. The entrance gate is locked during non-operating hours to prevent illegal access to the Facility. At the entrance gate, a sign (**Figure 1**) that is readable from a distance of 50 feet will be posted indicating the operator's name; surface waste management Facility permit or order number; surface waste management Facility location by unit letter, section, township and range; and emergency telephone numbers.

As required by **19.15.13.I** a fence has been installed around the perimeter of the landfill site to control unauthorized access to the premises. A manually locked gate, at the entrance to the site can only be opened by North Ranch Landfill personnel and local Emergency Departments. Public traffic is prohibited from entering the property. **Appendix C** of the Permit Narrative provides a plat map of the permit boundary, the security fence will be place along and parallel to this boundary.

2.1.3 Fire Prevention

As required by **19.15.36.14.A(3)**, the Landfill shall be operated in a manner that does not pose a fire hazard to personnel or property. However, in the event that a fire does occur, stockpiles of soil are readily accessible on the north side and near the working face of the Landfill. Portable fire extinguishers are kept in the scalehouse/administration building, on landfill operating equipment and one by the diesel storage tank which will be located near the facility entrance and scale house. In the event a fire cannot be contained by onsite personnel, Emergency numbers are posted on the Landfill sign (**Figure 1**) at the Facility entrance and in the scalehouse/administration building. Refer to **Appendix F** Contingency Plan of the PA narrative.

2.1.4 Litter, Odor, and Dust Control

The Facility does not expect to accept waste which will cause blowing litter. In accordance with **19.15.36.14.A(4)**, the Facility will maintain litter control provisions at all times. If applicable, the incoming waste will be properly managed to assure that litter is picked up and the Facility is kept in a neat and orderly fashion. The nature of the waste to be accepted and the application of periodic cover material is generally an adequate means of on-site litter control. In the event that blowing litter causes a problem, the following measures may be taken:

- Installation of litter fences (portable and/or permanent);
- Utilization of temporary litter crews to collect litter which has left the active disposal area.

Prior to oil field waste acceptance vehicles will be screened for the presence of hydrogen sulfide (H_2S). If H_2S is detected above 10 parts per million (ppm), the load will be treated with calcium hypochlorite [$Ca(ClO)_2$] to lower the H_2S to acceptable levels prior to unloading. In addition, at least 1,000 of chemicals will be maintained onsite to control H_2S and its associated odors originating from the evaporation pond or disposal units. Surrounding land use is vacant oil-field industry land, it is not anticipated that odors generated at this Facility will adversely affect the public.

The access roads and active areas within the Facility will be treated with water, approved recycled waters (e.g. diluted leachate over lined or future lined areas), or dust palliatives, as needed, from a water truck to reduce dust generation. The posted speed limit will be 15 miles per hour (mph) inside the property which will assist in limiting the amount of dust generated by onsite traffic. Routine operations listed below are the most likely sources of dust along with recommended primary and secondary control measures"

- Disposal Operations
  - Primary Control Measure; apply water to unpaved roads as necessary, enforce posted speed limits
  - Secondary Control Measure; apply dust palliatives to unpaved portions of the facility, pave high traffic areas if operator determines it necessary.
- Excavations
  - Primary Control Measure; water areas prior to and during excavation. Water areas of excavation and haul roads during and at the end of each day to form a dust binding soil crust.
  - Secondary Control Measure; Phase work to reduce the amount of disturbed surface, apply additional water, work at lower elevations when wind velocity is high.
- Stockpiles
  - Primary control measure; water areas prior to excavation. Apply water to short term stockpiles when transporting soils, stockpile below grade or behind berms.

    - Secondary Control Measure; control vehicle access to the area. Apply dust surfactant to long-term stockpiles or apply seed/mulch or proven stabilization measures to prevent erosion.
- Track out extending onto public roadways
    - Primary Control Measure; pave permanent onsite entrance roadway. Sweep as necessary.
    - Secondary Control Measure; Apply recycled asphalt, caliche/gravel pads or similar materials at the transition from paved to unpaved roadways.
- Unpaved roadways and parking areas
    - Primary Control Measure; limit vehicle speed via post signage, apply water, use aggregate or caliche.
    - Secondary Control Measure; Apply water or surfactants to unpaved roads and parking lots, as needed, provide additional pavement.

Litter and odor will be further controlled by insuring that waste is processed and disposed of as quickly as it is received so that no waste accumulation occurs. All waste that is processed during the day is properly transported to the landfill active face. The Facility will cover disposed waste in the active working area as necessary to control fires, dust, debris, odors, blowing litter, and to limit the generation of leachate. Additional compacted soil approved by the Division will be applied to surfaces that will not receive an additional application of oil field waste or final cover for one month or more.

2.1.5 Prohibited Activities

As required under **19.15.36.14.A(5)**, the following activities will be prohibited at the Facility except as approved by the Division:

- Excavation of a closed cell by Facility personnel;
- Excavation of a closed cell by others.

2.1.6 Periodic Cover

19.15.36.14.A(6) requires that the operator shall provide adequate cover for the landfill's active face as needed to control dust, debris, odors or other nuisances, or as otherwise required by the Division. The facility will utilize water trucks for dust control. The water used will either come from the non-contact stormwater basins or an onsite fresh water well. Waste will be covered periodically with at least six inches of soil or an NMOCD approved alternative cover material as necessary to control the undesirable conditions. Cover soil material will be obtained from on-site borrow areas or excavated material stockpiles located throughout the landfill property. **19.15.36.14.A(7)** requires that any active area that does not receive waste or final cover for more than one month will be covered with an intermediate cover that consists of at least 12 inches of compacted onsite soils in accordance with Section 2.1.7 below.

2.1.7 Intermediate Cover

For areas of the landfill that will not receive additional oil field waste for one month or more, but have not reached the final waste elevation, **19.15.36.14.A(7)** requires that the operator shall provide intermediate cover that shall be:

- approved by the Division;
- stabilized with vegetation; and
- inspected and maintained to prevent erosion and manage infiltration or leachate during the oil field waste deposition process.

Operators at the Facility will place a minimum of 12-inches of soil from onsite sources over both intermediate slopes that will remain inactive for a month or more, and slopes that have reached final grade. Slopes that have reached final grade will utilize the intermediate cover soil as the lower most layer of the proposed final cover system.

Due to the arid climate of the Facility's location, wastes underlying the intermediate cover, and site soil types it is unlikely that vegetation will grow and establish over intermediate slopes. The Facility proposes to maintain the intermediate soil cover on temporary slopes via routine inspection and erosion repair. Intermediate slopes will be graded for positive drainage to promote run-off and minimize surface water infiltration and leachate generation/percolation.

Where available, relatively low permeable soils will be used for intermediate cover on temporary slopes. The intermediate cover over final grade slopes shall have a permeability of $1x10^{-5}$ cm/s or less. **Appendix E** of the permit application provides an inspection and maintenance plan for the Facility, which includes directives for inspection and maintenance of areas having received intermediate cover.

2.1.8 Landfill Cell Closure

19.15.36.14.A(8) indicates that when the operator has filled a landfill cell to final waste grades, the operator shall close it pursuant to the conditions contained in the surface waste management Facility permit and the requirements of **19.15.36.18.D(2)**. The operator shall notify the Division's Environmental Bureau at least three working days prior to a landfill cell's closure.

As required by **19.15.36.18.D(2)**, the operator shall properly close landfill cells, covering the cell with a top cover of soil contoured to promote drainage of precipitation. Side slopes shall not exceed a 25 percent grade (4:1 H:V), such that the final cover of the landfill's top portion has a gradient of two percent to five percent, and the slopes are sufficient to prevent the ponding of water and erosion of the cover material. The operator shall re-vegetate the area overlying the cell with native grass covering at least 70 percent of the landfill cover and surrounding areas, consisting of at least two grasses and not including noxious weeds or deep-rooted shrubs or trees, and maintain that cover through the post closure period.

2.1.9 Equipment Requirements

The Facility will be equipped with suitable equipment associated with the daily operation of the landfill, as well as provisions for routine maintenance of the equipment. The types and amounts of equipment and quantity of personnel required to operate the Oil Field Waste Landfill and Evaporation Pond will vary depending on the types and quantities of waste requiring disposal. **Table 2** below lists the typical equipment and personnel associated with the operation of the Landfill and Evaporation Pond. Additional equipment may be obtained from outside sources as needed to support the construction, operation, and maintenance needs of the Landfill and Evaporation Pond.

TABLE 2
EQUIPMENT AND PERSONNEL REQUIREMENTS

EQUIPMENT/PERSONNEL	TYPICAL QUANTITY	PURPOSE/USE
Equipment		
Excavator, bulldozers, scrapers, backhoes, graders, tractors and pans or front-end loaders	2-4	Used for excavation of future waste areas, borrow areas, and general site earthwork. Excavators load trucks from borrow areas and deliver cover soils to the landfill operating area.
Dump Truck(s), Water Truck(s)	4	Used to deliver soils and gravel to the landfill, water Facility roads, etc.
Compactor(s)	1-2	Waste compaction
Mower(s)/Bushhog(s)	1	Maintenance of vegetation
Personnel		
Oil Field Waste Landfill Manager	1	Manages operations of the Oil Field Waste Landfill. Completes the required paperwork associated with management of the Facility
Oil Field Waste Landfill Operators	1 to 2 or as needed for proper operations	Perform operations of the Oil Field Waste Landfill including directing waste placement, earthwork, and general Facility maintenance.
Truck/Tractor Drivers	2 to 3	Haul waste/cover soil to landfill. Will include but may not be limited to the Oil Field Waste Landfill Operators.

The equipment will be inspected on a regular basis to ensure the equipment is in good operating condition. Adequate back-up equipment will be leased or borrowed within 24 hours in the event of equipment breakdowns.

2.1.10 Ancillary Facilities

Employee facilities are provided at the scalehouse. Sanitary facilities and potable water are accessible to all landfill personnel.

2.1.11 Nuisance Avoidance

To prevent the Facility from becoming a public nuisance or public health hazard, procedures will be implemented to ensure compliance with **19.15.36.14.A(6)** and **19.15.36.17.A**. These procedures include dust and odor control, application of cover material, litter control, maintaining stormwater control structures, and general Facility maintenance.

2.1.12 Cover Maintenance Systems

The owner or operator shall be responsible for maintaining the cover system integrity and shall promptly repair erosion, washout, tracking, or other defects that result in exposed waste in either weekly or intermediate cover, or exposure of the barrier system of the final cover. Areas of liquids seepage, or areas exhibiting evidence of liquids seepage such as staining and discoloration of the cover system shall also be promptly repaired."

The integrity of the cover system for the landfill will be maintained throughout the active life of the Landfill and during the post-closure care period. Erosion, washouts, tracking and other cover system defects will be repaired as soon as weather allows. If liquids seepage should develop, the Facility will repair the area by the placement of additional cover material. If additional cover does not stop a seep, a case specific repair/mitigation measure will be developed and implemented.

The Facility will cover disposed waste in the active working area periodically as needed to control dust, debris, odors or other nuisances, and to limit the generation of leachate. An additional six inches of compacted soil (or suitable equivalent material approved by the NMOCD) will be applied to surfaces that will not receive an additional application of waste or final cover within 30 days. The intermediate cover shall be inspected and maintained to prevent erosion and manage surface water infiltration during the oil field waste deposition process, in accordance with **19.15.36.14.A(7)**.

2.1.13 Wet Weather Repairs

In the event that repairs to the landfill cover system are needed during inclement weather conditions, precautions will be exercised to prevent the creation of additional cover defects. Temporary measures shall be implemented until permanent repairs can be executed. Installation of final cover and establishment of permanent vegetative cover on closed waste

disposal cells will be scheduled so as to minimize the impacts to the Facility of performing work during wet weather.

2.2 Management of Approved Oil Field Wastes

Approved oil field wastes to be handled at the Facility will be managed in accordance with this Operating Plan and the Management Plan - Approved Oil Field Wastes included in **Attachment A** to this Operating Plan.

2.3 Emergency Response Contingency Plan

Pursuant to **19.15.36.8.C(10)**, the applicant is required to develop and implement a contingency plan in the event of fire or other emergency situations. The North Ranch Landfill has developed an emergency response contingency plan that is included in **Appendix F** of the PA narrative.

2.4 Procedures for Excluding the Receipt of Hazardous Waste & Unauthorized Waste

In accordance with **19.15.36.13.F** the North Ranch Landfill must implement a program to detect and prevent the disposal of regulated hazardous wastes, NORM, and additional unauthorized wastes. The Facility has developed a site-specific Hazardous and Unauthorized Waste Exclusion Plan (HUWEP) for the Landfill in accordance with the requirements of the NMAC.

The HUWEP includes the following:

- Purpose of monitoring and roles of landfill personnel;
- Types of wastes to be excluded;
- A written protocol that describes the methods to identify and screen potentially hazardous waste and other unauthorized wastes before it enters the landfill including the review of industrial customer's procedures for separating hazardous waste and other unauthorized wastes from other wastes. The written protocol shall describe the procedures, evaluation criteria, testing requirements, and decision making process that will be followed to determine whether to accept or reject industrial or process waste for disposal before it enters the landfill;
- Sampling and analysis procedures to be followed for new customers and for periodic re-testing of existing customer wastes. Testing laboratories shall be acceptable to the NMOCD;
- Random inspection procedures and documentation;
- Personnel training to be provided;
- Recordkeeping requirements; and
- A contingency plan, which includes notification procedures, and remedial actions to be taken when hazardous waste and other unauthorized wastes are identified.

The North Ranch Landfill maintains permanent operating records associated with the hazardous waste exclusion program, including all dates, procedures, and final waste disposition. The Facility HUWEP is included as **Attachment B** to this Operating Plan.

2.5 Gas Safety Management Plan

19.15.36.13.O states that each operator of a surface waste management facility that includes a landfill shall have a gas safety management plan that describes in detail procedures and methods that will be used to prevent landfill-generated gases from interfering or conflicting with the landfill's operation and protect fresh water, public health, safety and the environment. The plan shall address anticipated amounts and types of gases that may be generated, an air monitoring plan that includes the vadose zone and measuring, sampling, analyzing, handling, control and processing methods. The plan shall also include final post closure monitoring and control options. Section 5.3 below discusses the anticipated generation rate of landfill gas. Gas Safety is addressed in **Appendix F** of the PA narrative.

2.8 Run-On/Runoff Control Systems

19.15.36.13.M states that each operator shall have a plan to control run-on water onto the site and run-off water from the site, such that:

- the run-on and run-off control system shall prevent flow onto the surface waste management facility's active portion during the peak discharge from a 25-year storm; and
- run-off from the surface waste management facility's active portion shall not be allowed to discharge a pollutant to the waters of the state or United States that violates state water quality standards.

All stormwater control systems including ponds, ditches, dikes, and berms utilized to manage run-on and run-off for the North Ranch landfill are designed to handle the run-off from a 25-year/24-hour storm event. The Run-on/Run-off Control System and stormwater management are addressed in **Appendix J** of the permit narrative.

2.9 Surface Water Requirements

The landfill and associated surface water management infrastructure is designed to protect fresh water, public health and the environment. The Oil Field Waste landfill and associated facilities will implement and maintain best management practices (BMPs) to minimize erosion and control sediment to protect surface water quality during storm events. BMPs will include the construction of three area specific stormwater detention ponds designed to handle the 25-year, 24-hour design storm. The Oil Field Waste landfill and associated facilities shall not:

- Deposit waste in standing water; and shall not
- Allow the discharge of leachate from the landfill unit unless the discharge is permitted within a valid liquids disposal system or permitted under the NPDES system.

Stormwater run-off from the waste disposal areas that have not undergone final approved closure will be collected and diverted to detention basins as shown on the Permit Drawings in **Appendix K**. Stormwater that accumulates in the detention basins will evaporate and/or be contained within the facility perimeter berms. Although no discharge is expected, if the Multi-sector General Permit for stormwater discharges is required, then any stormwater discharges shall be in accordance with the Facility permit. The design of the landfill shall include provisions for let-down structures and mid-slope terraces as needed to minimize and control soil erosion. Also, all run-on and run-off control systems are designed to control a 25-year, 24-hour storm event.

2.10 Liquids Restrictions

In accordance with **19.15.36.13.E,** oil field waste containing free liquids will not be placed within the landfill. The operator will use the paint filter test as prescribed by the EPA (EPA SW-846, method 9095) to determine conformance of the oil field waste to this criterionOil field waste containing free liquids may be placed on drying pads, for evaporation of liquids and/or mixing with a soil or similar bulking agent, as indicated in the Permit Drawings in **Appendix K**. Absence of free liquids will be confirmed using the paint filter test prior to landfill disposal of the materials from the drying pads.

2.11 Recordkeeping Requirements

Sections **19.15.36.13.G**, **19.15.36.13.L**, **19.15.36.13.P**, **19.15.36.14.C.8**, **19.15.36.14.G**, **19.15.36.17.C.2**, and **19.15.36.17.D.2** outline specific recordkeeping requirements for surface waste management facilities. In particular, the Facility permanent operating record (POR) system will include:

- The North Ranch commercial facility shall maintain records reflecting the generator, the location of origin, the location of disposal within the commercial facility, the volume and type of oil field waste, the date of disposal and the hauling company for each load or category of oil field waste accepted at the commercial facility. The operator shall maintain such records for a period of not less than five years after the commercial facility's closure, subject to Division inspection; The C-138 form can be found in Appendix A.
- The Facility Inspection and Maintenance Plan (see **Appendix E** of the permit narrative) requires monthly inspections of leak detection sumps, including sampling if fluids are present, with analyses of fluid samples furnished to the Division. Records are required to be maintained for inspection dates, the inspector and the leak detection system's status. The Plan also requires records be kept of semi-annual inspection and sampling of monitoring wells events, if required, with analyses of ground water furnished to the Division, and maintenance of records of inspection dates, the inspector and ground water monitoring wells' status. Records are also kept for inspections of the berms and the outside walls of pond levees (quarterly and

after a major rainfall or windstorm) and maintenance of berms in such a manner as to prevent erosion. Inspection forms are provided in **Appendix E** of the permit narrative;

- The operator shall maintain records of the Facility training program, subject to Division inspection, for at least five years. Each operator shall conduct annual training for key personnel that includes general operations, permit conditions, emergencies, site safety, proper sampling methods and identification of exempt and non-exempt waste and hazardous waste;
- The operator shall monitor leak detection systems pursuant to the approved surface waste management facility permit conditions regarding the leachate evaporation pond(s). Monitoring records will be maintained in a form readily accessible for Division inspection and the Facility will report discovery of liquids in the leak detection system to the Division within 24 hours. Inspection forms are provided in **Appendix E** of the permit narrative;
- The operator shall seal a solid drainage pipe from the landfill leak detection system to convey collected liquids to a corrosion-proof sump or sumps located outside the landfill's perimeter for observation, storage, treatment or disposal. The operator may install alternative designs as approved by the Division. The operator shall test sumps' integrity annually and shall promptly repair or replace a sump that does not demonstrate integrity. The operator may test sumps that can be removed from their emplacements by visual inspection. The operator shall test other sumps by appropriate mechanical means. The operator shall maintain records of sump inspection and testing and make such records available for Division inspection. Inspection forms are provided in **Appendix E** of the permit narrative.
- Inspection records; and
- Retention Period record.

The North Ranch Landfill maintains a record keeping filing system to comply with these sections of the NMAC (Permanent Operating Record or POR). All records will be maintained at the Facility during the active life of the landfill and through the 30-year post-closure care period at which time the NMOCD Director may authorized destruction of the records. The Facility may develop an electronic POR record keeping system and enter newly acquired electronic records into the file storage directory. The electronic record shall be made available to Division personnel for inspection. (see also Section 9.0 below)

2.14 Survey Control

The North Ranch will establish a survey control system. The survey control system is used to insure and document that the Facility is developed in accordance with the approved permit drawings. A site coordinate system has been established at the Facility. The site coordinate system has been tied to the New Mexico East Zone State Plane Coordinate System and

provides the basis and reference for all construction and waste disposal operations at the Facility.

Grid markers shall be established, as needed, at positions to allow visual inspection of the progression of the fill and other features. The markers shall be mounted on steel or wooden posts, brightly painted, and placed in areas where they are not likely to be damaged or destroyed. Markers shall be identified consistent with permit drawing notations.

19.15.36.14.A.1 states that solid waste shall be spread and compacted in the smallest practical area as soon as it is unloaded for disposal. Spreading and compaction of the waste material is important as it maximizes the density and/or amount (tons) of waste that can be placed in a given area. Increasing the density and/or the amount (tons) of waste in a given area maximizes the useful life of the Facility. Compaction of the waste in layers also minimizes settling which can result in ponding of stormwater and/or damage to the final cover system.

2.15 Waste Filling Operations

2.15.1 Placement of Waste

The Oil Field Waste Landfill and Evaporation Pond at the Facility are to be developed in a sequence of phases in general accordance with the Permit Drawings in **Appendix K**. However, the landfill may be developed in areas contiguous with operating landfill areas, whether in the subsequent order or not, if operating conditions or engineering judgment necessitate it. Typically, waste disposal and fill progression in the Oil Field Waste Landfill will proceed from the lowest point in each cell or prepared area to the highest. A prepared area will be filled in lifts until the maximum design grades and/or slopes are reached (minus the final cover thickness). Waste will be spread and compacted per **19.15.36.14.A.1**. Normally, waste will be deposited in layers or lifts that generally will not exceed 10-15 feet in compacted thickness. Interior waste slopes will generally not exceed 3:1 (horizontal: vertical) with final slopes not exceeding 4:1. The top of each lift shall be graded to drain to the perimeter run-off control system at a minimum grade of 4%.

Waste loads and cover soils will generally be deposited at or near the top or toe of the active working face, except as indicated below for the case of waste placement in a new cell. Scrapers or dump trucks may deliver cover soil from the borrow area. A waste compactor or large bulldozer will push the waste or soil up or down the working face slope while evenly spreading the material. The waste compactor or dozer will then traverse the waste slope (both parallel and perpendicular to the slope if feasible) several times until the waste is compacted to the extent possible and practical. The number and orientation of compactor or dozer passes will vary depending on the type of compactor or dozer used, slope of the active working face, type of waste, and other factors. Cover soil will only be place as needed to control odors, dust, debris, and other nuisances, intermediate soil will be place over areas that will remain inactive for a period of 1-month or longer.

The operator shall not use equipment that may damage the integrity of the liner system in direct contact with a geosynthetic liner. The design of the Oil Field Waste Landfill includes a leachate collection and removal system and a protective layer designed to provide separation and protection for the critical underlying liner/leachate collection system components. Stress calculations demonstrating that a CAT 657 Scraper, or equivalent, may drive over the protective cover are provided in **Attachment E2** of **Appendix J** of the permit narrative.

The placement of the initial waste or first lift in a prepared area requires additional care and caution to avoid damage to the underlying liner and/or leachate collection systems. Generally, the only vehicles that should travel on the working surface/protective cover surface are pickup trucks, waste collection vehicles, trucks/trailers, and low ground pressure equipment. At no time shall waste compactors, dozers, excavators, loaders, or scrapers be allowed directly on the protective cover/working surface. Waste loads placed during initial development of a new cell will always be from the toe upward to the crest over the top of the leachate collection system protective cover. Once the initial 10-15 feet thick lift is placed and compacted over the protective cover, waste may be placed from the top or toe as indicated above.

2.15.2 Configuration and Development of Landfill

The Landfill is being developed in general accordance with the Permit Drawings in **Appendix K** of the permit narrative. The Landfill will be closed in accordance with the Facility closure in **Appendix H** of the permit narrative.

The side slopes of the completed cells will be graded to 4:1 (horizontal to vertical). The top of the Landfill will be graded to a minimum of 4% slope to promote runoff. A perimeter, all-weather access road will surround the Landfill.

In general, a typical waste cell is developed by the following steps:

1. Preparing a new waste disposal area to the depths and dimensions shown on the Construction Drawings, and stockpiling excavated soils on-site.
2. Constructing a bottom liner system to the dimensions shown on the Construction Drawings and in accordance with the plans and specifications for the construction project. A typical detail of the bottom liner system is shown on the Permit Drawings.
3. Grading the area around the waste cell and constructing diversion berms to minimize run-on into the waste cell.
4. Placing initial lift (approximately 10-ft thick) across bottom of new cell. The placement of the initial lift requires additional care and caution to avoid damage to the underlying liner system. At no time will waste compactors or other high ground pressure equipment be allowed directly on the protective cover.
5. Moving disposal activities to top of previously completed and covered waste, progressing on each new lift to give the site positive drainage at all times.

6. Starting the cycle over in subsequent waste areas.

Future waste cells will be developed sequentially in general accordance with the Facility cell progression plan shown on the Permit Drawings. The Facility may alter the sequence based on engineering planning of future development areas and economic considerations at the time of cell construction.

2.15.3 Site Capacity and Service Life

The estimated minimum operational waste capacity (waste and routine/intermediate soil cover) of the Landfill is 40,264,324 CY. Annual airspace consumption/disposal rate is unknown at the time of the PA preparation, therefore a range of potential site life is provided in Table 1.2 below.

TABLE 1
RANGE OF POTENTIAL SITE LIFE

Annual Disposal Rate (cy/year)	Design Capacity (cy)	Estimated Site Life (Years)
250,000	40,264,324	161.0
500,000	40,264,324	80.5
750,000	40,264,324	53.6
1,000,000	40,264,324	40.3

2.15.4 Eligible Wastes

The North Ranch Oil Field Waste landfill is permitted for the disposal of all eligible Oil Field Wastes as outlined in **19.15.36.13**. Eligible Oil Field Wastes means exempt or non-hazardous oil field wastes containing no free liquids. The operator shall not accept hazardous waste or waste containing regulated NORM. A solid waste is hazardous if it has been specifically listed as hazardous by the EPA or if it is hazardous by Ignitability, Reactivity and Corrosivity (IRC) characteristics.

The operator shall require documentation for accepting eligible oil field wastes in accordance with the Management Plan - Approved Oil Field Wastes included in **Attachment A** to this Operating Plan. Exempt and non-exempt Oil Field Wastes are further defined below:

- Certain Oil Field Wastes as allowed by NMAC 19.15.35.8, the operator will require testing and division authorization as required by this section.
- Exempt oil field wastes. EPA provided an exemption for oil field wastes that are codified in 40CFR Section 261.4 (b)(5) Exclusions. Therefore, most Oil Field Wastes are regulated as solid wastes rather than hazardous wastes. EPA identified criteria for these wastes to be exempt from RCRA Subtitle C regulations. For a waste to be exempt, it must satisfy the following:
  - Must be associated with operations to locate or remove oil or gas from the ground or to remove impurities from such substances and it must be intrinsic to and uniquely associated with oil and gas exploration, development or production operations (commonly referred to simply as exploration and production or Oil Field Waste). The waste must not be generated by transportation or manufacturing operations;
  - Must be waste from primary field operations;
- Excerpts from EPA's report entitled "Exemption of Oil and Gas Exploration and Production Wastes from Federal Hazardous Waste Regulations," regarding Exempt and Non-exempt Wastes are below:
  - **Exempt Oil Field Wastes**
    - Produced water
    - Drilling fluids
    - Drill cuttings
    - Rig wash
    - Drilling fluids and cuttings from offshore operations disposed of onshore
    - Geothermal production fluids
    - Hydrogen sulfide abatement wastes from geothermal energy production
    - Well completion, treatment, and stimulation fluids
    - Basic sediment, water, and other tank bottoms from storage facilities that hold product and exempt waste

- Accumulated materials such as hydrocarbons, solids, sands, and emulsion from production separators, fluid treating vessels, and production impoundments
- Pit sludges and contaminated bottoms from storage or disposal of exempt wastes
- Gas plant dehydration wastes, including glycol-based compounds, glycol filters, and filter media, backwash, and molecular sieves
- Workover wastes
- Cooling tower blowdown
- Gas plant sweetening wastes for sulfur removal, including amines, amine filters, amine filter media, backwash, precipitated amine sludge, iron sponge, and hydrogen sulfide scrubber liquid and sludge
- Spent filters, filter media, and backwash (assuming the filter itself is not hazardous and the residue in it is from an exempt waste stream)
- Pipe scale, hydrocarbon solids, hydrates, and other deposits removed from piping and equipment prior to transportation
- Produced sand
- Packing fluids
- Hydrocarbon-bearing soil
- Pigging wastes from gathering lines
- Wastes from subsurface gas storage and retrieval, except for the non-exempt wastes listed on page 11 (of the EPA publication)
- Constituents removed from produced water before it is injected or otherwise disposed of
- Liquid hydrocarbons removed from the production stream but not from oil refining
- Gases from the production stream, such as hydrogen sulfide and carbon dioxide, and volatilized hydrocarbons
- Materials ejected from a producing well during blowdown
- Waste crude oil from primary field operations
- Light organics volatilized from exempt wastes in reserve pits, impoundments, or production equipment

- **Non-Exempt Wastes**
  - Unused fracturing fluids or acids
  - Gas plant cooling tower cleaning wastes
  - Painting wastes
  - Waste solvents
  - Oil and gas service company wastes such as empty drums, drum rinsate, and blast media, painting wastes, spent solvents, spilled chemicals, and waste acids
  - Vacuum truck and drum rinsate from trucks and drums transporting or containing non-exempt waste

- Refinery wastes
- Liquid and solid wastes generated by crude oil and tank bottom reclaimers1
- Used equipment lubricating oils
- Waste compressor oil, filters, and blowdown
- Used hydraulic fluids
- Waste in transportation pipeline related pits
- Caustic or acid cleaners
- Boiler cleaning wastes
- Boiler refractory bricks
- Boiler scrubber fluids, sludges, and ash
- Incinerator ash
- Laboratory wastes
- Sanitary wastes
- Pesticide wastes
- Radioactive tracer wastes
- Drums, insulation, and miscellaneous solids

Additional eligible Oil Field Wastes that may be disposed of in the North Ranch Landfill include non-exempt, non-hazardous, oil field wastes. The operator shall require a form C-138, oil field waste document, completed by the generator or its authorized agent. This form shall be accompanied by acceptable documentation to determine that the oil field waste is non-hazardous. Also eligible for disposal at the Facility are “emergency non-oil field wastes.” The operator may accept non-hazardous, non-oil field wastes in an emergency if ordered by the department of public safety. The generator shall complete a form C-138, oil field waste document, describing the waste, and maintain the same, accompanied by the department of public safety order, subject to Division inspection. In any case, the operator must sign the C-138 form prior to acceptance and disposal of any waste.

2.16 Bottom Liner System Construction

In accordance with **19.15.36.14.C**, the bottom liner system associated with the Oil Field Waste Landfill has been designed and will be constructed using a double composite liner system. The purpose of the double composite liner system is to contain the waste mass while preventing liquids infiltration into the subsurface while also providing a mechanism for leak detection.

The bottom liner system for the Oil Field Waste disposal areas will begin with a geosynthetic clay liner (GCL), as an alternative base layer. A 60-mil textured High Density Polyethylene (HDPE) geomembrane will overly the base layer to form the composite barrier below the leak detection system. The leak detection system will consist and alternative 200-mil geocomposite drainage net that will blanket the entire cell floor. Ultimately, leaked fluids if any, will collect in a central collection sump which will have an inspection riser. The primary (upper) 60-mil textured HDPE geomembrane will be placed over the leak detection system. A leachate collection and removal system will consist of an alternative 200-mil geocomposite drainage net that will blanket

the entire cell floor and transmit leachate to 6-inch central collection pipe trench. Ultimately, the leachate system will convey leachate to a central collection sump where it will be pumped to the leachate evaporation by automatic pumps. The Leachate system will be overlain by 2-feet of protective cover soil. The cell floor shall be sloped at 2% in the lateral direction toward the main collection trench and 2% along the main collection trench toward the central collection sump. **Appendices J and K** of the permit narrative describe more detailed information on bottom liner construction.

2.17 Periodic and Intermediate Cover Placement

Waste will be covered as frequently as necessary with at least six inches of soil or an NMOCD approved alternative cover material. Cover soil material will be obtained from on-site borrow areas located throughout the landfill property. Any active area that does not receive waste or final cover for more than 30 days will be covered with an intermediate cover system that consists of at least 12 inches of onsite soils (including periodic cover). More information on daily/intermediate cover can be found in Section 2.1.6 of this Operating Plan.

2.18 Final Cover Placement

The proposed soil only, evapotranspiration (ET), alternative final cover system for the Landfill has been designed to prevent infiltration into the waste mass. The various components of the final cover system permitted for the Landfill are listed below and include the following from top to bottom:

- A soil erosion/vegetation layer composed of at least 12-inches of vegetated soil. A 70% coverage of at least two native grasses shall be maintained in accordance with the post closure provisions of **19.15.36.18.C.2.b**. The seed list shall conform to the most recent list from NMDOT Revegetation Zone 5 – Southern Desertic Basins, Plains, and Mountains.
- A compacted soil infiltration barrier layer composed of at least 36-inches of soil with a permeability of $1x10^{-5}$ cm/s or less.
- A compacted soil intermediate cover layer composed of at least 12-inches of soil with a permeability of $1x10^{-5}$ cm/s or less.

Design calculations demonstrating the performance equivalence to that of the regulatory prescriptive final cover system are provided in Appendix J of the permit application document.

The operator shall install the top landfill cover within one year of achieving the final landfill cell waste elevation. The operator shall ensure that the final landfill design elevation of the working face of the oil field waste is achieved in a timely manner with the date recorded in a field construction log. The operator shall also record the date of top landfill cover installation to document the timely installation of top landfill covers. The operator shall provide a minimum of three working

days' notice to the NMOCD in advance of the top landfill cover's installation to allow the Division to witness the top landfill cover's installation.

3.0 EVAPORATION POND OPERATING PROCEDURES

19.15.36.17 provides specific requirements that apply to the leachate evaporation pond. The evaporation pond will be the primary mechanism for the disposal of leachate resulting from landfilling operations. Secondary disposal options are discussed in the Leachate Management Plan presented in **Appendix G** of the permit narrative.

3.1 Evaporation Pond(s) Operations

3.1.1 Acceptable Liquids

19.15.36.17.C.1 requires the operator to ensure that only produced fluids or non-hazardous waste are discharged into or stored in the evaporation pond(s); and that no measurable or visible oil layer is allowed to accumulate or remain anywhere on the pond surface. Leachate discharging to the evaporation pond is not expected to contain measurable or visible oil due to its collection through the landfill's leachate collection and recovery system. Wet wastes placed in the landfill will be dried out prior to placement and due to the nature of the wastes accepted at this facility, minimal natural leachate generation is expected. Therefore, the leachate collected will primarily be from precipitation (which is minimal in the local arid climate) that must filter through the waste mass and the liner system's protective cover before arriving at the landfill sump. However, the oil absorbent booms located at the scalehouse will be used if necessary to clean oil from the evaporation pond surface.

3.1.2 Evaporation Pond Leak Detection

Pursuant to 19.15.36.17.C.2, the operator shall monitor leak detection systems pursuant to the approved surface waste management facility permit conditions, maintain monitoring records in a form readily accessible for Division inspection and report discovery of liquids in the leak detection system to the Division within 24 hours. Inspection forms for the leachate evaporation pond are provided in **Appendix E of the Permit Application.**

3.1.3 Evaporation Pond Access and Migratory Bird Protection

19.15.36.13.I and 19.15.36.17.C.3 sets forth requirements for fencing, screening, netting and covering the proposed leachate evaporation pond to prevent unauthorized access to the pond and to protect migratory birds. The Facility will have a perimeter chain link fence and pond specific fences are not required if there is an adequate perimeter fence surrounding the surface waste management facility. In lieu of screening, netting or covering the pond as a protection measure for migratory bird, the Facility proposes alternate means of bird protection and control around the pond area. The following subsections provides proposed alternative measures for controlling and protecting migratory birds.

NGL is proposing alternate procedures that have proven historically effective in discouraging bird propagation for comparable protection of migratory birds. There is a significant absence of habitat (i.e. wetlands) or food for migratory birds which will naturally deter migratory birds from congregating or landing in the proposed evaporation pond. In addition, Facility operations will

not deposit wet waste or free liquids into a disposal cell. All accepted wet waste will be dried on a concrete drying pad to the point that it can pass a paint filter test prior to disposal, thus, accumulation of oil is not anticipated into the leachate collection system. Therefore, leachate conveyed to the evaporation pond is not likely to contain oil. This eliminates the concerns typically associated with migratory birds being endangered if the land on the evaporation ponds.

To prevent oil sheen accumulation on the surface of the ponds (19.15.36.17.C(1) NMAC), Facility personnel will work routinely during each day inspect the pond for a visible sheen. In the unlikely event that a sheen or oil is found on the evaporation pond, the following actions will be implemented. Booms will be used to bring the oil sheen to the banks of the ponds where the oil will be removed by vacuum trucks and disposed at a nearby process water treatment facility. The Facility Manager, operators and employees will conduct periodic (every fifteen minutes) inspection rounds making note of migratory bird activity in or surrounding the evaporation pond during draining. Should migratory bird activity be discovered at the Facility, inspection and scare tactic frequency will be increased to alleviate the roosting of the birds.

Operations will not lend the Facility to migratory bird congregation, with proposed operations 24 hours per day, 7 days per week, and 365 days per year. During this time truck traffic will be consistently entering and leaving the Facility, and pumps will be intermittently transferring waters to the evaporation ponds. General activities at the site will involve human and truck motion, a natural deterrent to wildlife.
In the unlikely event that a bird lands on the pond and becomes contaminated, Facility employees will immediately make efforts to retrieve the bird. Upon retrieval, Facility employees will transport the bird to a local veterinary clinic for treatment. Bird rescue procedures adapted from those of the International Bird Rescue Research Center (www.bird-rescue.org) are provided in **Attachment D.**

3.1.4 Evaporation Spray Systems

19.15.36.17.C.4 indicates that the Division may approve spray systems to enhance natural evaporation. NGL is not proposing the use of spray systems at the evaporation pond. However, should the operator decide spray systems are necessary, engineering designs for spray systems shall be submitted to the Division's environmental bureau for approval prior to installation. If used, the operator shall ensure that spray evaporation systems are operated so that spray-borne suspended or dissolved solids remain within the perimeter of the pond's lined portion.

3.1.5 Oil and Solids Separation

19.15.36.17.C.5 requires that the operator shall use skimmer pits or tanks to separate oil from leachate prior to water discharge into the evaporation pond. However, leachate discharging to the evaporation pond is not expected to contain measurable oil due to its collection through the landfill's leachate collection and recovery system. Wet wastes placed in the landfill will be dried out prior to placement and due to the nature of the wastes accepted at this facility, minimal

natural leachate generation is expected. Therefore, the leachate collected will primarily be from precipitation (which is minimal in the local arid climate) that must filter through the waste mass and the liner system's protective cover before arriving at the landfill sump. If additional leachate evaporation ponds are constructed in the future, the operator shall also install a trap device in connected ponds to prevent solids from transferring from one pond to another unless approved in the surface waste management facility permit.

3.3 Below-Grade Tanks and Sumps

19.15.36.17.D(1) requires that below grade tanks be constructed with secondary containment and not be allowed to overflow. The tank materials shall be made from materials resistant to the tank's contents and sunlight. The Facility will comply with this regulation if and when a below grade tank is installed.

19.15.36.17.D(1) requires that sump integrity shall be tested annually and be repaired or replaced as necessary. The leachate evaporation pond's leak detection sump will be inspected as described in **Appendix E** of the Permit Narrative. If it is found that the sump requires repair or replacement, the operator shall pump all leachate from the landfill to a liquid waste disposal truck and taken to a permitted liquid waste treatment and disposal facility or salt water disposal well for the duration of the repair and certification.

3.4 Closure Required

19.15.36.17.E requires that the operator shall properly close pits, ponds and below-grade tanks within six months after cessation of use. The operator shall ensure that:

- Liquids, sludges, and residual sediments in the ponds or pits are removed and disposed of in permitted and lined oil field waste management facility;
- Liners can be shredded and recycled or disposed of in a permitted and lined solid waste management facility.;
- Concrete, piping, tanks, and appurtenances shall be removed and disposed of at a permitted and lined solid waste management facility;
- Equipment associated with the surface waste management facility is removed;
- The pond subgrade is sampled, in accordance with the procedures specified in chapter nine of EPA publication SW-846, test methods for evaluating solid waste, physical/chemical methods for TPH, BTEX, metals and other inorganics listed in Subsections A and B of **20.6.2.3103**, in accordance with a gridded plat of the pond containing at least four equal sections per Figure 3 of Appendix H of the permit application document. ; and
- Sample results are submitted to the environmental bureau in the Division's Santa Fe office.

The post-closure care period for a pond or pit shall be three years if the operator has achieved clean closure. During that period the operator or other responsible entity shall regularly inspect and maintain required re-vegetation. If there has been a release to the vadose zone or to ground water, then the operator shall comply with the applicable requirements of **19.15.29** and **19.15.30** (see Section 4.5 below).

4.0 SURFACE WATER MANAGEMENT

19.15.36 outlines specific requirements for run-on and run-off control systems associated with Oil Field Waste disposal areas. Landfills are required to design, construct, and maintain run-on and run-off control systems that include the following:

1. A run-on control system to prevent the flow onto the active portion of the landfill or waste processing area during the peak discharge from a 25-year, 24-hour storm;

2. A run-off control system from the active portion of the landfill to collect and control at least the water volume resulting from a 25-year, 24-hour storm.

The North Ranch Oil Field Waste Landfill and Evaporation Pond (Facility) have been designed with a series of berms, ditches, and drainage conveyances to direct storm water away from and around the active disposal area. Stormwater diversion is necessary and desirable to minimize contact with waste while limiting the potential for leachate production.

The surface of the landfill will be shaped and contoured to promote proper drainage away from the landfill. A series of intermediate and internal ditches will be necessary to divert stormwater run-off from the landfill to the perimeter ditches. The final cover system will also include a series of mid-slope drainage conveyances designed to control drainage off the landfill surface while minimizing erosion. All surface water run-off will be directed to area specific no-discharge stormwater sedimentation ponds located outside the active disposal area.

4.1 Seeding

Seeding of the landfill cover shall be conducted in the spring and fall (typically during February through April and September through November) on recently completed waste cells and areas requiring additional grass cover. Operations are typically timed to provide the maximum area available for seeding operations.

Selection of the appropriate vegetative species for the final cover surface is an important consideration for landfill closures. The seed list shall conform to the most recent list from NMDOT Revegetation Zone 5 – Southern Desertic Basins, Plains, and Mountains. In accordance with **19.15.36.18.C(2)(b)** final cover and surrounding areas shall be re-vegetated with two native grasses and shall be established such that at least 70% of the area is covered at the 2-year mark and then maintained throughout the post closure period.

Seed mixtures used in conjunction with the closure of the landfill will be applied using hydro mulching or other suitable technologies. Rolled erosion control products and other stabilization measures will be installed as needed in support of establishment of vegetation at the site.

4.2 Erosion Control Measures

Because exposed earth fill is subject to erosion, temporary and permanent erosion control measures are used to mitigate the potential for severe erosion and are part of the active maintenance program at the Landfill. In addition to seeding, other erosion control measures include, but may not be limited to, the following:

- Terracing;
- Slope drains;
- Rock-lined ditches and swales; and
- Grass-lined ditches and swales.

Temporary erosion control measures are used as necessary to reduce erosion of exposed slopes on waste disposal areas, berms, or stockpiles. Temporary erosion control measures include the following (use will depend on the time of year and the length of time it is anticipated the soil will remain exposed):

- Seeding;
- Tracking slopes perpendicular to the fall line;
- Covering with mulch;
- Terracing; and
- Diversion ditches and slope drains.

Tracking of slopes (bulldozer tracks made perpendicular to the fall line of the slope) is completed as soon as the slope is finished, regardless of the time of year. Mulching of exposed slopes is done during wet weather conditions when seeding is not possible, or in conjunction with seeding as necessary to establish vegetation. Diversion ditches and slope drains will be constructed as necessary to prevent surface water flow from eroding exposed and covered slopes as well as preventing runoff generated on surrounding land from running into the active areas of the landfill.

4.3 Sedimentation Control

The erosion control measures described in Section 4.4 will mitigate offsite sedimentation by reducing the amount of soil carried away in the runoff. Additional sedimentation controls include sediment barriers and the sediment basins discussed in Section 4.2.

4.3.1 Sediment Barriers

Sediment barriers include rock check dams, sediment logs and silt fencing. They are placed as needed during operations. They are most frequently placed below disturbed slopes to prevent silt in overland flow from reaching channels or ditches. The barriers will be installed as necessary. Sediment control fences will also be constructed and maintained in the drainage

channels of the active areas of the site. Sediment shall be removed to keep channels open and the soil replaced at the source as required.

4.3.2 Sediment Basins

The Facility will be equipped with temporary and permanent perimeter non-contact stormwater run-off control collection, control, and conveyance systems. These stormwater conveyances will ultimately deliver collected stormwater to one of three sedimentation ponds that are designed to prevent releases of sediment from the site. Water will be retained in the ponds and evaporated. The Facility will also have a 2-foot high berm around the perimeter and if a storm event greater than the 25-year, 24-hour design storm occurs, stormwater will back up into the bermed areas of the site within the perimeter berm system. Offsite discharge from the Facility is not anticipated.

4.4 System Maintenance Procedures

It is very important that the stormwater management system at the Facility be maintained so that it may function properly during a storm event. The following maintenance is recommended especially after large storm events.

- Keep all ditches and swales unobstructed;
- Remove sediment from ditches, swales, sediment basins, and sediment barriers routinely. Sediment controls are most effective when sediment is removed regularly;
- Inspect and clean check dams and outlet control structures of sediment and other materials that may restrict flow;
- Periodically inspect the stormwater system for damage and repair immediately; and
- Inspect and clean the stormwater system following a major storm event.

Additional inspection and maintenance requirements and procedures are included in the Facility Inspection and Maintenance Plan (see **Appendix E** of the permit narrative)

4.5 Emergency Procedures and Contingency Action

If necessary, immediate action will be taken to control damage by constructing physical barriers or channeling flows away from critical structures. Onsite drainage structures will be immediately repaired and returned to service. Any contaminated surface water or soils will be removed if it is determined to be necessary. Pursuant to ***19.15.36.8.C(10)***, the applicant is required to develop and implement a contingency plan in the event of fire or other emergency situations. The North Ranch Landfill has developed an emergency response contingency plan that is included in **Appendix F** of the PA narrative.

Pursuant to ***19.15.36.13K***, the operator will also comply with the spill reporting and corrective action provisions of **19.15.29** and **19.15.30**. In accordance with **19.15.29**, the operator will report unauthorized releases of oil, gases, produced water, condensate or oil field wastes,

including regulated NORM or other oil filed related chemicals, contaminants or mixtures of those chemicals or contaminants during receiving and disposal operations. Notifications will go to the NMOCD and will include the content required by **19.15.29.10** and that content required by other spill prevention environmental plans held by the Facility, such as the SPCC Plan. **Attachment C** contains regulations **19.15.29** and **19.15.30**.

19.15.30 requires that the responsible party abate pollution of subsurface water so that ground water of the state that has a background concentration of 10,000 mg/l or less TDS is either remediated or protected for use as domestic, industrial and agricultural water supply, and to remediate or protect those segments of surface waters that are gaining because of subsurface-water inflow for uses designated in the water quality standards for interstate and intrastate surface waters in New Mexico, 20.6.4 NMAC; and abate surface-water pollution so that surface waters of the state are remediated or protected for designated or attainable uses as defined in the water quality standards for interstate and intrastate surface waters in New Mexico, 20.6.4 NMAC. The responsible party will abate the contaminants in accordance with the regulation under an approved abatement plan.

5.0 GROUNDWATER, VADOSE ZONE AND GAS MONITORING

5.1 Groundwater Monitoring

19.15.36.14.B requires that if fresh groundwater exists at a site, the operator shall establish a groundwater monitoring program at the Facility that is approved by the Division's Environmental Bureau. Groundwater was not found to be present within approximately 165 feet below the ground surface at the Oil Field Waste landfill footprint when characterized by borings in accordance with the boring plan submittal for landfill siting for the Facility, formerly known as McCloy Ranch Landfill. **Appendix I** shows the locations of the wells in relation to the landfill operations. Groundwater monitoring is not proposed for the Facility.

5.2 Vadose Zone Monitoring

Installment of vadose zone monitoring is proposed for the facility. When vadose zone monitoring wells are placed, they may secondarily be used for confirmatory explosive gas monitoring should such monitoring be required in the future. See the Vadose Zone Monitoring Plan provided as **Attachment B of Appendix E** of the Facility Permit Application Document.

5.3 Explosive Gas Control Monitoring

Significant landfill gas generation may be expected for wastes high in organics, such as municipal solid waste. Oil field wastes are not expected to contain significant amounts of organics. Considering the type of waste and the low availability of moisture in the arid desert climate at the Facility, no landfill gas monitoring is proposed. It is not expected that the limited landfill gas generation setting for the Oil Field Waste landfill will cause generation rates or pressure gradients at the point of generation that will interfere with landfill operations or cause an impact on fresh water, public health, and the environment. Facility buildings, such as the scalehouse, will be constructed with precautionary passive vapor mitigation systems consisting of a spray applied asphaltic membrane/geomembrane composite underlain by a low-profile gas vent system vented at the roof. Continuous monitoring for H2S gas is proposed for the scalehouse/administration building and any future occupied structures at the Facility.

6.0 LEACHATE COLLECTION AND TRANSMISSION

The Landfill has been designed to include a leachate collection and removal system, in accordance with **19.15.36.14.C(5)**. The design of the leachate collection system associated with the Oil Field Waste disposal area includes a lateral drainage layer and a series of pipes, sumps, and pumps designed to remove leachate from the waste mass to prevent buildup of leachate head on the liner system. Once the leachate is collected, it is pumped to the on-site evaporation pond as illustrated on the Permit Drawings in **Appendix K**. Diluted leachate may be reused as dust control over lined or future lined areas as provided in **Section 2.1.4.**

In general, wet wastes placed in the landfill will be dried out prior to placement and free liquids and/or liquids mobilization is not expected to occur once places. Further, due to the nature of the oil field wastes accepted at this facility (i.e. inorganic, non-putrescible, minimal natural leachate generation is expected. Therefore, the leachate collected will primarily be from precipitation, which is minimal in the local arid climate. Stormwater that comes in contact with waste material (i.e., working face) will be managed and treated as leachate. In addition, water that percolates through existing waste areas will be collected and managed as leachate. Stormwater not incidental to the active area and exposed slopes, will be separated from leachate by utilizing temporary diversion ditches and berms to divert drainage away from and/or around the active disposal operations.

All cells of the Oil Field Waste Landfill have sump pumps and side slope risers that serve as the regulator for the level of leachate in the waste disposal cells. The sump pumps are designed to turn on when the leachate in the sump reaches a level that would cause at least 12 inches of leachate to be present on the bottom liner. A Leachate Management Plan is presented as **Appendix G** of the permit narrative.

7.0 INSPECTION AND MAINTENANCE

The Inspection and Maintenance Plan is presented in **Appendix E** of the permit narrative.

8.0 HEALTH AND SAFETY

8.1 Introduction

8.1.1 General

The primary purpose of this section is to provide guidance to help prevent personal injuries or illnesses that could be caused by conditions typically found at Oil Field Waste landfill facilities. It is not the intent of this section to establish a comprehensive safety program for the North Ranch employees or contractors; but rather to augment the existing program with awareness of special hazards related to the Oil Field Waste landfill. Unless otherwise authorized by North Ranch and the NMOCD, all on-site contractors and Facility personnel shall refer and adhere to the North Ranch Landfill Contingency Plan requirements (see **Appendix F** of the permit narrative).

8.1.2 Reporting and Investigation of Accidents and Illnesses

Accidents must be reported PROMPTLY to the employee's immediate supervisor and the Solid Waste Management Facility Manager for evaluation and/or investigation. Immediate reporting is mandatory not only to comply with applicable laws and regulations, but also to ensure that steps are taken to correct the conditions that contributed to the accident. Since every accident includes a sequence of contributing factors, it is possible to avoid a repeat of the first event by recognizing and eliminating these factors. The removal of just a single factor could prevent a recurrence. Reporting procedures should be in compliance with the Facility Contingency Plan emergency procedures.

8.2 Potential Hazards

The North Ranch Landfill personnel work in all types of weather, with different types of heavy equipment, and with a variety of materials presenting diverse hazards. For this reason, safety equipment must be used and maintained in a sanitary and reliable condition. Personal protective equipment (for eyes, face, head, hearing, and extremities), protective clothing, respiratory devices, and other protective equipment must be worn whenever hazards of processes or environment are capable of causing injury.

8.3 Hazard Abatement

The following procedures, guidelines, and recommendations represent standards in the solid waste disposal industry presently in use to mitigate or eliminate the various safety and health hazards that may exist at the Oil Field Waste Landfill Facility.

8.3.1 Traffic Control

To prevent unnecessary traffic in and around the working face, trucks will be directed to dump waste only in designated areas.

8.3.2 Personal Protective Equipment

Facility personnel shall refer to the Facility Contingency Plan for personal protective equipment requirements.

8.3.3 Operations Safety

Transporting and unloading solid waste is a serious area of safety concern. Uncontrolled dust, differing flows and direction of traffic and operational equipment, and equipment operation angles pose dangers to those in the vicinity of the working face. For these reasons, safeguards will be provided on Oil Field Waste Landfill equipment to protect the operator and the vehicle. Operating personnel who direct the placement of the delivery vehicles must take care to maintain sufficient clearance between the vehicle and the equipment. Normal safety precautions will be exercised while operating or working in the vicinity of heavy equipment. General public traffic will be prohibited from the landfill working face area.

8.3.4 Fire Prevention and Control

Soil material is available at the site and will be used, if necessary, for controlling landfill fires. In the event of a fire, fire control measures, such as soil and landfill equipment, are available at the landfill. Additional measures include fire extinguishers (scalehouse and landfill equipment), and a water truck. In the event the fire cannot be controlled by onsite means, the Facility will notify the local fire department in accordance with the Contingency Plan located in **Appendix F** of the permit narrative.

8.3.5 Contaminant Releases

Liquid byproducts and contaminated water caused by precipitation percolating through the waste, as well as contaminated soil cover materials that run off during periods of wet weather are a potential hazard. In the event of a leachate seep or other type of contaminant release, the Landfill personnel will:

- Take immediate action to stop, contain, and clean up any unauthorized discharge;
- Take all reasonable steps to minimize adverse impacts to waters of the state and correct the problem; and
- Notify the NMOCD with the necessary information described in **Section 4.5 or 9.0** of this Plan, as applicable.

8.4 Emergency Procedures

The emergency conditions discussed in this section are general. It is not intended to cover every possible emergency situation. The Oil Field Waste Landfill personnel must be constantly aware that problems may arise. In addition, the list of important phone numbers should be kept at the Oil Field Waste Landfill scalehouse and should be updated regularly. Facility personnel, when necessary, will provide emergency telephone numbers.

8.5 Handling of Unacceptable Wastes

Only wastes described in the permit and current Operating Plan are allowed for disposal at the Oil Field Waste Landfill. Any wastes other than the approved wastes shall be approved by the NMOCD before placement in the landfill.

9.0 RECORDKEEPING AND REPORTING

9.1 Landfill Permanent Operating Record (POR)

The North Ranch SWMF has in place a POR in place to satisfy permit requirements. All information contained in the Facility POR is available for inspection and is provided to the NMOCD upon request. The Facility will maintain these records until the NMOCD authorizes the destruction of the records following the completion of the post-closure care monitoring period. The POR includes the following information if applicable:

- Permit information, regulations, and operator requirements;
- Siting restriction demonstrations;
- Groundwater/Vadose Zone monitoring and gas monitoring data and reports;
- Leachate analytical data and disposal documentation;
- Operational plans and programs;
- Inspection records, training procedures and records, and notification procedures;
- Design demonstrations;
- Geotechnical and hydrogeological information;
- Any reports and testing data related to final closure of areas;
- Financial assurance documentation; and
- Quality assurance/quality control documentation, certification, and test results relating to the construction of the Landfill and Evaporation Pond liner systems, leachate collection system and final cover system, waste drying pads, and truck wash pads

9.2 Inspection Log

Inspections of the overall site, facilities, and operations are carried out on a routine basis. Inspections are performed often enough to identify problems in time to correct them before they harm human health or the environment. Inspections also prevent malfunction, deterioration, and operator error from affecting the performance of the facilities and operations.

The frequencies of inspections are noted on the inspection checklist (Operations Inspection Forms are located in **Appendix E** – Inspection and Maintenance Plan of the permit narrative). Inspections are also carried out after any major storm event or natural disaster. The inspection checklist will be kept in the POR and will be made available to the NMOCD on request.

9.3 Reports

9.3.1 Waste Quantity Reports

The reports include the weight and description of solid waste that has been disposed at the Landfill during the previous 3 months. Copies of waste quantity reports will be maintained in the Facility POR. (See also section 2.11)

9.3.2 Monitoring Results

Records of monitoring activities and results are submitted to the NMOCD, as required, and will be maintained in the Facility POR until destruction of the records is authorized by the NMOCD following completion of the post-closure care monitoring period.

9.4 Incident Reports

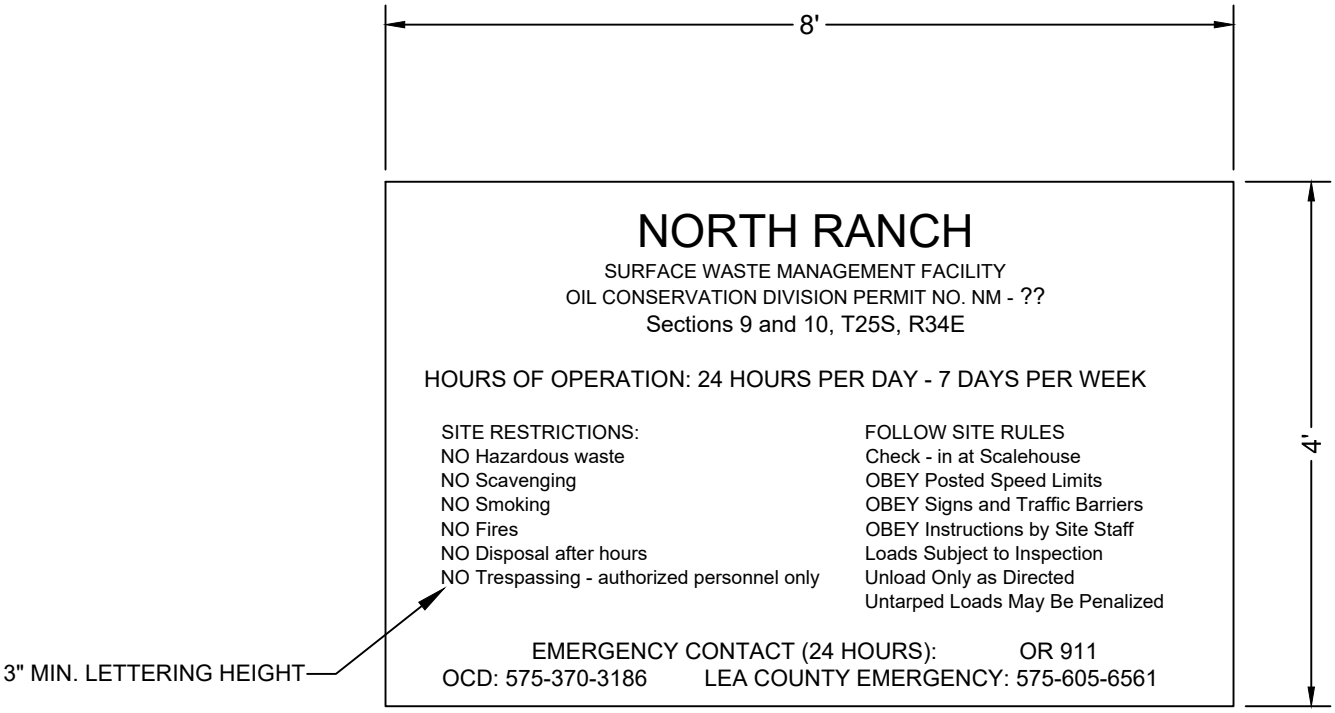
9.4.1 Emergency Reports

The Facility will submit a written report to the NMOCD district office for the area within 48 hours after an emergency has occurred at the landfill Facility. The report will describe the emergency and the actions taken to minimize hazards to human health and the environment. The report will also outline any follow up procedures that will be implemented. Emergencies include fires, explosions, storm damage, and any other events requiring the prompt intervention of Facility personnel, police, fire department, or other public health and safety officials.

9.4.2 Notifying Government Agencies

In the event that the Facility does not, or is unable to, comply with any of the conditions specified in the Facility's operating permit and **19.15.36**, the North Ranch SWMF will do the following:

- Provide the NMOCD with a description of the nature and cause of noncompliance;
- Inform the NMOCD of the period of noncompliance, including exact dates and times and/or the anticipated time when the Facility will return to compliance;
- Notify the NMOCD of steps taken or to be taken to reduce, eliminate, and prevent recurrences of the noncompliance; and
- Take the first three actions listed above within 24 hours in the case of any noncompliance that could constitute a threat to human health, welfare or the environment, and, if the requisite information is provided orally, provide it in writing within five (5) days, unless this requirement is waived or extended by the NMOCD on a case-by-case basis.



Project Mngr: MPB	Project No. 35187378	Terracon Consulting Engineers and Scientists	SITE ENTRANCE SIGN	FIG. No.
Drawn By: DEW	Scale: AS SHOWN	25809 INTERSTATE 30 S BRYANT, ARKANSAS 72022	PERMIT APPLICATION FIGURE	1
Checked By: MPB	File No. 572/002	PH. (501) 847-9292 FAX. (501) 847-2910	SURFACE WASTE MANAGEMENT FACILITY	
Approved By: FOC	Date: 3/30/2019		NORTH RANCH	
			LEA COUNTY NEW MEXICO	

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NORTH RANCH SWMF
E & P WASTE LANDFILL &
EVAPORATION POND

LEA COUNTY, NEW MEXICO

OIL CONSERVATION DIVISION PERMIT NO. NM- ??

N:\GECA\CHIVE\CAD\572\002\MCCLOY\PERMIT TEXT FIGURES\OPERATING PLAN\FIG2_SITE SIGNS.DWG

REV.	DATE	BY	DESCRIPTION

Terracon
Consulting Engineers and Scientists
25809 I-30 SOUTH BRYANT, AR 72022
PH. (501) 847-9292 FAX. (501) 847-9210

TYPICAL SITE SIGNS

PERMIT APPLICATION FIGURE
SURFACE WASTE MANAGMENT FACILITY
NORTH RANCH
LEA COUNTY NEW MEXICO

FIG. 2

DESIGNED BY:	DEW
DRAWN BY:	DEW
APPVD. BY:	FOC
SCALE:	AS SHOWN
DATE:	03/30/2019
JOB NO.	35187378
ACAD NO.	572/002
SHEET NO.:	X OF X

ATTACHMENT A

Management Plan
Approved Oil Field Wastes

Management Plan
Approved Oil Field Wastes

North Ranch Surface Waste Management Facility
Lea County, New Mexico

September 2019
Project No. 35187378

Prepared for:
NGL Waste Solutions, LLC
3773 Cherry Creek Dr., Suite 1000
Denver, CO 80209
303-815-1010

Prepared by:
Terracon Consultants, Inc.
25809 Interstate 30 South
Bryant, Arkansas 72022
(501) 847-9292

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List of Exhibits

1.0 INTRODUCTION

1.1 Purpose, Scope, and Applicability

This document details how oil field solid wastes will be managed at the NGL North Ranch Surface Waste Management Facility (SWMF or Facility) located near Jal, Lea County, New Mexico.

1.1.1 Relationship to Other Facility Documents

This document is included as **Attachment A** to the Facility Operating Plan and may be used in conjunction with the Operating Plan and its ancillary components to properly handle and manage solid wastes at the Facility.

2.0 WASTE MANAGEMENT PLAN

2.1 Gate Receipt of Oil Field Solid Waste

Prior to receipt of eligible oil field wastes at the Facility, waste generators shall request approval for the Facility to accept their solid waste by submitting generator and waste profile information using NMOCD Form C-138. A blank copy of the Form is presented in **Exhibit A** at the end of this document. Wastes will only be received at the Facility when the entrance gate is open and there is an operator/attendant present at the scalehouse to receive wastes.

2.2 Weigh Scale Measurement of Gate Receipts

Oil field waste trucks will be directed onto an inbound scale for weighing of waste plus hauling tare. Tickets are issued to customers, including commercial in-state and out-of-state oil field waste haulers. Scale weights are used to determine the amount of material received. Solid waste weights are compiled and entered into the permanent operating record (POR) quarterly. Waste volumes measured as landfill airspace utilization will periodically be entered into the POR.

The commercial scale(s) used at the NGL North Ranch SWMF will periodically be calibrated in accordance with requirements for commercial weighing and measuring devices as set forth in New Mexico Administrative Code (NMAC) **19.15.103.**

The NGL North Ranch commercial facility shall maintain records of all C-138 forms reflecting the generator, the location of origin, the location of disposal within the commercial facility, the volume and type of oil field waste, the date of disposal and the hauling company for each load or category of oil field waste accepted at the commercial facility. The operator shall maintain such records in the POR, subject to NMOCD inspection. A blank C-138 form is provided in **Exhibit A**.

2.3 Waste Screening

Upon entry into the NGL North Ranch SWMF, and at the time of weighing of wastes, facility personnel will screen the wastes in accordance with procedures set forth in the Operating Plan and Hazardous and Unauthorized Waste Exclusion Plan (See **Attachment B** for the HUWEP). Screening is implemented to detect and prevent the disposal of regulated hazardous wastes, NORM, liquid wastes and additional unauthorized wastes.

Those wastes included in Operating Plan Section 2.15.4 – Eligible Wastes will be accepted for disposal in the E&PW landfill. At the Owner's discretion, oil field waste containing free liquids may be placed on drying pads for evaporation of liquids and/or for mixing with bulking soils or absorbents at the locations indicated in the Permit Drawings in **Appendix K**. Evaporation and/or absorption of free liquids will be confirmed using the paint filter test prior to landfill disposal of the materials from the drying pads

2.4 Waste Haul Route Directions

Facility personnel will direct waste haulers with eligible wastes to the temporary and/or permanent haul route being used for deposition of oil field wastes that day. Waste haulers must follow routes and directions as directed by the Facility operator.

2.5 Unloading of Oil Field Solid Waste

Waste haulers must off-load wastes at the location indicated by Facility operations personnel at the current working face. The operator will supervise the unloading and dumping at the site. Once waste is deposited as directed, haulers will return by the designated route to the outbound scale for tare weight if required.

2.6 Working Face Size

The Facility will limit waste disposal to the smallest practical area and compact the oil field waste to the smallest practical volume.

2.7 Access Requirements

The NGL North Ranch SWMF has only one public access for vehicular traffic located at the northeastern corner of the site. The scalehouse is located in-route upon entry into the site. As required by NMAC **19.15.13.I** a fence has been installed around the perimeter of the SWMF to control unauthorized access to the premises. The fence is constructed of 6-foot tall chain-link fencing with barbed wire around the top. Public traffic is prohibited from entering the property.

2.89 Periodic and Intermediate Cover

Waste will be covered on an as needed basis with at least six inches of soil, or an NMOCD approved alternative cover material, to control dust, debris, odors, vectors, and other potential nuisances. Cover soil material will be obtained from on-site borrow areas located throughout the landfill property. Any active area that does not receive waste or final cover for more than 30 days will be covered with an intermediate cover system that consists of at least 12 inches of onsite soils (including periodic cover). More information on daily/intermediate cover can be found in Section 2.1.6 of the Operating Plan.

2.9 Waste Filling Operations

Typically, waste disposal and fill progression in the E&PW Landfill will proceed from the lowest point in each cell or prepared area to the highest. A prepared area will be filled in lifts until the maximum design grades and/or slopes are reached (minus the final cover thickness). Waste will be spread and compacted per the Operating Plan. Normally, waste will be deposited in layers or lifts that generally will not exceed 10-15 feet in compacted thickness. Interior waste slopes will generally not exceed 3:1 (horizontal: vertical) with final slopes not exceeding 4:1. The top of each lift shall be graded to drain to the perimeter run-off control system at a minimum grade of 4%.

Waste loads will generally be deposited at or near the top or toe of the active working face, except as indicated below for the case of waste placement in a new cell. A waste compactor or large bulldozer will push the waste up or down the working face slope while evenly spreading the material. The waste compactor or dozer will then traverse the waste slope (both parallel and perpendicular to the slope if feasible) several times until the waste is compacted to the extent possible and practical. The number and orientation of compactor or dozer passes will vary depending on the type of compactor or dozer used, slope of the active working face, waste characteristics, and other factors.

The operator shall not use equipment that may damage the integrity of the liner system in direct contact with a geosynthetic liner. The design of the E&PW Landfill includes a leachate collection and removal system aggregate and a protective layer designed to provide separation and protection for the critical underlying liner/leachate collection system components.

The placement of the initial waste or first lift in a prepared area requires additional care and caution to avoid damage to the underlying liner and/or leachate collection systems. Generally, the only vehicles that should travel on the working surface/protective cover surface are pickup trucks, waste collection vehicles, trucks/trailers, and low ground pressure equipment. At no time shall waste compactors be allowed directly on the protective cover/working surface. Waste loads placed during initial development of a new cell will always be from the toe upward to the crest over the top of the leachate collection system protective cover. Once the initial 10-15 feet thick lift is placed and compacted over the protective cover, waste may be placed from the top or toe as indicated above.

EXHIBIT A

Form C-138

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-138
Revised August 1, 2011

*Surface Waste Management Facility Operator and Generator shall maintain and make this documentation available for Division inspection.

REQUEST FOR APPROVAL TO ACCEPT SOLID WASTE

1. Generator Name and Address:

2. Originating Site:

3. Location of Material (Street Address, City, State or ULSTR):

4. Source and Description of Waste:

Estimated Volume _____ yd^3 / bbls Known Volume (to be entered by the operator at the end of the haul) _____ yd^3 / bbls

5. GENERATOR CERTIFICATION STATEMENT OF WASTE STATUS

I, _____, representative or authorized agent for _____ do hereby certify that according to the Resource Conservation and Recovery Act (RCRA) and the US Environmental Protection Agency's July 1988 regulatory determination, the above described waste is: (Check the appropriate classification)

☐ RCRA Exempt: Oil field wastes generated from oil and gas exploration and production operations and are not mixed with non-exempt waste. *Operator Use Only: Waste Acceptance Frequency* ☐ *Monthly* ☐ *Weekly* ☐ *Per Load*

☐ RCRA Non-Exempt: Oil field waste which is non-hazardous that does not exceed the minimum standards for waste hazardous by characteristics established in RCRA regulations, 40 CFR 261.21-261.24, or listed hazardous waste as defined in 40 CFR, part 261, subpart D, as amended. The following documentation is attached to demonstrate the above-described waste is non-hazardous. (Check the appropriate items)

☐ MSDS Information ☐ RCRA Hazardous Waste Analysis ☐ Process Knowledge ☐ Other (Provide description in Box 4)

GENERATOR 19.15.36.15 WASTE TESTING CERTIFICATION STATEMENT FOR LANDFARMS

I, _____, representative for _____ do hereby certify that representative samples of the oil field waste have been subjected to the paint filter test and tested for chloride content and that the samples have been found to conform to the specific requirements applicable to landfarms pursuant to Section 15 of 19.15.36 NMAC. The results of the representative samples are attached to demonstrate the above-described waste conform to the requirements of Section 15 of 19.15.36 NMAC.

5. Transporter:

OCD Permitted Surface Waste Management Facility

Name and Facility Permit #:

Address of Facility:

Method of Treatment and/or Disposal:

☐ Evaporation ☐ Injection ☐ Treating Plant ☐ Landfarm ☐ Landfill ☐ Other

Waste Acceptance Status:

☐ **APPROVED** ☐ **DENIED** (Must Be Maintained As Permanent Record)

PRINT NAME: _____ TITLE: _____ DATE: _____

SIGNATURE: _____ TELEPHONE NO.: _____

Surface Waste Management Facility Authorized Agent

ATTACHMENT B

Hazardous and Unauthorized Waste Exclusion Plan

Hazardous and Unauthorized Waste Exclusion Plan

North Ranch Surface Waste Management Facility
Lea County, New Mexico

September 2019
Project No. 35187378

Prepared for:
NGL Waste Services, LLC
3773 Cherry Creek Dr., Suite 1000
Denver, CO 80209
303-815-1010

Prepared by:
Terracon Consultants, Inc.
25809 Interstate 30 South
Bryant, Arkansas 72022
(501) 847-9292

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LIST OF EXHIBITS

1.0 PURPOSE

The purpose of this Hazardous and Unauthorized Waste Exclusion Plan (HWEP) is to provide procedures for solid waste acceptance at the North Ranch E&P Waste Landfill Facility (Facility), in accordance with the current New Mexico Administrative Code Rules [Energy, Minerals and Natural Resources Department, Oil Conservation Division (NMOCD, OCD or Division), effective date June 30, 2016 2007]. This HWEP provides pre-acceptance procedures for E&P wastes to determine the acceptability of a waste pursuant to Facility permit conditions, operational capabilities and state and federal regulations. This program is designed to monitor incoming waste loads and verify that it agrees with the pre-acceptance waste conditions and the provisions of the Facility permit issued by the OCD. It should be noted that throughout this HWEP the references to *New Mexico Administrative Code (NMAC)* are noted as **19.15.36.XX**.

This plan includes at a minimum:

- Purpose of monitoring and roles of landfill personnel;
- Types of wastes to be excluded;
- A written protocol that describes the methods to identify and screen potentially hazardous waste and other unauthorized wastes before it enters the landfill including the review of industrial customer's procedures for separating hazardous waste and other unauthorized wastes from other wastes. The written protocol shall describe the procedures, evaluation criteria, testing requirements and decision making process that will be followed to determine whether to accept or reject industrial or process waste for disposal before it enters the landfill;
- Sampling and analysis procedures to be followed for new customers and for periodic re-testing of existing customer wastes. Testing laboratories shall be certified by the Department;
- Random inspection procedures and documentation;
- Personnel training to be provided;
- Recordkeeping requirements; and
- A contingency procedure, that includes notification procedures, and remedial actions to be taken when hazardous waste and other unauthorized wastes are identified.

Hazardous Wastes are defined by the Federal government under the Resource Conservation and Recovery Act (RCRA) and subsequent amendments. This plan shall define a procedure for the rejection and removal of any waste determined unacceptable, whether pre or post disposal, by the Facility, to comply with Federal or State of New Mexico Rules and Regulations for disposal in the E&PW Landfill.

2.0 TYPES OF WASTE TO BE EXCLUDED

19.15.36 allows for the disposal of all eligible wastes that are exempt oil field wastes or non-hazardous oil field wastes containing no free liquids**.** Non-hazardous oil field wastes do not require written authorization from the OCD, provided the materials must be characterized by the generator of the waste prior to acceptance for disposal in the landfill in accordance with the Facility written hazardous waste exclusion program. Generators of exempt oil field wastes, or their authorized agent, shall provide signed documentation that the oil field wastes are generated from oil and gas exploration and production operations, are exempt waste and are not mixed with non-exempt waste as certified on Form C-138 (see form in **Exhibit A**). Generators of non-hazardous oil field wastes shall provide documentation that the waste has been characterized, sampled and laboratory tested for toxicity characteristics in addition to Form C-138. If the materials show characteristics of a hazardous waste, it shall not be accepted. All wastes require specified written authorization in a Form C-138 prior to acceptance at the Facility. Any waste, not encompassed by the definition of E&P waste as defined above, should be excluded from disposal at the Facility, with the following exception - the operator may accept non-hazardous, non-oil field wastes in an emergency if ordered by the Department of Public Safety. The operator shall complete a form C-138, oil field waste document, describing the waste, and maintain the same, accompanied by the Department of Public Safety order, subject to Division inspection.

A non-exempt oil field solid waste should be considered hazardous if it is listed in Subpart D – Lists of Hazardous Wastes of **40 CFR §261**. Exempt oil field wastes have been excluded from that subpart under **40 CFR Section 261.4 (b)(5)** Exclusions. **Section 2.15.4** of the Operating Plan lists exempt E&P wastes. A copy of Subpart D – Lists of Hazardous Wastes has been included as **Exhibit B** to this HWEP. Hazardous wastes shall not be accepted for disposal at the Facility.

Liquid Waste is currently defined in **19.15.36.13.E** as any waste material that is determined to contain "free liquids" as defined by Method 9095 (Paint Filter Liquids Test), described in "Test Methods of Evaluating Solid Wastes, Physical/Chemical Methods" (EPA Pub. No. SW-846). All future updates or revisions to the Paint Filter Liquids Test shall be incorporated into this plan by reference. Wastes which fail the paint filter test (i.e. contain free liquids) shall not be immediately disposed of in the landfill. Liquid wastes may be placed on one of the proposed concrete waste drying pads to allow the waste to dry. Wastes place on a drying pad will be managed until such a time that is can pass a paint filter test, at which point it will be taken to the active disposal area. The results of the Paint Filter Tests shall be recorded on a form such as the Paint Filter Test Form located in **Exhibit C**.

Wastes not specifically covered or considered a certain oil field wastes as defined under NMAC 19.36.35.8. Will not be accepted. Generators not able to present results of testing and/or NMOCD authorizations for wastes listed requiring testing and NMOCD authorization will be denied acceptance of their waste.

3.0 IDENTIFICATION AND SCREENING PROTOCOLS

Pre-acceptance procedures are put it place to determine whether to accept or reject a particular waste before it is disposed of in the landfill. If the waste is classified as either (1) a non-exempt hazardous waste, (2) a waste containing free liquids, (3) a radioactive waste or (4) as an un-permitted waste, it shall not be accepted for disposal at the Facility. The procedures are based on the Facility permit and the current state and federal regulations on waste classification. The pre-acceptance protocols also state what information a waste generator must provide to the Facility in order to determine the acceptability of a particular waste for disposal. Oil field wastes may be accepted under the pre-acceptance procedures if the waste generator can provide the documentation mentioned in Section 2.0 Types of Wastes to be Excluded. The documentation and approval procedures used during the pre-acceptance of an applicable waste are outlined below.

The program for detecting and preventing the disposal of regulated hazardous wastes as defined in Section 2.0 Types of Waste to be Excluded includes the following:

- Inspections of incoming waste loads
  - Visual observation of incoming waste shipments by a trained individual(s);
  - Monitoring for hydrogen sulfide using a H_2S monitor at the scalehouse;
  - Minimum random inspection frequency as described in Section 5.0 Random Inspection Procedures; and
  - Special attention given to shipments from new oil field waste generators.
  - Verification that exempt oil field waste is not mixed with non-exempt oil filed waste as required by **19.15.36.13.F(1)**
- Record-keeping Procedures
  - Documentation of questionable wastes identified, and
  - Record maintenance required during the life of the Facility and the 30-year post closure care period.
- Training
  - Employee training to address identification, handling, and safety associated with hazardous materials or radioactive wastes, and
  - Documentation of training certification maintained in the Facility permanent operating record.
- Notification
  - Notification to the OCD of a regulated hazardous waste or radioactive waste is discovered at the Facility.

The generator of an exempt hazardous waste or other unauthorized waste must provide a completed C-138 form to the operator for review and signature before the waste will be considered for landfilling. The signed documentation form (Form C-138, **Exhibit B**) must contain

the following information:

- Generator name and address;
- Facility address of site generating waste;
- Contact name of the party responsible;
- Name of the disposal Facility;
- Quantity of waste to be disposed of at the Facility; and
- Characterization of the type of waste including:
  - Name of the type of waste;
  - Process generating the waste;
  - Special handling instructions; if required;
  - Pertinent physical, chemical and shipping information;
  - Analytical testing information, if appropriate; and
  - Certification that the waste is RCRA exempt or non-hazardous oil field waste and does not contain regulated NORM or radioactive materials.

Non-exempt oil field wastes shall require testing for the hazardous characteristics of ignitability, corrosivity, reactivity, and toxicity (40 CFR 261.21-24) prior to acceptance of the waste, or documented process knowledge which confirms that the waste is not a characteristic or listed hazardous waste as defined by federal regulations. NORM waste satisfies the definition and testing criteria defined in 19.15.36.8 and 19.15.35.9 NMAC, generators must provide the prescribed documentation for acceptance into the landfill. NORM not meeting all of the regulatory criteria of these sections will not be accepted. New customers requesting disposal of oil field wastes shall provide analytical testing in accordance with this paragraph prior to delivery of initial wastes for disposal. Periodic re-testing of existing customers' wastes shall be requested in accordance with Facility policies.

The documentation of the waste as described above shall be sent to the landfill manager or his/her designee for documentation noting any conditions or limitations. Once received, documentation and analytical data will be reviewed by the landfill's representative or consultant. If the information confirms that the waste is (1) non-hazardous and (2) within the scope of waste acceptable for disposal, the landfill manager will then send the appropriate approval or denial correspondence. If the waste stream is deemed unacceptable for disposal, the waste generator will be notified.

Once approved for disposal, the waste generator may be required to notify the Facility and to schedule the delivery of the material so that the landfill's operation and efficiency will not be impaired. All waste information records will be maintained in the Facility's on-site or electronic operating record for a minimum period of 5-years after closure. Facility personnel receive training in regulatory compliance which provides a review of applicable state regulations with emphasis on the Surface Waste Management Facility permit. The controlled and documented entry of incoming waste loads by trained personnel will reasonably ensure exclusion of

prohibited waste.

Upon arrival at the Facility, if the waste is materially different from the pre-acceptance documentation (e.g. significant inconsistencies with pre-acceptance documentation), the truck will not be allowed to unload. If any significant inconsistencies in the waste are identified during unloading at the landfill, the material may be rejected and the truck reloaded. The applicant/waste generator will be notified of the material difference in the waste stream characteristics. No unapproved waste, or waste with unapproved documentation, will be accepted for landfilling. The landfill manager reserves the right to reject any load at any time. The landfill manager may consult other appropriate technical personnel prior to a final determination. Loads will be visually inspected at the working face by operation personnel. In the event the waste is determined to be a hazardous, radioactive, or other regulated waste excluded by the Facility permit, the landfill manager will be notified. Waste rejection and removal procedures may be initiated under a contingency procedure if necessary.

If the waste delivery process indicates the waste is approved and all required information is documented the truck will be directed to proceed to the appropriate disposal area. The waste will be unloaded and disposed of with other solid wastes. The operator shall also document the approximate location of where wastes are being filled within the landfill as necessary for location purposes in the event that a waste needs to be exhumed and removed after the fact.

4.0 SAMPLING AND ANALYSIS PROCEDURES

The Facility's landfill policy is that it is the responsibility of the waste generator and waste shipper to demonstrate that the waste is acceptable, according to all applicable rules and regulations of the Facility. The Facility reserves the right to refuse a shipment if any landfill personnel suspects that any amount of waste, no matter how small, may be found to be unacceptable by Facility, Federal or State of New Mexico Rules and Regulations.

If a shipment is refused, the waste generator shall have the suspect waste tested at a laboratory and certified by the NMOCD that the waste is acceptable for disposal at the Facility. All fees associated with the testing will be the responsibility of the shipper/applicant. If the laboratory proves that the waste is acceptable for disposal at the Facility, and the OCD certifies that the waste is acceptable for disposal at the Facility, the waste generator or waste shipper/applicant shall provide documentation to the Facility before the shipper/applicant will be allowed to landfill the waste. Any shipment of waste that enters the property of the landfill may be subject to a random inspection per Section 5.0 Random Inspection Procedures in order to determine if non-exempt hazardous, radioactive, or other un-authorized wastes are present. If testing is deemed necessary by landfill personnel, all fees associated with the testing will be the responsibility of the shipper/applicant. If the shipper/applicant does not agree to these terms, the shipment shall be refused.

5.0 RANDOM INSPECTION PROCEDURES

Random inspections of incoming loads will be used as a tool for detecting and preventing the disposal of regulated non-exempt hazardous, radioactive, or other unauthorized wastes. Landfill personnel shall conduct random load inspections in accordance with Facility random sampling procedures and the prescribed procedure outlined below. Documentation of the inspections shall be maintained in the landfill records. A reasonable number of inspections will be conducted each month.

The procedures for conducting a random load inspection are:

- A designated person (equipment operator, landfill manager, etc.) will be responsible for random load inspections;
- The load to be inspected will be chosen at random;
- After the load has been designated for inspection, the driver of that vehicle will be notified and the vehicle directed to a designated location on the landfill. The designated location will be away from the active face and other customer traffic but over a lined area
- The load will be discharged for inspection and the driver of the load will be invited to monitor the inspection process;
- Any waste found to be unacceptable for disposal will be returned to the vehicle; and
- A random load inspection form (**Exhibit D**) will be completed by the inspector and may be signed by the driver of the vehicle at the driver's discretion.

If the entire waste load is refused for disposal, the waste generator's name and phone number shall be document on the random inspection form. The waste generator shall be notified and the random inspection form will be maintained in the landfill office or electronic operating record.

If during a random inspection, a regulated hazardous, radioactive, or other un-authorized waste is discovered, the OCD shall be notified within 72 hours.

6.0 PERSONNEL TRAINING

Landfill personnel responsible for waste acceptance and random load inspections shall be able to properly identify and screen hazardous and unauthorized wastes. To train the landfill personnel to be able to perform the duties previously listed, the following procedures should, at a minimum, be followed:

- New employees shall be given this HWEP and the Solid Waste and Emergency Response Training Module – Introduction to Hazardous Waste Identification (40 CFR Parts 261) (**Exhibit E**), and the employee should become familiar with applicable sections of the documents;
- New employees shall be trained on:
    - This Hazardous Waste and Unauthorized Waste Exclusion Plan;
    - Applicable sections of the Solid Waste and Emergency Response Training Module located in **Exhibit E**;
    - C-138 Waste Acceptance Form;
    - Facility operations and screening procedures;
    - Proper identification of unacceptable wastes; and
    - How to conduct a random inspection and fill out the required inspection forms.
- Annual training shall be provided for all landfill personnel – to include:
    - Review of this Hazardous Waste and Unauthorized Waste Exclusion Plan;
    - Review of applicable sections of the Solid Waste and Emergency Response Training Module located in **Exhibit E**;
    - Review of C-138 Waste Acceptance Form;
    - Review and updates of Facility operations and screening procedures;
    - Review of how to properly identify unacceptable wastes; and
    - Review of how to conduct a random inspection and fill out the required inspection forms.
- Records shall be maintained for each employee at the landfill office. This includes new employee training and annual refreshers.

The safety of landfill employees is also a primary concern. All new employees will be given and trained in the correct use of personal protective equipment (PPE). In addition to the distribution and training on PPE, new employees will also be trained in safe waste handling procedures.

7.0 RECORD KEEPING

Landfill personnel must record and retain at the Facility, in an operating record, electronic operating record, or in an alternative location, the following:

- This Hazardous Waste Exclusion Plan;
- The Solid Waste and Emergency Response Training Module located in **Appendix E**;
- Paint Filter Test Forms;
- C-138 Waste Acceptance Forms including documents provided by the waste generator(s);
- Random Load Inspection Forms; and
- Training records for landfill employees involved with waste acceptance and random load inspections.

These records will be made available to the OCD when requested. Records will be maintained by the operator for a minimum period of 5-year after closure.

8.0 CONTINGENCY PROCEDURES

This Contingency procedure is intended to protect the safety and welfare of the employees, Facility, and community in the event that a hazardous or unauthorized waste has been accepted for disposal in the landfill. This Contingency procedure is also intended to satisfy the requirements of **19.15.36** and describes the procedures for excluding the receipt of non-exempt hazardous waste and unauthorized waste. This Plan is developed to include, at a minimum, notification procedures and remedial actions to be taken when non-exempt hazardous waste and other unauthorized wastes are identified at the Facility. The Contingency procedure should be used by employees at the landfill as a guide for emergency and remedial procedures in the event a non-exempt hazardous or unauthorized waste has been accepted by the Facility. This plan is initiated by identification of hazardous or unauthorized waste, and includes the following:

- Internal notification process and notification to appropriate state and federal agencies;
- Assessment of the nature and extent of the incident;
- Control of the hazardous or unauthorized waste; and
- Reporting.

8.1 Internal Notification Process and Notification to Appropriate State and Federal Agencies

In the event of an incident involving hazardous or unauthorized wastes at the Facility, the employee first identifying the incident will contact the landfill manager regarding the incident. The landfill manager shall determine if it is necessary to halt operations at the Facility. The landfill manager shall then notify all landfill personnel of the incident and continue to follow the steps outline in this Contingency procedure.

The first priority of the landfill manager should be the safety of the employees at the Facility, and he/she therefore should begin mitigating the incident immediately. However, within 72 hours the manager shall contact the OCD of the acceptance of the hazardous or unauthorized waste. The landfill manager shall provide the OCD with all available information concerning the generator, type of waste, amount of waste, dates of disposal and reason for concern or reclassification of the waste.

8.2 Assessment of the Nature and Extent of the Incident

Once the applicable notifications have been made, the landfill manager will locate and determine the identity, exact source and amount of non-exempt hazardous or other unauthorized waste that was accepted into the landfill. The manager will then be able to determine if the acceptance of the hazardous or other unauthorized waste constitutes an emergency based on the gathered information. After the waste has been identified, the specific information on the associated hazards, appropriate PPE, decontamination, etc. will be obtained

from the associated material safety data sheet (MSDS), the waste generator, or from appropriate reference materials. The assessment of the incident should include, at a minimum, the following:

- Exposure – The magnitude of actual or potential exposure to employees, the general public, and the environment. The duration and pathways of exposure should also be evaluated.
- Toxicity – The types of adverse health or environmental effects associated with exposure to the material.
- Reactivity – The degree to which the material is reactive with other materials.
- Uncertainties -Considerations for undeterminable or future exposures. Uncertain or unknown health effects, including future health effects.

8.3 Control of the Hazardous or Unauthorized Waste

After the applicable notifications have been made, and the landfill manager has assessed the nature and extent of the incident, the landfill manager should verify that the waste has been disposed of in the landfill. Different procedures should be followed depending on if the waste has been disposed of in the landfill, or if the waste has been accepted through the gate but not disposed. It should be noted that, if necessary, the Facility shall immediately suspend receipt of further shipment(s) of the non-authorized waste from the generator until the procedures of this section have been fulfilled.

If that waste has not been disposed of in the landfill, the waste should be stockpiled in a place that will reduce the potential for harm to employees, the general public, or the environment. As soon as practical, the waste shall be returned to the waste hauler or waste generator according to the materials safe handling procedures. The generator or hauler shall then take responsibility for the waste.

If the waste has been disposed of in the landfill, the landfill manager shall determine if the waste poses a risk to the health and safety of the employees or the general public. If the waste does not pose a potential risk, and with the approval of the OCD, the waste shall remain in the landfill and records of the event will be maintained in the Facility operating record. Monitoring of constituents of concern, evaluation of potential receptors and pathways, and/or reclassification of the waste stream may result from this interactive process with the OCD. If the waste does pose a potential risk, the waste shall be removed from the landfill according to the following waste rejection and removal procedures.

The waste material will be removed by personnel specifically trained in projects of this nature. A Remedial Services Contractor (RSC) will perform the removal activities with assistance from properly trained Facility personnel. Every effort and control necessary to minimize or eliminate the escape of leachate or waste to the ground, surface waters or the atmosphere shall be

utilized. The RSC will document the waste removal activities and prepare a project summary report for documentation of all stages of removal. The following outlines the RSC operational and technical approach which may be necessary to perform remedial activities associated with the removal of waste stream.

- Mobilization;
- Site Preparation;
- Excavation of Overburden;
- Excavation and Staging of Waste;
- Excavation and Loading of Unauthorized Waste Material;
- Transportation and Disposal of Unauthorized Waste Material;
- Stormwater Control;
- Site Restoration;
- Decontamination of Equipment; and
- Demobilization.

A project health and safety plan shall be prepared by the RSC which will establish health and safety protocols for the project in strict accordance with OSHA, USEPA, NMOCD and/or NMED regulatory requirements. The health and safety plan will, at a minimum, address the following items:

- Preliminary investigation of the site to identify proper health and safety issues;
- Explosive or hazardous gases and other landfill specific hazards assessment;
- Training program for RSC personnel presented prior to allowing these individuals to enter the project site;
- Establish work zones for the project site. Individual areas within the zones will be delineated based on project activities which may require different levels of personal protection;
- Levels of personal protection required based upon a determination regarding the applicability of OSHA Levels A, B, C, or D protection with specified personal protective equipment being provided; and
- Emergency response procedures will be established prior to initiation of any RSC on-site operations.

A review of Facility records will indicate the dates and amounts of the waste material to be removed and rejected. Prior to initiation of excavation activities, the RSC will erect marked temporary barriers around the designated work zones to exclude vehicular and pedestrian traffic from those zones to areas during and after work hours. The overburden, if necessary, will be removed from those areas targeted for removal utilizing an excavator. If required, additional equipment will be used which provide the excavation capabilities required by the project.

The overburden will be used as required to construct temporary staging areas adjacent to the proposed removal locations. The overburden material will be separated from waste material designated for removal during the excavation process. Once the disposal locations have been uncovered, and the material identified, the material will be excavated and loaded directly into transport vehicles for off-site disposal at an approved facility. Loading of the material will be conducted such that decontamination of the transport vehicle will not be required prior to departure from the Facility. Polyethylene sheeting will be place adjacent to the trucks to contain potential spillage during the loading process. Waste material spilled during the loading process will be collected and placed into the trucks. All trucks will be weighed at the Facility scales to ensure the Department of Transportation (DOT) weight requirements have been met and maximum payloads have been achieved for each vehicle and for manifesting purposes.

It is anticipated the excavation equipment to be utilized will allow for the removal of the waste material from locations outside the excavation area. As a result, only the backhoe bucket and portion of the boom will come into contact with the material to be removed. All excavation activities shall be completed in accordance with OSHA trenching requirements, 29 CFR Part 1926.

If cleaning is required during excavation operations, the cleaning will take place directly over a loaded transport vehicle (or in a designated decontamination area with fluid handling accommodations) such that all contaminated fluids will be captured. The volume of rinsing material anticipated will be effectively contained in the lined truck. Prior to trucks leaving the Facility, they will be visually inspected for potential contact with the excavated material outside the trucks lined box. Decontamination of any affected portions of the truck will be performed by dry methods (i.e. scrapping, brushing) and/or steam cleaning as necessary. Documentation shall be made of the visual inspections and decontamination process if applicable. These inspections will be included in the project summary report.

A weather proof tarp shall be provided and secured over each shipment leaving the site. All shipments will comply with applicable regulatory and DOT requirements of the waste material removed. Vehicles used for the transportation of waste material removed from the Facility will be licensed, as required, and will be plainly marked and placarded as specified by the USEPA, NMED and DOT regulatory requirements. If any waste that is accepted and then needs to be exported, the North Ranch SWMF Operator becomes the waste generator and will follow the C-138 form and requirements for off-site disposal.

After the rejected material has been excavated, it will be transported to a facility which is permitted to accept material of the type rejected. The rejected material will be manifested in accordance with all Federal and State regulations as administered by the OCD before it is shipped off-site. The Generator of the rejected waste, or its designee, will be responsible for completing manifests for all shipments transported off-site. If the original generator cannot be located, the Operator will assume the responsibility of generator and follow the documentation

requirements of the C-138 form.

Once all waste removal activities have been completed and all required inspections performed, the excavation area will then be backfilled with refuse removed in the process as overburden. If necessary, additional waste accepted during normal Facility operations will be placed in the excavated area to achieve working grades up to permitted final grades. Intermediate cover material will be replaced, if previously present, and regraded according to the Facility permit requirements. Because unauthorized waste material in question will have been removed, there is no need for any maintenance procedures in addition to the Facility's existing landfill site maintenance.

8.4 Reporting

Every stage of the process, after identifying that a non-exempt hazardous or unauthorized waste was accepted at the landfill shall be documented and kept on-site in the Facility's operating record or electronic operating record.

If, after the non-exempt hazardous or unauthorized waste was disposed of in the landfill, each of the various stages of the rejection and removal process will be recorded for documentation purposes and placed into a project summary report. Documentation may include photographs, certified survey drawings/records, field reports of excavation procedures, Health and Safety Plan, manifests and waste disposal tickets. Once completed the project summary report will be placed in the Facility files for a permanent record of the waste rejection and removal activity. A copy will be provided to the waste material generator for their records and files.

At completion of the rejection and removal activities, as outlined above, the Facility will submit to the NMOCD a certification that the waste material has been removed in accordance with this Contingency procedure. If the waste material was disposed of in the landfill, the certification will be signed by the Facility, as operator.

9.0 SUMMARY

This Hazardous Waste Exclusion Plan outlines the steps and procedures for acceptance of waste at the North Ranch Oil Field Waste Landfill Facility and enables a safe and efficient use of the Facility as the disposal site for oil field solid wastes. By following these guidelines, the Facility can minimize the potential for disposing of a non-exempt hazardous or unauthorized waste.

Exhibit A
Waste Acceptance Form C-138

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-138
Revised August 1, 2011

*Surface Waste Management Facility Operator and Generator shall maintain and make this documentation available for Division inspection.

REQUEST FOR APPROVAL TO ACCEPT SOLID WASTE

1. Generator Name and Address:

2. Originating Site:

3. Location of Material (Street Address, City, State or ULSTR):

4. Source and Description of Waste:

Estimated Volume _____ yd^3 / bbls Known Volume (to be entered by the operator at the end of the haul) _____ yd^3 / bbls

5. GENERATOR CERTIFICATION STATEMENT OF WASTE STATUS

I, _____, representative or authorized agent for _____ do hereby certify that according to the Resource Conservation and Recovery Act (RCRA) and the US Environmental Protection Agency's July 1988 regulatory determination, the above described waste is: (Check the appropriate classification)

☐ RCRA Exempt: Oil field wastes generated from oil and gas exploration and production operations and are not mixed with non-exempt waste. *Operator Use Only: Waste Acceptance Frequency* ☐ *Monthly* ☐ *Weekly* ☐ *Per Load*

☐ RCRA Non-Exempt: Oil field waste which is non-hazardous that does not exceed the minimum standards for waste hazardous by characteristics established in RCRA regulations, 40 CFR 261.21-261.24, or listed hazardous waste as defined in 40 CFR, part 261, subpart D, as amended. The following documentation is attached to demonstrate the above-described waste is non-hazardous. (Check the appropriate items)

☐ MSDS Information ☐ RCRA Hazardous Waste Analysis ☐ Process Knowledge ☐ Other (Provide description in Box 4)

GENERATOR 19.15.36.15 WASTE TESTING CERTIFICATION STATEMENT FOR LANDFARMS

I, _____, representative for _____ do hereby certify that representative samples of the oil field waste have been subjected to the paint filter test and tested for chloride content and that the samples have been found to conform to the specific requirements applicable to landfarms pursuant to Section 15 of 19.15.36 NMAC. The results of the representative samples are attached to demonstrate the above-described waste conform to the requirements of Section 15 of 19.15.36 NMAC.

5. Transporter:

OCD Permitted Surface Waste Management Facility

Name and Facility Permit #:

Address of Facility:

Method of Treatment and/or Disposal:

☐ Evaporation ☐ Injection ☐ Treating Plant ☐ Landfarm ☐ Landfill ☐ Other

Waste Acceptance Status:

☐ **APPROVED** ☐ **DENIED** (Must Be Maintained As Permanent Record)

PRINT NAME: _____ TITLE: _____ DATE: _____

SIGNATURE: _____ TELEPHONE NO.: _____

Surface Waste Management Facility Authorized Agent

Exhibit B

40 CFR Part 261 Subsection D – Lists of Hazardous Waste

Subpart D—Lists of Hazardous Wastes

Contents

§261.30 General.

(a) A solid waste is a hazardous waste if it is listed in this subpart, unless it has been excluded from this list under §§260.20 and 260.22.

(b) The Administrator will indicate his basis for listing the classes or types of wastes listed in this subpart by employing one or more of the following Hazard Codes:

Ignitable Waste	(I)
Corrosive Waste	(C)
Reactive Waste	(R)
Toxicity Characteristic Waste	(E)
Acute Hazardous Waste	(H)
Toxic Waste	(T)

Appendix VII identifies the constituent which caused the Administrator to list the waste as a Toxicity Characteristic Waste (E) or Toxic Waste (T) in §§261.31 and 261.32.

(c) Each hazardous waste listed in this subpart is assigned an EPA Hazardous Waste Number which precedes the name of the waste. This number must be used in complying with the notification requirements of Section 3010 of the Act and certain recordkeeping and reporting requirements under parts 262 through 265, 267, 268, and 270 of this chapter.

(d) The following hazardous wastes listed in §261.31 are subject to the exclusion limits for acutely hazardous wastes established in §261.5: EPA Hazardous Wastes Nos. F020, F021, F022, F023, F026 and F027.

[45 FR 33119, May 19, 1980, as amended at 48 FR 14294, Apr. 1, 1983; 50 FR 2000, Jan. 14, 1985; 51 FR 40636, Nov. 7, 1986; 55 FR 11863, Mar. 29, 1990; 75 FR 13002, Mar. 18, 2010]

§261.31 Hazardous wastes from non-specific sources.

(a) The following solid wastes are listed hazardous wastes from non-specific sources unless they are excluded under §§260.20 and 260.22 and listed in appendix IX.

Industry and EPA hazardous waste No.	Hazardous waste	Hazard code
Generic:		
F001	The following spent halogenated solvents used in degreasing: Tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, and chlorinated fluorocarbons; all spent solvent mixtures/blends used in degreasing containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those solvents listed in F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures	(T)
F002	The following spent halogenated solvents: Tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, ortho-dichlorobenzene, trichlorofluoromethane, and 1,1,2-trichloroethane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those listed in F001, F004, or F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures	(T)
F003	The following spent non-halogenated solvents: Xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, and methanol; all spent solvent mixtures/blends containing, before use, only the above spent non-halogenated solvents; and all spent solvent mixtures/blends containing, before use, one or more of the above non-halogenated solvents, and, a total of ten percent or more (by volume) of one or more of those solvents listed in F001, F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures	(I)*
F004	The following spent non-halogenated solvents: Cresols and cresylic acid, and nitrobenzene; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, and F005; and still bottoms from the recovery of these spent solvents and spent solvent mixtures	(T)
F005	The following spent non-halogenated solvents: Toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine, benzene, 2-	(I,T)

	ethoxyethanol, and 2-nitropropane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by volume) of one or more of the above non-halogenated solvents or those solvents listed in F001, F002, or F004; and still bottoms from the recovery of these spent solvents and spent solvent mixtures	
F006	Wastewater treatment sludges from electroplating operations except from the following processes: (1) Sulfuric acid anodizing of aluminum; (2) tin plating on carbon steel; (3) zinc plating (segregated basis) on carbon steel; (4) aluminum or zinc-aluminum plating on carbon steel; (5) cleaning/stripping associated with tin, zinc and aluminum plating on carbon steel; and (6) chemical etching and milling of aluminum	(T)
F007	Spent cyanide plating bath solutions from electroplating operations	(R, T)
F008	Plating bath residues from the bottom of plating baths from electroplating operations where cyanides are used in the process	(R, T)
F009	Spent stripping and cleaning bath solutions from electroplating operations where cyanides are used in the process	(R, T)
F010	Quenching bath residues from oil baths from metal heat treating operations where cyanides are used in the process	(R, T)
F011	Spent cyanide solutions from salt bath pot cleaning from metal heat treating operations	(R, T)
F012	Quenching waste water treatment sludges from metal heat treating operations where cyanides are used in the process	(T)
F019	Wastewater treatment sludges from the chemical conversion coating of aluminum except from zirconium phosphating in aluminum can washing when such phosphating is an exclusive conversion coating process. Wastewater treatment sludges from the manufacturing of motor vehicles using a zinc phosphating process will not be subject to this listing at the point of generation if the wastes are not placed outside on the land prior to shipment to a landfill for disposal and are either: disposed in a Subtitle D municipal or industrial landfill unit that is equipped with a single clay liner and is permitted, licensed or otherwise authorized by the state; or disposed in a landfill unit subject to, or otherwise meeting, the landfill requirements in §258.40, §264.301 or §265.301. For the purposes of this listing, motor vehicle manufacturing is defined in paragraph (b)(4)(i) of this section and (b)(4)(ii) of this section describes the recordkeeping requirements for motor vehicle manufacturing facilities	(T)
F020	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- or tetrachlorophenol, or of intermediates used to produce their pesticide	(H)

	derivatives. (This listing does not include wastes from the production of Hexachlorophene from highly purified 2,4,5-trichlorophenol.)	
F021	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of pentachlorophenol, or of intermediates used to produce its derivatives	(H)
F022	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzenes under alkaline conditions	(H)
F023	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the production or manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tri- and tetrachlorophenols. (This listing does not include wastes from equipment used only for the production or use of Hexachlorophene from highly purified 2,4,5-trichlorophenol.)	(H)
F024	Process wastes, including but not limited to, distillation residues, heavy ends, tars, and reactor clean-out wastes, from the production of certain chlorinated aliphatic hydrocarbons by free radical catalyzed processes. These chlorinated aliphatic hydrocarbons are those having carbon chain lengths ranging from one to and including five, with varying amounts and positions of chlorine substitution. (This listing does not include wastewaters, wastewater treatment sludges, spent catalysts, and wastes listed in §261.31 or §261.32.)	(T)
F025	Condensed light ends, spent filters and filter aids, and spent desiccant wastes from the production of certain chlorinated aliphatic hydrocarbons, by free radical catalyzed processes. These chlorinated aliphatic hydrocarbons are those having carbon chain lengths ranging from one to and including five, with varying amounts and positions of chlorine substitution	(T)
F026	Wastes (except wastewater and spent carbon from hydrogen chloride purification) from the production of materials on equipment previously used for the manufacturing use (as a reactant, chemical intermediate, or component in a formulating process) of tetra-, penta-, or hexachlorobenzene under alkaline conditions	(H)
F027	Discarded unused formulations containing tri-, tetra-, or pentachlorophenol or discarded unused formulations containing compounds derived from these chlorophenols. (This listing does not include formulations containing Hexachlorophene sythesized from prepurified 2,4,5-trichlorophenol as the sole component.)	(H)

F028	Residues resulting from the incineration or thermal treatment of soil contaminated with EPA Hazardous Waste Nos. F020, F021, F022, F023, F026, and F027	(T)
F032	Wastewaters (except those that have not come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that currently use or have previously used chlorophenolic formulations (except potentially cross-contaminated wastes that have had the F032 waste code deleted in accordance with §261.35 of this chapter or potentially cross-contaminated wastes that are otherwise currently regulated as hazardous wastes (i.e., F034 or F035), and where the generator does not resume or initiate use of chlorophenolic formulations). This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol	(T)
F034	Wastewaters (except those that have not come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use creosote formulations. This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol	(T)
F035	Wastewaters (except those that have not come into contact with process contaminants), process residuals, preservative drippage, and spent formulations from wood preserving processes generated at plants that use inorganic preservatives containing arsenic or chromium. This listing does not include K001 bottom sediment sludge from the treatment of wastewater from wood preserving processes that use creosote and/or pentachlorophenol	(T)
F037	Petroleum refinery primary oil/water/solids separation sludge—Any sludge generated from the gravitational separation of oil/water/solids during the storage or treatment of process wastewaters and oily cooling wastewaters from petroleum refineries. Such sludges include, but are not limited to, those generated in oil/water/solids separators; tanks and impoundments; ditches and other conveyances; sumps; and stormwater units receiving dry weather flow. Sludge generated in stormwater units that do not receive dry weather flow, sludges generated from non-contact once-through cooling waters segregated for treatment from other process or oily cooling waters, sludges generated in aggressive biological treatment units as defined in §261.31(b)(2) (including sludges generated in one or more additional units after wastewaters have been treated in aggressive biological treatment units) and K051 wastes are not included in this listing. This listing does include residuals generated from processing or recycling oil-bearing hazardous	(T)

	secondary materials excluded under §261.4(a)(12)(i), if those residuals are to be disposed of	
F038	Petroleum refinery secondary (emulsified) oil/water/solids separation sludge—Any sludge and/or float generated from the physical and/or chemical separation of oil/water/solids in process wastewaters and oily cooling wastewaters from petroleum refineries. Such wastes include, but are not limited to, all sludges and floats generated in: induced air flotation (IAF) units, tanks and impoundments, and all sludges generated in DAF units. Sludges generated in stormwater units that do not receive dry weather flow, sludges generated from non-contact once-through cooling waters segregated for treatment from other process or oily cooling waters, sludges and floats generated in aggressive biological treatment units as defined in §261.31(b)(2) (including sludges and floats generated in one or more additional units after wastewaters have been treated in aggressive biological treatment units) and F037, K048, and K051 wastes are not included in this listing	(T)
F039	Leachate (liquids that have percolated through land disposed wastes) resulting from the disposal of more than one restricted waste classified as hazardous under subpart D of this part. (Leachate resulting from the disposal of one or more of the following EPA Hazardous Wastes and no other Hazardous Wastes retains its EPA Hazardous Waste Number(s): F020, F021, F022, F026, F027, and/or F028.)	(T)

*(I,T) should be used to specify mixtures that are ignitable and contain toxic constituents.

(b) Listing Specific Definitions:

(1) For the purposes of the F037 and F038 listings, oil/water/solids is defined as oil and/or water and/or solids.

(2)(i) For the purposes of the F037 and F038 listings, aggressive biological treatment units are defined as units which employ one of the following four treatment methods: activated sludge; trickling filter; rotating biological contactor for the continuous accelerated biological oxidation of wastewaters; or high-rate aeration. High-rate aeration is a system of surface impoundments or tanks, in which intense mechanical aeration is used to completely mix the wastes, enhance biological activity, and (A) the units employ a minimum of 6 hp per million gallons of treatment volume; and either (B) the hydraulic retention time of the unit is no longer than 5 days; or (C) the hydraulic retention time is no longer than 30 days and the unit does not generate a sludge that is a hazardous waste by the Toxicity Characteristic.

(ii) Generators and treatment, storage and disposal facilities have the burden of proving that their sludges are exempt from listing as F037 and F038 wastes under this definition. Generators and treatment, storage and disposal facilities must maintain, in their operating or other onsite records, documents and data sufficient to prove that: (A) the unit is an aggressive biological treatment unit as defined in this subsection; and (B) the sludges sought to be exempted from the definitions of F037 and/or F038 were actually generated in the aggressive biological treatment unit.

(3) (i) For the purposes of the F037 listing, sludges are considered to be generated at the moment of deposition in the unit, where deposition is defined as at least a temporary cessation of lateral particle movement.

(ii) For the purposes of the F038 listing, (A) sludges are considered to be generated at the moment of deposition in the unit, where deposition is defined as at least a temporary cessation of lateral particle movement and (B) floats are considered to be generated at the moment they are formed in the top of the unit.

(4) For the purposes of the F019 listing, the following apply to wastewater treatment sludges from the manufacturing of motor vehicles using a zinc phosphating process.

(i) Motor vehicle manufacturing is defined to include the manufacture of automobiles and light trucks/utility vehicles (including light duty vans, pick-up trucks, minivans, and sport utility vehicles). Facilities must be engaged in manufacturing complete vehicles (body and chassis or unibody) or chassis only.

(ii) Generators must maintain in their on-site records documentation and information sufficient to prove that the wastewater treatment sludges to be exempted from the F019 listing meet the conditions of the listing. These records must include: the volume of waste generated and disposed of off site; documentation showing when the waste volumes were generated and sent off site; the name and address of the receiving facility; and documentation confirming receipt of the waste by the receiving facility. Generators must maintain these documents on site for no less than three years. The retention period for the documentation is automatically extended during the course of any enforcement action or as requested by the Regional Administrator or the state regulatory authority.

[46 FR 4617, Jan. 16, 1981]

EDITORIAL NOTE: For FEDERAL REGISTER citations affecting §261.31, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and at www.govinfo.gov.

§261.32 Hazardous wastes from specific sources.

(a)The following solid wastes are listed hazardous wastes from specific sources unless they are excluded under §§260.20 and 260.22 and listed in appendix IX.

Industry and EPA hazardous waste No.	Hazardous waste	Hazard code
Wood preservation: K001	Bottom sediment sludge from the treatment of wastewaters from wood preserving processes that use creosote and/or pentachlorophenol	(T)
Inorganic pigments:		
K002	Wastewater treatment sludge from the production of chrome yellow and orange pigments	(T)

K003	Wastewater treatment sludge from the production of molybdate orange pigments	(T)
K004	Wastewater treatment sludge from the production of zinc yellow pigments	(T)
K005	Wastewater treatment sludge from the production of chrome green pigments	(T)
K006	Wastewater treatment sludge from the production of chrome oxide green pigments (anhydrous and hydrated)	(T)
K007	Wastewater treatment sludge from the production of iron blue pigments	(T)
K008	Oven residue from the production of chrome oxide green pigments	(T)
Organic chemicals:		
K009	Distillation bottoms from the production of acetaldehyde from ethylene	(T)
K010	Distillation side cuts from the production of acetaldehyde from ethylene	(T)
K011	Bottom stream from the wastewater stripper in the production of acrylonitrile	(R, T)
K013	Bottom stream from the acetonitrile column in the production of acrylonitrile	(R, T)
K014	Bottoms from the acetonitrile purification column in the production of acrylonitrile	(T)
K015	Still bottoms from the distillation of benzyl chloride	(T)
K016	Heavy ends or distillation residues from the production of carbon tetrachloride	(T)
K017	Heavy ends (still bottoms) from the purification column in the production of epichlorohydrin	(T)
K018	Heavy ends from the fractionation column in ethyl chloride production	(T)
K019	Heavy ends from the distillation of ethylene dichloride in ethylene dichloride production	(T)
K020	Heavy ends from the distillation of vinyl chloride in vinyl chloride monomer production	(T)
K021	Aqueous spent antimony catalyst waste from fluoromethanes production	(T)

K022	Distillation bottom tars from the production of phenol/acetone from cumene	(T)
K023	Distillation light ends from the production of phthalic anhydride from naphthalene	(T)
K024	Distillation bottoms from the production of phthalic anhydride from naphthalene	(T)
K025	Distillation bottoms from the production of nitrobenzene by the nitration of benzene	(T)
K026	Stripping still tails from the production of methy ethyl pyridines	(T)
K027	Centrifuge and distillation residues from toluene diisocyanate production	(R, T)
K028	Spent catalyst from the hydrochlorinator reactor in the production of 1,1,1-trichloroethane	(T)
K029	Waste from the product steam stripper in the production of 1,1,1-trichloroethane	(T)
K030	Column bottoms or heavy ends from the combined production of trichloroethylene and perchloroethylene	(T)
K083	Distillation bottoms from aniline production	(T)
K085	Distillation or fractionation column bottoms from the production of chlorobenzenes	(T)
K093	Distillation light ends from the production of phthalic anhydride from ortho-xylene	(T)
K094	Distillation bottoms from the production of phthalic anhydride from ortho-xylene	(T)
K095	Distillation bottoms from the production of 1,1,1-trichloroethane	(T)
K096	Heavy ends from the heavy ends column from the production of 1,1,1-trichloroethane	(T)
K103	Process residues from aniline extraction from the production of aniline	(T)
K104	Combined wastewater streams generated from nitrobenzene/aniline production	(T)
K105	Separated aqueous stream from the reactor product washing step in the production of chlorobenzenes	(T)
K107	Column bottoms from product separation from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides	(C,T)

K108	Condensed column overheads from product separation and condensed reactor vent gases from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides	(I,T)
K109	Spent filter cartridges from product purification from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides	(T)
K110	Condensed column overheads from intermediate separation from the production of 1,1-dimethylhydrazine (UDMH) from carboxylic acid hydrazides	(T)
K111	Product washwaters from the production of dinitrotoluene via nitration of toluene	(C,T)
K112	Reaction by-product water from the drying column in the production of toluenediamine via hydrogenation of dinitrotoluene	(T)
K113	Condensed liquid light ends from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene	(T)
K114	Vicinals from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene	(T)
K115	Heavy ends from the purification of toluenediamine in the production of toluenediamine via hydrogenation of dinitrotoluene	(T)
K116	Organic condensate from the solvent recovery column in the production of toluene diisocyanate via phosgenation of toluenediamine	(T)
K117	Wastewater from the reactor vent gas scrubber in the production of ethylene dibromide via bromination of ethene	(T)
K118	Spent adsorbent solids from purification of ethylene dibromide in the production of ethylene dibromide via bromination of ethene	(T)
K136	Still bottoms from the purification of ethylene dibromide in the production of ethylene dibromide via bromination of ethene	(T)
K149	Distillation bottoms from the production of alpha- (or methyl-) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups, (This waste does not include still bottoms from the distillation of benzyl chloride.)	(T)
K150	Organic residuals, excluding spent carbon adsorbent, from the spent chlorine gas and hydrochloric acid recovery processes associated with the production of alpha- (or methyl-) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups	(T)

K151	Wastewater treatment sludges, excluding neutralization and biological sludges, generated during the treatment of wastewaters from the production of alpha- (or methyl-) chlorinated toluenes, ring-chlorinated toluenes, benzoyl chlorides, and compounds with mixtures of these functional groups	(T)
K156	Organic waste (including heavy ends, still bottoms, light ends, spent solvents, filtrates, and decantates) from the production of carbamates and carbamoyl oximes. (This listing does not apply to wastes generated from the manufacture of 3-iodo-2-propynyl n-butylcarbamate.)	(T)
K157	Wastewaters (including scrubber waters, condenser waters, washwaters, and separation waters) from the production of carbamates and carbamoyl oximes. (This listing does not apply to wastes generated from the manufacture of 3-iodo-2-propynyl n-butylcarbamate.)	(T)
K158	Bag house dusts and filter/separation solids from the production of carbamates and carbamoyl oximes. (This listing does not apply to wastes generated from the manufacture of 3-iodo-2-propynyl n-butylcarbamate.)	(T)
K159	Organics from the treatment of thiocarbamate wastes	(T)
K161	Purification solids (including filtration, evaporation, and centrifugation solids), bag house dust and floor sweepings from the production of dithiocarbamate acids and their salts. (This listing does not include K125 or K126.)	(R,T)
K174	Wastewater treatment sludges from the production of ethylene dichloride or vinyl chloride monomer (including sludges that result from commingled ethylene dichloride or vinyl chloride monomer wastewater and other wastewater), unless the sludges meet the following conditions: (i) they are disposed of in a subtitle C or non-hazardous landfill licensed or permitted by the state or federal government; (ii) they are not otherwise placed on the land prior to final disposal; and (iii) the generator maintains documentation demonstrating that the waste was either disposed of in an on-site landfill or consigned to a transporter or disposal facility that provided a written commitment to dispose of the waste in an off-site landfill. Respondents in any action brought to enforce the requirements of subtitle C must, upon a showing by the government that the respondent managed wastewater treatment sludges from the production of vinyl chloride monomer or ethylene dichloride, demonstrate that they meet the terms of the exclusion set forth above. In doing so, they must provide appropriate documentation (e.g., contracts between the generator and the	(T)

	landfill owner/operator, invoices documenting delivery of waste to landfill, etc.) that the terms of the exclusion were met	
K175	Wastewater treatment sludges from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process	(T)
K181	Nonwastewaters from the production of dyes and/or pigments (including nonwastewaters commingled at the point of generation with nonwastewaters from other processes) that, at the point of generation, contain mass loadings of any of the constituents identified in paragraph (c) of this section that are equal to or greater than the corresponding paragraph (c) levels, as determined on a calendar year basis. These wastes will not be hazardous if the nonwastewaters are: (i) disposed in a Subtitle D landfill unit subject to the design criteria in §258.40, (ii) disposed in a Subtitle C landfill unit subject to either §264.301 or §265.301, (iii) disposed in other Subtitle D landfill units that meet the design criteria in §258.40, §264.301, or §265.301, or (iv) treated in a combustion unit that is permitted under Subtitle C, or an onsite combustion unit that is permitted under the Clean Air Act. For the purposes of this listing, dyes and/or pigments production is defined in paragraph (b)(1) of this section. Paragraph (d) of this section describes the process for demonstrating that a facility's nonwastewaters are not K181. This listing does not apply to wastes that are otherwise identified as hazardous under §§261.21-261.24 and 261.31-261.33 at the point of generation. Also, the listing does not apply to wastes generated before any annual mass loading limit is met	(T)
Inorganic chemicals:		
K071	Brine purification muds from the mercury cell process in chlorine production, where separately prepurified brine is not used	(T)
K073	Chlorinated hydrocarbon waste from the purification step of the diaphragm cell process using graphite anodes in chlorine production	(T)
K106	Wastewater treatment sludge from the mercury cell process in chlorine production	(T)
K176	Baghouse filters from the production of antimony oxide, including filters from the production of intermediates (e.g., antimony metal or crude antimony oxide)	(E)
K177	Slag from the production of antimony oxide that is speculatively accumulated or disposed, including slag from the production of intermediates (e.g., antimony metal or crude antimony oxide)	(T)

K178	Residues from manufacturing and manufacturing-site storage of ferric chloride from acids formed during the production of titanium dioxide using the chloride-ilmenite process	(T)
Pesticides:		
K031	By-product salts generated in the production of MSMA and cacodylic acid	(T)
K032	Wastewater treatment sludge from the production of chlordane	(T)
K033	Wastewater and scrub water from the chlorination of cyclopentadiene in the production of chlordane	(T)
K034	Filter solids from the filtration of hexachlorocyclopentadiene in the production of chlordane	(T)
K035	Wastewater treatment sludges generated in the production of creosote	(T)
K036	Still bottoms from toluene reclamation distillation in the production of disulfoton	(T)
K037	Wastewater treatment sludges from the production of disulfoton	(T)
K038	Wastewater from the washing and stripping of phorate production	(T)
K039	Filter cake from the filtration of diethylphosphorodithioic acid in the production of phorate	(T)
K040	Wastewater treatment sludge from the production of phorate	(T)
K041	Wastewater treatment sludge from the production of toxaphene	(T)
K042	Heavy ends or distillation residues from the distillation of tetrachlorobenzene in the production of 2,4,5-T	(T)
K043	2,6-Dichlorophenol waste from the production of 2,4-D	(T)
K097	Vacuum stripper discharge from the chlordane chlorinator in the production of chlordane	(T)
K098	Untreated process wastewater from the production of toxaphene	(T)
K099	Untreated wastewater from the production of 2,4-D	(T)
K123	Process wastewater (including supernates, filtrates, and washwaters) from the production of ethylenebisdithiocarbamic acid and its salt	(T)
K124	Reactor vent scrubber water from the production of ethylenebisdithiocarbamic acid and its salts	(C, T)
K125	Filtration, evaporation, and centrifugation solids from the production of ethylenebisdithiocarbamic acid and its salts	(T)

K126	Baghouse dust and floor sweepings in milling and packaging operations from the production or formulation of ethylenebisdithiocarbamic acid and its salts	(T)
K131	Wastewater from the reactor and spent sulfuric acid from the acid dryer from the production of methyl bromide	(C, T)
K132	Spent absorbent and wastewater separator solids from the production of methyl bromide	(T)
Explosives:		
K044	Wastewater treatment sludges from the manufacturing and processing of explosives	(R)
K045	Spent carbon from the treatment of wastewater containing explosives	(R)
K046	Wastewater treatment sludges from the manufacturing, formulation and loading of lead-based initiating compounds	(T)
K047	Pink/red water from TNT operations	(R)
Petroleum refining:		
K048	Dissolved air flotation (DAF) float from the petroleum refining industry	(T)
K049	Slop oil emulsion solids from the petroleum refining industry	(T)
K050	Heat exchanger bundle cleaning sludge from the petroleum refining industry	(T)
K051	API separator sludge from the petroleum refining industry	(T)
K052	Tank bottoms (leaded) from the petroleum refining industry	(T)
K169	Crude oil storage tank sediment from petroleum refining operations	(T)
K170	Clarified slurry oil tank sediment and/or in-line filter/separation solids from petroleum refining operations	(T)
K171	Spent Hydrotreating catalyst from petroleum refining operations, including guard beds used to desulfurize feeds to other catalytic reactors (this listing does not include inert support media)	(I,T)
K172	Spent Hydrorefining catalyst from petroleum refining operations, including guard beds used to desulfurize feeds to other catalytic reactors (this listing does not include inert support media)	(I,T)
Iron and steel:		
K061	Emission control dust/sludge from the primary production of steel in electric furnaces	(T)

K062	Spent pickle liquor generated by steel finishing operations of facilities within the iron and steel industry (SIC Codes 331 and 332)	(C,T)
Primary aluminum:		
K088	Spent potliners from primary aluminum reduction	(T)
Secondary lead:		
K069	Emission control dust/sludge from secondary lead smelting. (NOTE: This listing is stayed administratively for sludge generated from secondary acid scrubber systems. The stay will remain in effect until further administrative action is taken. If EPA takes further action effecting this stay, EPA will publish a notice of the action in the FEDERAL REGISTER)	(T)
K100	Waste leaching solution from acid leaching of emission control dust/sludge from secondary lead smelting	(T)
Veterinary pharmaceuticals:		
K084	Wastewater treatment sludges generated during the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds	(T)
K101	Distillation tar residues from the distillation of aniline-based compounds in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds	(T)
K102	Residue from the use of activated carbon for decolorization in the production of veterinary pharmaceuticals from arsenic or organo-arsenic compounds	(T)
Ink formulation:		
K086	Solvent washes and sludges, caustic washes and sludges, or water washes and sludges from cleaning tubs and equipment used in the formulation of ink from pigments, driers, soaps, and stabilizers containing chromium and lead	(T)
Coking:		
K060	Ammonia still lime sludge from coking operations	(T)
K087	Decanter tank tar sludge from coking operations	(T)
K141	Process residues from the recovery of coal tar, including, but not limited to, collecting sump residues from the production of coke from coal or the recovery of coke by-products produced from coal. This listing does not include K087 (decanter tank tar sludges from coking operations)	(T)

K142	Tar storage tank residues from the production of coke from coal or from the recovery of coke by-products produced from coal	(T)
K143	Process residues from the recovery of light oil, including, but not limited to, those generated in stills, decanters, and wash oil recovery units from the recovery of coke by-products produced from coal	(T)
K144	Wastewater sump residues from light oil refining, including, but not limited to, intercepting or contamination sump sludges from the recovery of coke by-products produced from coal	(T)
K145	Residues from naphthalene collection and recovery operations from the recovery of coke by-products produced from coal	(T)
K147	Tar storage tank residues from coal tar refining	(T)
K148	Residues from coal tar distillation, including but not limited to, still bottoms	(T)

(b) *Listing Specific Definitions:* (1) For the purposes of the K181 listing, dyes and/or pigments production is defined to include manufacture of the following product classes: dyes, pigments, or FDA certified colors that are classified as azo, triarylmethane, perylene or anthraquinone classes. Azo products include azo, monoazo, diazo, triazo, polyazo, azoic, benzidine, and pyrazolone products. Triarylmethane products include both triarylmethane and triphenylmethane products. Wastes that are not generated at a dyes and/or pigments manufacturing site, such as wastes from the offsite use, formulation, and packaging of dyes and/or pigments, are not included in the K181 listing.

(c) *K181 Listing Levels.* Nonwastewaters containing constituents in amounts equal to or exceeding the following levels during any calendar year are subject to the K181 listing, unless the conditions in the K181 listing are met.

Constituent	Chemical abstracts No.	Mass levels (kg/yr)
Aniline	62-53-3	9,300
o-Anisidine	90-04-0	110
4-Chloroaniline	106-47-8	4,800
p-Cresidine	120-71-8	660
2,4-Dimethylaniline	95-68-1	100
1,2-Phenylenediamine	95-54-5	710
1,3-Phenylenediamine	108-45-2	1,200

(d) *Procedures for demonstrating that dyes and/or pigment nonwastewaters are not K181.* The procedures described in paragraphs (d)(1)-(d)(3) and (d)(5) of this section establish when nonwastewaters from the production of dyes/pigments would not be hazardous (these procedures

apply to wastes that are not disposed in landfill units or treated in combustion units as specified in paragraph (a) of this section). If the nonwastewaters are disposed in landfill units or treated in combustion units as described in paragraph (a) of this section, then the nonwastewaters are not hazardous. In order to demonstrate that it is meeting the landfill disposal or combustion conditions contained in the K181 listing description, the generator must maintain documentation as described in paragraph (d)(4) of this section.

(1) *Determination based on no K181 constituents.* Generators that have knowledge (e.g., knowledge of constituents in wastes based on prior sampling and analysis data and/or information about raw materials used, production processes used, and reaction and degradation products formed) that their wastes contain none of the K181 constituents (*see* paragraph (c) of this section) can use their knowledge to determine that their waste is not K181. The generator must document the basis for all such determinations on an annual basis and keep each annual documentation for three years.

(2) *Determination for generated quantities of 1,000 MT/yr or less for wastes that contain K181 constituents.*If the total annual quantity of dyes and/or pigment nonwastewaters generated is 1,000 metric tons or less, the generator can use knowledge of the wastes (e.g., knowledge of constituents in wastes based on prior analytical data and/or information about raw materials used, production processes used, and reaction and degradation products formed) to conclude that annual mass loadings for the K181 constituents are below the listing levels of paragraph (c) of this section. To make this determination, the generator must:

(i) Each year document the basis for determining that the annual quantity of nonwastewaters expected to be generated will be less than 1,000 metric tons.

(ii) Track the actual quantity of nonwastewaters generated from January 1 through December 31 of each year. If, at any time within the year, the actual waste quantity exceeds 1,000 metric tons, the generator must comply with the requirements of paragraph (d)(3) of this section for the remainder of the year.

(iii) Keep a running total of the K181 constituent mass loadings over the course of the calendar year.

(iv) Keep the following records on site for the three most recent calendar years in which the hazardous waste determinations are made:

(A) The quantity of dyes and/or pigment nonwastewaters generated.

(B) The relevant process information used.

(C) The calculations performed to determine annual total mass loadings for each K181 constituent in the nonwastewaters during the year.

(3) *Determination for generated quantities greater than 1,000 MT/yr for wastes that contain K181 constituents.* If the total annual quantity of dyes and/or pigment nonwastewaters generated is greater than 1,000 metric tons, the generator must perform all of the steps described in paragraphs ((d)(3)(i)-(d)(3)(xi) of this section) in order to make a determination that its waste is not K181.

(i) Determine which K181 constituents (see paragraph (c) of this section) are reasonably expected to be present in the wastes based on knowledge of the wastes (e.g., based on prior

sampling and analysis data and/or information about raw materials used, production processes used, and reaction and degradation products formed).

(ii) If 1,2-phenylenediamine is present in the wastes, the generator can use either knowledge or sampling and analysis procedures to determine the level of this constituent in the wastes. For determinations based on use of knowledge, the generator must comply with the procedures for using knowledge described in paragraph (d)(2) of this section and keep the records described in paragraph (d)(2)(iv) of this section. For determinations based on sampling and analysis, the generator must comply with the sampling and analysis and recordkeeping requirements described below in this section.

(iii) Develop a waste sampling and analysis plan (or modify an existing plan) to collect and analyze representative waste samples for the K181 constituents reasonably expected to be present in the wastes. At a minimum, the plan must include:

(A) A discussion of the number of samples needed to characterize the wastes fully;

(B) The planned sample collection method to obtain representative waste samples;

(C) A discussion of how the sampling plan accounts for potential temporal and spatial variability of the wastes.

(D) A detailed description of the test methods to be used, including sample preparation, clean up (if necessary), and determinative methods.

(iv) Collect and analyze samples in accordance with the waste sampling and analysis plan.

(A) The sampling and analysis must be unbiased, precise, and representative of the wastes.

(B) The analytical measurements must be sufficiently sensitive, accurate and precise to support any claim that the constituent mass loadings are below the listing levels of paragraph (c) of this section.

(v) Record the analytical results.

(vi) Record the waste quantity represented by the sampling and analysis results.

(vii) Calculate constituent-specific mass loadings (product of concentrations and waste quantity).

(viii) Keep a running total of the K181 constituent mass loadings over the course of the calendar year.

(ix) Determine whether the mass of any of the K181 constituents listed in paragraph (c) of this section generated between January 1 and December 31 of any year is below the K181 listing levels.

(x) Keep the following records on site for the three most recent calendar years in which the hazardous waste determinations are made:

(A) The sampling and analysis plan.

(B) The sampling and analysis results (including QA/QC data)

(C) The quantity of dyes and/or pigment nonwastewaters generated.

(D) The calculations performed to determine annual mass loadings.

(xi) Nonhazardous waste determinations must be conducted annually to verify that the wastes remain nonhazardous.

(A) The annual testing requirements are suspended after three consecutive successful annual demonstrations that the wastes are nonhazardous. The generator can then use knowledge of the wastes to support subsequent annual determinations.

(B) The annual testing requirements are reinstated if the manufacturing or waste treatment processes generating the wastes are significantly altered, resulting in an increase of the potential for the wastes to exceed the listing levels.

(C) If the annual testing requirements are suspended, the generator must keep records of the process knowledge information used to support a nonhazardous determination. If testing is reinstated, a description of the process change must be retained.

(4) *Recordkeeping for the landfill disposal and combustion exemptions.* For the purposes of meeting the landfill disposal and combustion condition set out in the K181 listing description, the generator must maintain on site for three years documentation demonstrating that each shipment of waste was received by a landfill unit that is subject to or meets the landfill design standards set out in the listing description, or was treated in combustion units as specified in the listing description.

(5) *Waste holding and handling.* During the interim period, from the point of generation to completion of the hazardous waste determination, the generator is responsible for storing the wastes appropriately. If the wastes are determined to be hazardous and the generator has not complied with the subtitle C requirements during the interim period, the generator could be subject to an enforcement action for improper management.

[46 FR 4618, Jan. 16, 1981]

EDITORIAL NOTE: For FEDERAL REGISTER citations affecting §261.32, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and at www.govinfo.gov.

§261.33 Discarded commercial chemical products, off-specification species, container residues, and spill residues thereof.

The following materials or items are hazardous wastes if and when they are discarded or intended to be discarded as described in §261.2(a)(2)(i), when they are mixed with waste oil or used oil or other material and applied to the land for dust suppression or road treatment, when they are otherwise applied to the land in lieu of their original intended use or when they are contained in products that are applied to the land in lieu of their original intended use, or when, in lieu of their original intended use, they are produced for use as (or as a component of) a fuel, distributed for use as a fuel, or burned as a fuel.

(a) Any commercial chemical product, or manufacturing chemical intermediate having the generic name listed in paragraph (e) or (f) of this section.

(b) Any off-specification commercial chemical product or manufacturing chemical intermediate which, if it met specifications, would have the generic name listed in paragraph (e) or (f) of this section.

(c) Any residue remaining in a container or in an inner liner removed from a container that has held any commercial chemical product or manufacturing chemical intermediate having the generic name listed in paragraphs (e) or (f) of this section, unless the container is empty as defined in §261.7(b) of this chapter.

[*Comment:* Unless the residue is being beneficially used or reused, or legitimately recycled or reclaimed; or being accumulated, stored, transported or treated prior to such use, re-use, recycling or reclamation, EPA considers the residue to be intended for discard, and thus, a hazardous waste. An example of a legitimate re-use of the residue would be where the residue remains in the container and the container is used to hold the same commercial chemical product or manufacturing chemical intermediate it previously held. An example of the discard of the residue would be where the drum is sent to a drum reconditioner who reconditions the drum but discards the residue.]

(d) Any residue or contaminated soil, water or other debris resulting from the cleanup of a spill into or on any land or water of any commercial chemical product or manufacturing chemical intermediate having the generic name listed in paragraph (e) or (f) of this section, or any residue or contaminated soil, water or other debris resulting from the cleanup of a spill, into or on any land or water, of any off-specification chemical product and manufacturing chemical intermediate which, if it met specifications, would have the generic name listed in paragraph (e) or (f) of this section.

[*Comment:* The phrase “commercial chemical product or manufacturing chemical intermediate having the generic name listed in . . .” refers to a chemical substance which is manufactured or formulated for commercial or manufacturing use which consists of the commercially pure grade of the chemical, any technical grades of the chemical that are produced or marketed, and all formulations in which the chemical is the sole active ingredient. It does not refer to a material, such as a manufacturing process waste, that contains any of the substances listed in paragraph (e) or (f). Where a manufacturing process waste is deemed to be a hazardous waste because it contains a substance listed in paragraph (e) or (f), such waste will be listed in either §261.31 or §261.32 or will be identified as a hazardous waste by the characteristics set forth in subpart C of this part.]

(e) The commercial chemical products, manufacturing chemical intermediates or off-specification commercial chemical products or manufacturing chemical intermediates referred to in paragraphs (a) through (d) of this section, are identified as acute hazardous wastes (H).

[*Comment:* For the convenience of the regulated community the primary hazardous properties of these materials have been indicated by the letters T (Toxicity), and R (Reactivity). Absence of a letter indicates that the compound only is listed for acute toxicity. Wastes are first listed in alphabetical order by substance and then listed again in numerical order by Hazardous Waste Number.]

These wastes and their corresponding EPA Hazardous Waste Numbers are:

Hazardous waste No.	Chemical abstracts No.	Substance
P023	107-20-0	Acetaldehyde, chloro-
P002	591-08-2	Acetamide, N-(aminothioxomethyl)-

P057	640-19-7	Acetamide, 2-fluoro-
P058	62-74-8	Acetic acid, fluoro-, sodium salt
P002	591-08-2	1-Acetyl-2-thiourea
P003	107-02-8	Acrolein
P070	116-06-3	Aldicarb
P203	1646-88-4	Aldicarb sulfone.
P004	309-00-2	Aldrin
P005	107-18-6	Allyl alcohol
P006	20859-73-8	Aluminum phosphide (R,T)
P007	2763-96-4	5-(Aminomethyl)-3-isoxazolol
P008	504-24-5	4-Aminopyridine
P009	131-74-8	Ammonium picrate (R)
P119	7803-55-6	Ammonium vanadate
P099	506-61-6	Argentate(1-), bis(cyano-C)-, potassium
P010	7778-39-4	Arsenic acid H_3 AsO_4
P012	1327-53-3	Arsenic oxide As_2 O_3
P011	1303-28-2	Arsenic oxide As_2 O_5
P011	1303-28-2	Arsenic pentoxide
P012	1327-53-3	Arsenic trioxide
P038	692-42-2	Arsine, diethyl-
P036	696-28-6	Arsonous dichloride, phenyl-
P054	151-56-4	Aziridine
P067	75-55-8	Aziridine, 2-methyl-
P013	542-62-1	Barium cyanide
P024	106-47-8	Benzenamine, 4-chloro-
P077	100-01-6	Benzenamine, 4-nitro-
P028	100-44-7	Benzene, (chloromethyl)-
P042	51-43-4	1,2-Benzenediol, 4-[1-hydroxy-2-(methylamino)ethyl]-, (R)-
P046	122-09-8	Benzeneethanamine, alpha,alpha-dimethyl-
P014	108-98-5	Benzenethiol

P127	1563-66-2	7-Benzofuranol, 2,3-dihydro-2,2-dimethyl-, methylcarbamate.
P188	57-64-7	Benzoic acid, 2-hydroxy-, compd. with (3aS-cis)-1,2,3,3a,8,8a-hexahydro-1,3a,8-trimethylpyrrolo[2,3-b]indol-5-yl methylcarbamate ester (1:1).
P001	[1]81-81-2	2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenylbutyl)-, & salts, when present at concentrations greater than 0.3%
P028	100-44-7	Benzyl chloride
P015	7440-41-7	Beryllium powder
P017	598-31-2	Bromoacetone
P018	357-57-3	Brucine
P045	39196-18-4	2-Butanone, 3,3-dimethyl-1-(methylthio)-, O-[(methylamino)carbonyl] oxime
P021	592-01-8	Calcium cyanide
P021	592-01-8	Calcium cyanide $Ca(CN)_2$
P189	55285-14-8	Carbamic acid, [(dibutylamino)- thio]methyl-, 2,3-dihydro-2,2-dimethyl- 7-benzofuranyl ester.
P191	644-64-4	Carbamic acid, dimethyl-, 1-[(dimethyl-amino)carbonyl]- 5-methyl-1H- pyrazol-3-yl ester.
P192	119-38-0	Carbamic acid, dimethyl-, 3-methyl-1- (1-methylethyl)-1H- pyrazol-5-yl ester.
P190	1129-41-5	Carbamic acid, methyl-, 3-methylphenyl ester.
P127	1563-66-2	Carbofuran.
P022	75-15-0	Carbon disulfide
P095	75-44-5	Carbonic dichloride
P189	55285-14-8	Carbosulfan.
P023	107-20-0	Chloroacetaldehyde
P024	106-47-8	p-Chloroaniline
P026	5344-82-1	1-(o-Chlorophenyl)thiourea
P027	542-76-7	3-Chloropropionitrile
P029	544-92-3	Copper cyanide
P029	544-92-3	Copper cyanide Cu(CN)
P202	64-00-6	m-Cumenyl methylcarbamate.
P030		Cyanides (soluble cyanide salts), not otherwise specified

P031	460-19-5	Cyanogen
P033	506-77-4	Cyanogen chloride
P033	506-77-4	Cyanogen chloride (CN)Cl
P034	131-89-5	2-Cyclohexyl-4,6-dinitrophenol
P016	542-88-1	Dichloromethyl ether
P036	696-28-6	Dichlorophenylarsine
P037	60-57-1	Dieldrin
P038	692-42-2	Diethylarsine
P041	311-45-5	Diethyl-p-nitrophenyl phosphate
P040	297-97-2	O,O-Diethyl O-pyrazinyl phosphorothioate
P043	55-91-4	Diisopropylfluorophosphate (DFP)
P004	309-00-2	1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexa- chloro-1,4,4a,5,8,8a,-hexahydro-, (1alpha,4alpha,4abeta,5alpha,8alpha,8abeta)-
P060	465-73-6	1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexa- chloro-1,4,4a,5,8,8a-hexahydro-, (1alpha,4alpha,4abeta,5beta,8beta,8abeta)-
P037	60-57-1	2,7:3,6-Dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1aalpha,2beta,2aalpha,3beta,6beta,6aalpha,7beta, 7aalpha)-
P051	[1]72-20-8	2,7:3,6-Dimethanonaphth [2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1aalpha,2beta,2abeta,3alpha,6alpha,6abeta,7beta, 7aalpha)-, & metabolites
P044	60-51-5	Dimethoate
P046	122-09-8	alpha,alpha-Dimethylphenethylamine
P191	644-64-4	Dimetilan.
P047	[1]534-52-1	4,6-Dinitro-o-cresol, & salts
P048	51-28-5	2,4-Dinitrophenol
P020	88-85-7	Dinoseb
P085	152-16-9	Diphosphoramide, octamethyl-
P111	107-49-3	Diphosphoric acid, tetraethyl ester
P039	298-04-4	Disulfoton
P049	541-53-7	Dithiobiuret

P185	26419-73-8	1,3-Dithiolane-2-carboxaldehyde, 2,4-dimethyl-, O- [(methylamino)-carbonyl]oxime.
P050	115-29-7	Endosulfan
P088	145-73-3	Endothall
P051	72-20-8	Endrin
P051	72-20-8	Endrin, & metabolites
P042	51-43-4	Epinephrine
P031	460-19-5	Ethanedinitrile
P194	23135-22-0	Ethanimidothioic acid, 2-(dimethylamino)-N-[[(methylamino) carbonyl]oxy]-2-oxo-, methyl ester.
P066	16752-77-5	Ethanimidothioic acid, N-[[(methylamino)carbonyl]oxy]-, methyl ester
P101	107-12-0	Ethyl cyanide
P054	151-56-4	Ethyleneimine
P097	52-85-7	Famphur
P056	7782-41-4	Fluorine
P057	640-19-7	Fluoroacetamide
P058	62-74-8	Fluoroacetic acid, sodium salt
P198	23422-53-9	Formetanate hydrochloride.
P197	17702-57-7	Formparanate.
P065	628-86-4	Fulminic acid, mercury(2 +) salt (R,T)
P059	76-44-8	Heptachlor
P062	757-58-4	Hexaethyl tetraphosphate
P116	79-19-6	Hydrazinecarbothioamide
P068	60-34-4	Hydrazine, methyl-
P063	74-90-8	Hydrocyanic acid
P063	74-90-8	Hydrogen cyanide
P096	7803-51-2	Hydrogen phosphide
P060	465-73-6	Isodrin
P192	119-38-0	Isolan.
P202	64-00-6	3-Isopropylphenyl N-methylcarbamate.

P007	2763-96-4	3(2H)-Isoxazolone, 5-(aminomethyl)-
P196	15339-36-3	Manganese, bis(dimethylcarbamodithioato-S,S′)-,
P196	15339-36-3	Manganese dimethyldithiocarbamate.
P092	62-38-4	Mercury, (acetato-O)phenyl-
P065	628-86-4	Mercury fulminate (R,T)
P082	62-75-9	Methanamine, N-methyl-N-nitroso-
P064	624-83-9	Methane, isocyanato-
P016	542-88-1	Methane, oxybis[chloro-
P112	509-14-8	Methane, tetranitro- (R)
P118	75-70-7	Methanethiol, trichloro-
P198	23422-53-9	Methanimidamide, N,N-dimethyl-N′-[3-[[(methylamino)-carbonyl]oxy]phenyl]-, monohydrochloride.
P197	17702-57-7	Methanimidamide, N,N-dimethyl-N′-[2-methyl-4-[[(methylamino)carbonyl]oxy]phenyl]-
P050	115-29-7	6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-, 3-oxide
P059	76-44-8	4,7-Methano-1H-indene, 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-
P199	2032-65-7	Methiocarb.
P066	16752-77-5	Methomyl
P068	60-34-4	Methyl hydrazine
P064	624-83-9	Methyl isocyanate
P069	75-86-5	2-Methyllactonitrile
P071	298-00-0	Methyl parathion
P190	1129-41-5	Metolcarb.
P128	315-8-4	Mexacarbate.
P072	86-88-4	alpha-Naphthylthiourea
P073	13463-39-3	Nickel carbonyl
P073	13463-39-3	Nickel carbonyl $Ni(CO)_4$, (T-4)-
P074	557-19-7	Nickel cyanide
P074	557-19-7	Nickel cyanide $Ni(CN)_2$

P075	[1]54-11-5	Nicotine, & salts
P076	10102-43-9	Nitric oxide
P077	100-01-6	p-Nitroaniline
P078	10102-44-0	Nitrogen dioxide
P076	10102-43-9	Nitrogen oxide NO
P078	10102-44-0	Nitrogen oxide NO_2
P081	55-63-0	Nitroglycerine (R)
P082	62-75-9	N-Nitrosodimethylamine
P084	4549-40-0	N-Nitrosomethylvinylamine
P085	152-16-9	Octamethylpyrophosphoramide
P087	20816-12-0	Osmium oxide OsO_4, (T-4)-
P087	20816-12-0	Osmium tetroxide
P088	145-73-3	7-Oxabicyclo[2.2.1]heptane-2,3-dicarboxylic acid
P194	23135-22-0	Oxamyl.
P089	56-38-2	Parathion
P034	131-89-5	Phenol, 2-cyclohexyl-4,6-dinitro-
P048	51-28-5	Phenol, 2,4-dinitro-
P047	[1]534-52-1	Phenol, 2-methyl-4,6-dinitro-, & salts
P020	88-85-7	Phenol, 2-(1-methylpropyl)-4,6-dinitro-
P009	131-74-8	Phenol, 2,4,6-trinitro-, ammonium salt (R)
P128	315-18-4	Phenol, 4-(dimethylamino)-3,5-dimethyl-, methylcarbamate (ester).
P199	2032-65-7	Phenol, (3,5-dimethyl-4-(methylthio)-, methylcarbamate
P202	64-00-6	Phenol, 3-(1-methylethyl)-, methyl carbamate.
P201	2631-37-0	Phenol, 3-methyl-5-(1-methylethyl)-, methyl carbamate.
P092	62-38-4	Phenylmercury acetate
P093	103-85-5	Phenylthiourea
P094	298-02-2	Phorate
P095	75-44-5	Phosgene
P096	7803-51-2	Phosphine
P041	311-45-5	Phosphoric acid, diethyl 4-nitrophenyl ester

P039	298-04-4	Phosphorodithioic acid, O,O-diethyl S-[2-(ethylthio)ethyl] ester
P094	298-02-2	Phosphorodithioic acid, O,O-diethyl S-[(ethylthio)methyl] ester
P044	60-51-5	Phosphorodithioic acid, O,O-dimethyl S-[2-(methylamino)-2-oxoethyl] ester
P043	55-91-4	Phosphorofluoridic acid, bis(1-methylethyl) ester
P089	56-38-2	Phosphorothioic acid, O,O-diethyl O-(4-nitrophenyl) ester
P040	297-97-2	Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester
P097	52-85-7	Phosphorothioic acid, O-[4-[(dimethylamino)sulfonyl]phenyl] O,O-dimethyl ester
P071	298-00-0	Phosphorothioic acid, O,O,-dimethyl O-(4-nitrophenyl) ester
P204	57-47-6	Physostigmine.
P188	57-64-7	Physostigmine salicylate.
P110	78-00-2	Plumbane, tetraethyl-
P098	151-50-8	Potassium cyanide
P098	151-50-8	Potassium cyanide K(CN)
P099	506-61-6	Potassium silver cyanide
P201	2631-37-0	Promecarb
P070	116-06-3	Propanal, 2-methyl-2-(methylthio)-, O-[(methylamino)carbonyl]oxime
P203	1646-88-4	Propanal, 2-methyl-2-(methyl-sulfonyl)-, O-[(methylamino)carbonyl] oxime.
P101	107-12-0	Propanenitrile
P027	542-76-7	Propanenitrile, 3-chloro-
P069	75-86-5	Propanenitrile, 2-hydroxy-2-methyl-
P081	55-63-0	1,2,3-Propanetriol, trinitrate (R)
P017	598-31-2	2-Propanone, 1-bromo-
P102	107-19-7	Propargyl alcohol
P003	107-02-8	2-Propenal
P005	107-18-6	2-Propen-1-ol
P067	75-55-8	1,2-Propylenimine

P102	107-19-7	2-Propyn-1-ol
P008	504-24-5	4-Pyridinamine
P075	[1]54-11-5	Pyridine, 3-(1-methyl-2-pyrrolidinyl)-, (S)-, & salts
P204	57-47-6	Pyrrolo[2,3-b]indol-5-ol, 1,2,3,3a,8,8a-hexahydro-1,3a,8-trimethyl-, methylcarbamate (ester), (3aS-cis)-.
P114	12039-52-0	Selenious acid, dithallium(1 +) salt
P103	630-10-4	Selenourea
P104	506-64-9	Silver cyanide
P104	506-64-9	Silver cyanide Ag(CN)
P105	26628-22-8	Sodium azide
P106	143-33-9	Sodium cyanide
P106	143-33-9	Sodium cyanide Na(CN)
P108	[1]57-24-9	Strychnidin-10-one, & salts
P018	357-57-3	Strychnidin-10-one, 2,3-dimethoxy-
P108	[1]57-24-9	Strychnine, & salts
P115	7446-18-6	Sulfuric acid, dithallium(1 +) salt
P109	3689-24-5	Tetraethyldithiopyrophosphate
P110	78-00-2	Tetraethyl lead
P111	107-49-3	Tetraethyl pyrophosphate
P112	509-14-8	Tetranitromethane (R)
P062	757-58-4	Tetraphosphoric acid, hexaethyl ester
P113	1314-32-5	Thallic oxide
P113	1314-32-5	Thallium oxide $Tl_2 O_3$
P114	12039-52-0	Thallium(I) selenite
P115	7446-18-6	Thallium(I) sulfate
P109	3689-24-5	Thiodiphosphoric acid, tetraethyl ester
P045	39196-18-4	Thiofanox
P049	541-53-7	Thioimidodicarbonic diamide $[(H_2 N)C(S)]_2 NH$
P014	108-98-5	Thiophenol
P116	79-19-6	Thiosemicarbazide

P026	5344-82-1	Thiourea, (2-chlorophenyl)-
P072	86-88-4	Thiourea, 1-naphthalenyl-
P093	103-85-5	Thiourea, phenyl-
P185	26419-73-8	Tirpate.
P123	8001-35-2	Toxaphene
P118	75-70-7	Trichloromethanethiol
P119	7803-55-6	Vanadic acid, ammonium salt
P120	1314-62-1	Vanadium oxide $V_2 O_5$
P120	1314-62-1	Vanadium pentoxide
P084	4549-40-0	Vinylamine, N-methyl-N-nitroso-
P001	[1]81-81-2	Warfarin, & salts, when present at concentrations greater than 0.3%
P205	137-30-4	Zinc, bis(dimethylcarbamodithioato-S,S′)-,
P121	557-21-1	Zinc cyanide
P121	557-21-1	Zinc cyanide $Zn(CN)_2$
P122	1314-84-7	Zinc phosphide $Zn_3 P_2$, when present at concentrations greater than 10% (R,T)
P205	137-30-4	Ziram.
P001	[1]81-81-2	2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenylbutyl)-, & salts, when present at concentrations greater than 0.3%
P001	[1]81-81-2	Warfarin, & salts, when present at concentrations greater than 0.3%
P002	591-08-2	Acetamide, -(aminothioxomethyl)-
P002	591-08-2	1-Acetyl-2-thiourea
P003	107-02-8	Acrolein
P003	107-02-8	2-Propenal
P004	309-00-2	Aldrin
P004	309-00-2	1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexa-chloro-1,4,4a,5,8,8a,-hexahydro-, (1alpha,4alpha,4abeta,5alpha,8alpha,8abeta)-
P005	107-18-6	Allyl alcohol
P005	107-18-6	2-Propen-1-ol
P006	20859-73-8	Aluminum phosphide (R,T)

P007	2763-96-4	5-(Aminomethyl)-3-isoxazolol
P007	2763-96-4	3(2H)-Isoxazolone, 5-(aminomethyl)-
P008	504-24-5	4-Aminopyridine
P008	504-24-5	4-Pyridinamine
P009	131-74-8	Ammonium picrate (R)
P009	131-74-8	Phenol, 2,4,6-trinitro-, ammonium salt (R)
P010	7778-39-4	Arsenic acid H_3 AsO_4
P011	1303-28-2	Arsenic oxide As_2 O_5
P011	1303-28-2	Arsenic pentoxide
P012	1327-53-3	Arsenic oxide As_2 O_3
P012	1327-53-3	Arsenic trioxide
P013	542-62-1	Barium cyanide
P014	108-98-5	Benzenethiol
P014	108-98-5	Thiophenol
P015	7440-41-7	Beryllium powder
P016	542-88-1	Dichloromethyl ether
P016	542-88-1	Methane, oxybis[chloro-
P017	598-31-2	Bromoacetone
P017	598-31-2	2-Propanone, 1-bromo-
P018	357-57-3	Brucine
P018	357-57-3	Strychnidin-10-one, 2,3-dimethoxy-
P020	88-85-7	Dinoseb
P020	88-85-7	Phenol, 2-(1-methylpropyl)-4,6-dinitro-
P021	592-01-8	Calcium cyanide
P021	592-01-8	Calcium cyanide $Ca(CN)_2$
P022	75-15-0	Carbon disulfide
P023	107-20-0	Acetaldehyde, chloro-
P023	107-20-0	Chloroacetaldehyde
P024	106-47-8	Benzenamine, 4-chloro-
P024	106-47-8	p-Chloroaniline

P026	5344-82-1	1-(o-Chlorophenyl)thiourea
P026	5344-82-1	Thiourea, (2-chlorophenyl)-
P027	542-76-7	3-Chloropropionitrile
P027	542-76-7	Propanenitrile, 3-chloro-
P028	100-44-7	Benzene, (chloromethyl)-
P028	100-44-7	Benzyl chloride
P029	544-92-3	Copper cyanide
P029	544-92-3	Copper cyanide Cu(CN)
P030		Cyanides (soluble cyanide salts), not otherwise specified
P031	460-19-5	Cyanogen
P031	460-19-5	Ethanedinitrile
P033	506-77-4	Cyanogen chloride
P033	506-77-4	Cyanogen chloride (CN)Cl
P034	131-89-5	2-Cyclohexyl-4,6-dinitrophenol
P034	131-89-5	Phenol, 2-cyclohexyl-4,6-dinitro-
P036	696-28-6	Arsonous dichloride, phenyl-
P036	696-28-6	Dichlorophenylarsine
P037	60-57-1	Dieldrin
P037	60-57-1	2,7:3,6-Dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1aalpha,2beta,2aalpha,3beta,6beta,6aalpha,7beta, 7aalpha)-
P038	692-42-2	Arsine, diethyl-
P038	692-42-2	Diethylarsine
P039	298-04-4	Disulfoton
P039	298-04-4	Phosphorodithioic acid, O,O-diethyl S-[2-(ethylthio)ethyl] ester
P040	297-97-2	O,O-Diethyl O-pyrazinyl phosphorothioate
P040	297-97-2	Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester
P041	311-45-5	Diethyl-p-nitrophenyl phosphate
P041	311-45-5	Phosphoric acid, diethyl 4-nitrophenyl ester
P042	51-43-4	1,2-Benzenediol, 4-[1-hydroxy-2-(methylamino)ethyl]-, (R)-
P042	51-43-4	Epinephrine

P043	55-91-4	Diisopropylfluorophosphate (DFP)
P043	55-91-4	Phosphorofluoridic acid, bis(1-methylethyl) ester
P044	60-51-5	Dimethoate
P044	60-51-5	Phosphorodithioic acid, O,O-dimethyl S-[2-(methyl amino)-2-oxoethyl] ester
P045	39196-18-4	2-Butanone, 3,3-dimethyl-1-(methylthio)-, O-[(methylamino)carbonyl] oxime
P045	39196-18-4	Thiofanox
P046	122-09-8	Benzeneethanamine, alpha,alpha-dimethyl-
P046	122-09-8	alpha,alpha-Dimethylphenethylamine
P047	[1]534-52-1	4,6-Dinitro-o-cresol, & salts
P047	[1]534-52-1	Phenol, 2-methyl-4,6-dinitro-, & salts
P048	51-28-5	2,4-Dinitrophenol
P048	51-28-5	Phenol, 2,4-dinitro-
P049	541-53-7	Dithiobiuret
P049	541-53-7	Thioimidodicarbonic diamide $[(H_2N)C(S)]_2NH$
P050	115-29-7	Endosulfan
P050	115-29-7	6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-, 3-oxide
P051	[1]72-20-8	2,7:3,6-Dimethanonaphth [2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a,2,2a,3,6,6a,7,7a-octahydro-, (1aalpha,2beta,2abeta,3alpha,6alpha,6abeta,7beta, 7aalpha)-, & metabolites
P051	72-20-8	Endrin
P051	72-20-8	Endrin, & metabolites
P054	151-56-4	Aziridine
P054	151-56-4	Ethyleneimine
P056	7782-41-4	Fluorine
P057	640-19-7	Acetamide, 2-fluoro-
P057	640-19-7	Fluoroacetamide
P058	62-74-8	Acetic acid, fluoro-, sodium salt
P058	62-74-8	Fluoroacetic acid, sodium salt

P059	76-44-8	Heptachlor
P059	76-44-8	4,7-Methano-1H-indene, 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-
P060	465-73-6	1,4,5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexa-chloro-1,4,4a,5,8,8a-hexahydro-, (1alpha,4alpha,4abeta,5beta,8beta,8abeta)-
P060	465-73-6	Isodrin
P062	757-58-4	Hexaethyl tetraphosphate
P062	757-58-4	Tetraphosphoric acid, hexaethyl ester
P063	74-90-8	Hydrocyanic acid
P063	74-90-8	Hydrogen cyanide
P064	624-83-9	Methane, isocyanato-
P064	624-83-9	Methyl isocyanate
P065	628-86-4	Fulminic acid, mercury(2 +) salt (R,T)
P065	628-86-4	Mercury fulminate (R,T)
P066	16752-77-5	Ethanimidothioic acid, N-[[(methylamino)carbonyl]oxy]-, methyl ester
P066	16752-77-5	Methomyl
P067	75-55-8	Aziridine, 2-methyl-
P067	75-55-8	1,2-Propylenimine
P068	60-34-4	Hydrazine, methyl-
P068	60-34-4	Methyl hydrazine
P069	75-86-5	2-Methyllactonitrile
P069	75-86-5	Propanenitrile, 2-hydroxy-2-methyl-
P070	116-06-3	Aldicarb
P070	116-06-3	Propanal, 2-methyl-2-(methylthio)-, O-[(methylamino)carbonyl]oxime
P071	298-00-0	Methyl parathion
P071	298-00-0	Phosphorothioic acid, O,O,-dimethyl O-(4-nitrophenyl) ester
P072	86-88-4	alpha-Naphthylthiourea
P072	86-88-4	Thiourea, 1-naphthalenyl-
P073	13463-39-3	Nickel carbonyl

P073	13463-39-3	Nickel carbonyl $Ni(CO)_4$, (T-4)-
P074	557-19-7	Nickel cyanide
P074	557-19-7	Nickel cyanide $Ni(CN)_2$
P075	[1]54-11-5	Nicotine, & salts
P075	[1]54-11-5	Pyridine, 3-(1-methyl-2-pyrrolidinyl)-, (S)-, & salts
P076	10102-43-9	Nitric oxide
P076	10102-43-9	Nitrogen oxide NO
P077	100-01-6	Benzenamine, 4-nitro-
P077	100-01-6	p-Nitroaniline
P078	10102-44-0	Nitrogen dioxide
P078	10102-44-0	Nitrogen oxide NO_2
P081	55-63-0	Nitroglycerine (R)
P081	55-63-0	1,2,3-Propanetriol, trinitrate (R)
P082	62-75-9	Methanamine, -methyl-N-nitroso-
P082	62-75-9	N-Nitrosodimethylamine
P084	4549-40-0	N-Nitrosomethylvinylamine
P084	4549-40-0	Vinylamine, -methyl-N-nitroso-
P085	152-16-9	Diphosphoramide, octamethyl-
P085	152-16-9	Octamethylpyrophosphoramide
P087	20816-12-0	Osmium oxide OsO_4, (T-4)-
P087	20816-12-0	Osmium tetroxide
P088	145-73-3	Endothall
P088	145-73-3	7-Oxabicyclo[2.2.1]heptane-2,3-dicarboxylic acid
P089	56-38-2	Parathion
P089	56-38-2	Phosphorothioic acid, O,O-diethyl O-(4-nitrophenyl) ester
P092	62-38-4	Mercury, (acetato-O)phenyl-
P092	62-38-4	Phenylmercury acetate
P093	103-85-5	Phenylthiourea
P093	103-85-5	Thiourea, phenyl-
P094	298-02-2	Phorate

P094	298-02-2	Phosphorodithioic acid, O,O-diethyl S-[(ethylthio)methyl] ester
P095	75-44-5	Carbonic dichloride
P095	75-44-5	Phosgene
P096	7803-51-2	Hydrogen phosphide
P096	7803-51-2	Phosphine
P097	52-85-7	Famphur
P097	52-85-7	Phosphorothioic acid, O-[4-[(dimethylamino)sulfonyl]phenyl] O,O-dimethyl ester
P098	151-50-8	Potassium cyanide
P098	151-50-8	Potassium cyanide K(CN)
P099	506-61-6	Argentate(1-), bis(cyano-C)-, potassium
P099	506-61-6	Potassium silver cyanide
P101	107-12-0	Ethyl cyanide
P101	107-12-0	Propanenitrile
P102	107-19-7	Propargyl alcohol
P102	107-19-7	2-Propyn-1-ol
P103	630-10-4	Selenourea
P104	506-64-9	Silver cyanide
P104	506-64-9	Silver cyanide Ag(CN)
P105	26628-22-8	Sodium azide
P106	143-33-9	Sodium cyanide
P106	143-33-9	Sodium cyanide Na(CN)
P108	[1]157-24-9	Strychnidin-10-one, & salts
P108	[1]157-24-9	Strychnine, & salts
P109	3689-24-5	Tetraethyldithiopyrophosphate
P109	3689-24-5	Thiodiphosphoric acid, tetraethyl ester
P110	78-00-2	Plumbane, tetraethyl-
P110	78-00-2	Tetraethyl lead
P111	107-49-3	Diphosphoric acid, tetraethyl ester
P111	107-49-3	Tetraethyl pyrophosphate

P112	509-14-8	Methane, tetranitro-(R)
P112	509-14-8	Tetranitromethane (R)
P113	1314-32-5	Thallic oxide
P113	1314-32-5	Thallium oxide $Tl_2 O_3$
P114	12039-52-0	Selenious acid, dithallium(1 +) salt
P114	12039-52-0	Tetraethyldithiopyrophosphate
P115	7446-18-6	Thiodiphosphoric acid, tetraethyl ester
P115	7446-18-6	Plumbane, tetraethyl-
P116	79-19-6	Tetraethyl lead
P116	79-19-6	Thiosemicarbazide
P118	75-70-7	Methanethiol, trichloro-
P118	75-70-7	Trichloromethanethiol
P119	7803-55-6	Ammonium vanadate
P119	7803-55-6	Vanadic acid, ammonium salt
P120	1314-62-1	Vanadium oxide V_2O_5
P120	1314-62-1	Vanadium pentoxide
P121	557-21-1	Zinc cyanide
P121	557-21-1	Zinc cyanide $Zn(CN)_2$
P122	1314-84-7	Zinc phosphide $Zn_3 P_2$, when present at concentrations greater than 10% (R,T)
P123	8001-35-2	Toxaphene
P127	1563-66-2	7-Benzofuranol, 2,3-dihydro-2,2-dimethyl-, methylcarbamate.
P127	1563-66-2	Carbofuran
P128	315-8-4	Mexacarbate
P128	315-18-4	Phenol, 4-(dimethylamino)-3,5-dimethyl-, methylcarbamate (ester)
P185	26419-73-8	1,3-Dithiolane-2-carboxaldehyde, 2,4-dimethyl-, O-[(methylamino)-carbonyl]oxime.
P185	26419-73-8	Tirpate
P188	57-64-7	Benzoic acid, 2-hydroxy-, compd. with (3aS-cis)-1,2,3,3a,8,8a-hexahydro-1,3a,8-trimethylpyrrolo[2,3-b]indol-5-yl methylcarbamate ester (1:1)

P188	57-64-7	Physostigmine salicylate
P189	55285-14-8	Carbamic acid, [(dibutylamino)-thio]methyl-, 2,3-dihydro-2,2-dimethyl-7-benzofuranyl ester
P189	55285-14-8	Carbosulfan
P190	1129-41-5	Carbamic acid, methyl-, 3-methylphenyl ester
P190	1129-41-5	Metolcarb
P191	644-64-4	Carbamic acid, dimethyl-, 1-[(dimethyl-amino)carbonyl]-5-methyl-1H-pyrazol-3-yl ester
P191	644-64-4	Dimetilan
P192	119-38-0	Carbamic acid, dimethyl-, 3-methyl-1-(1-methylethyl)-1H-pyrazol-5-yl ester
P192	119-38-0	Isolan
P194	23135-22-0	Ethanimidthioic acid, 2-(dimethylamino)-N-[[(methylamino) carbonyl]oxy]-2-oxo-, methyl ester
P194	23135-22-0	Oxamyl
P196	15339-36-3	Manganese, bis(dimethylcarbamodithioato-S,S′)-,
P196	15339-36-3	Manganese dimethyldithiocarbamate
P197	17702-57-7	Formparanate
P197	17702-57-7	Methanimidamide, N,N-dimethyl-N′-[2-methyl-4-[[(methylamino)carbonyl]oxy]phenyl]-
P198	23422-53-9	Formetanate hydrochloride
P198	23422-53-9	Methanimidamide, N,N-dimethyl-N′-[3-[[(methylamino)-carbonyl]oxy]phenyl]-monohydrochloride
P199	2032-65-7	Methiocarb
P199	2032-65-7	Phenol, (3,5-dimethyl-4-(methylthio)-, methylcarbamate
P201	2631-37-0	Phenol, 3-methyl-5-(1-methylethyl)-, methyl carbamate
P201	2631-37-0	Promecarb
P202	64-00-6	m-Cumenyl methylcarbamate
P202	64-00-6	3-Isopropylphenyl N-methylcarbamate
P202	64-00-6	Phenol, 3-(1-methylethyl)-, methyl carbamate
P203	1646-88-4	Aldicarb sulfone
P203	1646-88-4	Propanal, 2-methyl-2-(methyl-sulfonyl)-, O-[(methylamino)carbonyl] oxime

P204	57-47-6	Physostigmine
P204	57-47-6	Pyrrolo[2,3-b]indol-5-ol, 1,2,3,3a,8,8a-hexahydro-1,3a,8-trimethyl-, methylcarbamate (ester), (3aS-cis)-
P205	137-30-4	Zinc, bis(dimethylcarbamodithioato-S,S′)-,
P205	137-30-4	Ziram

[1]CAS Number given for parent compound only.

(f) The commercial chemical products, manufacturing chemical intermediates, or off-specification commercial chemical products referred to in paragraphs (a) through (d) of this section, are identified as toxic wastes (T) unless otherwise designated.

[*Comment:* For the convenience of the regulated community, the primary hazardous properties of these materials have been indicated by the letters T (Toxicity), R (Reactivity), I (Ignitability) and C (Corrosivity). Absence of a letter indicates that the compound is only listed for toxicity. Wastes are first listed in alphabetical order by substance and then listed again in numerical order by Hazardous Waste Number.]

These wastes and their corresponding EPA Hazardous Waste Numbers are:

Hazardous waste No.	Chemical abstracts No.	Substance
U394	30558-43-1	A2213.
U001	75-07-0	Acetaldehyde (I)
U034	75-87-6	Acetaldehyde, trichloro-
U187	62-44-2	Acetamide, N-(4-ethoxyphenyl)-
U005	53-96-3	Acetamide, N-9H-fluoren-2-yl-
U240	[1]94-75-7	Acetic acid, (2,4-dichlorophenoxy)-, salts & esters
U112	141-78-6	Acetic acid ethyl ester (I)
U144	301-04-2	Acetic acid, lead(2 +) salt
U214	563-68-8	Acetic acid, thallium(1 +) salt
see F027	93-76-5	Acetic acid, (2,4,5-trichlorophenoxy)-
U002	67-64-1	Acetone (I)
U003	75-05-8	Acetonitrile (I,T)
U004	98-86-2	Acetophenone
U005	53-96-3	2-Acetylaminofluorene

U006	75-36-5	Acetyl chloride (C,R,T)
U007	79-06-1	Acrylamide
U008	79-10-7	Acrylic acid (I)
U009	107-13-1	Acrylonitrile
U011	61-82-5	Amitrole
U012	62-53-3	Aniline (I,T)
U136	75-60-5	Arsinic acid, dimethyl-
U014	492-80-8	Auramine
U015	115-02-6	Azaserine
U010	50-07-7	Azirino[2′,3′:3,4]pyrrolo[1,2-a]indole-4,7-dione, 6-amino-8-[[(aminocarbonyl)oxy]methyl]-1,1a,2,8,8a,8b-hexahydro-8a-methoxy-5-methyl-, [1aS-(1aalpha, 8beta,8aalpha,8balpha)]-
U280	101-27-9	Barban.
U278	22781-23-3	Bendiocarb.
U364	22961-82-6	Bendiocarb phenol.
U271	17804-35-2	Benomyl.
U157	56-49-5	Benz[j]aceanthrylene, 1,2-dihydro-3-methyl-
U016	225-51-4	Benz[c]acridine
U017	98-87-3	Benzal chloride
U192	23950-58-5	Benzamide, 3,5-dichloro-N-(1,1-dimethyl-2-propynyl)-
U018	56-55-3	Benz[a]anthracene
U094	57-97-6	Benz[a]anthracene, 7,12-dimethyl-
U012	62-53-3	Benzenamine (I,T)
U014	492-80-8	Benzenamine, 4,4′-carbonimidoylbis[N,N-dimethyl-
U049	3165-93-3	Benzenamine, 4-chloro-2-methyl-, hydrochloride

U093	60-11-7	Benzenamine, N,N-dimethyl-4-(phenylazo)-
U328	95-53-4	Benzenamine, 2-methyl-
U353	106-49-0	Benzenamine, 4-methyl-
U158	101-14-4	Benzenamine, 4,4′-methylenebis[2-chloro-
U222	636-21-5	Benzenamine, 2-methyl-, hydrochloride
U181	99-55-8	Benzenamine, 2-methyl-5-nitro-
U019	71-43-2	Benzene (I,T)
U038	510-15-6	Benzeneacetic acid, 4-chloro-alpha-(4-chlorophenyl)-alpha-hydroxy-, ethyl ester
U030	101-55-3	Benzene, 1-bromo-4-phenoxy-
U035	305-03-3	Benzenebutanoic acid, 4-[bis(2-chloroethyl)amino]-
U037	108-90-7	Benzene, chloro-
U221	25376-45-8	Benzenediamine, ar-methyl-
U028	117-81-7	1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl) ester
U069	84-74-2	1,2-Benzenedicarboxylic acid, dibutyl ester
U088	84-66-2	1,2-Benzenedicarboxylic acid, diethyl ester
U102	131-11-3	1,2-Benzenedicarboxylic acid, dimethyl ester
U107	117-84-0	1,2-Benzenedicarboxylic acid, dioctyl ester
U070	95-50-1	Benzene, 1,2-dichloro-
U071	541-73-1	Benzene, 1,3-dichloro-
U072	106-46-7	Benzene, 1,4-dichloro-
U060	72-54-8	Benzene, 1,1′-(2,2-dichloroethylidene)bis[4-chloro-
U017	98-87-3	Benzene, (dichloromethyl)-
U223	26471-62-5	Benzene, 1,3-diisocyanatomethyl- (R,T)
U239	1330-20-7	Benzene, dimethyl- (I)
U201	108-46-3	1,3-Benzenediol
U127	118-74-1	Benzene, hexachloro-

U056	110-82-7	Benzene, hexahydro- (I)
U220	108-88-3	Benzene, methyl-
U105	121-14-2	Benzene, 1-methyl-2,4-dinitro-
U106	606-20-2	Benzene, 2-methyl-1,3-dinitro-
U055	98-82-8	Benzene, (1-methylethyl)- (I)
U169	98-95-3	Benzene, nitro-
U183	608-93-5	Benzene, pentachloro-
U185	82-68-8	Benzene, pentachloronitro-
U020	98-09-9	Benzenesulfonic acid chloride (C,R)
U020	98-09-9	Benzenesulfonyl chloride (C,R)
U207	95-94-3	Benzene, 1,2,4,5-tetrachloro-
U061	50-29-3	Benzene, 1,1′-(2,2,2-trichloroethylidene)bis[4-chloro-
U247	72-43-5	Benzene, 1,1′-(2,2,2-trichloroethylidene)bis[4- methoxy-
U023	98-07-7	Benzene, (trichloromethyl)-
U234	99-35-4	Benzene, 1,3,5-trinitro-
U021	92-87-5	Benzidine
U278	22781-23-3	1,3-Benzodioxol-4-ol, 2,2-dimethyl-, methyl carbamate.
U364	22961-82-6	1,3-Benzodioxol-4-ol, 2,2-dimethyl-,
U203	94-59-7	1,3-Benzodioxole, 5-(2-propenyl)-
U141	120-58-1	1,3-Benzodioxole, 5-(1-propenyl)-
U367	1563-38-8	7-Benzofuranol, 2,3-dihydro-2,2-dimethyl-
U090	94-58-6	1,3-Benzodioxole, 5-propyl-
U064	189-55-9	Benzo[rst]pentaphene
U248	[1]81-81-2	2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenyl-butyl)-, & salts, when present at concentrations of 0.3% or less
U022	50-32-8	Benzo[a]pyrene
U197	106-51-4	p-Benzoquinone

U023	98-07-7	Benzotrichloride (C,R,T)
U085	1464-53-5	2,2′-Bioxirane
U021	92-87-5	[1,1′-Biphenyl]-4,4′-diamine
U073	91-94-1	[1,1′-Biphenyl]-4,4′-diamine, 3,3′-dichloro-
U091	119-90-4	[1,1′-Biphenyl]-4,4′-diamine, 3,3′-dimethoxy-
U095	119-93-7	[1,1′-Biphenyl]-4,4′-diamine, 3,3′-dimethyl-
U225	75-25-2	Bromoform
U030	101-55-3	4-Bromophenyl phenyl ether
U128	87-68-3	1,3-Butadiene, 1,1,2,3,4,4-hexachloro-
U172	924-16-3	1-Butanamine, N-butyl-N-nitroso-
U031	71-36-3	1-Butanol (I)
U159	78-93-3	2-Butanone (I,T)
U160	1338-23-4	2-Butanone, peroxide (R,T)
U053	4170-30-3	2-Butenal
U074	764-41-0	2-Butene, 1,4-dichloro- (I,T)
U143	303-34-4	2-Butenoic acid, 2-methyl-, 7-[[2,3-dihydroxy- 2-(1-methoxyethyl)-3-methyl-1-oxobutoxy]methyl]- 2,3,5,7a-tetrahydro-1H-pyrrolizin-1-yl ester, [1S-[1alpha(Z),7(2S*,3R*),7aalpha]]-
U031	71-36-3	n-Butyl alcohol (I)
U136	75-60-5	Cacodylic acid
U032	13765-19-0	Calcium chromate
U372	10605-21-7	Carbamic acid, 1H-benzimidazol-2-yl, methyl ester.
U271	17804-35-2	Carbamic acid, [1-[(butylamino)carbonyl]-1H-benzimidazol-2-yl]-, methyl ester.

U280	101-27-9	Carbamic acid, (3-chlorophenyl)-, 4-chloro-2-butynyl ester.
U238	51-79-6	Carbamic acid, ethyl ester
U178	615-53-2	Carbamic acid, methylnitroso-, ethyl ester
U373	122-42-9	Carbamic acid, phenyl-, 1-methylethyl ester.
U409	23564-05-8	Carbamic acid, [1,2-phenylenebis (iminocarbonothioyl)]bis-, dimethyl ester.
U097	79-44-7	Carbamic chloride, dimethyl-
U389	2303-17-5	Carbamothioic acid, bis(1-methylethyl)-, S-(2,3,3-trichloro-2-propenyl) ester.
U387	52888-80-9	Carbamothioic acid, dipropyl-, S-(phenylmethyl) ester.
U114	[1]111-54-6	Carbamodithioic acid, 1,2-ethanediylbis-, salts & esters
U062	2303-16-4	Carbamothioic acid, bis(1-methylethyl)-, S-(2,3-dichloro-2-propenyl) ester
U279	63-25-2	Carbaryl.
U372	10605-21-7	Carbendazim.
U367	1563-38-8	Carbofuran phenol.
U215	6533-73-9	Carbonic acid, dithallium(1 +) salt
U033	353-50-4	Carbonic difluoride
U156	79-22-1	Carbonochloridic acid, methyl ester (I,T)
U033	353-50-4	Carbon oxyfluoride (R,T)
U211	56-23-5	Carbon tetrachloride
U034	75-87-6	Chloral
U035	305-03-3	Chlorambucil
U036	57-74-9	Chlordane, alpha & gamma isomers
U026	494-03-1	Chlornaphazin
U037	108-90-7	Chlorobenzene
U038	510-15-6	Chlorobenzilate

U039	59-50-7	p-Chloro-m-cresol
U042	110-75-8	2-Chloroethyl vinyl ether
U044	67-66-3	Chloroform
U046	107-30-2	Chloromethyl methyl ether
U047	91-58-7	beta-Chloronaphthalene
U048	95-57-8	o-Chlorophenol
U049	3165-93-3	4-Chloro-o-toluidine, hydrochloride
U032	13765-19-0	Chromic acid H_2CrO_4, calcium salt
U050	218-01-9	Chrysene
U051		Creosote
U052	1319-77-3	Cresol (Cresylic acid)
U053	4170-30-3	Crotonaldehyde
U055	98-82-8	Cumene (I)
U246	506-68-3	Cyanogen bromide (CN)Br
U197	106-51-4	2,5-Cyclohexadiene-1,4-dione
U056	110-82-7	Cyclohexane (I)
U129	58-89-9	Cyclohexane, 1,2,3,4,5,6-hexachloro-, (1alpha,2alpha,3beta,4alpha,5alpha,6beta)-
U057	108-94-1	Cyclohexanone (I)
U130	77-47-4	1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-
U058	50-18-0	Cyclophosphamide
U240	[1]94-75-7	2,4-D, salts & esters
U059	20830-81-3	Daunomycin
U060	72-54-8	DDD
U061	50-29-3	DDT
U062	2303-16-4	Diallate
U063	53-70-3	Dibenz[a,h]anthracene

U064	189-55-9	Dibenzo[a,i]pyrene
U066	96-12-8	1,2-Dibromo-3-chloropropane
U069	84-74-2	Dibutyl phthalate
U070	95-50-1	o-Dichlorobenzene
U071	541-73-1	m-Dichlorobenzene
U072	106-46-7	p-Dichlorobenzene
U073	91-94-1	3,3′-Dichlorobenzidine
U074	764-41-0	1,4-Dichloro-2-butene (I,T)
U075	75-71-8	Dichlorodifluoromethane
U078	75-35-4	1,1-Dichloroethylene
U079	156-60-5	1,2-Dichloroethylene
U025	111-44-4	Dichloroethyl ether
U027	108-60-1	Dichloroisopropyl ether
U024	111-91-1	Dichloromethoxy ethane
U081	120-83-2	2,4-Dichlorophenol
U082	87-65-0	2,6-Dichlorophenol
U084	542-75-6	1,3-Dichloropropene
U085	1464-53-5	1,2:3,4-Diepoxybutane (I,T)
U108	123-91-1	1,4-Diethyleneoxide
U028	117-81-7	Diethylhexyl phthalate
U395	5952-26-1	Diethylene glycol, dicarbamate.
U086	1615-80-1	N,N′-Diethylhydrazine
U087	3288-58-2	O,O-Diethyl S-methyl dithiophosphate
U088	84-66-2	Diethyl phthalate
U089	56-53-1	Diethylstilbesterol
U090	94-58-6	Dihydrosafrole
U091	119-90-4	3,3′-Dimethoxybenzidine

U092	124-40-3	Dimethylamine (I)
U093	60-11-7	p-Dimethylaminoazobenzene
U094	57-97-6	7,12-Dimethylbenz[a]anthracene
U095	119-93-7	3,3′-Dimethylbenzidine
U096	80-15-9	alpha,alpha-Dimethylbenzylhydroperoxide (R)
U097	79-44-7	Dimethylcarbamoyl chloride
U098	57-14-7	1,1-Dimethylhydrazine
U099	540-73-8	1,2-Dimethylhydrazine
U101	105-67-9	2,4-Dimethylphenol
U102	131-11-3	Dimethyl phthalate
U103	77-78-1	Dimethyl sulfate
U105	121-14-2	2,4-Dinitrotoluene
U106	606-20-2	2,6-Dinitrotoluene
U107	117-84-0	Di-n-octyl phthalate
U108	123-91-1	1,4-Dioxane
U109	122-66-7	1,2-Diphenylhydrazine
U110	142-84-7	Dipropylamine (I)
U111	621-64-7	Di-n-propylnitrosamine
U041	106-89-8	Epichlorohydrin
U001	75-07-0	Ethanal (I)
U404	121-44-8	Ethanamine, N,N-diethyl-
U174	55-18-5	Ethanamine, N-ethyl-N-nitroso-
U155	91-80-5	1,2-Ethanediamine, N,N-dimethyl-N′-2-pyridinyl-N′-(2-thienylmethyl)-
U067	106-93-4	Ethane, 1,2-dibromo-
U076	75-34-3	Ethane, 1,1-dichloro-
U077	107-06-2	Ethane, 1,2-dichloro-
U131	67-72-1	Ethane, hexachloro-
U024	111-91-1	Ethane, 1,1′-[methylenebis(oxy)]bis[2-chloro-

U117	60-29-7	Ethane, 1,1′-oxybis-(I)
U025	111-44-4	Ethane, 1,1′-oxybis[2-chloro-
U184	76-01-7	Ethane, pentachloro-
U208	630-20-6	Ethane, 1,1,1,2-tetrachloro-
U209	79-34-5	Ethane, 1,1,2,2-tetrachloro-
U218	62-55-5	Ethanethioamide
U226	71-55-6	Ethane, 1,1,1-trichloro-
U227	79-00-5	Ethane, 1,1,2-trichloro-
U410	59669-26-0	Ethanimidothioic acid, N,N′-[thiobis[(methylimino)carbonyloxy]]bis-, dimethyl ester
U394	30558-43-1	Ethanimidothioic acid, 2-(dimethylamino)-N-hydroxy-2-oxo-, methyl ester.
U359	110-80-5	Ethanol, 2-ethoxy-
U173	1116-54-7	Ethanol, 2,2′-(nitrosoimino)bis-
U395	5952-26-1	Ethanol, 2,2′-oxybis-, dicarbamate.
U004	98-86-2	Ethanone, 1-phenyl-
U043	75-01-4	Ethene, chloro-
U042	110-75-8	Ethene, (2-chloroethoxy)-
U078	75-35-4	Ethene, 1,1-dichloro-
U079	156-60-5	Ethene, 1,2-dichloro-, (E)-
U210	127-18-4	Ethene, tetrachloro-
U228	79-01-6	Ethene, trichloro-
U112	141-78-6	Ethyl acetate (I)
U113	140-88-5	Ethyl acrylate (I)
U238	51-79-6	Ethyl carbamate (urethane)
U117	60-29-7	Ethyl ether (I)
U114	[1]111-54-6	Ethylenebisdithiocarbamic acid, salts & esters
U067	106-93-4	Ethylene dibromide

U077	107-06-2	Ethylene dichloride
U359	110-80-5	Ethylene glycol monoethyl ether
U115	75-21-8	Ethylene oxide (I,T)
U116	96-45-7	Ethylenethiourea
U076	75-34-3	Ethylidene dichloride
U118	97-63-2	Ethyl methacrylate
U119	62-50-0	Ethyl methanesulfonate
U120	206-44-0	Fluoranthene
U122	50-00-0	Formaldehyde
U123	64-18-6	Formic acid (C,T)
U124	110-00-9	Furan (I)
U125	98-01-1	2-Furancarboxaldehyde (I)
U147	108-31-6	2,5-Furandione
U213	109-99-9	Furan, tetrahydro-(I)
U125	98-01-1	Furfural (I)
U124	110-00-9	Furfuran (I)
U206	18883-66-4	Glucopyranose, 2-deoxy-2-(3-methyl-3-nitrosoureido)-, D-
U206	18883-66-4	D-Glucose, 2-deoxy-2-[[(methylnitrosoamino)-carbonyl]amino]-
U126	765-34-4	Glycidylaldehyde
U163	70-25-7	Guanidine, N-methyl-N′-nitro-N-nitroso-
U127	118-74-1	Hexachlorobenzene
U128	87-68-3	Hexachlorobutadiene
U130	77-47-4	Hexachlorocyclopentadiene
U131	67-72-1	Hexachloroethane
U132	70-30-4	Hexachlorophene
U243	1888-71-7	Hexachloropropene
U133	302-01-2	Hydrazine (R,T)

U086	1615-80-1	Hydrazine, 1,2-diethyl-
U098	57-14-7	Hydrazine, 1,1-dimethyl-
U099	540-73-8	Hydrazine, 1,2-dimethyl-
U109	122-66-7	Hydrazine, 1,2-diphenyl-
U134	7664-39-3	Hydrofluoric acid (C,T)
U134	7664-39-3	Hydrogen fluoride (C,T)
U135	7783-06-4	Hydrogen sulfide
U135	7783-06-4	Hydrogen sulfide H_2S
U096	80-15-9	Hydroperoxide, 1-methyl-1-phenylethyl- (R)
U116	96-45-7	2-Imidazolidinethione
U137	193-39-5	Indeno[1,2,3-cd]pyrene
U190	85-44-9	1,3-Isobenzofurandione
U140	78-83-1	Isobutyl alcohol (I,T)
U141	120-58-1	Isosafrole
U142	143-50-0	Kepone
U143	303-34-4	Lasiocarpine
U144	301-04-2	Lead acetate
U146	1335-32-6	Lead, bis(acetato-O)tetrahydroxytri-
U145	7446-27-7	Lead phosphate
U146	1335-32-6	Lead subacetate
U129	58-89-9	Lindane
U163	70-25-7	MNNG
U147	108-31-6	Maleic anhydride
U148	123-33-1	Maleic hydrazide
U149	109-77-3	Malononitrile

U150	148-82-3	Melphalan
U151	7439-97-6	Mercury
U152	126-98-7	Methacrylonitrile (I, T)
U092	124-40-3	Methanamine, N-methyl- (I)
U029	74-83-9	Methane, bromo-
U045	74-87-3	Methane, chloro- (I, T)
U046	107-30-2	Methane, chloromethoxy-
U068	74-95-3	Methane, dibromo-
U080	75-09-2	Methane, dichloro-
U075	75-71-8	Methane, dichlorodifluoro-
U138	74-88-4	Methane, iodo-
U119	62-50-0	Methanesulfonic acid, ethyl ester
U211	56-23-5	Methane, tetrachloro-
U153	74-93-1	Methanethiol (I, T)
U225	75-25-2	Methane, tribromo-
U044	67-66-3	Methane, trichloro-
U121	75-69-4	Methane, trichlorofluoro-
U036	57-74-9	4,7-Methano-1H-indene, 1,2,4,5,6,7,8,8-octachloro-2,3,3a,4,7,7a-hexahydro-
U154	67-56-1	Methanol (I)
U155	91-80-5	Methapyrilene
U142	143-50-0	1,3,4-Metheno-2H-cyclobuta[cd]pentalen-2-one, 1,1a,3,3a,4,5,5,5a,5b,6-decachlorooctahydro-
U247	72-43-5	Methoxychlor
U154	67-56-1	Methyl alcohol (I)
U029	74-83-9	Methyl bromide
U186	504-60-9	1-Methylbutadiene (I)
U045	74-87-3	Methyl chloride (I,T)
U156	79-22-1	Methyl chlorocarbonate (I,T)

U226	71-55-6	Methyl chloroform
U157	56-49-5	3-Methylcholanthrene
U158	101-14-4	4,4′-Methylenebis(2-chloroaniline)
U068	74-95-3	Methylene bromide
U080	75-09-2	Methylene chloride
U159	78-93-3	Methyl ethyl ketone (MEK) (I,T)
U160	1338-23-4	Methyl ethyl ketone peroxide (R,T)
U138	74-88-4	Methyl iodide
U161	108-10-1	Methyl isobutyl ketone (I)
U162	80-62-6	Methyl methacrylate (I,T)
U161	108-10-1	4-Methyl-2-pentanone (I)
U164	56-04-2	Methylthiouracil
U010	50-07-7	Mitomycin C
U059	20830-81-3	5,12-Naphthacenedione, 8-acetyl-10-[(3-amino-2,3,6-trideoxy)-alpha-L-lyxo-hexopyranosyl)oxy]-7,8,9,10-tetrahydro-6,8,11-trihydroxy-1-methoxy-, (8S-cis)-
U167	134-32-7	1-Naphthalenamine
U168	91-59-8	2-Naphthalenamine
U026	494-03-1	Naphthalenamine, N,N′-bis(2-chloroethyl)-
U165	91-20-3	Naphthalene
U047	91-58-7	Naphthalene, 2-chloro-
U166	130-15-4	1,4-Naphthalenedione
U236	72-57-1	2,7-Naphthalenedisulfonic acid, 3,3′-[(3,3′-dimethyl[1,1′-biphenyl]-4,4′-diyl)bis(azo)bis[5-amino-4-hydroxy]-, tetrasodium salt
U279	63-25-2	1-Naphthalenol, methylcarbamate.
U166	130-15-4	1,4-Naphthoquinone
U167	134-32-7	alpha-Naphthylamine
U168	91-59-8	beta-Naphthylamine

U217	10102-45-1	Nitric acid, thallium(1 +) salt
U169	98-95-3	Nitrobenzene (I,T)
U170	100-02-7	p-Nitrophenol
U171	79-46-9	2-Nitropropane (I,T)
U172	924-16-3	N-Nitrosodi-n-butylamine
U173	1116-54-7	N-Nitrosodiethanolamine
U174	55-18-5	N-Nitrosodiethylamine
U176	759-73-9	N-Nitroso-N-ethylurea
U177	684-93-5	N-Nitroso-N-methylurea
U178	615-53-2	N-Nitroso-N-methylurethane
U179	100-75-4	N-Nitrosopiperidine
U180	930-55-2	N-Nitrosopyrrolidine
U181	99-55-8	5-Nitro-o-toluidine
U193	1120-71-4	1,2-Oxathiolane, 2,2-dioxide
U058	50-18-0	2H-1,3,2-Oxazaphosphorin-2-amine, N,N-bis(2-chloroethyl)tetrahydro-, 2-oxide
U115	75-21-8	Oxirane (I,T)
U126	765-34-4	Oxiranecarboxyaldehyde
U041	106-89-8	Oxirane, (chloromethyl)-
U182	123-63-7	Paraldehyde
U183	608-93-5	Pentachlorobenzene
U184	76-01-7	Pentachloroethane
U185	82-68-8	Pentachloronitrobenzene (PCNB)
See F027	87-86-5	Pentachlorophenol
U161	108-10-1	Pentanol, 4-methyl-
U186	504-60-9	1,3-Pentadiene (I)
U187	62-44-2	Phenacetin
U188	108-95-2	Phenol

U048	95-57-8	Phenol, 2-chloro-
U039	59-50-7	Phenol, 4-chloro-3-methyl-
U081	120-83-2	Phenol, 2,4-dichloro-
U082	87-65-0	Phenol, 2,6-dichloro-
U089	56-53-1	Phenol, 4,4′-(1,2-diethyl-1,2-ethenediyl)bis-, (E)-
U101	105-67-9	Phenol, 2,4-dimethyl-
U052	1319-77-3	Phenol, methyl-
U132	70-30-4	Phenol, 2,2′-methylenebis[3,4,6-trichloro-
U411	114-26-1	Phenol, 2-(1-methylethoxy)-, methylcarbamate.
U170	100-02-7	Phenol, 4-nitro-
See F027	87-86-5	Phenol, pentachloro-
See F027	58-90-2	Phenol, 2,3,4,6-tetrachloro-
See F027	95-95-4	Phenol, 2,4,5-trichloro-
See F027	88-06-2	Phenol, 2,4,6-trichloro-
U150	148-82-3	L-Phenylalanine, 4-[bis(2-chloroethyl)amino]-
U145	7446-27-7	Phosphoric acid, lead(2 +) salt (2:3)
U087	3288-58-2	Phosphorodithioic acid, O,O-diethyl S-methyl ester
U189	1314-80-3	Phosphorus sulfide (R)
U190	85-44-9	Phthalic anhydride
U191	109-06-8	2-Picoline
U179	100-75-4	Piperidine, 1-nitroso-
U192	23950-58-5	Pronamide
U194	107-10-8	1-Propanamine (I,T)
U111	621-64-7	1-Propanamine, N-nitroso-N-propyl-
U110	142-84-7	1-Propanamine, N-propyl- (I)

U066	96-12-8	Propane, 1,2-dibromo-3-chloro-
U083	78-87-5	Propane, 1,2-dichloro-
U149	109-77-3	Propanedinitrile
U171	79-46-9	Propane, 2-nitro- (I,T)
U027	108-60-1	Propane, 2,2′-oxybis[2-chloro-
U193	1120-71-4	1,3-Propane sultone
See F027	93-72-1	Propanoic acid, 2-(2,4,5-trichlorophenoxy)-
U235	126-72-7	1-Propanol, 2,3-dibromo-, phosphate (3:1)
U140	78-83-1	1-Propanol, 2-methyl- (I,T)
U002	67-64-1	2-Propanone (I)
U007	79-06-1	2-Propenamide
U084	542-75-6	1-Propene, 1,3-dichloro-
U243	1888-71-7	1-Propene, 1,1,2,3,3,3-hexachloro-
U009	107-13-1	2-Propenenitrile
U152	126-98-7	2-Propenenitrile, 2-methyl- (I,T)
U008	79-10-7	2-Propenoic acid (I)
U113	140-88-5	2-Propenoic acid, ethyl ester (I)
U118	97-63-2	2-Propenoic acid, 2-methyl-, ethyl ester
U162	80-62-6	2-Propenoic acid, 2-methyl-, methyl ester (I,T)
U373	122-42-9	Propham.
U411	114-26-1	Propoxur.
U387	52888-80-9	Prosulfocarb.
U194	107-10-8	n-Propylamine (I,T)
U083	78-87-5	Propylene dichloride
U148	123-33-1	3,6-Pyridazinedione, 1,2-dihydro-
U196	110-86-1	Pyridine
U191	109-06-8	Pyridine, 2-methyl-

U237	66-75-1	2,4-(1H,3H)-Pyrimidinedione, 5-[bis(2-chloroethyl)amino]-
U164	56-04-2	4(1H)-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-
U180	930-55-2	Pyrrolidine, 1-nitroso-
U200	50-55-5	Reserpine
U201	108-46-3	Resorcinol
U203	94-59-7	Safrole
U204	7783-00-8	Selenious acid
U204	7783-00-8	Selenium dioxide
U205	7488-56-4	Selenium sulfide
U205	7488-56-4	Selenium sulfide SeS_2 (R,T)
U015	115-02-6	L-Serine, diazoacetate (ester)
See F027	93-72-1	Silvex (2,4,5-TP)
U206	18883-66-4	Streptozotocin
U103	77-78-1	Sulfuric acid, dimethyl ester
U189	1314-80-3	Sulfur phosphide (R)
See F027	93-76-5	2,4,5-T
U207	95-94-3	1,2,4,5-Tetrachlorobenzene
U208	630-20-6	1,1,1,2-Tetrachloroethane
U209	79-34-5	1,1,2,2-Tetrachloroethane
U210	127-18-4	Tetrachloroethylene
See F027	58-90-2	2,3,4,6-Tetrachlorophenol
U213	109-99-9	Tetrahydrofuran (I)
U214	563-68-8	Thallium(I) acetate
U215	6533-73-9	Thallium(I) carbonate

U216	7791-12-0	Thallium(I) chloride
U216	7791-12-0	thallium chloride TlCl
U217	10102-45-1	Thallium(I) nitrate
U218	62-55-5	Thioacetamide
U410	59669-26-0	Thiodicarb.
U153	74-93-1	Thiomethanol (I,T)
U244	137-26-8	Thioperoxydicarbonic diamide $[(H_2 N)C(S)]_2 S_2$, tetramethyl-
U409	23564-05-8	Thiophanate-methyl.
U219	62-56-6	Thiourea
U244	137-26-8	Thiram
U220	108-88-3	Toluene
U221	25376-45-8	Toluenediamine
U223	26471-62-5	Toluene diisocyanate (R,T)
U328	95-53-4	o-Toluidine
U353	106-49-0	p-Toluidine
U222	636-21-5	o-Toluidine hydrochloride
U389	2303-17-5	Triallate.
U011	61-82-5	1H-1,2,4-Triazol-3-amine
U226	71-55-6	1,1,1-Trichloroethane
U227	79-00-5	1,1,2-Trichloroethane
U228	79-01-6	Trichloroethylene
U121	75-69-4	Trichloromonofluoromethane
See F027	95-95-4	2,4,5-Trichlorophenol
See F027	88-06-2	2,4,6-Trichlorophenol

U404	121-44-8	Triethylamine.
U234	99-35-4	1,3,5-Trinitrobenzene (R,T)
U182	123-63-7	1,3,5-Trioxane, 2,4,6-trimethyl-
U235	126-72-7	Tris(2,3-dibromopropyl) phosphate
U236	72-57-1	Trypan blue
U237	66-75-1	Uracil mustard
U176	759-73-9	Urea, N-ethyl-N-nitroso-
U177	684-93-5	Urea, N-methyl-N-nitroso-
U043	75-01-4	Vinyl chloride
U248	[1]81-81-2	Warfarin, & salts, when present at concentrations of 0.3% or less
U239	1330-20-7	Xylene (I)
U200	50-55-5	Yohimban-16-carboxylic acid, 11,17-dimethoxy-18-[(3,4,5-trimethoxybenzoyl)oxy]-, methyl ester, (3beta,16beta,17alpha,18beta,20alpha)-
U249	1314-84-7	Zinc phosphide $Zn_3 P_2$, when present at concentrations of 10% or less
U001	75-07-0	Acetaldehyde (I)
U001	75-07-0	Ethanal (I)
U002	67-64-1	Acetone (I)
U002	67-64-1	2-Propanone (I)
U003	75-05-8	Acetonitrile (I,T)
U004	98-86-2	Acetophenone
U004	98-86-2	Ethanone, 1-phenyl-
U005	53-96-3	Acetamide, -9H-fluoren-2-yl-
U005	53-96-3	2-Acetylaminofluorene
U006	75-36-5	Acetyl chloride (C,R,T)
U007	79-06-1	Acrylamide
U007	79-06-1	2-Propenamide
U008	79-10-7	Acrylic acid (I)

U008	79-10-7	2-Propenoic acid (I)
U009	107-13-1	Acrylonitrile
U009	107-13-1	2-Propenenitrile
U010	50-07-7	Azirino[2′,3′:3,4]pyrrolo[1,2-a]indole-4,7-dione, 6-amino-8-[[(aminocarbonyl)oxy]methyl]-1,1a,2,8,8a,8b-hexahydro-8a-methoxy-5-methyl-, [1aS-(1aalpha, 8beta,8aalpha,8balpha)]-
U010	50-07-7	Mitomycin C
U011	61-82-5	Amitrole
U011	61-82-5	1H-1,2,4-Triazol-3-amine
U012	62-53-3	Aniline (I,T)
U012	62-53-3	Benzenamine (I,T)
U014	492-80-8	Auramine
U014	492-80-8	Benzenamine, 4,4′-carbonimidoylbis[N,N-dimethyl-
U015	115-02-6	Azaserine
U015	115-02-6	L-Serine, diazoacetate (ester)
U016	225-51-4	Benz[c]acridine
U017	98-87-3	Benzal chloride
U017	98-87-3	Benzene, (dichloromethyl)-
U018	56-55-3	Benz[a]anthracene
U019	71-43-2	Benzene (I,T)
U020	98-09-9	Benzenesulfonic acid chloride (C,R)
U020	98-09-9	Benzenesulfonyl chloride (C,R)
U021	92-87-5	Benzidine
U021	92-87-5	[1,1′-Biphenyl]-4,4′-diamine
U022	50-32-8	Benzo[a]pyrene
U023	98-07-7	Benzene, (trichloromethyl)-
U023	98-07-7	Benzotrichloride (C,R,T)
U024	111-91-1	Dichloromethoxy ethane

U024	111-91-1	Ethane, 1,1′-[methylenebis(oxy)]bis[2-chloro-
U025	111-44-4	Dichloroethyl ether
U025	111-44-4	Ethane, 1,1′-oxybis[2-chloro-
U026	494-03-1	Chlornaphazin
U026	494-03-1	Naphthalenamine, N,N′-bis(2-chloroethyl)-
U027	108-60-1	Dichloroisopropyl ether
U027	108-60-1	Propane, 2,2′-oxybis[2-chloro-
U028	117-81-7	1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl) ester
U028	117-81-7	Diethylhexyl phthalate
U029	74-83-9	Methane, bromo-
U029	74-83-9	Methyl bromide
U030	101-55-3	Benzene, 1-bromo-4-phenoxy-
U030	101-55-3	4-Bromophenyl phenyl ether
U031	71-36-3	1-Butanol (I)
U031	71-36-3	n-Butyl alcohol (I)
U032	13765-19-0	Calcium chromate
U032	13765-19-0	Chromic acid H_2CrO_4, calcium salt
U033	353-50-4	Carbonic difluoride
U033	353-50-4	Carbon oxyfluoride (R,T)
U034	75-87-6	Acetaldehyde, trichloro-
U034	75-87-6	Chloral
U035	305-03-3	Benzenebutanoic acid, 4-[bis(2-chloroethyl)amino]-
U035	305-03-3	Chlorambucil
U036	57-74-9	Chlordane, alpha & gamma isomers
U036	57-74-9	4,7-Methano-1H-indene, 1,2,4,5,6,7,8,8-octachloro-2,3,3a,4,7,7a-hexahydro-
U037	108-90-7	Benzene, chloro-

U037	108-90-7	Chlorobenzene
U038	510-15-6	Benzeneacetic acid, 4-chloro-alpha-(4-chlorophenyl)-alpha-hydroxy-, ethyl ester
U038	510-15-6	Chlorobenzilate
U039	59-50-7	p-Chloro-m-cresol
U039	59-50-7	Phenol, 4-chloro-3-methyl-
U041	106-89-8	Epichlorohydrin
U041	106-89-8	Oxirane, (chloromethyl)-
U042	110-75-8	2-Chloroethyl vinyl ether
U042	110-75-8	Ethene, (2-chloroethoxy)-
U043	75-01-4	Ethene, chloro-
U043	75-01-4	Vinyl chloride
U044	67-66-3	Chloroform
U044	67-66-3	Methane, trichloro-
U045	74-87-3	Methane, chloro- (I,T)
U045	74-87-3	Methyl chloride (I,T)
U046	107-30-2	Chloromethyl methyl ether
U046	107-30-2	Methane, chloromethoxy-
U047	91-58-7	beta-Chloronaphthalene
U047	91-58-7	Naphthalene, 2-chloro-
U048	95-57-8	o-Chlorophenol
U048	95-57-8	Phenol, 2-chloro-
U049	3165-93-3	Benzenamine, 4-chloro-2-methyl-, hydrochloride
U049	3165-93-3	4-Chloro-o-toluidine, hydrochloride
U050	218-01-9	Chrysene
U051		Creosote
U052	1319-77-3	Cresol (Cresylic acid)
U052	1319-77-3	Phenol, methyl-

U053	4170-30-3	2-Butenal
U053	4170-30-3	Crotonaldehyde
U055	98-82-8	Benzene, (1-methylethyl)-(I)
U055	98-82-8	Cumene (I)
U056	110-82-7	Benzene, hexahydro-(I)
U056	110-82-7	Cyclohexane (I)
U057	108-94-1	Cyclohexanone (I)
U058	50-18-0	Cyclophosphamide
U058	50-18-0	2H-1,3,2-Oxazaphosphorin-2-amine, N,N-bis(2-chloroethyl)tetrahydro-, 2-oxide
U059	20830-81-3	Daunomycin
U059	20830-81-3	5,12-Naphthacenedione, 8-acetyl-10-[(3-amino-2,3,6-trideoxy)-alpha-L-lyxo-hexopyranosyl)oxy]-7,8,9,10-tetrahydro-6,8,11-trihydroxy-1-methoxy-, (8S-cis)-
U060	72-54-8	Benzene, 1,1′-(2,2-dichloroethylidene)bis[4-chloro-
U060	72-54-8	DDD
U061	50-29-3	Benzene, 1,1′-(2,2,2-trichloroethylidene)bis[4-chloro-
U061	50-29-3	DDT
U062	2303-16-4	Carbamothioic acid, bis(1-methylethyl)-, S-(2,3-di chloro-2-propenyl) ester
U062	2303-16-4	Diallate
U063	53-70-3	Dibenz[a,h]anthracene
U064	189-55-9	Benzo[rst]pentaphene
U064	189-55-9	Dibenzo[a,i]pyrene
U066	96-12-8	1,2-Dibromo-3-chloropropane
U066	96-12-8	Propane, 1,2-dibromo-3-chloro-
U067	106-93-4	Ethane, 1,2-dibromo-

U067	106-93-4	Ethylene dibromide
U068	74-95-3	Methane, dibromo-
U068	74-95-3	Methylene bromide
U069	84-74-2	1,2-Benzenedicarboxylic acid, dibutyl ester
U069	84-74-2	Dibutyl phthalate
U070	95-50-1	Benzene, 1,2-dichloro-
U070	95-50-1	o-Dichlorobenzene
U071	541-73-1	Benzene, 1,3-dichloro-
U071	541-73-1	m-Dichlorobenzene
U072	106-46-7	Benzene, 1,4-dichloro-
U072	106-46-7	p-Dichlorobenzene
U073	91-94-1	[1,1′-Biphenyl]-4,4′-diamine, 3,3′-dichloro-
U073	91-94-1	3,3′-Dichlorobenzidine
U074	764-41-0	2-Butene, 1,4-dichloro-(I,T)
U074	764-41-0	1,4-Dichloro-2-butene (I,T)
U075	75-71-8	Dichlorodifluoromethane
U075	75-71-8	Methane, dichlorodifluoro-
U076	75-34-3	Ethane, 1,1-dichloro-
U076	75-34-3	Ethylidene dichloride
U077	107-06-2	Ethane, 1,2-dichloro-
U077	107-06-2	Ethylene dichloride
U078	75-35-4	1,1-Dichloroethylene
U078	75-35-4	Ethene, 1,1-dichloro-
U079	156-60-5	1,2-Dichloroethylene
U079	156-60-5	Ethene, 1,2-dichloro-, (E)-
U080	75-09-2	Methane, dichloro-
U080	75-09-2	Methylene chloride
U081	120-83-2	2,4-Dichlorophenol
U081	120-83-2	Phenol, 2,4-dichloro-
U082	87-65-0	2,6-Dichlorophenol

U082	87-65-0	Phenol, 2,6-dichloro-
U083	78-87-5	Propane, 1,2-dichloro-
U083	78-87-5	Propylene dichloride
U084	542-75-6	1,3-Dichloropropene
U084	542-75-6	1-Propene, 1,3-dichloro-
U085	1464-53-5	2,2′-Bioxirane
U085	1464-53-5	1,2:3,4-Diepoxybutane (I,T)
U086	1615-80-1	N,N′-Diethylhydrazine
U086	1615-80-1	Hydrazine, 1,2-diethyl-
U087	3288-58-2	O,O-Diethyl S-methyl dithiophosphate
U087	3288-58-2	Phosphorodithioic acid, O,O-diethyl S-methyl ester
U088	84-66-2	1,2-Benzenedicarboxylic acid, diethyl ester
U088	84-66-2	Diethyl phthalate
U089	56-53-1	Diethylstilbesterol
U089	56-53-1	Phenol, 4,4′-(1,2-diethyl-1,2-ethenediyl)bis-, (E)-
U090	94-58-6	1,3-Benzodioxole, 5-propyl-
U090	94-58-6	Dihydrosafrole
U091	119-90-4	[1,1′-Biphenyl]-4,4′-diamine, 3,3′-dimethoxy-
U091	119-90-4	3,3′-Dimethoxybenzidine
U092	124-40-3	Dimethylamine (I)
U092	124-40-3	Methanamine, -methyl-(I)
U093	60-11-7	Benzenamine, N,N-dimethyl-4-(phenylazo)-
U093	60-11-7	p-Dimethylaminoazobenzene
U094	57-97-6	Benz[a]anthracene, 7,12-dimethyl-
U094	57-97-6	7,12-Dimethylbenz[a]anthracene

U095	119-93-7	[1,1′-Biphenyl]-4,4′-diamine, 3,3′-dimethyl-
U095	119-93-7	3,3′-Dimethylbenzidine
U096	80-15-9	alpha,alpha-Dimethylbenzylhydroperoxide (R)
U096	80-15-9	Hydroperoxide, 1-methyl-1-phenylethyl-(R)
U097	79-44-7	Carbamic chloride, dimethyl-
U097	79-44-7	Dimethylcarbamoyl chloride
U098	57-14-7	1,1-Dimethylhydrazine
U098	57-14-7	Hydrazine, 1,1-dimethyl-
U099	540-73-8	1,2-Dimethylhydrazine
U099	540-73-8	Hydrazine, 1,2-dimethyl-
U101	105-67-9	2,4-Dimethylphenol
U101	105-67-9	Phenol, 2,4-dimethyl-
U102	131-11-3	1,2-Benzenedicarboxylic acid, dimethyl ester
U102	131-11-3	Dimethyl phthalate
U103	77-78-1	Dimethyl sulfate
U103	77-78-1	Sulfuric acid, dimethyl ester
U105	121-14-2	Benzene, 1-methyl-2,4-dinitro-
U105	121-14-2	2,4-Dinitrotoluene
U106	606-20-2	Benzene, 2-methyl-1,3-dinitro-
U106	606-20-2	2,6-Dinitrotoluene
U107	117-84-0	1,2-Benzenedicarboxylic acid, dioctyl ester
U107	117-84-0	Di-n-octyl phthalate
U108	123-91-1	1,4-Diethyleneoxide
U108	123-91-1	1,4-Dioxane
U109	122-66-7	1,2-Diphenylhydrazine
U109	122-66-7	Hydrazine, 1,2-diphenyl-
U110	142-84-7	Dipropylamine (I)
U110	142-84-7	1-Propanamine, N-propyl-(I)
U111	621-64-7	Di-n-propylnitrosamine

U111	621-64-7	1-Propanamine, N-nitroso-N-propyl-
U112	141-78-6	Acetic acid ethyl ester (I)
U112	141-78-6	Ethyl acetate (I)
U113	140-88-5	Ethyl acrylate (I)
U113	140-88-5	2-Propenoic acid, ethyl ester (I)
U114	[1]111-54-6	Carbamodithioic acid, 1,2-ethanediylbis-, salts & esters
U114	[1]111-54-6	Ethylenebisdithiocarbamic acid, salts & esters
U115	75-21-8	Ethylene oxide (I,T)
U115	75-21-8	Oxirane (I,T)
U116	96-45-7	Ethylenethiourea
U116	96-45-7	2-Imidazolidinethione
U117	60-29-7	Ethane, 1,1′-oxybis-(I)
U117	60-29-7	Ethyl ether (I)
U118	97-63-2	Ethyl methacrylate
U118	97-63-2	2-Propenoic acid, 2-methyl-, ethyl ester
U119	62-50-0	Ethyl methanesulfonate
U119	62-50-0	Methanesulfonic acid, ethyl ester
U120	206-44-0	Fluoranthene
U121	75-69-4	Methane, trichlorofluoro-
U121	75-69-4	Trichloromonofluoromethane
U122	50-00-0	Formaldehyde
U123	64-18-6	Formic acid (C,T)
U124	110-00-9	Furan (I)
U124	110-00-9	Furfuran (I)
U125	98-01-1	2-Furancarboxaldehyde (I)
U125	98-01-1	Furfural (I)
U126	765-34-4	Glycidylaldehyde
U126	765-34-4	Oxiranecarboxyaldehyde
U127	118-74-1	Benzene, hexachloro-

U127	118-74-1	Hexachlorobenzene
U128	87-68-3	1,3-Butadiene, 1,1,2,3,4,4-hexachloro-
U128	87-68-3	Hexachlorobutadiene
U129	58-89-9	Cyclohexane, 1,2,3,4,5,6-hexachloro-, (1alpha,2alpha,3beta,4alpha,5alpha,6beta)-
U129	58-89-9	Lindane
U130	77-47-4	1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-
U130	77-47-4	Hexachlorocyclopentadiene
U131	67-72-1	Ethane, hexachloro-
U131	67-72-1	Hexachloroethane
U132	70-30-4	Hexachlorophene
U132	70-30-4	Phenol, 2,2′-methylenebis[3,4,6-trichloro-
U133	302-01-2	Hydrazine (R,T)
U134	7664-39-3	Hydrofluoric acid (C,T)
U134	7664-39-3	Hydrogen fluoride (C,T)
U135	7783-06-4	Hydrogen sulfide
U135	7783-06-4	Hydrogen sulfide H_2S
U136	75-60-5	Arsinic acid, dimethyl-
U136	75-60-5	Cacodylic acid
U137	193-39-5	Indeno[1,2,3-cd]pyrene
U138	74-88-4	Methane, iodo-
U138	74-88-4	Methyl iodide
U140	78-83-1	Isobutyl alcohol (I,T)
U140	78-83-1	1-Propanol, 2-methyl- (I,T)
U141	120-58-1	1,3-Benzodioxole, 5-(1-propenyl)-
U141	120-58-1	Isosafrole
U142	143-50-0	Kepone

U142	143-50-0	1,3,4-Metheno-2H-cyclobuta[cd]pentalen-2-one, 1,1a,3,3a,4,5,5,5a,5b,6-decachlorooctahydro-
U143	303-34-4	2-Butenoic acid, 2-methyl-, 7-[[2,3-dihydroxy-2-(1-methoxyethyl)-3-methyl-1-oxobutoxy]methyl]-2,3,5,7a-tetrahydro-1H-pyrrolizin-1-yl ester, [1S-[1alpha(Z),7(2S*,3R*),7aalpha]]-
U143	303-34-4	Lasiocarpine
U144	301-04-2	Acetic acid, lead(2 +) salt
U144	301-04-2	Lead acetate
U145	7446-27-7	Lead phosphate
U145	7446-27-7	Phosphoric acid, lead(2 +) salt (2:3)
U146	1335-32-6	Lead, bis(acetato-O)tetrahydroxytri-
U146	1335-32-6	Lead subacetate
U147	108-31-6	2,5-Furandione
U147	108-31-6	Maleic anhydride
U148	123-33-1	Maleic hydrazide
U148	123-33-1	3,6-Pyridazinedione, 1,2-dihydro-
U149	109-77-3	Malononitrile
U149	109-77-3	Propanedinitrile
U150	148-82-3	Melphalan
U150	148-82-3	L-Phenylalanine, 4-[bis(2-chloroethyl)amino]-
U151	7439-97-6	Mercury
U152	126-98-7	Methacrylonitrile (I,T)
U152	126-98-7	2-Propenenitrile, 2-methyl- (I,T)
U153	74-93-1	Methanethiol (I,T)
U153	74-93-1	Thiomethanol (I,T)

U154	67-56-1	Methanol (I)
U154	67-56-1	Methyl alcohol (I)
U155	91-80-5	1,2-Ethanediamine, N,N-dimethyl-N′-2-pyridinyl-N′-(2-thienylmethyl)-
U155	91-80-5	Methapyrilene
U156	79-22-1	Carbonochloridic acid, methyl ester (I,T)
U156	79-22-1	Methyl chlorocarbonate (I,T)
U157	56-49-5	Benz[j]aceanthrylene, 1,2-dihydro-3-methyl-
U157	56-49-5	3-Methylcholanthrene
U158	101-14-4	Benzenamine, 4,4′-methylenebis[2-chloro-
U158	101-14-4	4,4′-Methylenebis(2-chloroaniline)
U159	78-93-3	2-Butanone (I,T)
U159	78-93-3	Methyl ethyl ketone (MEK) (I,T)
U160	1338-23-4	2-Butanone, peroxide (R,T)
U160	1338-23-4	Methyl ethyl ketone peroxide (R,T)
U161	108-10-1	Methyl isobutyl ketone (I)
U161	108-10-1	4-Methyl-2-pentanone (I)
U161	108-10-1	Pentanol, 4-methyl-
U162	80-62-6	Methyl methacrylate (I,T)
U162	80-62-6	2-Propenoic acid, 2-methyl-, methyl ester (I,T)
U163	70-25-7	Guanidine, -methyl-N'-nitro-N-nitroso-
U163	70-25-7	MNNG
U164	56-04-2	Methylthiouracil
U164	56-04-2	4(1H)-Pyrimidinone, 2,3-dihydro-6-methyl-2-thioxo-
U165	91-20-3	Naphthalene
U166	130-15-4	1,4-Naphthalenedione
U166	130-15-4	1,4-Naphthoquinone
U167	134-32-7	1-Naphthalenamine

U167	134-32-7	alpha-Naphthylamine
U168	91-59-8	2-Naphthalenamine
U168	91-59-8	beta-Naphthylamine
U169	98-95-3	Benzene, nitro-
U169	98-95-3	Nitrobenzene (I,T)
U170	100-02-7	p-Nitrophenol
U170	100-02-7	Phenol, 4-nitro-
U171	79-46-9	2-Nitropropane (I,T)
U171	79-46-9	Propane, 2-nitro- (I,T)
U172	924-16-3	1-Butanamine, N-butyl-N-nitroso-
U172	924-16-3	N-Nitrosodi-n-butylamine
U173	1116-54-7	Ethanol, 2,2′-(nitrosoimino)bis-
U173	1116-54-7	N-Nitrosodiethanolamine
U174	55-18-5	Ethanamine, -ethyl-N-nitroso-
U174	55-18-5	N-Nitrosodiethylamine
U176	759-73-9	N-Nitroso-N-ethylurea
U176	759-73-9	Urea, N-ethyl-N-nitroso-
U177	684-93-5	N-Nitroso-N-methylurea
U177	684-93-5	Urea, N-methyl-N-nitroso-
U178	615-53-2	Carbamic acid, methylnitroso-, ethyl ester
U178	615-53-2	N-Nitroso-N-methylurethane
U179	100-75-4	N-Nitrosopiperidine
U179	100-75-4	Piperidine, 1-nitroso-
U180	930-55-2	N-Nitrosopyrrolidine
U180	930-55-2	Pyrrolidine, 1-nitroso-
U181	99-55-8	Benzenamine, 2-methyl-5-nitro-
U181	99-55-8	5-Nitro-o-toluidine
U182	123-63-7	1,3,5-Trioxane, 2,4,6-trimethyl-
U182	123-63-7	Paraldehyde

U183	608-93-5	Benzene, pentachloro-
U183	608-93-5	Pentachlorobenzene
U184	76-01-7	Ethane, pentachloro-
U184	76-01-7	Pentachloroethane
U185	82-68-8	Benzene, pentachloronitro-
U185	82-68-8	Pentachloronitrobenzene (PCNB)
U186	504-60-9	1-Methylbutadiene (I)
U186	504-60-9	1,3-Pentadiene (I)
U187	62-44-2	Acetamide, -(4-ethoxyphenyl)-
U187	62-44-2	Phenacetin
U188	108-95-2	Phenol
U189	1314-80-3	Phosphorus sulfide (R)
U189	1314-80-3	Sulfur phosphide (R)
U190	85-44-9	1,3-Isobenzofurandione
U190	85-44-9	Phthalic anhydride
U191	109-06-8	2-Picoline
U191	109-06-8	Pyridine, 2-methyl-
U192	23950-58-5	Benzamide, 3,5-dichloro-N-(1,1-dimethyl-2-propynyl)-
U192	23950-58-5	Pronamide
U193	1120-71-4	1,2-Oxathiolane, 2,2-dioxide
U193	1120-71-4	1,3-Propane sultone
U194	107-10-8	1-Propanamine (I,T)
U194	107-10-8	n-Propylamine (I,T)
U196	110-86-1	Pyridine
U197	106-51-4	p-Benzoquinone
U197	106-51-4	2,5-Cyclohexadiene-1,4-dione

U200	50-55-5	Reserpine
U200	50-55-5	Yohimban-16-carboxylic acid, 11,17-dimethoxy-18-[(3,4,5-trimethoxybenzoyl)oxy]-, methyl ester,(3beta,16beta,17alpha,18beta,20alpha)-
U201	108-46-3	1,3-Benzenediol
U201	108-46-3	Resorcinol
U203	94-59-7	1,3-Benzodioxole, 5-(2-propenyl)-
U203	94-59-7	Safrole
U204	7783-00-8	Selenious acid
U204	7783-00-8	Selenium dioxide
U205	7488-56-4	Selenium sulfide
U205	7488-56-4	Selenium sulfide SeS_2 (R,T)
U206	18883-66-4	Glucopyranose, 2-deoxy-2-(3-methyl-3-nitrosoureido)-, D-
U206	18883-66-4	D-Glucose, 2-deoxy-2-[[(methylnitrosoamino)-carbonyl]amino]-
U206	18883-66-4	Streptozotocin
U207	95-94-3	Benzene, 1,2,4,5-tetrachloro-
U207	95-94-3	1,2,4,5-Tetrachlorobenzene
U208	630-20-6	Ethane, 1,1,1,2-tetrachloro-
U208	630-20-6	1,1,1,2-Tetrachloroethane
U209	79-34-5	Ethane, 1,1,2,2-tetrachloro-
U209	79-34-5	1,1,2,2-Tetrachloroethane
U210	127-18-4	Ethene, tetrachloro-
U210	127-18-4	Tetrachloroethylene
U211	56-23-5	Carbon tetrachloride
U211	56-23-5	Methane, tetrachloro-
U213	109-99-9	Furan, tetrahydro-(I)

U213	109-99-9	Tetrahydrofuran (I)
U214	563-68-8	Acetic acid, thallium(1 +) salt
U214	563-68-8	Thallium(I) acetate
U215	6533-73-9	Carbonic acid, dithallium(1 +) salt
U215	6533-73-9	Thallium(I) carbonate
U216	7791-12-0	Thallium(I) chloride
U216	7791-12-0	Thallium chloride TlCl
U217	10102-45-1	Nitric acid, thallium(1 +) salt
U217	10102-45-1	Thallium(I) nitrate
U218	62-55-5	Ethanethioamide
U218	62-55-5	Thioacetamide
U219	62-56-6	Thiourea
U220	108-88-3	Benzene, methyl-
U220	108-88-3	Toluene
U221	25376-45-8	Benzenediamine, ar-methyl-
U221	25376-45-8	Toluenediamine
U222	636-21-5	Benzenamine, 2-methyl-, hydrochloride
U222	636-21-5	o-Toluidine hydrochloride
U223	26471-62-5	Benzene, 1,3-diisocyanatomethyl- (R,T)
U223	26471-62-5	Toluene diisocyanate (R,T)
U225	75-25-2	Bromoform
U225	75-25-2	Methane, tribromo-
U226	71-55-6	Ethane, 1,1,1-trichloro-
U226	71-55-6	Methyl chloroform

U226	71-55-6	1,1,1-Trichloroethane
U227	79-00-5	Ethane, 1,1,2-trichloro-
U227	79-00-5	1,1,2-Trichloroethane
U228	79-01-6	Ethene, trichloro-
U228	79-01-6	Trichloroethylene
U234	99-35-4	Benzene, 1,3,5-trinitro-
U234	99-35-4	1,3,5-Trinitrobenzene (R,T)
U235	126-72-7	1-Propanol, 2,3-dibromo-, phosphate (3:1)
U235	126-72-7	Tris(2,3-dibromopropyl) phosphate
U236	72-57-1	2,7-Naphthalenedisulfonic acid, 3,3′-[(3,3′-dimethyl[1,1′-biphenyl]-4,4′-diyl)bis(azo)bis[5-amino-4-hydroxy]-, tetrasodium salt
U236	72-57-1	Trypan blue
U237	66-75-1	2,4-(1H,3H)-Pyrimidinedione, 5-[bis(2-chloroethyl)amino]-
U237	66-75-1	Uracil mustard
U238	51-79-6	Carbamic acid, ethyl ester
U238	51-79-6	Ethyl carbamate (urethane)
U239	1330-20-7	Benzene, dimethyl- (I,T)
U239	1330-20-7	Xylene (I)
U240	[1]94-75-7	Acetic acid, (2,4-dichlorophenoxy)-, salts & esters
U240	[1]94-75-7	2,4-D, salts & esters
U243	1888-71-7	Hexachloropropene
U243	1888-71-7	1-Propene, 1,1,2,3,3,3-hexachloro-
U244	137-26-8	Thioperoxydicarbonic diamide $[(H_2N)C(S)]_2 S_2$, tetramethyl-
U244	137-26-8	Thiram
U246	506-68-3	Cyanogen bromide (CN)Br

U247	72-43-5	Benzene, 1,1′-(2,2,2-trichloroethylidene)bis[4- methoxy-
U247	72-43-5	Methoxychlor
U248	[1]81-81-2	2H-1-Benzopyran-2-one, 4-hydroxy-3-(3-oxo-1-phenyl-butyl)-, & salts, when present at concentrations of 0.3% or less
U248	[1]81-81-2	Warfarin, & salts, when present at concentrations of 0.3% or less
U249	1314-84-7	Zinc phosphide $Zn_3 P_2$, when present at concentrations of 10% or less
U271	17804-35-2	Benomyl
U271	17804-35-2	Carbamic acid, [1-[(butylamino)carbonyl]-1H-benzimidazol-2-yl]-, methyl ester
U278	22781-23-3	Bendiocarb
U278	22781-23-3	1,3-Benzodioxol-4-ol, 2,2-dimethyl-, methyl carbamate
U279	63-25-2	Carbaryl
U279	63-25-2	1-Naphthalenol, methylcarbamate
U280	101-27-9	Barban
U280	101-27-9	Carbamic acid, (3-chlorophenyl)-, 4-chloro-2-butynyl ester
U328	95-53-4	Benzenamine, 2-methyl-
U328	95-53-4	o-Toluidine
U353	106-49-0	Benzenamine, 4-methyl-
U353	106-49-0	p-Toluidine
U359	110-80-5	Ethanol, 2-ethoxy-
U359	110-80-5	Ethylene glycol monoethyl ether
U364	22961-82-6	Bendiocarb phenol
U364	22961-82-6	1,3-Benzodioxol-4-ol, 2,2-dimethyl-,
U367	1563-38-8	7-Benzofuranol, 2,3-dihydro-2,2-dimethyl-

U367	1563-38-8	Carbofuran phenol
U372	10605-21-7	Carbamic acid, 1H-benzimidazol-2-yl, methyl ester
U372	10605-21-7	Carbendazim
U373	122-42-9	Carbamic acid, phenyl-, 1-methylethyl ester
U373	122-42-9	Propham
U387	52888-80-9	Carbamothioic acid, dipropyl-, S-(phenylmethyl) ester
U387	52888-80-9	Prosulfocarb
U389	2303-17-5	Carbamothioic acid, bis(1-methylethyl)-, S-(2,3,3-trichloro-2-propenyl) ester
U389	2303-17-5	Triallate
U394	30558-43-1	A2213
U394	30558-43-1	Ethanimidothioic acid, 2-(dimethylamino)-N-hydroxy-2-oxo-, methyl ester
U395	5952-26-1	Diethylene glycol, dicarbamate
U395	5952-26-1	Ethanol, 2,2′-oxybis-, dicarbamate
U404	121-44-8	Ethanamine, N,N-diethyl-
U404	121-44-8	Triethylamine
U409	23564-05-8	Carbamic acid, [1,2-phenylenebis (iminocarbonothioyl)]bis-, dimethyl ester
U409	23564-05-8	Thiophanate-methyl
U410	59669-26-0	Ethanimidothioic acid, N,N′-[thiobis[(methylimino)carbonyloxy]]bis-, dimethyl ester
U410	59669-26-0	Thiodicarb

U411	114-26-1	Phenol, 2-(1-methylethoxy)-, methylcarbamate
U411	114-26-1	Propoxur
See F027	93-76-5	Acetic acid, (2,4,5-trichlorophenoxy)-
See F027	87-86-5	Pentachlorophenol
See F027	87-86-5	Phenol, pentachloro-
See F027	58-90-2	Phenol, 2,3,4,6-tetrachloro-
See F027	95-95-4	Phenol, 2,4,5-trichloro-
See F027	88-06-2	Phenol, 2,4,6-trichloro-
See F027	93-72-1	Propanoic acid, 2-(2,4,5-trichlorophenoxy)-
See F027	93-72-1	Silvex (2,4,5-TP)
See F027	93-76-5	2,4,5-T
See F027	58-90-2	2,3,4,6-Tetrachlorophenol
See F027	95-95-4	2,4,5-Trichlorophenol
See F027	88-06-2	2,4,6-Trichlorophenol

[1]CAS Number given for parent compound only.

[45 FR 78529, 78541, Nov. 25, 1980]

EDITORIAL NOTE: For FEDERAL REGISTER citations affecting §261.33, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and at *www.govinfo.gov.*

§261.35 Deletion of certain hazardous waste codes following equipment cleaning and replacement.

(a) Wastes from wood preserving processes at plants that do not resume or initiate use of chlorophenolic preservatives will not meet the listing definition of F032 once the generator has met all of the requirements of paragraphs (b) and (c) of this section. These wastes may, however, continue to meet another hazardous waste listing description or may exhibit one or more of the hazardous waste characteristics.

(b) Generators must either clean or replace all process equipment that may have come into contact with chlorophenolic formulations or constituents thereof, including, but not limited to, treatment cylinders, sumps, tanks, piping systems, drip pads, fork lifts, and trams, in a manner that minimizes or eliminates the escape of hazardous waste or constituents, leachate, contaminated drippage, or hazardous waste decomposition products to the ground water, surface water, or atmosphere.

(1) Generators shall do one of the following:

(i) Prepare and follow an equipment cleaning plan and clean equipment in accordance with this section;

(ii) Prepare and follow an equipment replacement plan and replace equipment in accordance with this section; or

(iii) Document cleaning and replacement in accordance with this section, carried out after termination of use of chlorophenolic preservations.

(2) Cleaning Requirements.

(i) Prepare and sign a written equipment cleaning plan that describes:

(A) The equipment to be cleaned;

(B) How the equipment will be cleaned;

(C) The solvent to be used in cleaning;

(D) How solvent rinses will be tested; and

(E) How cleaning residues will be disposed.

(ii) Equipment must be cleaned as follows:

(A) Remove all visible residues from process equipment;

(B) Rinse process equipment with an appropriate solvent until dioxins and dibenzofurans are not detected in the final solvent rinse.

(iii) Analytical requirements.

(A) Rinses must be tested by using an appropriate method.

(B) “Not detected” means at or below the following lower method calibration limits (MCLs): The 2,3,7,8-TCDD-based MCL—0.01 parts per trillion (ppt), sample weight of 1000 g, IS spiking level of 1 ppt, final extraction volume of 10-50 µL. For other congeners—multiply the values by 1 for TCDF/PeCDD/PeCDF, by 2.5 for HxCDD/HxCDF/HpCDD/HpCDF, and by 5 for OCDD/OCDF.

(iv) The generator must manage all residues from the cleaning process as F032 waste.

(3) Replacement requirements.

(i) Prepare and sign a written equipment replacement plan that describes:

(A) The equipment to be replaced;

(B) How the equipment will be replaced; and

(C) How the equipment will be disposed.

(ii) The generator must manage the discarded equipment as F032 waste.

(4) Documentation requirements.

(i) Document that previous equipment cleaning and/or replacement was performed in accordance with this section and occurred after cessation of use of chlorophenolic preservatives.

(c) The generator must maintain the following records documenting the cleaning and replacement as part of the facility's operating record:

(1) The name and address of the facility;

(2) Formulations previously used and the date on which their use ceased in each process at the plant;

(3) Formulations currently used in each process at the plant;

(4) The equipment cleaning or replacement plan;

(5) The name and address of any persons who conducted the cleaning and replacement;

(6) The dates on which cleaning and replacement were accomplished;

(7) The dates of sampling and testing;

(8) A description of the sample handling and preparation techniques, including techniques used for extraction, containerization, preservation, and chain-of-custody of the samples;

(9) A description of the tests performed, the date the tests were performed, and the results of the tests;

(10) The name and model numbers of the instrument(s) used in performing the tests;

(11) QA/QC documentation; and

(12) The following statement signed by the generator or his authorized representative:

I certify under penalty of law that all process equipment required to be cleaned or replaced under 40 CFR 261.35 was cleaned or replaced as represented in the equipment cleaning and replacement plan and accompanying documentation. I am aware that there are significant penalties for providing false information, including the possibility of fine or imprisonment.

[55 FR 50482, Dec. 6, 1990, as amended at 56 FR 30195, July 1, 1991; 70 FR 34561, June 14, 2005]

Exhibit C
Paint Filter Test Form

PAINT FILTER TEST RESULTS

TEST DATE: _____

SAMPLE INFORMATION: TYPE OF WASTE: _____

SOLIDIFICATION AGENT USED: _____

SAMPLE TAKEN BY: _____

TEST INFORMATION: TEST PERFORMED BY: _____

TIME OF TEST: START: _____

FINISHED: _____

RESULTS: _____ PASS (no liquid in test cylinder)

_____ FAIL (liquid in test cylinder)

ACTION TAKEN: _____

_____

_____

_____

_____

METHOD 9095B

PAINT FILTER LIQUIDS TEST

1.0 SCOPE AND APPLICATION

1.1 This method is used to determine the presence of free liquids in a representative sample of waste.

1.2 The method is used to determine compliance with 40 CFR 264.314 and 265.314.

2.0 SUMMARY OF METHOD

2.1 A predetermined amount of material is placed in a paint filter. If any portion of the material passes through and drops from the filter within the 5-min test period, the material is deemed to contain free liquids.

3.0 INTERFERENCES

3.1 Filter media were observed to separate from the filter cone on exposure to alkaline materials. This development causes no problem if the sample is not disturbed.

3.2 Temperature can affect the test results if the test is performed below the freezing point of any liquid in the sample. Tests must be performed above the freezing point and can, but are not required to, exceed room temperature of 25 ^{o}C.

4.0 APPARATUS AND MATERIALS

4.1 Conical paint filter -- Mesh number 60 +/- 5% (fine meshed size). Available at local paint stores such as Sherwin-Williams and Glidden.

4.2 Glass funnel -- If the paint filter, with the waste, cannot sustain its weight on the ring stand, then a fluted glass funnel or glass funnel with a mouth large enough to allow at least 1 in. of the filter mesh to protrude should be used to support the filter. The funnel should be fluted or have a large open mouth in order to support the paint filter yet not interfere with the movement, to the graduated cylinder, of the liquid that passes through the filter mesh.

4.3 Ring stand and ring, or tripod.

4.4 Graduated cylinder or beaker -- 100-mL.

5.0 REAGENTS

5.1 None.

6.0 SAMPLE COLLECTION, PRESERVATION, AND HANDLING

A 100-mL or 100-g representative sample is required for the test. If it is not possible to obtain a sample of 100 mL or 100 g that is sufficiently representative of the waste, the analyst may use larger size samples in multiples of 100 mL or 100 g, i.e., 200, 300, 400 mL or g. However, when larger samples are used, analysts shall divide the sample into 100-mL or 100-g portions and test each portion separately. If any portion contains free liquids, the entire sample is considered to have free liquids. If the sample is measured volumetrically, then it should lack major air spaces or voids.

7.0 PROCEDURE

7.1 Assemble test apparatus as shown in Figure 1.

7.2 Place sample in the filter. A funnel may be used to provide support for the paint filter. If the sample is of such light bulk density that it overflows the filter, then the sides of the filter can be extended upward by taping filter paper to the inside of the filter and above the mesh. Settling the sample into the paint filter may be facilitated by lightly tapping the side of the filter as it is being filled.

7.3 In order to assure uniformity and standardization of the test, material such as sorbent pads or pillows which do not conform to the shape of the paint filter should be cut into small pieces and poured into the filter. Sample size reduction may be accomplished by cutting the sorbent material with scissors, shears, a knife, or other such device so as to preserve as much of the original integrity of the sorbent fabric as possible. Sorbents enclosed in a fabric should be mixed with the resultant fabric pieces. The particles to be tested should be reduced smaller than 1 cm (i.e., should be capable of passing through a 9.5 mm (0.375 inch) standard sieve). Grinding sorbent materials should be avoided as this may destroy the integrity of the sorbent and produce many "fine particles" which would normally not be present.

7.4 For brittle materials larger than 1 cm that do not conform to the filter, light crushing to reduce oversize particles is acceptable if it is not practical to cut the material. Materials such as clay, silica gel, and some polymers may fall into this category.

7.5 Allow sample to drain for 5 min into the graduated cylinder.

7.6 If any portion of the test material collects in the graduated cylinder in the 5-min period, then the material is deemed to contain free liquids for purposes of 40 CFR 264.314 and 265.314.

8.0 QUALITY CONTROL

8.1 Duplicate samples should be analyzed on a routine basis.

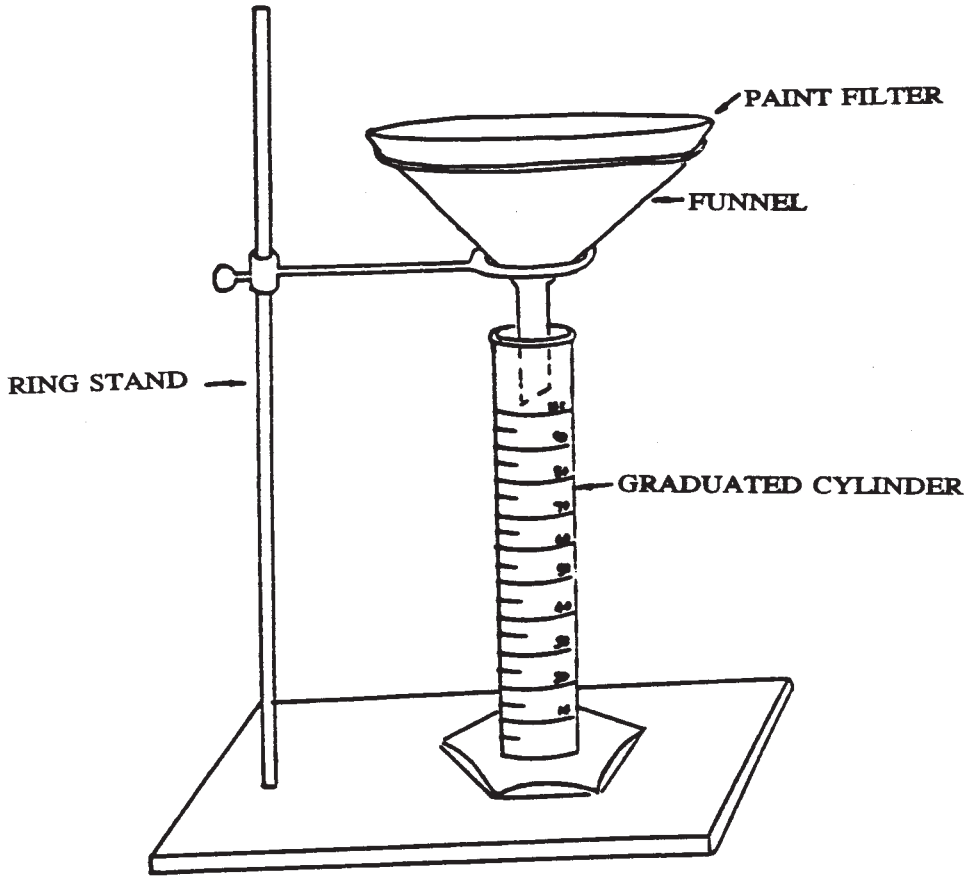
9.0 METHOD PERFORMANCE

9.1 No data provided.

10.0 REFERENCES

10.1 None provided.

FIGURE 1
PAINT FILTER TEST APPARATUS



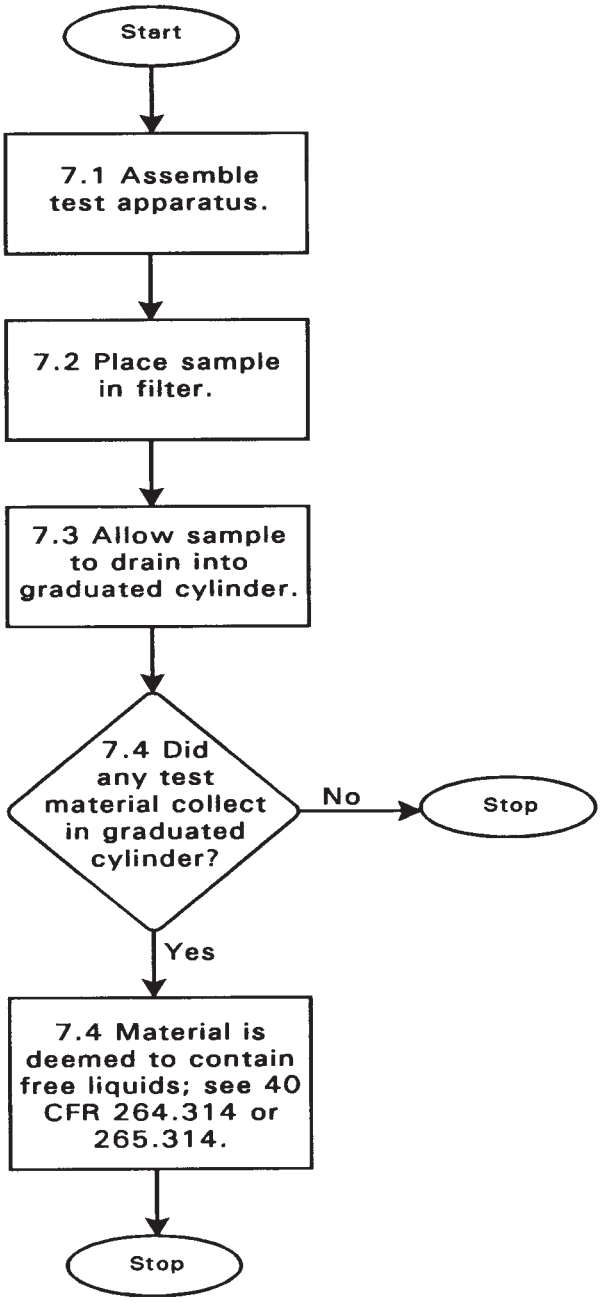

Start
7.1 Assemble test apparatus.
7.2 Place sample in filter.
7.3 Allow sample to drain into graduated cylinder.
7.4 Did any test material collect in graduated cylinder?
No
Stop
Yes
7.4 Material is deemed to contain free liquids; see 40 CFR 264.314 or 265.314.
Stop

Exhibit D
Random Inspection Form

RANDOM INSPECTION DOCUMENTATION

NGL North Ranch E&PW Landfill

Lea County, New Mexico

DATE: _____

TIME: _____

INSPECTED BY: _____

WASTE GENERATOR: _____

_____

WASTE HAULER: _____

_____

DESCRIPTION OF QUESTIONABLE WASTE: _____

_____

ACTION TAKEN: _____

Exhibit E

Solid Waste and Emergency Response Training Module – Introduction to Hazardous Waste Identification (40 CFR Part 261)

RCRA Training Module

Solid Waste and Emergency Response
(5305W)
EPA530-K-05-012

Introduction to

Hazardous Waste Identification

(40 CFR Parts 261)

United States
Environmental Protection
Agency

September 2005

HAZARDOUS WASTE IDENTIFICATION

CONTENTS

1. INTRODUCTION

"Is my waste a hazardous waste regulated under the Resource Conservation and Recovery Act (RCRA)?" This is one of the most common and basic RCRA questions and is the key to the RCRA hazardous waste program. If something is not a hazardous waste, it is not regulated under RCRA. Proper identification of a hazardous waste can be a difficult and confusing task, as the RCRA regulations establish a complex definition of the term "hazardous waste." To help make sense of what is and is not a hazardous waste, this module presents the steps involved in the process of identifying, or "characterizing," a hazardous waste.

While introducing the entire hazardous waste identification process, this module will focus on the final steps, the definition of a hazardous waste. The other steps in the process, including the definition of solid waste and the solid and hazardous waste exclusions will be discussed in other modules.

After reading this module, you will be able to explain the hazardous waste identification process and the definition of hazardous waste, and be familiar with the following concepts:

- hazardous waste listings
- hazardous waste characteristics
- the "mixture" and "derived-from" rules
- the "contained-in" policy
- the Hazardous Waste Identification Rules (HWIR).

2. REGULATORY OVERVIEW

What is a hazardous waste? In its most basic form, the answer to that question can be quite simple. A hazardous waste is a waste with a chemical composition or other properties that make it capable of causing illness, death, or some other harm to humans and other life forms when mismanaged or released into the environment. Developing a regulatory program that ensures the safe handling of such dangerous wastes, however, demands a far more precise definition of the term. EPA therefore created hazardous waste identification regulations that outline a process to determine whether any particular material is a hazardous waste for the purposes of RCRA.

2.1 HAZARDOUS WASTE IDENTIFICATION PROCESS

Proper hazardous waste identification is essential to the success of the hazardous waste management program. The RCRA regulations at 40 CFR §262.11 require that any person who produces or generates a waste must determine if that waste is hazardous. In doing so, §262.11 presents the steps in the hazardous waste identification process:

- Is the waste a "solid waste"?
- Is the waste specifically excluded from the RCRA regulations?
- Is the waste a "listed" hazardous waste?
- Does the waste exhibit a characteristic of hazardous waste?

When faced with the question of whether or not a waste is regulated as hazardous under RCRA, turn to §262.11. This regulation will remind you of the four steps in the RCRA hazardous waste identification process.

IS THE WASTE A SOLID WASTE?

Hazardous waste identification begins with an obvious point: in order for any material to be a hazardous waste, it must first be a waste. But, deciding whether an item is or is not a waste is not always easy. For example, a material (like an aluminum can) that one person discards could seem valuable to another person who recycles that material. EPA developed a set of regulations to assist in determining whether a material is a waste. RCRA uses the term "solid waste" in place of the common term "waste." Under RCRA, the term "solid waste" means any waste, whether it is a solid, semisolid, or liquid. The first section of the RCRA hazardous waste identification regulations focuses on the definition of solid waste. For this module, you need only understand in general terms the role that the definition of solid waste plays in the RCRA hazardous waste identification process. Another module, Definition of Solid Waste and Hazardous Waste Recycling, explains the definition of solid waste in greater detail.

IS THE WASTE EXCLUDED?

Only a small fraction of all RCRA solid wastes actually qualify as hazardous wastes. At first glance, one would imagine that distinguishing between hazardous and nonhazardous wastes is a

simple matter of chemical and toxicological analysis. Other factors must be considered, however, before evaluating the actual hazard that a waste's chemical composition poses. Regulation of certain wastes may be impractical, unfair, or otherwise undesirable, regardless of the hazards they pose. For instance, household waste can contain dangerous chemicals, like solvents and pesticides, but making households subject to the strict RCRA waste management regulations would create a number of practical problems. Congress and EPA exempted or excluded certain wastes, like household wastes, from the hazardous waste definition and regulations. Determining whether or not a waste is excluded or exempted from hazardous waste regulation is the second step in the RCRA hazardous waste identification process. Only after determining that a solid waste is not somehow excluded from hazardous waste regulation should the analysis proceed to evaluate the actual chemical hazard that a waste poses. The module entitled Solid and Hazardous Waste Exclusions explains which wastes are excluded from hazardous waste regulation.

IS THE WASTE A LISTED HAZARDOUS WASTE, OR DOES IT EXHIBIT A CHARACTERISTIC?

The final steps in the hazardous waste identification process determine whether a waste actually poses a sufficient chemical or physical hazard to merit regulation. These steps in the hazardous waste identification process involve evaluating the waste in light of the regulatory definition of hazardous waste. The remainder of this module explains the definition of hazardous waste in detail.

2.2 DEFINITION OF HAZARDOUS WASTE

A discussion of the definition of hazardous waste should begin with Congress' original statutory definition of the term. RCRA §1004(5) defines hazardous waste as:

> A solid waste, or combination of solid waste, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (a) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (b) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed.

This broad statutory definition provides a general indication of which wastes Congress intended to regulate as hazardous, but it obviously does not provide the clear distinctions necessary for industrial waste handlers to determine whether their wastes pose a sufficient threat to warrant regulation or not. Congress instructed EPA to develop more specific criteria for defining hazardous waste. There are therefore two definitions of hazardous waste under the RCRA program: a statutory definition and a regulatory definition. The statutory definition cited above is seldom used today. It served primarily as a general guideline for EPA to follow in developing the regulatory definition of hazardous waste. The regulatory definition is an essential element of the current RCRA program. It precisely identifies which wastes are subject to RCRA waste management regulations.

Congress asked EPA to fulfill the task of developing a regulatory definition of hazardous waste by using two different mechanisms: by listing certain specific wastes as hazardous and by identifying characteristics which, when present in a waste, make it hazardous. Following its statutory mandate, EPA developed a regulatory definition of hazardous waste that incorporates both listings and characteristics.

HAZARDOUS WASTE LISTINGS

A hazardous waste listing is a narrative description of a specific type of waste that EPA considers dangerous enough to warrant regulation. Hazardous waste listings describe wastes from various industrial processes, wastes from specific sectors of industry, or wastes in the form of specific chemical formulations. Before developing a hazardous waste listing, EPA thoroughly studies a particular wastestream and the threat it can pose to human health and the environment. If the waste poses enough of a threat, EPA includes a precise description of that waste on one of the hazardous waste lists in the regulations. Thereafter, any waste fitting that narrative listing description is considered hazardous, regardless of its chemical composition or any other potential variable. For example, one of the current hazardous waste listings reads as: "API separator sludge from the petroleum refining industry." An API separator is a device commonly used by the petroleum refining industry to separate contaminants from refinery wastewaters. After studying the petroleum refining industry and typical sludges from API separators, EPA decided these sludges were dangerous enough to warrant regulation as hazardous waste under all circumstances. The listing therefore designates all petroleum refinery API separator sludges as hazardous. Chemical composition or other factors about a specific sample of API separator sludge are not relevant to its status as hazardous waste under the RCRA program.

Using listings to define hazardous wastes presents certain advantages and disadvantages. One advantage is that listings make the hazardous waste identification process easy for industrial waste handlers. Only knowledge of a waste's origin is needed to determine if it is listed; laboratory analysis is unnecessary. By comparing any waste to narrative listing descriptions, one can easily determine whether or not the waste is hazardous. EPA's use of listings also presents certain disadvantages. For example, listing a waste as hazardous demands extensive study of that waste by EPA. EPA lacks the resources to investigate the countless types of chemical wastes produced in the United States – the hazardous waste listings simply cannot address all dangerous wastes. Another disadvantage of the hazardous waste listings is their lack of flexibility. Listings designate a waste as hazardous if it falls within a particular category or class. The actual composition of the waste is not a consideration as long as the waste matches the appropriate listing description. For instance, some API separator sludges from petroleum refining might contain relatively few hazardous constituents and pose a negligible risk to human health and the environment. Such sludges are still regulated as hazardous, however, because the listing for this wastestream does not consider the potential variations in waste composition. Thus, the hazardous waste listings can unnecessarily regulate some wastes that do not pose a significant health threat. It is also possible for industries to substantially change their processes so that wastes would no longer meet a listing description in spite of the presence of hazardous constituents. The hazardous waste characteristics provide an important complement to listings

by addressing most of the shortcomings of the listing methodology of hazardous waste identification.

HAZARDOUS WASTE CHARACTERISTICS

A hazardous waste characteristic is a property which, when present in a waste, indicates that the waste poses a sufficient threat to merit regulation as hazardous. When defining hazardous waste characteristics, EPA does not study particular wastestreams from specific industries. Instead, EPA asks the question, "what properties or qualities can a waste have which cause that waste to be dangerous?" For example, EPA found that ignitability, or the tendency for a waste to easily catch fire and burn, is a dangerous property. Thus, ignitability is one of the hazardous waste characteristics and a waste displaying that property is regulated as hazardous, regardless of whether the waste is listed. When defining hazardous waste characteristics, EPA identifies, where practicable, analytical tests capable of detecting or demonstrating the presence of the characteristic. For instance, EPA regulations reference a laboratory flash point test to be used when deciding if a liquid waste is ignitable. Whether or not a waste displays a hazardous characteristic generally depends on how it fares in one of the characteristics tests. Therefore, the chemical makeup or other factors about the composition of a particular waste typically determine whether or not it tests as hazardous for a characteristic.

Using characteristics to define hazardous wastes presents certain advantages over designating hazardous wastes by listings. One advantage is that hazardous characteristics and the tests used to evaluate their presence have broad applicability. Once EPA has defined a characteristic and selected a test for use in identifying it, waste handlers can evaluate any wastestream to see if it is classified as a hazardous waste. Furthermore, use of characteristics can be a more equitable way of designating wastes as hazardous. Instead of categorizing an entire group of wastes as hazardous, characteristics allow a waste handler to evaluate each waste sample on its own merits and classify it according to the actual danger it poses. Aware of these advantages, EPA originally planned to use characteristics as the primary means of identifying hazardous waste. EPA hoped to define and select test methods for identifying all hazardous characteristics, including organic toxicity, mutagenicity (the tendency to cause mutations), teratogenicity (the tendency to cause defects in offspring), bioaccumulation potential, and phytotoxicity (toxicity to plants). EPA encountered problems, however, when trying to develop regulatory definitions of these properties. One primary problem was that no straightforward testing protocols were available for use in determining if a waste possessed any of these characteristics. For example, deciding if a particular wastestream poses an unacceptable cancer risk demands extensive laboratory experimentation. Requiring such analysis on a routine basis from industrial waste handlers would be impractical. Therefore, EPA developed a hazardous waste definition that relies on both listings and characteristics to define hazardous wastes.

2.3 LISTED HAZARDOUS WASTES

EPA has studied and listed as hazardous hundreds of specific industrial wastestreams. These wastes are described or listed on four different lists that are found in the regulations at Part 261, Subpart D. These four lists are:

- The F list — The F list designates particular solid wastes from certain common industrial or manufacturing processes as hazardous. Because the processes producing these wastes can occur in different sectors of industry, the F list wastes are known as wastes from nonspecific sources. The F list is codified in the regulations at §261.31.

- The K list — The K list designates particular solid wastes from certain specific industries as hazardous. K list wastes are known as wastes from specific sources. The K list is found at §261.32.

- The P list and the U list — These two lists are similar in that both list pure or commercial grade formulations of certain specific unused chemicals as hazardous. Both the P list and U list are codified in §261.33.

These four lists each designate anywhere from 30 to a few hundred wastestreams as hazardous. Each waste on the lists is assigned a waste code consisting of the letter associated with the list followed by three numbers. For example, the wastes on the F list are assigned the waste codes F001, F002, and so on. These waste codes are an important part of the RCRA regulatory system. Assigning the correct waste code to a waste has important implications for the management standards that apply to the waste.

LISTING CRITERIA

Before listing any waste as hazardous, the Agency developed a set of criteria to use as a guide when determining whether or not a waste should be listed. These listing criteria provide a consistent frame of reference when EPA considers listing a wastestream. Remember that EPA only uses these criteria when evaluating whether to list a waste; the listing criteria are not used by waste handlers, who refer to the actual hazardous waste lists for hazardous waste identification purposes. There are four different criteria upon which EPA may base its determination to list a waste as hazardous. These criteria are codified in Part 261, Subpart B. Note that these four criteria do not directly correspond to the four different lists of hazardous waste. The four criteria EPA may use to list a waste are:

- The waste typically contains harmful chemicals, and other factors indicate that it could pose a threat to human health and the environment in the absence of special regulation. Such wastes are known as toxic listed wastes.

- The waste contains such dangerous chemicals that it could pose a threat to human health and the environment even when properly managed. Such wastes are known as acutely hazardous wastes.

- The waste typically exhibits one of the four characteristics of hazardous waste described in the hazardous waste identification regulations (ignitability, corrosivity, reactivity, or toxicity).

- When EPA has to cause to believe for some other reason, the waste typically fits within the statutory definition of hazardous waste developed by Congress.

EPA may list a waste as hazardous for any and all of the above reasons. The majority of listed wastes fall into the toxic waste category. To decide if a waste should be a toxic listed waste, EPA first determines whether it typically contains harmful chemical constituents. Appendix VIII of Part 261 contains a list of chemical compounds or elements which scientific studies show to have toxic, carcinogenic, mutagenic, or teratogenic effects on humans or other life forms. If a waste contains chemical constituents found on the Appendix VIII list, EPA then evaluates 11 other factors to determine if the wastestream is likely to pose a threat in the absence of special restrictions on its handling. These additional considerations include a risk assessment and study of past cases of damage caused by the waste.

Acutely hazardous wastes are the second most common type of listed waste. EPA designates a waste as acutely hazardous if it contains Appendix VIII constituents that scientific studies show to be fatal to humans or animals in low doses. In a few cases, acutely hazardous wastes contain no Appendix VIII constituents, but are extremely dangerous for another reason. An example is the listed waste P081, which designates unused discarded formulations of nitroglycerine as acutely hazardous. Although nitroglycerine is not an Appendix VIII hazardous constituent, wastes containing unused nitroglycerine are so unstable that they pose an acute hazard. The criteria for designating a waste as acutely hazardous require only that EPA considers the typical chemical makeup of the wastestream. EPA is not required to study other factors, such as relative risk and evidence of harm, when listing a waste as acutely hazardous.

To indicate its reason for listing a waste, EPA assigns a hazard code to each waste listed on the F, K, P, and U lists. These hazard codes are listed below. The last four hazard codes apply to wastes that have been listed because they typically exhibit one of the four regulatory characteristics of hazardous waste. You will learn more about the four characteristics of hazardous waste. The hazard codes indicating the basis for listing a waste are:

Toxic Waste	(T)
Acute Hazardous Waste	(H)
Ignitable Waste	(I)
Corrosive Waste	(C)
Reactive Waste	(R)
Toxicity Characteristic Waste	(E)

The hazard codes assigned to listed wastes affect the regulations that apply to handling the waste. For instance, acute hazardous wastes accompanied by the hazard code (H) are subject to stricter management standards than most other wastes.

THE F LIST: WASTES FROM NONSPECIFIC SOURCES

The F list designates as hazardous particular wastestreams from certain common industrial or manufacturing processes. F list wastes usually consist of chemicals that have been used for their intended purpose in an industrial process. That is why F list wastes are known as

"manufacturing process wastes." The F list wastes can be divided into seven groups, depending on the type of manufacturing or industrial operation that creates them. The seven categories of F-listed wastes are:

- spent solvent wastes (F001 - F005)
- wastes from electroplating and other metal finishing operations (F006 - F012, F019)
- dioxin-bearing wastes (F020 - F023 and F026 - F028)
- wastes from the production of certain chlorinated aliphatic hydrocarbons (F024, F025)
- wastes from wood preserving (F032, F034, and F035)
- petroleum refinery wastewater treatment sludges (F037 and F038)
- multisource leachate (F039).

Spent Solvent Wastes

Waste codes F001 - F005 apply to wastestreams from the use of certain common organic solvents. Solvents are chemicals with many uses, although they are most often used in degreasing or cleaning. The solvents covered by the F listings are commonly used in industries ranging from mechanical repair to dry cleaning to electronics manufacturing. EPA decided that only certain solvents used in certain ways produce wastestreams that warrant a hazardous waste listing. Therefore, a number of key factors must be evaluated in order to determine whether the F001 - F005 waste codes apply to a particular waste solvent. First, one or more of the 31 specific organic solvents designated in the F001 - F005 listing description must have been used in the operation that created the waste. Second, the listed solvent must have been used in a particular manner – it must have been used for its "solvent properties," as EPA defines that expression. Finally, EPA decided that only a wastestream created through use of concentrated solvents should be listed. Thus, the concentration of the solvent formulation or product before its use in the process that created the waste is also a factor in determining the applicability of the F001 - F005 listing.

The F001 - F005 spent solvent listings provide a good illustration of a principle common to all listed hazardous wastes. To determine whether a waste qualifies as listed, knowledge of the process that created the waste is essential, while information about the waste's chemical composition is often irrelevant. For example, the F005 listing description can allow two different wastes with identical chemical contents to be regulated differently because of subtle differences in the processes that created the wastes. A waste made up of toluene and paint is F005 if the toluene has been used to clean the paint from brushes or some other surface. A waste with the same chemical composition is not F005 if the toluene has been used as an ingredient (such as a thinner) in the paint. EPA considers use as a cleaner to be "use as a solvent;" use as an ingredient does not qualify as solvent use. As you can see, knowledge of the process that created a waste is the key in evaluating whether a waste can be a hazardous spent solvent or other listed hazardous waste.

Wastes from Electroplating and Other Metal-Finishing Operations

The listed hazardous wastes F006 - F012 and F019 are wastes commonly produced during electroplating and other metal finishing operations. Diverse industries use electroplating and other methods to change the surface of metal objects in order to enhance the appearance of the objects, make them more resistant to corrosion, or impart some other desirable property to them. Industries involved in plating and metal finishing range from jewelry manufacture to automobile production. A variety of techniques can be used to amend a metal's surface. For example, electroplating uses electricity to deposit a layer of a decorative or protective metal on the surface of another metal object. Chemical conversion coating also amends the surface of a metal, but does so by chemically converting (without use of electricity) a layer of the original base metal into a protective coating. Because each of these processes produces different types of wastes, EPA only designated wastes from certain metal-finishing operations as hazardous. The first step in determining whether one of the F006-F012 or F019 listings applies to a waste is identifying the type of metal finishing process involved in creating the waste:

- F006 - F009 listings only apply to wastes from electroplating operations
- F010 - F012 listings only apply to wastes from metal heat treating operations
- the F019 listing only applies to wastes from the chemical conversion coating of aluminum.

Dioxin-Bearing Wastes

The listed wastes F020 - F023 and F026 - F028 are commonly known as the "dioxin-bearing wastes." These listings describe a number of wastestreams that EPA believes are likely to contain dioxins, which are considered to be among the most dangerous known chemical compounds. The dioxin listings apply primarily to manufacturing process wastes from the production of specific pesticides or specific chemicals used in the production of pesticides. The F027 listing deserves special notice because it does not apply to used manufacturing wastes. It applies only to certain unused pesticide formulations. F027 is in fact the only listing on the F list or K list that describes an unused chemical rather than an industrial wastestream consisting of chemicals that have served their intended purpose. With the exception of F028, all of the dioxin-bearing wastes are considered acute hazardous wastes and are designated with the hazard code (H). These wastes are therefore subject to stricter management standards than other hazardous wastes.

Wastes from the Production of Certain Chlorinated Aliphatic Hydrocarbons

The F024 and F025 listings designate as hazardous certain wastestreams produced in the manufacture of chlorinated aliphatic hydrocarbons. These listings stand out on the F list (the list of wastes from nonspecific sources) because they focus on wastes from a very narrow industrial sector. Many other wastestreams from the manufacture of organic chemicals are listed on the K list, the list of wastes from specific sources, including two waste codes for chlorinated aliphatic wastes, K174 and K175.

Wood Preserving Wastes

The F032, F034, and F035 listings apply to certain wastes from wood preserving operations. Many types of wood used for construction or other non-fuel applications is chemically treated to slow the deterioration caused by decay and insects. Such chemical treatment is commonly used in telephone poles, railroad ties, and other wood products prepared to withstand the rigors of outdoor use. Wood preservation typically involves pressure treating the lumber with pentachlorophenol, creosote, or preservatives containing arsenic or chromium. (It should be noted that after December 31, 2003, many wood treaters will not be using arsenic or chromium based inorganic preservatives.) The wood preserving process creates a number of common wastestreams containing these chemicals. For example, once wood has been treated with a preservative excess preservative drips from the lumber. The F032, F034, and F035 listings designate this preservative drippage as listed hazardous waste. These listings also apply to a variety of other residues from wood preserving. Whether the F032, F034, or F035 listings apply to a particular wood preserving waste depends entirely on the type of preservative used at the facility. Waste generated from wood preserving processes using pentachlorophenol is F032, waste from the use of creosote is F034, and waste from treating wood with arsenic or chromium is F035. The K list also includes a waste code, K001, which applies to bottom sediment sludge from treating wastewaters associated with processes using pentachlorophenol and/or creosote.

Petroleum Refinery Wastewater Treatment Sludges

The F037 and F038 listings apply to specific wastestreams from petroleum refineries. The petroleum refining process typically creates large quantities of contaminated wastewater. Before this wastewater can be discharged to a river or sewer, it must be treated to remove oil, solid material, and chemical pollutants. Gravity provides a simple way of separating these pollutants from refinery wastewaters. Over time, solids and heavier pollutants precipitate from wastewaters to form a sludge. Other less dense pollutants accumulate on the surface of wastewaters, forming a material known as float. These gravitational separation processes can be encouraged through chemical or mechanical means. The F037 listing applies to the sludges and float created by gravitational treatment of petroleum refinery wastewaters. The F038 listing applies to sludges and float created during the chemical or physical treatment of refinery wastewaters. The K list also includes waste codes for certain petroleum wastestreams generated by the petroleum refining industry. These waste codes are K048 through K052 and K169 through K172.

Multisource Leachate

The F039 listing applies to multisource leachate, the liquid material that accumulates at the bottom of a hazardous waste landfill. Understanding the natural phenomenon known as leaching is essential to understanding a number of key RCRA regulations. Leaching occurs when liquids such as rainwater filter through soil or buried materials, such as wastes placed in a landfill. When this liquid comes in contact with buried wastes, it leaches or draws chemicals out of those wastes. This liquid (called leachate) can then carry the leached chemical contaminants further into the ground, eventually depositing them elsewhere in the subsurface or in groundwater. The leachate that percolates through landfills, particularly hazardous waste landfills, usually contains high concentrations of chemicals, and is often collected to minimize the potential that it may enter the subsurface environment and contaminate soil or groundwater. This leachate that

percolates through hazardous waste landfills and other buried hazardous waste is designated as F039.

THE K LIST: WASTES FROM SPECIFIC SOURCES

The K list of hazardous wastes designates particular wastes from specific sectors of industry and manufacturing as hazardous. The K list wastes are therefore known as wastes from specific sources. Like F list wastes, K list wastes are manufacturing process wastes. They contain chemicals that have been used for their intended purpose. To determine whether a waste qualifies as K-listed, two primary questions must be answered. First, is the facility that created the waste within one of the industrial or manufacturing categories on the K list? Second, does the waste match one of the specific K list waste descriptions? The 13 industries that can generate K list wastes are:

- wood preservation
- inorganic pigment manufacturing
- organic chemicals manufacturing
- inorganic chemicals manufacturing
- pesticides manufacturing
- explosives manufacturing
- petroleum refining
- iron and steel production
- primary aluminum production
- secondary lead processing
- veterinary pharmaceuticals manufacturing
- ink formulation
- coking (processing of coal to produce coke, a material used in iron and steel production).

Remember that not all wastes from these 13 industries are hazardous, only those specifically described in the detailed K list descriptions.

Previously, the K list included waste codes for 17 different industries. However, EPA revoked the K waste codes applicable to the wastestreams in the primary copper, primary lead, primary zinc, and ferroalloys industries (K064, K065, K066, K090, and K091) (63 FR 28556, 28579; May 26, 1998). Currently, there are no K waste codes applicable to these four industries.

In general, the K listings target much more specific wastestreams than the F listings. For example, EPA added a number of listings to the petroleum refining category of the K list. EPA estimates that one hundred facilities nationwide produce wastestreams covered by these new K listings. In contrast, F-listed spent solvent wastes are commonly generated in thousands of different plants and facilities. You may also notice that industries generating K-listed wastes, such as the wood preserving and petroleum refining industries, can also generate F-listed wastes. Typically, K listings describe more specific wastestreams than F listings applicable to the same industry. For example, K051 and K048 designate as hazardous two very specific types of petroleum refinery wastewater treatment residues: wastewater treatment sludges created in API separators and wastewater treatment float created using dissolved air flotation (DAF) pollution

control devices. The F037 and F038 listings complement these two K listings by designating as hazardous all other types of petroleum refinery wastewater treatment sludges and floats. These petroleum refinery listings illustrate that the K listings are typically more specific than the F listings. They also illustrate that the two lists are in many ways very similar.

THE P AND U LISTS: DISCARDED COMMERCIAL CHEMICAL PRODUCTS

The P and U lists designate as hazardous pure or commercial grade formulations of certain unused chemicals. As you will see, the P and U listings are quite different from the F and K listings. For a waste to qualify as P- or U-listed, a waste must meet the following three criteria:

- the waste must contain one of the chemicals listed on the P or U list
- the chemical in the waste must be unused
- the chemical in the waste must be in the form of a "commercial chemical product," as EPA defines that term.

The following paragraphs explore these three criteria in detail and examine EPA's rationale in creating the P and U lists.

You have already learned that hazardous waste listings are narrative descriptions of specific wastestreams and that a waste's actual chemical composition is generally irrelevant to whether a listing applies to it. At first glance, the P and U listings seem inconsistent with these principles. Each P and U listing consists only of the chemical name of a compound known to be toxic or otherwise dangerous; no description is included. EPA adopted this format because the same narrative description applies to all P and U list wastes. Instead of appearing next to each one of the hundreds of P and U list waste codes, this description is found in the regulatory text that introduces the two lists.

The generic P and U list waste description involves two key factors. First, a P or U listing applies only if one of the listed chemicals is discarded unused. In other words, the P and U lists do not apply to manufacturing process wastes, as do the F and K lists. The P and U listings apply to unused chemicals that become wastes. Unused chemicals become wastes for a number of reasons. For example, some unused chemicals are spilled by accident. Others are intentionally discarded because they are off-specification and cannot serve the purpose for which they were originally produced.

The second key factor governing the applicability of the P or U listings is that the listed chemical must be discarded in the form of a "commercial chemical product." EPA uses the phrase commercial chemical product to describe a chemical that is in pure form, that is in commercial grade form, or that is the sole active ingredient in a chemical formulation. The pure form of a chemical is a formulation consisting of 100 percent of that chemical. The commercial grade form of a chemical is a formulation in which the chemical is almost 100 percent pure, but contains minor impurities. A chemical is the sole active ingredient in a formulation if that chemical is the only ingredient serving the function of the formulation. For instance, a pesticide made for killing insects may contain a poison such as heptachlor as well as various solvent ingredients which act as carriers or lend other desirable properties to the poison. Although all of

these chemicals may be capable of killing insects, only the heptachlor serves the primary purpose of the insecticide product. The other chemicals involved are present for other reasons, not because they are poisonous. Therefore, heptachlor is the sole active ingredient in such a formulation even though it may be present in low concentrations.

As you can see, the P and U listings apply only to a very narrow category of wastes. For example, an unused pesticide consisting of pure heptachlor is listed waste P059 when discarded. An unused pesticide consisting of pure toxaphene is listed waste P123 when discarded. An unused pesticide made up of 50 percent heptachlor and 50 percent toxaphene as active ingredients, while being just as deadly as the first two formulations, is not a listed waste when discarded. That is because neither compound is discarded in the form of a commercial chemical product. Why did EPA choose such specific criteria for designating P- or U-listed chemicals as hazardous? When first developing the definition of hazardous waste, EPA was not able to identify with confidence all the different factors that can cause a waste containing a known toxic chemical to be dangerous. It was obvious, however, those wastes consisting of pure, unadulterated forms of certain chemicals were worthy of regulation. EPA used the P and U lists to designate hazardous wastes consisting of pure or highly concentrated forms of known toxic chemicals. As you will see in the following sections of the module, wastes that remain unregulated by listings may still fall under protective hazardous waste regulation due to the four characteristics of hazardous waste.

2.4 CHARACTERISTIC HAZARDOUS WASTES

A hazardous waste characteristic is a property that indicates that a waste poses a sufficient threat to deserve regulation as hazardous. EPA tried to identify characteristics which, when present in a waste, can cause death or illness in humans or ecological damage. EPA also decided that the presence of any characteristic of hazardous waste should be detectable by using a standardized test method or by applying general knowledge of the waste's properties. EPA believed that unless generators were provided with widely available and uncomplicated test methods for determining whether their wastes exhibited hazardous characteristics, this system of identifying hazardous wastes would be unfair and impractical. Given these criteria, EPA only finalized four hazardous waste characteristics. These characteristics are a necessary supplement to the hazardous waste listings. They provide a screening mechanism that waste handlers must apply to all wastes from all industries. In this sense, the characteristics provide a more complete and inclusive means of identifying hazardous wastes than do the hazardous waste listings. The four characteristics of hazardous waste are:

- ignitability
- corrosivity
- reactivity
- toxicity.

The regulations explaining these characteristics and the test methods to be used in detecting their presence are found in Part 261, Subpart C. Note that although waste handlers can use the test methods referenced in Subpart C to determine whether a waste displays characteristics, they are not required to do so. In other words, any handler of industrial waste may apply knowledge of

the waste's properties to determine if it exhibits a characteristic, instead of sending the waste for expensive laboratory testing. As with listed wastes, characteristic wastes are assigned waste codes. Ignitable, corrosive, and reactive wastes carry the waste codes D001, D002, and D003, respectively. Wastes displaying the characteristic of toxicity can carry any of the waste codes D004 through D043.

IGNITABILITY

Ignitable wastes are wastes that can readily catch fire and sustain combustion. Many paints, cleaners, and other industrial wastes pose such a fire hazard. Most ignitable wastes are liquid in physical form. EPA selected a flash point test as the method for determining whether a liquid waste is combustible enough to deserve regulation as hazardous. The flash point test determines the lowest temperature at which a chemical ignites when exposed to flame. Many wastes in solid or nonliquid physical form (e.g., wood, paper) can also readily catch fire and sustain combustion, but EPA did not intend to regulate most of these nonliquid materials as ignitable wastes. A nonliquid waste is only hazardous due to ignitability if it can spontaneously catch fire under normal handling conditions and can burn so vigorously that it creates a hazard. Certain compressed gases and chemicals called oxidizers can also be ignitable. Ignitable wastes carry the waste code D001 and are among the most common hazardous wastes. The regulations describing the characteristic of ignitability are codified at §261.21.

CORROSIVITY

Corrosive wastes are acidic or alkaline (basic) wastes which can readily corrode or dissolve flesh, metal, or other materials. They are also among the most common hazardous wastestreams. Waste sulfuric acid from automotive batteries is an example of a corrosive waste. EPA uses two criteria to identify corrosive hazardous wastes. The first is a pH test. Aqueous wastes with a pH greater than or equal to 12.5, or less than or equal to 2 are corrosive under EPA's rules. A waste may also be corrosive if it has the ability to corrode steel in a specific EPA-approved test protocol. Corrosive wastes carry the waste code D002. The regulations describing the corrosivity characteristic are found at §261.22.

REACTIVITY

A reactive waste is one that readily explodes or undergoes violent reactions. Common examples are discarded munitions or explosives. In many cases, there is no reliable test method to evaluate a waste's potential to explode or react violently under common handling conditions. Therefore, EPA uses narrative criteria to define most reactive wastes and allows waste handlers to use their best judgment in determining if a waste is sufficiently reactive to be regulated. This is possible because reactive hazardous wastes are relatively uncommon and the dangers they pose are well known to the few waste handlers who deal with them. A waste is reactive if it meets any of the following criteria:

- it can explode or violently react when exposed to water, when heated, or under normal handling conditions

- it can create toxic fumes or gases when exposed to water or under normal handling conditions

- it meets the criteria for classification as an explosive under Department of Transportation rules

- it generates toxic levels of sulfide or cyanide gas when exposed to a pH range of 2 through 12.5.

Wastes exhibiting the characteristic of reactivity are assigned the waste code D003. The reactivity characteristic is described in the regulations at §261.23.

TOXICITY CHARACTERISTIC

The leaching of toxic compounds or elements into groundwater drinking supplies from wastes disposed of in landfills is one of the most common ways the general population can be exposed to the chemicals found in industrial wastes. EPA developed a characteristic designed to identify wastes likely to leach dangerous concentrations of certain known toxic chemicals into groundwater. In order to predict whether any particular waste is likely to leach chemicals into groundwater in the absence of special restrictions on its handling, EPA first designed a lab procedure that replicates the leaching process and other effects that occur when wastes are buried in a typical municipal landfill. This lab procedure is known as the Toxicity Characteristic Leaching Procedure (TCLP). Using the TCLP on a waste sample creates a liquid leachate that is similar to the liquid EPA would expect to find in the ground near a landfill containing the same waste. Once the leachate is created in the lab, a waste handler must determine whether it contains any of 39 different toxic chemicals above specified regulatory levels. If the leachate sample contains a sufficient concentration of one of the specified chemicals, the waste exhibits the toxicity characteristic (TC). EPA used groundwater modeling studies and toxicity data for a number of common toxic compounds and elements to set these threshold concentration levels. Much of the toxicity data were originally developed under the Safe Drinking Water Act.

However, there is one exception to using the TCLP to identify a waste as hazardous. The D.C. Circuit Court, in *Association of Battery Recyclers vs. EPA*, vacated the use of the TCLP to determine whether manufactured gas plant (MGP) wastes exhibit the characteristic of toxicity. As previously stated, the TCLP replicates the leaching process in municipal landfills. The court found that EPA did not produce sufficient evidence that co-disposal of MGP wastes from remediation sites with municipal solid waste (MSW) has happened or is likely to happen. On March 13, 2002, in response to the court vacatur, EPA codified language exempting MGP waste from the toxicity characteristic regulation (67 FR 11251).

To recap, determining whether a waste exhibits the toxicity characteristic involves two principal steps: (1) creating a leachate sample using the TCLP; and (2) evaluating the concentration of 39 chemicals in that sample against the regulatory levels listed below in Table 1. If a waste exhibits the TC, it carries the waste code associated with the compound or element that exceeded the regulatory level. The following table presents the toxicity characteristic waste codes, regulated constituents, and regulatory levels. This table and the regulations describing the characteristic of toxicity are

codified at §261.24.

Table 1
TOXICITY CHARACTERISTIC CONSTITUENTS AND REGULATORY LEVELS

Waste Code	Contaminants	Concentration
D004	Arsenic	5.0
D005	Barium	100.0
D018	Benzene	0.5
D006	Cadmium	1.0
D019	Carbon tetrachloride	0.5
D020	Chlordane	0.03
D021	Chlorobenzene	100.0
D022	Chloroform	6.0
D007	Chromium	5.0
D023	o-Cresol*	200.0
D024	m-Cresol*	200.0
D025	p-Cresol*	200.0
D026	Total Cresols*	200.0
D016	2,4-D	10.0
D027	1,4-Dichlorobenzene	7.5
D028	1,2-Dichloroethane	0.5
D029	1,1-Dichloroethylene	0.7
D030	2,4-Dinitrotoluene	0.13
D012	Endrin	0.02
D031	Heptachlor (and its epoxide)	0.008
D032	Hexachlorobenzene	0.13
D033	Hexachlorobutadiene	0.5
D034	Hexachloroethane	3.0
D008	Lead	5.0
D013	Lindane	0.4
D009	Mercury	0.2
D014	Methoxychlor	10.0
D035	Methyl ethyl ketone	200.0
D036	Nitrobenzene	2.0
D037	Pentachlorophenol	100.0
D038	Pyridine	5.0
D010	Selenium	1.0
D011	Silver	5.0
D039	Tetrachloroethylene	0.7
D015	Toxaphene	0.5
D040	Trichloroethylene	0.5
D041	2,4,5-Trichlorophenol	400.0
D042	2,4,6-Trichlorophenol	2.0
D017	2,4,5-TP (Silvex)	1.0
D043	Vinyl chloride	0.2

*If o-, m-, and p-cresols cannot be individually measured, the regulatory level for total cresols is used.

2.5 WASTES LISTED SOLELY FOR EXHIBITING THE CHARACTERISTIC OF IGNITABILITY, CORROSIVITY, AND/OR REACTIVITY

Hazardous wastes listed solely for exhibiting the characteristic of ignitability, corrosivity, and/or reactivity are not regulated the same way that other listed hazardous wastes are regulated under RCRA. When wastes are generated that meet a listing description for one of the 29 wastes listed only for exhibiting the characteristic of ignitability, corrosivity, and/or reactivity, the waste is not hazardous if it does not exhibit a characteristic (66 FR 27266, 27283; May 16, 2001). This concept is consistent with the mixture and derived-from rules, which will be discussed in detail later in this module. For example, F003 is listed for the characteristic of ignitability. If a waste is generated and meets the listing description for F003 but does not exhibit the characteristic of ignitability, it is not regulated as a hazardous waste. However, such wastes are still subject to the land disposal restrictions unless they do not exhibit a characteristic at the point of generation.

2.6 THE MIXTURE AND DERIVED-FROM RULES

So far, this module has introduced the fundamentals of the hazardous waste identification process and an overview of the hazardous waste listings and characteristics. You should now be able to explain in general terms which solid wastes are hazardous wastes. Now we analyze a new question: "When do these hazardous wastes cease being regulated as hazardous wastes?" The regulations governing this issue are commonly known as the mixture and derived-from rules.

BACKGROUND

When EPA first developed the RCRA regulations and the definition of hazardous waste in the late 1970s, the Agency focused on establishing the listings and characteristics, criteria allowing industry to identify which wastes deserved regulation as hazardous wastes. Commenters on EPA's original proposed regulations brought up other key questions about the hazardous waste identification process. For example, these commenters asked, "once a waste is identified as hazardous, what happens if that waste changes in some way? If the hazardous waste is changed, either by mixing it with other wastes or by treating it to modify its chemical composition, should it still be regulated as hazardous?" Faced with a short time frame for answering this difficult question, EPA developed a fairly simple and strict answer and presented it in the mixture and derived-from rules.

LISTED HAZARDOUS WASTES

The mixture and derived-from rules operate differently for listed waste and characteristic wastes. The mixture rule for listed wastes states that a mixture made up of any amount of a nonhazardous solid waste and any amount of a listed hazardous waste is considered a listed hazardous waste. In other words, if a small vial of listed waste is mixed with a large quantity of nonhazardous waste, the resulting mixture bears the same waste code and regulatory status as the original listed component of the mixture. This principle applies regardless of the actual health

threat posed by the waste mixture or the mixture's chemical composition. The derived-from rule governs the regulatory status of materials that are created by treating or changing a hazardous waste in some way. For example, ash created by burning a hazardous waste is considered "derived-from" that hazardous waste. The derived-from rule for listed wastes states that any material derived from a listed hazardous waste is also a listed hazardous waste. Thus, ash produced by burning a listed hazardous waste bears that same waste code and regulatory status as the original listed waste, regardless of the ash's actual properties.

The net effect of the mixture and derived-from rules for listed wastes can be summarized as follows: once a waste matches a listing description, it is forever a listed hazardous waste, regardless of how it is mixed, treated, or otherwise changed. Furthermore, any material that comes in contact with the listed waste will also be considered listed, regardless of its chemical composition.

Although the regulations do provide a few exceptions to the mixture and derived-from rules, most listed hazardous wastes are subject to the strict principles outlined above. Why did EPA create such a rigid system? To understand the logic behind the mixture and derived-from rules, one must consider the circumstances under which EPA developed them. If EPA relied solely on the narrative listing descriptions to govern when a waste ceased being hazardous, industry might easily circumvent RCRA's protective regulation. For example, a waste handler could simply mix different wastes and claim that they no longer exactly matched the applicable hazardous waste listing descriptions. These wastes would no longer be regulated by RCRA, even though the chemicals they contained would continue to pose the same threats to human health and the environment. EPA was not able to determine what sort of treatment or concentrations of chemical constituents indicated that a waste no longer deserved regulation. EPA therefore adopted the simple, conservative approach of the mixture and derived-from rules, while admitting that these rules might make some waste mixtures and treatment residues subject to unnecessary regulation. Adopting the mixture and derived-from rules also presented certain advantages. For instance, the mixture rule gives waste handlers a clear incentive to keep their listed hazardous wastes segregated from other nonhazardous or less dangerous wastestreams. The greater the volume of hazardous waste, the more expensive it is to store, treat and dispose.

CHARACTERISTIC WASTES

As mentioned previously, the mixture and derived-from rules apply differently to listed and characteristic wastes. A mixture involving characteristic wastes is hazardous only if the mixture itself exhibits a characteristic. Similarly, treatment residues and materials derived from characteristic wastes are hazardous only if they themselves exhibit a characteristic. Unlike listed hazardous wastes, characteristic wastes are hazardous because they possess one of four unique and measurable properties. EPA decided that once a characteristic waste no longer exhibits one of these four dangerous properties, it no longer deserves regulation as hazardous. Thus, a characteristic waste can be made nonhazardous by treating it to remove its hazardous property; however, EPA places certain restrictions on the manner in which a waste can be treated. You will learn more about these restrictions in the module entitled Land Disposal Restrictions. Handlers who render characteristic wastes nonhazardous must consider these restrictions when treating wastes to remove their hazardous properties.

WASTE LISTED SOLELY FOR EXHIBITING THE CHARACTERISTIC OF IGNITABILITY, CORROSIVITY, AND/OR REACTIVITY

All wastes listed solely for exhibiting the characteristic of ignitability, corrosivity and/or reactivity characteristic (including mixtures, derived-from, and as-generated wastes) are not regulated as hazardous wastes once they no longer exhibit a characteristic (66 FR 27266, 27268; May 16, 2001). EPA can list a waste as hazardous if that waste typically exhibits one or more of the four hazardous waste characteristics. If a hazardous waste listed only for the characteristics of ignitability, corrosivity and/or reactivity is mixed with a solid waste, the original listing does not carry through to the resulting mixture if that mixture does not exhibit any hazardous waste characteristics. For example, EPA listed the F003 spent solvents as hazardous because these wastes typically display the ignitability characteristic. If F003 waste is treated by mixing it with another waste, and the resulting mixture does not exhibit a characteristic, the F003 listing no longer applies. (Be aware, however, that for the land disposal restrictions, the Agency places certain controls on how hazardous wastes can be treated or mixed with other wastes. Any hazardous waste mixing must be consistent with these rules.)

If a waste derived from the treatment, storage, or disposal of a hazardous waste listed for the characteristics of ignitability, corrosivity, and/or reactivity, no longer exhibits one of those characteristics, it is not a hazardous waste (§261.3(g)(2)(ii)). For example, if a sludge is generated from the treatment of F003, and that sludge does not exhibit the characteristic of ignitability, corrosivity, or reactivity, the F003 listing will not apply to the sludge.

MIXTURE RULE EXEMPTIONS

There are a few situations in which EPA does not require strict application of the mixture and derived-from rules. EPA determined that certain mixtures involving listed wastes and certain residues from the treatment of listed wastes typically do not pose enough of a health or environmental threat to deserve regulation as listed wastes. The principal regulatory exclusions from the mixture and derived-from rules are summarized below.

There are eight exemptions from the mixture rule. The first exemption from the mixture rule applies to mixtures of characteristic wastes and specific mining wastes excluded under §261.4(b)(7). This narrow exemption allows certain mixtures to qualify as nonhazardous wastes, even if the mixtures exhibit one or more hazardous waste characteristics. The module entitled Solid and Hazardous Waste Exclusions will explain in more detail the mining waste or Bevill exclusion.

The remaining exemptions from the mixture rule apply to certain listed hazardous wastes that are discharged to wastewater treatment facilities (§261.3(a)(2)(iv)). Many industrial facilities produce large quantities of nonhazardous wastewaters as their primary wastestreams. These wastewaters are typically discharged to a water body or local sewer system after being treated to remove pollutants, as required by the Clean Water Act. At many of these large facilities, on-site cleaning, chemical spills, or laboratory operations also create relatively small secondary wastestreams that are hazardous due to listings or characteristics. For example, a textile plant producing large quantities of nonhazardous wastewater can generate a secondary wastestream of

listed spent solvents from cleaning equipment. Routing such secondary hazardous wastestreams to the facility's wastewater treatment system is a practical way of treating and getting rid of these wastes. This management option triggers the mixture rule, however, since even a very small amount of a listed wastestream combined with very large volumes of nonhazardous wastewater causes the entire mixture to be listed. EPA provided exemptions from the mixture rule for a number of these situations where relatively small quantities of listed hazardous wastes are routed to large-volume wastewater treatment systems. To qualify for this exemption from the mixture rule, the amount of listed waste introduced into a wastewater treatment system must be very small (or de minimis) relative to the total amount of wastewater treated in the system, and the wastewater system must be regulated under the Clean Water Act.

DERIVED-FROM RULE EXEMPTIONS

There are five regulatory exemptions from the derived-from rule. The first of these derived-from rule exemptions applies to materials that are reclaimed from hazardous wastes and used beneficially. Many listed and characteristic hazardous wastes can be recycled to make new products or be processed to recover usable materials with economic value. Such products derived from recycled hazardous wastes are no longer solid wastes. Using the hazardous waste identification process discussed at the beginning of this module, if the materials are not solid wastes, then whether they are derived from listed wastes or whether they exhibit hazardous characteristics is irrelevant. The module entitled Definition of Solid Waste and Hazardous Waste Recycling will explain which residues derived from hazardous wastes actually cease to be wastes and qualify for this exemption.

The other four exemptions from the derived-from rule apply to residues from the treatment of specific wastes using specific treatment processes. For example, K062 describes spent pickle liquor from the iron and steel industry. Pickle liquor is an acid solution used to finish the surface of steel. When pickle liquor is spent and becomes a waste, it usually contains acids and toxic heavy metals. This waste can be treated by mixing it with lime to form a sludge. This treatment, called stabilization, neutralizes the acids in the pickle liquor and makes the metals less dangerous by chemically binding them within the sludge. EPA studied this process and determined that K062 treated in this manner no longer poses enough of a threat to warrant hazardous waste regulation. Therefore, lime-stabilized waste pickle liquor sludge derived from K062 is not a listed hazardous waste. The other exemptions from the derived-from rule for listed wastes are also quite specific and include: waste derived-from the burning of exempt recyclable fuels, biological treatment sludge derived-from treatment of K156 and K157, catalyst inert support media separated from K171 and K172, and residues from high temperature metal recovery of K061, K062, and F006, provided certain conditions are met.

DELISTING

The RCRA regulations provide another form of relief from the mixture and derived-from rule principles for listed hazardous wastes. Through a site-specific process known as "delisting," a waste handler can submit to EPA a petition demonstrating that while a particular wastestream generated at their facility may meet a hazardous waste listing description, it does not pose sufficient hazard to deserve RCRA regulation (§260.22). If EPA grants such a petition, the

particular wastestream at that facility will not be regulated as a listed hazardous waste. Because the delisting process is difficult, time-consuming, and expensive, it is not considered a readily available exception to the mixture and derived-from from rules.

The hazardous waste listings, the hazardous waste characteristics, and the mixture and derived-from rules are all essential parts of the definition of hazardous waste, but these key elements are all described in different sections of the RCRA regulations. Only one regulatory section, §261.3, unites all four elements to establish the formal definition of hazardous waste. This section is entitled Definition of Hazardous Waste. Section 261.3 states that all solid wastes exhibiting one of the four hazardous characteristics defined in Part 261, Subpart C, are hazardous wastes. This section also states that all solid wastes listed on one of the four hazardous waste lists in Part 261, Subpart D, are hazardous wastes. Finally, this section explains in detail the mixture and derived-from rules and the regulatory exemptions from these rules. Thus, although §261.3 is entitled Definition of Hazardous Waste, it serves primarily as a guide to the mixture and derived-from rules. Substantive rules about the two most crucial elements of the hazardous waste definition, the listings and characteristics, are found elsewhere.

2.7 THE CONTAINED-IN POLICY

The contained-in policy is a special, more flexible version of the mixture and derived-from rules that applies to environmental media and debris contaminated with hazardous waste. Environmental media (singular, "medium") is the term EPA uses to describe soil, sediments, and groundwater. Debris is a term EPA uses to describe a broad category of larger manufactured and naturally occurring objects that are commonly discarded (§268.2(g)). Examples of debris include:

- dismantled construction materials such as used bricks, wood beams, and chunks of concrete
- decommissioned industrial equipment such as pipes, pumps, and dismantled tanks
- other discarded manufactured objects such as personal protective equipment (e.g., gloves, coveralls, eyewear)
- large, naturally occurring objects such as tree trunks and boulders.

Environmental media and debris are contaminated with hazardous waste in a number of ways. Environmental media are usually contaminated through accidental spills of hazardous waste or spills of product chemicals which, when spilled, become hazardous wastes. Debris can also be contaminated through spills. Most debris in the form of industrial equipment and personal protective gear becomes contaminated with waste or product chemicals during normal industrial operations. Contaminated media and debris are primary examples of "remediation wastes." In other words, they are not wastestreams created during normal industrial or manufacturing operations. They are typically created during cleanups of contaminated sites and during the decommissioning of factories. Handlers of contaminated media and debris usually cannot

control or predict the composition of these materials, which have become contaminated though accidents or past negligence. In contrast, handlers of "as-generated wastes," the term often used to describe chemical wastestreams created during normal industrial or manufacturing operations, can usually predict or control the creation of these wastes through the industrial process. Examples of as-generated wastes include concentrated spent chemicals, industrial wastewaters, and pollution control residues such as sludges.

The hazardous waste identification principles you have learned, including the mixture and derived-from rules, apply to as-generated industrial wastes. EPA decided that a more flexible version of these principles should apply to the primary remediation wastes: environmental media and debris. In particular, EPA determined that strict application of the mixture and derived-from rules was inappropriate for media and debris, especially when listed wastes were involved. Applying the mixture and derived-from rules to media and debris would present certain disadvantages, as the following examples illustrate. First, under the traditional mixture and derived-from rules, environmental media and debris contaminated with any amount of listed hazardous waste would be forever regulated as hazardous. Such a strict regulatory interpretation would require excavated or dismantled materials to be handled as listed hazardous wastes and could discourage environmental cleanup efforts. Second, most spills of chemicals into soil or groundwater produce very large quantities of these media containing relatively low concentrations of chemicals. Strict application of the mixture and derived-from principles to media would therefore cause many tons of soil to be regulated as listed hazardous waste despite containing low concentrations of chemicals and posing little actual health threat. Finally, one of the main benefits of the mixture and derived-from rules is not relevant to media and debris. The mixture and derived-from principles encourage handlers of as-generated wastes to keep their listed wastes segregated from less hazardous wastestreams to avoid creating more listed wastes. Handlers of contaminated media and debris generally have no control over the process by which these materials come into contact with hazardous waste.

For all of the above reasons, EPA chose to apply a special, more flexible, version of the mixture and derived-from rules to environmental media and debris. Contaminated soil, groundwater, and debris can still present health threats if they are not properly handled and/or disposed. Therefore, EPA requires that any medium and debris contaminated with a listed waste or exhibiting a hazardous characteristic be regulated like any other hazardous waste. Media and debris contaminated with listed hazardous wastes can, however, lose their listed status and become nonhazardous. This occurs after a demonstration that the particular medium or debris in question no longer poses a sufficient health threat to deserve RCRA regulation. The requirements for making this demonstration are explained below. Once the demonstration is made, the medium or debris in question is no longer considered to "contain" a listed hazardous waste and is no longer regulated. In addition, contaminated media that contain a waste listed solely for the characteristics of ignitability, corrosivity, and/or reactivity, would no longer be managed as a hazardous waste when no longer exhibiting a characteristic (66 FR 27266, 27286; May 16, 2001). This concept that media and debris can contain or cease to contain a listed hazardous waste accounts for the name of the policy.

The contained-in policy for environmental media is not actually codified in the RCRA regulations. In legal terms, it is merely a special interpretation of the applicability of the mixture

and derived-from rules to soil and groundwater that has been upheld in federal court. These principles for the management of contaminated media are therefore known as a policy instead of a rule. The terms of the contained-in policy are relatively general. In order for environmental medium contaminated with a listed waste to no longer be considered hazardous, the handler of that media must demonstrate to EPA's satisfaction that it no longer poses a sufficient health threat to deserve RCRA regulation. Although handlers of listed media must obtain EPA's concurrence before disposing of such media as nonhazardous, the current contained-in policy provides no guidelines on how this demonstration to EPA should be made. The contained-in policy is a far easier option for eliminating unwarranted hazardous waste regulation for low-risk listed wastes than the process of delisting a hazardous waste mentioned previously. The delisting process demands extensive sampling and analysis, submission of a formal petition, and a complete rulemaking by EPA. A determination that an environmental medium no longer contains a listed hazardous waste can be granted on a site-specific basis by EPA officials without any regulatory procedure.

Debris contaminated with hazardous waste has traditionally been governed by the same nonregulatory contained-in policy explained above. In 1992, EPA codified certain aspects of the contained-in policy for debris in the definition of hazardous waste regulations in §261.3(f) (57 FR 37194, 34225; August 18, 1992). In particular, EPA included a regulatory passage that explains the process by which handlers of debris contaminated with listed hazardous waste can demonstrate that the debris is nonhazardous. This passage also references certain treatment technologies for decontaminating listed debris so that it no longer contains a listed waste. Thus, the term contained-in policy is now something of a misnomer for contaminated debris, since a contained-in rule for debris now exists.

3. REGULATORY DEVELOPMENTS

The hazardous waste identification process is subject to critical review, and adjusted accordingly to reflect technology changes and new information. The hazardous waste listings are particularly dynamic as the Agency conducts further research to incorporate new listings. The following is a brief discussion of several developments to hazardous waste identification.

3.1 THE HAZARDOUS WASTE IDENTIFICATION RULES

EPA proposed to significantly impact the RCRA hazardous waste identification process through a rulemaking effort called the Hazardous Waste Identification Rules (HWIR). The first rule, HWIR-media, was finalized on November 30, 1998, and addressed contaminated media (63 FR 65874). The second rule, HWIR-waste, was finalized on May 16, 2001, and modified the mixture and derived-from rules, as well as the contained-in policy for listed wastes (66 FR 27266). Both the HWIR-media rule, and the HWIR-waste rule, attempt to increase flexibility to the hazardous waste identification system by providing a regulatory mechanism for certain hazardous wastes with low concentrations of hazardous constituents to exit the Subtitle C universe.

The final HWIR-media rule addresses four main issues. First, the Agency promulgated a streamlined permitting process for remediation sites that will simplify and expedite the process of obtaining a permit. Second, EPA created a new unit, called a "staging pile," that allows more flexibility when storing remediation wastes during cleanups. Third, the Agency promulgated an exclusion for dredged materials permitted under the Clean Water Act, or the Marine Protection, Research, and Sanctuaries Act. Fourth, the rule finalized provisions that enable states to more easily receive authorization when their RCRA programs are updated in order to incorporate revisions to the federal RCRA regulations. The HWIR-media rule did not incorporate the provisions that would have removed low risk remediation waste from Subtitle C regulations because of fundamental disagreements between stakeholders.

On July 18, 2000, the Agency released HWIR-waste exemption levels for 36 chemicals that were developed using a risk model known as the Multimedia, Multipathway and Multireceptor Risk Assessment (3MRA) Model (65 FR 44491). EPA is currently reviewing the public comments and will decide whether further revisions to the model are necessary. After completion of independent testing, EPA submitted the model to EPA's Science Advisory Board (SAB) for review during 2003.

The May 16, 2001, HWIR-waste rule revised and retained the hazardous waste mixture and derived-from rules as previously discussed in this module. In addition, the rule finalized provisions that conditionally exempt mixed waste (waste that is both radioactive and hazardous), if the mixed waste meets certain conditions in Part 266 (66 FR 27266).

3.2 FINAL HAZARDOUS WASTE LISTING DETERMINATIONS

EPA first signed a proposed consent decree with the Environmental Defense Fund (EDF) on June 18, 1991, following a suit concerning EPA's obligations to take certain actions pursuant to RCRA. A consent decree is a legally binding agreement, approved by the Court, which details the agreements of the parties in settling a suit. The proposed consent decree, commonly known as the "mega-deadline," settles some of the outstanding issues from the case by creating a schedule for EPA to take action on its RCRA obligations. The consent decree, which has been periodically updated, requires EPA to evaluate specified wastestreams and determine whether or not to add them to the hazardous waste listings.

On November 8, 2000, EPA listed as hazardous two wastes generated by the chlorinated aliphatics industry (65 FR 67068). The two wastes are K174, wastewater treatment sludges from the production of ethylene dichloride or vinyl chloride monomer (EDC/VCM), and K175, wastewater treatment sludges from the production of vinyl chloride monomer using mercuric chloride catalyst in an acetylene-based process. For K174, EPA finalized a contingent-management listing approach which specifies that the waste will not be listed if it is sent to a Subtitle C landfill or a non-hazardous landfill licensed or permitted by the state or federal government.

On November 20, 2001, EPA published a final rule listing three wastes generated from inorganic chemical manufacturing processes as hazardous wastes (66 FR 58257). The three wastes are K176, baghouse filters from the production of antimony oxide; K177, slag from the production of antimony oxide that is speculatively accumulated or disposed; and K178, residues from manufacturing and manufacturing-site storage of ferric chloride from acids formed during the production of titanium dioxide using the chloride-ilmenite process.

EPA proposed a concentration-based hazardous waste listing for certain waste solids and liquids (K180 and K179) generated from the production of paint on February 13, 2001 (66 FR 10060). Following a review of the public comments and supplemental analyses based on those public comments, EPA determined that the paint wastes identified in the proposal do not present a substantial hazard to human health or the environment. Therefore, EPA did not list these paint production wastes as hazardous. See the April 4, 2002, final determination regarding these hazardous waste listings (67 FR 16261) for additional information.

On February 24, 2005, EPA published a final rule listing nonwastewaters from the production of certain dyes, pigments, and food, drug, and cosmetic colorants (70 FR 9138) as hazardous (K181) using a mass loading-based approach. Under the mass loading approach, these wastes are hazardous if they contain any of the constituents of concern at annual mass loading levels that meet or exceed the regulatory levels. The K181 listing focuses on seven hazardous constituents: aniline, o-anisidine, 4-chloroaniline, p-cresidine, 1,2-phenylenediamine, 1,3-phenylenediamine, and 2,4-dimethylaniline. Waste that contains less than the specified threshold levels of constituents of concern are not hazardous. The K181 listing is EPA's final obligation under the consent decree.

3.3 PROPOSED REVISION TO WASTEWATER TREATMENT EXEMPTION FOR HAZARDOUS WASTE MIXTURES

On April 8, 2003, EPA proposed to add benzene and 2-ethoxyethanol to the list of solvents whose mixtures with wastewater are exempted from the definition of hazardous waste (68 FR 17234). EPA is proposing to provide flexibility in the way compliance with the rule is determined by adding the option of directly measuring solvent chemical levels at the headworks of the wastewater treatment system. In addition, EPA is proposing to include scrubber waters derived from the combustion of spent solvents to the headworks exemption. Finally, EPA is proposing to extend the de minimis exemption to wastes listed in §§261.31 and 261.32 when released in de minimis quantities and to non-manufacturing facilities if certain conditions are met. The final rule is scheduled to be published in the Fall of 2005.

ATTACHMENT C

Referenced Regulations

TITLE 19 NATURAL RESOURCES AND WILDLIFE
CHAPTER 15 OIL AND GAS
PART 29 RELEASES

19.15.29.1 ISSUING AGENCY: Oil Conservation Commission.
[19.15.29.1 NMAC - Rp, 19.15.29.1 NMAC, 8/14/2018]

19.15.29.2 SCOPE: 19.15.29 NMAC applies to persons engaged in oil and gas development and production within New Mexico.
[19.15.29.2 NMAC - Rp, 19.15.29.2 NMAC, 8/14/2018]

19.15.29.3 STATUTORY AUTHORITY: 19.15.29 NMAC is adopted pursuant to the Oil and Gas Act, Section 70-2-11 NMSA 1978 (1977) and Section 70-2-12 NMSA 1978 (2004).
[19.15.29.3 NMAC - Rp, 19.15.29.3 NMAC, 8/14/2018]

19.15.29.4 DURATION: Permanent.
[19.15.29.4 NMAC - Rp, 19.15.29.4 NMAC, 8/14/2018]

19.15.29.5 EFFECTIVE DATE: August 14, 2018, unless a later date is cited at the end of a section.
[19.15.29.5 NMAC - Rp, 19.15.29.5 NMAC, 8/14/2018]

19.15.29.6 OBJECTIVE: To require persons who operate or control the release or the location of the release to report the unauthorized release of oil, gases, produced water, condensate or oil field waste including regulated NORM or other oil field related chemicals, contaminants or mixtures of those chemicals or contaminants that occur during drilling, producing, storing, disposing, injecting, transporting, servicing or processing and to establish reporting, site assessment, remediation, closure, variance and enforcement procedures.
[19.15.29.6 NMAC - Rp, 19.15.29.6 NMAC, 8/14/2018]

19.15.29.7 DEFINITIONS:

A. "Major release" means:

(1) an unauthorized release of a volume, excluding gases, of 25 barrels or more;

(2) an unauthorized release of a volume that:

(a) results in a fire or is the result of a fire;

(b) may with reasonable probability reach a watercourse;

(c) may with reasonable probability endanger public health; or

(d) substantially damages property or the environment;

(3) an unauthorized release of gases exceeding 500 MCF; or

(4) a release of a volume that may with reasonable probability be detrimental to fresh water.

B. "Minor release" means an unauthorized release, which is not a major release and is a volume greater than five barrels but less than 25 barrels; or for gases, greater than 50 MCF but less than 500 MCF.

C. "Responsible party" means the operator, as defined in 19.15.2 NMAC. Notwithstanding the foregoing, the division, in its sole discretion, may also consider a person causing the release, or controlling the location of the release as the responsible party.

D. "Wellstream" means the gas, oil, water, suspended constituents, or any combination thereof, which comes from the wellbore.
[19.15.29.7 NMAC - Rp, 19.15.29.7 NMAC, 8/14/2018]

19.15.29.8 RELEASES:

A. Requirements. For all releases regardless of volume, the responsible party shall comply with 19.15.29.8 NMAC and shall remediate the release. For major and minor releases, the responsible party shall also comply with 19.15.29.9, 19.15.29.10, 19.15.29.11, 19.15.29.12 and 19.15.29.13 NMAC.

B. Initial response. The responsible party must take the following immediate actions unless the actions could create a safety hazard that would result in injury.

(1) Source elimination and site security. The responsible party must take appropriate measures to stop the source of the release and limit access to the site as necessary to protect human health and the environment.

(2) Containment. Once the site is secure, the responsible party must contain the materials released by construction of berms or dikes, the use of absorbent pads or other containment actions to limit the area affected by the release and prevent potential fresh water contaminants from migrating to watercourses or areas that could pose a threat to public health and environment. The responsible party must monitor the containment to ensure that it is effectively containing the material and not being degraded by weather or onsite activity.

(3) Site stabilization. After containment, the responsible party must recover any free liquids and recoverable materials that can be physically removed from the surface within the containment area. The responsible party must deliver material removed from the site to a division-approved facility.

(4) Remediation. The responsible party may commence remediation immediately.

[19.15.29.8 NMAC - Rp, 19.15.29.8 NMAC, 8/14/2018]

19.15.29.9 RELEASE NOTIFICATION:

A. The responsible party must notify the division on form C-141 of a major or minor release occurring during the drilling, producing, storing, disposing, injecting, transporting, servicing or processing of oil, gases, produced water, condensate or oil field waste including regulated NORM, or other oil field related chemicals, contaminants or mixture of the chemicals or contaminants, in accordance with the requirements of 19.15.29 NMAC.

B. If state, federal or tribal lands are involved, the responsible party must send a copy of the form C-141 to the appropriate land managing agency including the state land office, the BLM or tribal authority, as applicable.

[19.15.29.9 NMAC - Rp, 19.15.29.9 NMAC, 8/14/2018]

19.15.29.10 RELEASE NOTIFICATION REPORTING REQUIREMENTS: The responsible party must notify the division of releases in 19.15.29.9 NMAC as follows.

A. Reporting a major release.

(1) The responsible party must notify the division's environmental bureau chief and the appropriate division district office verbally or by e-mail within 24 hours of discovery of the release. The notification must provide the information required on form C-141.

(2) The responsible party must also notify the appropriate division district office in writing within 15 days of discovering the release by completing and filing form C-141. The written notification must verify the prior verbal or e-mail notification and include additions or corrections to the information contained in the prior verbal or e-mail notification.

B. Reporting a minor release. The responsible party must notify the appropriate division district office in writing within 15 days of discovery of the release by completing and filing form C-141.

[19.15.29.10 NMAC - Rp, 19.15.29.10 NMAC, 8/14/2018]

19.15.29.11 SITE ASSESSMENT/CHARACTERIZATION: After the responsible party has removed all free liquids and recoverable materials, the responsible party must assess soils both vertically and horizontally for potential environmental impacts from any major or minor release containing liquids.

A. Characterization requirements. The responsible party must submit information characterizing the release to the appropriate division district office within 90 days of discovery of the release or characterize the release by submitting a final closure report within 90 days of discovery of the release in accordance with Subsection E of 19.15.29.12 NMAC. The responsible party may seek an extension of time to submit characterization information for good cause as determined by the division. The responsible party must submit the following information to the division.

(1) Site map. The responsible party must provide a scaled diagram that shows the potentially impacted area, significant surface features including roads and site infrastructure, location of borings, sample points, monitoring wells and subsurface features such as known pipelines to the extent known at the time of submittal including the source of information regarding subsurface features.

(2) Depth to ground water. The responsible party must determine the depth to ground water where the release occurred. If the exact depth to ground water is unknown, the responsible party must provide a reasonable determination of probable ground water depth using data generated by numeric models, cathodic well lithology, water well data, published information or other tools as approved by the appropriate division district office. If the responsible party uses water well data, the responsible party must provide all pertinent well information.

(3) Wellhead protection area. The responsible party must determine the horizontal distance from all known water sources within a half mile of the release including private and domestic water sources. Water

sources are wells, springs or other sources of fresh water extraction. Private and domestic water sources are those water sources used by less than five households for domestic or stock purposes.

(4) Distance to nearest significant watercourse. The responsible party must determine the horizontal distance to the nearest significant watercourse as defined in Subsection P of 19.15.17.7 NMAC within a half mile of any horizontal boundary of the release.

(5) Soil/waste characteristics. The responsible party must determine the lateral and vertical extents of soil contamination, as follows.

(a) If the release occurred within a lined containment area, the responsible party must demonstrate liner integrity after affected material is removed and the affected area of the liner is exposed and provide:

(i) certification on form C-141 that the responsible party has visually inspected the liner where the release occurred and the liner remains intact and had the ability to contain the leak in question; and

(ii) at least two business days' notice to the appropriate division district office before conducting the liner inspection.

(b) If the responsible party is unable to demonstrate liner integrity or the release occurred outside of a lined containment area, the responsible party must delineate the release horizontally and vertically using Table I of 19.15.29.12 NMAC constituents or as required by Subparagraph (e) of Paragraph (5) of Subsection A of 19.15.29.11 NMAC based on the type of release. The responsible party shall use one or more of the following soil sampling methods for characterization:

(i) NRCS Field Guide;

(ii) EPA SW-846;

(iii) ASTM Method 4547;

(iv) EPA 600; or

(v) or other division-approved methods.

(c) In addition to Subparagraph (b) of Paragraph (5) of Subsection A of 19.15.29.11 NMAC, if the release occurred outside of a lined containment area and is in an area where depth to ground water is greater than 50 feet and less than or equal to 100 feet, the responsible party must delineate the vertical extent of the release to the greater of 600 mg/kg chloride or background chloride level, if:

(i) the release contains produced water that exceeds 10,000 mg/l of chloride (if the responsible party contends the fluid is less than 10,000 mg/l, the responsible party must provide current sample results to the division); and

(ii) the release is of an unknown quantity or results in greater than 200 barrels of unrecovered produced water.

(d) If the conditions are met in Subparagraph (c) of Paragraph (5) of Subsection A of 19.15.29.11 NMAC, the responsible party must submit at least two soil samples for laboratory analysis from each borehole or sample point (highest observed contamination and deepest depth investigated). Field screening and assessment techniques are acceptable (headspace, titration, electrical conductivity [include algorithm for validation purposes], electromagnetics, etc.), but the sampling procedures must be clearly defined. The responsible party must submit copies of field notes attributable to field sampling and provide copies of the actual laboratory results including chain of custody documentation.

(e) If a known release of other oil field related chemicals occurs that is not included in Table I of 19.15.29.12 NMAC, and does not include oil, gas, produced water or other fluids from the wellstream, the standards for remediation shall be as follows:

(i) if the constituent appears on Table 1 of 40 C.F.R. 261.24(b), then that constituent shall be remediated according to 40 C.F.R. 261.24;

(ii) if the constituent is not identified in Table 1 of 40 C.F.R. 261.24(b), but is identified in the New Mexico environment department's Risk Assessment Guidance for Site Investigations and Remediation Volumes I and II (assessment), the division will determine the appropriate Assessment Volume and remediation shall occur pursuant to the assessment;

(iii) if the constituent is not identified in Items (i) or (ii) of Subparagraph (e) of Paragraph (5) of Subsection A of 19.15.29.11 NMAC, the division shall consult with the responsible party to determine appropriate remediation of the release.

B. Unless the site characterization report includes completed efforts at remediation, the report must include a proposed remediation plan in accordance with 19.15.29.12 NMAC, which includes the anticipated timelines for beginning and completing the remediation.

C. If the division determines that more information is needed to understand the character of the release and its potential impact on fresh water, public health and the environment, the division may request the responsible party submit additional information. Should the division request additional information, it must do so in writing to the responsible party within 30 days from receipt of the characterization report or remediation plan with what specific information the division is requesting and reasons why the additional information is needed. The responsible party has 14 days to respond to a written request for additional information. If the responsible party disagrees with the request for additional information, it may consult with the division, or file an application for hearing pursuant to 19.15.4 NMAC within 30 days of the issuance of the request for additional information. [19.15.29.11 NMAC - Rp, 19.15.29.11 NMAC, 8/14/2018]

19.15.29.12 REMEDIATION AND CLOSURE:

A. The responsible party must remediate all releases regardless of volume.

B. Remediation requirements.

(1) Unless remediation is completed, and a final closure report submitted, within 90 days of discovery of the release, the responsible party must complete division-approved remediation for releases either pursuant to a remediation plan approved pursuant to 19.15.29.12 NMAC or pursuant to an abatement plan in accordance with 19.15.30 NMAC. If the director determines that the release has caused water pollution in excess of the standards and requirements of 19.15.30 NMAC, the director may notify the responsible party that an abatement plan may be required pursuant to 19.15.30 NMAC.

(2) Any remediation under 19.15.29 NMAC should be completed as soon as practicable. Any remediation that exceeds 90 days must follow the division-approved timeline in the remediation plan. The responsible party may request an extension of time to remediate upon a showing of good cause as determined by the division.

C. Remediation plan requirements. The responsible party must take the following action for any major or minor release containing liquids.

(1) The responsible party must submit a detailed description of proposed remediation measures in accordance with the findings of the site assessment/characterization plan that includes:

(a) delineation results, including laboratory analysis;

(b) a scaled sitemap showing release area with horizontal and vertical delineation points;

(c) estimated volume of impacted material to be remediated;

(d) proposed remediation technique; and

(e) proposed timeline for remediation activities.

(2) The responsible party shall restore the impacted surface area of a release occurring on a developed well pad, central tank battery, drilling site, compressor site or other exploration, development, production or storage sites to meet the standards of Table I of 19.15.29.12 NMAC or other applicable remediation standards and restore and reclaim the area pursuant to 19.15.29.13 NMAC. If contamination is located in areas immediately under or around production equipment such as production tanks, wellheads and pipelines where remediation could cause a major facility deconstruction, the remediation, restoration and reclamation may be deferred with division written approval until the equipment is removed during other operations, or when the well or facility is plugged or abandoned, whichever comes first. The deferral may be granted so long as the contamination is fully delineated and does not cause an imminent risk to human health, the environment, or ground water. Final remediation and reclamation shall take place in accordance with 19.15.29.12 and 19.15.29.13 NMAC once the site is no longer being used for oil and gas operations.

(3) The responsible party shall remediate the impacted surface area of a release not occurring on a lined, bermed or otherwise contained exploration, development, production or storage site to meet the standards of Table I of 19.15.29.12 NMAC or other applicable remediation standards and restore and reclaim the area pursuant to 19.15.29.13 NMAC.

(4) If a release occurs within the following areas, the responsible party must treat the release as if it occurred less than 50 feet to ground water in Table I of 19.15.29.12 NMAC:

(a) within

(i) 300 feet of any continuously flowing watercourse or any other significant watercourse, or

(ii) 200 feet of any lakebed, sinkhole or playa lake (measured from the ordinary high-water mark);

(b) within 300 feet from an occupied permanent residence, school, hospital, institution or church;

(c) within

(i) 500 feet of a spring or a private, domestic fresh water well used by less than five households for domestic or stock watering purposes, or

(ii) 1000 feet of any fresh water well or spring;

(d) within incorporated municipal boundaries or within a defined municipal fresh water well field covered under a municipal ordinance adopted pursuant to Section 3-27-3 NMSA 1978 as amended, unless the municipality specifically approves;

(e) within 300 feet of a wetland;

(f) within the area overlying a subsurface mine;

(g) within an unstable area; or

(h) within a 100-year floodplain.

(5) The division has 60 days from receipt of the proposed remediation plan to review and approve, approve with conditions or deny the remediation plan. If 60 days have lapsed without response from the division, then the plan is deemed denied. If the plan is approved with conditions or affirmatively denied, the division shall provide a written summary of deficiencies on which the decision is based. If the responsible party disagrees with any conditions of approval or denial of the plan, it shall consult with the division or file an application for hearing pursuant to 19.15.4 NMAC within 30 days of the denial or issuance of the conditions.

D. Closure requirements. The responsible party must take the following action for any major or minor release containing liquids.

(1) The responsible party must test the remediated areas for contamination with representative five-point composite samples from the walls and base, and individual grab samples from any wet or discolored areas. The samples must be analyzed for the constituents listed in Table I of 19.15.29.12 NMAC or constituents from other applicable remediation standards.

(a) The responsible party must verbally notify the appropriate division district office two business days prior to conducting final sampling. If the division district office does not respond to the notice within the two business days, the responsible party may proceed with final sampling. The responsible party may request a variance from this requirement upon a showing of good cause as determined by the division.

(b) The responsible party may submit a composite and grab sample plan for the division's review and approval separately or with the remediation plan.

(c) Alternately, without division approval, the responsible party may elect to perform a composite and grab sample plan of the remediated area where each composite sample is not representative of more than 200 square feet.

(2) If all composite and grab sample concentrations are less than or equal to the parameters listed in Table I of 19.15.29.12 NMAC or any conditions of approval, then the responsible party may proceed to backfill any excavated areas.

E. Closure reporting. The responsible party must take the following action for any major or minor release containing liquids.

(1) The responsible party must submit to the division a closure report on form C-141, including required attachments, to document all closure activities including sampling results and the details on any backfilling, capping or covering, where applicable. The responsible party must certify that all information in the closure report and attachments is correct and that the responsible party has complied with all applicable closure requirements and conditions specified in division rules or directives. The responsible party must submit closure report along with form C-141 to the division within 90 days of the remediation plan approval. The responsible party may apply for additional time to submit the final closure report upon a showing of good cause as determined by the division. The final report must include:

(a) a scaled site and sampling diagram;

(b) photographs of the remediated site prior to backfill;

(c) laboratory analyses of final sampling; and

(d) a description of all remedial activities.

(2) The division district office has 60 days to review and approve or deny the closure report. If 60 days have lapsed without response from the division, then the report is deemed denied. If the report is affirmatively denied, the division shall provide a written summary of deficiencies on which the decision is based. If the responsible party disagrees with denial of the closure report, it may consult with the division or file an application for hearing pursuant to 19.15.4 NMAC within 30 days of the denial.

Table I Closure Criteria for Soils Impacted by a Release			
Minimum depth below any point within the horizontal boundary of the release to ground water less than 10,000 mg/l TDS	Constituent	Method*	Limit**
≤ 50 feet	Chloride***	EPA 300.0 or SM4500 Cl B	600 mg/kg
	TPH (GRO+DRO+MRO)	EPA SW-846 Method 8015M	100 mg/kg
	BTEX	EPA SW-846 Method 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 Method 8021B or 8260B	10 mg/kg
51 feet-100 feet	Chloride***	EPA 300.0 or SM4500 Cl B	10,000 mg/kg
	TPH (GRO+DRO+MRO)	EPA SW-846 Method 8015M	2,500 mg/kg
	GRO+DRO	EPA SW-846 Method 8015M	1,000 mg/kg
	BTEX	EPA SW-846 Method 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 Method 8021B or 8260B	10 mg/kg
>100 feet	Chloride***	EPA 300.0 or SM4500 Cl B	20,000 mg/kg
	TPH (GRO+DRO+MRO)	EPA SW-846 Method 8015M	2,500 mg/kg
	GRO+DRO	EPA SW-846 Method 8015M	1,000 mg/kg
	BTEX	EPA SW-846 Method 8021B or 8260B	50 mg/kg
	Benzene	EPA SW-846 Method 8021B or 8260B	10 mg/kg

*Or other test methods approved by the division.
**Numerical limits or natural background level, whichever is greater.
***This applies to releases of produced water or other fluids, which may contain chloride.
[19.15.29.12 NMAC - N, 8/14/2018]

19.15.29.13 RESTORATION, RECLAMATION AND RE-VEGETATION:

A. The responsible party must substantially restore the impacted surface areas to the condition that existed prior to the release or their final land use. Restoration of the site must include the replacement of removed material and must be replaced to the near original relative positions and contoured to achieve erosion control, long-term stability and preservation of surface water flow patterns.

B. Areas reasonably needed for production operations or for subsequent drilling operations must be compacted, covered, paved or otherwise stabilized and maintained in such a way as to minimize dust and erosion to the extent practical.

C. The responsible party must construct the soil cover to the site's existing grade and prevent ponding of water and erosion of the cover material.

D. Reclamation of areas no longer in use. The responsible party shall reclaim all areas disturbed by the remediation and closure, except areas reasonably needed for production operations or for subsequent drilling

operations, as early and as nearly as practical to their original condition or their final land use and maintain those areas to control dust and minimize erosion to the extent practical.

(1) The reclamation must contain a minimum of four feet of non-waste containing, uncontaminated, earthen material with chloride concentrations less than 600 mg/kg as analyzed by EPA Method 300.0, or other test methods approved by the division. The soil cover must include a top layer, which is either the background thickness of topsoil or one foot of suitable material to establish vegetation at the site, whichever is greater.

(2) The responsible party must reseed disturbed area in the first favorable growing season following closure of the site.

(3) The division will consider reclamation of all disturbed areas complete when uniform vegetative cover has been established that reflects a life-form ratio of plus or minus fifty percent of pre-disturbance levels and a total percent plant cover of at least seventy percent of pre-disturbance levels, excluding noxious weeds.

(4) For any major or minor release containing liquids, the responsible party must notify the division when reclamation and re-vegetation are complete.

E. The surface restoration, reclamation and re-vegetation obligations imposed by federal or state agencies or tribes on lands managed or owned by those agencies supersede these provisions and govern the obligations of any responsible party subject to those provisions, provided that the other requirements provide equal or better protection of fresh water, human health and the environment.

[19.15.29.13 NMAC - N, 8/14/2018]

19.15.29.14 VARIANCES:

A. A responsible party may file a written request for a variance from any requirement of 19.15.29 NMAC with the appropriate division district office. The variance request must include:

(1) a detailed statement explaining the need for a variance; and

(2) a detailed written demonstration that the variance will provide equal or better protection of fresh water, public health and the environment.

B. The division district office must approve or deny the variance in writing within 60 days of receipt. If the division district office denies the variance, it must provide the responsible party with the reasons for denial.

C. If the division district office does not approve or deny a request for variance from the requirements of 19.15.29 NMAC within 60 days of the date the request for variance is received by the division district office, then the request for variance is deemed denied and the responsible party may file an application for a hearing pursuant to 19.15.4 NMAC within 30 days of the denial.

D. If the responsible party requests a hearing pursuant to 19.15.4 NMAC within 30 days after receipt of notice, the division must set the matter for hearing with notice to the responsible party and appropriate division district office.

E. In addition to the notice provisions in 19.15.4 NMAC, the responsible party must provide notice of the hearing on the request for variance to the surface owner of the site by certified mail, return receipt requested, at least 20 days prior to the date of the hearing.

F. Variances must receive division approval prior to implementation.

[19.15.29.14 NMAC - N, 8/14/2018]

19.15.29.15 ENFORCEMENT:

A. The responsible party must comply with all the requirements of 19.15.29 NMAC. The division may take enforcement action against any responsible party who does not comply with 19.15.29 NMAC pursuant to 19.15.5.10 NMAC.

B. A responsible party may enter an agreed compliance order with the division for any violation of 19.15.29 NMAC, except for 19.15.29.9 NMAC. An agreed compliance order may be entered prior to or after the filing of an application by the division or any other party for an administrative compliance proceeding. Any administrative compliance order will have the same force and effect as a compliance order issued after an adjudicatory hearing.

C. The director or the director's designee may deny any application or permit, including but not limited to, a permit to drill, deepen or plug back a well if the responsible party is not in compliance with a court order, agreed compliance order or administrative compliance order arising from 19.15.29 NMAC.

D. If the division or other party files an administrative enforcement application, the provisions of 19.15.4 NMAC apply to the enforcement proceeding, unless altered or amended by 19.15.5.10 NMAC or 19.15.29 NMAC.

[19.15.29.15 NMAC - N, 8/14/2018]

19.15.29.16 TRANSITIONAL PROVISIONS:

A. Responsible parties with current ongoing corrective actions/remediation with approved plans and timelines as of August 14, 2018 do not have to submit revised plans.

B. Responsible parties with ongoing corrective actions/remediation without approved timelines or plans as of August 14, 2018 must submit a characterization plan or corrective action/remediation plan with proposed timeframes within 90 days of August 14, 2018.

[19.15.29.16 NMAC - N, 8/14/2018]

HISTORY of 19.15.29 NMAC:

History of Repealed Material:

19.15.3 NMAC, Drilling (filed 10/29/2001) repealed 12/1/2008.

19.15.29 NMAC, Release Notification (filed 12/1/2008) was repealed effective 8/14/2018.

NMAC History:

That applicable portion of 19.15.3 NMAC, Drilling (Section 116) (filed 10/29/2001) was replaced by 19.15.29 NMAC, Release Notification, effective 12/1/2008.

19.15.29 NMAC, Release Notification (filed 12/1/2008) was repealed and replaced by 19.15.29, Releases, effective 8/14/2018.

TITLE 19 NATURAL RESOURCES AND WILDLIFE
CHAPTER 15 OIL AND GAS
PART 35 WASTE DISPOSAL

19.15.35.1 ISSUING AGENCY: Energy, Minerals and Natural Resources Department, Oil Conservation Division.
[19.15.35.1 NMAC - Rp, 19.15.9.1 NMAC, 12/1/08]

19.15.35.2 SCOPE: 19.15.35 NMAC applies to persons engaged in oil and gas exploration, development, production, storage, transportation, treatment and refinement and the oil field service industry within New Mexico.
[19.15.35.2 NMAC - Rp, 19.15.9.2 NMAC, 12/1/08; A, 6/30/16]

19.15.35.3 STATUTORY AUTHORITY: 19.15.35 NMAC is adopted pursuant to the Oil and Gas Act, NMSA 1978, Section 70-2-6, Section 70-2-11 and Section 70-2-12, which authorizes the division to regulate the disposition of non-domestic waste resulting from the exploration, development, production or storage of oil or gas; from the oil field service industry; the transportation of oil or gas; the treatment of gas; or the refinement of oil.
[19.15.35.3 NMAC - Rp, 19.15.9.3 NMAC, 12/1/08]

19.15.35.4 DURATION: Permanent.
[19.15.35.4 NMAC - Rp, 19.15.9.4 NMAC, 12/1/08]

19.15.35.5 EFFECTIVE DATE: December 1, 2008, unless a later date is cited at the end of a section.
[19.15.35.5 NMAC - Rp, 19.15.9.5 NMAC, 12/1/08]

19.15.35.6 OBJECTIVE: To establish procedures for the disposal of certain oil field waste at solid waste facilities permitted by the New Mexico environment department and for the disposal of regulated NORM associated with the oil and gas industry.
[19.15.35.6 NMAC - Rp, 19.15.9.6 NMAC, 12/1/08; A, 6/30/16]

19.15.35.7 DEFINITIONS:

A. "Discharge plan" means a plan the operator submits and the division approves pursuant to NMSA 1978, Section 70-2-12(B)(22) and WQCC rules.

B. "EPA clean" means the cleanliness standards established by the EPA in 40 C.F.R. section 261.7(b).

C. "NESHAP" means the National Emission Standards for Hazardous Air Pollutants of the EPA, 40 C.F.R. Part 61.

D. "Solid waste facility" means a facility permitted or authorized as a solid waste facility by the New Mexico environment department pursuant to the Solid Waste Act, NMSA 1978, Sections 74-9-1 *et seq.* and New Mexico environmental improvement board rules to accept industrial solid waste or other special waste.

E. "TCLP" means the testing protocol established by the EPA in 40 C.F.R. Part 261, entitled "Toxicity Characteristic Leaching Procedure" or an alternative hazardous constituent analysis the division has approved.
[19.15.35.7 NMAC - Rp, 19.15.9.712 NMAC, 12/1/08; A, 6/30/16]

19.15.35.8 DISPOSAL OF CERTAIN OIL FIELD WASTE AT SOLID WASTE FACILITIES:

A. A person may dispose of certain oil field waste at a solid waste facility in accordance with 19.15.35.8 NMAC.

B. Procedure.

(1) A person may dispose of oil field waste listed in Paragraph (1) of Subsection C of 19.15.35.8 NMAC at a solid waste facility without the division's prior written authorization.

(2) A person may dispose of oil field waste listed in Paragraph (2) of Subsection C of 19.15.35.8 NMAC at a solid waste facility after testing and the division's prior written authorization. Before the division grants authorization, the applicant for the authorization shall provide copies of test results to the division and to the solid waste facility where the applicant will dispose of the oil field waste. In appropriate cases and so long as a representative sample is tested, the division may authorize disposal of a waste stream listed in Paragraph (2) of Subsection C of 19.15.35.8 NMAC without individual testing of each delivery.

(3) A person may dispose of oil field waste listed in Paragraph (3) of Subsection C of 19.15.35.8 NMAC at a solid waste facility on a case-by-case basis after testing the division may require and the division's prior written authorization. Before the division grants authorization, the applicant for the authorization shall provide copies of test results to the division and to the solid waste facility where it will dispose of the oil field waste.

(4) Simplified procedure for holders of discharge plans. Holders of an approved discharge plan may amend the discharge plan to provide for disposal of oil field waste listed in Paragraph (2) of Subsection C of 19.15.35.8 NMAC and, as applicable, Paragraph (3) of Subsection C of 19.15.35.8 NMAC. If the division approves the amendment to the discharge plan, the holder may dispose of oil field wastes listed in Paragraphs (2) and (3) of Subsection C of 19.15.35.8 NMAC at a solid waste facility without obtaining the division's prior written authorization.

C. The following provisions apply to the types of oil field waste described below as specified.

(1) The person disposing of the oil field waste does not have to test the following oil field waste before disposal:

(a) barrels, drums, five-gallon buckets or one-gallon containers so long as they are empty and EPA-clean;

(b) uncontaminated brush and vegetation arising from clearing operations;

(c) uncontaminated concrete;

(d) uncontaminated construction debris;

(e) non-friable asbestos and asbestos contaminated waste material, so long as the disposal complies with applicable federal regulations and state rules for non-friable asbestos materials and so long as the facility operator removes the asbestos from steel pipes and boilers and, if applicable, recycles the steel;

(f) detergent buckets, so long as the buckets are completely empty;

(g) fiberglass tanks so long as the tank is empty, cut up or shredded and EPA clean;

(h) grease buckets, so long as empty and EPA clean;

(i) uncontaminated ferrous sulfate or elemental sulfur so long as recovery and sale as a raw material is not possible;

(j) metal plate and metal cable;

(k) office trash;

(l) paper and paper bags, so long as the paper bags are empty;

(m) plastic pit liners, so long as the person cleans them well;

(n) soiled rags or gloves, which if wet pass the paint filter test prior to disposal; or

(o) uncontaminated wood pallets.

(2) The person disposing of the oil field waste shall test the following oil field wastes for the substances indicated prior to disposal:

(a) activated alumina for TPH and BTEX;

(b) activated carbon for TPH and BTEX;

(c) amine filters, which the facility operator air-dries for at least 48 hours before testing, for BTEX;

(d) friable asbestos and asbestos-contaminated waste material, which the facility operator removes asbestos from steel pipes and boilers and, if applicable, recycles the steel before disposal, where the disposal otherwise complies with applicable federal regulations and state rules for friable asbestos materials pursuant to NESHAP;

(e) cooling tower filters, which the facility operator drains and then air-dries for at least 48 hours before testing, for TCLP/chromium;

(f) dehydration filter media, which the facility operator drains and then air-dries for at least 48 hours before testing, for TPH and BTEX;

(g) gas condensate filters, which the facility operator drains and then air-dries for at least 48 hours before testing, for BTEX;

(h) glycol filters, which the facility operator drains and then air-dries for at least 48 hours before testing, for BTEX;

(i) iron sponge, which the facility operator oxidizes completely, for ignitability testing;

(j) junked pipes, valves and metal pipe for NORM;

(k) molecular sieves, which the facility operator cools in a non-hydrocarbon inert atmosphere and hydrates in ambient air for at least 24 hours before testing, for TPH and BTEX;

(l) pipe scale and other deposits removed from pipeline and equipment for TPH, TCLP/metals and NORM;

(m) produced water filters, which the facility operator drains and then air-dries for at least 48 hours before testing, for corrosivity;

(n) sandblasting sand for TCLP/metals or, if the division requires, TCLP/total metals; or

(o) waste oil filters, which the facility operator drains thoroughly of oil at least 24 hours before testing and recycles the oil and metal parts, for TCLP/metals.

(3) A person may dispose of the following oil field wastes on a case-by-case basis with the division's approval:

(a) sulfur contaminated soil;

(**b)** catalysts;

(c) contaminated soil other than petroleum contaminated soil;

(d) petroleum contaminated soil in the event of a director-declared emergency;

(e) contaminated concrete;

(f) demolition debris not otherwise specified in 19.15.35.8 NMAC;

(g) unused dry chemicals; in addition to testing the division requires, the person applying for division approval shall forward a copy of the material safety data sheet to the division and the solid waste facility on each chemical proposed for disposal;

(h) contaminated ferrous sulfate or elemental sulfur;

(i) unused pipe dope;

(j) support balls;

(k) tower packing materials;

(l) contaminated wood pallets;

(m) partial sacks of unused drilling mud; in addition to testing the division requires, the person applying for division approval shall forward a copy of the material safety data sheet to division and the solid waste facility at which the it will dispose of the partial sacks; or

(n) other oil field wastes as applicable.

D. Testing.

(1) The person applying for division approval to dispose of oil field waste in a solid waste facility shall conduct testing required by 19.15.35.8 NMAC according to the Test Methods for Evaluating Solid Waste, EPA No. SW-846 and shall direct questions concerning the standards or a particular testing facility to the division.

(2) The testing facility shall conduct testing according to the test method listed:

(a) TPH: EPA method 418.1 or 8015 (DRO and GRO only) or an alternative, division-approved hydrocarbon analysis;

(b) TCLP: EPA Method 1311 or an alternative hazardous constituent analysis approved by the division;

(c) paint filter test: EPA Method 9095A;

(d) ignitability test: EPA Method 1030;

(e) corrosivity: EPA Method 1110;

(f) reactivity: test procedures and standards the division establishes on a case-by-case basis; and

(g) NORM. 20.3.14 NMAC.

(3) To be eligible for disposal pursuant to 19.15.35.8 NMAC, the concentration of substances the testing facility identifies during testing shall not exceed the following limits:

(a) benzene: 9.99 mg/kg;

(b) BTEX: 499.99 mg/kg (sum of all);

(c) TPH: 1000 mg/kg;

(d) hazardous air pollutants: the standards set forth in NESHAP; and

(e) TCLP:

(i) arsenic: 5 mg/l,

(ii) barium: 100 mg/l,

(iii) cadmium: 1 mg/l,

(iv) chromium: 5 mg/l,

(v) lead: 5 mg/l,

(vi) mercury: 0.2 mg/l,
(vii) selenium: 1 mg/l, and
(viii) silver: 5 mg/l.

[19.15.35.8 NMAC - Rp, 19.15.9.712 NMAC, 12/1/08; A, 6/30/16]

19.15.35.9 DISPOSAL OF REGULATED NORM: A person disposing of regulated NORM, as defined at 19.15.2.7 NMAC, is subject to 19.15.35.9 NMAC through 19.15.35.14 NMAC and to New Mexico environmental improvement board rule, 20.3.14 NMAC.

[19.15.35.9 NMAC - Rp, 19.15.9.714 NMAC, 12/1/08]

19.15.35.10 NON-RETRIEVED FLOWLINES AND PIPELINES:

A. The division shall consider a proposal from an operator for leaving flowlines and pipelines (hereinafter "pipeline") that contain regulated NORM in the ground provided the operator performs the abandonment procedures in a manner to protect the environment, public health and fresh waters. Division approval is contingent on the applicant meeting the following requirements as a minimum.

B. An application the applicant submits to the division shall contain the following as a minimum:

(1) the pipeline layout over its entire length on a form C-102 including the legal description of the location of both ends and surface ownership along the pipeline;

(2) results of a radiation survey the applicant conducts at all accessible points and a surface radiation survey along the complete pipeline route in a division-approved form; surveys conducted consistent with division-approved procedures;

(3) the type of material for which the applicant or any predecessor operator used the pipeline;

(4) the procedure the applicant will use for flushing hydrocarbons or produced water from the pipeline;

(5) an explanation as to why it is more beneficial to leave the pipeline in the ground than to retrieve it; and

(6) proof the applicant has sent notice of the proposed abandonment to all surface owners where the pipeline is located; the director may require the applicant to send additional notification as described in 19.15.35.14 NMAC.

C. Upon division approval of the application, the operator shall notify the appropriate division district office at least 24 hours prior to beginning work on the pipeline abandonment.

D. As a condition of completion of the pipeline abandonment, the operator shall permanently cap all accessible points.

E. An operator shall not place additional regulated NORM in a pipeline to be abandoned under 19.15.35.10 NMAC other than that which accumulated in the pipeline under the pipeline's normal operation.

F. An operator may abandon a pipeline that does not exhibit regulated NORM pursuant to required surveys without an application pursuant to 19.15.35.10 NMAC in accordance with the operator's applicable lease agreements.

G. If a pipeline's appurtenance contains regulated NORM, but upon the appurtenance's removal, no accessible point or surface above the pipeline exhibits the presence of regulated NORM, then the applicant shall submit to the division the information regarding the regulated NORM in the appurtenance and a statement concerning that regulated NORM's management. With respect to the pipeline left in the ground, the applicant is subject to the requirements of 19.15.35.10 NMAC with the exception of Paragraph (6) of Subsection B of 19.15.35.10 NMAC.

[19.15.35.10 NMAC - Rp, 19.15.9.714 NMAC, 12/1/08]

19.15.35.11 COMMERCIAL OR CENTRALIZED SURFACE WASTE MANAGEMENT FACILITIES:

A. The division shall consider proposals for the disposal of regulated NORM in commercial or centralized surface waste management facilities, provided the applicant performs the disposal in a manner that protects the environment, public health and fresh waters. Division approval is contingent on the applicant obtaining a permit in accordance with 19.15.36 NMAC for the facility and complying with additional requirements specifically related to regulated NORM disposal as described in Subsections B through D of 19.15.35.11 NMAC.

B. The division shall set requests for permission to receive and dispose of regulated NORM in commercial or centralized surface waste management facilities for hearing in order for the facility's operator to obtain or modify a permit in accordance with 19.15.36 NMAC. The division shall consider a request to dispose of

regulated NORM at a facility previously permitted under 19.15.36 NMAC a major modification to that facility. The facility's operator shall submit a hearing request to the division that contains the following at a minimum:

(1) complete plans for the facility, including the sources of regulated NORM, radiation survey readings, quantities of regulated NORM to be disposed and monitoring proposals;

(2) a copy of this permit for the facility, if the division has issued one;

(3) proof of public notice of the application as required by 19.15.36 NMAC; and

(4) evidence of issuance of a specific license pursuant to 20.3.14 NMAC, a license pursuant to 20.3.13 NMAC and other authorizations required by law.

C. The division shall establish operating procedures that are protective of the environment, public health and fresh waters in its order.

D. A person desiring to dispose of regulated NORM in an approved commercial or centralized surface waste management facility shall furnish regulated NORM information to the facility's operator sufficient for the operator to submit form C-138 for division approval. The facility operator shall receive division approval prior to receiving the regulated NORM at the disposal facility.

[19.15.35.11 NMAC - Rp, 19.15.9.714 NMAC, 12/1/08]

19.15.35.12 DOWNHOLE DISPOSAL IN WELLS TO BE PLUGGED AND ABANDONED:

A. The division shall consider proposals from an operator for downhole disposal of regulated NORM in wells that are to be plugged and abandoned, provided the operator performs the plugging and abandonment procedures in a manner that protects the environment, public health and fresh waters and in accordance with division rules pertaining to well plugging and abandonment.

B. The applicant shall complete form C-103 and submit it to the division for approval.

(1) In addition to all other information required for C-103 submittal, the form shall specifically state that the applicant will place regulated NORM in the well bore. The abandonment procedure contained in the application shall identify depths at which the operator will place regulated NORM, radiation survey results conducted on the regulated NORM to be disposed, the procedure the operator will use to place the regulated NORM in the well bore and the specific form of regulated NORM the operator will place in the well bore (*e.g.* scale, pipe, dirt, etc.).

(2) The applicant shall address abnormally pressured zones in the well bore that might result in migration of the regulated NORM after it has been placed in the plugged and abandoned well in the application.

(3) The applicant shall send notice of the submittal of an application to dispose of regulated NORM in a plugged and abandoned well to the surface owner and the mineral lessor. The director may require additional notification as described in 19.15.35.14 NMAC.

C. The operator shall not commence work until the division has approved the application for regulated NORM disposal in a plugged and abandoned well.

D. The operator shall comply with the following requirements when disposing of the regulated NORM in a plugged and abandoned well.

(1) The operator shall follow plugging and abandonment procedures the division routinely requires unless the procedures are specifically superseded at the division's instruction to facilitate the regulated NORM disposal.

(2) The operator shall color-dye the cement plug located directly above the regulated NORM and the surface plug with red iron oxide.

(3) The operator shall dispose of regulated NORM at a depth of at least 100 feet below the lower most known underground source of drinking water zone. There must be evidence that there is cement across the known underground source of drinking water zones.

[19.15.35.12 NMAC - Rp, 19.15.9.714 NMAC, 12/1/08]

19.15.35.13 INJECTION:

A. The division shall consider an operator's proposal for injecting regulated NORM into injection wells provided the operator will perform the injection in a manner that protects the environment, public health and fresh waters and complies with division rules pertaining to injection. Division approval is contingent on the applicant meeting the requirements in Subsection B of 19.15.35.13 NMAC at a minimum.

B. An applicant wishing to dispose of regulated NORM in a disposal well shall comply with the following requirements.

(1) An application submitted to the division for permission to dispose of a regulated NORM in an existing or newly permitted disposal well shall contain the following information at a minimum:

(a) a completed form C-108 with proof of required notification and a statement that regulated NORM will be injected;

(b) a description of regulated NORM to be disposed including its source, radiation levels and quantity; and

(c) a description of the process used on the material to improve injectivity.

(2) An operator shall comply with the following requirements when disposing of regulated NORM in a disposal well.

(a) The operator may only inject regulated NORM from the operator's operations.

(b) Each time the operator injects regulated NORM into the disposal well, the operator shall submit a form C-103 to the division and the appropriate division district office. The operator shall submit the completed form C-103 five working days following the injection, which contains the following information: source of regulated NORM, NORM radiation level, quantity of material injected, description of any process the operator used on the material to improve injectivity, the injection pressure while injecting and dates of injection.

(c) The operator shall report mechanical failures to the appropriate division district office within 24 hours of the failure. The operator shall submit a description of the failure and immediate measures the operator took in response to the failure no later than 15 days following the failure. The operator shall notify the appropriate division district office of proposed repair plans. The operator shall receive division approval of repair plans prior to commencing work and provide notice of commencement to the appropriate division district office so that the division may witness or inspect repairs. The operator shall monitor well repairs to ensure regulated NORM does not escape the well bore or is completely contained in the repair operations.

(d) At the time of the disposal well's abandonment, the operator shall squeeze the injection interval that the operator used for regulated NORM injection with cement or locate a cement plug directly above the injection interval. Cement in either case shall contain red iron oxide.

(e) The injection zone shall be at a depth of at least 100 feet below the lower most known underground drinking water zone.

C. Injection in EOR injection wells. The division shall consider issuing a permit for the disposal of regulated NORM into injection wells within an approved EOR project only after notice and hearing and upon the applicant's minimum demonstration that:

(1) the injection will not reduce the project's efficiency or otherwise cause a reduction in the ultimate recovery of hydrocarbons from the project;

(2) the injection will not cause an increase in the radiation level of regulated NORM produced from the EOR interval in an producing well located either within or offsetting the project area; and

(3) the operations will conform to provisions of Subsection B of 19.15.35.13 NMAC.

D. Injection above fracture pressure.

(1) The division shall consider issuing a permit for the disposal of regulated NORM in a disposal well above fracture pressure only after notice and hearing and upon receiving the following minimum information from the applicant:

(a) a completed form C-108 clearly stating that disposal of regulated NORM at or above fracture pressure is proposed;

(b) information required under Subsection B of 19.15.35.13 NMAC above;

(c) model results predicting the fracture propagation including the expected height, extension, direction and any other evidence sufficient to demonstrate that the fracture will not extend beyond the injection interval or into the confining zones; the application shall include the procedure, the anticipated pressures and the type and pressure rating of equipment that the operator will use; the division may consider the current or potential utilization of zones immediately above and below the zone of interest in the acceptance or rejection of model predictions; and

(d) a contingency plan of the procedures, including containment plans that the operator will employ if a mechanical failure occurs.

(2) The operator shall comply with the following requirements when disposing of regulated NORM in a disposal well above fracture pressure.

(a) The operator shall notify the appropriate division district office 24 hours prior to commencing injection.

(b) Upon completion of the injection, the operator shall squeeze the disposal interval with cement or locate a cement plug directly above the injection interval. In either case the cement in either case shall contain red iron oxide. The operator shall submit a completed form C-103 to the division and the

appropriate division district office within five working days of the injection. If the operator desires to return the well to injection below fracture pressure, the operator shall include those plans in the application.

E. Injection in commercial disposal facilities. The division shall consider issuing a permit for the commercial disposal of regulated NORM by injection only after notice and hearing, and provided the applicant has obtained a specific license pursuant to 20.3.14 NMAC and pursuant to 20.3.13 NMAC. In addition to obtaining these licenses the operator shall also comply with Subparagraph (a) of Paragraph 2 of Subsection B of 19.15.35.13 NMAC.

[19.15.35.13 NMAC - Rp, 19.15.9.714 NMAC, 12/1/08]

19.15.35.14 ADDITIONAL NOTIFICATION:

A. The director may require additional notice for an application under 19.15.35.9 NMAC to 19.15.35.13 NMAC.

B. A notified party seeking to comment or request a public hearing on an application shall file comments or a written hearing request with the division within 20 days after receiving notice. A request for a hearing shall set forth the reasons why the division should hold a hearing.

C. The division shall hold a public hearing as required in 19.15.35.9 NMAC through 19.15.35.13 NMAC or if the director determines there is sufficient cause to hold a public hearing.

[19.15.35.14 NMAC - Rp, 19.15.9.714 NMAC, 12/1/08]

HISTORY of 19.15.35 NMAC:

History of Repealed Material: 19.15.9 NMAC, Secondary or Other Enhanced Recovery, Pressure Maintenance, Salt Water Disposal, and Underground Storage (filed 11/13/2000) repealed 12/1/08.

NMAC History:

Those applicable portions of 19.15.9 NMAC, Secondary or Other Enhanced Recovery, Pressure Maintenance, Salt Water Disposal, and Underground Storage (Sections 712 and 714) (filed 11/13/2000) were replaced by 19.15.35 NMAC, Waste Disposal, effective 12/1/08.

TITLE 19 NATURAL RESOURCES AND WILDLIFE
CHAPTER 15 OIL AND GAS
PART 36 SURFACE WASTE MANAGEMENT FACILITIES

19.15.36.1 ISSUING AGENCY: Energy, Minerals and Natural Resources Department, Oil Conservation Division.
[19.15.36.1 NMAC - N, 2/14/2007; A, 12/1/08]

19.15.36.2 SCOPE: 19.15.36 NMAC applies to persons or entities that operate surface waste management facilities as defined in Subsection S of 19.15.2.7 NMAC.
[19.15.36.2 NMAC - N, 2/14/2007; A, 12/1/08; A, 6/30/16]

19.15.36.3 STATUTORY AUTHORITY: 19.15.36 NMAC is adopted pursuant to the Oil and Gas Act, NMSA 1978, Section 70-2-6, Section 70-2-11 and Section 70-2-12, which grants the division jurisdiction and authority over the disposition of wastes resulting from oil and gas operations.
[19.15.36.3 NMAC - N, 2/14/2007; A, 12/1/08]

19.15.36.4 DURATION: Permanent.
[19.15.36.4 NMAC - N, 2/14/2007]

19.15.36.5 EFFECTIVE DATE: February 14, 2007, unless a later date is cited at the end of a section.
[19.15.36.5 NMAC - N, 2/14/2007; A, 12/1/08]

19.15.36.6 OBJECTIVE: To regulate the disposal of oil field waste and the construction, operation, closure and post closure of surface waste management facilities.
[19.15.36.6 NMAC - N, 2/14/2007; A, 6/30/16]

19.15.36.7 DEFINITIONS:

A. Definitions relating to types of surface waste management facilities.

(1) "Centralized facility" means a surface waste management facility:

(a) that is used exclusively by one generator subject to New Mexico's Oil and Gas Conservation Tax Act, NMSA 1978, Section 7-30-1, as amended;

(b) where the generator or operator does not receive compensation for oil field waste management at that facility; and

(c) receives exclusively oil field wastes that are generated from production units or leases the generator, or an affiliate of the generator, operates (for this provision's purposes, an affiliate of a generator is a person who controls, is controlled by or is under common control with the generator).

(2) "Commercial facility" means a surface waste management facility that is not a centralized facility.

(3) "Landfarm" means a discrete area of land designated and used for the remediation of petroleum hydrocarbon-contaminated soils and drill cuttings.

(4) "Landfill" means a discrete area of land or an excavation designed for permanent disposal of exempt or non-hazardous waste.

(5) "Small landfarm" means a centralized landfarm of two acres or less that has a total capacity of 2000 cubic yards or less in a single lift of eight inches or less, remains active for a maximum of three years from the date of its registration and that receives only petroleum hydrocarbon-contaminated soils (excluding drill cuttings) that are exempt or non-hazardous waste.

B. Other definitions.

(1) "Active portion" means that part of a surface waste management facility that has received or is receiving oil field waste and has not been closed.

(2) "Cell" means a confined area engineered for the disposal or treatment of oil field waste.

(3) "Composite liner" means a liner that may consist of multiple layers of geosynthetics and low-permeability soils. The different layers of a composite liner may have different material properties and may be applied at different stages of landfill liner installation.

(4) "Geosynthetic" means the general classification of synthetic materials used in geotechnical applications, including the following classifications:

(a) "geocomposite" means a manufactured material using geotextiles, geogrids or geomembranes, or combinations thereof, in a laminated or composite form;

(b) "geogrid" means a deformed or non-deformed, netlike polymeric material used to provide reinforcement to soil slopes;

(c) "geomembrane" means an impermeable polymeric sheet material that is impervious to liquid and gas as long as it maintains its integrity, and is used as an integral part of an engineered structure designed to limit the movement of liquid or gas in a system;

(d) "geonet" means a type of geogrid that allows planar flow of liquids and serves as a drainage system;

(e) "geosynthetic clay liner (GCL)" means a relatively thin layer of processed clay (typically bentonite) that is either bonded to a geomembrane or fixed between two sheets of geotextile; and

(f) "geotextile" means a sheet material that is less impervious to liquid than a geomembrane but more resistant to penetration damage, and is used as part of an engineered structure or system to serve as a filter to prevent the movement of soil fines into a drainage system, to provide planar flow for drainage, to serve as a cushion to protect geomembranes or to provide structural support.

(5) "Leachate" means the liquid that has passed through or emerged from oil field waste and contains soluble, suspended or miscible materials.

(6) "Landfarm cell" means a bermed area of 10 acres or less within a landfarm.

(7) "Landfarm lift" means an accumulation of soil or drill cuttings predominately contaminated by petroleum hydrocarbons that is placed into a landfarm cell for treatment.

(8) "Lower explosive limit" means the lowest percent by volume of a mixture of explosive gases in air that will propagate a flame at 77 degrees fahrenheit and atmospheric pressure.

(9) "Major modification" means a modification of a surface waste management facility that involves an increase in the land area that the permitted surface waste management facility occupies; a change in the design capacity or nature of the permitted oil field waste stream; addition of a new treatment process; an exception to, waiver of or change to a numerical standard provided in 19.15.36 NMAC; or other modification that the division determines is sufficiently substantial that public notice and public participation in the application process are appropriate.

(10) "Minor modification" means a modification of a surface waste management facility that is not a major modification.

(11) "Operator" means the person who owns the surface waste management facility.

(12) "Poor foundation conditions" are features that indicate that a natural or human-induced event may result in inadequate foundational support for a surface waste management facility's structural components.

(13) "Run-off" means rainwater, leachate or other liquid that drains over land from any part of a surface waste management facility.

(14) "Structural components of a landfill" are liners, leachate collection and removal systems, final covers, run-on/run-off systems and other components used in a landfill's construction or operation that are necessary for protection of fresh water, public health or the environment.

[19.15.36.7 NMAC - Rp, 19.15.9.711 NMAC, 2/14/2007; A, 12/1/08; A, 6/30/16]

19.15.36.8 SURFACE WASTE MANAGEMENT FACILITY PERMITS AND APPLICATION REQUIREMENTS:

A. Permit required. No person shall operate a surface waste management facility (other than a small landfarm registered pursuant to Paragraph (1) of Subsection A of 19.15.36.16 NMAC) except pursuant to and in accordance with the terms and conditions of a division-issued surface waste management facility permit. The applicant for a permit or permit modification, renewal or transfer shall be the operator of the surface waste management facility. The operator is responsible for the actions of the operator's officers, employees, consultants, contractors and subcontractors as they relate to the operation of the surface waste management facility. Any person who is involved in a surface waste management facility's operation shall comply with 19.15.36 NMAC and the permit.

B. Permitting requirements. Except for small landfarms registered pursuant to Paragraph (1) of Subsection A of 19.15.36.16 NMAC, new commercial or centralized facilities prior to commencement of construction, and existing commercial or centralized facilities prior to modification or permit renewal, shall be permitted by the division in accordance with the applicable requirements of Subsection C of 19.15.36.8 NMAC and 19.15.36.11 NMAC.

C. Application requirements for new facilities, major modifications and permit renewals. An applicant or operator shall file an application, form C-137, for a permit for a new surface waste management facility, to modify an existing surface waste management facility or for permit renewal with the environmental bureau in the division's Santa Fe office. The application shall include:

(1) the names and addresses of the applicant and principal officers and owners of twenty-five percent or more of the applicant;

(2) a plat and topographic map showing the surface waste management facility's location in relation to governmental surveys (quarter-quarter section, township and range); highways or roads giving access to the surface waste management facility site; watercourses; fresh water sources, including wells and springs; and inhabited buildings within one-half mile of the site's perimeter based upon the records of the applicable county clerk or clerk's office;

(3) the names and addresses of the surface owners of the real property on which the surface waste management facility is sited and surface owners of the real property within one mile of the site's perimeter;

(4) a description of the surface waste management facility with a diagram indicating the location of fences and cattle guards, and detailed construction/installation diagrams of pits, liners, dikes, piping, sprayers, tanks, roads, fences, gates, berms, pipelines crossing the surface waste management facility, buildings and chemical storage areas;

(5) engineering designs, certified by a registered professional engineer, including technical data on the design elements of each applicable treatment, remediation and disposal method and detailed designs of surface impoundments;

(6) a plan for management of approved oil field wastes that complies with the applicable requirements contained in 19.15.36.13 NMAC, 19.15.36.14 NMAC, 19.15.36.15 NMAC and 19.15.36.17 NMAC;

(7) an inspection and maintenance plan that complies with the requirements contained in Subsection L of 19.15.36.13 NMAC;

(8) a hydrogen sulfide prevention and contingency plan that complies with those provisions of 19.15.11 NMAC that apply to surface waste management facilities;

(9) a closure and post closure plan, including a responsible third party contractor's cost estimate, sufficient to close the surface waste management facility in a manner that will protect fresh water, public health and the environment, and to comply with the closure and post closure requirements contained in Subsections A through F of 19.15.36.18 NMAC;

(10) a contingency plan that complies with the requirements of Subsection N of 19.15.36.13 NMAC and with NMSA 1978, Sections 12-12-1 through 12-12-30, as amended;

(11) a plan to control run-on water onto the site and run-off water from the site that complies with the requirements of Subsection M of 19.15.36.13 NMAC;

(12) in the case of an application to permit a new or expanded landfill, a leachate management plan that describes the anticipated amount of leachate that will be generated and the leachate's handling, storage, treatment and disposal, including final post closure options;

(13) in the case of an application to permit a new or expanded landfill, a gas safety management plan that complies with the requirements of Subsection O of 19.15.36.13 NMAC;

(14) a best management practice plan to ensure protection of fresh water, public health and the environment;

(15) geological/hydrological data including:

(a) a map showing names and location of streams, springs or other watercourses, and water wells within one mile of the site;

(b) laboratory analyses, performed by an independent commercial laboratory, for major cations and anions; BTEX; RCRA metals; and TDS of ground water samples of the shallowest fresh water aquifer beneath the proposed site;

(c) depth to, formation name, type and thickness of the shallowest fresh water aquifer;

(d) soil types beneath the proposed surface waste management facility, including a lithologic description of soil and rock members from ground surface down to the top of the shallowest fresh water aquifer;

(e) geologic cross-sections;

(f) potentiometric maps for the shallowest fresh water aquifer; and

(g) porosity, permeability, conductivity, compaction ratios and swelling characteristics for the sediments on which the contaminated soils will be placed;

(16) certification by the applicant that information submitted in the application is true, accurate and complete to the best of the applicant's knowledge, after reasonable inquiry; and

(17) other information that the division may require to demonstrate that the surface waste management facility's operation will not adversely impact fresh water, public health or the environment and that the surface waste management facility will comply with division rules and orders.

D. Application requirements for minor modifications. Before making a minor modification, the operator of an existing surface waste management facility shall file a form C-137A with the environmental bureau in the division's Santa Fe office describing the proposed change. Minor modifications are not subject to Subsection C of 19.15.36.8 NMAC. If the division denies the application for a minor modification, the operator may request a hearing pursuant to Subsection B of 19.15.36.10 NMAC.

[19.15.36.8 NMAC - Rp, 19.15.9.711 NMAC, 2/14/2007; A, 12/1/08; A, 6/30/16]

19.15.36.9 APPLICATION PROCESS AND NOTICE REQUIREMENTS FOR NEW SURFACE WASTE MANAGEMENT FACILITIES, MAJOR MODIFICATIONS OR RENEWALS AND ISSUANCE OF A FINAL DECISION:

A. Submittal of application. The applicant shall submit three copies (two paper copies and one electronic copy) of the application to the division's Santa Fe office for consideration of approval. Upon receipt of an application for a new surface waste management facility, or a renewal or major modification of an existing permit, the division shall post a notice on the division's website that lists the type of facility, type of application, county or municipality where the facility is located and name of the applicant, and provides information on where the application can be viewed and whom to contact to be placed on a mailing list for notice regarding a proposed decision.

B. Division review: Within 90 days after the receipt of an application, the division shall review the application and determine if the application is approvable, approval with conditions or not approvable.

(1) Upon completion of the division's review, if the division determines the application is approvable, the division shall, within 30 days following such determination, prepare a proposed decision, which may include conditions, and mail notice of the proposed approval, together with a copy of the proposed decision, by certified mail, return receipt requested, to the applicant. The division shall post the proposed decision on the division's website.

(2) Upon completion of the division's review, if the division determines the application is not approvable, the division shall, within 60 days of such determination, mail a deficiency letter by certified mail, return receipt requested, to the applicant. The deficiency letter shall identify and address all of the division's concerns regarding the application in specific detail allowing the applicant the opportunity to correct the deficiencies by submitting a revised application.

(3) If the division issues a deficiency letter, the applicant shall have 60 days from the division's issuance of the deficiency letter to submit a revised application. The applicant may request, in writing, additional time to submit a revised application. The division shall grant additional time for good cause. The applicant may notify the division that it will not submit a revised application. Within 10 days of receipt of the notification the division shall deny the application without prejudice. If the applicant fails to timely submit a revised application or notify the division that it will not submit a revised application, the division shall deny the application without prejudice within 10 days after the 60 day time limit for the applicant to respond to the deficiency letter has expired.

(4) If the applicant timely submits a revised application, within 90 days of the receipt of the revised application the division shall review the revised application and determine if the revised application is approvable, approvable with conditions or not approvable. The division shall mail notice of denial or the proposed approval with or without conditions, together with a copy of the decision to deny or the proposed decision to approve with or without conditions, by certified mail, return receipt requested, to the applicant. A denial letter shall identify and address all of the division's reasons for denial of the revised application. The division shall post the decision to deny the application or the proposed decision to approve the application with or without conditions on the division's website.

(5) The process provided in Subsection B of 19.15.36.9 NMAC is not intended to limit informal informational exchanges during the application review period or prior to submission of an application. The process also does not prohibit an applicant from withdrawing an application and submitting a new application under Subsection A of 19.15.36.9 NMAC.

C. Upon receipt of a proposed decision to approve an application with or without conditions, the applicant shall provide a division-approved notice of the proposed approval by:

(1) giving written notice, by certified mail, return receipt requested, of the division's proposed decision to approve the application with or without conditions to the surface owners within one-half mile of the surface waste facility;

(2) publishing in a newspaper of general circulation in the county or counties where the surface waste management facility is or will be located;

(3) mailing notice by first class mail or e-mail to persons, as identified to the applicant by the division, who have requested notification of applications generally, or of the particular application, and who have provided a legible return address or e-mail address; and

(4) mailing notice by first class or e-mail to affected local, state, federal or tribal governmental agencies, as determined and identified to the applicant by the division.

D. This notice issued pursuant to Subsection C of 19.15.36.9 NMAC shall include:

(1) the applicant's name and address;

(2) the surface waste management facility's location, including a street address if available, and sufficient information to locate the surface waste management facility with reference to surrounding roads and landmarks;

(3) a brief description including the type of facility (*i.e.* landfarm, landfill, treating plant, etc.) of the proposed surface waste management facility;

(4) the depth to, and TDS concentration of, the ground water in the shallowest aquifer beneath the surface waste management facility site;

(5) a statement that the division's proposed decision to approve the application with or without conditions is available on the division's website, or, upon request, from the division clerk, including the division clerk's name, address and telephone number;

(6) a division-approved description of alternatives, exceptions or waivers that may be under consideration in accordance with Subsection F of 19.15.36.18 NMAC or 19.15.36.19 NMAC; and

(7) a statement of the procedures for requesting a hearing on the application pursuant to 19.15.4 NMAC.

E. The applicant shall mail notice that is required to be mailed on or before publication of the notice that is published in a newspaper of general circulation in the county or counties where the surface waste management facility is or will be located.

F. The applicant shall provide the division with proof that the public notice requirements of Subsections C and D of 19.15.36.9 NMAC have been met prior to the division scheduling a hearing pursuant to 19.15.36.10 NMAC or issuing the permit.

G. If after the applicant provides notice as required herein, no requests for hearing are timely filed with the division as provided by 19.15.36.10 NMAC, or any such requests for hearing are filed by persons the division determines lack standing, and the division does not otherwise schedule a hearing pursuant to 19.15.36.10 NMAC, the division's proposed decision to approve the application with or without conditions shall become final and the division shall issue the permit upon the applicant providing financial assurance as provided in 19.15.36.10 NMAC.

[19.15.36.9 NMAC - Rp, 19.15.9.711 NMAC, 2/14/2007; Repealed, 6/30/16; 19.15.36.9 NMAC - N, 6/30/16]

19.15.36.10 COMMENTS AND HEARING ON APPLICATION:

A. A person who wishes to comment or request a hearing shall file comments or request a hearing on the proposed approval of an application with the division clerk within 90 days after the date of the newspaper publication provided in Subsection C of 19.15.36.9 NMAC. A request for a hearing shall be in writing and shall state specifically the reasons why a hearing should be held. The director may deny a request for hearing if the director determines the person requesting the hearing lacks standing.

B. If the division denies an application pursuant to Paragraphs (3) or (4) of Subsection B of 19.15.39.9 NMAC, the applicant may request a hearing within 30 days of the receipt of the notice of denial and the division shall schedule a hearing.

C. In addition to the requests for hearing provided in Subsections A and B of 19.15.36.10 NMAC, the division shall schedule a hearing on the application if:

(1) the division's proposed decision to approve the application includes conditions not expressly required by rule, and the applicant requests a hearing within 90 days of receipt of the notice of proposed approval;

(2) the director determines that there is significant public interest in the application;

(3) the director determines that comments have raised objections that have probable technical merit; or

(4) approval of the application requires that the division make a finding, pursuant to Paragraph (3) of Subsection F of 19.15.2.7 NMAC, whether a water source has a present or reasonably foreseeable beneficial use that contamination would impair.

D. If the division schedules a hearing on an application, the hearing shall be conducted according to 19.15.4 NMAC.

[19.15.36.10 NMAC - Rp, 19.15.9.711 NMAC, 2/14/2007; A, 12/1/08; A, 6/30/16]

19.15.36.11 FINANCIAL ASSURANCE REQUIREMENTS:

A. Centralized facilities. Upon notification by the division that it has approved a permit but prior to the division issuing the permit, an applicant for a new centralized facility permit shall submit acceptable financial assurance in the amount of $25,000 per centralized facility, or a statewide "blanket" financial assurance in the amount of $50,000 to cover all of that applicant's centralized facilities, unless such applicant has previously posted a blanket financial assurance for centralized facilities.

B. New commercial facilities or major modifications of existing commercial facilities. Upon notification by the division that it has approved a permit for a new commercial facility or a major modification of an existing commercial facility but prior to the division issuing the permit, the applicant shall submit acceptable financial assurance in the amount of the commercial facility's estimated closure and post closure cost, or $25,000, whichever is greater. The commercial facility's estimated closure and post closure cost shall be the amount provided in the closure and post closure plan the applicant submitted pursuant to Paragraph (9) of Subsection C of 19.15.36.8 NMAC unless the division determines that such estimate does not reflect a reasonable and probable closure and post closure cost to implement the closure and post closure plan, in which event, the division shall determine the estimated closure and post closure cost and shall include such determination in its proposed decision. If the applicant disagrees with the division's determination of estimated closure and post closure cost, the applicant may request a hearing as provided in 19.15.36.10 NMAC. If the applicant so requests, and no other person files a request for a hearing regarding the proposed decision, the hearing shall be limited to determination of estimated closure and post closure cost.

C. Terms of financial assurance. The financial assurance shall be on division-prescribed forms, or forms otherwise acceptable to the division, payable to the energy, minerals and natural resources department, oil conservation division and conditioned upon the surface waste management facility's proper operation, site closure and post closure operations in compliance with state of New Mexico statutes, division rules, applicable division orders and the surface waste management facility permit terms. The division may require proof that the individual signing for an entity on a financial assurance document or any amendment thereto has the authority to obligate that entity.

D. Forfeiture of financial assurance. The division shall give the operator 20 days' notice and an opportunity for a hearing prior to forfeiting financial assurance. All forfeitures the division demands pursuant to 19.15.36 NMAC shall be made payable to the energy, minerals and natural resources department, oil conservation division upon demand by the division.

E. Forms of financial assurance. The division may accept the following forms of financial assurance.

(1) Surety bonds. A surety bond shall be executed and notarized by the applicant and by a corporate surety licensed by the superintendent of insurance to do business in the state. All surety bonds shall be non-cancelable and payable to the energy, minerals and natural resources department, oil conservation division within 45 days after demand is made by the division. All surety bonds shall be governed by the laws of the state of New Mexico.

(2) Letters of credit. A letter of credit shall be issued by a national or state-chartered banking association, shall be irrevocable for a term of not less than five years and shall provide for automatic renewal for successive, like terms upon expiration, unless the issuer has notified the division in writing of non-renewal at least 120 days before its expiration date. All letters of credit shall be governed by the laws of the state of New Mexico. If a letter of credit is not replaced by an approved financial assurance within 30 days of notice of non-renewal provided to the division, the division may demand and collect a letter of credit.

(3) Cash accounts. An operator may provide financial assurance in the form of a federally insured or equivalently protected cash account or accounts in a financial institution, provided that the operator and the financial institution shall execute as to each such account a collateral assignment of the account to the division, which shall provide that only the division may authorize withdrawals from the account. In the event of forfeiture pursuant to 19.15.36 NMAC, the division may, at any time and from time to time, direct payment of all or part of the

balance of such account (excluding interest accrued on the account) to itself or its designee for the surface waste management facility's closure and post closure. Any assignment of cash collateral shall be governed by the laws of the state of New Mexico and shall be on division-prescribed forms.

F. Replacement of financial assurance.

(1) The division may allow an operator to replace existing forms of financial assurance with other forms of financial assurance that provide equivalent coverage.

(2) The division shall not release existing financial assurance until the operator has submitted, and the division has approved, an acceptable replacement.

(3) Any time an operator changes the corporate surety, financial institution or amount of financial assurance, the operator shall file updated financial assurance documents on division-prescribed forms within 30 days. Notwithstanding the foregoing, if an operator makes other changes to its financial assurance documents, the division may require the operator to file updated financial assurance documents on division-prescribed forms within 45 days after notice to the operator from the division.

G. Review of adequacy of financial assurance. The division may at any time not less than five years after initial acceptance of financial assurance for a commercial facility, or whenever the operator applies for a major modification of the commercial facility's permit, and at least once during every successive five-year period, initiate a review of such financial assurance's adequacy. Additionally, whenever the division determines that a landfarm operator has not achieved the closure standards specified in Paragraph (3) of Subsection G of 19.15.36.15 NMAC, the division may review the adequacy of the landfarm operator's financial assurance, without regard to the date of its last review. Upon determination, after notice to the operator and an opportunity for a hearing, that the financial assurance is not adequate to cover the reasonable and probable cost of a commercial facility's closure and post closure operations, the division may require the operator to furnish additional financial assurance sufficient to cover such reasonable and probable cost.

H. Duty to report. Any operator who files for bankruptcy shall provide notice to the division, through the process provided for under the rules of the United States bankruptcy court, and the New Mexico attorney general.

[19.15.36.11 NMAC - Rp, 19.15.9.711 NMAC, 2/14/2007; A, 6/30/16]

19.15.36.12 PERMIT APPROVAL, DENIAL, REVOCATION, SUSPENSION, MODIFICATION OR TRANSFER:

A. Granting of permit.

(1) The division may issue a permit for an new surface waste management facility or major modification upon finding that an acceptable application has been filed, that the conditions of 19.15.36.9 NMAC and 19.15.36.11 NMAC have been met and that the surface waste management facility or modification can be constructed and operated in compliance with applicable statutes and rules and without endangering fresh water, public health or the environment.

(2) Each permit the division issues for a new surface waste management facility shall remain in effect for 10 years from the date of its issuance. If the division grants a permit for a major modification of a surface waste management facility, the permit for that surface waste management facility shall remain in effect for 10 years from the date the division approves the major modification.

(a) A surface waste management facility permit may be renewed for successive 10-year terms. If the holder of a surface waste management facility permit submits an application for permit renewal at least 120 days before the surface waste management facility permit expires, and the operator is not in violation of the surface waste management facility permit on the date of its expiration, then the existing surface waste management facility permit for the same activity shall not expire until the division has approved or denied an application for renewal. If the division has not notified the operator of a violation, if the operator is diligently pursuing procedures to contest a violation or if the operator and the division have signed an agreed compliance order providing for remedying the violation, then the surface waste management facility permit shall continue in effect as above provided notwithstanding the surface waste management facility permit violation's existence. A surface waste management facility permit continued under this provision remains fully effective and enforceable.

(b) An application for permit renewal shall include and adequately address the information necessary for evaluation of a new surface waste management facility permit as provided in Subsection C of 19.15.36.8 NMAC. Previously submitted materials may be included by reference provided they are current, readily available to the division and sufficiently identified so that the division may retrieve them.

(c) Upon receipt of a proposed decision to approve a renewal application, the operator shall give public notice in the manner prescribed by 19.15.36.9 NMAC. The division shall grant an

application for renewal if the division finds that an acceptable application has been filed, that the conditions of 19.15.36.9 NMAC and 19.15.36.11 NMAC have been met and that the surface waste management facility can be operated in compliance with applicable statutes and rules and without endangering fresh water, public health or the environment.

(3) The division shall review each surface waste management facility permit at least once during the 10-year term, and shall review surface waste management facility permits to which Paragraph (2) of Subsection A of 19.15.36.12 NMAC does not apply at least every five years. The review shall address the operation, compliance history, financial assurance and technical requirements for the surface waste management facility. The division, after notice to the operator and an opportunity for a hearing, may require appropriate modifications of the surface waste management facility permit, including modifications necessary to make the surface waste management facility permit terms and conditions consistent with statutes, rules or judicial decisions.

B. Denial of permit. The division may deny an application for a surface waste management facility permit or modification of a surface waste management facility permit if it finds that the proposed surface waste management facility or modification may be detrimental to fresh water, public health or the environment. The division may also deny an application for a surface waste management facility permit if the applicant, an owner of twenty-five percent or greater interest in the applicant or an affiliate of the applicant has a history of failure to comply with division rules and orders or state or federal environmental laws; is subject to a division or commission order, issued after notice and hearing, finding such entity to be in violation of an order requiring corrective action; or has a penalty assessment for violation of division or commission rules or orders that is unpaid more than 70 days after issuance of the order assessing the penalty. An affiliate of an applicant, for purposes of Subsection B of 19.15.36.12 NMAC, shall be a person who controls, is controlled by or under is common control with the applicant or a twenty-five percent or greater owner of the applicant.

C. Additional requirements. The division may impose conditions or requirements, in addition to the operational requirements set forth in 19.15.36 NMAC, that it determines are necessary and proper for the protection of fresh water, public health or the environment. The division shall incorporate such additional conditions or requirements into the surface waste management facility permit.

D. Revocation, suspension or modification of a permit. The division may revoke, suspend or impose additional operating conditions or limitations on a surface waste management facility permit at any time, for good cause, after notice to the operator and an opportunity for a hearing. The division may suspend a surface waste management facility permit or impose additional conditions or limitations in an emergency to forestall an imminent threat to fresh water, public health or the environment, subject to the provisions of NMSA 1978, Section 70-2-23, as amended. If the division initiates a major modification it shall provide notice in accordance with 19.15.36.9 NMAC. Suspension of a surface waste management facility permit may be for a fixed period of time or until the operator remedies the violation or potential violation. If the division suspends a surface waste management facility's permit, the surface waste management facility shall not accept oil field waste during the suspension period.

E. Transfer of a permit. The operator shall not transfer a permit without the division's prior written approval. A request for transfer of a permit shall identify officers, directors and owners of twenty-five percent or greater in the transferee. Unless the director otherwise orders, public notice or hearing are not required for the transfer request's approval. If the division denies the transfer request, it shall notify the operator and the proposed transferee of the denial by certified mail, return receipt requested, and either the operator or the proposed transferee may request a hearing with 10 days after receipt of the notice. Until the division approves the transfer and the required financial assurance is in place, the division shall not release the transferor's financial assurance.
[19.15.36.12 NMAC - Rp, 19.15.9.711 NMAC, 2/14/2007; A, 12/1/08; A, 6/30/16]

19.15.36.13 SITING AND OPERATIONAL REQUIREMENTS APPLICABLE TO ALL PERMITTED SURFACE WASTE MANAGEMENT FACILITIES: Except as otherwise provided in 19.15.36 NMAC.

A. Depth to ground water.

(1) No landfill shall be located where ground water is less than 100 feet below the lowest elevation of the design depth at which the operator will place oil field waste.

(2) No landfarm that accepts soil or drill cuttings with a chloride concentration that exceeds 500 mg/kg shall be located where ground water is less than 100 feet below the lowest elevation at which the operator will place oil field waste. See Subsection A of 19.15.36.15 NMAC for oil field waste acceptance criteria.

(3) No landfarm that accepts soil or drill cuttings with a chloride concentration that is 500 mg/kg or less shall be located where ground water is less than 50 feet below the lowest elevation at which the operator will place oil field waste.

(4) No small landfarm shall be located where ground water is less than 50 feet below the lowest elevation at which the operator will place oil field waste.

(5) No other surface waste management facility shall be located where ground water is less than 50 feet below the lowest elevation at which the operator will place oil field waste.

B. No surface waste management facility shall be located:

(1) within 200 feet of a watercourse, lakebed, sinkhole or playa lake;

(2) within an existing wellhead protection area or 100-year floodplain;

(3) within, or within 500 feet of, a wetland;

(4) within the area overlying a subsurface mine;

(5) within 500 feet from the nearest permanent residence, school, hospital, institution or church in existence at the time of initial application; or

(6) within an unstable area, unless the operator demonstrates that engineering measures have been incorporated into the surface waste management facility design to ensure that the surface waste management facility's integrity will not be compromised.

C. No surface waste management facility shall exceed 500 acres.

D. The operator shall not accept oil field wastes transported by motor vehicle at the surface waste management facility unless the transporter has a form C-133, authorization to move liquid waste, approved by the division.

E. The operator shall not place oil field waste containing free liquids in a landfill or landfarm cell. The operator shall use the paint filter test, as prescribed by the EPA (EPA SW-846, method 9095) to determine conformance of the oil field waste to this criterion.

F. Surface waste management facilities shall accept only exempt or non-hazardous waste, except as provided in Paragraph (3) of Subsection F of 19.15.36.13 NMAC. The operator shall not accept hazardous waste at a surface waste management facility. The operator shall not accept wastes containing NORM at a surface waste management facility except as provided in 19.15.35 NMAC. The operator shall require the following documentation for accepting oil field wastes, and both the operator and the generator shall maintain and make the documentation available for division inspection.

(1) Exempt oil field wastes. The operator shall require a certification on form C-138, signed by the generator or the generator's authorized agent, that represents and warrants that the oil field wastes are generated from oil and gas exploration and production operations, are exempt waste and are not mixed with non-exempt waste. The operator shall have the option to accept such certifications on a monthly, weekly or per load basis. The operator shall maintain and shall make the certificates available for the division's inspection.

(2) Non-exempt, non-hazardous, oil field wastes. The operator shall require a form C-138, oil field waste document, signed by the generator or its authorized agent. This form shall be accompanied by acceptable documentation to determine that the oil field waste is non-hazardous.

(3) Emergency non-oil field wastes. The operator may accept non-hazardous, non-oil field wastes in an emergency if ordered by the department of public safety. The operator shall complete a form C-138, oil field waste document, describing the waste, and maintain the same, accompanied by the department of public safety order, subject to division inspection.

G. The operator of a commercial facility shall maintain records reflecting the generator, the location of origin, the location of disposal within the commercial facility, the volume and type of oil field waste, the date of disposal and the hauling company for each load or category of oil field waste accepted at the commercial facility. The operator shall maintain such records for a period of not less than five years after the commercial facility's closure, subject to division inspection.

H. Disposal at a commercial facility shall occur only when an attendant is on duty unless loads can be monitored or otherwise isolated for inspection before disposal. The surface waste management facility shall be secured to prevent unauthorized disposal.

I. To protect migratory birds, tanks exceeding eight feet in diameter, and exposed pits and ponds shall be screened, netted or covered. Upon the operator's written application, the division may grant an exception to screening, netting or covering upon the operator's showing that an alternative method will protect migratory birds or that the surface waste management facility is not hazardous to migratory birds. Surface waste management facilities shall be fenced in a manner approved by the division.

J. Surface waste management facilities shall have a sign, readable from a distance of 50 feet and containing the operator's name; surface waste management facility permit or order number; surface waste management facility location by unit letter, section, township and range; and emergency telephone numbers.

K. The operators shall comply with the spill reporting and corrective action provisions of 19.15.30 NMAC or 19.15.29 NMAC.

L. Each operator shall have an inspection and maintenance plan that includes the following:

(1) monthly inspection of leak detection sumps including sampling if fluids are present with analyses of fluid samples furnished to the division; and maintenance of records of inspection dates, the inspector and the leak detection system's status;

(2) semi-annual inspection and sampling of monitoring wells as required, with analyses of ground water furnished to the division; and maintenance of records of inspection dates, the inspector and ground water monitoring wells' status; and

(3) inspections of the berms and the outside walls of pond levees quarterly and after a major rainfall or windstorm, and maintenance of berms in such a manner as to prevent erosion.

M. Each operator shall have a plan to control run-on water onto the site and run-off water from the site, such that:

(1) the run-on and run-off control system shall prevent flow onto the surface waste management facility's active portion during the peak discharge from a 25-year storm; and

(2) run-off from the surface waste management facility's active portion shall not be allowed to discharge a pollutant to the waters of the state or United States that violates state water quality standards.

N. Contingency plan. Each operator shall have a contingency plan. The operator shall provide the division's environmental bureau with a copy of an amendment to the contingency plan, including amendments required by Paragraph (8) of Subsection N of 19.15.36.13 NMAC; and promptly notify the division's environmental bureau of changes in the emergency coordinator or in the emergency coordinator's contact information. The contingency plan shall be designed to minimize hazards to fresh water, public health or the environment from fires, explosions or an unplanned sudden or non-sudden release of contaminants or oil field waste to air, soil, surface water or ground water. The operator shall carry out the plan's provisions immediately whenever there is a fire, explosion or release of contaminants or oil field waste constituents that could threaten fresh water, public health or the environment; provided that the emergency coordinator may deviate from the plan as necessary in an emergency situation. The contingency plan for emergencies shall:

(1) describe the actions surface waste management facility personnel shall take in response to fires, explosions or releases to air, soil, surface water or ground water of contaminants or oil field waste containing constituents that could threaten fresh water, public health or the environment;

(2) describe arrangements with local police departments, fire departments, hospitals, contractors and state and local emergency response teams to coordinate emergency services;

(3) list the emergency coordinator's name; address; and office, home and mobile phone numbers (where more than one person is listed, one shall be named as the primary emergency coordinator);

(4) include a list, which shall be kept current, of emergency equipment at the surface waste management facility, such as fire extinguishing systems, spill control equipment, communications and alarm systems and decontamination equipment, containing a physical description of each item on the list and a brief outline of its capabilities;

(5) include an evacuation plan for surface waste management facility personnel that describes signals to be used to begin evacuation, evacuation routes and alternate evacuation routes in cases where fire or releases of wastes could block the primary routes;

(6) include an evaluation of expected contaminants, expected media contaminated and procedures for investigation, containment and correction or remediation;

(7) list where copies of the contingency plan will be kept, which shall include the surface waste management facility; local police departments, fire departments and hospitals; and state and local emergency response teams;

(8) indicate when the contingency plan will be amended, which shall be within five working days whenever:

(a) the surface waste management facility permit is revised or modified;

(b) the plan fails in an emergency;

(c) the surface waste management facility changes design, construction, operation, maintenance or other circumstances in a way that increases the potential for fires, explosions or releases of oil field waste constituents that could threaten fresh water, public health or the environment or change the response necessary in an emergency;

(d) the list of emergency coordinators or their contact information changes; or

(e) the list of emergency equipment changes;

(9) describe how the emergency coordinator or the coordinator's designee, whenever there is an imminent or actual emergency situation, will immediately;

(a) activate internal surface waste management facility alarms or communication systems, where applicable, to notify surface waste management facility personnel; and

(b) notify appropriate state and local agencies with designated response roles if their assistance is needed;

(10) describe how the emergency coordinator, whenever there is a release, fire or explosion, will immediately identify the character, exact source, amount and extent of released materials (the emergency coordinator may do this by observation or review of surface waste management facility records or manifests, and, if necessary, by chemical analysis) and describe how the emergency coordinator will concurrently assess possible hazards to fresh water, public health or the environment that may result from the release, fire or explosion (this assessment shall consider both the direct and indirect hazard of the release, fire or explosion);

(11) describe how, if the surface waste management facility stops operations in response to fire, explosion or release, the emergency coordinator will monitor for leaks, pressure buildup, gas generation or rupture in valves, pipes or the equipment, wherever this is appropriate;

(12) describe how the emergency coordinator, immediately after an emergency, will provide for treating, storing or disposing of recovered oil field waste, or other material that results from a release, fire or explosion at a surface waste management facility;

(13) describe how the emergency coordinator will ensure that no oil field waste, which may be incompatible with the released material, is treated, stored or disposed of until cleanup procedures are complete; and

(14) provide that the emergency coordinator may amend the plan during an emergency as necessary to protect fresh water, public health or the environment.

O. Gas safety management plan. Each operator of a surface waste management facility that includes a landfill shall have a gas safety management plan that describes in detail procedures and methods that will be used to prevent landfill-generated gases from interfering or conflicting with the landfill's operation and protect fresh water, public health and the environment. The plan shall address anticipated amounts and types of gases that may be generated, an air monitoring plan that includes the vadose zone and measuring, sampling, analyzing, handling, control and processing methods. The plan shall also include final post closure monitoring and control options.

P. Training program. Each operator shall conduct an annual training program for key personnel that includes general operations, permit conditions, emergencies proper sampling methods and identification of exempt and non-exempt waste and hazardous waste. The operator shall maintain records of such training, subject to division inspection, for five years.

[19.15.36.13 NMAC - Rp, 19.15.9.711 NMAC, 2/14/2007; A, 12/1/08; A, 6/30/16]

19.15.36.14 SPECIFIC REQUIREMENTS APPLICABLE TO LANDFILLS:

A. General operating requirements.

(1) The operator shall confine the landfill's working face to the smallest practical area and compact the oil field waste to the smallest practical volume. The operator shall not use equipment that may damage the integrity of the liner system in direct contact with a geosynthetic liner.

(2) The operator shall prevent unauthorized access by the public and entry by large animals to the landfill's active portion through the use of fences, gates, locks or other means that attain equivalent protection.

(3) The operator shall prevent and extinguish fires.

(4) The operator shall control litter and odors.

(5) The operator shall not excavate a closed cell or allow others to excavate a closed cell except as approved by the division.

(6) The operator shall provide adequate cover for the landfill's active face as needed to control dust, debris, odors or other nuisances, or as otherwise required by the division.

(7) For areas of the landfill that will not receive additional oil field waste for one month or more, but have not reached the final waste elevation, the operator shall provide intermediate cover that shall be:

(a) approved by the division;

(b) stabilized with vegetation; and

(c) inspected and maintained to prevent erosion and manage infiltration or leachate during the oil field waste deposition process.

(8) When the operator has filled a landfill cell, the operator shall close it pursuant to the conditions contained in the surface waste management facility permit and the requirements of Paragraph (2) of

Subsection C of 19.15.36.18 NMAC. The operator shall notify the division's environmental bureau at least three working days prior to a landfill cell's closure.

B. Ground water monitoring program. If fresh ground water exists at a site, the operator shall, unless otherwise approved by the division, establish a ground water monitoring program, approved by the division's environmental bureau, which shall include a ground water monitoring work plan, a sampling and analysis plan, a ground water monitoring system and a plan for reporting ground water monitoring results. The ground water monitoring system shall consist of a sufficient number of wells, installed at appropriate locations and depths, to yield ground water samples from the uppermost aquifer that:

(1) represent the quality of background ground water that leakage from a landfill has not affected; and

(2) represent the quality of ground water passing beneath and down gradient of the surface waste management facility.

C. Landfill design specification. New landfill design systems shall include a base layer and a lower geomembrane liner (*e.g.*, composite liner), a leak detection system, an upper geomembrane liner, a leachate collection and removal system, a leachate collection and removal system protective layer, an oil field waste zone and a top landfill cover.

(1) The base layer shall, at a minimum, consist of two feet of clay soil compacted to a minimum ninety percent standard proctor density (ASTM D-698)(Copyright ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428. This document is available for public viewing at the New Mexico state records center and archives and may not be reproduced, in full or in part. A copy of this publication may be obtained from ASTM International, www.astm.org.) with a hydraulic conductivity of 1×10^{-7} cm/sec or less. In areas where no ground water is present, the operator may propose an alternative base layer design, subject to division approval.

(2) The lower geomembrane liner shall consist of a 30-mil flexible PVC or 60-mil HDPE liner, or an equivalent liner approved by the division.

(3) The operator shall place the leak detection system, which shall consist of two feet of compacted soil with a saturated hydraulic conductivity of 1×10^{-5} cm/sec or greater, between the lower and upper geomembrane liners. The leak detection system shall consist of a drainage and collection system placed no more than six inches above the lower geomembrane liner in depressions and sloped so as to facilitate the earliest possible leak detection at designated collection points. Drainage piping shall be designed to withstand chemical attack from oil field waste and leachate and structural loading and other stresses and disturbances from overlying oil field waste, cover materials, equipment operation, expansion or contraction, and to facilitate clean-out maintenance. The material placed between the pipes and laterals shall be sufficiently permeable to allow the transport of fluids to the drainage pipe. The slope of the landfill sub-grade and drainage pipes and laterals shall be at least two percent grade; *i.e.*, two feet of vertical drop per 100 horizontal feet. The piping collection network shall be comprised of solid and perforated pipe having a minimum diameter of four inches and a minimum wall thickness of schedule 80. The operator shall seal a solid drainage pipe to convey collected liquids to a corrosion-proof sump or sumps located outside the landfill's perimeter for observation, storage, treatment or disposal. The operator may install alternative designs as approved by the division.

(4) The operator shall place the upper geomembrane liner, which shall consist of a 30-mil flexible PVC or 60-mil HDPE liner, or an equivalent liner approved by the division, over the leak detection system.

(5) The operator shall place the leachate collection and removal system, which shall consist of at least two feet of compacted soil with a saturated hydraulic conductivity of 1×10^{-2} cm/sec or greater, over the upper geomembrane liner to facilitate drainage. The leachate collection and removal system shall consist of a drainage and collection and removal system placed no more than six inches above the upper geomembrane liner in depressions and sloped so as to facilitate the maximum leachate collection. Piping shall be designed to withstand chemical attack from oil field waste or leachate and structural loading and other stresses and disturbances from overlying oil field waste, cover materials, equipment operation, expansion or contraction and to facilitate clean-out maintenance. The material placed between the pipes and laterals shall be sufficiently permeable to allow the transport of fluids to the drainage pipe. The slope of the upper geomembrane liner and drainage lines and laterals shall be at least two percent grade; *i.e.*, two feet of vertical drop per 100 horizontal feet. The piping collection network shall be comprised of solid and perforated pipe having a minimum diameter of four inches and a minimum wall thickness of schedule 80. The operator shall seal a solid drainage pipe to convey collected fluids outside the landfill's perimeter for storage, treatment and disposal. The operator may install alternative designs as approved by the division.

(6) The operator shall place the leachate collection and removal system protection layer, which shall consist of a soil layer at least one foot thick with a saturated hydraulic conductivity of 1 x 10^{-2} cm/sec or greater, over the leachate collection and removal system.

(7) The operator shall place oil field waste over the leachate collection and removal system protective layer.

(8) The top landfill cover design shall consist of the following layers (top to bottom): a soil erosion layer composed of at least 12 inches of fertile topsoil re-vegetated in accordance with the post closure provisions of Subparagraph (b) of Paragraph (2) of Subsection C of 19.15.36.18 NMAC; a protection or frost protection layer composed of 12 to 30 inches of native soil; a drainage layer composed of at least 12 inches of sand or gravel with a saturated hydraulic conductivity of 1 x 10^{-2} cm/sec or greater and a minimum bottom slope of four percent, a hydraulic barrier-layer-geomembrane (minimum of a 30-mil flexible PVC or 60-mil HDPE liner, or an equivalent liner approved by the division); and a gas vent or foundation layer composed of at least 12 inches of sand or gravel above oil field waste with soils compacted to the minimum eighty percent Standard Proctor Density. The operator shall install the top landfill cover within one year of achieving the final landfill cell waste elevation. The operator shall ensure that the final landfill design elevation of the working face of the oil field waste is achieved in a timely manner with the date recorded in a field construction log. The operator shall also record the date of top landfill cover installation to document the timely installation of top landfill covers. The operator shall provide a minimum of three working days' notice to the division in advance of the top landfill cover's installation to allow the division to witness the top landfill cover's installation.

(9) Alternatively, the operator may propose a performance-based landfill design system using geosynthetics or geocomposites, including geogrids, geonets, geosynthetic clay liners, composite liner systems, etc., when supported by EPA's "hydrologic evaluation of landfill performance" (HELP) model or other division-approved model. The operator shall design the landfill to prevent the "bathtub effect". The bathtub effect occurs when a more permeable cover is placed over a less permeable bottom liner or natural subsoil.

(10) External piping, *e.g.*, leachate collection, leak detection and sump removal systems shall be designed for installation of a sidewall riser pipe. Pipes shall not penetrate the liner with the exception of gas vent or collection wells where the operator shall install a flexible clamped pipe riser through the top landfill cover liner that will accommodate oil field waste settling and will prevent tears.

D. Liner specifications and requirements.

(1) General requirements.

(a) Geomembrane liner specifications. Geomembrane liners shall consist of a 30-mil flexible PVC or 60-mil HDPE liner, or an equivalent liner approved by the division. Geomembrane liners shall have a hydraulic conductivity no greater than 1 x 10^{-9} cm/sec. Geomembrane liners shall be composed of impervious, geosynthetic material that is resistant to petroleum hydrocarbons, salts and acidic and alkaline solutions. Liners shall also be resistant to ultraviolet light, or the operator shall make provisions to protect the material from sunlight. Liner compatibility shall comply with EPA SW-846 method 9090A.

(b) Liners shall be able to withstand projected loading stresses, settling and disturbances from overlying oil field waste, cover materials and equipment operations.

(c) The operator shall construct liners with a minimum of two percent slope to promote positive drainage and to facilitate leachate collection and leak detection.

(2) Additional requirements for geomembranes.

(a) Geomembranes shall be compatible with the oil field waste to be disposed. Geomembranes shall be resistant to chemical attack from the oil field waste or leachate. The operator shall demonstrate this by means of the manufacturer's test reports, laboratory analyses or other division-approved method.

(b) Geosynthetic material the operator installs on a slope greater than twenty-five percent shall be designed to withstand the calculated tensile forces acting upon the material. The design shall consider the maximum friction angle of the geosynthetic with regard to a soil-geosynthetic or geosynthetic-geosynthetic interface and shall ensure that overall slope stability is maintained.

(c) The operator shall thermally seal (hot wedge) field seams in geosynthetic material with a double track weld to create an air pocket for non-destructive air channel testing. In areas where double-track welding cannot be achieved, the operator may propose alternative thermal seaming methods. A stabilized air pressure of 35psi, plus or minus one percent, shall be maintained for at least five minutes. The operator shall overlap liners four to six inches before seaming, and shall orient seams parallel to the line of maximum slope; *i.e.*, oriented along, not across, the slope. The operator shall minimize the number of field seams in

corners and irregularly shaped areas. The operator shall use factory seams whenever possible. The operator shall not install horizontal seams within five feet of the slope's toe. Qualified personnel shall perform all field seaming.

E. Requirements for the soil component of composite liners.

(1) The operator shall place and compact the base layer to ninety percent standard proctor density on a prepared sub-grade.

(2) The soil surface upon which the operator installs a geosynthetic shall be free of stones greater than one half inch in any dimension, organic matter, local irregularities, protrusions, loose soil and abrupt changes in grade that could damage the geosynthetic.

(3) The operator shall compact a clay soil component of a composite liner to a minimum of ninety percent standard proctor density, which shall have, unless otherwise approved by the division, a plasticity index greater than ten percent, a liquid limit between twenty-five and fifty percent, a portion of material passing the no. 200 sieve (0.074 mm and less fraction) greater than forty percent by weight; and a clay content greater than eighteen percent by weight.

F. The leachate collection and removal system protective layer and the soil component of the leak detection system shall consist of soil materials that shall be free of organic matter, shall have a portion of material passing the no. 200 sieve no greater than five percent by weight and shall have a uniformity coefficient (Cu) less than 6, where Cu is defined as D60/D10. Geosynthetic materials or geocomposites including geonets and geotextiles, if used as components of the leachate collection and removal or leak detection system, shall have a hydraulic conductivity, transmissivity and chemical and physical qualities that oil field waste placement, equipment operation or leachate generation will not adversely affect. These geosynthetics or geocomposites, if used in conjunction with the soil protective cover for liners, shall have a hydraulic conductivity designed to ensure that the liner's hydraulic head never exceeds one foot.

G. Landfill gas control systems. If the gas safety management plan or requirements of other federal, state or local agencies require the installation of a gas control system at a landfill, the operator shall submit a plan for division approval, which shall include the following:

(1) the system's design, indicating the location and design of vents, barriers, collection piping and manifolds and other control measures that the operator will install (gas vent or collection wells shall incorporate a clamped and seamed pipe riser design through the top cover liner);

(2) if gas recovery is proposed, the design of the proposed gas recovery system and the system's major on-site components, including storage, transportation, processing, treatment or disposal measures required in the management of generated gases, condensates or other residues;

(3) if gas processing is proposed, a processing plan designed in a manner that does not interfere or conflict with the activities on the site or required control measures or create or cause danger to persons or property;

(4) if gas disposal is proposed, a disposal plan designed:

(a) in a manner that does not interfere or conflict with the activities on the site or with required control measures;

(b) so as not to create or cause danger to persons or property; and

(c) with active forced ventilation, using vents located at least one foot above the landfill surface at each gas vent's location;

(5) physical and chemical characterization of condensates or residues that are generated and a plan for their disposal;

(6) means that the operator will implement to prevent gas' generation and lateral migration such that:

(a) the concentration of the gases the landfill generates does not exceed twenty-five percent of the lower explosive limit for gases in surface waste management facility structures (excluding gas control or recovery system components); and

(b) the concentration of gases does not exceed the lower explosive limit for gases at the surface waste management facility boundary; and

(7) a routine gas monitoring program providing for monitoring at least quarterly; the specific type and frequency of monitoring to be determined based on the following:

(a) soil conditions;

(b) the hydrogeologic and hydraulic conditions surrounding the surface waste management facility; and

(c) the location of surface waste management facility structures and property lines.

H. Landfill gas response. If gas levels exceed the limits specified in Paragraph (6) of Subsection G of 19.15.36.14 NMAC, the operator shall:

(1) immediately take all necessary steps to ensure protection of fresh water, public health and the environment and notify the division;

(2) within seven days of detection, record gas levels detected and a description of the steps taken to protect fresh water, public health and the environment;

(3) within 30 days of detection, submit a remediation plan for gas releases that describes the problem's nature and extent and the proposed remedy; and

(4) within 60 days after division approval, implement the remediation plan and notify the division that the plan has been implemented.

[19.15.36.14 NMAC - N, 2/14/2007; A, 12/1/08; A, 6/30/16]

19.15.36.15 SPECIFIC REQUIREMENTS APPLICABLE TO LANDFARMS:

A. Oil field waste acceptance criteria. Only soils and drill cuttings predominantly contaminated by petroleum hydrocarbons shall be placed in a landfarm. The division may approve placement of tank bottoms in a landfarm if the operator demonstrates that the tank bottoms do not contain economically recoverable petroleum hydrocarbons. Soils and drill cuttings placed in a landfarm shall be sufficiently free of liquid content to pass the paint filter test, and shall not have a chloride concentration exceeding 500 mg/kg if the landfarm is located where ground water is less than 100 feet but at least 50 feet below the lowest elevation at which the operator will place oil field waste or exceeding 1000 mg/kg if the landfarm is located where ground water is 100 feet or more below the lowest elevation at which the operator will place oil field waste. The person tendering oil field waste for treatment at a landfarm shall certify, on form C-138, that representative samples of the oil field waste have been subjected to the paint filter test and tested for chloride content, and that the samples have been found to conform to these requirements. The landfarm's operator shall not accept oil field waste for landfarm treatment unless accompanied by this certification.

B. Background testing. Prior to beginning operation of a new landfarm or to opening a new cell at an existing landfarm at which the operator has not already established background, the operator shall take, at a minimum, 12 composite background soil samples, with each consisting of 16 discrete samples from areas that previous operations have not impacted at least six inches below the original ground surface, to establish background soil concentrations for the entire surface waste management facility. The operator shall analyze the background soil samples for TPH, as determined by EPA method 418.1 or other EPA method approved by the division; BTEX, as determined by EPA SW-846 method 8021B or 8260B; chlorides; and other constituents listed in Subsections A and B of 20.6.2.3103 NMAC, using approved EPA methods.

C. Operation and oil field waste treatment.

(1) The operator shall berm each landfarm cell to prevent rainwater run-on and run-off.

(2) The operator shall not place contaminated soils received after the effective date of 19.15.36 NMAC within 100 feet of the surface waste management facility's boundary.

(3) The operator shall not place contaminated soils received at a landfarm after the effective date of 19.15.36 NMAC within 20 feet of a pipeline crossing the landfarm.

(4) With 72 hours after receipt, the operator shall spread and disk contaminated soils in eight-inch or less lifts or approximately 1000 cubic yards per acre per eight-inch lift or biopile.

(5) The operator shall ensure that soils are disked biweekly and biopiles are turned at least monthly.

(6) The operator shall add moisture, as necessary, to enhance bioremediation and to control blowing dust.

(7) The application of microbes for the purposes of enhancing bioremediation requires prior division approval.

(8) Pooling of liquids in the landfarm is prohibited. The operator shall remove freestanding water within 24 hours.

(9) The operator shall maintain records of the landfarm's remediation activities in a form readily accessible for division inspection.

(10) The division's environmental bureau may approve other treatment procedures if the operator demonstrates that they provide equivalent protection for fresh water, public health and the environment.

D. Treatment zone monitoring. The operator shall spread contaminated soils on the surface in eight-inch or less lifts or approximately 1000 cubic yards per acre per eight-inch lift. The operator shall conduct treatment zone monitoring to ensure that prior to adding an additional lift the TPH concentration of each lift, as determined by

EPA SW-846 method 8015M or EPA method 418.1 or other EPA method approved by the division, does not exceed 2500 mg/kg and that the chloride concentration, as determined by EPA method 300.1, does not exceed 500 mg/kg if the landfarm is located where ground water is less than 100 feet but at least 50 feet below the lowest elevation at which the operator will place oil field waste or 1000 mg/kg if the landfarm is located where ground water is 100 feet or more below the lowest elevation at which the operator will place oil field waste. The operator shall collect and analyze at least one composite soil sample, consisting of four discrete samples, from the treatment zone at least semi-annually using the methods specified below for TPH and chlorides. The maximum thickness of treated soils in a landfarm cell shall not exceed two feet or approximately 3000 cubic yards per acre. When that thickness is reached, the operator shall not place additional oil field waste in the landfarm cell until it has demonstrated by monitoring the treatment zone at least semi-annually that the contaminated soil has been treated to the standards specified in Subsection F of 19.15.36.15 NMAC or the contaminated soils have been removed to a division-approved surface waste management facility.

E. Vadose zone monitoring.

(1) Sampling. The operator shall monitor the vadose zone beneath the treatment zone in each landfarm cell. The operator shall take the vadose zone samples from soils between three and four feet below the cell's original ground surface.

(2) Semi-annual monitoring program. The operator shall collect and analyze a minimum of four randomly selected, independent samples from the vadose zone at least semi-annually using the methods specified below for TPH, BTEX and chlorides and shall compare each result to the higher of the PQL or the background soil concentrations to determine whether a release has occurred.

(3) Five year monitoring program. The operator shall collect and analyze a minimum of four randomly selected, independent samples from the vadose zone, using the methods specified below for the constituents listed in Subsections A and B of 20.6.2.3103 NMAC at least every five years and shall compare each result to the higher of the PQL or the background soil concentrations to determine whether a release has occurred.

(4) Record keeping. The operator shall maintain a copy of the monitoring reports in a form readily accessible for division inspection.

(5) Release response. If vadose zone sampling results show that the concentrations of TPH, BTEX or chlorides exceed the higher of the PQL or the background soil concentrations, then the operator shall notify the division's environmental bureau of the exceedance, and shall immediately collect and analyze a minimum of four randomly selected, independent samples for TPH, BTEX, chlorides and the constituents listed in Subsections A and B of 20.6.2.3103 NMAC. The operator shall submit the results of the re-sampling event and a response action plan for the division's approval within 45 days of the initial notification. The response action plan shall address changes in the landfarm's operation to prevent further contamination and, if necessary, a plan for remediating existing contamination.

F. Treatment zone closure performance standards. After the operator has filled a landfarm cell to the maximum thickness of two feet or approximately 3000 cubic yards per acre, the operator shall continue treatment until the contaminated soil has been remediated to the higher of the background concentrations or the following closure performance standards. The operator shall demonstrate compliance with the closure performance standards by collecting and analyzing a minimum of one composite soil sample, consisting of four discrete samples.

(1) Benzene, as determined by EPA SW-846 method 8021B or 8260B, shall not exceed 0.2 mg/kg.

(2) Total BTEX, as determined by EPA SW-846 method 8021B or 8260B, shall not exceed 50 mg/kg.

(3) The GRO and DRO combined fractions, as determined by EPA SW-846 method 8015M, shall not exceed 500 mg/kg. TPH, as determined by EPA method 418.1 or other EPA method approved by the division, shall not exceed 2500 mg/kg.

(4) Chlorides, as determined by EPA method 300.1, shall not exceed 500 mg/kg if the landfarm is located where ground water is less than 100 feet but at least 50 feet below the lowest elevation at which the operator will place oil field waste or 1000 mg/kg if the landfarm is located where ground water is 100 feet or more below the lowest elevation at which the operator will place oil field waste.

(5) The concentration of constituents listed in Subsections A and B of 20.6.2.3103 NMAC shall be determined by EPA SW-846 methods 6010B or 6020 or other methods approved by the division. If the concentration of those constituents exceed the PQL or background concentration, the operator shall either perform a site specific risk assessment using EPA approved methods and shall propose closure standards based upon individual site conditions that protect fresh water, public health and the environment, which shall be subject to division approval or remove pursuant to Paragraph (2) of Subsection G of 19.15.36.15 NMAC.

G. Disposition of treated soils.

(1) If the operator achieves the closure performance standards specified in Subsection F of 19.15.36.15 NMAC, then the operator may either leave the treated soils in place, or, with prior division approval, dispose or reuse of the treated soils in an alternative manner.

(2) If the operator cannot achieve the closure performance standards specified in Subsection F of 19.15.36.15 NMAC within five years or as extended by the division, then the operator shall remove contaminated soils from the landfarm cell and properly dispose of it at a division-permitted landfill, or reuse or recycle it in a manner approved by the division.

(3) If the operator cannot achieve the closure performance standards specified in Subsection F of 19.15.36.15 NMAC within five years or as extended by the division, then the division may review the adequacy of the operator's financial assurance, as provided in Subsection G of 19.15.36.11 NMAC. In that event, the division may require the operator to modify its financial assurance to provide for the appropriate disposition of contaminated soil in a manner acceptable to the division.

(4) The operator may request approval of an alternative soil closure standard from the division, provided that the operator shall give division-approved public notice of an application for alternative soil closure standards in the manner provided in 19.15.36.9 NMAC. The division may grant the request administratively if no person files an objection thereto within 30 days after publication of notice; otherwise the division shall set the matter for hearing.

H. Environmentally acceptable bioremediation endpoint approach.

(1) A landfarm operator may use an environmentally acceptable bioremediation endpoint approach to landfarm management in lieu of compliance with the requirements of Paragraph (3) of Subsection F of 19.15.36.15 NMAC. The bioremediation endpoint occurs when TPH, as determined by EPA method 418.1 or other EPA method approved by the division, is reduced to a minimal concentration as a result of bioremediation and is dependent upon the bioavailability of residual hydrocarbons. An environmentally acceptable bioremediation endpoint occurs when the TPH concentration has been reduced by at least eighty percent by a combination of physical, biological and chemical processes and the rate of change in the reduction in the TPH concentration is negligible. The environmentally acceptable bioremediation endpoint in soil is determined statistically by the operator's demonstration that the rate of change in the reduction of TPH concentration is negligible.

(2) In addition to the requirements specified in Subsection C of 19.15.36.8 NMAC, an operator who plans to use an environmentally acceptable bioremediation endpoint approach shall submit for the division's review and approval a detailed landfarm operation plan for those landfarm cells exclusively dedicated to the use of the environmentally acceptable bioremediation endpoint approach. At a minimum, the operations plan shall include detailed information on the native soils, procedures to characterize each lift of contaminated soil, operating procedures and management procedures that the operator shall follow.

(3) In addition to other operational requirements specified in 19.15.36.15 NMAC, the operator using an environmentally acceptable bioremediation endpoint approach shall comply with the following.

(a) Native soil information required. The operator shall submit detailed information on the soil conditions present for each of its landfarm cells immediately prior to the application of the petroleum hydrocarbon-contaminated soils, including: treatment cell size, soil porosity, soil bulk density, soil pH, moisture content, field capacity, organic matter concentration, soil structure, SAR, EC, soil composition, soil temperature, soil nutrient (C:N:P) (calcium, nitrogen and phosphate) concentrations and oxygen content.

(b) Characterization of contaminated soil. The operator shall submit a description of the procedures that it will follow to characterize each lift of contaminated soil or drill cuttings, prior to treating each lift of contaminated soil or drill cuttings, for petroleum hydrocarbon loading factor, TPH, BTEX, chlorides, constituents listed in Subsections A and B of 20.6.2.3103 NMAC, contaminated soil moisture, contaminated soil pH and API gravity of the petroleum hydrocarbons.

(c) Operating procedures. The operator shall submit a description of the procedures, including a schedule, that it shall follow to properly monitor and amend each lift of contaminated soil in order to maximize bioremediation, including tilling procedures and schedule; procedures to limit petroleum hydrocarbon loading to less than five percent; procedures to maintain pH between six and eight; procedures to monitor and apply proper nutrients; procedures to monitor, apply and maintain moisture to sixty to eighty percent of field capacity; and procedures to monitor TPH concentrations.

(d) Management procedures. The operator shall submit a description of the management procedures that it shall follow to properly schedule landfarming operations, including modifications during cold weather, record keeping, sampling and analysis, statistical procedures, routine reporting, determination

and reporting of achievement of the environmentally acceptable bioremediation endpoint and closure and post-closure plans.
[19.15.36.15 NMAC - N, 2/14/2007; A, 12/1/08; A, 6/30/16]

19.15.36.16 SMALL LANDFARMS: Small landfarms as defined in Paragraph (5) of Subsection A of 19.15.36.7 NMAC are exempt from 19.15.36 NMAC except for the requirements specified in 19.15.36.16 NMAC.

A. General requirements.

(1) Registration. Prior to establishment of a new small landfarm, the operator shall file a form C-137 EZ, small landfarm registration, with the environmental bureau in the division's Santa Fe office. If the operator is not the surface estate owner at the proposed site, the operator shall furnish with its form C-137 EZ its certification it has a written agreement with the surface estate owner authorizing the site's use for the proposed small landfarm. The division shall issue the operator a registration number no more than 30 days from receipt of the properly completed form.

(2) Limitation. The operator shall operate only one active small landfarm per governmental section at any time. No small landfarm shall be located more than one mile from the operator's nearest oil or gas well or other production facility.

B. General operating procedures. The operator shall:

(1) comply with the siting requirements of Subsections A and B of 19.15.36.13 NMAC;

(2) accept only exempt or non-hazardous wastes consisting of soils (excluding drill cuttings) generated as a result of accidental releases from production operations, that are predominantly contaminated by petroleum hydrocarbons, do not contain free liquids, would pass the paint filter test and where testing shows chloride concentrations are 500 mg/kg or below;

(3) berm the landfarm to prevent rainwater run-on and run-off; and

(4) post a sign at the site readable from a distance of 50 feet and listing the operator's name; small landfarm registration number; location by unit letter, section, township and range; expiration date; and an emergency contact telephone number.

C. Oil field waste management standards. The operator shall spread and disk contaminated soils in a single eight inch or less lift within 72 hours of receipt. The operator shall conduct treatment zone monitoring to ensure that the TPH concentration, as determined by EPA SW-846 method 8015M or EPA method 418.1 or other EPA method approved by the division, does not exceed 2500 mg/kg and that the chloride concentration, as determined by EPA method 300.1, does not exceed 500 mg/kg. The operator shall treat soils by disking at least once a month and by watering and adding bioremediation enhancing materials when needed.

D. Record-keeping requirements. The operator shall maintain records reflecting the generator, the location of origin, the volume and type of oil field waste, the date of acceptance and the hauling company for each load of oil field waste received. The division shall post on its website each small landfarm's location, operator and registration date. In addition, the operator shall maintain records of the small landfarm's remediation activities in a form readily accessible for division inspection. The operator shall maintain all records for five years following the small landfarm's closure.

E. Small landfarm closure.

(1) Closure performance standards and disposition of soils. If the operator achieves the closure performance standards specified below, then the operator may return the soil to the original generation site, leave the treated soil in place at the small landfarm or, with prior division approval, dispose or reuse the treated soil in an alternative manner. If the operator cannot achieve the closure performance standards within three years from the registration date, then the operator shall remove contaminated soil from the landfarm and properly dispose of it at a permitted landfill, unless the division authorizes a specific alternative disposition. The following standards shall apply:

(a) benzene, as determined by EPA SW-846 method 8021 B or 8260B, shall not exceed 0.2 mg/kg;

(b) Total BTEX, as determined by EPA SW-846 method 8021 B or 8260B, shall not exceed 50 mg/kg;

(c) TPH, as determined by EPA SW-846 method 418.1 or other EPA method approved by the division, shall not exceed 2500 mg/kg; the GRO and DRO combined fraction, as determined by EPA SW-846 method 8015M, shall not exceed 500 mg/kg; and

(d) chlorides, as determined by EPA method 300.1, shall not exceed 500 mg/kg.

(2) Closure requirements. The operator shall:

(a) re-vegetate soils remediated to the closure performance standards if left in place in accordance with Paragraph (6) of Subsection A of 19.15.36.18 NMAC;

(b) remove landfarmed soils that have not or cannot be remediated to the closure performance standards within three years to a division-approved surface waste management facility, and re-vegetate the cell filled in with native soil to the standards in Paragraph (6) of Subsection A of 19.15.36.18 NMAC;

(c) if the operator returns remediated soils to the original site, or with division permission, recycles them, re-vegetate the cell filled in with native soil to the standards in Paragraph (6) of Subsection A of 19.15.36.18 NMAC;

(d) remove berms on the small landfarm and buildings, fences, roads and equipment; and

(e) clean up the site and collect one vadose zone soil sample from three to five feet below the middle of the treatment zone, or in an area where liquids may have collected due to rainfall events; the vadose zone soil sample shall be collected and analyzed using the methods specified above for TPH, BTEX and chlorides.

F. Final report. The operator shall submit a final closure report on a form C-137 EZ, together with photographs of the closed site, to the environmental bureau in the division's Santa Fe office. The division, after notice to the operator and an opportunity for a hearing if requested, may require additional information, investigation or clean up activities.

[19.15.36.16 NMAC - N, 2/14/2007; A, 12/1/08]

19.15.36.17 SPECIFIC REQUIREMENTS APPLICABLE TO EVAPORATION, STORAGE, TREATMENT AND SKIMMER PONDS:

A. Engineering design plan. An applicant for a surface waste management facility permit or modification requesting inclusion of a skimmer pit; an evaporation, storage or treatment pond; or a below-grade tank shall submit with the surface waste management facility permit application a detailed engineering design plan, certified by a registered profession engineer, including operating and maintenance procedures; a closure plan; and a hydrologic report that provides sufficient information and detail on the site's topography, soils, geology, surface hydrology and ground water hydrology to enable the division to evaluate the actual and potential effects on soils, surface water and ground water. The plan shall include detailed information on dike protection and structural integrity; leak detection, including an adequate fluid collection and removal system; liner specifications and compatibility; freeboard and overtopping prevention; prevention of nuisance and hazardous odors such as H2S; an emergency response plan, unless the pit is part of a surface waste management facility that has an integrated contingency plan; type of oil field waste stream, including chemical analysis; climatological factors, including freeze-thaw cycles; a monitoring and inspection plan; erosion control; and other pertinent information the division requests.

B. Construction, standards.

(1) In general. The operator shall ensure each pit, pond and below-grade tank is designed, constructed and operated so as to contain liquids and solids in a manner that will protect fresh water, public health and the environment.

(2) Liners required. Each pit or pond shall contain, at a minimum, a primary (upper) liner and a secondary (lower) liner with a leak detection system appropriate to the site's conditions.

(3) Liner specifications. Liners shall consist of a 30-mil flexible PVC or 60-mil HDPE liner, or an equivalent liner approved by the division. Synthetic (geomembrane) liners shall have a hydraulic conductivity no greater than 1×10^{-9} cm/sec. Geomembrane liners shall be composed of an impervious, synthetic material that is resistant to petroleum hydrocarbons, salts and acidic and alkaline solutions. Liner materials shall be resistant to ultraviolet light, or the operator shall make provisions to protect the material from sunlight. Liner compatibility shall comply with EPA SW-846 method 9090A.

(4) Alternative liner media. The division may approve other liner media if the operator demonstrates to the division's satisfaction that the alternative liner protects fresh water, public health and the environment as effectively as the specified media.

(5) Each pit or pond shall have a properly constructed foundation or firm, unyielding base, smooth and free of rocks, debris, sharp edges or irregularities, in order to prevent rupture or tear of the liner and an adequate anchor trench; and shall be constructed so that the inside grade of the levee is no steeper than 2H:1V. Levees shall have an outside grade no steeper than 3H:1V. The levees' tops shall be wide enough to install an anchor trench and provide adequate room for inspection and maintenance. The operator shall minimize liner seams and orient them up and down, not across a slope. The operator shall use factory seams where possible. The operator

shall ensure field seams in geosynthetic material are thermally seamed (hot wedge) with a double track weld to create an air pocket for non-destructive air channel testing. A stabilized air pressure of 35 psi, plus or minus one percent, shall be maintained for at least five minutes. The operator shall overlap liners four to six inches before seaming, and orient seams parallel to the line of maximum slope, i.e., oriented along, not across, the slope. The operator shall minimize the number of field seams in corners and irregularly shaped areas. There shall be no horizontal seams within five feet of the slope's toe. Qualified personnel shall perform field seaming.

(6) At a point of discharge into or suction from the lined pit, the liner shall be protected from excessive hydrostatic force or mechanical damage, and external discharge lines shall not penetrate the liner.

(7) Primary liners shall be constructed of a synthetic material.

(8) A secondary liner may be a synthetic liner or an alternative liner approved by the division. Secondary liners constructed with compacted soil membranes, i.e., natural or processed clay and other soils, shall be at least three feet thick, placed in six-inch lifts and compacted to ninety-five percent of the material's standard proctor density, or equivalent. Compacted soil membranes used in a liner shall undergo permeability testing in conformity with ASTM standards and methods approved by the division before and after construction. Compacted soil membranes shall have a hydraulic conductivity of no greater than 1×10^{-8} cm/sec. The operator shall submit results of pre-construction testing to the division for approval prior to construction.

(9) The operator shall place a leak detection system between the lower and upper geomembrane liners that consists of two feet of compacted soil with a saturated hydraulic conductivity of 1×10^{-5} cm/sec or greater to facilitate drainage. The leak detection system shall consist of a properly designed drainage and collection and removal system placed above the lower geomembrane liner in depressions and sloped so as to facilitate the earliest possible leak detection. Piping used shall be designed to withstand chemical attack from oil field waste or leachate; structural loading from stresses and disturbances from overlying oil field waste, cover materials, equipment operation or expansion or contraction; and to facilitate clean-out maintenance. The material placed between the pipes and laterals shall be sufficiently permeable to allow the transport of fluids to the drainage pipe. The slope of the interior sub-grade and of drainage lines and laterals shall be at least a two percent grade, i.e., two feet vertical drop per 100 horizontal feet. The piping collection system shall be comprised of solid and perforated pipe having a minimum diameter of four inches and a minimum wall thickness of schedule 80. The operator shall seal a solid sidewall riser pipe to convey collected fluids to a collection, observation and disposal system located outside the perimeter of the pit or pond. The operator may install alternative methods as approved by the division.

(10) The operator shall notify the division at least 72 hours prior to the primary liner's installation so that a division representative may inspect the leak detection system before it is covered.

(11) The operator shall construct pits and ponds in a manner that prevents overtopping due to wave action or rainfall, and maintain a three foot freeboard at all times.

(12) The maximum size of an evaporation or storage pond shall not exceed 10 acre-feet.

C. Operating standards.

(1) The operator shall ensure that only produced fluids or non-hazardous waste are discharged into or stored in a pit or pond; and that no measurable or visible oil layer is allowed to accumulate or remain anywhere on a pit's surface except an approved skimmer pit.

(2) The operator shall monitor leak detection systems pursuant to the approved surface waste management facility permit conditions, maintain monitoring records in a form readily accessible for division inspection and report discovery of liquids in the leak detection system to the division within 24 hours.

(3) Fencing and netting. The operator shall fence or enclose pits or ponds to prevent unauthorized access and maintain fences in good repair. Fences are not required if there is an adequate perimeter fence surrounding the surface waste management facility. The operator shall screen, net, cover or otherwise render non-hazardous to migratory birds tanks exceeding eight feet in diameter and exposed pits and ponds. Upon written application, the division may grant an exception to screening, netting or covering requirements upon the operator's showing that an alternative method will adequately protect migratory birds or that the tank or pit is not hazardous to migratory birds.

(4) The division may approve spray systems to enhance natural evaporation. The operator shall submit engineering designs for spray systems to the division's environmental bureau for approval prior to installation. The operator shall ensure that spray evaporation systems are operated so that spray-borne suspended or dissolved solids remain within the perimeter of the pond's lined portion.

(5) The operator shall use skimmer pits or tanks to separate oil from produced water prior to water discharge into a pond. The operator shall install a trap device in connected ponds to prevent solids and oils from transferring from one pond to another unless approved in the surface waste management facility permit.

D. Below-grade tanks and sumps.

(1) The operator shall construct below-grade tanks with secondary containment and leak detection. The operator shall not allow below-grade tanks to overflow. The operator shall install only below-grade tanks of materials resistant to the tank's particular contents and to damage from sunlight.

(2) The operator shall test sumps' integrity annually, and shall promptly repair or replace a sump that does not demonstrate integrity. The operator may test sumps that can be removed from their emplacements by visual inspection. The operator shall test other sumps by appropriate mechanical means. The operator shall maintain records of sump inspection and testing and make such records available for division inspection.

E. Closure required. The operator shall properly close pits, ponds and below-grade tanks within six months after cessation of use.

[19.15.36.17 NMAC - N, 2/14/2007; A, 6/30/16]

19.15.36.18 CLOSURE AND POST CLOSURE:

A. Surface waste management facility closure by operator.

(1) The operator shall notify the division's environmental bureau at least 60 days prior to cessation of operations at the surface waste management facility and provide a proposed schedule for closure. Upon receipt of such notice and proposed schedule, the division shall review the current closure and post closure plan (post closure is not required for oil treating plants) for adequacy and inspect the surface waste management facility.

(2) The division shall notify the operator within 60 days after the date of cessation of operations specified in the operator's closure notice of modifications of the closure and post closure plan and proposed schedule or additional requirements that it determines are necessary for the protection of fresh water, public health or the environment.

(3) If the division does not notify the operator of additional closure or post closure requirements within 60 days as provided, the operator may proceed with closure in accordance with the approved closure and post closure plan; provided that the director may, for good cause, extend the time for the division's response for an additional period not to exceed 60 days by written notice to the operator.

(4) The operator shall be entitled to a hearing concerning a modification or additional requirement the division seeks to impose if it files an application for a hearing within 10 days after receipt of written notice of the proposed modifications or additional requirements.

(5) Closure shall proceed in accordance with the approved closure and post closure plan and schedule and modifications or additional requirements the division imposes. During closure operations the operator shall maintain the surface waste management facility to protect fresh water, public health and the environment.

(6) Upon completion of closure, the operator shall re-vegetate the site unless the division has approved an alternative site use plan as provided in Subsection F of 19.15.36.18 NMAC. Re-vegetation, except for landfill cells, shall consist of establishment of a vegetative cover equal to seventy percent of the native perennial vegetative cover (un-impacted by overgrazing, fire or other intrusion damaging to native vegetation) or scientifically documented ecological description consisting of at least three native plant species, including at least one grass, but not including noxious weeds, and maintenance of that cover through two successive growing seasons.

B. Release of financial assurance.

(1) When the division determines that closure is complete it shall release the financial assurance, except for the amount needed to maintain monitoring wells for the applicable post closure care period, to perform semi-annual analyses of such monitoring wells and to re-vegetate the site. Prior to the partial release of the financial assurance covering the surface waste management facility, the division shall inspect the site to determine that closure is complete.

(2) After the applicable post closure care period has expired, the division shall release the remainder of the financial assurance if the monitoring wells show no contamination and the re-vegetation in accordance with Paragraph (6) of Subsection A of 19.15.36.18 NMAC is successful. If monitoring wells or other monitoring or leak detection systems reveal contamination during the surface waste management facility's operation or in the applicable post closure care period following the surface waste management facility's closure the division shall not release the financial assurance until the contamination is remediated in accordance with 19.15.30 NMAC and 19.15.29 NMAC, as applicable.

(3) In any event, the division shall not finally release the financial assurance until it determines that the operator has successfully re-vegetated the site in accordance with Paragraph (6) of Subsection A of 19.15.36.18 NMAC, or, if the division has approved an alternative site use plan, until the landowner has obtained the necessary regulatory approvals and begun implementation of the use.

C. Surface waste management facility and cell closure and post closure standards. The following minimum standards shall apply to closure and post closure of the installations indicated, whether the entire surface waste management facility is being closed or only a part of the surface waste management facility.

(1) Oil treating plant closure. The operator shall ensure that:

(a) tanks and equipment used for oil treatment are cleaned and oil field waste is disposed of at a division-approved surface waste management facility (the operator shall reuse, recycle or remove tanks and equipment from the site within 90 days of closure);

(b) the site is sampled, in accordance with the procedures specified in chapter nine of EPA publication SW-846, test methods for evaluating solid waste, physical/chemical methods, for TPH, BTEX, major cations and anions and RCRA metals, in accordance with a gridded plat of the site containing at least four equal sections that the division has approved; and

(c) sample results are submitted to the environmental bureau in the division's Santa Fe office.

(2) Landfill cell closure.

(a) The operator shall properly close landfill cells, covering the cell with a top cover pursuant to Paragraph (8) of Subsection C of 19.15.36.14 NMAC, with soil contoured to promote drainage of precipitation; side slopes shall not exceed a twenty-five percent grade (four feet horizontal to one foot vertical), such that the final cover of the landfill's top portion has a gradient of two percent to five percent, and the slopes are sufficient to prevent the ponding of water and erosion of the cover material.

(b) The operator shall re-vegetate the area overlying the cell with native grass covering at least seventy percent of the landfill cover and surrounding areas, consisting of at least two grasses and not including noxious weeds or deep rooted shrubs or trees, and maintain that cover through the post closure period.

(3) Landfill post closure. Following landfill closure, the post closure care period for a landfill shall be 30 years.

(a) A post closure care and monitoring plan shall include maintenance of cover integrity, maintenance and operation of a leak detection system and leachate collection and removal system and operation of gas and ground water monitoring systems.

(b) The operator or other responsible entity shall sample existing ground water monitoring wells annually and submit reports of monitoring performance and data collected within 45 days after the end of each calendar year. The operator shall report any exceedance of a ground water standard that it discovers during monitoring pursuant to 19.15.29 NMAC.

(4) Landfarm closure. The operator shall ensure that:

(a) disking and addition of bioremediation enhancing materials continues until soils within the cells are remediated to the standards provided in Subsection F of 19.15.36.15 NMAC, or as otherwise approved by the division;

(b) soils remediated to the foregoing standards and left in place are re-vegetated in accordance with Paragraph (6) of Subsection A of 19.15.36.18 NMAC;

(c) landfarmed soils that have not been or cannot be remediated to the standards in Subsection F of 19.15.36.15 NMAC are removed to a division-approved surface waste management facility and the landfarm remediation area is filled in with native soil and re-vegetated in accordance with Paragraph (6) of Subsection A of 19.15.36.18 NMAC;

(d) if treated soils are removed, the cell is filled in with native soils and re-vegetated in accordance with Paragraph (6) of Subsection A of 19.15.36.18 NMAC;

(e) berms are removed;

(f) buildings, fences, roads and equipment are removed, the site cleaned-up and tests conducted on the soils for contamination;

(g) annual reports of vadose zone and treatment zone sampling are submitted to the division's environmental bureau until the division has approved the surface waste management facility's final closure; and

(h) for an operator who chooses to use the landfarm methods specified in Subsection H of 19.15.36.15 NMAC, that the soil has an ECs of less than or equal to 4.0 mmhos/cm (dS/m) and a SAR of less than or equal to 13.0.

D. Pond and pit closure. The operator shall ensure that:

(1) liquids in the ponds or pits are removed and disposed of in a division-approved surface waste management facility;

(2) liners are disposed of in a division-approved surface waste management facility;

(3) equipment associated with the surface waste management facility is removed;

(4) the site is sampled, in accordance with the procedures specified in chapter nine of EPA publication SW-846, test methods for evaluating solid waste, physical/chemical methods for TPH, BTEX, metals and other inorganics listed in Subsections A and B of 20.6.2.3103 NMAC, in accordance with a gridded plat of the site containing at least four equal sections that the division has approved; and

(5) sample results are submitted to the environmental bureau in the division's Santa Fe office.

E. Landfarm and pond and pit post closure. The post-closure care period for a landfarm or pond or pit shall be three years if the operator has achieved clean closure. During that period the operator or other responsible entity shall regularly inspect and maintain required re-vegetation. If there has been a release to the vadose zone or to ground water, then the operator shall comply with the applicable requirements of 19.15.30 NMAC and 19.15.29 NMAC.

F. Alternatives to re-vegetation. If the landowner contemplates use of the land where a cell or surface waste management facility is located for purposes inconsistent with re-vegetation, the landowner may, with division approval, implement an alternative surface treatment appropriate for the contemplated use, provided that the alternative treatment will effectively prevent erosion. If the division approves an alternative to re-vegetation, it shall not release the portion of the operator's financial assurance reserved for post-closure until the landowner has obtained necessary regulatory approvals and begun implementation of such alternative use.

G. Surface waste management facility closure initiated by the division. Forfeiture of financial assurance.

(1) For good cause, the division may, after notice to the operator and an opportunity for a hearing, order immediate cessation of a surface waste management facility's operation when it appears that cessation is necessary to protect fresh water, public health or the environment, or to assure compliance with statutes or division rules and orders. The division may order closure without first having a hearing in the event of an emergency, subject to Section 70-2-23 NMSA 1978, as amended.

(2) If the operator refuses or is unable to conduct operations at a surface waste management facility in a manner that protects fresh water, public health and the environment; refuses or is unable to conduct or complete an approved closure and post closure plan; is in material breach of the terms and conditions of its surface waste management facility permit; or the operator defaults on the conditions under which the division accepted the surface waste management facility's financial assurance; or if disposal operations have ceased and there has been no significant activity at the surface waste management facility for six months the division may take the following actions to forfeit all or part of the financial assurance:

(a) send written notice by certified mail, return receipt requested, to the operator and the surety, if any, informing them of the decision to close the surface waste management facility and to forfeit the financial assurance, including the reasons for the forfeiture and the amount to be forfeited, and notifying the operator and surety that a hearing request or other response shall be made within 20 days of receipt of the notice; and

(b) advise the operator and surety of the conditions under which they may avoid the forfeiture; such conditions may include but are not limited to an agreement by the operator or another party to perform closure and post closure operations in accordance with the surface waste management facility permit conditions, the closure and post closure plan (including modifications or additional requirements imposed by the division) and division rules, and satisfactory demonstration that the operator or other party has the ability to perform such agreement.

(3) The division may allow a surety to perform closure and post closure if the surety can demonstrate an ability to timely complete the closure and post closure in accordance with the approved plan.

(4) If the operator and the surety do not respond to a notice of proposed forfeiture within the time provided, or fail to satisfy the specified conditions for non-forfeiture, the division shall proceed, after hearing if the operator or surety has timely requested a hearing, to declare the financial assurance's forfeiture. The division may then proceed to collect the forfeited amount and use the funds to complete the closure and post closure, or, at the division's election, to close the surface waste management facility and collect the forfeited amount as reimbursement.

(a) The division shall deposit amounts collected as a result of forfeiture of financial assurance in the oil and gas reclamation fund.

(b) In the event the amount forfeited and collected is insufficient for closure and post closure, the operator shall be liable for the deficiency. The division may complete or authorize completion of closure and post closure and may recover from the operator reasonably incurred costs of closure and post closure and forfeiture in excess of the amount collected pursuant to the forfeiture.

(c) In the event the amount collected pursuant to the forfeiture was more than the amount necessary to complete closure and post closure, including remediation costs, and forfeiture costs, the division shall return the excess to the operator or surety, as applicable, reserving such amount as may be reasonably necessary for post closure operations and re-vegetation in accordance with Paragraph (6) of Subsection A of 19.15.36.18 NMAC. The division shall return excess of the amount retained over the actual cost of post closure operations and re-vegetation to the operator or surety at the later of the conclusion of the applicable post closure period or when the site re-vegetation in accordance with Paragraph (6) of Subsection A of 19.15.36.18 NMAC is successful.

(5) If the operator abandons the surface waste management facility or cannot fulfill the conditions and obligations of the surface waste management facility permit or division rules, after notice and an opportunity for hearing, the state of New Mexico, its agencies, officers, employees, agents, contractors and other entities designated by the state shall have all rights of entry into, over and upon the surface waste management facility property, including all necessary and convenient rights of ingress and egress with all materials and equipment to conduct operation, termination and closure of the surface waste management facility, including but not limited to the temporary storage of equipment and materials, the right to borrow or dispose of materials and all other rights necessary for the surface waste management facility's operation, termination and closure in accordance with the surface waste management facility permit and to conduct post closure operations.

[19.15.36.18 NMAC - Rp, 19.15.9.711 NMAC, 2/14/2007; A, 12/1/08; A, 6/30/16]

19.15.36.19 EXCEPTIONS AND WAIVERS:

A. In a surface waste management facility permit application, the applicant may propose alternatives to requirements of 19.15.36 NMAC, and the division may approve such alternatives if it determines that the proposed alternatives will provide equivalent protection of fresh water, public health and the environment.

B. The division may grant exceptions to, or waivers of, or approve alternatives to requirements of 19.15.36 NMAC in an emergency without notice or hearing. The operator requesting an exception or waiver, except in an emergency, shall apply for a surface waste management facility permit modification in accordance with Subsection C of 19.15.36.8 NMAC. If the requested modification is a major modification, the operator shall provide notice of the request in accordance with 19.15.36.9 NMAC.

[19.15.36.19 NMAC - N, 2/14/2007; A, 6/30/16]

19.15.36.20 TRANSITIONAL PROVISIONS: Existing permitted facilities. Surface waste management facilities in operation prior to the effective date of 19.15.36 NMAC pursuant to division permits or orders may continue to operate in accordance with such permits or orders, subject to the following provisions.

A. Existing surface waste management facilities shall comply with the financial assurance, operational, monitoring, waste acceptance and closure and post closure requirements provided in 19.15.36 NMAC, except as otherwise specifically provided in the applicable permit or order, or in a specific waiver, exception or agreement that the division has granted in writing to the particular surface waste management facility.

B. The division shall not require financial assurance for a commercial facility permitted prior to the effective date of 19.15.36 NMAC that exceeds $250,000 until such time as:

(1) the division reviews the commercial facility's permit pursuant to Paragraph (3) of Subsection A of 19.15.36.12 NMAC, at which time the division may require the operator to submit a closure and post closure plan; which shall include a responsible third party contractor's cost estimate to complete closure and post closure of the surface waste management facility pursuant to the requirements of Subsections A through F of 19.15.36.18 NMAC:

(a) if the division determines that such estimate does not reflect a reasonable and probable closure and post closure cost, the division shall determine the estimated closure and post closure cost and shall provide its determination of estimated closure and post closure cost to the operator;

(b) if the operator disagrees with the division's determination of estimated closure and post closure cost, the operator may request a hearing, which shall be conducted according to 19.15.4 NMAC; or

(2) the commercial facility applies for a major modification.

C. Major modification of an existing surface waste management facility and a new landfarm cells constructed at an existing surface waste management facility shall comply with the requirements provided in 19.15.36 NMAC.

[19.15.36.20 NMAC - Rp, 19.15.9.711 NMAC, 2/14/2007; A, 6/30/16]

History of 19.15.36 NMAC:

Pre-NMAC History:
Material in the part was derived from that previously filed with the commission of public records - state records center and archives:
Rule 711, Commercial Surface Waste Disposal Facilities, filed 6-6-88;
Rule 711, Commercial Surface Waste Disposal Facilities, filed 10-11-89;
Rule 711, Commercial Surface Waste Disposal Facilities, filed 2-5-91;
Rule 711, Applicable to Surface Waste Management Facilities Only, filed 7-27-95;
Rule 711, Applicable to Surface Waste Management Facilities Only, filed 12-18-95.

History of Repealed Material:
Repeal of Section 711 of 19.15.9 NMAC, 2/14/2007.

Other History:
Rule 711, Applicable to Surface Waste Management Facilities Only (filed 12-18-95) renumbered and reformatted into that portion of 19 NMAC 15.I, effective 02-01-1996.
19 NMAC 15.I, Secondary or Other Enhanced Recovery, Pressure Maintenance, Salt Water Disposal, and Underground Storage (filed 01-18-96) was renumbered, reformatted and amended **to** 19.15.9 NMAC, effective 11-30-2000.
Section 711 of 19.15.9 NMAC was renumbered to and replaced by 19.15.36 NMAC, Surface Waste Management Facilities, effective 2/14/2007.

ATTACHMENT D

Bird Rescue Protocol

Bird Rescue Protocol
North Ranch Surface Waste Management Facility
NGL Waste Services, LLC

1. The bird's entire body is immersed in a one percent solution of Dawn and warm water (warm enough to approximate the bird's internal body temperature. Once wet, the bird is unable to thermo regulate) by one person while a second vigorously agitates the water into the bird's feathers.

2. A WaterPik® filled with the same solution is used to clean the head.

3. A soft toothbrush and cotton swabs are used to loosen dried oil around the head and eye area.

4. When the water becomes dirty, the bird is moved to a second pan. The washing process is repeated as often as necessary.

5. The bird is considered clean when the tub of water is clear and free of oil.

6. The bird is moved to another pan of clean warm water for rinsing.

7. A WaterPik filled with the warm water is used to clean the head.

8. When the water becomes soapy, the bird is moved to a second pan. The rinsing process is repeated as often as necessary to remove the remaining soap.

9. The bird is considered rinsed when no soap is visible in a fresh pan of water.

10. After wash and rinse, the cleaned bird is placed in a protective net-bottomed pen. As it rests, the bird will begin to preen its own feathers back into place. The complete realignment of feathers in a tight overlapping pattern creates a waterproof seal.

11. The bird is fed a nutritious food mixture to assure proper nourishment, plenty of fluids, as well as vitamins and medications, and is allowed free access to food.

The bird is released when it is stable, healthy, and completed preening. The bird shall be taken to a local veterinary clinic for examination prior to release.

Appendix E
Inspection and Maintenance Plan

Inspection and Maintenance Plan

North Ranch Surface Waste Management Facility
Lea County, New Mexico

September 2019
Project No. 35187378

PREPARED FOR:

NGL Waste Services, LLC
3773 Cherry Creek Dr., Suite 1000
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1.0 INTRODUCTION

This Inspection and Maintenance Plan presents a site-specific inspection and maintenance schedule for the NGL Waste Services, LLC (NGL) North Ranch Surface Waste Management Facility (Facility) that complies with the requirements contained in Subsection L of New Mexico Administrative Code (NMAC) **19.15.36.13**. It should be used in conjunction with the **Operating Plan**, found in **Appendix D** of the permit application (PA).

Records of inspections and documentation of any maintenance resulting from the inspections will be recorded on Inspection Forms, such as the ones included in **ATTACHMENT A** of this document. The inspection forms may be modified as needed. A proposed minimum inspection and maintenance schedule is included in **TABLE 1** below. Inspection records and documentation will be placed in the Facility Permanent Operating Record System (POR).

Table 1. Facility Inspection Schedule

Site Component	Inspection Frequency	Form
Landfill/Operations Disposal operations and location Litter, odor, waste cover, free liquids	Daily	Facility Inspection Checklist
Facility Entrance Gate	Daily	Facility Inspection Checklist
Fueling Station	Daily	Facility Inspection Checklist
Leachate Evaporation Pond pH, DO, wind speed and direction, H_2S air concentration[1]	Daily	Daily Air and Water Inspection Form
Earth Moving Equipment	Weekly/As needed	Facility Inspection Checklist
Leachate Collection System Depth of leachate in sumps	Weekly	Leachate Inspection Form
Leak Detection Sumps Landfill Leachate Evaporation Pond Wet Waste Drying Pad Truck Wash Pad	Monthly	Leachate Monitoring Form
Environmental Monitoring Systems Vadose Monitoring Wells Landfill Gas Monitoring Probes	 Semi-annual Quarterly	Facility Inspection Checklist

Stormwater Structures Run-on/run-off Ditches Erosion control structures Culverts Pumps	Monthly or after a significant rain event	Stormwater Inspection Form
Facility Security/Access Signs Fencing/gates Access roads	Monthly/As Needed	Facility Inspection Checklist
Emergency Response Equipment	Monthly/As needed	Table 4 in Appendix F-Contingency Plan
Fire Extinguishers	Monthly Inspection/ Annual Test	Table 4 in Appendix F-Contingency Plan
Stormwater Ponds Berms/levees Rainfall/windspeed Damage assessment	Quarterly or after a significant rain event	Pond Inspection Form
Leachate Evaporation Pond Berms Riser/pipe HDPE liner	Quarterly or after a significant rain event	Pond Inspection Form
Landfill Bottom Liner system Intermediate Cover System Final Cover System	Monthly	Interim and Final Cover Inspection Form
Facility Survey Control Monuments Survey Grid Markers	Annually	Facility Inspection Checklist

[1] H_2S monitors will be calibrated based on the monitor's manufacturer recommended frequency at a minimum.

2.0 FACILITY DESCRIPTION

The NGL Waste Services, LLC (NGL) North Ranch Surface Waste Management Facility (Facility) consists of approximately 303 total acres and is designed for the disposal of approved oil field wastes. The Facility includes designated areas for leachate disposal, waste handling, truck washing, scalehouse, a leachate evaporation pond and three independent stormwater ponds. **Figure 7** in the Permit Narritive provides the facility layout.

2.1 Earth Moving Equipment

Earth moving equipment will be inspected weekly and repaired as needed. If earth-moving equipment will be disabled for an extended period of time for repairs, additional equipment will

be leased or borrowed as necessary to support the Landfill. Operators to use the Facility Inspection Checklist Form provided in **Attachment A**.

2.2 Fences and Gates

Integrity of Facility fencing shall be inspected monthly and repaired as necessary. The entrance gate to the Facility shall be inspected daily to assure the locking mechanism is properly functional. Operators to use the Facility Inspection Checklist Form provided in **Attachment A**.

2.3 Facility Roads

Temporary and permanent access roads shall be inspected monthly and maintained as needed to provide access, and to control dust and mud accumulations. The Landfill access roads shall be graded and additional gravel or other surface course applied as necessary to minimize rutting, washboarding, mudding, and dust accumulation. Operators to use the Facility Inspection Checklist Form provided in **Attachment A**.

2.4 Leachate Collection System

The leachate pumping system will be inspected weekly to ensure proper operation. The leachate level in the collection sumps will be monitored weekly to verify compliance with regulatory head requirements (12 inches maximum). The leak detection sumps will be inspected monthly. If fluids that are 12-inches over the liner, and above the leachate collection sump rim, then sampling will be conducted with the analyses of fluid samples submitted to the OCD. Inspection dates, maintenance records, name of the inspector, and leak detection system's status will be included in documentation. Operators to use the Leachate Collection System Inspection Form provided in **Attachment A**.

2.5 Stormwater and Surface Water System

Stormwater features including all ditches, temporary and permanent erosion control structures, ponds and culverts shall be inspected monthly or after each significant rainfall event, whichever is more frequent. Stormwater features shall be cleaned, repaired, or replaced as necessary.

It is very important that the stormwater management system at the Landfill be maintained so that it functions properly during a storm event. The following maintenance is recommended:

- Keep all ditches and swales unobstructed;

- Remove sediment from ditches, swales, sediment basins, and sediment barriers routinely; Sediment controls are most effective when sediment is removed regularly;
- Inspect and clean check dams and outlet control structures of sediment and other materials that may restrict flow;
- Periodically inspect the stormwater system (including pumps) for damage and repair immediately.
- Inspect and clean the stormwater system following a major storm event.

Operators to use the Stormwater Inspection Form provided in **Attachment A**.

2.6 Stormwater Ponds

The Facility includes three independent stormwater ponds, designated the north, east, and west stormwater ponds in the corners of the site. They have surface areas of approximately 3.5, 3.4, and 5.6 acres respectively and are 10 feet deep (including 2-3 feet of freeboard). Berms and the outside walls of pond levees will be inspected quarterly and after major rainfall or windstorms. Berms will be maintained in such a manner as to prevent erosion.

Operators to use the Pond Inspection Form provided in **Attachment A**.

2.7 Leachate Evaporation Pond

The leachate evaporation pond, located in the northeast portion of the site, has a surface area of approximately 2.2 acres, a minimum depth of 3 feet at its lowest point, and a maximum depth of 11 feet at its deepest. The berm surrounding the leachate evaporation pond has a height of 2 feet at its lowest point and 3 feet at its highest point. The pond is lined with two layers of 60-mil HDPE, a geocomposite leak detection drainage layer, and a leak detection sump. Berms and pond levees are to be inspected quarterly and after major rainfall or windstorms. Berms will be maintained in such a manner as to prevent erosion.

Per **NMAC 19.15.36.13.L**, leak detection sumps will be inspected monthly. If fluids are present, then sampling will be conducted with the analyses of fluid samples submitted to the OCD. Also, **NMAC 19.15.36.17.C.2** States that the operator shall monitor leak detection systems pursuant to the approved surface waste management facility permit conditions, maintain monitoring records in a form readily accessible for Division inspection and report discovery of liquids in the leak detection system to the Division within 24 hours.

The pH and dissolved oxygen (DO) in the leachate evaporation pond will also be monitored daily when liquids are present. Inspections will include a check for the presence of an oil sheen on the liquid surface. The results will be recorded on the Daily Air and Water Inspection Form in **Attachment A**. The wind speed, direction and H_2S air concentrations will be recorded daily and documented on the Daily Air and Water Inspection Form as well. If H_2S concentrations are

detected above ten (10) parts per million (ppm), then the **Hydrogen Sulfide Contingency Plan** in **Attachment A** of **Appendix F** should be referred to for emergency response and notification procedures.

Operators to use the Pond Inspection Form and Leachate Evaporation Pond: Daily Air and Water Inspection Form provided in **Attachment A**.

2.8 Emergency Response Equipment

Communication equipment, the list of emergency phone numbers, and all first aid kits will be checked monthly or immediately after use. All equipment will be inspected, decontaminated, cleaned and replaced if necessary immediately after use. If lost or damaged, equipment will be replaced immediately. The emergency coordinator will verify that equipment has been maintained after an emergency and will be readied for reuse if another emergency or incident occurs.

Fire extinguishers will be tested annually, and condition checked once per month. **Table 1** and **Table 2** in the **Contingency Plan**, found in **Appendix F** of the PA, contain the lists of emergency phone numbers. **Table 4** in the Contingency Plan (**Appendix F**) contains a list of the primary equipment used for emergency response.

Operators to use the Facility Inspection Checklist Form provided in **Attachment A**.

2.9 Bottom Liner, Intermediate Cover, and Final Cover System

The intermediate and final cover system shall be inspected monthly for evidence of erosion, cracking or surface depressions. Where severe erosion has taken place, soil cover should be re-applied and seeded, given the appropriate seeding conditions. Temporary or permanent erosion control measures shall be used if significant erosion occurs. Various types of erosion control methods are discussed in **Section 4.4** of the **Operating Plan**, located in **Appendix D** of the PA. Areas of liquids seepage will be promptly repaired.

Operators to use the Cover Inspection Form provided in **Attachment A**.

2.10 Survey Control Monuments

The survey control monuments will be inspected annually in conjunction with an annual engineering inspection. In the event benchmarks are damaged, the monuments shall be re-established immediately.

2.11 Landfill Grid Marker System

The waste grid markers will be inspected annually. Repairs or replacements will be accomplished as necessary.

2.12 Perimeter Environmental Monitoring Systems

The Facility will not have groundwater monitoring wells as fresh groundwater was not encountered within 115-feet below the lowest point of the proposed landfill bottom during site subsurface investigations (see **Appendix I** of the Permit Application Document. Further, due to the arid environment and non-putrescible nature of the wastes disposed minimal landfill gas generation is anticipated, thus the Facility will also not have perimeter landfill gas monitoring probes. However, as detailed in **Attachment B,** the facility will be equipped with a vadose zone monitoring network. The vadose zone monitoring wells can also be used as needed to measure landfill gas. If perimeter landfill gas monitoring probes are installed they will be inspected quarterly (Facility Inspection Checklist Form in **Attachment A).** Vadose zone and/or groundwater monitoring wells will be inspected semi-annually (Facility Inspection Checklist Form in **Attachment A).**

3.0 Recordkeeping

The NGL North Ranch Surface Waste Management Facility has in place a Permanent Operating Record System (POR) as outlined in **NMAC 19.15.36.13.G**, **19.15.36.13.L**, **19.15.36.13.P**, **19.15.36.14.C.8**, **19.15.36.14.G**, **19.15.36.17.C.2**, and **19.15.36.17.D.2.** All information contained in the Facility POR is available for inspection and is provided to the NMOCD upon request. The Facility will maintain these records for a minimum period of 5-years following the completion of the post-closure care monitoring period.

3.1 Inspection Log

Inspections and maintenance of the overall site, facilities, and operations are performed routinely by the landfill manager or facility personnel. Inspections should be performed often enough to identify problems in time to correct them before they harm human health or the environment. Inspections also prevent malfunction, deterioration, and operator error from affecting the performance of the facilities and operations.

The frequency of inspections is noted on the inspection checklist in **Table 1** (Operations Inspection Forms are located in **Attachment A** of this document). Inspections are also carried out after any major storm event or natural disaster. The inspection records will be kept in the POR and will be made available to the NMOCD on request.

3.2 Landfill Permanent Operating Record Requirements

The Facility Permanent Operating Record (POR) system includes the following information:

- Permit Application Document, Permit Conditions, regulations, and operator licenses;
- Location restriction demonstrations;
- Groundwater/vadose zone monitoring and gas monitoring data and records;

- Leachate analytical data and disposal documentation;
- Operational plans and programs;
- Inspection records, training procedures and records, and notification procedures;
- Design demonstrations;
- Geotechnical and hydrogeological information;
- Any reports and testing data related to final closure of areas;
- Financial assurance documentation; and
- Quality assurance/quality control documentation, certification, and test results relating to the construction of the Landfill and Evaporation Pond liner, leachate collection system, groundwater/vadose zone monitoring system, and final cover system.

Refer to **Section 9** of the **Operating Plan**, located **Appendix D** for more information on the Permanent Operating Records System for the NGL North Ranch SWMF.

ATTACHMENT A
Facility Inspection Forms

North Ranch Surface Waste Management Facility

Monthly Cover Inspection

Inspection Items	Compliance Issue(s) - If deficient; explain	Comments and/or Corrective Actions Taken
Liner System Integrity		
1) Erosion on protective cover?	□ Yes □ No □ N/A	
2) Vegetation present on protective cover?	□ Yes □ No □ N/A	
3) Anchor Trench runout exposed?	□ Yes □ No □ N/A	
4) Geosynthetics damage?	□ Yes □ No □ N/A	
3) Exposed geosynthetics?	□ Yes □ No □ N/A	
Soil Cover Integrity		
1) Ponded water on slopes?	□ Yes □ No □ N/A	
2) Erosion rills or gullies?	□ Yes □ No □ N/A	
3) Settlement holes or damage?	□ Yes □ No □ N/A	
4) Animal burrow holes or any intrusive human activity?	□ Yes □ No □ N/A	
5) Any slope instability, tension cracks, or slides?	□ Yes □ No □ N/A	
6) Soil washout around edge of crown?	□ Yes □ No □ N/A	
7) Terraces, swales, and down spouts show any signs of erosion?	□ Yes □ No □ N/A	
8) Is access road integrity sufficient?	□ Yes □ No □ N/A	
Vegetation Coverage		
1) Woody plants or saplings on slope?	□ Yes □ No □ N/A	
2) Problem with vegetation coverage larger than 100 ft?	□ Yes □ No □ N/A	
3) Indications of botanical disease or weather stress?	□ Yes □ No □ N/A	
4) Is there vegetation coverage in surrounding ditches ?	□ Yes □ No □ N/A	

INSPECTION NOTES:

(Signed) Date

North Ranch Surface Waste Management Facility
Leachate Evaporation Pond: Daily Air and Water Inspection Form

Ambient Air H_2S Monitoring							
	Sunday	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**
Sampler							
Date and Time							
H_2S Reading (ppm)							
Wind speed (mph)							
Wind Direction							

Pond Conditions							
	Sunday	**Monday**	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**
Pond Level							
Pond Color, Oil Sheen Present?							
Water Temperature							
pH							
Dissolved Oxygen							
Dissolved H_2S/Sulfides							

North Ranch Surface Waste Management Facility

Facility Inspection Checklist Form

DISPOSAL LOCATION	**Frequency**	**Description**	
Where are Disposal Operations Occuring? (general location description)	Daily		
CHECKLIST ITEMS		**INSPECTION COMPLETE**	**COMMENTS OR ACTIONS TAKEN**
Litter Control Inspection, Active Area and Perimter Fence	Daily	□ Yes □ No □ N/A	
Odor	Daily	□ Yes □ No □ N/A	
Waste Cover	Daily	□ Yes □ No □ N/A	
Free Liquids	Daily	□ Yes □ No □ N/A	
Fueling Station	Daily	□ Yes □ No □ N/A	
Earth Moving Equipment	Daily	□ Yes □ No □ N/A	
Facility Roads	monthly	□ Yes □ No □ N/A	
Facility Emergency Response Equipment	monthly	□ Yes □ No □ N/A	
Facility Security Fence and Access Gates	monthly	□ Yes □ No □ N/A	
Perimeter Landfill Gas Monitoring Probes	Quarterly	□ Yes □ No □ N/A	
Groundwater or Vadose Zone Monitoring Wells	Semi-Annually	□ Yes □ No □ N/A	
Survey Control Monuments/Grid Markers	annually	□ Yes □ No □ N/A	

INSPECTION NOTES:

(Signed) Date

North Ranch Surface Waste Management Facility

Quarterly Leachate Collection System Inspection (or after major rain events)

Inspection Item	Compliance Issue(s) - If deficient; explain	Comments and/or Corrective Actions Taken
Leachate Collection System Integrity		
1) Are flow meters in working condition?	□ Yes □ No □ N/A	
2) Are leachate pipes in proper working condition?	□ Yes □ No □ N/A	
3) Are valves in proper working condition?	□ Yes □ No □ N/A	
4) Blind flanges/are they in working/sealed condition?	□ Yes □ No □ N/A	
5) Are pumps in proper working conditon?	□ Yes □ No □ N/A	
6) Are leachate levels within guidelines?	□ Yes □ No □ N/A	
7) Is secondary containment area in proper working condition?	□ Yes □ No □ N/A	
8) Are containment structures free of of water, debris, fire hazards, and vegetation?	□ Yes □ No □ N/A	
9) Is the liquid level gauge in proper working condition?	□ Yes □ No □ N/A	
10) sump inspedtion in leachate evaporation pond?	□ Yes □ No □ N/A	
11) Samples Taken?		

INSPECTION NOTES:

(Signed) Date

Was this a rain event inspection? □ Yes □ No

North Ranch Surface Waste Management Facility
Quarterly Leachate Monitoring Form

Leachate Level Data				Pumping Data			Notes
Date	Time	Sump I.D.	Monitored by	Date	Company	Volume Pumped (gal)	

North Ranch Surface Waste Management Facility
Quarterly Pond Inspection Form (Leachate and Stormwater)

Inspector(s) Name: _____

Date: _____ Time: _____AM/PM

Weather

Temperature: _____ deg. F Precipitation (last 24 hours): _____ inches

Skies: _____Wind Speed: _____ mph Wind Direction: _____

Pond Condition

Notes: "D" indicates a Deficiency has been noted.
"P" indicates that a Photograph has been taken.
"S" indicates that a Sample has been collected.
Reference each item by a location.

Location	Erosion	Vegetation Establishment	Animal Activity	Bird Control Measures	Sample Taken

Inspection of Leak Detection Sump: Liquid Present ___YES ___NO

Observations/Notes: _____

North Ranch Surface Waste Management Facility

Monthly Stormwater Conveyance Systems Inspection Form

Inspection Items	Compliance Issue(s) - If deficient; explain	Comments and/or Corrective Actions Taken
Soil Cover Integrity		
1) Is there a buildup of silt deposits?	□ Yes □ No □ N/A	
2) Do culverts have obstructions or washouts?	□ Yes □ No □ N/A	
3) Do drainage structures have obstructions or erosion damage?	□ Yes □ No □ N/A	
4) Does drainage structure have excess sediment?	□ Yes □ No □ N/A	
5) Any damage to drainage terraces?	□ Yes □ No □ N/A	
6) Any damage to letdown structures?	□ Yes □ No □ N/A	
7) Are the perimeter channels damaged?	□ Yes □ No □ N/A	
8) Is access road integrity sufficient?	□ Yes □ No □ N/A	
9) Any damage to surrounding vegetation?	□ Yes □ No □ N/A	
10) Are rip-rap surfaces damaged?	□ Yes □ No □ N/A	
11) Any indications of weather stress or contaminants in water?	□ Yes □ No □ N/A	
12) Is water flowing off landfill cap outside of drainage ditch?	□ Yes □ No □ N/A	
13) Does the vegetation on the pond or landfill containment berms require re-seeding?	□ Yes □ No □ N/A	

INSPECTION NOTES:

(Signed) Date

Was this a rain event inspection? □ Yes □ No

ATTACHMENT B
Vadose Zone Monitoring Plan

Vadose Zone Monitoring Plan

North Ranch Surface Waste Management Facility
Lea County, New Mexico

September 8, 2019
Project No. 35187378

Prepared for:
NGL Waste Services, LLC
3773 Cherry Creek Dr., Suite 1000
Denver, CO 80209
303-815-1010

Prepared by:
Terracon Consultants, Inc.
25809 Interstate 30 South
Bryant, Arkansas 72022
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TABLE OF CONTENTS

TABLES

FIGURES

EXHIBITS

1.0 INTRODUCTION

This Vadose Zone Monitoring Plan (VZMP) presents the details of the vadose zone monitoring program proposed for the North Ranch Surface Waste Management Facility (SWMF) and is submitted to satisfy the requirements of the NMOCD provisions set forth in *NMAC 19.15.36*. This VZMP will serve as a guidance document for personnel performing site monitoring during the active life of the facility and during closure and post-closure periods.

The Facility is located in Lea County in the State of New Mexico and is operated by the applicant - NGL Waste Services, LLC. The proposed facility includes an Oil Field Waste Landfill, a leachate evaporation pond, and associated infrastructure. The site for the proposed North Ranch SWMF (previously known as McCloy Ranch) is located 16 miles west of Jal, New Mexico and is approximately 303 acres in size. More specifically, the North Ranch SWMF site is located within Section 9 and 10 of T25S, R34E. **Figure 1** shows the approximate location of the SWMF on a site location map showing the locations of USGS monitored groundwater wells.

19.15.36.13.A(1) and **(5)** stipulate that no landfill shall be located where groundwater is less than 100 feet below the lowest elevation of the design depth at which oil field waste will be placed, and no other surface waste management facility shall be located where groundwater is less than 50 feet below the placement of oil field waste. **19.15.36.14.B** requires that a groundwater monitoring program be established if fresh groundwater exists at a site unless otherwise approved by the Division.

As indicated in **Appendix I** Hydrogeological Report, seven borings were advanced in the landfill footprint area to a depth of 165 feet below existing grade. Groundwater was not encountered in any of the borings beneath the landfill site. The uppermost aquifer beneath the landfill area exceeds 165 feet below existing grades and is more than 100 feet below the proposed maximum landfill depth. Depth to water-bearing zones in the Santa Rosa Sandstone is expected to occur at a depth of greater than 500 feet everywhere beneath the land surface in the landfill footprint area**.** **Figure 2** illustrates the existing SWMF site, the locations of the seven geotechnical borings and the proposed locations of the five (5) vadose zone monitoring wells to be included in this VZMP.

Water-bearing zones within the Santa Rosa Sandstone are indicated as vertically separated from proposed waste cells at the facility by at least 500 feet of Chinle Formation deposits. The Triassic Chinle Formation is described as a red to green claystone with minor fine-grained sandstone and siltstones. The Chinle is present in all of the eastern part of southern Lea County but thins westward and is absent in extreme western portions. Thickness of the Chinle varies from 0 to 1,270 feet. Geotechnical borings advanced at the SWMF characterized the upper Chinle Formation as primarily fine-grained sandstone. However, regional borings within the Chinle Formation confirm the presence of shale and other low permeability strata within the interval overlying the Santa Rosa Sandstone. Therefore, the Chinle Formation is expected to provide an

aquitard relative to downward migration of near surface groundwater into the Santa Rosa Sandstone regional aquifer.

The Santa Rosa Sandstone is described as a primarily red, fine-to-coarse grained sandstone, is exposed only in minor outcrops, and the thickness ranges from 140 to 300 feet. Approximate depths from the lowest point of the proposed landfill to formational contacts and the top of the water-bearing zone below the facility are summarized in Table 1 below.

TABLE 1
LANDFILL SUBSURFACE CHARACTERISTICS

Site Hydrogeologic Features	Approximate Depth Below Ground Surface at Lowest Waste Placement Location (ft)	Approximate Depth Below Landfill Lowest Sump Placement (Cell E-3) Elev. (ft)
Top of Chinle Formation	54	1
Top of Santa Rosa Sandstone	601	548
Approximate Potentiometric Surface Elevation – Uppermost Aquifer	171	118

The proposed SWMF landfill incorporates a double HDPE geomembrane composite liner system with a leak detection layer and associated leachate collection and removal system infrastructure. For the purpose of vadose zone monitoring, in the unlikely event that leakage through the bottom liner occurs, it is assumed that some down-dip (generally east-southeast) lateral migration will be caused along the contact between overlying Quaternary age unconsolidated sands and the sandstone and claystone beds of the underlying Triassic Chinle Formation.

Vadose zone monitoring at the Chinle Formation/Unconsolidated sands contact is proposed for the site. It is anticipated that properly located and completed vadose zone monitoring wells would detect leakage from the facility long before groundwater monitoring wells completed in the uppermost aquifer or Santa Rosa Sandstone. Early detection through vadose zone monitoring wells would provide a greater level of protection to groundwater resources below the landfill and evaporation pond. The sections below discuss the stratigraphic setting in the SWMF area and the proposed design for vadose zone monitoring at the site.

2.0 SITE GEOLOGY/HYDROGEOLOGY

The proposed North Ranch SWMF is located near the boundary between the South Plain and Eunice Plain of Southern Lea County. Eunice Plain is underlain by a hard caliche surface and is almost entirely covered by reddish-brown dune sand. The South Plain has no generally accepted local name and has irregular topography without integrated drainage. Several well developed gullies originate in the Eunice Plain area but do not completely traverse the South Plain. The South Plain area is almost completely covered by a thick layer of sand (Nicholson and Clebsch, 1961).

The Great Plains Physiographic Province near surface profile in the vicinity of the North Ranch SWMF consists of generally dipping (southeast) Triassic sedimentary bedrock units (Chinle Formation “red beds” and Santa Rosa Sandstone) covered by varying thickness unconsolidated to semi-consolidated sand, silt, gravel and caliche deposits of the Ogallala Formation and Quaternary eolian and piedmont deposits. For the purposes of this VZMP, any potential Ogallala Formation alluvial and eolian deposits and Quaternary alluvial, piedmont or eolian deposits are not differentiated. It is assumed that the Ogallala has been largely removed locally by erosion and a veneer (approximately 50 feet) of Quaternary age unconsolidated Ogallala detritus and eolian sands cover the sandstone and claystone beds of the Triassic Chinle.

3.0 SITE GROUNDWATER CONDITIONS

Water-bearing units in the vicinity of the SWMF include local shallow Quaternary alluvial aquifers and the Santa Rosa Sandstone, which is in the lower portion of the Triassic Dockum Group. The Santa Rosa Sandstone, underlying the Chinle Formation, is present at depth throughout much of southern Lea County and locally produces modest quantities of groundwater. **Figure 3** provides approximate top of Chinle Formation contours, based on the local geotechnical borings advanced at the site and **Figure 4** illustrates top of Santa Rosa Sandstone general contours based on reviewed data.

The USGS Water Information System includes historic depth to groundwater measurements for groundwater wells in Lea County. ChevronTexaco mapped the depth to uppermost groundwater contours for Lea County based on the USGS monitoring points. Three local groundwater wells in the vicinity of the SWMF have been completed in the Ogallala Formation/Unconsolidated Sands and Chinle Formation to depths of from about 175 to 300 feet below ground surface (see **Figure 1**). **Figure 5** illustrates the local potentiometric surface elevations based on the USGS measurements and adapted from the ChevronTexaco depth to groundwater map.

The potentiometric surface is projected at an elevation of around 3166 feet above NGVD29 beneath the lowest point of waste placement in the SWMF landfill. Three USGS monitored groundwater wells - USGS 320738103270501, USGS 320934103253901 and USGS 321025103263601 (New Mexico Office of the State Engineer, New Mexico Water Rights

Reporting System wells C-02314, C-02401 and C-04310 respectively) are located in the vicinity of the SWMF as shown on **Figure 1**. Well USGS 320738103270501 is located approximately 0.7 miles southeast of the landfill footprint in S15, T25S, R34E.

Boring data obtained during the proposed vadose zone monitoring wells installations will be added to the site characterization data for the North Ranch SWMF. Locations of site characterization borings and wells in the vicinity of the SWMF are shown on **Figure 1** and **Figure 2**. The approximate cross-sectional relationship between the existing groundline, top of the landfill bottom liner system, the underlying geologic units and the groundwater potentiometric surface are illustrated in **Figure 6**.

4.0 PROPOSED VADOSE ZONE MONITORING WELL NETWORK

Due to the anticipated significant depth to the shallowest water-bearing units in the vicinity of the SWMF, vadose zone monitoring is proposed for the site. The proposed vadose zone monitoring wells would be positioned along the eastern boundary of the disposal cells and leachate evaporation pond and screened across the Unconsolidated Sand/Alluvium and Chinle Formation contact, where fluid from a potential leak from the facility would likely be detected before approaching water-bearing zones in uppermost aquifer and the Santa Rosa Sandstone regional aquifer, more than 500 feet below.

4.1 Proposed Monitoring Well Locations

Locations of the proposed vadose zone monitoring wells for the facility are shown on **Figure 2.** Five wells are proposed along the eastern boundaries of facility disposal cells and the leachate evaporation pond, including one directly downgradient from the leachate collecting sump for Cell E-3, which is the lowest point in the landfill liner system. Based upon the general structural dip of the Chinle Formation, there is a high probability that proposed vadose zone monitoring wells positioned directly downdip from the proposed waste disposal cells and pond areas will provide the best available opportunity for early detection of escaping liquids in the unlikely event of a release.

4.2 Proposed Well Drilling and Completion

Prior to drilling, each proposed well location will be staked, and the elevation of existing ground determined so that formational elevations can be approximated during drilling. Found top of Chinle elevations will be compared to the conceptual structural top of Chinle model. The site geologist or engineer will determine the elevation of the top of the Chinle during drilling observation.

Proposed vadose zone monitoring wells would be installed using hollow-stem auger drilling methods; i.e., no fluids would be introduced into the borings during drilling. Drilling equipment would be equipped to switch to air rotary should auger refusal be reached before adequate depth is reached for each well. Undisturbed, depth-referenced samples would be collected on five-foot

intervals using split spoon sampling equipment. Standard Penetration Test blow counts will be determined during split spoon sampling and used to verify the location of the upper indurated Chinle (redbeds) surface in each well boring. A competent geologist or engineer will be present during drilling and will log descriptions of the lithology, texture, sorting, rounding, color, plasticity, degree of lithification, and moisture content of each sample and stratigraphic unit that is penetrated.

Each boring would be advanced into the hardened Triassic Chinle Formation to a penetration depth of at least 20 feet, or 10 feet lower than the sump elevation of the adjacent waste cells, whichever is lower in elevation. Each well boring will be evaluated for the presence of water. Upon reaching total depth, the drilling rig would be placed on standby for at least two hours, during which time soundings will be made inside the augers to check for accumulating fluid.

Vadose zone monitoring wells will be completed in accordance with the Typical Vadose Zone Monitoring Well detail shown in **Figure 7**. Each well will be completed using 2-inch schedule 40 flush joint PVC casing. Each well will be completed with a 30-foot length of 0.010-inch slotted PVC well screen, positioned with the lowermost end extending 20 feet into the upper Chinle Formation surface and the upper screened interval extending ten feet above the Chinle Formation surface. Each well annulus will be backfilled with a 10/20 CSSI sand pack extending two feet above the top of the screened interval, a two foot pelletized bentonite seal and an annular seal consisting of bentonite grout or equivalent extending to 3 feet below land surface. The remainder of the annulus to land surface will be filled with concrete integral to the well pad. Each well would be equipped with a sloped concrete well pad with locking steel protective steel security cover extending at least three (3) feet above grade. The security cover will be positioned a minimum of four inches from the top of the PVC well casing to allow for easy access for removal of the PVC vented cap.

A 4ft x 4ft x 6in concrete pad will be poured around the steel protective covers. The pads will be sloped away from the wells to promote stormwater drainage away from the wells; and will be protected on each corner by steel bollards.

The tops of each PVC well casing, and points set in the tops of the of concrete pads of the new monitoring wells, will be surveyed in State Plane coordinates with elevations relative to the site survey grid and control points. Well completion data, NMOSE drilling permits and well records and survey location information will be submitted to NMOCD in a Well Completion Report.

5.0 VADOSE ZONE MONITORING PROGRAM

The proposed vadose zone monitoring program will include initial monthly inspections of each well for the presence of fluid, alongside the inspections of the landfill and leachate pond leak detection sumps, in accordance with provisions set forth in **19.15.36.13.L**. Results of fluid detection measurements would be submitted with related leachate monitoring results in normal facility operations reporting to the NMOCD. If fluids are noted in any of the monitoring wells, the fluid will be sampled and tested quarterly in accordance with **19.15.30.9** and **20.6.2.7** NMAC and a report of findings will be transmitted to the division in accordance with requirements for groundwater monitoring and reporting set forth in **19.15.36.14.B**.

Evidence of fluids in the vadose zone monitoring wells will not necessarily mean that the wells have been impacted by landfill or leachate pond fluids, requiring that the fluid's origin be ascertained by sampling and analysis. For example, geometric re-configuration of stormwater run-off may alter subsurface water recharge and liquids may potentially accumulate in a monitoring well from condensate within the well casing. The following sections describe the planned monitoring plan for the SWMF vadose zone monitoring network.

5.1 Monitoring Schedule

The proposed vadose zone monitoring program will initially include inspection of each well for the presence of fluid in advance of the applicable disposal area construction. After the initial inspection, each well will be monitored for the presence of free liquids on a monthly basis for a period of 12 months. If the monthly monitoring results continually indicate the absence of fluid, a petition will be made to the NMOCD to transition the vadose zone monitoring wells to quarterly monitoring. A continued lack of fluids in the wells during the quarterly monitoring will initialize additional requests to the NMOCD for a reduced monitoring frequency (i.e., semi-annual or annual).

5.2 Monitoring Assessment

Monitoring for the presence of liquid will be performed by tape down measurement with a water level indicator that emits an audible signal when a water surface is encountered. Total well depth measurements will also be recorded with the same electronic tape. **Exhibit A** to this Monitoring Plan is an example field information form that may be used for routine vadose zone monitoring purposes.

If the water level indicator detects free liquids in the well casing, an attempt will be made to extract the liquid to investigate its origin by lowering a two-inch PVC or Teflon bailer to remove the liquid from the well for sampling/testing purposes. If a liquid sample cannot be retrieved, then the quantity of liquid in the well will be considered de minimis and likely the result of condensation. The same procedures will be used to check for liquid and evacuate samples for each subsequent monitoring event.

If a sufficient quantity of liquid is available to allow sample collection, the liquid will be field-screened for specific conductance, pH, and temperature (i.e., field parameters). In addition, initial sampling will include independent qualified commercial laboratory analysis for the parameters identified in **Table 2**. Initial data will be collected prior to construction of adjacent landfill cells or the leachate pond and will be considered "background values." The initial field and laboratory data collected post-construction will be evaluated to determine if the water encountered is the result of surface water infiltration or potential impacts from the landfill or pond.

If the initial analyses indicate that no impact from the SWMF is evident, then routine monitoring of field parameters will continue on either a monthly or quarterly basis, as applicable, for wells with a measurable water column. If subsequent monitoring indicates elevated measurements of the field parameters relative to the background measurements (i.e., greater than five times background values), additional samples will be collected for laboratory analyses, and the data will be evaluated in accordance with the following Section to determine if a release from the landfill or leachate pond is evident.

5.3 Monitoring Data Evaluation

If the field parameter measurements indicate that a well shows evidence of contaminant influenced water, the NMOCD will be notified within 48 hours and verification re-sampling for the parameters listed in **Table 2** will be conducted within two weeks. If the secondary sampling analytical results indicate that a statistically significant increase and potential SWMF release may have occurred, within 90 days of the finding, leachate samples from each active Landfill sump will collected and analyzed for the parameters listed in **Table 2** for comparative evaluation with the re-sampling results. This data comparison is important for determining whether the potential source of an identified significant change is from the SWMF, another on-site or off-site source, natural variability, an error in the sampling and analysis process, etc. The SWMF will work with NMOCD to devise an appropriate scope of work for assessing water quality changes.

If the evaluation indicates that the well may contain SWMF derived liquids, the SWMF will submit an Action Plan detailing the course of action to investigate further the potential release and/or complete any mitigation measures as appropriate, to the NMOCD within 30 days. If the comparative evaluation indicates that no SWMF derived impacts have occurred, the monitoring data will be maintained as part of the Permanent Operating Record and submitted with annual vadose zone monitoring data for the facility.

TABLE 1 VADOSE ZONE MONITORING PARAMETERS	
Field Parameters	Specific Conductance pH Temperature Depth to Water Total Depth of Well
Major Cations	Calcium Iron Magnesium Potassium Sodium
Major Anions	Fluoride Chloride Nitrate as N Phosphorous Sulfate
RCRA Metals	Arsenic Lead Barium Mercury Cadmium Selenium Chromium Silver
Organic Compounds	Benzene Ethylbenzene Toluene Xylenes
Additional Parameters	Total Dissolved Solids (TDS) Total Petroleum Hydrocarbons (TPH)

During each vadose zone monitoring event, H2S monitoring will be performed in each vadose zone monitoring well using a portable gas analyzer, or equivalent instrument. Soil vapor samples will be purged from each vadose zone monitoring well and screened for concentrations of H2S. Hydrogen sulfide concentrations will be expressed as percent volume in air and will be recorded on the form provided in **Exhibit A**. In the event that hydrogen sulfide concentrations approach the OSHA Permissible Exposure Limit (PEL) for construction workers, the SWMF will work with NMOCD to devise an appropriate scope of work for assessing the H2S monitoring results.

6.0 REFERENCES

Gordon Environmental, Inc. and Golder Associates, Inc., 2016, Vadose Zone Monitoring Plan for the Proposed OWL Landfill Services, LLC Surface Waste Management Facility, Lea County, New Mexico, via NMOCD.

Nicholson, A., and Clebsch, A., 1961, Geology and Ground - Water Conditions in Southern Lea County, New Mexico, New Mexico Bureau of Mines and Mineral Resources, Socorro, New Mexico, Groundwater Report 6.

ChevronTexaco, 2005, Lea Co. Depth to Ground Water.

Office of the New Mexico State Engineer, 2013, Electronic image well log files for Lea County, http://www.ose.state.nm.us/water_info_rights_dist2_LeaCountyWellLogs.html.

Figures

USGS 321025103263601
T.D. 257'
OGALLA FM
DEPTH TO WATER 220'

SITE BOUNDARY

USGS 320934103253901
T.D. 300'
CHINLE FM
DEPTH TO WATER 223'

USGS 320738103270501
T.D. 175'
OGALLALA FM
DEPTH TO WATER 165'

USGS WATER WELLS

Oil and Gas Field

CUSTER MOUNTAIN

Numerous sinkholes

Windmills

Ranch

Windmill

Plant

Bennett

Oil Field

LEA COUNTY

NEW MEXICO

TEXAS

LOVING COUNTY

WINKLER CO

REV.	DATE	BY	DESCRIPTION

SITE LOCATION MAP
NORTH RANCH SURFACE WASTE MANAGEMENT FACILITY
NGL WASTE SERVICES, LLC
LEA COUNTY NEW MEXICO

Terracon
Consulting Engineers and Scientists
BRYANT, AR 72022
FAX: (501) 847-9210
25809 I-30 SOUTH
PH: (501) 847-9292

FIGURE 1

DESIGNED BY:	FOC
DRAWN BY:	JBM
APPVD. BY:	FOC
SCALE:	SEE SCALEBAR
DATE:	SEPT. 2019
JOB NO.	35187378
ACAD NO.	572-002
SHEET NO.:	1 OF 7

N:\SEC\ARCHIVE\EGA\D572\002\MCCLOY\35187378 DESIGN PERMITTING\VADOSE ZONE MONITORING\001 - SITE LOCATION MAP.DWG

LEGEND:

- 3300 — EXISTING GRADE CONTOURS (2' CONTOURS)
- PERMIT BOUNDARY AND SECURITY FENCELINE
- OE — OVERHEAD ELECTRIC
- G — EXISTING GAS LINES / GAS EASEMENT
- W — EXISTING WATER LINE
- EXISTING CENTERLINE
- BH # — SITE INVESTIGATION GEOTECHNICAL BOREHOLE LOCATIONS
- 3000 — SPOT ELEVATIONS
- N: E: — PERMIT BOUNDARY CORNERS
- 30-02-30458 (PLUGGED) — EXISTING WELLS
- NGL PROPERTY LINE
- S — SURVEY SECTION LINE
- PROPOSED VADOSE ZONE MONITORING WELLS

EXISTING WELL PAD
30-025-42382 (CANCELLED)
30-025-42383 (CANCELLED)
EXISTING TANK PAD
30-02-30458 (PLUGGED)
N:419526.18 E:813513.83
BH 1
N:419281.43 E:813526.49
N:419295.16 E:811946.18
30-025-29127 (PLUGGED)
3342.55
N:418825.22 E:813489.27
T25S, R34E SEC. 10
BH 2
3342.64
3342.96
GAS & OHE TO BE RELOCATED BY OWNER PRIOR TO CELL CONSTRUCTION IN THIS AREA
BH 7
N:417601.86 E:807487.96
BH 3
3339.74
3336.77
QUARTER SECTION LINE
BH 8
SURVEY SECTION LINE
N:417020.33 E:808329.76
N:416843.79 E:808597.23
3336.65
3336.65
3337.58
BATTLE AXE ROAD (HWY 2)
N:416502.69 E:810363.47
3336.66
T25S, R34E SEC. 9
N:416176.17 E:812569.06
30-025-20906 (PLUGGED)
N:415983.97 E:809369.36
3335.63
EXISTING TANK PAD
BH 4
N:415729.21 E:809851.19
30-025-43651 (ACTIVE)
BH 5
N:415486.09 E:812251.42
EXISTING WELL PAD
30-025-43650
30-025-44175 (ACTIVE)
30-025-44175 (ACTIVE)
EXISTING WELL PAD
QUARTER SECTION LINE
FOR PERMITTING PURPOSES ONLY

N

500 0 250 500

SCALE IN FEET

REV.	DATE	BY	DESCRIPTION

SITE LAYOUT WITH VADOSE ZONE WELL LOCATIONS
NORTH RANCH SURFACE WASTE MANAGEMENT FACILITY
NGL WASTE SERVICES, LLC
LEA COUNTY
NEW MEXICO

Terracon
Consulting Engineers and Scientists
BRYANT, AR 72022
25809 I-30 SOUTH
PH: (501) 847-9292
FAX: (501) 847-9210

FIGURE 2

DESIGNED BY:	FOC
DRAWN BY:	JBM
APPVD. BY:	FOC
SCALE:	SEE SCALEBAR
DATE:	SEPT. 2019
JOB NO.	35187378
ACAD NO.	572-002
SHEET NO.:	2 OF 7

N:\GEC\ARCHIVE\CAD\572\2020\MCCLOY\35187378 DESIGN PERMITTING\VADOSE ZONE MONITORING\002 - SITE LAYOUT_BORINGS, PROP VZ WELLS.DWG

LEGEND:

- PERMIT BOUNDARY AND SECURITY FENCELINE
- OE — OVERHEAD ELECTRIC
- G — EXISTING GAS LINES / GAS EASEMENT
- W — EXISTING WATER LINE
- EXISTING CENTERLINE
- BH # — SITE INVESTIGATION GEOTECHNICAL BOREHOLE LOCATIONS
- NGL PROPERTY LINE
- SL — SURVEY SECTION LINE
- 3300 — APPROXIMATE TOP OF CHINLE CONTOURS

BH 1
BH 2
BH 3
BH 4
BH 5
BH 7
BH 8

30-025-29127 (PLUGGED)

T25S, R34E SEC. 10

T25S, R34E SEC. 9

3290

3280

SURVEY SECTION LINE

QUARTER SECTION LINE

QUARTER SECTION LINE

QUARTER SECTION LINE

GAS & OHE TO BE RELOCATED BY OWNER PRIOR TO CELL CONSTRUCTION IN THIS AREA

BATTLE AXE ROAD (HWY 2)

A 6 — 0+00

3+00 6+00 9+00 12+00 15+00 18+00 21+00 24+00 27+00 30+00 33+00 36+00 39+00 42+00 45+00 48+00

A' 6 — 50+35

N

500 0 250 500

SCALE IN FEET

NOTE:

1. TOP OF CHINLE FORMATION (REDBEDS) DERIVED FROM SITE INVESTIGATION BORINGS

FOR PERMITTING PURPOSES ONLY

REV.	DATE	BY	DESCRIPTION

APPROXIMATE TOP OF CHINLE FORMATION
NORTH RANCH SURFACE WASTE MANAGEMENT FACILITY
NGL WASTE SERVICES, LLC
LEA COUNTY NEW MEXICO

Terracon
Consulting Engineers and Scientists
BRYANT, AR 72022
FAX: (501) 847-9210
29809 I-30 SOUTH
PH: (501) 847-9292

FIGURE 3

DESIGNED BY:	FOC
DRAWN BY:	JBM
APPVD. BY:	FOC
SCALE:	SEE SCALEBAR
DATE:	SEPT. 2019
JOB NO.	35187378
ACAD NO.	572-002
SHEET NO.:	3 OF 7

N:\GEC\ARCHIVE\CAD\572\002\MCCLOY\35187378 DESIGN PERMITTING\VADOSE ZONE MONITORING\003 - TOP OF CHINLE.DWG

LEGEND:

- PERMIT BOUNDARY AND SECURITY FENCELINE
- OE — OVERHEAD ELECTRIC
- G — EXISTING GAS LINES / GAS EASEMENT
- W — EXISTING WATER LINE
- EXISTING CENTERLINE
- ⊕ BH # — SITE INVESTIGATION GEOTECHNICAL BOREHOLE LOCATIONS
- NGL PROPERTY LINE
- SL — SURVEY SECTION LINE
- APPROXIMATE TOP OF SANTA ROSA SANDSTONE CONTOURS

BH 1
BH 2
BH 3
BH 4
BH 5
BH 7
BH 8

30-025-29127
(PLUGGED)

T25S, R34E
SEC. 10

T25S, R34E
SEC. 9

GAS & OHE TO BE RELOCATED BY OWNER PRIOR TO CELL CONSTRUCTION IN THIS AREA

QUARTER SECTION LINE

SURVEY SECTION LINE

3336.65

BATTLE AXE ROAD (HWY 2)

A 6 — 0+00

A' 6 — 50+35

3+00 6+00 9+00 12+00 15+00 18+00 21+00 24+00 27+00 30+00 33+00 36+00 39+00 42+00 45+00 48+00

2770 2760 2750 2740 2730 2720 2710 2700

N

500 0 250 500
SCALE IN FEET

NOTE:

1. DERIVED FROM STRUCTURAL TOP OF SANTA ROSA SANDSTONE MAP, GORDON ENVIRONMENTAL/GOLDER ASSOCIATES, 2016

FOR PERMITTING PURPOSES ONLY

REV.	DATE	BY	DESCRIPTION

APPROXIMATE TOP OF SANTA ROSA SANDSTONE
NORTH RANCH SURFACE WASTE MANAGEMENT FACILITY
NGL WASTE SERVICES, LLC
LEA COUNTY
NEW MEXICO

Terracon
Consulting Engineers and Scientists
25809 I-30 SOUTH
PH: (501) 847-9292
BRYANT, AR 72022
FAX: (501) 847-9210

FIGURE 4

DESIGNED BY:	FOC
DRAWN BY:	JBM
APPVD. BY:	FOC
SCALE:	SEE SCALEBAR
DATE:	SEPT. 2019
JOB NO.	35187378
ACAD NO.	572-002
SHEET NO.:	4 OF 7

N:\SEC\ARCHIVE\DAD\SEP2020\MCCLOY\35187378 DESIGN PERMITTING\VADOSE ZONE MONITORING\004 - TOP OF SANTA ROSA SANDSTONE.DWG

LEGEND:

- PERMIT BOUNDARY AND SECURITY FENCELINE
- OE — OVERHEAD ELECTRIC
- G — EXISTING GAS LINES / GAS EASEMENT
- W — EXISTING WATER LINE
- EXISTING CENTERLINE
- BH # — SITE INVESTIGATION GEOTECHNICAL BOREHOLE LOCATIONS
- NGL PROPERTY LINE
- SL — SURVEY SECTION LINE
- 3170 — POTENTIOMETRIC SURFACE CONTOURS

BH 1
BH 2
BH 3
BH 4
BH 5
BH 7
BH 8

30-025-29127
(PLUGGED)

T25S, R34E
SEC. 10

T25S, R34E
SEC. 9

GAS & OHE TO BE RELOCATED
BY OWNER PRIOR TO CELL
CONSTRUCTION IN THIS AREA

QUARTER
SECTION LINE

SURVEY SECTION LINE

3+00 6+00 9+00 12+00 15+00 18+00 21+00 24+00 27+00 30+00 33+00 36+00 39+00 42+00 45+00 48+00

A 6 — 0+00

A' 6 — 50+35

3336.65

30-025-20906
(PLUGGED)

EXISTING
TAP PAD

BATTLE AXE ROAD (HWY 2)

3340 3150 3160 3170

N

500 0 250 500

SCALE IN FEET

NOTE:

1. APPROXIMATE TOP OF UPPERMOST AQUIFER ELEVATIONS ADAPTED FROM CHEVRON TEXACO 2005 LEA COUNTY DEPTH TO GROUNDWATER MAP.

FOR PERMITTING PURPOSES ONLY

REV.	DATE	BY	DESCRIPTION

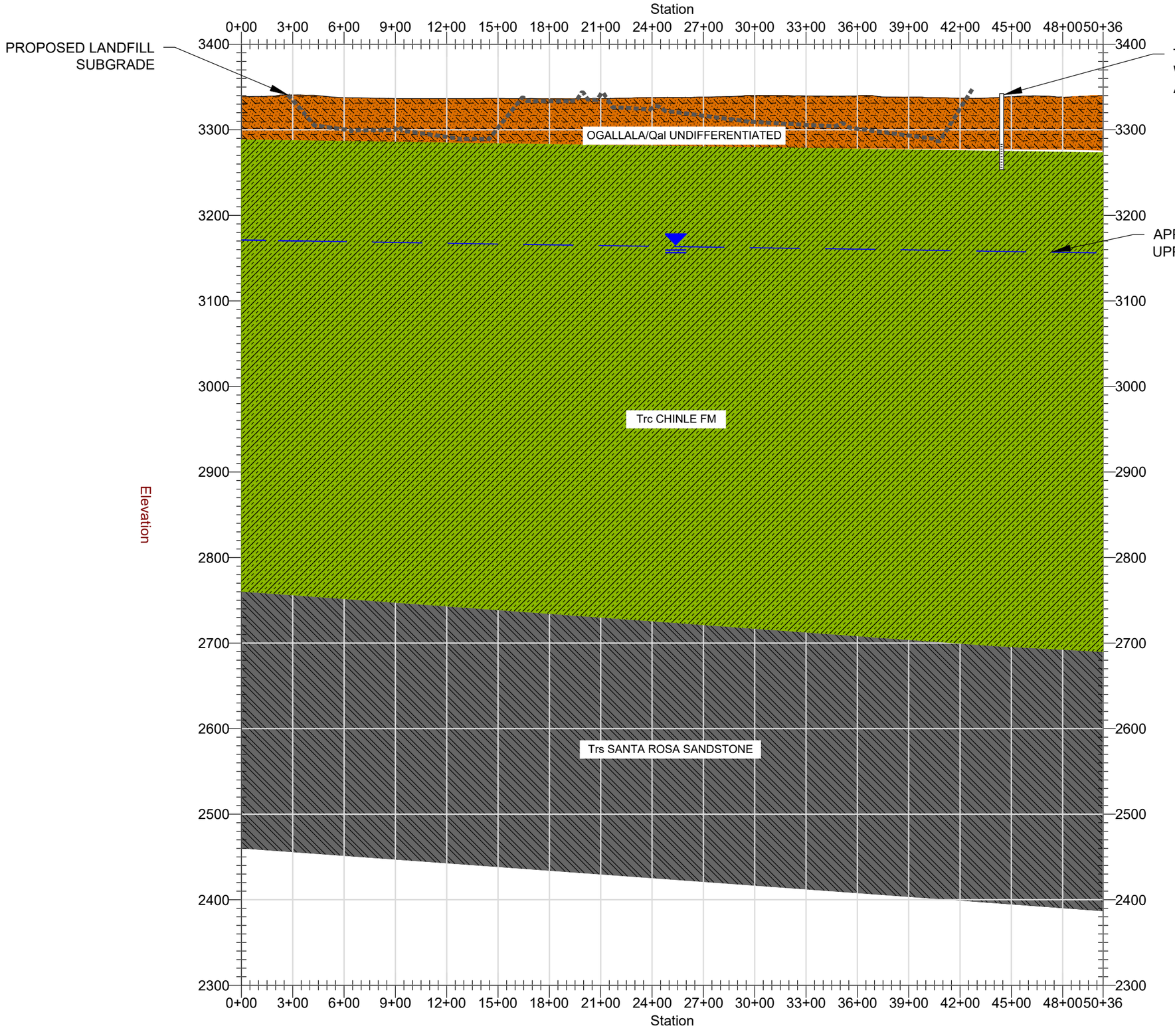
APPROXIMATE REGIONAL POTENTIOMETRIC SURFACE
NORTH RANCH SURFACE WASTE MANAGEMENT FACILITY
NGL WASTE SERVICES, LLC
LEA COUNTY NEW MEXICO

Terracon
Consulting Engineers and Scientists
BRYANT, AR 72022
25809 I-30 SOUTH
PH: (501) 847-9292
FAX: (501) 847-9210

FIGURE 5

DESIGNED BY:	FOC
DRAWN BY:	JBM
APPVD. BY:	FOC
SCALE:	SEE SCALEBAR
DATE:	SEPT. 2019
JOB NO.	35187378
ACAD NO.	572-002
SHEET NO.:	5 OF 7

N:\SEC\ARCHIVE\DAD\572-002\MCCLOY\35187378 DESIGN PERMITTING\VADOSE ZONE MONITORING\305 - REGIONAL POT SURFACE.DWG



FOR PERMITTING PURPOSES ONLY

REV.	DATE	BY	DESCRIPTION

VADOSE ZONE CROSS SECTION

NORTH RANCH SURFACE WASTE MANAGEMENT FACILITY

NGL WASTE SERVICES, LLC

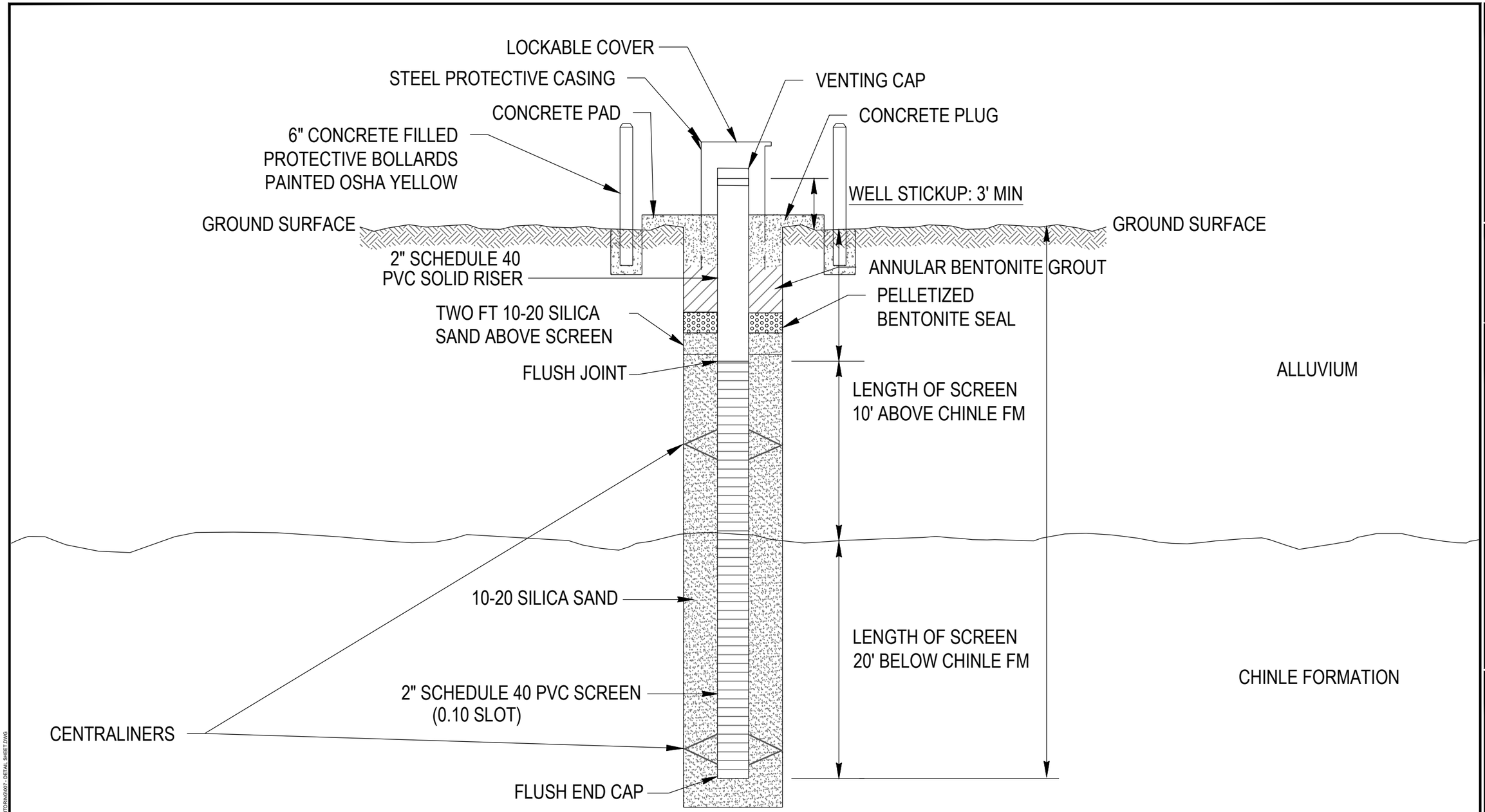
LEA COUNTY NEW MEXICO

Terracon
Consulting Engineers and Scientists
25809-I-30 SOUTH BRYANT, AR 72022
PH: (501) 847-9232 FAX: (501) 847-9210

FIGURE 6

DESIGNED BY:	FOC
DRAWN BY:	JBM
APPVD. BY:	FOC
SCALE:	SEE SCALEBAR
DATE:	SEPT. 2019
JOB NO.	35187378
ACAD NO.	572-002
SHEET NO.:	6 OF 7

N:\GEOARCHIVE\CAD\572-002\MCCLOY\35187378 DESIGN PERMITTING\VADOSE ZONE MONITORING\3006 - VADOSE ZONE CROSS SECTION.DWG



REV.	DATE	BY	DESCRIPTION

TYPICAL VADOSE ZONE MONITORING WELL

NORTH RANCH SURFACE WASTE MANAGEMENT FACILITY

NGL WASTE SERVICES, LLC

LEA COUNTY NEW MEXICO

Terracon
Consulting Engineers and Scientists
2809 I-30 SOUTH
PH: (501) 847-9292
BRYANT, AR 72022
FAX: (501) 847-9210

FIGURE 7

DESIGNED BY:	FOC
DRAWN BY:	JBM
APPVD. BY:	FOC
SCALE:	SEE SCALEBAR
DATE:	SEPT. 2019
JOB NO.	35187378
ACAD NO.	572-002
SHEET NO.:	7 OF 7

FOR PERMITTING PURPOSES ONLY

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Exhibit A

Example Vadose Zone Monitoring Record

VADOSE ZONE MONITORING RECORD

Terracon

WELL ID:					
SAMPLING LOCATION:					
WEATHER CONDITIONS:					
WIND SPEED/DIRECTION:					
BAROMETRIC PRESSURE:					
MONITORING WELL CONDITION:					
	WELL LOCKED?		**WELL NUMBER LABELED?**		
	CASING CONDITION:				
	DATUM FOR WATER/CASING DEPTH (TOC EL.):				
	GENERAL WELL EXTERIOR/INTERIOR CONDITIONS:				
DECON FIELD EQUIPMENT:					
WATER DEPTH (WD):		**TOTAL DEPTH OF WELL (TD):**			
VOLUME OF WATER IN WELL:					
	V = 0.0408 x [TD-WD(feet)] x [Well Diameter (inches)]^2 =		**Gallons**		
WATER CONDITION BEFORE SAMPLING IF KNOWN:					
	APPEARANCE:		**ODOR:**		
WELL SAMPLING DATE:		**SAMPLING METHOD:**			
	TIME OF SAMPLING:				
	VOLUME EXTRACTED:				
	APPEARANCE:		**ODOR:**		
	WELL DRY?				

FIELD MEASUREMENTS:

TIME	TEMP (DEG °C)	H_2S GAS (%)	pH (SU)	SPEC COND (mS/cm)	Water Level

FIELD SAMPLE PRESERVATION:	
CONTAINER HANDLING:	
COMMENTS:	

Appendix F
Contingency Plan

Contingency Plan

North Ranch Surface Waste Management Facility
Lea County, New Mexico

September 2019
Project No. 35187378

Prepared for:
NGL Waste Services, LLC
3773 Cherry Creek Dr., Suite 1000
Denver, CO 80209
303-815-1010

Prepared by:
Terracon Consultants, Inc.
25809 Interstate 30 South
Bryant, Arkansas 72022
(501) 847-9292

TABLE OF CONTENTS

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1.0 INTRODUCTION

The following document comprises the Contingency Plan for the NGL Waste Services, LLC (NGL) North Ranch Surface Waste Management Facility (Facility) located near Jal, Lea County, New Mexico. New Mexico Administrative Code (NMAC) **19.15.36.13.N** requires that owners and operators of surface waste management facilities maintain a written Contingency Plan that also complies with New Mexico Statues Annotated (NMSA) 12-12-1 through 12-12-30 (the Emergency Management Act). This Contingency Plan contains procedures to be followed in the event of fire, explosion, unplanned sudden or non-sudden release of contaminants or oil field wastes to air, soil, surface water, or groundwater.

The objective of this plan is to minimize hazards and ensure the safety of site personnel, emergency responders, public health, fresh water, and the environment. It is intended to complement existing law, regulations, rules, standards, policies, and procedures pertaining to safety standards, fire prevention, and pollution prevention rules.

1.1 General Facility Information

The North Ranch Surface Waste Management Facility is an Oil Field Waste Landfill and is located west of Jal, New Mexico in Township 25 South, Range 34 East, Sections 9 and 10. More specifically, the site can be accessed by traveling approximately 14 miles west of Jal on New Mexico State Road 128 West, then turning southwest onto Battle Axe Rd. The landfill entrance is located approximately 5 miles down Battle Axe Rd, traveling southwest. The site consists of approximately 303 acres with a Landfill footprint of approximately 205 acres. The property includes designated areas for leachate disposal, waste handling, scale house, equipment maintenance facilities, and truck washing.

2.0 RELEVANT TELEPHONE NUMBERS

TABLE 1 lists the designated site primary emergency contacts who will act as the contingency plan emergency coordinators. If no emergency contact can be reached, the employee who identified the situation shall follow the necessary steps until an emergency contact is available. **TABLE 2** lists local, state, and federal emergency contacts not included in Table 1**.** A list of these phone numbers shall be posted and updated regularly.

Table 1. Emergency Contacts

Position	Name	Phone	
		Office Phone	Address
North Rach SWMF - Facility Manager (Primary Emergency Contact)	TBD	TBD	TBD
North Ranch Landfill – Facility Operator (Alternate Emergency Contact)	TBD	TBD	TBD
Engineering Services – Terracon Consultants, Inc.	Michael Bradford, P.E.	501-847-9292 (O) , 307-343-2788 (M)	25809 Interstate 30 South Bryant, Arkansas 72022
Lea Regional Medical Center		911 or 575-492-5000	

In the event an individual needs to be taken to the hospital, an ambulance can be called, or the person may be taken to the following location:

Lea Regional Medical Center - Medical Center
5419 N Lovington Hwy
Hobbs, NM 88240

A map depicting the location of the Hospital in relation to the site is shown on **FIGURE 1**. The Lea Regional Medical Center is located approximately 74 miles northeast of the Landfill Facility.

Table 2. Emergency Telephone Numbers

Organization	Phone Number
All Emergencies	911
Fire	
Jal Fire Department	911 or 575-395-2221
Police	
Jal Police Department	911 or 575-395-2501
Lea County Sheriff's Department Sheriff - Corey Helton	911 or 575- 396-3611
New Mexico State Police (Hobbs District Office)	911 or 575-392-5580
Medical	
Jal Clinic 805 W Kansas Ave Jal, NM 88252	911 or 575-395-3400
Lea Regional Medical Center 5419 N Lovington Hwy Hobbs, New Mexico 88240	911 or 575-492-5000
Lea County Health Department 302 N 5th Street Lovington, NM 88260	911 or 575-396-2853
Poison Control Center	800-222-1222
Oil Conservation Division (OCD) Emergency Contacts	
Oil Conservation Division – District 1 1625 N. French Drive Hobbs, NM 88240	575-393-6161 (office) 575-370-3186 (cell)
New Mexico Oil Conservation Division – Main Office 1220 S. St. Francis Drive Santa Fe, NM 87505	505-476-3440 (office)
State of New Mexico Contacts	
New Mexico Environmental Department Solid Waste Bureau 1190 St. Francis Drive Santa Fe, NM 87502	505-872-0197 (office)
New Mexico Environmental Emergencies	505-827-9329 (24 hrs)
Local Emergency Response Contacts	
Lea County Emergency Management Director – Lorenzo Velasquez	575-391-2983 (office) 575-605-6561 (cell)

Federal Emergency Contacts	800-424-8802
National Response Center (NRC)	
US EPA Region 6 Hotline	800-887-6063 214-665-2760
Additional Local Contacts	
Lea County Electrical Coop.	575-396-3631
Hobbs Animal Shelter – contact Emergency Management	575-397-9323

3.0 EMERGENCY PROCEDURES

The Contingency Plan here within shall be carried out immediately whenever there is a fire, explosion or release of contaminants or oil field waste constituents that could threaten fresh water, public health or the environment. A copy of the Contingency Plan shall be kept at the scale house of the Facility. Other types of emergencies include: storm damage, spills, and any other events requiring the prompt intervention of the landfill facility officials, police and fire departments, or other public health and safety officials. Accidents must be reported **PROMPTLY** to the employee's immediate supervisor for evaluation and/or investigation. Immediate reporting is mandatory not only to comply with applicable laws and regulations, but also to ensure that steps are taken to correct the conditions that contributed to the accident. Since every accident includes a sequence of contributing factors, it is possible to avoid a repeat of the first event by recognizing and eliminating these factors. The removal of just a single factor could prevent a recurrence.

3.1 Assessment and Notification in an Emergency

In the event of an emergency, **TABLE 3** shall be followed to assess the scene and provide notification quickly and effectively. However, the emergency coordinator may deviate from the plan as necessary in an emergency situation if any of the actions could create a safety hazard. Initial efforts will focus on the safety and protection of the facility personnel and the persons using the facility. No persons shall attempt to contain or control fires, explosions, spills, or leaks beyond their corresponding scope of safety, training, and available equipment. Refer to **Section 3.4** for fire/explosion response procedures **and Sections 3.5 - 3.8** for spill/release response procedures.

Table 3. Assessment and Notification Procedures for Emergencies

1.	**Notify Emergency Contact** The employee who identifies the emergency will immediately notify the designated primary emergency contact. If the primary emergency contact is not available, the alternate emergency contact or the onsite manager will be notified. The responding emergency contact will assume the role of emergency coordinator over the situation.
2.	**Assess the Scene** The emergency coordinator will assess the scene and identify the source, amount and extent of spill/release, fire or explosion. Possible hazards to personnel, safety, public health, fresh water, or the environment will be identified.
3.	**Containment and Control** Once the scene has been assessed, the emergency coordinator will determine if it is safe and within the abilities of onsite personnel to contain the incident. Containment and/or control procedures will only be implemented if deemed safe to do so. If deemed safe by the emergency coordinator, personnel will perform actions within the scope of their training to contain the incident and prevent the spread/dispersion of the release. Depending on the type of emergency, the appropriate equipment will be used (absorbents for spills, fire extinguishers, and/or earthmoving equipment).
4.	**Notify Emergency Authorities** Appropriate state and local emergency authorities and the OCD will be notified depending on the emergency if their assistance is needed. **Section 3.5** shall be followed in the event of a major or minor spill/release.
5.	**Divert Traffic and Evacuate** Facility personnel and vehicular traffic not actively assisting in emergency response activities will be diverted from the scene of the emergency until the area is determined safe and the situation is abated.

3.2 Emergency Response Team Coordination

Facility officials will coordinate with local agencies regarding notification, emergency response procedures, and evacuation. Jal Police Department, Lea County Sheriff's Department, the local fire department and hospital, contractors, and emergency response teams will be provided copies of the Contingency Plan so that the organizations can be prepared to coordinate with the Facility in the event of an emergency. The Environmental Bureau of the Oil Conservation Division (OCD) shall also be provided a copy of the Contingency Plan and will be promptly notified of changes in emergency coordinator personnel or in the emergency coordinators' contact information. A copy of this contingency plan will be provided and documented to local police, fire, hospitals and local emergency response.

If there is imminent or an actual emergency situation the emergency coordinator will immediately notify all onsite personnel and the following list of contacts will also be contacted immediately:

- OCD District 1 – office (575) 393-6161
- OCD District 1 – mobile phone (575) 370-3186
- OCD Santa Fe main office (505) 476-3440
- New Mexico State Police (Hobbs District Office) 911 or (575) 392-5580
- Lea County Sheriff Department 911 or (575) 396-3611
- Lea County Emergency Management 911 or (575) 391-2983

3.3 Emergency Response Equipment

Table 4 contains a list of the primary equipment used for emergency response, the operator will keep this list current. The OCD will be notified within 5 days of any changes to the list provided in Table 4. Immediately after use, all equipment will be inspected, decontaminated, cleaned and made ready to be used again. If lost or damaged, equipment will be replaced immediately. The emergency coordinator will verify that equipment has been maintained after an emergency and will be readied for reuse if another emergency or incident occurs. Also See **Figure 2** for visual representation of locations of some of the items listed below.

Table 4. Emergency Response Equipment List

Equipment Description	Location	Quantity	Purpose
10-lb ABC rated fire extinguisher 2-min duration	Scale house	2	firefighting
10-lb ABC rated fire extinguisher 2-min duration	Trucks	2	firefighting
10-lb ABC rated fire extinguisher 2-min duration	Heavy equipment	1	firefighting
20-lb ABC rated fire extinguisher 4-min duration	Diesel storage tank	1	firefighting
Loader (~2 Cubic Yard per Load)	Facility	1	Berm repair
Oil Booms	Scalehouse	4	Oil containment
Self-contained breathing apparatus	Scalehouse	1 per employee	Employee protective gear
Pair leather gloves	Assigned to employee	1 per employee	Employee protective gear
Nomex coveralls	Assigned to employee	7 per employee	Employee protective gear
Pair safety glasses	All employee workstations	1 per employee	Employee protective gear
Water Truck (2,000 gal min)	Facility	1-2	Fire fighting

Round-point wood-handle shovels	Scalehouse	2	Earth movement/fire/spill containment
First aid kit	Scalehouse	1	First aid
First aid kit	Facility Vehicles	1 per vehicle	First aid
Eye wash station	Scalehouse	1	First aid
Portable 2-way radio	Basic unit at Scalehouse	1 per employee	Communications
Cell phones	Facility manager Facility operator(s)	Min. 3	Communications
Office phone	Scalehouse	2	Communications
Mobile pressure washer	Facility	1	Decontaminating equipment

3.4 Fire/Explosion Prevention, Preparedness, and Response

As required by **19.15.36.14A(3)**, the Facility shall be operated in a manner that does not pose a fire hazard to personnel or property. Personnel will receive training on fire safety and prevention before beginning work at the facility and on an annual basis thereafter. Incoming loads of waste and vehicles entering the site will be regularly inspected. Waste inspections will be pursuant to the Facility's Hazardous and Unauthorized Waste Exclusion Plan provided in **Attachment B of Appendix D** of the Permit Application. **Table 4** includes a list of emergency response equipment at the Facility that is available in the event of an incident or emergency, including a physical description of each item and a brief outline of its purpose.

In the event that a fire does occur, stockpiles of soil are readily accessible on the north side and near the working face of the Landfill. Portable fire extinguishers are kept in the landfill office, on the landfill operating equipment and one by the diesel storage tank. Personnel shall be trained in the use of these extinguishers and shall become familiar with their locations. The extinguishers shall be inspected annually and maintained in a ready condition. In the event a fire cannot be contained by onsite personnel, Emergency numbers are posted on the Landfill sign at the Facility entrance, and the Fire Department shall be contacted immediately.

After notifying the local Fire Department or the Lea County Emergency Management, the following procedures shall be followed as applicable:

- Cover the fire with soil;
- Use a fire extinguisher and/or water hose to combat fire; direct the discharge from the extinguisher at the base of the fire. Note: Never fight an electrical fire with water – use a Carbon Dioxide (CO_2) or dry chemical extinguisher;

- Employees will be trained in the use of the P.A.S.S. method for ABC-type fire extinguishers (Pull pin, Aim nozzle, Squeeze trigger, Sweep from side to side to extinguish).
- Secure all electrical power to the facility at the main breaker, and station a guard at the gate to keep the access road clear for emergency vehicles;
- Remain on guard over the affected area after the fire is extinguished until the fire fighters arrive. Monitor the site for leaks, pressure buildup, gas generation, or ruptures in valves, pipes, and equipment;
- If at any time the fire is out of control, immediately evacuate all personnel from the facility (A fire shall be considered out of control any time it advances in size greater than 16 square feet or whenever the smoke concentration prevents visual inspection of the fire).

The Emergency Coordinator will document the incident on an Incident Report Form (**Attachment B**) and maintain a copy in the Facility Permanent Operating Record. The Emergency Coordinator will also meet with personnel and any agencies involved to assess the cause of the incident and determine steps to take to prevent it from occurring again. Facility personnel will be informed of these resultant actions and, if needed, the Contingency Plan will be updated.

3.5 Spill/Release Prevention, Preparedness and Response

Incoming loads will be inspected by trained facility personnel to identify waste loads containing unauthorized material or material of potential concern. Also, liquid by-products and contaminated water cause by precipitation percolating through the waste, or contaminated soil cover materials that run off during period of wet weather are potential release hazards. In the event that a spill/release occurs, the following procedures will be followed as applicable:

- All untrained personnel and persons present onsite will be directed to evacuate to a safe distance.
- The emergency coordinator will assess the situation to determine the proper actions to contain and control the situation.
- If it is safe to do so, the source of the release should be eliminated or stopped.
- The emergency coordinator will make the necessary plans to contain, separate, store, and dispose of the wastes, water, or contaminated materials.
- The emergency coordinator will determine if the material can be safely removed to a designated waste inspection area, or if not, initiate actions within the scope of personnel training to contain the release to the smallest possible area.
- Spill containment equipment such as non-reactive sorbent materials, oil booms, sand, shovels and heavy equipment can be used. If the spill/release is out of the scope of facility personnel to contain, a third-party contractor is available for emergency response. These materials will be kept in storage shed located near the scale house of the Facility.

- If sampling is appropriate, isolate contaminants in designated leak-proof containers.
- After the release has been contained, and necessary samples have been obtained, cleanup will be initiated by removing the spilled materials, sorbent materials, and soils used for containment. No oil field waste, which may be incompatible with the released material, will be treated, stored or disposed of until cleanup procedures are complete.
- Liners and equipment in use, including valves and pipes, will be monitored for leaks, pressure buildup, gas generation or rupture as appropriate (**NMAC 19.15.36.13N(11)**).
- Dependent on visual and/or laboratory analysis of the material, the waste will be disposed of appropriately.
- An Incident Report Form will be completed to document the emergency and the resulting action. If the spill/release is a major or minor release, as defined in **Section 3.6**, the OCD will be notified by filling out Form C-141 (**Attachment C**) and following the steps described in **Section 3.7**.

Spilled or contaminated material approved to be disposed of at the Facility will be disposed of following standard operating practices. Hazardous material not approved for disposal at the site will be isolated in leak-proof containers and disposed of as applicable with local, state, and federal regulations. A third-party cleanup contractor may be called upon for assistance as well. If at any time the scope of the spill/release is beyond the capabilities of the on-site personnel to contain and/or extinguish, the emergency coordinator will contact the local Fire Department of the Lea County Emergency Management for assistance.

3.6 Spill/Release Definitions

According to **NMAC 19.15.29.7**, a **major release** means:

(1) An unauthorized release of a volume, excluding gases, of 25 barrels or more;

(2) An unauthorized release of a volume that:
  (a) Results in a fire or is the result of a fire
  (b) May with reasonable probability reach a watercourse
  (c) May with reasonable probability endanger public health; or
  (d) Substantially damages property or the environment

(3) An unauthorized release of gases exceeding 500 MCF; or

(4) A release of a volume that may with reasonable probability be detrimental to fresh water or exceed the standards in **NMAC 19.15.30.9** subsections A, B, or C.

A **minor release** means an unauthorized release, which is not a major release and is a volume greater than five barrels but less than 25 barrels; or for gases, greater than 50 MCF but less than 500 MCF.

3.7 Spill/Release Notification Requirements

The emergency coordinator must notify the OCD of a major or minor release occurring during the drilling, producing, storing, disposing, injecting, transporting, servicing or processing of oil, gases, produced water, condensate or oil field waste including regulated NORM, or other oil field related chemicals, contaminants or mixture of the chemicals or contaminants, by filling out Form C-141 (see **Attachment C**), in accordance with the requirements of **19.15.29 NMAC**.

According to **19.15.29.10 NMAC**, for reporting a **major release**, the responsible party must notify the OCD's environmental bureau chief and the NMOCD District 1 office verbally or by email within 24 hours of discovery of the release. The notification must provide the information required on Form C-141, including the following:

- Provide the NMOCD with a description of the nature and cause of noncompliance;
- Inform the NMOCD of the period of noncompliance, including exact dates and times and/or the anticipated time when the Facility will return to compliance;
- Notify the NMOCD of steps taken or to be taken to reduce, eliminate, and prevent recurrences of the noncompliance; and
- Take the first three actions listed above within 24 hours inn the case of any noncompliance that could constitute a threat to human health, welfare or the environment.

The NMOCD District 1 office must also be notified in writing within 15 days or discovering the release by completing and filing Form C-141. The written notification must verify the prior verbal or email notification and include any additions or corrections to the information contained in the prior verbal or email notification.

For reporting a **minor release**, the responsible party must notify the appropriate division district office in writing within 15 days of discovery of the release by completing and filing Form C-141.

3.8 Spill/Release Corrective Action

The Facility shall comply with any corrective action deemed necessary by the OCD for releases that endanger public health or the environment, as required by **19.15.29.11 NMAC**. A remediation or abatement plan shall be submitted to and approved by the OCD in accordance with **19.15.30 NMAC** to address any such releases.

3.9 Hazardous and Unauthorized Waste

In accordance with **19.15.36.13.F** the North Ranch Landfill must implement a program to detect and prevent the disposal of regulated hazardous wastes, naturally occurring radioactive materials (NORM), and additional unauthorized wastes. The Facility has developed a site-specific Hazardous and Unauthorized Waste Exclusion Plan (HUWEP) for the Landfill in

accordance with the requirements of the NMAC. The Facility HUWEP is included as **Attachment B** to the **Operating Plan**, located in **Appendix D** of the permit application.

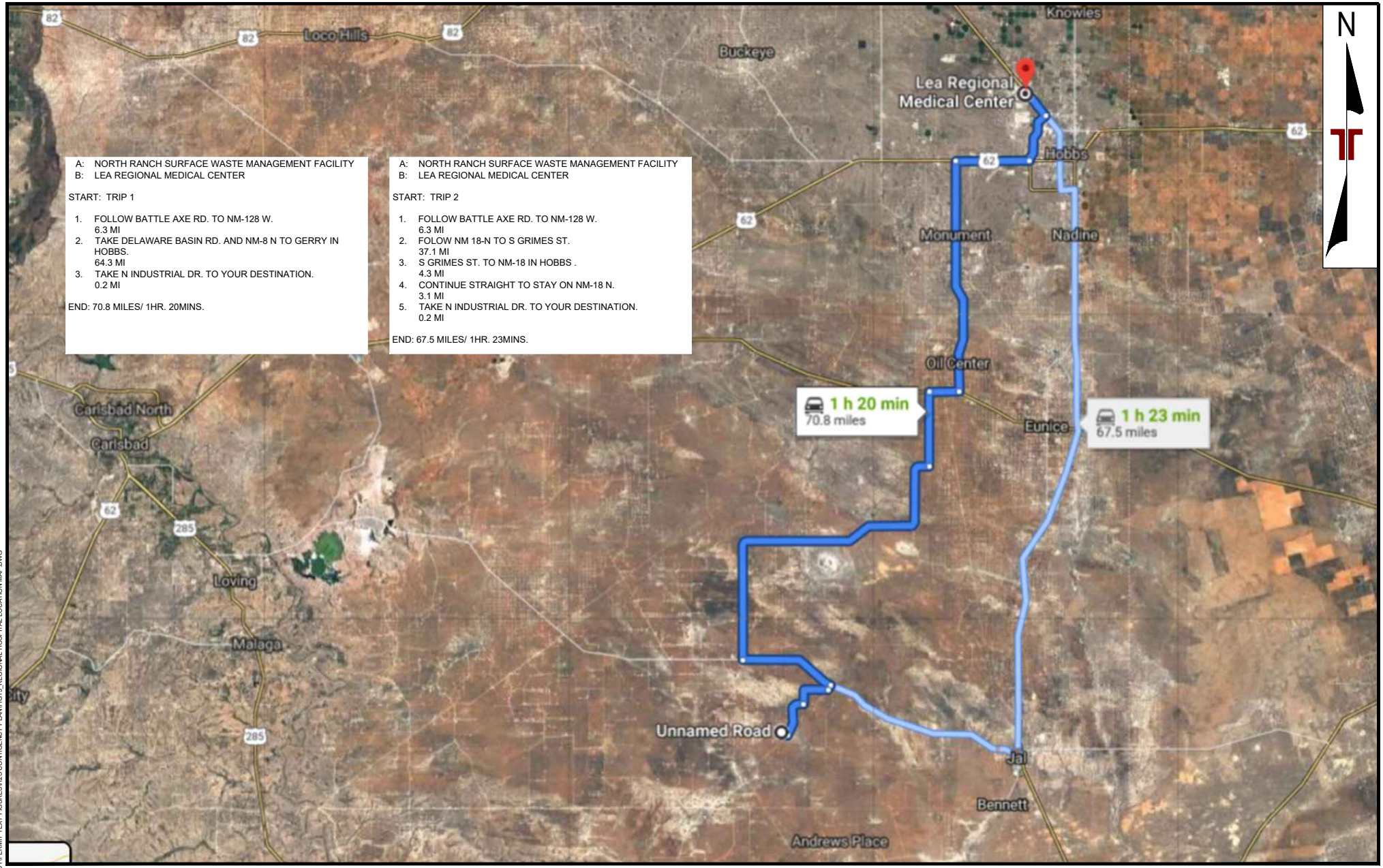
3.10 Evacuation Plan

When an incident or emergency constitutes an evacuation of the site, the following plan shall be followed:

1. The evacuation notice will immediately be communicated to all facility personnel by facility radios, cellular phones, and/or facility telephones.
2. All traffic, incoming waste loads, and other vehicles will be diverted from the area where the emergency is taking place and directed towards facility exits (see Figure 2).
3. Facility personnel will be directed to assemble at the scale house where the emergency coordinator will perform a headcount and identify any missing persons.
4. Once assembled and accounted for, facility personnel will assist the emergency coordinator in securing the site or evacuate to a further distance away.

3.11 Contingency Plan Amendments

The Contingency Plan will be amended within five (5) working days if the Facility permit is revised or modified, the plan fails in the event of an emergency, or the list of emergency equipment changes. Additionally, if the design, construction operation, maintenance, or other characteristics of the Facility changes in a way that increases the potential for fires, explosions, or releases of oilfield waste constituents that could pose a threat to safety, public health, fresh water, and the environment or alter the response necessary in an emergency, the Contingency Plan will be amended accordingly. The emergency coordinator can revise this plan as necessary to address an emergency. Any change in the emergency coordinators or their contact information will necessitate an update to the Contingency Plan immediately. The Facility will provide the OCD's environmental bureau and local emergency response agencies with a copy of any amendments to the Contingency Plan promptly.



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REV.	DATE	BY	DESCRIPTION

Terracon
Consulting Engineers and Scientists
25809 I-30 SOUTH BRYANT, AR 72022
PH. (501) 847-9292 FAX. (501) 847-9210

HOSPITAL LOCATION MAP

PERMIT APPLICATION FIGURE

SURFACE WASTE MANAGEMENT FACILITY

NORTH RANCH

LEA COUNTY NEW MEXICO

FIG. 1

DESIGNED BY:	DEW
DRAWN BY:	DEW
APPVD. BY:	MPB
SCALE:	AS SHOWN
DATE:	APRIL 2019
JOB NO.	35187378
ACAD NO.	572/002
SHEET NO.:	1 OF 2

LEGEND:

- 3300 — EXISTING GRADE CONTOURS (11-30-2018, 2' CONTOURS)
- PERMIT BOUNDARY AND SECURITY FENCELINE
- OE — OVERHEAD ELECTRIC
- G — EXISTING GAS LINES / GAS EASEMENT
- W — EXISTING WATER LINE
- EXISTING CENTERLINE
- CELL BOUNDARIES
- SITE ROAD
- PRIMARY EVACUATION ROUTE
- SECONDARY EVACUATION ROUTE
- 10 LB FIRE EXTINGUISHER
- 20 LB FIRE EXTINGUISHER
- OIL BOOM
- SCBA — SELF CONTAINED BREATHING APPARATUS
- PPE — PERSONAL PROTECTIVE EQUIPMENT
- FIRST AID KIT
- EYE WASH STATION
- TWO WAY RADIO

EXISTING WELL PAD

EXISTING TANK PAD

NORTH STORMWATER POND

SITE ENTRANCE

MAIN GATE

SCALES AND SCALEHOUSE

LEACHATE EVAP POND

PPE
SCBA

PAVED DRIVEWAY

DIESEL STORAGE TANK, IF INSTALLED LOCATION MAY VARY

CELL E-1 (9.6 AC.)

CELL E-2 (9.6 AC.)

CELL E-3 (28.2 AC.)

CELL W-1 (15.3 AC.)

CELL W-2 (11.8 AC.)

CELL W-3 (15.2 AC.)

CELL W- (23.9 AC.)

CELL W-5 (2 .7 AC.)

PHASE 3

PHASE 2

PHASE 1

CELL E- (18. AC.)

CELL E-5 (18.6 AC.)

CELL E-6 (21.6 AC.)

PROPOSED DRYING PAD

PROPOSED WASH PAD

BATTLE AXE ROAD (HWY 2)

WEST STORMWATER POND

EAST STORMWATER POND

SECONDARY EMERGENCY EVACUATION/ACCESS GATE

EXISTING WELL PAD

EXISTING TANK PAD

EXISTING WELL PAD

N

500 0 250 500

SCALE IN FEET

N:\SEC\ARCHIVE\DAD\572\2022\MCCLOY\PERMIT TEXT FIGURES\HSS CONTIGENCY PLAN\FIG 2-SITE REV- SITE EVAC.DWG

REV.	DATE	BY	DESCRIPTION

SITE EVACUATION PLAN

PERMIT APPLICATION FIGURE

SURFACE WASTE MANAGEMENT FACILITY

NORTH RANCH

LEA COUNTY NEW MEXICO

Terracon
Consulting Engineers and Scientists
25809 I-30 SOUTH
PH: (501) 847-9292
BRYANT, AR 72022
FAX: (501) 847-9210

FIGURE 2

DESIGNED BY:	MPB
DRAWN BY:	DEW
APPVD. BY:	MPB
SCALE:	SEE SCALEBAR
DATE:	APRIL 2019
JOB NO.	35187378
ACAD NO.	572/002
SHEET NO.:	1 OF 2

ATTACHMENT A

HYDROGEN SULFIDE CONTINGENCY PLAN

Hydrogen Sulfide Prevention and Contingency Plan

North Ranch Surface Waste Management Facility
Lea County, New Mexico
September 2019
Project No. 35187378

Prepared for:
NGL Waste Services, LLC
3773 Cherry Creek Dr., Suite 1000
Denver, CO 80209
303-815-1010

Prepared by:
Terracon Consultants, Inc.
25809 Interstate 30 South
Bryant, Arkansas 72022
(501) 847-9292

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1.0 INTRODUCTION

New Mexico Administrative Code (NMAC) **19.15.36.8.C(8)** requires that owners and operators of surface waste management facilities maintain a written Hydrogen Sulfide (H_2S Prevention and Contingency Plan that complies with **19.15.11 NMAC**. This Facility will not be accepting, treating, or managing process water, thus major health and safety concerns regarding H_2S are not anticipated. As discussed herein, the Facility will be routinely monitoring for H_sS of incoming wastes and at various locations throughout the Facility for concentrations exceeding 1 parts per million. Regardless, the Facility will maintain this document, which comprises the Hydrogen Sulfide Prevention and Contingency Plan for the proposed NGL North Ranch Surface Waste Management Facility. It is intended to provide a systematic approach to emergency response in the event of a release or detection of hydrogen sulfide (H_2S) and is designed to complement existing laws, regulations, rules, standards, policies, and procedures pertaining to safety standards, fire prevention, and pollution prevention rules.

1.1 General Facility Information

The proposed facility is an Oil Exploration and Production Waste (E&PW) Landfill and is located west of Jal, New Mexico. The site can be accessed by traveling approximately 14 miles on New Mexico State Road 128 West, then turning southwest onto Battle Axe Rd. The landfill entrance is located approximately 5 miles down Battle Axe Rd, traveling southwest. More specifically, the site is in Township 25 South, Range 34 East, Sections 9 and 10. The site consists of approximately 303-acres with a Landfill footprint of approximately 205-acres. See site location map provided as **Figure 1.**

1.2 Hydrogen Sulfide Characteristics

Hydrogen sulfide (H_2S) is a colorless, extremely toxic, flammable gas that can be encountered in the production of crude oil and associated gas and waters. It is slightly heavier than air and can collect in low places. Sometimes a rotten-egg odor can indicate the presence of H_2S; however, smell cannot be relied upon to detect dangerous concentrations of the gas because exposure to high concentrations of the gas paralyzes the olfactory nerve and the sense of smell. Therefore, odor cannot be expected to alert persons to the presence of dangerously high concentrations of H_2S. Exposure to the gas can poison the respiratory system and cause death.

The following sections describe measures that will be taken at the facility to ensure the safety of employees, visitors, nearby landowners, and the public. The facility will implement a H_2S monitoring program. Facility employees will participate in H_2S training on an annual basis or if any changes are made to the plan. Also, new employees will be trained in H_2S safety before beginning work at the facility. An Immediate Action Plan is included that contains instructions to be followed in the event a potentially hazardous concentration of H_2S is detected. Facility

officials will coordinate with local agencies regarding notification, emergency response procedures and evacuation. See **Figure 3 for an evacuation routing map.**

2.0 RELEVANT TELEPHONE NUMBERS

A list of important phone numbers shall be posted and updated regularly. **TABLE 1** lists the designated site primary emergency contacts and other important contacts. **TABLE 2** lists local, state, and federal emergency contacts not included on **TABLE 1.**

Table 1. Emergency Contacts

Position	Name	Phone	
		Office Phone	Address
North Rach SWMF - Facility Manager (Primary Emergency Contact)	TBD	TBD	TBD
North Ranch Landfill – Facility Operator (Alternate Emergency Contact)	TBD	TBD	TBD
Engineering Services – Terracon Consultants, Inc.	Michael Bradford, P.E.	501-847-9292 (O) , 307-343-2788 (M)	25809 Interstate 30 South Bryant, Arkansas 72022
Lea Regional Medical Center		911 or 575-492-5000	

In the event an individual need to be taken to the hospital, an ambulance can be called, or the person may be taken to the following location:

Lea Regional Medical Center
5419 N Lovington Hwy
Hobbs, New Mexico 88240

A map depicting the location of the Hospital in relation to the site is shown on **FIGURE 2**. The Lea Regional Medical Center is located approximately 74 miles northeast of the Landfill Facility.

Table 2. Emergency Telephone Numbers

Organization	Phone Number
All Emergencies	911
Fire	
Jal Fire Department	911 or 575-395-2221
Police	
Jal Police Department	911 or 575-395-2501
Lea County Sheriff's Department Sheriff - Corey Helton	911 or 575- 396-3611
New Mexico State Police (Hobbs District Office)	911 or 575-392-5580
Medical	
Jal Clinic 805 W Kansas Ave Jal, NM 88252	911 or 575-395-3400
Lea Regional Medical Center 5419 N Lovington Hwy Hobbs, New Mexico 88240	911 or 575-492-5000
Lea County Health Department 302 N 5th Street Lovington, NM 88260	911 or 575-396-2853
Poison Control Center	800-222-1222
Oil Conservation Division (OCD) Emergency Contacts	
Oil Conservation Division – District 1 1625 N. French Drive Hobbs, NM 88240	575-393-6161 (office) 575-370-3186 (cell)
New Mexico Oil Conservation Division – Main Office 1220 S. St. Francis Drive Santa Fe, NM 87505	505-476-3440 (office)
State of New Mexico Contacts	
New Mexico Environmental Department Solid Waste Bureau 1190 St. Francis Drive Santa Fe, NM 87502	505-872-0197 (office)
New Mexico Environmental Emergencies	505-827-9329 (24 hrs)
Local Emergency Response Contacts	
Lea County Emergency Management Director – Lorenzo Velasquez	575-391-2983 (office) 575-605-6561 (cell)

Federal Emergency Contacts	800-424-8802
National Response Center (NRC)	
US EPA Region 6 Hotline	800-887-6063 214-665-2760
Additional Local Contacts	
Lea County Electrical Coop.	575-396-3631
Hobbs Animal Shelter – contact Emergency Management	575-397-9323

3.0 Immediate Action Plan

Table 3 below provides an Immediate Action Plan contains procedures for alerting and protecting facility and contractor personnel and the public. Per the requirements of **19.15.36.8.C(8) NMAC** and **19.15.11 NMAC**, as it applies to surface waste management facilities, the IAP follows the guidelines laid out in the American Petroleum Institution "Recommended Practice for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide (API RP-55). See **Exhibit C** for a complete copy of ARI RP-55.

3.1 Radius of Exposure

The radius of exposure is calculated for hydrogen sulfide using the following formula assuming a continuous release of H_2S from a waste load during daytime hours:

$$ROE\ (ft) = Antilog[A * log(C_{H2S}) + B] \qquad \text{(OG 2010)}$$

Where:

A	Concentration Coefficient
B	Concentration Coefficient
C_{H2S}	H2S Discharge rate in cubic feet per hour (CFH)

Assuming a 12 cubic yard waste load left is left open while waiting in line to dispose for a prolonged period of time at the scale house, and one-tenth of that volume is a continuous gas generation every minute. In this case, a continuous release rate of 1,944 CFH is assumed a H_2S concentration of 10 parts per million. At that concentration the coefficients are, A = 0.61 and B = 0.84 (OG 2010). These coefficients also assume stable air with a Stability Class PG F an average wind speed of 2.2 mph. Therefore, the radius of exposure with a point source at the scale house is:

$$ROE\ (ft) = Antilog[0.61 * log(1{,}944\ CFH) + 0.84]$$

ROE = 692 ft,

This point source and ROE is represented on **Figure 3**

Table 3. API Recommended Practice 55

Immediate Action Plan

Each contingency plan should contain a condensed Immediate Action Plan followed by designated personnel any time they receive notice of a potentially hazardous hydrogen sulfide or sulfur dioxide discharge. For personnel protection (including the general public) and abatement of the discharge, the Immediate Action Plan should include but not be limited to the following provisions:

a. Alert and account for facility personnel.

   1. Move away from hydrogen sulfide or sulfur dioxide source and leave affected area.
   2. Equip personnel with proper breathing equipment.
   3. Alert other affected personnel.
   4. Assist personnel in distress.
   5. Proceed to designated emergency assembly area.
   6. Account for Onsite Personnel

b. Take immediate measure to control present or potential hydrogen sulfide or sulfur dioxide discharge and eliminate possible ignition sources. Emergency shutdown procedures should be initiated as necessary to correct or control specific situations. When required action cannot be accomplished in time to prevent exposing operating personnel or public to hazardous concentration of hydrogen sulfide or sulfur dioxide, proceed to the following steps as appropriate for the site-specific conditions.
c. Alert the public (directly or through appropriate government agencies) subjected to an atmosphere exposure exceeding 30-ppm[21] or 10-ppm[21] of sulfur dioxide.
d. Initiate evacuation operations.
e. Contact the first available designated supervisor on the call list. Notify supervisor of circumstances and whether immediate assistance is needed. The supervisor should notify other supervisors and other appropriate personnel (including public officials) on call list.
f. Make recommendations to public officials regarding blocking unauthorized access to the unsafe area and assist as needed.
g. Make recommendations to public officials regarding evacuating the public and assist.
h. Notify, as required, state and local officials and the National Response Center to comply with release reporting requirement (i.e., 40 *Code of Federal Regulations Parts 302 and 355*).
i. Monitor the ambient air in the area of exposure (after following abatement measures) to determine when safe for re-entry.

[21]Emergency Response Planning Guide Level 2 (ERPG-2), refer to Reference 27. ERPG-2 is defined as the maximum airborne concentration below believed that nearly all individuals could be exposed for up to 1-hr without experiencing or developing irreversible or other serious health effects or symptoms that could impair an individual's ability to take protective action.
Note: This sequence (Par 7.6) should be altered to fit the prevailing situation. Certain actions, especially those dealing with the public, should be coordinated with public officials.

Citation: This Table is extracted from the American Petroleum Institute (API) Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide, Recommended Practice 55, Second Edition, February

15, 1995.

4.0 H2S Monitoring

The Facility will monitor gas by inspection of vehicles with incoming waste and at the evaporation pond. Incoming loads will be inspected at the scalehouse. Loads will be monitored for hydrogen sulfide (H_2S). H_2S monitors will be placed throughout the site and continuous monitoring will be implemented in the scalehouse and any future habitable structures. Monitoring locations include the scalehouse, landfill working face, and the stabilization/drying pad areas. Facility personnel will be quipped with breathing zone monitors in the process area.

4.1 Monitoring Waste Loads

Oilfield waste loads will be monitored for H_2S upon arriving at the site. OCD Form C-138 will be utilized for recording monitoring results. The documentation of the monitoring will be kept in the Facility Permanent Operating Record System (POR). Monitors will alarm staff if concentrations of H_2S exceed 1-parts per million (ppm). If H_2S levels exceed 1-ppm on incoming waste, the waste will not be accepted, and the hauler will leave the facility. One stationary H_2S monitor will be positioned at the scale house, see **Figure 4** for stationary monitor locations and a local windrose.

4.2 Monitoring Leachate Evaporation Pond, Drying Pads, and Truck Wash

The NGL North Ranch Facility has one leachate evaporation pond, located in the northeast portion of the site. Monitoring will be performed when there is liquid present in the pond. Stationary H_2S monitors will be placed around the evaporation pond to continuously monitor for H_2S. Wind speed, direction and H_2S concentrations will be recorded daily and documented on the Daily Air and Water Inspection Form (see **Attachment A** of the **Inspection and Maintenance Plan**, located in **Appendix E** of the permit application). The pH and dissolved oxygen (DO) will also be tested daily in the leachate evaporation pond. DO and pH are integral to the treatment and removal of H_2S. Continuous monitoring via stationary monitors will also occur around waste drying pads and near the truck was sump. See **Figure 4** for stationary monitor locations and a local wind rose.

If H_2S is detected above 1-ppm, personnel will take a second reading downwind of the leachate evaporation pond within one (1) hour and at the property boundary downwind of the pond, if it is safe to do so. A sample from the pond will be tested for DO and dissolved sulfides, if safe to do so. If the second reading is also over 1-ppm, the District 1 OCD office will immediately be notified, and hourly monitoring will continue for the next 24-hours.

If H_2S is detected at more than 10-ppm, the Facility will immediately be evacuated (see the **Contingency Plan**, located in **Appendix F** of the permit application, for site evacuation instructions). New Mexico State Police, Lea County Sheriff, Lea County Emergency Management and the OCD will be notified immediately. Records of incidents will be maintained for at least five

(5) years at the Facility in the POR and made available to the OCD per request. See **Figure 3 for an evacuation routing map**

4.2 H_2S Treatment Plan

In the event of an H2S detection of 1 ppm or greater, the following procedures will be implemented:

Presence in Waste Load

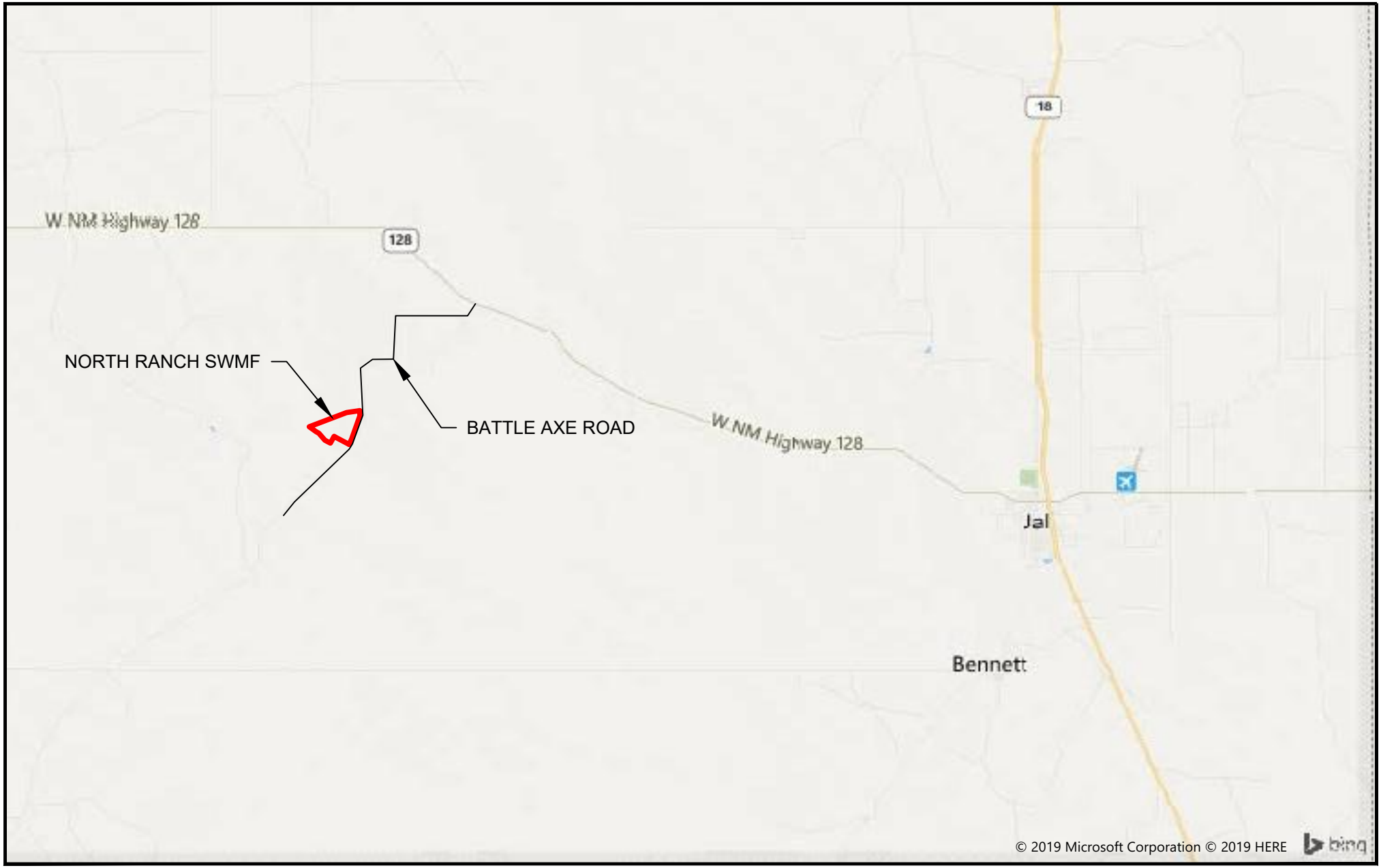
- Notification of the presence of H2S in a waste load will be provided to both the driver (hauler) and the generator.
- The generator will be provided the option of allowing the Operator to treat the load on-site. Should the generator decline treatment, the load will be rejected and directed to leave the Facility.
- If the generator requests treatment, personnel will take the load to a waste drying pad where it will be managed until such a time that the H_2S concentration has decreased below 1 ppm, then placed in the active landfilling area
- Treatment information and the final H2S measurement will be recorded on the OCD Form-C138 under "Source and Description of Waste"

Presence at the Leachate Evaporation Pond

- Concentration levels will be recorded in the inspection form provided in **Appendix E** of the Permit Narrative
- Personnel wearing the appropriate personal protective equipment and respirator if necessary, shall treat the pond water with 35 oz of calcium hypochlorite ($Ca(ClO)_2$) (1 coffee can).
- After approximately 20 minutes, the pond water will be re-sampled for the presence of H2S. Treatment will continue until the H2S reading is below 1 ppm.
- Completion of treatment will be recorded in the Facility operating log.

5.0 References

Oil and Gas Petroleum Refineries, 2010 (OG 2010).
https://oilandgass.blogspot.com/2010/04/radius-of-exposure-roe-calculation.html



REV.	DATE	BY	DESCRIPTION

Terracon
Consulting Engineers and Scientists
25809 I-30 SOUTH BRYANT, AR 72022
PH. (501) 847-9292 FAX. (501) 847-9210

SITE LOCATION MAP

PERMIT APPLICATION FIGURE

SURFACE WASTE MANAGEMENT FACILITY

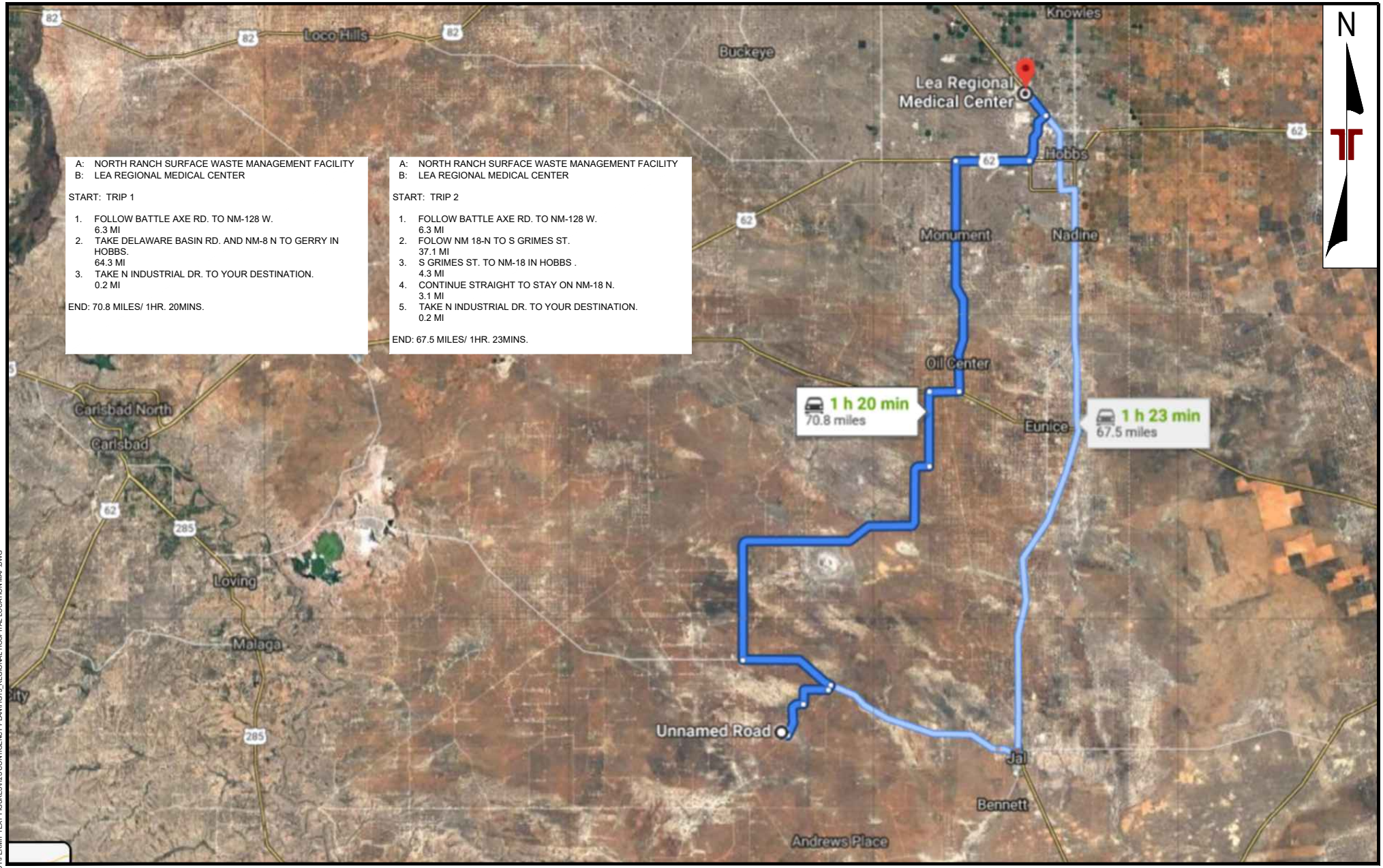
NORTH RANCH

LEA COUNTY NEW MEXICO

FIG. 1

DESIGNED BY:	-
DRAWN BY:	DEW
APPVD. BY:	MPB
SCALE:	1" = 100'
DATE:	SEPTEMBER 2019
JOB NO.	35187378
ACAD NO.	572/002
SHEET NO.:	1 OF 1

N:\GEOARCHIVE\CAD\572\002\MCCLOY\PERMIT TEXT FIGURES\PERMIT NARRATIVE\FIG 1 - SITE LOCATION MAP.DWG



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REV.	DATE	BY	DESCRIPTION

Terracon
Consulting Engineers and Scientists
25809 I-30 SOUTH BRYANT, AR 72022
PH. (501) 847-9292 FAX. (501) 847-9210

HOSPITAL LOCATION MAP

PERMIT APPLICATION FIGURE

SURFACE WASTE MANAGEMENT FACILITY

NORTH RANCH

LEA COUNTY NEW MEXICO

FIG. 2

DESIGNED BY:	DEW
DRAWN BY:	DEW
APPVD. BY:	MPB
SCALE:	AS SHOWN
DATE:	APRIL 2019
JOB NO.	35187378
ACAD NO.	572/002
SHEET NO.:	1 OF 2

LEGEND:

- 3300 — EXISTING GRADE CONTOURS (11-30-2018, 2' CONTOURS)
- PERMIT BOUNDARY AND SECURITY FENCELINE
- OE — OVERHEAD ELECTRIC
- G — EXISTING GAS LINES / GAS EASEMENT
- W — EXISTING WATER LINE
- EXISTING CENTERLINE
- CELL BOUNDARIES
- SITE ROAD
- PRIMARY EVACUATION ROUTE
- SECONDARY EVACUATION ROUTE
- 10 LB FIRE EXTINGUISHER
- 20 LB FIRE EXTINGUISHER
- OIL BOOM
- SCBA — SELF CONTAINED BREATHING APPARATUS
- PPE — PERSONAL PROTECTIVE EQUIPMENT
- FIRST AID KIT
- EYE WASH STATION
- TWO WAY RADIO

EXISTING WELL PAD

EXISTING TANK PAD

SITE ENTRANCE

NORTH STORMWATER POND

MAIN GATE

SCALES AND SCALEHOUSE

LEACHATE EVAP POND

PPE
SCBA

PAVED DRIVEWAY

CELL E-1 (9.6 AC.)

CELL E-2 (9.6 AC.)

CELL W-1 (15.3 AC.)

CELL W-2 (11.8 AC.)

CELL W-3 (15.2 AC.)

CELL W- (23.9 AC.)

CELL W-5 (2 .7 AC.)

PHASE 2

PHASE 3

PHASE 1

CELL E-3 (28.2 AC.)

CELL E- (18. AC.)

CELL E-5 (18.6 AC.)

CELL E-6 (21.6 AC.)

DIESEL STORAGE TANK, IF INSTALLED LOCATION MAY VARY

PROPOSED DRYING PAD

PROPOSED WASH PAD

10 PPM POINT SOURCE AT SCALE HOUSE, H2S RADIUS OF EXPOSURE ~692-FEET

BATTLE AXE ROAD (HWY 2)

WEST STORMWATER POND

EAST STORMWATER POND

SECONDARY EMERGENCY EVACUATION/ACCESS GATE

EXISTING WELL PAD

EXISTING TANK PAD

EXISTING WELL PAD

N

500 0 250 500

SCALE IN FEET

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REV.	DATE	BY	DESCRIPTION

SITE EVACUATION PLAN

PERMIT APPLICATION FIGURE

SURFACE WASTE MANAGEMENT FACILITY

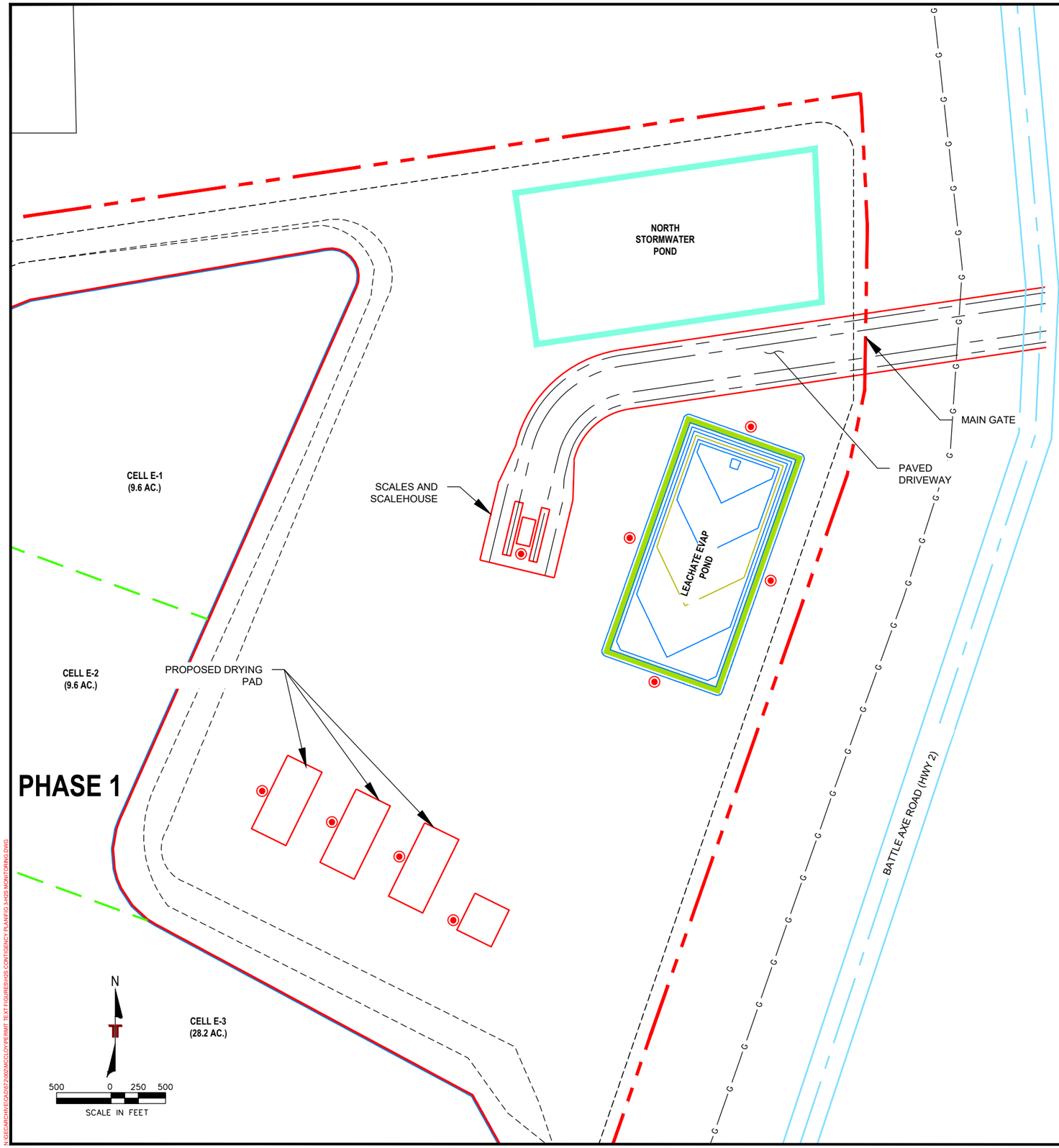
NORTH RANCH

LEA COUNTY NEW MEXICO

Terracon
Consulting Engineers and Scientists
25809 I-30 SOUTH
PH. (501) 847-9292
BRYANT, AR 72022
FAX: (501) 847-9210

FIGURE 3

DESIGNED BY:	MPB
DRAWN BY:	DEW
APPVD. BY:	MPB
SCALE:	SEE SCALEBAR
DATE:	APRIL 2019
JOB NO.	35187378
ACAD NO.	572/002
SHEET NO.:	OF

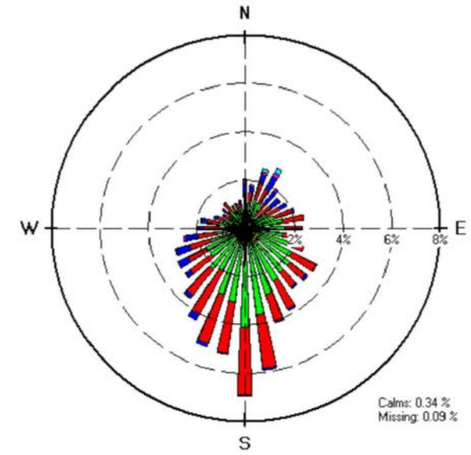


LEGEND:

- 3300 — EXISTING GRADE CONTOURS (11-30-2018, 2' CONTOURS)
- PERMIT BOUNDARY AND SECURITY FENCELINE
- G G G — EXISTING GAS LINES / GAS EASEMENT
- EXISTING CENTERLINE
- CELL BOUNDARIES
- SITE ROAD
- STATIONARY H2S MONITORING LOCATION

NEW MEXICO ENVIRONMENTAL DEPARTMENT - AIR QUALITY BUREAU

2015 WINDROSE DATA FOR HOBBS, NEW MEXICO (STATION 722676)



Note: Diagram of the frequency of occurance of each wind direction.

Met File Type: AERMET SFC

REV.	DATE	BY	DESCRIPTION

STATIONARY H2S MONITORING
PERMIT APPLICATION FIGURE
SURFACE WASTE MANAGEMENT FACILITY
NORTH RANCH
LEA COUNTY
NEW MEXICO

Terracon
Consulting Engineers and Scientists
25899 I-30 SOUTH
PH: (501) 847-9292
BRYANT, AR 72022
FAX: (501) 847-9210

FIGURE 4

DESIGNED BY:	MPB
DRAWN BY:	DEW
APPVD. BY:	MPB
SCALE:	SEE SCALEBAR
DATE:	APRIL 2019
JOB NO.	35187378
ACAD NO.	572/002
SHEET NO.:	OF

N:\GEC\ARCHIVE\CAD\572\002\MCCLOY\PERMIT TEXT FIGURES\H2S CONTIGENCY PLAN\FIG 3-H2S MONITORING.DWG

EXHIBIT A

INCIDENT REPORT FORM

North Ranch Surface Waste Management Facility
Incident Report Form

Type of Incident and General Information	
[ ] Work Related Injury/Illness	[ ] Unsafe Act/Near Miss
[ ] Property Damage	[ ] Vandalism/Criminal Activity
[ ] Vehicular Accident	[ ] Other _____ (i.e. spill, release, fire, explosion, hot load, etc.)

Employee Name: _____ Job Title: _____

Phone No.: _____ Date of Incident: _____ Time of Incident: _____AM/PM

Location of Incident: _____ Weather: _____

Date and Time Reported to Management: Date: _____Time: _____AM/PM

Reported to: _____Title: _____ Reported by: _____

Injury Category of Incident when first reported?
[ ] N/A Employee was not injured
[ ] Notice of injury only, medical treatment declined at this time
[ ] First aid performed onsite, medical treatment declined at this time
[ ] Medical Treatment - transported by _____ to _____
[ ] Employee Fatality

(Section below to be filled out by employee)

Employee's Description of Incident
Were you injured? [ ] yes [ ] no
Type of injury?
Area of body?
In your own words, explain the incident:

Employee Signature: _____ Date: _____

EXHIBIT B

FORM C-141

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources Department

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-141
Revised August 24, 2018
Submit to appropriate OCD District office

Incident ID	
District RP	
Facility ID	
Application ID	

Release Notification

Responsible Party

Responsible Party	OGRID
Contact Name	Contact Telephone
Contact email	Incident # *(assigned by OCD)*
Contact mailing address	

Location of Release Source

Latitude _____ Longitude _____
(NAD 83 in decimal degrees to 5 decimal places)

Site Name	Site Type
Date Release Discovered	API# *(if applicable)*

Unit Letter	Section	Township	Range	County

Surface Owner: ☐ State ☐ Federal ☐ Tribal ☐ Private (*Name:* _____)

Nature and Volume of Release

Material(s) Released (Select all that apply and attach calculations or specific justification for the volumes provided below)

☐ Crude Oil	Volume Released (bbls)	Volume Recovered (bbls)
☐ Produced Water	Volume Released (bbls)	Volume Recovered (bbls)
	Is the concentration of dissolved chloride in the produced water >10,000 mg/l?	☐ Yes ☐ No
☐ Condensate	Volume Released (bbls)	Volume Recovered (bbls)
☐ Natural Gas	Volume Released (Mcf)	Volume Recovered (Mcf)
☐ Other (describe)	Volume/Weight Released (provide units)	Volume/Weight Recovered (provide units)
Cause of Release		

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

Was this a major release as defined by 19.15.29.7(A) NMAC? ☐ Yes ☐ No	If YES, for what reason(s) does the responsible party consider this a major release?
If YES, was immediate notice given to the OCD? By whom? To whom? When and by what means (phone, email, etc)?	

Initial Response

The responsible party must undertake the following actions immediately unless they could create a safety hazard that would result in injury

☐ The source of the release has been stopped.

☐ The impacted area has been secured to protect human health and the environment.

☐ Released materials have been contained via the use of berms or dikes, absorbent pads, or other containment devices.

☐ All free liquids and recoverable materials have been removed and managed appropriately.

If all the actions described above have not been undertaken, explain why:

Per 19.15.29.8 B. (4) NMAC the responsible party may commence remediation immediately after discovery of a release. If remediation has begun, please attach a narrative of actions to date. If remedial efforts have been successfully completed or if the release occurred within a lined containment area (see 19.15.29.11(A)(5)(a) NMAC), please attach all information needed for closure evaluation.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Printed Name: _____ Title: _____

Signature: _____ Date: _____

email: _____ Telephone: _____

OCD Only

Received by: _____ Date: _____

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

Site Assessment/Characterization

This information must be provided to the appropriate district office no later than 90 days after the release discovery date.

What is the shallowest depth to groundwater beneath the area affected by the release?	_____ (ft bgs)
Did this release impact groundwater or surface water?	☐ Yes ☐ No
Are the lateral extents of the release within 300 feet of a continuously flowing watercourse or any other significant watercourse?	☐ Yes ☐ No
Are the lateral extents of the release within 200 feet of any lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark)?	☐ Yes ☐ No
Are the lateral extents of the release within 300 feet of an occupied permanent residence, school, hospital, institution, or church?	☐ Yes ☐ No
Are the lateral extents of the release within 500 horizontal feet of a spring or a private domestic fresh water well used by less than five households for domestic or stock watering purposes?	☐ Yes ☐ No
Are the lateral extents of the release within 1000 feet of any other fresh water well or spring?	☐ Yes ☐ No
Are the lateral extents of the release within incorporated municipal boundaries or within a defined municipal fresh water well field?	☐ Yes ☐ No
Are the lateral extents of the release within 300 feet of a wetland?	☐ Yes ☐ No
Are the lateral extents of the release overlying a subsurface mine?	☐ Yes ☐ No
Are the lateral extents of the release overlying an unstable area such as karst geology?	☐ Yes ☐ No
Are the lateral extents of the release within a 100-year floodplain?	☐ Yes ☐ No
Did the release impact areas **not** on an exploration, development, production, or storage site?	☐ Yes ☐ No

Attach a comprehensive report (electronic submittals in .pdf format are preferred) demonstrating the lateral and vertical extents of soil contamination associated with the release have been determined. Refer to 19.15.29.11 NMAC for specifics.

Characterization Report Checklist: ***Each of the following items must be included in the report.***

- ☐ Scaled site map showing impacted area, surface features, subsurface features, delineation points, and monitoring wells.
- ☐ Field data
- ☐ Data table of soil contaminant concentration data
- ☐ Depth to water determination
- ☐ Determination of water sources and significant watercourses within ½-mile of the lateral extents of the release
- ☐ Boring or excavation logs
- ☐ Photographs including date and GIS information
- ☐ Topographic/Aerial maps
- ☐ Laboratory data including chain of custody

If the site characterization report does not include completed efforts at remediation of the release, the report must include a proposed remediation plan. That plan must include the estimated volume of material to be remediated, the proposed remediation technique, proposed sampling plan and methods, anticipated timelines for beginning and completing the remediation. The closure criteria for a release are contained in Table 1 of 19.15.29.12 NMAC, however, use of the table is modified by site- and release-specific parameters.

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Printed Name: _____ Title: _____

Signature:_____ Date: _____

email: _____ Telephone: _____

OCD Only

Received by: _____ Date**:** _____

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

Remediation Plan

Remediation Plan Checklist: ***Each of the following items must be included in the plan.***

- ☐ Detailed description of proposed remediation technique
- ☐ Scaled sitemap with GPS coordinates showing delineation points
- ☐ Estimated volume of material to be remediated
- ☐ Closure criteria is to Table 1 specifications subject to 19.15.29.12(C)(4) NMAC
- ☐ Proposed schedule for remediation (note if remediation plan timeline is more than 90 days OCD approval is required)

Deferral Requests Only: ***Each of the following items must be confirmed as part of any request for deferral of remediation.***

☐ Contamination must be in areas immediately under or around production equipment where remediation could cause a major facility deconstruction.

☐ Extents of contamination must be fully delineated.

☐ Contamination does not cause an imminent risk to human health, the environment, or groundwater.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Printed Name: _____ Title: _____

Signature: _____ Date: _____

email: _____ Telephone: _____

OCD Only

Received by: _____ Date: _____

☐ Approved ☐ Approved with Attached Conditions of Approval ☐ Denied ☐ Deferral Approved

Signature: _____ Date: _____

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

Closure

The responsible party must attach information demonstrating they have complied with all applicable closure requirements and any conditions or directives of the OCD. This demonstration should be in the form of a comprehensive report (electronic submittals in .pdf format are preferred) including a scaled site map, sampling diagrams, relevant field notes, photographs of any excavation prior to backfilling, laboratory data including chain of custody documents of final sampling, and a narrative of the remedial activities. Refer to 19.15.29.12 NMAC.

Closure Report Attachment Checklist: *Each of the following items must be included in the closure report.*

☐ A scaled site and sampling diagram as described in 19.15.29.11 NMAC

☐ Photographs of the remediated site prior to backfill or photos of the liner integrity if applicable (Note: appropriate OCD District office must be notified 2 days prior to liner inspection)

☐ Laboratory analyses of final sampling (Note: appropriate ODC District office must be notified 2 days prior to final sampling)

☐ Description of remediation activities

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations. The responsible party acknowledges they must substantially restore, reclaim, and re-vegetate the impacted surface area to the conditions that existed prior to the release or their final land use in accordance with 19.15.29.13 NMAC including notification to the OCD when reclamation and re-vegetation are complete.

Printed Name: _____ Title: _____

Signature: _____ Date: _____

email: _____ Telephone: _____

OCD Only

Received by: _____ Date: _____

Closure approval by the OCD does not relieve the responsible party of liability should their operations have failed to adequately investigate and remediate contamination that poses a threat to groundwater, surface water, human health, or the environment nor does not relieve the responsible party of compliance with any other federal, state, or local laws and/or regulations.

Closure Approved by: _____ Date: _____

Printed Name: _____ Title: _____

EXHIBIT C

API RP – 55

Recommended Practice for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide

Recommended Practice for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide

API RECOMMENDED PRACTICE 55
SECOND EDITION, FEBRUARY 15, 1995
REAFFIRMED, MARCH 2007

Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide

Exploration and Production Department

API RECOMMENDED PRACTICE 55
SECOND EDITION, FEBRUARY 15, 1995

American
Petroleum
Institute

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CONTENTS

FOREWORD

These recommended practices were prepared by the API Subcommittee on Production Operations Involving Hydrogen Sulfide. This standard is under the administration of the American Petroleum Institute Exploration & Production Department's Executive Committee on Drilling & Production Practices.

It is intended that these voluntary recommended practices serve as a guide to promote and maintain integrity of oil and/or gas producing and gas processing facilities in the interests of public safety, personnel safety, and protection of the environment. Users of this publication are reminded that constantly developing technology, specific company requirements and policy, and specialized or limited operations do not permit coverage of all possible operations, practices, or alternatives. This standard is not so comprehensive as to present *all* of the recommended practices for oil and gas well producing operations and gas processing plant operations involving hydrogen sulfide. Alternative operating procedures and/or equipment are available and routinely used to meet or exceed recommended practices or performance levels set forth herein. Recommendations presented in this publication are based on industry experience and expertise involving a wide range of operating locations and conditions. Recommendations presented in this publication are not intended to inhibit developing technology and equipment improvements or improved operating procedures. This publication, or portions thereof, cannot be substituted for qualified technical/operations analysis and judgment to fit a specific situation.

There may be federal, state, or local statutes, rules, or regulations requiring oil and gas producing and gas processing operations to be conducted in a safe or environmentally sound manner. Organizations and individuals using this standard are cautioned that requirements of federal, state, or local laws and regulations are constantly evolving. These requirements should be reviewed to determine whether the practices recommended herein and the operations being planned or conducted are consistent with current laws and regulations.

Information concerning safety and health risks and proper precautions with respect to particular materials and conditions should be obtained from the employer, the manufacturer or supplier of that material, or the material safety data sheet (MSDS).

Provisions of these voluntary recommended practices include use of the verbs "shall" and "should", whichever is deemed most applicable for the specific situation. For purposes of this publication, the following definitions are applicable.

Shall: Indicates the "recommended practice(s)" has universal applicability to that specific activity.

Should: Denotes a "recommended practice(s)" 1) where a safe comparable alternative practice(s) is available; 2) that may be impractical under certain circumstances; or 3) that may be unnecessary under certain circumstances.

Suggested revisions to these recommended practices are invited and should be submitted in writing to: Director, Exploration & Production Department, American Petroleum Institute, 700 North Pearl Street, Suite 1840, Dallas, Texas 75201-2845.

Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide

0 Introduction

The petroleum industry, through many years of research and operating experience, has developed guidelines for safe operations under conditions involving hydrogen sulfide. Continuing industry efforts, which include planning, prudent selection and layout of equipment, prudent selection of materials, operating and emergency procedures, specialized safety equipment, and appropriate personnel training are all necessary to ensure successful and safe operations. Effective response to emergencies requires prior planning. *Good engineering practice (engineering and administrative controls) dictates that producing and gas processing systems be designed to minimize exposure of personnel and the public to hydrogen sulfide and sulfur dioxide.*

1 Scope

Recommendations set forth in this publication apply to oil and gas producing and gas processing plant operations conducted with hydrogen sulfide present in the fluids being handled. The presence of hydrogen sulfide in these operations also presents the possibility of exposure to sulfur dioxide from the combustion of hydrogen sulfide. *Refer to Section 4 for applicability of this standard.*

2 References

2.1 STANDARDS

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. All standards are subject to revision, and users are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

ACGIH[1]

1. *Threshold Limit Values and Biological Exposure Indices (1993-94).*

ANSI[2]

2. B31.3 *Chemical Plant and Petroleum Refining Piping.*
3. B31.4 *Liquid Petroleum Transportation Piping Systems.*
4. B31.8 *Gas Transmission and Distribution Piping Systems.*
5. CGA G-7.1 *Breathing Air, Grade D.*
6. ISEA 102 *Standard for Gas Detector Tube Units—Short Term Type for Toxic Gases and Vapors in Working Environments.*
7. Z88.2 *Practices for Respiratory Protection.*

API[3]

8. BUL E1 *Bulletin on the Generic Hazardous Chemical Category List and Inventory for the Oil and Gas Exploration & Production Industry.*
9. BUL E2 *Bulletin on Management of Naturally Occurring Radioactive Materials (NORM) in Oil and Gas Production.*
10. BUL E3 *Well Abandonment and Inactive Well Practices for U.S. Exploration and Production Operations.*
11. BUL E4 *Release Reporting for the Oil and Gas Exploration and Production Industry as Required by the CWA, CERCLA, and SARA Title III.*
12. RP12R1 *Recommended Practice for Setting, Maintenance, Inspection, Operation, and Repair of Tanks in Production Service.*
13. RP14C *Recommended Practice for Analysis, Design, Installation, and Testing of Basic Surface Safety Systems for Offshore Production Platforms.*
14. RP49 *Recommended Practice for Drilling and Drill Stem Testing Operations Involving Hydrogen Sulfide.*
15. RP500 *Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities.*
16. API 510 *Pressure Vessel Inspection Code: Maintenance Inspection, Rating, Repair, and Alteration.*
17. RP576 *Inspection of Pressure Relieving Devices.*
18. RP750 *Management of Process Hazards.*
19. STD 1104 *Welding of Pipelines and Related Facilities.*
20. PUBL 2217A *Guidelines for Work in Inert Confined Spaces in the Petroleum Industry.*

ASME[4]

21. *Boiler & Pressure Vessel Code.*

[1]American Conference of Governmental Industrial Hygienists, 1330 Kemper Drive, Cincinnati, OH 45240.
[2]American National Standards Institute, 1430 Broadway, New York, N.Y. 10018.
[3]American Petroleum Institute, Publications & Distribution Section, 1220 L Street NW, Washington, D.C. 20005.
[4]American Society of Mechanical Engineers, 22 Law Drive, Box 2300, Fairfield, NJ 07007-2300.

EPA[5]

22. EPA/600/8-86/026A *Health Assessment Document for Hydrogen Sulfide.*

ISA[6]

23. S12.15, Part I *Performance Requirements for Hydrogen Sulfide Detection Instruments.*

24. RP12.15, Part II *Installation, Operation, and Maintenance of Hydrogen Sulfide Detection Instruments.*

NACE[7]

25. MR0175-94 *Standard Material Requirements Sulfide Stress Cracking Resistant Metallic Materials for Oilfield Equipment.*

National Response Team[8]

26. NRT-1 *Hazardous Materials Emergency Planning Guide.*

27. *Technical Guidance for Hazards Analysis, Emergency Planning for Extremely HazardousSubstances.*

NFPA[9]

28. NFPA 70 *National Electrical Code.*

29. NFPA 496 *Purged and Pressurized Enclosures for Electrical Equipment in Hazardous (Classified) Locations.*

NIOSH[10]

30. NIOSH 74-111 *Criteria for a Recommended Standard for Occupational Exposure to Sulfur Dioxide (GPO No. 017-033-00029).*

31. NIOSH 77-158 *Criteria for a Recommended Standard for Occupational Exposure to Hydrogen Sulfide (GPO No. 017-033-00217-7).*

32. DHHS 85-114 *NIOSH Pocket Guide to Chemical Hazards.*

PACE[11]

33. Report 85-5 *Review of Ambient Hydrogen Sulfide Standards in Canada.*

2.2 REGULATIONS

The following regulations are referenced in this standard. All regulations are subject to revision, and users should determine the latest version to ensure compliance.

Bureau of Mines (DOI)[12]

34. 30 *CFR* Chapter 1, Subchapter B, Part II, Subpart H *Respiratory Protection Devices.*

Coast Guard (DOT)[13]

35. 33 *CFR* Parts 140, 143, and 146 *Emergency Evacuation Plans for Manned OCS Facilities.*

36. 54 *FR* 21566, May 18, 1989 *Emergency Evacuation Plans for Manned OCS Facilities.*

DOT[14]

37. 49 *CFR* Part 178, Subpart C *Shipping Container Specifications.*

EPA[5]

38. 40 *CFR* Part 264, Subpart D *Contingency Plans and Emergency Procedures.*

39. 40 *CFR* Part 302 *Designation, Reportable Quantities, and Notification.*

40. 40 *CFR* Part 355 *Emergency Planning and Notification.*

41. 40 *CFR* Part 370 *Hazardous Chemical Reporting: Community Right-to-Know.*

MMS (DOI)[15]

42. 30 *CFR* Parts 250 & 256 *Oil, Gas, and Sulphur Operations in the Outer Continental Shelf.*

43. 53 *FR* 10596-10777, April 1, 1988 *Oil, Gas, and Sulphur Operations in the Outer Continental Shelf.*

44. MMS-OCS-1 *Safety Requirements for Drilling Operations in a Hydrogen Sulfide Environment, Outer Continental Shelf. (February 1976).*

[5]Environmental Protection Agency, available from U.S. Government Printing Office, Washington, D.C. 20402.

[6]Instrument Society of America, Box 12277, Research Triangle Park, NC 27709.

[7]National Association of Corrosion Engineers, NACE International, Box 218340, Houston, Texas 77218-8340.

[8]National Response Team, National Oil and Hazardous Substances Contingency Plan GWDR/12, 2100 Second Street SW, Washington, D.C. 20593.

[9]National Fire Protection Association, 60 Batterymarch Park, Quincy, MA 02269.

[10]National Institute for Occupational Safety and Health (U.S. Department of Health, Education, and Welfare), available from U.S. Government Printing Office, Washington, D.C. 20402.

[11]Petroleum Association for Conservation of the Canadian Environment, 12002-275 Slater Street, Ottawa, Ontario, Canada LIP-5H9.

[12]Bureau of Mines, U.S. Department of Interior, available from U.S. Government Printing Office, Washington, D.C. 20402.

[13]Coast Guard, U.S. Department of Transportation, available from U.S. Government Printing Office, Washington, D.C. 20402.

[14]U.S. Department of Transportation, available from U.S. Government Printing Office, Washington, D.C. 20402.

[15]Minerals Management Service, U.S. Department of Interior, 381 Elden Street, Herndon, VA 22070-4817. Available from U.S. Government Printing Office, Washington, D.C. 20402.

45.	47 *FR* 28888, July 1, 1982	*Safety Requirements for Drilling Operations in a Hydrogen Sulfide Environment, Outer Continental Shelf. (July 1, 1982).*
OSHA[16]		
46.	29 *CFR* Part 1910.38	*Employee Emergency Plan and Fire Prevention Plans.*
47.	29 *CFR* Part 1910.119	*Process Safety Management of Highly Hazardous Chemicals.*
48.	29 *CFR* Part 1910.120	*Hazardous Waste Operations and Emergency Response.*
49.	54 *FR* Part 9294, March 6, 1989	*Hazardous Waste Operations and Emergency Response.*
50.	29 *CFR* Part 1910.134	*Respiratory Protection Standard.*
51.	29 *CFR* Part 1910.146	*Permit-required Confined Spaces.*
52.	29 *CFR* Part 1910.1000	*Toxic and Hazardous Substances (Air Contaminants).*
53.	54 *FR* 2332, January 19, 1989	*Air Contaminants.*
54.	58 *FR* 35338, June 30, 1993	*Air Contaminants.*
55.	29 *CFR* Part 1910.1200	*Hazard Communication Standard.*

2.3 OTHER REFERENCES

56. Poda, George A., "Hydrogen Sulfide Can Be Handled Safely", *Archives of Environmental Health,* Vol. 12, 795-800, June 1966.

57. Ronk, Richard and White, M. K., "Hydrogen Sulfide and the Probabilities of Inhalation Through a Tympanic Membrane Defect", *Journal of Occupational Medicine,* Vol. 25, No. 5, 337-340, May 1985.

58. *Synopsis of Boiler & Pressure Vessel Laws, Rules, and Regulations by States, Cities, Counties, and Provinces (United States and Canada),* available from Uniform Boiler and Pressure Vessel Laws Society, P. O. Box 1521, Oceanside, New York, NY 11572.

59. Pasquill, F., *Atmospheric Difusion,* Second Edition, John Wiley & Sons, New York, NY, 1947.

60. Slade, D. H., *Metrology and Atomic Energy* NTIS-TID 24190 (1968), National Technical Information Service (NTIS), U.S. Department of Commerce, Springfield, VA 22161.

61. Wilson, D. J., "Release and Dispersion of Gas from Pipeline Ruptures", Department of Mechanical Engineering, University of Alberta, Edmonton, Canada.

62. Jann, P. R., "Evaluation of Sheltering In Place", *Journal of Loss Prevention in the Process Industry,* Vol. 2, No. 1, Jan. 1989, pp 33-38.

63. MacFarlane, D. R. and Ewing, T. F., "Acute Health Effects From Accidental Releases of High Toxic Hazard Chemicals", *Journal of Loss Prevention in the Process Industry,* Vol. 3, No. 1, January 1990, pp 167-176.

64. Wilson, D. J., "Stay Indoors or Evacuate to Avoid Exposure to Toxic Gas?", *Emergency Preparedness Digest,* Ottawa, Canada, January-March 1987, pp 19-24.

65. Davies, P. C. and Purdy, G., "Toxic Gas Risk Assessments—The Effects of Being Indoors", North Western Branch Papers 1986 No. 1, Institution of Chemical Engineers, Health and Safety Executive, Major Hazards Assessment Unit, St. Annes House, Stanly Precinct, Bootle, Merseyside, England.

66. Glickman, T.S. and Ujrhara, A. M., "Protective Action Decision Making in Toxic Vapor Cloud Emergencies", Center for Risk Management, Resources for the Future, Washington, D. C. 20036.

67. Wilson, D. J., "Variation of Indoor Shelter Effectiveness Caused by Air Leakage Variability of Houses in Canada and the USA", US EPA/FEMA Conference on Effective Use of In-place Sheltering as a Potential Option to Evacuation During Chemical Release Emergencies, Emmitsburg, MD, November 30-December 1, 1988.

2.4 BIBLIOGRAPHY

The following publications contain information related to this subject:

API RP14F *Recommended Practice for Design and Installation of Electrical Systems for Offshore Production Platforms.*

API RP54 *Recommended Practices for Occupational Safety for Oil and Gas Well Drilling and Servicing Operations.*

Recommended Standard for Occupational Exposure to Hydrogen Sulfide, National Institute for Occupational Safety and Health, 125 Baker Drive, Morgantown, WV.

Texas Railroad Commission Rule 36: *Oil, Gas, and Geothermal Resources Operations in Hydrogen Sulfide Areas,* Texas Railroad Commission, Austin, TX.

Public Health Service Publication 999-AP-26, *Workbook on Atmospheric Dispersion Estimates,* D. Bruce Tanner, available from U.S. Department of Health, Education, and Welfare, Cincinnati, OH.

[16]Occupational Safety & Health Administration (U.S. Department of Labor), available from U.S. Government Printing Office, Washington, D.C. 20402.

GPA 2145-85 *Physical Constants of Paraffin Hydrocarbons and Other Components of Natural Gas*, available from Gas Processors Association, 6526 E. 60th Street, Tulsa, OK 74145.

2.5 ACRONYMS AND ABBREVIATIONS

The following acronyms and abbreviations are used in this publication:

ACC Acceptable Ceiling Concentration
ACGIH American Conference of Governmental Industrial Hygienists
ANSI American National Standards Institute
API American Petroleum Institute
ASME American Society of Mechanical Engineers
ASTM American Society for Testing and Materials
CERCLA *Comprehensive Environmental Response, Compensation, and Liability Act*
CFR *Code of Federal Regulations*
CWA *Clean Water Act*
DC Direct Current
DOI U. S. Department of Interior
DOL U. S. Department of Labor
DOT U. S. Department of Transportation
EMI Electromagnetic Interference
EPA Environmental Protection Agency
ERPG *Emergency Response Planning Guide*
FR *Federal Register*
HAZWOPER Hazardous Waste Operations and Emergency Response
IDLH Immediately Dangerous to Life or Health
ISA Instrument Society of America
LEL Lower Explosive Limit
LEPC Local Emergency Planning Committee
MMS Minerals Management Service
MSDS Material Safety Data Sheet
NACE National Association of Corrosion Engineers
NFPA National Fire Protection Association
NIOSH National Institute for Occupational Safety and Health
NORM Naturally Occurring Radioactive Material
NRTL National Recognized Testing Laboratory
NTIS National Technical Information Service
OCS Outer Continental Shelf
OSHA Occupational Safety and Health Administration
PEL Permissible Exposure Limit
PG Pasquill-Gifford
RCRA *Resource Conservation & Recovery Act*
REL Recommended Exposure Level
RFI Radio Frequency Interference
ROE Radius of Exposure
RP *Recommended Practice*
RQ Reportable Quantity
SARA *Superfund Amendments and Reauthorization Act*
SCF Standard Cubic Foot
SSC Sulfide Stress Cracking
STEL Short Term Exposure Level
TLV Threshold Limit Value
TPQ Threshold Planning Quantity
WPS Welding Procedure Specification

3 Definitions

For the purposes of this standard, the following definitions are applicable.

3.1 acceptable ceiling concentration: (ACC). The designated level of an air contaminant to which an employee may be exposed at any time during an 8-hour shift, except for a specified time period and up to a specified concentration not exceeding the "acceptable maximum peak concentration" above the acceptable ceiling concentration for an 8-hour shift. Refer to 29 *CFR* 1910.1000 and Appendix A, Par. A.2.

3.2 breathing zone: A hemisphere forward of the shoulders with a radius of 6 to 9 inches. Refer to OSHA Instruction CPL 2-2.20A, March 30, 1984; amended by CPL 2-20A CH-1, October 29, 1984.

3.3 continuous hydrogen sulfide monitoring equipment: Equipment capable of continuously measuring and displaying the concentration of hydrogen sulfide in ambient air.

3.4 emergency response planning guide—level 2: (ERPG-2). The maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair an individual's ability to take protective actions. Refer to *Technical Guidance for Hazards Analysis; Emergency Planning for Extremely Hazardous Substances.*

3.5 enclosed facility: A three-dimensional space enclosed by more than two-thirds (2/3) of the possible projected plane surface and of sufficient size to allow the entry of personnel. For a typical building, this would require that more than two-thirds of the walls, ceiling, and floor be present. Refer to *API Recommended Practice 500.*

3.6 essential personnel: Those individuals required to

provide proper and prudent safe operations activities and those required to effect control of the hazardous hydrogen sulfide or sulfur dioxide conditions.

3.7 gas detection instrument: An assembly of electrical, mechanical, and chemical components designed to sense and respond continuously to the presence of chemical gases in atmospheric mixtures.

3.8 hydrogen sulfide: Chemical formula is H_2S. A flammable, toxic gas that is heavier than air and sometimes found in fluids encountered in oil and gas producing and gas processing operations. *Inhalation at certain concentrations can lead to injury or death.* Refer to Appendix A.

3.9 immediately dangerous to life and health: (IDLH). An atmospheric concentration of any toxic, corrosive, or asphyxiant substance that poses an immediate threat to life or would cause irreversible or delayed adverse health effects or would interfere with an individual's ability to escape from a dangerous atmosphere. The National Institute for Occupational Safety & Health (NIOSH) considers 300 ppm and 100 ppm to be the IDLH concentrations for hydrogen sulfide and sulfur dioxide, respectively. *API Publication 2217A* specifies an oxygen content of less than 19.5% as oxygen deficient and an oxygen content of less than 16% is considered IDLH.

3.10 inadequately ventilated: Ventilation (natural or artificial) that is *not* sufficient to prevent the accumulation of significant quantities of hydrogen sulfide-air mixtures in excess of 10 ppm.

3.11 length-of-stain detector: A specially designed pump and colorimetric indicator tube detector (length-of-stain), with a supply of detector tubes, that operates by using the pump to pull a known volume of air or gas through a detector tube. The tubes contain chemical reagents that are designed to detect the presence and display the concentration of hydrogen sulfide or sulfur dioxide in the sample. The length of the resultant color band in the tube indicates an instantaneous quantitative concentration of the specific chemical in the sample.

3.12 permissible exposure limit: (PEL). The designated level of any airborne contaminant to which an employee may be exposed. The PEL may be expressed as an eight-hour time weighted average (TWA), a ceiling value, a short term exposure level (STEL), or a skin designation. PELs are subject to change and users should check the latest version of *29 Code of Federal Regulations* Part 1910.1000 for compliance.

3.13 shall: Indicates the "recommended practice(s)" has universal applicability to that specific activity.

3.14 shelter-in-place: The concept of providing the public additional protection by having residents stay indoors until emergency evacuators arrive or the emergency is over. Refer to references *62, 63, 64, 65, 66,* and *67.*

3.15 should: Denotes a "recommended practice(s)" 1) where a safe comparable alternative practice(s) is available; 2) that may be impractical under certain circumstances; or 3) that may be unnecessary under certain circumstances.

3.16 sulfur dioxide: Chemical formula is SO_2. A toxic product of combustion of hydrogen sulfide. This gas is heavier than air. *Inhalation at certain concentrations can lead to injury or death.* Refer to Appendix B.

3.17 threshold limit value: (TLV). The maximum airborne concentration of a substance to which, it is believed that, nearly all workers may be repeatedly exposed day after day without adverse effects, as determined by the responsible committees of the American Conference of Governmental Industrial Hygienists (ACGIH). Refer to *"Threshold Limit Values and Biological Indices.* "TLV" is a trademarked term of ACGIH. TLVs are subject to change and users should check the latest edition of the forestated reference.

4 Applicability

4.1 PERSONNEL AND EQUIPMENT PROTECTION

In oil and gas producing operations and gas processing plant operations, severity of the environment shall be assessed. As a minimum, the following measures shall be implemented:

a. Personnel protection should be provided if the work area concentration of hydrogen sulfide (refer to Par. 3.8) exceeds 10 ppm eight-hour time weighted average (TWA) or 15 ppm as a short term exposure level (STEL) averaged over 15 minutes (refer to Appendix A); or the work area concentration of sulfur dioxide (refer to Par. 3.16) exceeds 2 ppm as an eight-hour TWA or 5 ppm as a STEL averaged over 15 minutes (refer to Appendix B). Personnel safety provisions of this publication do not apply when:
1. the atmospheric concentration of hydrogen sulfide could not exceed 10 ppm (by volume), or
2. the atmospheric concentration of sulfur dioxide could not exceed 2 ppm (by volume).

b. Equipment and materials shall be selected on the basis of resistance to sulfide stress cracking and corrosion. Refer to Section 8, "Design and Construction Practices", Appendix D, and *NACE Standard MR0175* for recommendations for selection of equipment and materials. The equipment and materials provisions of this publication do not apply when the partial pressure of hydrogen sulfide in the gas could not exceed 0.05 psia or 10 psia in the gas phase of sour crude systems (refer to Appendix D, Par. D.1.1.2).

Some conditions may require extensive personnel safety measures but only the use of conventional equipment and materials; other conditions may require the use of special equipment and materials but only minimal personnel safety

measures; still other conditions may require both.

Throughout this publication, "trigger levels" for various actions are used to ensure safety of employees and the public. These trigger levels have been established considering threshold limit values (TLVs—refer to Par. 3.17). These TLVs are subject to change and users should check the latest edition of *Threshold Limit Values and Biological Exposure Indices* and the latest revision of *29 Code of Federal Regulations* Part 1910.1000, "Toxic and Hazardous Substances", for compliance.

In 1989, the U. S. Department of Labor, Occupational Safety and Health Administration (OSHA) issued updated permissible exposure limits (PELs) for several hundred chemicals, including revised PELs for hydrogen sulfide (10 ppm as an eight-hour TWA or 15 ppm STEL averaged over 15 minutes) and sulfur dioxide [2 ppm as an eight-hour TWA or 5 ppm STEL averaged over 15 minutes (refer to 54 *Federal Register (FR)* 2333, January 19, 1989]. A federal court set aside the OSHA 1989 rule (refer to 58 *Federal Register* 35338, June 30, 1993).

The American Conference of Governmental Industrial Hygienists (ACGIH) recommends a hydrogen sulfide TLV of 10 ppm (eight-hour TWA) and a STEL of 15 ppm averaged over 15 minutes and recommends 2 ppm as an eight-hour TWA TLV and 5 ppm as a STEL averaged over 15 minutes for sulfur dioxide (refer to *Threshold Limit Values for Chemical Substances and Biological Exposure Indices*).

In the interest of safety and health, this standard recommends use of the ACGIH TLVs (refer to *Threshold Limit Values for Chemical Substances and Biological Exposure Indices 1993-94*) as trigger levels for employee safety (refer to Appendices A and B). Some states have adopted these levels as requirements for personal safety.

Individual employers may set their own trigger levels after review and due consideration of site specific conditions, various regulatory requirements, and material safety data sheet (MSDS) information. Users should check the current status of OSHA PELs, OSHA acceptable ceiling concentrations (ACCs), ACGIH TLVs, and applicable regulatory requirements concerning substances of interest.

4.2 LEGAL REQUIREMENTS

This publication presents recommended practices and precautions deemed pertinent to protect personnel and the public from exposure to potentially hazardous concentrations of hydrogen sulfide and sulfur dioxide. These recommended practices recognize that owners, operators, contractors, and their employees have separate responsibilities that may be contractual in nature. It is not the intent of these recommended practices to alter the contractual relationship(s) between the parties. Some of the practices recommended herein are mandatory by local, state, or federal laws, rules, and regulations. Because of the functional and geographical diversity of these requirements, no attempt has been made in these recommended practices to designate which are optional and which are required. Furthermore, even if all the practices recommended herein are followed, there still may be existing or future legally imposed laws or regulations which would not be met. *In the event of any omission or conflict between these recommended practices and legally required action(s) the requirements of laws and regulations must control.* Some of the federal regulations pertinent to safe production operations involving hydrogen sulfide are listed in Section 2, "References". Users of this publication shall review these regulations and other federal, state, and local laws to assure appropriate compliance in their specific operations.

4.3 HAZARD COMMUNICATION (WORKER RIGHT-TO-KNOW)

This publication contains important information that is intended as a guide but may not comply in all respects with OSHA's Hazard Communication Standard. Appropriate counsel should be sought to assure compliance with hazard communication requirements for the specific operations. Refer to OSHA rules on hazard communication in 29 *Code of Federal Regulations* Part 1910.1200, "Hazard Communication Standard" (52 *Federal Register (FR)* 31877-31886, August 24, 1987).

4.4 *COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION, AND LIABILITY ACT* (CERCLA) AND *SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT* (SARA) TITLE III (EMERGENCY) PLANNING AND COMMUNITY RIGHT-TO-KNOW)

Environmental Protection Agency (EPA) regulations implementing Title III of the *Superfund Amendments and Reauthorization Act of 1986* (SARA Title III) set threshold levels (threshold planning quantities, i.e., TPQs) for emergency planning at a local level. Both SARA Title III and CERCLA set reportable quantities (RQs) for reporting releases to the environment. The TPQ for both hydrogen sulfide and sulfur dioxide is 500 pounds; RQs for release reporting are 100 pounds for hydrogen sulfide and 1 pound for sulfur dioxide. TPQs and RQs (trigger levels) and the regulations requiring response plans and release reports under both SARA Title III and CERCLA are set forth in 40 *Code of Federal Regulations* Part 302, and 40 *Code of Federal Regulations* Part 355. Refer to *API Bulletin E-4* for guidance on release reporting requirements. "Trigger levels" for response plan and release reporting requirements are subject to change and users shall check the latest revisions for compliance. SARA Title III also requires submission of periodic and annual reports of information to state and local officials on the presence of hazardous chemicals at production

and gas processing facilities. Those regulations are set forth in 40 *Code of Federal Regulations* Part 370, and API has published suggested generic reporting forms (refer to *API Bulletin E-1*) that are acceptable to EPA. Appropriate guidance should be sought to assure compliance with these programs for the specific operations.

4.5 HAZARDOUS WASTE OPERATIONS AND AND EMERGENCY RESPONSE (HAZWOPER)

OSHA's standard, 29 *Code of Federal Regulations* Part 1910.120, sets requirements for safety and health protection of employees involved in cleanup operations at uncontrolled hazardous waste sites being performed under government mandate; certain hazardous waste treatment, storage, and disposal operations conducted under the *Resource Conservation and Recovery Act* (RCRA); and emergency response to incidents involving hazardous substances. Appropriate guidance should be sought to assure compliance with 29 *Code of Federal Regulations* Part 1910.120 requirements for the specific operations (refer to 54 *Federal Register* 9294-9336, March 6, 1989).

5 Personnel Training

5.1 INTRODUCTION

Operators of oil and gas producing and gas processing operations involving hydrogen sulfide shall alert personnel (including employees, service companies, and contractors) of the possibility of hydrogen sulfide atmospheric concentrations greater than 10 ppm and sulfur dioxide atmospheric concentrations greater than 2 ppm that may be encountered in the performance of their work. All personnel working in an area where concentrations of hydrogen sulfide or sulfur dioxide may exceed the levels stipulated in Par. 4.1.a should be provided with training prior to beginning the work assignment. All employers, whether operator, contractor, or subcontractor, shall be responsible for training and instruction of their own employees. Personnel assigned to work in areas where they may be exposed to hydrogen sulfide or sulfur dioxide shall be trained by a hydrogen sulfide safety instructor, as defined in Par. 5.6.

5.2 MINIMUM TRAINING

The value of training and periodic drills in all oil and gas producing and gas processing plant operations cannot be over emphasized. The uniqueness or complexity of a specific facility or operation will determine the extent of the training (e.g., SARA Title III and HAZWOPER; refer to Pars. 4.4 and 4.5) deemed necessary for the assigned personnel. However, the following elements are considered a minimum level of training for regularly assigned personnel:

a. The hazards, characteristics, and properties of hydrogen sulfide and sulfur dioxide (refer to Appendices A and B).
b. Sources of hydrogen sulfide and sulfur dioxide.
c. Proper use of hydrogen sulfide and sulfur dioxide detection methods used at the workplace.
d. Recognition of and proper response to the warning signals for hydrogen sulfide and sulfur dioxide detection systems used at the workplace.
e. Symptoms of hydrogen sulfide exposure (refer to Appendix A); symptoms of sulfur dioxide exposure (refer to Appendix B).
f. Rescue techniques and first aid to victims of hydrogen sulfide and sulfur dioxide exposure.
g. Proper use and maintenance of breathing equipment for working in a hydrogen sulfide and sulfur dioxide atmosphere (theory and hands-on practice, with demonstrated proficiency). Refer to 29 *Code of Federal Regulations* Part 1910.134.
h. Workplace practices and relevant maintenance procedures that have been established to protect personnel from the hazards of hydrogen sulfide and sulfur dioxide.
i. Wind direction awareness and routes of egress (refer to Par. 6.7).
j. Confined space and enclosed facility entry procedures (if applicable).
k. Emergency response procedures that have been established for the facility. Refer to Section 7, "Contingency Planning Including Emergency Procedures".
l. Locations and use of safety equipment.
m. Locations of emergency assembly areas, if so designated.

5.3 ADDITIONAL TRAINING FOR ONSITE SUPERVISORY PERSONNEL

Those personnel assigned supervising responsibilities at the site shall have additional training in the following elements:

a. Supervisor responsibilities of the contingency plan (refer to Section 7).
b. Effects of hydrogen sulfide on components of the hydrogen sulfide handling system (i.e., corrosion, embrittlement, etc.).

5.4 REFRESHER TRAINING

A formal recurring training program shall be implemented to maintain proficiency in the elements listed in Pars. 5.2 and 5.3, as appropriate.

5.5 TRAINING VISITORS AND OTHER NON-REGULARLY ASSIGNED PERSONNEL

Prior to entering a potentially hazardous area, visitors and other non-regularly assigned personnel shall be briefed on route(s) of egress, emergency assembly area(s), applicable warning signals, and how to respond in the event of an emergency, including use of personal protective equipment, if re-

quired. These personnel may be allowed in potentially hazardous areas only in the presence of trained personnel, after being briefed on emergency action and evacuation procedures. In the event of an emergency, these personnel shall be immediately evacuated or immediately supplied with proper personal protective equipment.

5.6 HYDROGEN SULFIDE SAFETY INSTRUCTORS

Hydrogen sulfide safety instructors are persons who have successfully completed a course in hydrogen sulfide instructor training from an institution or organization offering such courses, or have received equivalent instruction from a company-designated hydrogen sulfide safety instructor/trainer, or have had equivalent instructor/trainer experience. A recurring training program shall be implemented to maintain proficiency of the hydrogen sulfide safety instructor.

5.7 SAFETY REVIEW

Before any persons unfamiliar with the job site enter the location, they shall, as a minimum, be briefed on emergency evacuation procedures.

5.8 SUPPLEMENTAL TRAINING

Training should be a continuing educational program for personnel (including personnel engaged in maintenance and repair work) whose work may involve exposure to hydrogen sulfide or sulfur dioxide. Effective ongoing training will ensure that personnel have current knowledge of potential job hazards, procedures for dealing with confined space entry, procedures for enclosed facilities work, relevant maintenance procedures, and cleanup methods. Depending on the nature of the programs, certain appropriate training aids may be very useful. These aids may include, but are not limited to, films, manuals, and industry publications or documents (refer to Section 2 "References"). Guest speakers, demonstrations, and consultants are also recommended.

5.9 RECORDS

Dates, instructors, attendees, and subjects for all personnel training sessions shall be documented and appropriate records should be retained for a minimum of one year.

5.10 OTHER PERSONNEL CONSIDERATIONS

5.10.1 Enclosed Facilities and Confined Space Entry

Refer to 29 *Code of Federal Regulations* Part 1910.146 for OSHA's confined space entry regulations. Refer to Section 12, "Operations Involving Enclosed Facilities", for some topics that may be used in training personnel for enclosed facilities work. Refer to Pars. 9.17 and 9.18 for further precautionary information on entry into confined spaces (including vessels) and enclosed facilities.

5.10.2 Respiratory Problems

Personnel with known physiological or psychological conditions which impair normal respiration shall not be assigned to jobs involving potential exposure to a hydrogen sulfide or sulfur dioxide environment if use of the breathing equipment or exposure will complicate their respiratory problems. Refer to OSHA's Respiratory Protection Standard (29 *Code of Federal Regulations* Part 1910.134).

Note: Personnel assigned job-related tasks requiring routine use of breathing equipment shall have a periodic review to determine their physiological and psychological adequacy for use of this equipment (refer to 29 *Code of Federal Regulations* Part 1910.134 and *ANSI Z88.2*.

5.10.3 Perforated Eardrums

There are differences of opinion[17] in the medical community about whether a person with a perforated eardrum can become overexposed to a toxic substance via the ear even when wearing properly functioning breathing apparatus (refer to Par. 6.4). Refer to Appendix A.

6 Personnel Protective Equipment

6.1 INTRODUCTION

Section 6 discusses some personnel protective equipment that can be used in oil and gas well producing and gas processing plant operations where the work atmosphere concentration of hydrogen sulfide could exceed 10 ppm or sulfur dioxide atmospheric concentration could exceed 2 ppm (refer to Par. 4.1 and Appendices A and B). Having personnel protective equipment available is not enough; training personnel in the selection, use, inspection, and maintenance of the equipment is essential.

6.2 STATIONARY HYDROGEN SULFIDE MONITORING SYSTEMS

Stationary hydrogen sulfide atmospheric monitoring systems used in oil and gas producing and gas processing plant operations shall include visual or audible alarm(s), located where the alarm can be seen or heard throughout the work area. The batteries of direct current (DC) systems should be checked daily during operation unless an automatic low voltage alarm is provided. Instrument Society of America publications, *ISA-S12.15*, Part I, and *ISA-RP12.15*, Part II, contain equipment performance requirements and

[17]Note: Compare Poda, George A., "Hydrogen Sulfide Can Be Handled Safely"[55], *Archives of Environmental Health*, Vol. 112, 795-800, June 1966, and Ronk, Richard and White, M. K., "Hydrogen Sulfide and the Probabilities of Inhalation Through a Tympanic Membrane Defect"[56], *Journal of Occupational Medicine*, Vol. 25, No. 5, 337-340, May 1985.

recommendations for installation, operation, and maintenance of hydrogen sulfide monitoring and detection instruments, respectively. Refer to Section 10 for additional details regarding evaluation and selection of hydrogen sulfide monitoring equipment.

6.3 PORTABLE DETECTION EQUIPMENT

If the atmospheric concentration of hydrogen sulfide could reach or exceed those levels stipulated in Par. 6.1, portable hydrogen sulfide detection instruments[18] shall be available. Refer to Section 10 for details regarding evaluation, selection, maintenance, and use of hydrogen sulfide detection equipment. In those instances where the hydrogen sulfide atmospheric concentration may exceed the measurement range of the detection instruments in use, a pump and colorimetric indicator tube detector[19] (length-of-stain), with a supply of detector tubes, shall be available to take instantaneous "grab" samples to determine hydrogen sulfide concentrations in enclosed facilities, storage tanks, vessels, etc.

If sulfur dioxide levels could reach or exceed those stipulated in Par. 6.1 (e.g., during flaring or other operations producing sulfur dioxide), either portable sulfur dioxide detection instruments or length-of-stain detectors, with a supply of detector tubes, shall be available for determining the sulfur dioxide concentration in the area and to monitor areas impacted by sulfur dioxide gas when fluids containing hydrogen sulfide are burned. Personnel shall wear appropriate personal breathing equipment (refer to Par. 6.4) unless it is established that the work area atmosphere is safe.

6.4 BREATHING (RESPIRATORY PROTECTION) EQUIPMENT

Site specific contingency plans shall be prepared to specify the quantity and location of breathing equipment to be available. Respirators shall meet the requirements of OSHA's Respiratory Protection Standard (refer to 29 *Code of Federal Regulations* Part 1910.134) and be approved under procedures outlined in *ANSI Z88.2*. All breathing air cylinders shall meet U.S. Department of Transportation (DOT) or other appropriate regulatory requirements (refer to 30 *Code of Federal Regulations*, Part 1910.134, Chapter 1, Subchapter B, Part II, Subpart H, Par. 11.80 and 49 *Code of Federal Regulations* Part 178, Subpart C). The following types of breathing equipment with full face piece meet these requirements and should be used where the work area atmospheric concentration exceeds 10 ppm for hydrogen sulfide or 2 ppm for sulfur dioxide:

a. Self-contained, positive-pressure/pressure-demand breathing equipment that provides respiratory protection in any atmospheric concentration of hydrogen sulfide or sulfur dioxide.

b. Positive-pressure/pressure-demand air-line breathing equipment coupled with a self-contained breathing apparatus equipped with a low pressure warning alarm and rated for fifteen minutes (minimum). This equipment permits the wearer to move from one work area to another.

c. Positive-pressure/pressure-demand, air-line breathing equipment, with an auxiliary self-contained air supply (rated for a minimum of 5 minutes). This type unit can be used for entry as long as the air line is connected to a source of breathing air. *The auxiliary self-contained air supply (rated for less than 15 minutes) is suitable only for escape or self-rescue use.*

Notes:
1. Personnel assigned job-related tasks requiring routine use of breathing equipment shall have a periodic review to determine their physiological and psychological adequacy for use of this equipment (refer to *ANSI Z 88.2* and 29 *Code of Federal Regulations* Part 1910.134).
2. Positive-pressure/pressure-demand, air-line or self-contained breathing apparatus, as appropriate, with full face piece shall be worn by personnel exposed to atmospheres containing concentrations of hydrogen sulfide or sulfur dioxide above OSHA's ACCs and PELs for air contaminants (refer to 29 *Code of Federal Regulations* Part 1910.1000.

CAUTION: Gas mask canister type breathing and demand type (negative pressure) equipment shall not be used in oil and gas producing and gas processing plant operations when a hydrogen sulfide or sulfur dioxide environment could be encountered.

6.4.1 Storage and Maintenance

Personal breathing equipment shall be strategically located so that this equipment is quickly and easily available to essential personnel. Essential personnel are those required to provide proper and prudent safe operations activities and those required to effect control of the hazardous hydrogen sulfide or sulfur dioxide conditions (refer to Par. 7.5). Additional breathing equipment may be required by site specific contingency plans (refer to Section 7). Breathing equipment shall be maintained and stored in a convenient, clean, and sanitary location, in accordance with OSHA's Respiratory Protection Standard (refer to 29 *Code of Federal Regulations* Part 1910.134). All breathing equipment shall be checked before and after each use and inspected at least monthly to ensure that it is maintained in satisfactory condition. A record of the monthly inspections, including dates and findings, shall be retained [refer to 29 *Code of Federal Regulations* 1910.134(f)]. These records should be retained for a minimum of twelve (12) months and longer if dictated by company policy. Equipment needing repair shall be appro-

[18]A gas detection instrument is an assembly of electricl, mechanical, and chemical components designed to sense and respond continuously to the presence of chemical gases (hydrogen sulfide or sulfur dioxide) in atmospheric mixtures.

[19]A pump and colorimetric indicator tube detector (length-of-stain), with a supply of detector tubes, is an assembly of specially designed pump and detector tubes that operates by using the pump to pull a known volume of air or gas through a detector tube. The tubes contain chemical reagents that are designed to detect the presence and display the concentration of hydrogen sulfide or sulfur dioxide in the sample. The length of the resultant color band in the tube indicates an instantaneous quantitative concentration of the specific chemical in the sample.

priately tagged and removed from equipment stock until it is suitably repaired or replaced. Proper storage, maintenance, handling, and inspection is essential to the integrity of personal breathing equipment. Personnel with assigned breathing equipment should be instructed in proper maintenance of this equipment, or other steps shall be taken to ensure its integrity. NIOSH, OSHA, and manufacturer's recommendations shall be followed.

6.4.2 Face Piece Restrictions

Full face piece breathing equipment meeting requirements of Par. 6.4 should be used where the work area atmosphere concentration exceeds 10 ppm for hydrogen sulfide or 2 ppm for sulfur dioxide. Personnel shall not wear eyeglasses with temple bars that extend through the sealing edge of the face piece. Using approved adapters, corrective prescription lenses may be mounted inside the breathing apparatus face piece.

As of this writing, U. S. Department of Labor (OSHA) does not permit wearing contacts when using respirator breathing equipment [refer to 29 *Code of Federal Regulations* Part 1910.134(e)(5)(ii)]. OSHA has investigated the prohibition of contact lenses used under respirator breathing equipment and issued a field memorandum (February 8, 1989, Thomas Shepich, Director, Directorate of Compliance Programs) stating their intent to modify the rule and issuing an interim enforcement policy as follows:

a. Violations of the Respiratory Protection Standard (29 *Code of Federal Regulations* Part 1910.134) involving the use of gas permeable and soft contact lenses shall continue to be documented in the case file and recorded as de minimis; citations shall not be issued.
b. Evidence indicating any negative effect(s) associated with the use of contact lenses with respirator breathing equipment should be provided to U. S. Department of Labor (DOL), Occupational Safety and Health Administration (OSHA), Directorate for Compliance Programs, Washington, D. C. 20210. Benefits associated with the use of contact lenses with respirator breathing equipment would be useful to OSHA. The issue of use of non-gas-permeable hard contact lenses will be resolved in OSHA's revision of 29 *Code of Federal Regulations* Part 1910.134.

Note: Companies should review available information and provide employee guidance regarding the use of contact lenses under respirator breathing equipment.

Personnel shall not wear facial hair that may prevent proper sealing of the face mask. Personnel shall be satisfied that a face seal can be obtained with the assigned equipment or randomly selected unassigned equipment before they use the equipment. If a seal cannot be obtained, either satisfactory equipment must be provided or the individual shall be disqualified from working in areas where hazardous conditions are anticipated or existent.

6.4.3 Air Supply

Breathing air quality shall meet requirements set forth in OSHA's Respiratory Protection Standard, 29 *Code of Federal Regulations* Part 1910.134, and shall at least meet Grade D requirements as described in *ANSI CGA G-7.1*.

6.4.4 Compressors

All breathing air compressors used shall meet the requirements set forth in 29 *Code of Federal Regulations* Part 1910.134 of OSHA's Respiratory Protection Standard. The air intake for such compressors must be located in a contaminant-free area that is unclassified by *API RP500*, Section B. Inlet air for such compressors shall be monitored when conditions arise which permit possible contamination of the inlet air by toxic, flammable, or combustible gases.

6.4.5 Breathing Equipment Use

Personnel shall use breathing equipment prior to entering an area where OSHA ACCs and PELs for hydrogen sulfide and sulfur dioxide, respectively, are exceeded (refer to Par. 4.1, Appendices A and B, and 29 *Code of Federal Regulations* Part 1910.1000, Subpart Z, Table Z.1) until either the area is made or tested safe or they return to a safe area. *Breathing equipment shall be put on in a safe area prior to either beginning a rescue operation or entering a hazardous environment.*

6.5 STANDBY RESCUE PERSONNEL

When personnel work in locations with hydrogen sulfide or sulfur dioxide concentrations considered immediately dangerous to life or health (IDLH) (refer to Appendices A and B) in the working breathing zone, a standby rescue person trained in rescue techniques and with suitable rescue equipment, including appropriate breathing apparatus (refer to Par. 6.4), shall be provided.

6.6 RESCUE EQUIPMENT

At locations with hydrogen sulfide, sulfur dioxide, or oxygen concentration considered immediately dangerous to life or health (IDLH), suitable rescue equipment [for example, appropriate breathing equipment, lifeline(s), and harness(es)] shall be provided. Types of rescue equipment required will vary and will depend on the type of job and work being performed. Appropriate counsel with qualified health and safety professional personnel should be effected to determine what rescue equipment should be available for site-specific job and work conditions.

6.7 WIND DIRECTION INDICATORS

Consideration should be given to locating windsocks, streamers, flags, or other suitable devices for indicating wind

direction at the producing or gas processing site. These devices shall be readily visible to personnel on or approaching the work location.

Note: Regulatory requirements for wind direction indicators shall be observed.

6.8 WARNING SIGNS

Legible warning signs, such as "HYDROGEN SULFIDE OPERATIONS—ENTER ONLY WHEN MONITORING SHOWS THE AREA TO BE SAFE" or "RESPIRATORY PROTECTION EQUIPMENT MUST BE WORN BEYOND THIS POINT," should be prominently posted at appropriate locations (e.g., entrance points) for facilities where produced fluids containing hydrogen sulfide (refer to Par. 4.1 for applicability) are being processed or handled.

Note: Regulatory requirements for sign posting shall be observed.

7 Contingency Planning Including Emergency Procedures

7.1 INTRODUCTION

Operators shall evaluate existing and new operations involving hydrogen sulfide and sulfur dioxide to determine if contingency plans, special emergency procedures, and/or training are required. The evaluation process shall identify potential emergencies and their impact on operating personnel and the general public. The contingency plan, if required, shall conform to all applicable local, state, and federal regulations regarding notifications, precautions, evacuations, and other requirements (refer to 40 *Code of Federal Regulations* Part 264, Subpart D; 29 *Code of Federal Regulations* Part 1910.120; and 29 *Code of Federal Regulations* Part 1910.38 for EPA and OSHA requirements, respectively, for contingency plans and emergency procedures).

7.2 SCOPE

The contingency plan should contain emergency response procedures that provide an organized immediate action plan for alerting and protecting operating personnel and the public. Contingency plans should be site specific for the facility operations and should consider the severity and extent of the anticipated atmospheric hydrogen sulfide and sulfur dioxide concentrations. Contingency plans should consider the dispersion characteristics of hydrogen sulfide and sulfur dioxide (refer to Appendix C or other recognized dispersion modelling techniques). Contingency plans should contain provisions for all applicable items listed in this section. (Refer to *Hazardous Materials Emergency Planning Guide, NRT-1*, and *Technical Guidance For Hazards Analysis*. In addition to the contingency plan, Sections 302 and 303 of the *Superfund Amendments and Reauthorization Act of 1986* (SARA Title III) can require a facility operator to name a facility emergency coordinator to work with a local emergency planning committee (LEPC) in the development of an emergency response plan (refer to 40 *Code of Federal Regulations* Part 355).

7.3 AVAILABILITY OF PLAN

The contingency plan shall be available to all personnel responsible for implementation, regardless of their normal location assignment.

7.4 PLAN INFORMATION

Contingency plans should contain, but not be limited to, information on the following subjects, as appropriate:

a. Emergency Procedures:
   1. Responsibilities of personnel (refer to Par. 7.5).
   2. Immediate action plan (refer to Par. 7.6).
   3. Telephone numbers and communication methods (refer to Par. 7.7).
   4. Locations of nearby residences, businesses, parks, schools, churches, roads, medical facilities, etc.
   5. Evacuation routes and road block locations.
   6. Safety equipment and supplies available (e.g., number and location of breathing equipment).
b. Characteristics of Hydrogen Sulfide and Sulfur Dioxide:
   1. Refer to Appendix A for hydrogen sulfide characteristics.
   2. Refer to Appendix B for sulfur dioxide characteristics.
c. Facility Description, Maps, and Drawings:
   1. Plants.
   2. Water injection stations.
   3. Wells, tank batteries, gas conditioning facilities, flowlines.
   4. Compression facilities.
d. Training and Drills (refer to Par. 7.8):
   1. Responsibilities and duties of essential personnel.
   2. On-site or classroom (tabletop) drills.
   3. Informing nearby residents on protective measures in emergency situations, as appropriate.
   4. Training and attendance documentation.
   5. Briefing of public officials on issues such as evacuation or *shelter-in-place*[20] plans.

7.5 RESPONSIBILITIES OF PERSONNEL

The contingency plan shall outline responsibilities and duties of all essential personnel. Visitors and other non-essential personnel should be prohibited from remaining in or entering an area contaminated by hydrogen sulfide exceeding an atmospheric concentration of 10 ppm or a concentra-

[20]Shelter-in-place refers to the concept of providing the public additional protection by having residents stay indoors until emergency evacuators arrive or the emergency is over (refer to References *62, 63, 64, 65, 66,* and *67*).

tion of sulfur dioxide exceeding 2 ppm in the atmosphere (refer to Par. 4.1 and Appendices A and B).

7.6 IMMEDIATE ACTION PLAN

Each contingency plan should contain a condensed "Immediate Action Plan" to be followed by designated personnel any time they receive notice of a potentially hazardous hydrogen sulfide or sulfur dioxide discharge. For the protection of personnel (including the general public) and abatement of the discharge, this "Immediate Action Plan" should include, but not be limited to, the following provisions:

a. Alert and account for facility personnel.
   1. Move away from the hydrogen sulfide or sulfur dioxide source and get out of the affected area.
   2. Don proper personal breathing equipment.
   3. Alert other affected personnel.
   4. Assist personnel in distress.
   5. Proceed to the designated emergency assembly area.
   6. Account for on-site personnel.

b. Take immediate measures to control the present or potential hydrogen sulfide or sulfur dioxide discharge and to eliminate possible ignition sources. Emergency shutdown procedures should be initiated as deemed necessary to correct or control the specific situation. When the required action cannot be accomplished in time to prevent exposing operating personnel or the public to hazardous concentrations of hydrogen sulfide or sulfur dioxide, proceed to the following steps, as appropriate for the site specific conditions.

c. Alert the public (directly or through appropriate government agencies) that may be subjected to an atmosphere exposure exceeding 30 ppm[21] of hydrogen sulfide or 10[21] ppm of sulfur dioxide.

d. Initiate evacuation operations.

e. Contact the first available designated supervisor on the call list (refer to Par. 7.4.a). Notify the supervisor of circumstances and whether or not immediate assistance is needed. The supervisor should notify (or arrange for notification of) other supervisors and other appropriate personnel (including public officials) on the call list.

f. Make recommendations to public officials regarding blocking unauthorized access to the unsafe area and assist as appropriate.

g. Make recommendations to public officials regarding evacuating the public and assist as appropriate.

h. Notify, as required, state and local officials and the National Response Center to comply with release reporting requirements (i.e., 40 *Code of Federal Regulations Parts* 302 and 355) (refer to Par. 4.4).

i. Monitor the ambient air in the area of exposure (after following abatement measures) to determine when it is safe for re-entry.

Note: This sequence (Par. 7.6) should be altered to fit the prevailing situation. Certain actions, especially those dealing with the public, should be coordinated with public officials.

7.7 EMERGENCY TELEPHONE LISTS

A list of emergency telephone numbers should be prepared and maintained as a part of the contingency plan, considering the need to contact any of the following:

a. Emergency Services
   1. Ambulances
   2. Hospitals
   3. Medical personnel (e.g., doctors)
   4. Helicopter services
   5. Veterinarians

b. Government Agencies and Contacts
   1. Local Emergency Planning Committee
   2. National Response Center
   3. State Emergency Response Commission
   4. State and Local Law Enforcement Agencies
   5. Civil Defense
   6. Fire Departments
   7. Other applicable government agencies.

c. Operator and Contractors
   1. Operator personnel
   2. Contractor personnel
   3. Applicable service companies

d. Public

7.8 TRAINING AND DRILLS

The value of training and drills in emergency response procedures for oil and gas operations involving hydrogen sulfide or sulfur dioxide cannot be over emphasized. All personnel identified in the plan shall have appropriate training. It is important that the training conveys a full appreciation of the importance of each role and the effect that each person has on implementing an effective emergency response.

Exercises or drills that simulate an emergency in which personnel perform or demonstrate their duties are important tools that can convey the importance of contingency plans and result in their being kept current. The exercise can be a tabletop or classroom discussion; or can be a realistic drill in which equipment is deployed, communication equipment is tested, and "victims" are sent to hospital facilities with simulated injuries. Public officials should be informed of (and preferably involved in) these exercises. After a plan is tested, it should be revised and retested until those responsible for the plan are confident the plan is operational. Refer to *NRT-1: Hazardous Materials Emergency Planning Guide.*

[21]Emergency Response Planning Guide Level 2 (ERPG-2), refer to Reference 27. ERPG-2 is defined as the maximum airborne concentration below which it is believed that nearly all individuals could be exposed for up to one hour without experiencing or developing irreversible or other serious health effects or symptoms that could impair an individual's ability to take protective action.

7.9 UPDATING PROVISIONS

A contingency plan shall be periodically reviewed and updated any time its provisions or coverage change (refer to Par. 9.24).

8 Design and Construction Practices

8.1 DESIGN GUIDELINES

Recommendations presented in Section 8 apply to producing and gas processing plant operations where the fluids handled contain sufficient hydrogen sulfide to be within the scope of *NACE Standard MR0175*. *NACE Standard MR0175* may also be a useful reference when designing and constructing other facilities handling hydrogen sulfide. Refer to Appendix D for information on defining a sour environment. All pressure vessels should be designed and constructed in accordance with *ASME Boiler and Pressure Vessel Code* [refer to *Synopsis of Boiler and Pressure Vessel Laws, Rules, and Regulations by States, Cities, Counties, and Provinces (United States and Canada)*]. All piping systems should be designed and constructed in accordance with applicable provisions of *ANSI B31.3*, *ANSI B31.4*, OR *ANSI B31.8*.

Manufactured equipment shall be designed, constructed, tested, and approved to meet or exceed system requirements for hydrogen sulfide service and should be installed in compliance with applicable codes and industry-accepted standards.

8.1.1 Process and Mechanical Considerations

Factors to be considered in facility design include, but are not limited to, the hydrogen sulfide concentration and impact of atmospheric and operating temperatures, system pressures, pH and water content of system fluids, mechanical stresses imposed on system components, operating and physical strength changes of system components resulting from corrosion and scale deposits, and conditions peculiar to individual processes that could be of a detrimental nature to the system.

8.1.2 Design Considerations

To minimize internal corrosion, piping and vessels should be designed and installed in such a way that areas of insufficient flow (including dead-end piping) are eliminated. Where this cannot be accomplished, provisions should be made for draining of accumulated fluids. Drain systems for hydrogen sulfide laden fluids should be designed to prevent migration of hydrogen sulfide from one point in the facility to another.

8.1.3 Materials Considerations

When exposed to an environment containing hydrogen sulfide, many materials may suddenly fail in a brittle manner. Failure occurs by a form of embrittlement known as sulfide stress cracking (SSC). Susceptibility of a given material to sulfide stress cracking increases as strength and tensile stress (residual or applied) increase. Material hardness frequently is used as an indirect measure of strength and sometimes is referenced as a limiting parameter. The failure of certain producing and gas processing plant equipment components used in the sulfide stress cracking regime could result in the uncontrolled release of hydrogen sulfide to the atmosphere. Such components should be made from sulfide stress cracking resistant materials (refer to Par. 8.1.4).

8.1.4 Materials Selection

Metallic materials satisfactory for use in hydrogen sulfide environments and the conditions under which they should be used are described in *NACE Standard MR0175*. The latest revision of this standard should be consulted when selecting materials for use in hydrogen sulfide environments. The provisions of *NACE Standard MR0175* should be considered minimum standards, with the equipment user free to apply more stringent specifications. The material requirements of *NACE Standard MR0175* offer resistance to sulfide stress cracking (SSC); however, other forms of corrosion and modes of failure (such as pitting, hydrogen-induced cracking, and chloride cracking) should be considered in the design and operation of equipment. Control of failures by mechanisms other than SSC should be mitigated by chemical inhibition, material selection, and environmental controls (refer to *NACE Standard MR0175*, Par. 1.1). Appendix D includes excerpts from *NACE Standard MR0175*, providing the definition of a sour environment and graphs that may be used to determine when sulfide stress cracking resistant materials should be used. Users of this publication should check the latest edition of *NACE Standard MR0175* for revisions to the defining criteria for a sour environment.

8.1.4.1 Manufacturer certification of compliance with *NACE Standard MR0175* for equipment intended for hydrogen sulfide service may be required by the user, depending on severity of the service. Adequate quality assurance procedures should be followed to verify compliance by the manufacturer for the original equipment and for any subsequent equipment modifications.

8.1.4.2 Materials not covered in *NACE Standard MR0175* that have been qualified for hydrogen sulfide environment service by the user or manufacturer, using recognized and acceptable testing procedures, may be used. A written agreement between the manufacturer and user may be appropriate. Recognized and acceptable testing procedures are those that demonstrate that the material(s) performs as well as or superior to similar material(s) set forth in *NACE Standard MR0175*, using laboratory procedures or procedures for which testing has been completed under actual or simulated

environmental conditions. The suitability of materials must be supported by appropriate documentation that should include a complete description of the materials, processing, and testing procedure. Laboratory, field, or other environmental testing results or service performance should be recorded in writing. Full documentation supporting the suitability of the material(s) for the selected service should be maintained by the user, manufacturer, or both. Materials use is subject to compliance with applicable regulations.

8.1.5 Site Selection

In selecting a facility site, consideration should be given to taking advantage of the prevailing wind direction, climatic conditions, terrain, transportation routes, and the proximity of populated or public areas. Site selection should consider maintenance of clear entrance and exit routes and should minimize existence of confined spaces. Applicable regulatory requirements concerning location, spacing, and height of flares or vent stacks shall be considered in site selection.

8.1.6 Warning Method

Facility design should incorporate a means to provide a warning of a hazardous upset or condition. Devices and equipment such as hydrogen sulfide monitoring equipment, hazardous warning equipment (audible or visual), and process monitoring devices (such as pressure and flow rate sensors) should be considered. The operator should specify, and the design should consider, the physical and environmental conditions that will be present at the installation site.

8.2 CONSTRUCTION GUIDELINES

Construction of facilities within the scope described in Paragraph 8.1 should be conducted in accordance with the following recommendations, as applicable.

8.2.1 Fabrication and Joining System Components

Welding rods of proper composition and size, applied at recommended temperature and rate, should be used to join pipe and system components by welding. Preheating, postheating, stress relieving, and hardness control requirements should be in accordance with a welding procedure specification (WPS). Proper bolting and gasket materials should be selected in accordance with *NACE Standard MR0175*. Proper alignment should be maintained for all piping, and all system components should be adequately supported to reduce stresses.

8.2.2 Qualification of Personnel

Fabrication of system components and joining of pipe should be done by experienced and qualified workers. Piping system welders should have passed a performance qualification test in accordance with Section IX, *ASME Boiler and Pressure Vessel Code* or *API Standard 1104*. Qualification under *API Standard 1104* will satisfy U. S. Department of Transportation (DOT) requirements for pipelines. Welders shall be permitted only to weld on materials, and to use only procedures, for which they are currently qualified.

8.2.3 Handling and Storage of Equipment

Materials and equipment used in facility construction, reconstruction, repair, or in routine maintenance should be stored and handled in a manner that will not jeopardize their integrity. Where equipment storage is required or where use after installation is delayed, adequate precautionary measures against corrosion, fouling, deterioration, and other harmful effects should be employed. Reliable warehouse control methods shall be employed to assure that material and equipment unsuitable for hydrogen sulfide service is not inadvertently used in hydrogen sulfide service.

8.2.4 Inspection

Pressure-containing components should be thoroughly cleaned and pressure tested in accordance with applicable construction codes. Welded connections should be tested by non-destructive tests (such as ultrasonic or radiographic methods). Final facility inspection should be conducted by knowledgeable personnel to determine that the completed facility complies with design specifications and material records and that markings indicate materials used are suitable for the intended service. Refer to *API 510* and *API Recommended Practice 12R1*.

8.2.5 Repairs

Equipment or systems damaged or worn to the extent that their safety and reliability are doubtful shall not be placed or retained in service. Vessel, piping, and equipment repairs shall be made by qualified and, where required, certified personnel in accordance with applicable codes and good work practices. Only compatible materials, suitable for use in the existing hydrogen sulfide environment shall be used to repair or replace equipment for use in this service. Refer to *API 510*.

8.3 ELECTRICAL DESIGN CONSIDERATIONS

In addition to being toxic, hydrogen sulfide is flammable at concentrations of 4.3 to 46 percent (by volume) in air. Electrical equipment installed in areas subject to exposure to a methane-hydrogen sulfide mixture composed of 25% or more (by volume) of hydrogen sulfide should be suitable for Class I, Group C classified areas (refer to Par. 3.5, "National Electric Code Grouping of Atmospheric Mixtures," in *API Recommended Practice 500*).

9 Operating Practices

9.1 INTRODUCTION

Section 9 discusses operating practices that should be followed to provide integrity of equipment and continuity of work practices in operations involving the design and handling of materials in hydrogen sulfide service (refer to Par. 4.1 and applicable regulatory requirements). Each equipment installation or work procedure should be reviewed and observed as often as necessary to detect when changes may be needed in operating practices or equipment. *Water injection and other enhanced recovery operations may result in the introduction of bacteria that can cause water soluble hydrogen sulfide to develop over time and be present in produced fluids.*

9.2 EMERGENCY PROCEDURES

Emergency operating and shutdown procedures shall be posted or readily available to operating personnel.

9.3 TEST PROCEDURES

Tests of the gas phase of produced fluids shall be conducted periodically to determine the hydrogen sulfide concentration. Procedures should be established and routine operational tests should be conducted periodically for hydrogen sulfide detection and monitoring equipment and alarm devices, forced air ventilation systems, and similar safety devices. Results of these tests should be recorded.

9.4 SAFE WORK PRACTICES

Safe operating procedures should be developed for performing operations and maintenance (e.g., tank gauging, water line blowdown, line repair, valve replacement, and sampling) so hazards due to the release of hydrogen sulfide can be avoided. A safety review of the work should be performed prior to beginning any maintenance or operating work activities requiring personnel to be in areas that could contain concentrations of hydrogen sulfide or sulfur dioxide exceeding the levels stipulated in Par. 4.1. Legible warning signs, such as "HYDROGEN SULFIDE OPERATIONS—ENTER ONLY WHEN MONITORING SHOWS THE AREA TO BE SAFE" or "RESPIRATORY PROTECTION MUST BE WORN BEYOND THIS POINT", should be prominently posted in the area where produced fluids containing hydrogen sulfide (refer to Par. 4.1 for applicability) are being handled or processed.

Note: Regulatory requirements for sign posting shall be observed.

9.5 LEAK DETECTION

In produced fluids handling systems containing hydrogen sulfide in concentrations capable of causing atmosphere concentrations in excess of 10 ppm, monitoring techniques or procedures (for example, visual observation, soap bubble test, portable detection equipment, fixed monitoring equipment) should be employed to detect leaks. Particular attention should be given to enclosed facilities (refer to Section 12).

9.6 SAFE WORK PERMITS

For activities without previously established operating procedures, special safety review documentation (e.g., hot work permits and check-off lists) outlining specific safety precautions with specific authorization should be used. Documentation should include personnel protective equipment required; equipment that should be properly blinded, blanked, or disconnected; equipment and piping that should be properly vented; procedures for excavation of buried lines in processing areas; etc.

9.7 VALVES, CONNECTIONS, AND GAUGES

Valves, flanges, gauges, connections, and other components should be observed for evidence of needed inspection, repair, or maintenance. The cause of equipment failure should be investigated and determined. If failure is caused by exposure to hydrogen sulfide, alternate methods or equipment should be considered.

9.8 ARTIFICIAL LIFT WELLS

Artificial lift wells should be observed for any change in operating conditions that could cause leaks or failures. Significant changes in wellhead pressure, gas-oil-water ratios, flow rates, and similar parameters should be evaluated to prevent leaks or failures.

9.9 FLOWING WELLS

Annuli of flowing wells should be tested at regular intervals for any pressure changes. Such pressure changes may indicate a downhole failure of the packer, tubing, or casing. Changes in fluid volumes or ratios, fluid corrosiveness, and surface pressures should be evaluated to determine the need for corrective measures.

9.10 FLOW/GATHERING LINES

Flow line and gathering line right-of-ways should be observed for conditions conducive to pipeline failures, such as those caused by excavation, construction, trespassing, or surface erosion.

9.11 PRESSURE VESSELS

Relief valves and other applicable components on pressure vessels shall be tested according to regulatory requirements or company policy. Refer to *API 510* and *API*

Recommended Practice 576.

9.12 PRESSURE RELIEF AND NORMALLY VENTING DEVICES

The discharge of pressure relief and normally venting devices should be located away from work areas and designed to maximize dispersion and minimize personnel exposure to hydrogen sulfide. Refer to Par. 8.1.4 for considerations for materials applications in hydrogen sulfide service.

9.13 STORAGE TANKS

Produced liquids storage tanks should be observed for needed repairs or maintenance. The tank thief hatch seals, inspection and clean-out plate seals, vent line back-pressure valves, etc., should be serviced or replaced as appropriate. Refer to *API Recommended Practice 12R1.*

9.14 FLARE SYSTEMS

Ignition devices for flare systems handling hydrogen sulfide in hazardous concentrations should be inspected and serviced regularly to ensure proper operation.

9.15 MONITORING EQUIPMENT—MAINTENANCE, TESTING, AND CALIBRATION

Monitoring equipment used to detect occupational exposure levels of hydrogen sulfide shall be serviced and tested at intervals recommended by the manufacturer, and possibly more frequently under extreme humidity, temperature, dust, or other adverse environmental operating conditions. The monitoring equipment should be calibrated by qualified individuals at intervals frequent enough to enable the user to determine an acceptable calibration schedule. The equipment should be calibrated once every three (3) months, at intervals not exceeding 100 days. Refer to *ISA Recommended Practice 12.15,* the equipment manufacturer's instruction manual, and Section 10.

9.16 CORROSION MONITORING

A corrosion monitoring program should be established to detect and mitigate internal and external corrosion activity that can affect equipment in hydrogen sulfide service.

9.17 CONFINED SPACE ENTRY

Enclosures with known or potential hydrogen sulfide hazards and restricted means of entrance and exit deserve special attention. These enclosures are not normally occupied by people nor well ventilated. Examples of such enclosures in the oil and gas producing and gas processing plant industries may include tanks, cellars, process vessels, tank trucks, temporary and permanent pits and trenches, and barges. A confined space entry permit shall be required for entry into a confined space. A confined space entry permit should as a minimum:

a. identify the job site.
b. indicate the date and duration of the permit.
c. specify testing requirements and other conditions to safely perform the job.
d. ensure that sufficient monitoring is conducted to ascertain that the hydrogen sulfide, oxygen,[22] or hydrocarbon concentrations do not become a health or fire hazard, and
e. bear the approval specified in the operator's procedure.

As an alternate to foregoing Par. 9.17, Item d, proper personal protective breathing equipment may be worn during the work operation; however, sufficient monitoring of the enclosure atmosphere shall be performed to ensure that it is free of an ignitable mixture of hydrocarbons. Refer to OSHA's Confined Space Entry Standard (29 *Code of Federal Regulations* Part 1910.146)

9.18 ENCLOSED FACILITY ENTRY

Personnel shall use extreme caution before entering enclosed facilities such as buildings housing oil, gas, or produced water processing and handling equipment containing hazardous concentrations of hydrogen sulfide. Personnel shall either establish that entry without personal protective breathing (respiratory protection) apparatus will be safe or shall wear protective breathing equipment. Refer to Section 12 for additional details and precautions.

9.19 IRON SULFIDE PRECAUTIONS

Iron sulfide, a reaction product of hydrogen sulfide and iron or spent iron sponge (a treating material), when exposed to air, can autoignite (spontaneous combustion) and burn. Iron sulfide, when exposed to air, should be kept wet until it can be disposed of in accordance with applicable regulations. Iron sulfide scale can accumulate on inside surfaces of vessels and on filter elements used in amine systems and become an autoignition hazard if exposed to atmospheric oxygen. One of the products of burning iron sulfide is sulfur dioxide; proper safety procedures must be effected to deal with this toxic substance.

9.20 DRILLING OPERATIONS

Refer to *API Recommended Practice 49* for recommended procedures for drilling and drill stem testing operations involving hydrogen sulfide.

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[22] *API PUBL 2217A: Guidelines for Work in Confined Spaces in the Petroleum Industry* specifies an oxygen content of less than 19.5% as oxygen deficient and an oxygen content of less than 16% is considered immediately dangerous to life and helath (IDLH).

9.21 SAFETY PRECAUTIONS FOR SAMPLING AND TANK GAUGING OPERATIONS

When it is known or suspected that the system to be sampled or gauged may contain hydrogen sulfide, special precautions shall be observed. Production tanks shall be tested to determine their hydrogen sulfide content (refer to Par. 9.3). Tests should also be conducted within the normal worker breathing zone to determine if the levels stipulated in Par 4.1 may be exceeded and if engineering controls, administrative procedures, or personal protective breathing equipment (refer to Par. 6.4) may be required for sampling or tank gauging operations. The tests should be conducted under operating and atmospheric conditions to determine the maximum hydrogen sulfide exposure level.

If the hydrogen sulfide level in the worker breathing zone exceeds IDLH level (300 ppm), in addition to appropriate personal protective breathing equipment (refer to Par. 6.4), rescue precautions and procedures (refer to Pars. 6.5 and 6.6) shall be utilized.

9.22 FACILITIES ABANDONMENT—SURFACE EQUIPMENT

Precautions should be taken to ensure that hazardous quantities of hydrogen sulfide do not remain in abandoned surface equipment, including buried pipelines and flow lines. Pipelines and flow lines left in place should be purged, bullplugged, or otherwise capped. Vessels should be flushed with water, purged, drained, and left open to the atmosphere. Precautions should be taken to prevent an iron sulfide fire (refer to Par. 9.19).

CAUTION: Prior to abandonment, vessels should be checked for the presence of naturally occurring radioactive material (NORM) and appropriate safety and handling procedures should be exercised. Refer to *API Bulletin E-2* for guidance on management of NORM.

9.23 WELL ABANDONMENT

The following recommended practices are not intended to supersede federal, state, or local regulations for well abandonment. Where not covered by applicable regulations, the practices and well conditions should be considered in planning and effecting permanent well abandonment. It is recommended that cement be set across formations that are known to produce or could produce hydrogen sulfide in hazardous concentrations. Refer to *API Bulletin E-3* for guidance and procedures for plugging and abandoning wells.

9.24 CONTINGENCY PLAN REVISIONS

Operating personnel should be observant for changes that would make reconsiderations and possible revisions advisable in contingency plan coverage, location(s) of monitoring equipment, and location(s) of lease equipment. Some changes that should be observed and considered are new residences or residential areas, stores, businesses, parks, schools, or roads; changes in well operations; and changes in lease facilities. Refer to Section 7 for suggested procedures for planning and implementing contingency plans and emergency procedures.

10 Guidelines for Evaluation and Selection of Continuous Hydrogen Sulfide Monitoring Equipment

10.1 INTRODUCTION

Section 10 is provided to make users of hydrogen sulfide monitoring equipment aware of some equipment limitations and certain desirable features of such equipment. There are a number of detection principles and analytical procedures available for monitoring the concentration of hydrogen sulfide in ambient air where the potential exists for exposure to levels that may be hazardous to health. These guidelines are intended to aid in the selection and application of continuous monitoring equipment for use in production operations involving hydrogen sulfide. The term "continuous hydrogen sulfide monitoring equipment" as used herein is defined as equipment capable of continuously measuring and displaying the concentration of hydrogen sulfide in ambient air. Section 10 is not applicable to personnel monitoring badges or length-of-stain or color-comparison type detector devices (refer to *ANSI/ISEA 102*).

10.2 GENERAL

All monitors, both portable and stationary, shall be designed on sound engineering and scientific principles and constructed of materials suitable for the application. Their design and construction should allow for ease of maintenance and repair. Instruments should be verified by a national recognized testing laboratory (NRTL) as meeting the minimum performance requirements of *ISA-S12.15*, Part I. Equipment should be installed, operated, and maintained in accordance with *ISA Recommended Practice 12.15*, Part II.

It generally is recommended (and frequently required) that electrical controls for safety systems such as hydrogen sulfide monitoring equipment and other gas detector systems be installed normally-energized ("fail-safe"). This means that power is supplied continuously during normal operations to devices which provide alarm(s) and corrective action if concentrations corresponding to specific alarm set points are reached. Under these conditions, interruption of power due to either deliberate safety device actuation or loss of power will initiate corrective action. It is desirable to provide a test means that will allow the system to be tested (and calibrated) without shutting in producing or gas processing plant operations (or other corrective action), but it should be evident to operating personnel that the system is in the test (bypass) mode.

To better ensure proper application, it is recommended that an environmental and application checklist (similar to the example shown in Appendix 1, *ISA Recommended Practice 12.15*, Part II) be provided to prospective vendors by the user.

10.3 CONSTRUCTION CHARACTERISTICS

The following construction and useability characteristics are desirable for hydrogen sulfide monitoring equipment.

10.3.1 Portability

Portable monitors, including all required parts and accessories, should weigh a maximum of ten (10) pounds and have a maximum volume of one (1) cubic foot.

10.3.2 Power Supply, Portable Monitoring Equipment

Portable hydrogen sulfide monitoring equipment is defined as self-contained, battery-operated, carriable or transportable instruments capable of operating within specifications from integral batteries for a period of eight hours minimum, including a 15 minute period of maximum load conditions (with alarms, lights, etc. activated), while exposed to clean air at a nominal temperature of 14°F (-10°C). Applications requiring in excess of eight hours of continuous operation or operation at lower temperatures should be specified by the end user.

10.3.3 Readout

Monitors should provide a direct readout of hydrogen sulfide concentration in parts per million (ppm) by volume.

10.3.4 Recorder Output

For certain applications, it may be desirable for monitors to provide an output signal (e.g., 4-20 ma) proportional to hydrogen sulfide concentration for use in connection with recorders or for other purposes.

10.3.5 Simplicity of Operation

Monitoring and detection equipment should be readily operable by personnel without scientific background or training in instrumentation.

10.3.6 Instruction Manuals

An instruction manual should be provided by the manufacturer with each instrument. The instruction manual should contain complete operating instructions, including procedures for startup, warm-up time, zero checks, calibration, alarm setting and testing, preventive maintenance, performance checks, and trouble-shooting. Monitors with rechargeable power supplies should be furnished with instructions for charging, storing, and maintaining the power supply. Information also should be included regarding instrument recovery time after the exposure of sensor(s) to hydrogen sulfide. The manufacturer should provide response time data and a list of interfering, desensitizing, or contaminating substances or water vapor concentrations known to the instrument manufacturer which may adversely affect proper operation and performance of the instrument (refer to Par. 10.4.7). Instruction manuals should include wiring diagrams and estimates of the life expectancy of all consumables. The manual should include a complete parts list suitable for identification of all replaceable parts and sources for procurement of these parts.

10.3.7 Electrical Approval

Any portion of a stationary hydrogen sulfide monitoring instrument intended for installation or use in a hazardous (classified) location and all portable monitoring instruments shall be approved for use in such a hazardous (classified) location and marked accordingly. Refer to *NFPA 70*, Article 500-3, FPN No. 2.

10.3.8 Ruggedness

Portable monitoring units should be sufficiently rugged to withstand routine transporting, handling, and use in the field environment, as specified by the user. Refer to *ISA-S12.15* for details of a recommended "drop test" to evaluate portable unit ruggedness and a "vibration test" to evaluate ruggedness of fixed and portable monitors.

10.3.9 Calibration Equipment

All accessories required to calibrate the instruments should be made available by the manufacturer. The life expectancy and any special handling required of any hydrogen sulfide test concentrations should be provided by the supplier.

10.3.10 Zero and Span Adjustments

Zero and span adjustment controls should be readily accessible for field adjustment, and the monitor design should include provisions to apply zero and calibration gases to the sensor(s) in a non-laboratory environment. All accessories for calibration and zero should be made available with the monitor and should be useable under field conditions.

10.3.11 Alarm Systems

Fixed monitors shall have provisions for external alarms. Portable monitor units should contain integral audible, visual, or physical presentation (e.g., vibrator signal) alarms as specified by the user. Hydrogen sulfide alarms should be unique to the location.

10.3.12 Testing Alarm Circuitry

Provisions should be included for the testing of alarms and alarm outputs. The test procedure should be included in the equipment instruction manual.

10.3.13 Remote Sampling

A remote sampling accessory (such as a probe) may be desirable for use with a portable monitoring unit.
CAUTION: Optional probe attachments for portable monitoring units, which allow the user to manually draw samples from remote locations, inherently prevent continuous monitoring of the immediate local environment. Users should consult the manufacturer's instruction manual to determine the proper number of bulb strokes required to draw samples when non-continuous monitoring attachments are used. The remote sampling attachment should be removed after use to restore the instrument to the normal continuous monitoring mode.

10.3.14 Equipment Trouble (Malfunction) Alarm

A trouble (malfunction) signal (indicator or output) should be provided for all monitors.

10.3.15 Detection Range Indication

The range(s) of detection should be conspicuously marked on the instrument.

10.4 PERFORMANCE GUIDELINES

The following recommended performance parameters are applicable to fixed and portable hydrogen sulfide monitoring equipment.

10.4.1 Accuracy

Instruments should meet requirements of the accuracy test specified in *ISA-S12.15*, Part I. Users are cautioned that the class of instruments suitable for field use are not "laboratory-grade" instruments, and *an equivalent degree of precision should not be expected.*

10.4.2 Zero Drift

Instruments should meet the requirements of the "Long-term Stability Test" specified in *ISA-S12.15*, Part I. Excessive zero drift is undesirable and can require instrument calibration at unreasonably short intervals.

10.4.3 Warm-up Time

The minimum warm-up time when power is first applied should be stated in the equipment instruction manual. A monitor ready-status indicator is a desirable feature.

10.4.4 Response Time

ISA-S12.15, Part I specifies monitoring equipment minimum response time to input step changes. The toxicity of hydrogen sulfide requires that monitoring equipment have rapid response time to alert personnel of potentially dangerous concentrations. Hence, response time of monitoring equipment is an important parameter for consideration in evaluation and selection of such equipment.

10.4.5 Operating Humidity Range

Monitoring equipment should meet the "Humidity Variation Test" specified in *ISA-S12.15*, Part I. Users should advise equipment manufacturers of the humidity ranges expected for specific equipment applications.

10.4.6 Operating Temperature Range

Monitoring equipment should be suitable for viable use in an ambient temperature range of 14°F to 122°F (-10°C to 50°C). Applications requiring equipment exposure to temperatures outside this range should be specified by the user.

10.4.7 Interferences

A list of interfering, desensitizing, and contaminating substances (e.g., carbon monoxide, sulfur dioxide, aromatic mercaptans, methanol, oxides of nitrogen, aldehydes, carbon sulfide, monoethanolamine, carbon dioxide, benzene, and methane) known by the manufacturer should be listed in the equipment instruction manual. Also, water vapor concentrations which may adversely affect proper equipment operation should be included in the instruction manual.
CAUTION: Monitoring and detector equipment and sensors should be protected from exposure to liquid spray or wash down. Such exposure can affect equipment performance and reliability.

10.4.8 Functional Field Test

Functional field testing of monitoring equipment should be conducted under "as installed" or "as used" conditions. All instrument and system accessories normally used with this equipment should be installed and operated during functional field tests. Functional field tests may include, but are not limited to, exposing the sensor to a sample containing sufficient hydrogen sulfide to cause response of the system. Functional field testing *does not* necessarily include zero and span adjustments. The hydrogen sulfide concentration used in functional field testing of monitoring equipment should not exceed the maximum operating range of the equipment being tested.

10.4.9 Air Velocity

Monitoring equipment should meet the "Air Velocity Variation Test" specified in *ISA-S12.15*, Part I. Accessories are

often available and may be desirable for use with detector equipment installed in areas of high air velocity.

10.4.10 Electromagnetic Interference (EMI)

Some monitoring equipment may be susceptible to electromagnetic interference (EMI), particularly radio frequency interference (RFI). Caution should be taken when using monitoring equipment in close proximity to a radio transmitter or other EMI generators. Refer to *ISA-S12.15*, Part I, Sections 9.5 and 11.6.

11 Offshore Operations

11.1 INTRODUCTION

Section 11 presents some additional recommendations that are needed offshore due to the uniqueness of offshore operations. Many recommendations in other sections of this publication also are applicable to offshore operations. Refer to Appendix F, "Toxic Gases", *API Recommended Practice 14C*.

11.2 UNIQUENESS OF OFFSHORE OPERATIONS

Problems that might be considered minor in onshore operations can be more critical in offshore operations. This is due to the remoteness of offshore operations, compactness of facilities, limited escape and evacuation routes, and sophisticated escape and evacuation equipment.

11.3 FEDERAL REGULATORY REQUIREMENTS

Refer to 30 *Code of Federal Regulations* Parts 250 and 256 for Minerals Management Service, U. S. Department of Interior (DOI) requirements for Outer Continental Shelf (OCS) oil and gas producing operations involving hydrogen sulfide. These regulations include requirements for training personnel involved in OCS oil and gas producing operations and for hydrogen sulfide contingency plans for OCS oil and gas producing operations.

11.4 CONTINGENCY PLANNING

Where potentially hazardous atmospheric concentration of hydrogen sulfide could occur offshore, contingency planning is particularly essential due to the uniqueness of facilities as discussed in Par. 11.2. Although the recommendations for contingency planning presented in Section 7 are applicable to offshore operations, there are additional items that should be addressed. These include, but are not limited to, the following:

a. Training. All personnel shall be familiar with the location and use of emergency escape equipment and routes. Personnel regularly assigned to offshore facilities shall be trained in the requirements of Par. 5.2, as well as be proficient in the use of oxygen resuscitation equipment.

b. Evacuation Procedures. The U. S. Coast Guard's (Department of Transportation) requirements for emergency evacuation plans for manned Outer Continental Shelf facilities are contained in 33 *Code of Federal Regulations* Parts 140, 143, and 146 (refer to 54 *Federal Register*, May 18, 1989, 21566). Surface and/or air transportation to the site should be available since it may be necessary to evacuate visitors and other non-essential personnel and to bring in specialists or equipment if a hazardous hydrogen sulfide condition is suspected or does occur. Monitoring for combustible gases (primarily methane) and hydrogen sulfide should be provided to avoid unnecessarily exposing personnel and equipment to the dangers of a fire, explosion, or hazardous concentration during transport or transfer operations. If a hazardous hydrogen sulfide condition is known or suspected to be imminent, boats and helicopters should approach the site from an upwind direction, when possible.

Proper personal protective breathing equipment must be provided for helicopter and boat crew members and all passengers. Evacuation routes and deboarding procedures shall be well planned and posted. Evacuation drills shall be regularly performed.

11.5 SIMULTANEOUS OPERATIONS

Particular emphasis must be given to coordination between drilling, well servicing, producing, and construction operations when two or more of these activities are conducted simultaneously. An individual shall be designated to be the person-in-charge for simultaneous operations, and the chain of command shall be communicated to all applicable personnel.

12 Operations Involving Enclosed Facilities

12.1 INTRODUCTION

Section 12 presents some additional recommendations that are unique to oil and gas producing and gas processing plant operations in enclosed facilities[23] and involving hydrogen sulfide (refer to Par. 4.1). An enclosed facility may be as simple as a single piece of equipment within an enclosure or as complicated as complex onshore or offshore enclosed facilities located in cold climates.

12.2 UNIQUENESS OF OPERATIONS INVOLVING ENCLOSED FACILITIES

The uniqueness of oil and gas producing and gas processing plant operations in enclosed facilities is due to the potential that escaping quantities of hydrocarbon gases containing hydrogen sulfide can be contained in an enclosed space[23], particularly if ventilation is inadequate. This space may be entered by personnel. A small leak of product containing hy-

drogen sulfide gas that would normally dissipate as it escaped can be contained in the enclosed space surrounding the leak and increase the hazard to entering personnel unless adequate ventilation is provided to reduce the hazard.

12.3 DESIGN CONSIDERATION

The design and construction practices of Section 8 generally apply to enclosed facilities, but there are areas of design that should be considered due to the unique operating situations they present. Additional design considerations for enclosed facilities can include, but are not limited to, the following:

a. Means to prevent flammable liquids and gases from coming into contact with surfaces hot enough to cause ignition. The autoignition temperature for natural gas is approximately 900°F (482°C). The autoignition temperature for other natural gas mixtures ranges from 700°F to 900°F (371°C to 482°C). The autoignition temperature for hydrogen sulfide is approximately 500°F (260°C).
b. Ventilation.
c. Onsite respiratory protection equipment.
d. Electrical equipment (possibly Group C versus Group D equipment required). Refer to Par. 3.5, "National Electrical Code Grouping of Atmospheric Mixtures", of *API Recommended Practice 500.*
e. Emergency relief and depressuring devices and their discharge points.
f. Hydrocarbon vents from diaphragm valves, machinery, and regulators.
g. Compressor depressuring and blowdown lines.
h. Floor drains.
i. Process drains, manual and automatic.
j. Vents from gas conditioning equipment (glycol and amine).
k. Hydrogen sulfide monitoring system.

12.4 FIXED HYDROGEN SULFIDE MONITORING SYSTEM

In many locations where personnel enter frequently, on a regular basis, or occupy enclosed facilities for relatively long periods of time, fixed hydrogen sulfide monitoring systems (with adequate alarms) can enhance safety. In some locations, an alternative to fixed monitoring systems may be implementation of personnel entry procedures (refer to Pars. 9.18 and 12.5).

Fixed hydrogen sulfide monitoring systems should be installed in facilities containing process equipment (vessels, machinery, etc.) handling gases or fluids containing hydrogen sulfide when a release of these gases or fluids is capable of causing atmospheres with hydrogen sulfide in concentrations exceeding 10 ppm when the locations are both:

a. an enclosed area (room, building, or space) as defined by Par. 12.1 and *API Recommended Practice 500.*
b. inadequately ventilated. [*Inadequately ventilated* is defined as ventilation (natural or artificial) which is *not* sufficient to prevent the accumulation of significant quantities of hydrogen sulfide-air mixtures in concentrations exceeding 10 ppm]. Adequacy of ventilation should be assessed on a site-specific basis.

Fixed monitoring systems shall contain audible alarm devices (and visual alarm devices in high noise areas, refer to Par. 10.3.11) activated by hydrogen sulfide concentrations at preset levels (not to exceed 10 ppm), as required to alert personnel. Hydrogen sulfide monitoring equipment should be calibrated in accordance with Par. 9.15.

It is recognized in specific instances that a fixed combustible gas detection system may detect the existence of a potentially hazardous atmospheric condition before a fixed hydrogen sulfide monitoring system that is set to alarm at 10 ppm of hydrogen sulfide would be activated. For example, in a release of a 300 ppm hydrogen sulfide in methane mixture, a combustible gas detector set to alarm at 20% lower explosive limit (LEL) would activate and sound an alarm at a hydrogen sulfide concentration of approximately 3 ppm.

In such instances, a regular testing program should be established to monitor content of the process stream to ensure that the concentration of hydrogen sulfide has not increased. If an increase in the hydrogen sulfide concentration is confirmed, the user should verify adequacy of the detection system in use. This verification should consider all variable criteria that will affect performance of the detection equipment as well as factors that could increase the concentration of hydrogen sulfide in the work atmosphere should a malfunction or equipment failure occur.

CAUTION: This option is limited in its scope and should be used only when all applicable limitations and site specific parameters have been duly considered.

Fixed monitoring systems are also desirable to monitor the air intake for enclosed areas when the air is used for makeup or for pressurizing the enclosed facilities (refer to *NFPA 496*).

12.5 PERSONNEL PROTECTION TECHNIQUES

A method of protecting personnel from exposure to atmospheric concentrations of hydrogen sulfide exceeding 10 ppm should be provided in all enclosed facilities containing process equipment (vessels, machinery, etc.) handling hydrogen sulfide bearing fluids and capable of causing hydrogen sulfide atmospheric concentrations in excess of 10 ppm. Acceptable methods include:

[23] An enclosed facility (room, building, or space) is defined as a three-dimensional space enclosed by more than two-thirds ($^2/_3$) of the possible projected plane surface and of sufficient size to allow the entry of personnel. For a typical building, this would require that more than two-thirds ($^2/_3$) of the walls, ceiling, and/or floor be present. Refer to *API Recommended Practice 500.*

a. Requiring personnel to wear proper protective breathing apparatus (refer to Par. 6.4) before entering and when in the facility.
b. Installing fixed hydrogen sulfide monitoring equipment (refer to Par. 6.2, Section 10, and Par. 12.4).
c. Properly ventilating the facility to maintain hydrogen sulfide concentrations in the work atmosphere less than 10 ppm, confirmed by monitoring with a fixed hydrogen sulfide monitoring system. Recirculation of air is allowed, but recirculated air streams should be monitored with fixed monitoring systems to alarm when concentrations of hydrogen sulfide exceed 10 ppm in the recirculated air.
d. Testing the facility before entry and continuously while in the facility, using portable hydrogen sulfide detection equipment (refer to Par. 6.3), to ensure that hydrogen sulfide concentration in the work area atmosphere does not exceed 10 ppm.

Note: Personnel shall either establish that entry without protective breathing (respiratory protection) equipment will be safe or shall wear appropriate personal protective breathing equipment (refer to Par. 6.4).

12.6 WARNING SIGNS

Legible warning signs, such as "HYDROGEN SULFIDE OPERATIONS—ENTER ONLY WHEN MONITORING SHOWS THE AREA TO BE SAFE" or "RESPIRATORY PROTECTION EQUIPMENT MUST BE WORN BEYOND THIS POINT", shall be prominently posted outside all access doorways leading into enclosed facilities where produced fluids or gases containing hydrogen sulfide (refer to Par. 4.1 for applicability) are being processed or handled.

Note: Regulatory requirements for sign posting shall be observed.

13 Gas Processing Plant Operations

13.1 INTRODUCTION

Section 13 presents some additional recommendations that are unique to gas processing plant operations involving hydrogen sulfide (refer to Par. 4.1.). Some recommendations in other sections of this publication also are applicable to gas processing plant operations.

13.2 GENERAL CONSIDERATIONS

Gas processing plant operations typically include more complex processes than field operations (e.g., gas conditioning facilities). Some differences include:

a. potentially higher volumes of gas containing hydrogen sulfide,
b. potentially higher concentrations of hydrogen sulfide,
c. generally a greater number of personnel and more equipment, and
d. the assignment of personnel on a more regular basis.

These differences often require special considerations to ensure safe operations involving activities such as vessel and line openings and confined space entry. When such activities are to take place, a coordinating meeting between operations, maintenance, contractor, and other involved parties should be held to ensure that facility personnel are aware of the activities involved, their effect(s) on plant operations, and the necessary safety precautions that are to be followed.

13.3 GAS CONDITIONING FACILITIES

Many gas treating and sulfur recovery processes are employed in gas processing plants. These processes can be classified into chemical reaction, physical solution, and adsorption processes, and can be further subdivided into regenerable and non-regenerable processes. Regenerable type processes include amine solvents, hot potassium carbonate, molecular sieve, and chelants. Non-regenerable type processes include iron sponge, caustic scrubbers, metal oxides, direct oxidation, and various other sulfur recovery processes. Because most of these methods result in a concentrated hydrogen sulfide stream or reaction product, operators shall be familiar with the various chemical and physical characteristics of the process(es) at the particular facility. The amount of hydrogen sulfide in residence within a process may be sufficient to require implementation of requirements contained in 29 *Code of Federal Regulations* Part 1910.119.

13.4 MATERIALS OF CONSTRUCTION

The failure of gas processing plant equipment components can permit the uncontrolled release of hydrogen sulfide to the atmosphere. Those equipment components in the sulfide stress cracking regime should be made from sulfide stress cracking resistant materials (refer to Par. 8.1.3).

13.5 CORROSION MONITORING

A corrosion monitoring program should be established to minimize internal and external corrosion activity which can affect equipment in hydrogen sulfide service.

13.6 LEAK DETECTION

In gas or liquid handling systems containing hydrogen sulfide in concentrations capable of causing atmospheric concentrations of 10 ppm or more of hydrogen sulfide, monitoring techniques or procedures (for example, visual observation, soap bubble test, portable detectors, or fixed monitoring equipment) should be employed to detect leaks. Particular attention should be given to enclosed facilities, such as control rooms, compressor buildings, cellars, and sumps (refer to Section 12). Regularly scheduled inspection of equipment for leaks, such as pump seals, is recommended. Results should be retained for a minimum of one year as a part of the facility or equipment operating and maintenance records. Fixed hydrogen sulfide ambient air monitoring systems are recommended (refer to Section 10 and Appendix C)

in gas processing plants located near populated areas to facilitate early detection and necessary warning to the general public.

13.7 CONTINGENCY PLANNING

Contingency plans for gas processing plant facilities shall cover plant personnel and the general public that could be exposed to a release of hydrogen sulfide (refer to Appendix B of *API Recommended Practice 750*. Operating personnel must be familiar with emergency plant shutdown procedures, rescue operations, notification procedures, briefing areas, and locations of emergency equipment (refer to Section 7). Visitors shall be briefed on the physical layout of the gas processing facility, applicable warning signals, and how to respond in the event of an emergency.

APPENDIX A—PHYSICAL PROPERTIES AND PHYSIOLOGICAL EFFECTS OF HYDROGEN SULFIDE

A.1 Physical Data

Chemical Name: Hydrogen Sulfide

CAS Number: 7783-06-4

Synonyms: Sulfureted hydrogen, hydrosulfuric acid, dihydrogen sulfide.

Chemical Family: Inorganic sulfide.

Chemical Formula: H_2S.

Normal Physical State: Colorless gas, slightly heavier than air. Vapor density (specific gravity) at 59°F (15°C) and 1 atmosphere = 1.189.

Autoignition Temperature: 500°F (260°C).

Boiling Point: -76.4°F (-60.2°C).

Melting Point: -117.2°F (-82.9°C).

Flammable Limits: 4.3 - 46 percent vapor by volume in air.

Solubility: Soluble in water and oil; solubility decreases as the fluid temperature increases.

Combustibility: Burns with a blue flame to produce sulfur dioxide (SO_2). Refer to Appendix B.

Odor and Warning Properties: Hydrogen sulfide has an extremely unpleasant odor, characteristic of rotten eggs, and is easily detected at low concentrations. However, due to rapid onset of olfactory fatigue and paralysis (inability to smell) ODOR *SHALL NOT* BE USED AS A WARNING MEASURE.

A.2 Exposure Limits

The Occupational Safety and Health Administration (OSHA) has established 20 ppm by volume as an acceptable ceiling concentration (ACC) and 50 ppm by volume as an acceptable maximum peak above the ACC for an 8-hour shift for hydrogen sulfide (refer to 29 *Code of Federal Regulations* Part 1910.1000, Subpart Z, Table Z-2). The American Conference of Governmental Industrial Hygienists (ACGIH) recommends a Threshold Limit Value (TLV)®[1] of 10 ppm (eight-hour TWA) and a short term exposure limit (STEL) of 15 ppm averaged over fifteen minutes. Exposure at the STEL should not be repeated more than four times per day with at least sixty minutes between successive exposures in this range. For Outer Continental Shelf (OCS) oil and gas producing operations, exposure levels exceeding 20 ppm instantaneous exposure require use of personal protective breathing equipment pursuant to U. S. Department of Interior, Minerals Management Service Final Rule, 30 *Code of Federal Regulations* Part 250.67, as published at 53 *Federal Register* 10596-10777, April 1, 1988[2]. The *NIOSH Recommended Standard for Occupational Exposure to Hydrogen Sulfide* should be consulted for additional detailed information. Refer to Table A-2 for additional information on exposure values. CHECK WITH THE EMPLOYER CONCERNING EXPOSURE LIMITS FOR PARTICULAR CIRCUMSTANCES.

A.3 Physiological Effects

INHALATION AT CERTAIN CONCENTRATIONS CAN LEAD TO INJURY OR DEATH (refer to Table A-1). Hydrogen sulfide is an extremely toxic, flammable gas that may be encountered in the production and processing of gas well gas, high-sulfur-content crude oil, crude oil fractions, associated gas, and waters. Since hydrogen sulfide is heavier than air, it can collect in low places. It is colorless and has a foul, rotten-egg odor. In low concentrations, it is detectable by its characteristic odor. However, smell cannot be relied on to forewarn of dangerous concentrations because exposure to high concentrations (greater than 100 ppm) of the gas rapidly paralyzes the sense of smell due to paralysis of the olfactory nerve. A longer exposure to lower concentrations has a similar desensitizing effect on the sense of smell. IT SHOULD BE WELL UNDERSTOOD THAT THE SENSE OF SMELL WILL BE RENDERED INEFFECTIVE BY HYDROGEN SULFIDE, WHICH CAN RESULT IN AN INDIVIDUAL FAILING TO RECOGNIZE THE PRESENCE OF DANGEROUSLY HIGH CONCENTRATIONS. Excess exposure to hydrogen sulfide causes death by poisoning the respiratory system *at the cellular level.* There is some indication that the presence of alcohol in the blood aggravates the effects of hydrogen sulfide in acute poisoning cases. Even at low concentrations (10-50 ppm) hydrogen sulfide is irritating to the eyes and respiratory tract. Closely repeated short-term exposures at low concentrations may lead to irritation of the eyes, nose, and throat. Symptoms from repeated exposures to low concentrations usually disappear after not being exposed for a period of time. Repeated exposures to low concentrations that do not produce effects initially may eventually lead to irritation if the exposures are frequent.

A.4 Respiratory Protection

The National Institute for Occupational Safety and Health (NIOSH) has examined the criteria for respirator tests and sources of respirator leakage and recommends that positive pressure, either supplied-air or self-contained breathing apparatus, as appropriate, with a full face piece be worn by

[1] "TLV" is a trademarked term of the American Conference of Governmental Industrial Hygienists (ACGIH). Refer to *Threshold Limit Values and Biological Exposure Indices* and companion documents available from ACGIH, 1330 Kemper Meadow Drive, Cincinnati, OH 45240 (check latest edition).

[2] Available from Superintendent of Documents, U. S. Government Printing Office, Washington, DC 20402.

anyone exposed to atmosphere containing hydrogen sulfide concentrations above OSHA's ACC (refer to 29 *Code of Federal Regulations* Part 1910.1000, Subpart Z, Table Z-2) Refer to Par. 6.4 for proper breathing equipment recommendations for oil and gas producing and gas processing plant operations involving hydrogen sulfide.

Note: There are differences of opinion in the medical community about whether a person with a perforated eardrum can become overexposed to a toxic substance via the ear, even when wearing proper personal breathing apparatus, and whether they should be excluded from work in a hydrogen sulfide environment[3]. Theoretical calculations by Richard Ronk and M. K. White[3] have led the authors to conclude that tympanic membrane (eardrum) defects do not significantly compromise respiratory protection against hydrogen sulfide and that individuals with perforated tympanic membranes should not be excluded from work in a hydrogen sulfide environment. The validity of these calculations is supported by the absence of case reports of hydrogen sulfide poisoning due to tympanic membrane defect.

Ronk and White[3] also concluded that wearers of positive-pressure, either supplied-air or self-contained personal breathing apparatus, with a full face piece, as recommended by the National Institute for Occupational Safety and Health (NIOSH), who have a tympanic membrane defect and a concurrent tympanomaxillary shunt or a patulous eustachian tube (the tube remains open) may experience the sensation of outward air flow which can be annoying.

In 1982, the Minerals Management Service (MMS), U. S. Department of Interior, amended requirements of the Outer Continental Shelf (OCS) Hydrogen Sulfide Standard, *MMS-OCS-1*, "Safety Requirements for Drilling Operations in a Hydrogen Sulfide Environment, Outer Continental Shelf", Section 5.2, February 1976. MMS rescinded the requirement for personnel eardrum examinations and rescinded the prohibition against persons with perforated eardrums working in a hydrogen sulfide environment (refer to 47 *Federal Register* 28888-28890, July 1, 1982).

The U. S. Occupational Safety and Health Administration may address this subject in future revision of its Respiratory Protection Standard (29 *Code of Federal Regulations* Part 1910.134).

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[3]Compare Poda, George A., "Hydrogen Sulfide Can Be Handled Safely", *Archives of Environmental Health*, Vol. 12, 795-800, June 1966, and Ronk, Richard and White, M. K., "Hydrogen Sulfide and the Probabilities of Inhalation Through Tympanic Membrane Defect", *Journal of Occupational Medicine*, Vol. 25, No. 5, 337-340, May 1985.

Table A-1—Hydrogen Sulfide

Concentration in Air				
Percent by Volume	Parts Per Million By Volume	Grains Per 100 Std. Cubic Feet	Milligrams Per Cubic Meter[4]	Typical Characteristics Regarding Hydrogen Sulfide Exposure[5]
0.000013	0.13[6]	0.008[6]	0.18[6]	Obvious and unpleasant odor generally at 0.13 ppm and quite noticeable at 4.6 ppm. As the concentration increases, the sense of smell fatigues and the gas can no longer be detected by odor.[6]
0.001	10	0.63	14.41	Unpleasant odor. Possible eye irritation. ACGIH recommended Threshold Limit Value (TLV)® (eight-hour TWA).[7]
0.0015	15	0.94	21.61	ACGIH STEL averaged over 15 minutes.[7]
0.002	20	1.26	28.83	Burning sensation in eyes and irritation of the respiratory tract after one hour or more exposure. OSHA ACC (refer to 29 *Code of Federal Regulations* Part 1910.1000, Subpart Z, Table Z-2).
0.005	50	3.15	72.07	Loss of sense of smell after about 15 or more minutes exposure. Exposure over one hour may lead to headache, dizziness, and /or staggering. Pulmonary edema reported following extended exposure to greater than 50 ppm.[8] Exposure at 50 ppm or greater can cause serious eye irritation or damage.
0.01	100	6.30	144.14	Coughing, eye irritation, loss of sense of smell after 3 to 15 minutes. Altered respiration, pain in eyes, and drowsiness after 15 to 20 minutes, followed by throat irritation after one hour. Prolonged exposure results in a gradual increase in the severity of these symptoms.
0.03	300	18.90	432.40	Marked conjunctivitis and respiratory tract irritation. Note: Concentration considered immediately dangerous to life or health (IDLH)[9] (refer to *DHHS No. 85-114, NIOSH Pocket Guide to Chemical Hazards.*[10]
0.05	500	31.49	720.49	Unconsciousness after short exposure, cessation of breathing if not treated quickly. Dizziness, loss of sense of reasoning and balance. Victims need prompt artificial ventilation and /or cardiopulmonary resuscitation (CPR) techniques.
0.07	700	44.08	1008.55	Unconscious quickly. Breathing will stop and death will result if not rescued promptly. Artificial ventilation and/or cardiopulmonary resuscitation (CPR) is needed immediately.
0.10+	1000+	62.98+	1440.98+	Unconsciousness at once. Permanent brain damage or death may result. Rescue promptly and apply artificial ventilation and /or cardiopulmonary resuscitation (CPR).

Note: Data in Table A-1 are approximate values for guidance. There are published data that show slightly different values.

[4]Based on 1% hydrogen sulfide = 629.77 gr/100 SCF @ 14.696 psia and 59°F (101.325 KPa and 15°C).

[5]Hydrogen sulfide has physiological effects on humans. These effects vary from person to person. FOR ADDITIONAL INFORMATION, CONSULT WITH THE EMPLOYER AND RESEARCH THE MATERIAL SAFETY DATA SHEETS (MSDS).

[6]There are wide variations in reported odor thresholds for hydrogen sulfide. A U.S. Environmental Protection Agency draft report states a range for the odor threshold of 0.1-0.2 ppm (refer to Review Draft: *Health Assessment Document for Hydrogen Sulfide*, EPA/600/8-86/026A, August 1986). A Petroleum Association for Conservation of the Canadian Environment (PACE) report, *Review of Ambient Hydrogen Sulfide Standards in Canada*, No. 85-5, December 1985, cites an odor threshold range of 0.005-0.05 ppm from the National Resource Council of Canada (1981) at Table 3.1 (page 3-10). The PACE document also cites reports of wider ranges of odor threshold from 0.0005-1.4 ppm at Table 4.1 (page 4-4).

[7]"TLV" is a trademarked term of the American Conference of Governmental Industrial Hygienists (ACGIH). Refer to *Threshold Limit Values and Biological Indices* and companion documents available from ACGIH, 1330 Kemper Meadow Drive, Cincinnati, Ohio 45240 (check latest edition).

[8]EPA Draft Review Document, supra Note *(6)*, page 1-2.

[9]IDLH means an atmospheric concentration of any toxic, corrosive, or asphyxiant substance that poses an immediate threat to life or would cause irreversible or delayed adverse health effects or would interfere with an individual's ability to escape from a dangerous atmosphere (refer to 29 *Code of Federal Regulations* Part 1910.120). NIOSH considers 300 ppm or more to be the IDLH concentration for hydrogen sulfide (refer to *NIOSH Pocket Guide to Chemical Hazards*).

[10]Available from Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

Table A-2—Summary of Occupational Exposure Values for Hydrogen Sulfide

OSHA ACCs[11]				ACGIH TLVs[12]				NIOSH RELs[13]			
ACC		Maximum Peak Above ACC For 8-hours		TWA		STEL		TWA		CEIL(C)	
ppm	mg/m³	ppm	mg/m³	ppm	mg/m³	ppm	mg/m³	ppm	mg/m³	ppm	mg/m³
20	29	50	72	10	14	15	21	N/A	N/A	C10	C15

ACC Acceptable Ceiling Concentration.
TLVs Threshold Limit Values.
RELs Recommended Exposure Limits.
TWA Eight-hour Time Weighted Average (refer to specific reference document for different methods of weighting used).
STEL Short Term Exposure Limit averaged over a period of 15 minutes.
N/A Not Applicable.
CEIL(C) NIOSH Ceiling Exposure Limit averaged over a period of 10 minutes.

[11] Refer to 29 *Code of Federal Regulations* Part 1910.1000, Subpart Z, Table Z-2.
[12] Refer to *Threshold Limit Values and Biological Exposure Indices, 1993-94.*
[13] Refer to *NIOSH 77-158: Criteria for a Recommended Standard for Occupational Exposure to Hydrogen Sulfide.*

APPENDIX B—PHYSICAL PROPERTIES AND PHYSIOLOGICAL EFFECTS OF SULFUR DIOXIDE

B.1 Physical Data

Chemical Name: Sulfur Dioxide.

CAS Number: 7446-09-05.

Synonyms: Sulfurous anhydride, sulfurous oxide.

Chemical Family: Inorganic.

Chemical Formula: SO_2.

Normal Physical State: Colorless gas appreciably heavier than air. Vapor density (specific gravity) at 32°F (0°C) and 1 atmosphere = 2.26.

Boiling Point: 14°F (-10.0°C).

Flammable Limits: Non-flammable (produced from burning hydrogen sulfide).

Solubility: Readily soluble in water and oil; solubility decreases as the fluid temperature increases.

Odor and Warning Properties: Sulfur dioxide has a pungent odor associated with burning sulfur. It produces a suffocating effect and produces sulfurous acid on membranes of the nose and throat.

B.2 Exposure Limits

The Occupational Safety and Health Administration (OSHA) has established a permissible exposure limit (PEL) of 5 ppm as an 8-hour TWA for sulfur dioxide (refer to 29) *Code of Federal Regulations* Part 1910.1000, Subpart Z, Table Z-1. The American Conference of Governmental Industrial Hygienists (ACGIH) recommends 2 ppm as an eight-hour TWA Threshold Limit Value (TLV)® and 5 ppm as a STEL averaged over 15 minutes for sulfur dioxide.[14] Refer to Table B-2 for additional information on exposure values. CHECK WITH THE EMPLOYER CONCERNING EXPOSURE LIMITS FOR PARTICULAR CIRCUMSTANCES.

B.3 Physiological Effects

B.3.1 ACUTE TOXICITY

INHALATION AT CERTAIN CONCENTRATIONS CAN LEAD TO INJURY OR DEATH (refer to Table B-1). Exposure to concentrations below 20 ppm can cause eye irritation, throat irritation, respiratory tract irritation, chest constriction, and some nausea. Exposure to concentrations above 20 ppm can result in marked coughing, sneezing, eye irritation, and chest constriction. Exposure to 50 ppm causes irritation to the nose and throat, running nose, coughing, reflex broncho-constriction with possible increase in bronchial mucous secretion, and increased pulmonary resistance to air flow (breathing congestion) occurs promptly. This atmosphere (50 ppm or more) will not be tolerated by most persons for more than 15 minutes. Some reported acute reactions of exposure to high concentrations include, but are not limited to, inflammation of the eyes, nausea, vomiting, abdominal pain, and sore throat. These symptoms are sometimes followed by bronchitis, pneumonia, and /or complaints of weakness for a period of weeks.

B.3.2 CHRONIC TOXICITY

It has been reported that prolonged exposures to sulfur dioxide may lead to increased risk of chronic nasopharyngitis, alteration in sense of smell and taste, shortness of breath on exertion, and a higher frequency of respiratory tract infections compared to unexposed persons. It has also been postulated that sulfur dioxide in the work environment "possibly enhances" the suspected carcinogenic (cancer) effect of arsenic or other cancer agents[15]. No definite evidence is available regarding co-carcinogenesis or promotion of cancer by sulfur dioxide exposure. A few persons apparently have or develop a hypersusceptibility to sulfur dioxide. Decrements in pulmonary function tests have been noted after both acute and chronic exposures.

B.3.3 EXPOSURE RISKS

It is not yet clear what concentrations of low level exposure or lengths of exposure increase the risks, nor by how much the risks are increased. Sulfur dioxide exposures should be minimized. Smoking by persons exposed to sulfur dioxide should be strongly discouraged.

Note: Any pre-existing chronic respiratory impairment must be considered in regard to job placement since these conditions can be aggravated by exposure to sulfur dioxide.

B.4 Respiratory Protection

The National Institute for Occupational Safety and Health (NIOSH) has examined the criteria for respirator tests and sources of respirator leakage and recommends that positive pressure, either supplied-air or self-contained personal breathing apparatus, as appropriate, with a full face piece be worn by anyone exposed to atmosphere containing sulfur dioxide concentrations above OSHA's permissible exposure limit (PEL) (refer to 29 *Code of Federal Regulations* Part 1910.1000, Subpart Z, Table Z-1). Refer to Par. 6.4 for proper breathing equipment recommendations for oil and gas producing and gas processing operations involving sulfur dioxide.

[14]"TLV" is a trademarked term of the American Conference of Governmental Industrial Hygienists (ACGIH). Refer to *Threshold Limit Values and Biological Exposure Indices* and companion documents available from ACGIH, 1330 Kemper Meadow Drive, Cincinnati, OH 45240 (check latest edition).

[15]*Criteria for a Recommended Standard for Occupational Exposure to Sulfur Dioxide*, NIOSH, 1974, P. 26. Refer also to the 1977 edition.

Table B-1—Sulfur Dioxide

Concentration in Air				
Percent by Volume	Parts Per Million By Volume	Grains Per 100 Std. Cubic Feet	Milligrams Per Cubic Meter[16]	Typical Characteristics Regarding Hydrogen Sulfide Exposure[17]
0.0001	1	0.12	2.71	Pungent odor, may cause respiratory changes.
0.0002	2	0.24	5.42	ACGIH TLV®[18], and NIOSH REL.
0.0005	5	0.59	13.50	Burning eyes, breathing irritation, and minor throat irritation. Note: OSHA PEL (refer to *29 CFR* 1910.1000, Table Z-1; ACGIH and NIOSH STEL as averaged over 15 minutes.
0.0012	12	1.42	32.49	Throat-irritating cough, constriction in chest, watering eyes, and nausea.
0.010	100	12.0	271.00	Concentration considered immediately dangerous to life or health (IDLH).[19] Refer to *DHHS No. 85-114, NIOSH Pocket Guide to Chemical Hazards.*[20]
0.015	150	17.76	406.35	Extreme irritation. Can be tolerated for only a few minutes.
0.05	500	59.2	1354.50	Causes a sense of suffocation, even with the first breath. Rescue promptly and apply artificial ventilation and/or cardiopulmonary resuscitation (CPR) techniques.
0.10	1000	118.4	2708.99	Death may result unless rescued promptly. Artificial ventilation and/or cardiopulmonary resuscitation (CPR) techniques should be immediately applied.

Note: Data in Table B-1 are approximate values for guidance. There are published data that show slightly different values.

[16]Based on 1% sulfur dioxide = 1184 gr/100 SCF @ 14.696 psia and 59°F (101.315 kPa and 15°C).

[17]Sulfur dioxide has physiological effects on humans. These effects vary from person to person. FOR ADDITIONAL INFORMATION, CONSULT WITH THE EMPLOYER AND RESEARCH THE MATERIAL SAFETY DATA SHEETS (MSDS).

[18]"TLV is a trademarked term of American Conference of Governmental Industrial Hygienists (ACGIH). Refer to *Threshold Limit Values and Biological Indices* and companion documents available from ACGIH, 1330 Kemper Meadow Drive, Cincinnati, Ohio 45240.

[19]IDLH means an atmospheric concentration of any toxic, corrosive, or asphyxiant substance that poses an immediate threat to life or would cause irreversible or delayed adverse health effects or would interfere with an individual's ability to escape from a dangerous atmosphere (refer to 29 *Code of Federal Regulations* Part 1910.120). NIOSH considers 100 ppm or more to be the IDLH concentration for sulfur dioxide (refer to *NIOSH Pocket Guide to Chemical Hazards).*

[20]Available from Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.

Table B-2—Summary of Occupational Exposure Values for Sulfur Dioxide

OSHA PELs[21]				ACGIH TLVs[22]				NIOSH RELs[23]			
TWA		STEL		TWA		STEL		TWA		STEL	
ppm	mg/m³	ppm	ppm	ppm	mg/m³	ppm	mg/m³	ppm	mg/m³	ppm	mg/m³
5	14	N/A	N/A	2	5	5	13	2	5	5	13

PELs Permissible Exposure Limits.
TLVs Threshold Limit Values.
RELs Recommended Exposure Limits.
TWA Eight-hour Time Weighted Average (refer to specific reference document for different methods of weighting used).
STEL Short Term Exposure Limit averaged over a period of 15 minutes.
N/A Not Applicable.

[21]Refer to 29 *Code of Federal Regulations* Part 1910.1000, Subpart Z, Table Z-1.

[22]Refer to *Threshold Limit Values and Biological Exposure Indices, 1993-94* (check latest edition).

[23]Refer to *NIOSH 77-158: Criteria for a Recommended Standard for Occupational Exposure to Sulfur Dioxide.*

APPENDIX C—A SCREENING APPROACH TO DISPERSION OF HYDROGEN SULFIDE

Note: The exposure radii shown in Figures C-1 through C-4 represent estimates developed by API's Air Modeling Task Force (AQ7) using simple screening models and modeling techniques. These models should be reasonably accurate for low velocity releases of neutrally-buoyant mixtures of hydrogen sulfide and carrier gas. Figures C-1 through C-4 are useful as a conservative screening tool for high velocity releases and for light hydrogen sulfide carrier gas mixtures. Figures C-1 through C-4 are not recommended for low velocity releases of heavier-than-air hydrogen sulfide/carrier gas mixtures or of potential aerosol-generating mixtures, since these illustrations sometimes will underpredict exposure radii for these mixtures. Site specific conditions should be assessed to determine the need for additional, more rigorous modeling techniques. Users should evaluate their operations and select proper modeling applications for their specific emergency planning purposes.

C.1 Introduction

The material presented in Appendix C is generic in nature and is intended for emergency response planning purposes to arrive at conservative hydrogen sulfide dispersion estimates. Figures C-1 through C-4 present the screening-level, model-predicted radius of exposure (ROE) for atmospheric concentrations of hydrogen sulfide at 10, 30, 100, 300, and 500 ppm for both continuous and puff (instantaneous) releases of pure hydrogen sulfide. The ROE represents the distance from the emission source to the concentration of interest measured along the plume's centerline at ground level. Equations were developed for predicting the ROE as a function of the quantity/rate of hydrogen sulfide released for each of the hydrogen sulfide concentrations modeled and the type of release (continuous and puff). The equations and corresponding coefficients are presented in Par. C.8 and Table C-1. Meteorological conditions typical of worst-case daytime and nighttime conditions were modeled.

Various regulations dealing with hydrogen sulfide operations prescribe a method(s) or technique(s) for ROE predictions. Such methods must be taken into account because specific compliance actions may require use of a method(s) specified by the regulation, unless use of other methods are allowed.

C.2 Methodology

The ROEs shown in Figures C-1, C-2, C-3, and C-4 were predicted using standard EPA-approved modeling procedures based on Gaussian dispersion theory. The ROEs shown in Figures C-1 and C-2 were predicted by modeling a continuous, steady-state point source release of 100 percent hydrogen sulfide. The ROEs shown in Figures C-3 and C-4 were predicted by modeling an instantaneous hydrogen sulfide release. Both hydrogen sulfide release types were modeled as releases of a neutrally-buoyant material under steady-state meteorological conditions. An effective plume height (release height plus plume rise) of 10 feet was used in all the modeling work. It was assumed that the predicted ROEs do not vary significantly with effective plume height in the range of 0-50 feet.

Table C-1—Linear Regression Coefficients for Mathematical Predictions of ROE as a Function of Downwind Hydrogen Sulfide Concentration and Release Quantity/Rate

Time*	Type of Release	Concentration, ppm	Coefficients A	Coefficients B
Day	Continuous	10	0.61	0.84
Day	Continuous	30	0.62	0.59
Day	Continuous	100	0.58	0.45
Day	Continuous	300	0.64	-0.08
Day	Continuous	500	0.64	-0.23
Night	Continuous	10	0.68	1.22
Night	Continuous	30	0.67	1.02
Night	Continuous	100	0.66	0.69
Night	Continuous	300	0.65	0.46
Night	Continuous	500	0.64	0.32
Day	Puff	10	0.39	2.23
Day	Puff	30	0.39	2.10
Day	Puff	100	0.39	1.91
Day	Puff	300	0.39	1.70
Day	Puff	500	0.40	1.61
Night	Puff	10	0.39	2.77
Night	Puff	30	0.39	2.60
Night	Puff	100	0.40	2.40
Night	Puff	300	0.40	2.20
Night	Puff	500	0.41	2.09

*Day Meteorological Conditions: Stability Class PG D (Neutral)—5 mph Wind Speed.
*Night Meteorological Conditions: Stability Class PG F (Stable)—2.2 mph Wind Speed.

For the purposes of dispersion modeling, the amount of turbulence in the ambient air is categorized into defined increments or stability classes. The most widely used categories are the Pasquill-Gifford (PG) Stability Classes A, B, C, D, E, and F (Pasquill, F., *Atmospheric Difusion,* Second Edition, John Wiley & Sons, New York, New York, 1974). PG Stability Class A denotes the most unstable (most turbulent) air conditions and PG Stability Class F denotes the most stable (least turbulent) air conditions. PG Stability Class D denotes neutral atmospheric conditions where the ambient temperature gradient is essentially the same as the adiabatic lapse rate. Under neutral conditions, rising or sinking air parcels cool or heat at the same rate as the ambient air, resulting in no enhancement or suppression of vertical air motion.

Standard Pasquill-Gifford (PG) dispersion coefficients for flat, open grassland were used in the continuous hydrogen sulfide release model. The Slade (refer to *NTIS-TID 24190:* Slade, D. H., *Meteorology and Atomic Energy,* 1968) dispersion coefficients for flat, open grassland were used in the puff (instantaneous) release model. When modeling instantaneous hydrogen sulfide releases it was assumed that the downwind (x) and the crosswind (y) dispersion coefficients

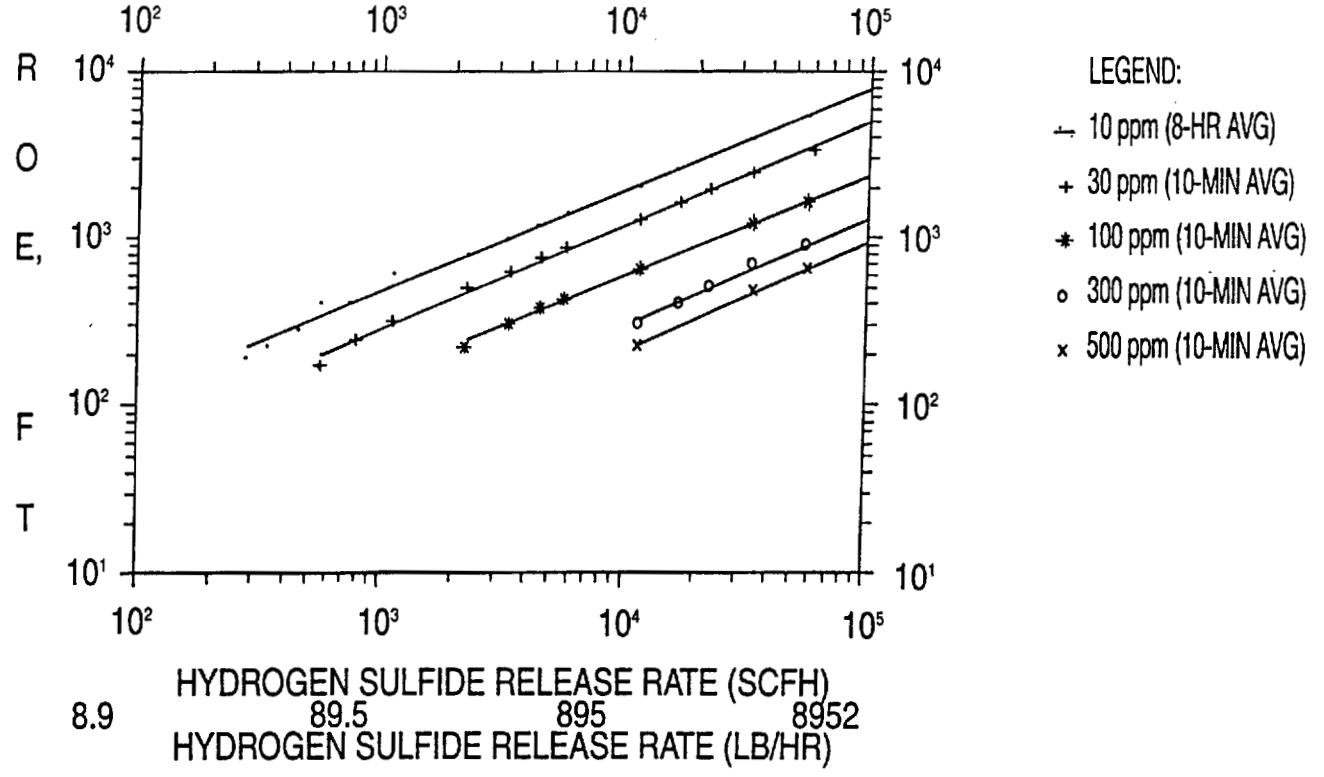

Figure C-1—Radius of Hydrogen Sulfide Exposure
Continuous Daytime Hydrogen Sulfide Releases [PG D (Neutral)—5 MPH Wind Speed]

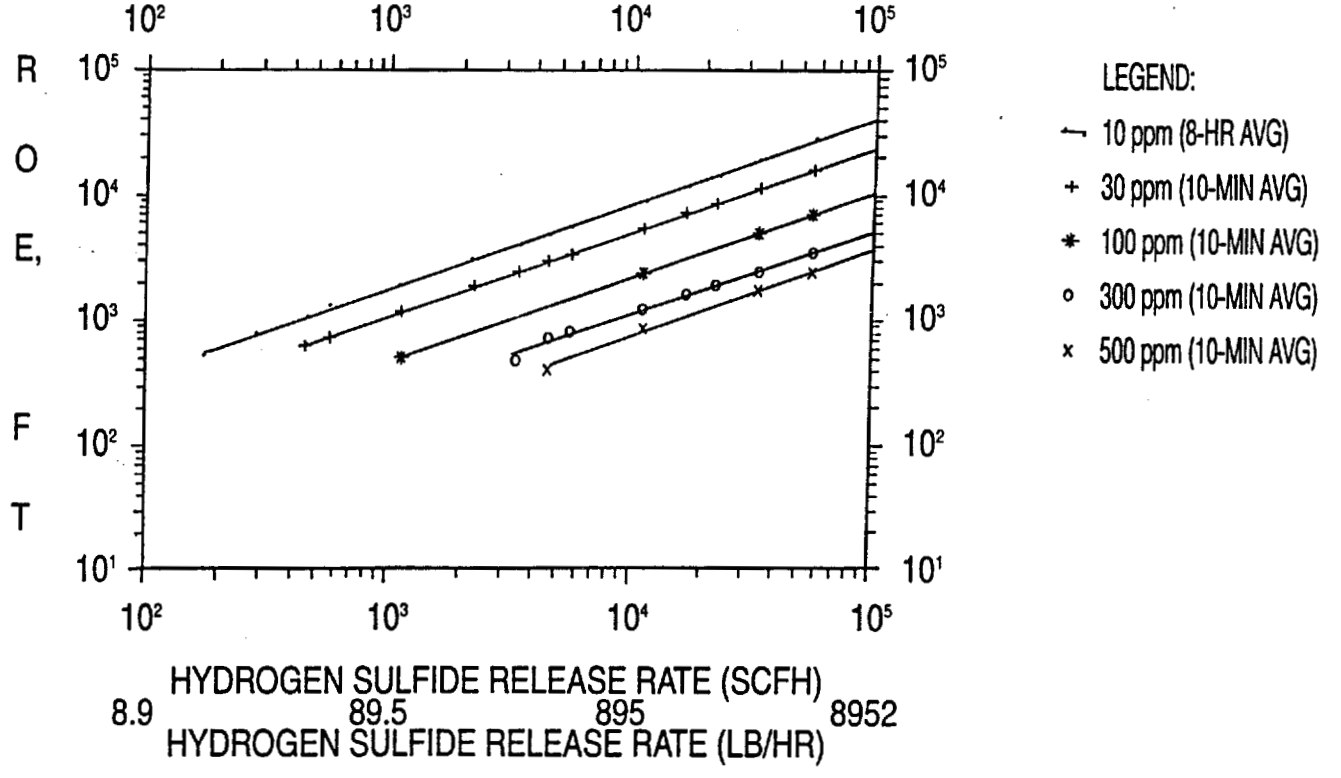

Figure C-2—Radius of Hydrogen Sulfide Exposure
Continuous Nighttime Hydrogen Sulfide Releases [PG F (Stable)—2.2 MPH Wind Speed]

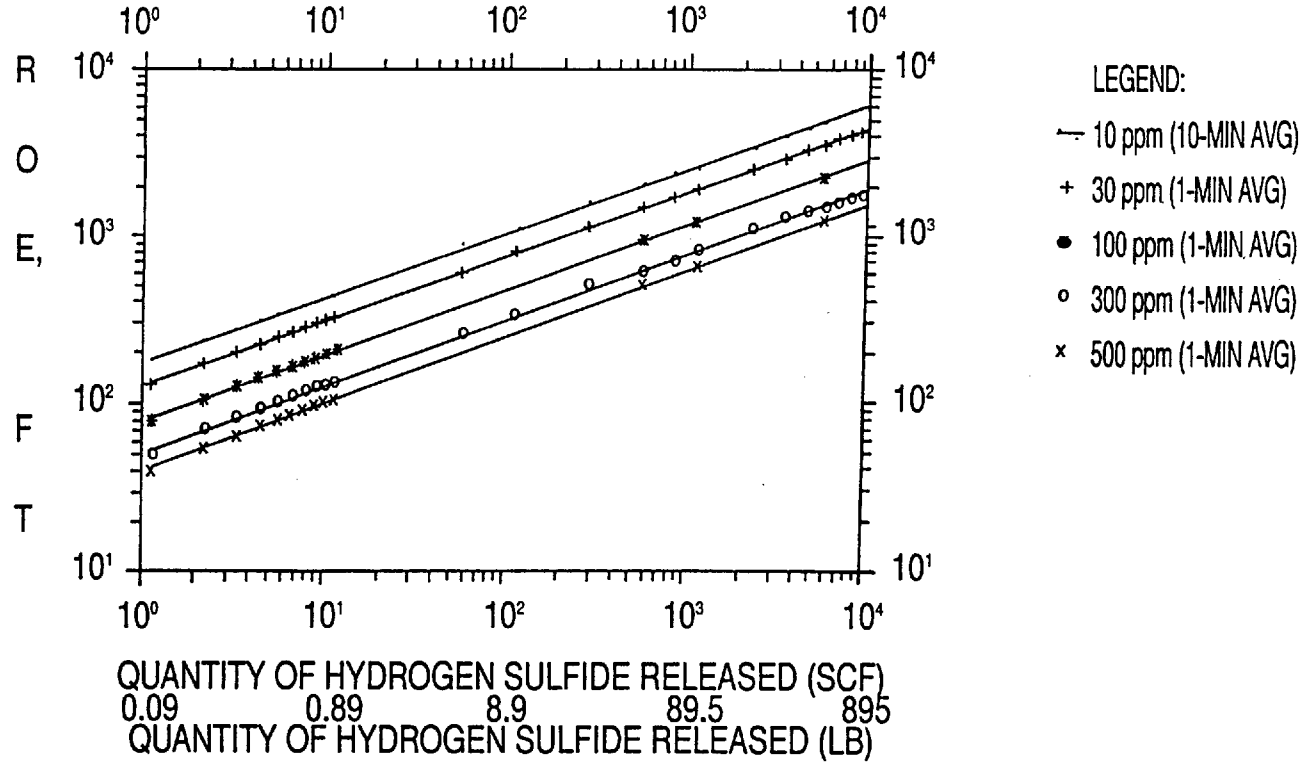

Figure C-3—Radius of Hydrogen Sulfide Exposure
Instantaneous Daytime Hydrogen Sulfide Releases [Slade A (Slightly Unstable)—5 MPH Wind Speed]

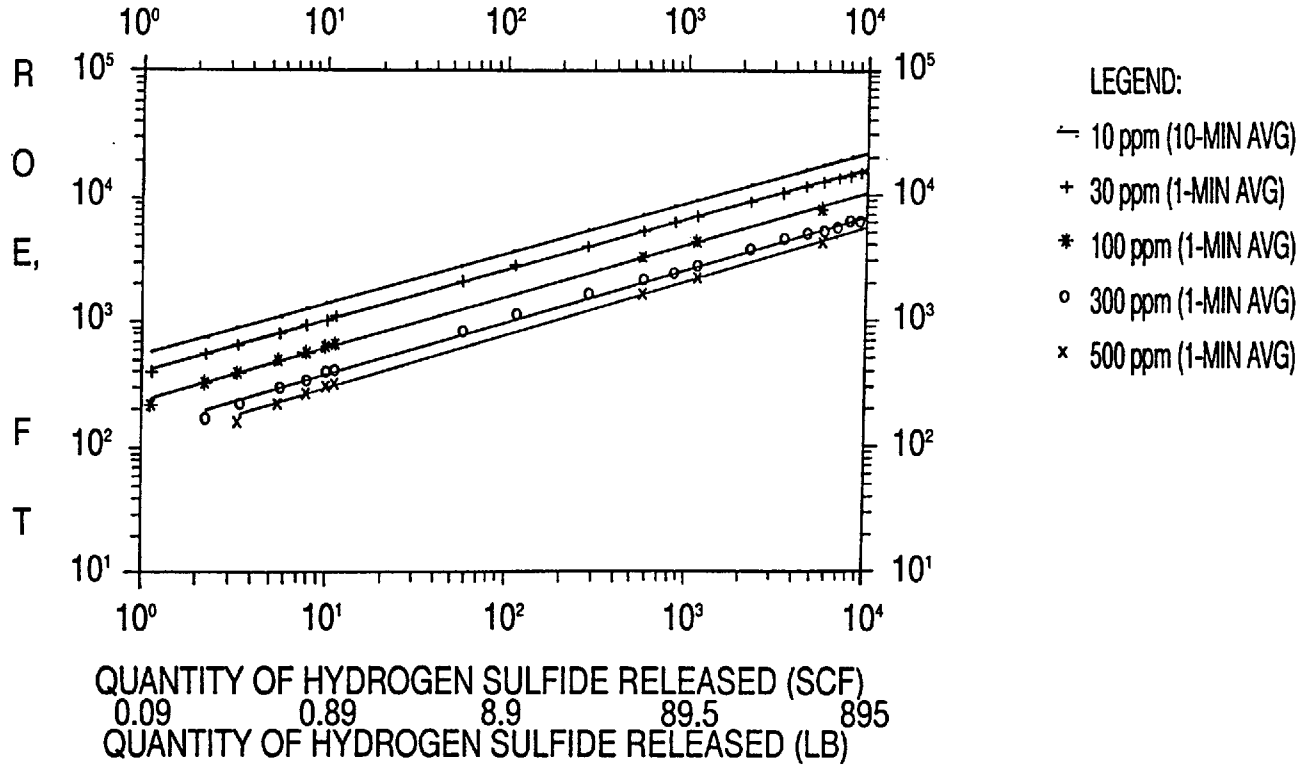

Figure C-4—Radius of Hydrogen Sulfide Exposure
Instantaneous Nighttime Hydrogen Sulfide Releases [Slade B (Neutral)—2.2 MPH Wind Speed]

were equivalent. This assumption results in conservative (worst case) estimates of the ROEs. The following meteorological conditions were assumed to be representative of worst case daytime and nighttime conditions. For continuous daytime releases a neutral Stability Class (PG D) and 5 miles per hour wind speed were chosen. For continuous nighttime releases, a stable Stability Class (PG F) and a 2.2 miles per hour wind speed were chosen. For instantaneous (puff) daytime releases, a slightly unstable Stability Class (Slade A) and a 5 miles per hour wind speed were chosen. For instantaneous nighttime releases, a neutral-to-stable Stability Class (Slade B) and a 2.2 miles per hour wind speed were chosen.

The ROEs for continuous hydrogen sulfide releases at 30, 100, 300, and 500 ppm are valid for averaging times of 10 minutes to 1 hour. The ROEs shown for 10 ppm (continuous hydrogen sulfide release) are based on an 8-hour average concentration, since 10 ppm represents the 8-hour time weighted average (TWA) for hydrogen sulfide. To obtain the 8-hour/10 ppm average concentration a factor of 0.7 was used to convert the 1-hour concentrations (refer to EPA-450/4-88-009: *A Workbook of Screening Techniques for Assessing Impacts of Toxic Air Pollutants*). The ROEs for the puff (instantaneous) hydrogen sulfide releases at 30, 100, 300, and 500 ppm are valid for averaging times of 1 to 10 minutes. EPA's 0.7 conversion factor was used to obtain the 10 minute/10 ppm time averaged concentrations from instantaneous peak concentrations predicted by the model. For continuous releases, the EPA considers 10-minute and 1-hour averaging times to be equivalent. The modeling reported herein assumed that an instantaneous release would be of a very short duration (10 to 15 minutes maximum).

Brief descriptions of the models used to predict the ROEs for both continuous and puff (instantaneous) hydrogen sulfide releases are presented in Par. C.13.

C.3 Results

ROEs for atmospheric plume-centerline, ground-level concentrations of hydrogen sulfide resulting from instantaneous and continuous hydrogen sulfide releases were predicted and are presented in Figures C-1 through C-4. Figures C-1 and C-2 present the predicted ROEs for continuous hydrogen sulfide releases during worst case daytime and nighttime meteorological conditions, respectively. Figures C-3 and C-4 present the predicted ROEs for instantaneous hydrogen sulfide releases during worst case daytime and nighttime meteorological conditions, respectively. The ROEs for concentrations of 10, 30, 100, 300 and 500 ppm were modeled for both release types. The 10 ppm concentration ROEs represent an 8-hour averaging time for the continuous hydrogen sulfide release and a 10-minute averaging time for the instantaneous release. The 30, 100, 300, and 500 ppm concentration ROEs represent a 10-minute averaging time for the continuous hydrogen sulfide release and a 1-minute averaging time for the instantaneous release. A hydrogen sulfide release rate range of 10 to 10,000 lb/hr (111.8 to 111,765 SCFH) was modeled for the continuous type release. For the puff (instantaneous) type hydrogen sulfide release, a release quantity range of 0.1 to 1000 lbs (1.1 to 11,177 SCF) was modeled. If the hydrogen sulfide release is based on pounds, standard cubic feet (SCF) can be obtained by multiplying pounds by a factor of 11.2.

Note: The ROEs presented in Figures C-1 through C-4 are plotted against the amount of hydrogen sulfide released. For the release of a multi-component gas stream, the actual amount of hydrogen sulfide released should be used to determine the ROE.

Equation coefficients based on linear regression for predicting the ROE as a function of the release type (continuous/puff) and quantity/rate of hydrogen sulfide released for both daytime and nighttime meteorological conditions are presented in Table C-1. The equation is given in Par. C.8. The coefficients are applicable only over the ranges presented in Figures C-1 through C-4, and extrapolation could result in overly conservative estimates of the ROEs. Any release lasting significantly longer than 15 minutes should be interpreted as a continuous release. The modeling work presented in Appendix C assumes steady-state meteorological conditions. ROEs predicted for a long averaging time (8-hour) and long downwind distances are conservative because it is unlikely that the same meteorological conditions will persist during that time period.

C.4 Additional Considerations

The modeling work presented in Appendix C assumes a neutrally-buoyant, gaseous hydrogen sulfide release in flat, rural terrain under steady-state meteorological conditions. Also, the ROEs shown in Figures C-1 through C-4 are for a generic class of hydrogen sulfide releases covering a wide range of site and release conditions. Actual ROEs will be dependent on the specifics of the type of release, release conditions, and release site. For instance, the ROEs for a release in a more urban setting where structures, buildings, etc. are present will be reduced significantly due to structure-induced turbulence. Some other conditions that could significantly affect the actual ROE include: a liquid/aerosol release, dense cloud behavior, a buoyant cloud (plume liftoff), a jet release, time-dependent release (well blowout, pipeline ruptures, etc.), and complex terrain. If any of these phenomena are present, then more rigorous modeling may be necessary.

The ROE curves of Figures C-1 through C-4 should not be used when the mixture of hydrogen sulfide and carrier gas being dispersed is significantly heavier than air and the mixture is released at a low velocity. If the hydrogen sulfide/carrier gas mixture specific gravity exceeds approximately 1.2, Figures C-1 through C-4 may not give conservative ROEs for all release rates and meteorological conditions. Hydrogen sulfide, as encountered in the petroleum industry, is usually

a minor constituent of a carrier gas, such as natural gas or carbon dioxide. Carbon dioxide has a specific gravity of 1.52. Dispersion predictions for hydrogen sulfide/carbon dioxide mixtures, using a dense gas model sometimes underpredict hydrogen sulfide ROEs for low velocity gas releases. Low velocity gas releases would include those with initial velocities less than 200 feet/second and releases greater than 200 feet/second involve impact of the gas jet from the leak with a nearby surface, thereby breaking the jet's momentum. Likewise, Figures C-1 through C-4 should not be used with any hydrogen sulfide/carrier gas release that potentially could form an aerosol.

Figures C-1 through C-4 can also substantially overpredict ROEs. In the case of hydrogen sulfide/carrier gas mixtures significantly lighter than air (i.e., specific gravity less than 0.8) released at low velocity, use of these illustrations may overpredict ROEs by a factor of 2 to 3. Use of these illustrations can result in overestimation of ROEs for high velocity hydrogen sulfide/carrier gas releases (i.e., gas release velocities greater than 200 feet/second) regardless of the orientation of the release. However, this overprediction is particularly significant in the case of vertical, high-velocity releases. In such situations, the overprediction can be two orders of magnitude. The user should consult more rigorous atmospheric dispersion models.

When calculating the ROE for dilute concentrations of hazardous gases, a significant overestimation can result. For example, it would not be practical to expect higher downwind atmospheric concentrations than are present in the released gas stream. The user should consult more rigorous atmospheric dispersion models.

In summary, the composition of the hydrogen sulfide/carrier gas and the velocity and orientation of the release are critical variables, dramatically affecting predicted hydrogen sulfide ROEs. Also, other variables, such as released gas temperature and flashing or aerosol formation involving liquid containing dissolved hydrogen sulfide, can have significant impacts on ROE predictions. Accurate atmospheric dispersion techniques are, of necessity, complex. Under some circumstances, such as those mentioned above, more rigorous modeling may be required.

References and models are available to address special release scenarios. A partial list of models that may be used in such cases is shown in Pars. C.5 and C.6. API does not endorse any one particular model. Further guidance on appropriate model selection and application can be obtained from the model developers as well as other individuals experienced in this field. A specific reference to address well blowout and pipeline ruptures is *"Release and Dispersion of Gas from Pipe Line Ruptures,"* Wilson, D. J., Department of Mechanical Engineering, University of Alberta, Edmonton, Canada.

In the event that hydrogen sulfide release quantities calculated by the user are below the ranges shown in Figures C-1 through C-4, extensions of the ROE curves are allowed to a minimum ROE of 50 feet. In some cases, ROEs of less than 50 feet may be inferred from extrapolation of the curves. Figures C-1 through C-4 were developed using an assumed release height plus plume rise of 10 feet. Actual release heights of other than 10 feet will result in different ROEs.

C.5 Proprietary Dispersion Models

Note: Users should carefully evaluate applicability of these models to prevailing conditions.

A list of some proprietary models that can be used to address special site-specific scenarios follows:

CHARM—(Radian Corporation): CHARM is a Gaussian puff model for continuous and instantaneous releases of gases or liquids. The model is configured to handle chemicals that are buoyant, neutrally buoyant, and heavier than air. Heavy gas dispersion is estimated using the Eidsvik model. Source components in the model include a modified version of Shell Oil Company's SPILLS Model. (Radian Corp., 850 MOPAC Blvd., Austin, TX 78759.)

FOCUS—(Quest Consultants, Inc.): FOCUS is a modeling package that includes both emission rate models (two-phase discharges, pool evaporation, jet vapor releases, etc.) and dispersion models for both neutrally-buoyant and dense-gas plumes. The models can be run separately or in a linked mode. (Quest Consultants, Inc., 908 26th Avenue, NW, Suite 103, Norman, OK 73069-6216.)

TRACE—(Dupont): TRACE uses a multiple Lagrangian Wall dispersion model to handle both puff and continuous releases. Wind channeling can be incorporated. Liquid evaporation and buoyancy effects are considered also. (E. I. Dupont de Nemours & Company, 5700 Corea Avenue, Westlake Village, CA 91362.)

WHAZAN—(Technica International): WHAZAN is a package of dispersion models for both neutrally-buoyant and dense-gas plumes. Submodels are included to handle two-phase discharges, evaporation, and vapor dispersion as a free jet. The model can be run both individually and in a linked mode. (Technica International Associates, Inc., Box 187, Woodstock, GA 30128-4420.)

C.6 Publicly-available Models

Note: Users should carefully evaluate applicability of these models to prevailing conditions.

A list of some publicly-available models that can be used to address special site-specific scenarios follows:

DEGADIS—(U. S. Coast Guard): DEGADIS, the Dense Gas Dispersion Model, is designed to simulate dispersion of heavier-than-air gas releases. It can handle both evaporative emissions from liquid spills and jet emissions. It is basically steady-state but simulates transient conditions by a series of steady-state calculations. Vapor generation rate, spill area, and meteorological parameters are important inputs to the

model. Information available through National Technical Information Service (NTIS), U. S. Department of Commerce, Springfield, VA 22161.

HEGADAS—(Shell Research B.V.): HEGADAS is a dispersion model for neutrally-buoyant and dense gases. The basic model components are solutions to the advection/diffusion equations and are in the standard form of Gaussian dispersion models. The model can handle a wide variety of source types, including transient horizontal jets. Information available through National Technical Information Service, U. S. Department of Commerce, Springfield, VA 22161.

SLAB—(Lawrence Livermore National Laboratory): SLAB is designed for application to dense gases that are emitted from liquid spills. The model considers the concentration integrated over a cross-section perpendicular to the plume centerline. The downwind variation of the integrated concentration is calculated. The size and emission rate of the liquid spill are required inputs to the model. Information available through Lawrence Livermore National Laboratory, Box 808, Livermore, CA 94550, or contact American Petroleum Institute, Health & Environmental Sciences Department, 1220 L Street, NW, Washington, D.C. 20005.

C.7 Sample Calculations for Figures C-1 through C-4

The following calculations may be used to estimate volume and mass of hydrogen sulfide when total gas volume and its hydrogen sulfide content are known:

Continuous Release.

Assume: Release of 5,000,000 SCFD of natural gas containing 8,000 ppm (by volume) of hydrogen sulfide.

Note: The user must know both the volume (or flow rate) of natural gas and its hydrogen sulfide concentration so that Figures C-1 through C-4 can be effectively used.

To determine standard cubic feet per hour (SCFH) of hydrogen sulfide released, the following calculations should be performed using appropriate values for the conditions being evaluated:

$$\frac{5{,}000{,}000 \text{ SCFD} \times 8{,}000 \text{ ppm } H_2S}{24{,}000{,}000}$$
$$= 1{,}667 \text{ SCFH of } H_2S \text{ released.}$$

To determine the pounds of hydrogen sulfide released per hour, the following calculations should be performed using appropriate values for the conditions being evaluated:

$$\frac{5{,}000{,}000 \text{ SCFD} \times 8{,}000 \text{ ppm } H_2S}{267{,}605{,}634}$$
$$= 150 \text{ lb/hr of } H_2S \text{ released.}$$

Instantaneous Release.

Assume: Release of 100,000 SCF of natural gas containing 8,000 ppm (by volume) of hydrogen sulfide. Also, assume this example is a daytime release, 5 miles per hour wind speed (refer to Figure C-3).

To determine the volume (SCF) of hydrogen sulfide released, the following calculations should be performed using appropriate values for the conditions being evaluated:

$$\frac{100{,}000 \text{ SCF} \times 8{,}000 \text{ ppm H2S}}{1{,}000{,}000}$$
$$= 800 \text{ SCF of } H_2S \text{ released}$$

After applying the appropriate calculations and using known factors to arrive at either hydrogen sulfide release rate or quantity of hydrogen sulfide released, refer to the appropriate chart (Figs. C-1 through C-4) or the equation in Par. C.8 (example calculations in Pars. C.9 through C.12) for obtaining radius of exposure (ROE) information.

The following equation can be used to convert percent hydrogen sulfide to parts per million on a volume basis:

$$\text{Percent } H_2S \times 10{,}000 = \text{ppm } H_2S$$

C.8 Radius of Exposure (ROE) Calculation

Using the values of coefficients "A" and "B" in Table C-1, the radius of exposure (ROE) for various hydrogen sulfide release rates (H_2S) can be mathematically predicted using the following equation:

$$ROE = \text{Antilog } [A \times \log (H_2S) + B]$$

For a continuous release, enter the hydrogen sulfide release rate (H_2S) in standard cubic feet per hour (SCFH). For a puff (instantaneous) release, enter the quantity of hydrogen sulfide (H_2S) released in standard cubic feet (SCF).

C.9 Sample Calculation—Continuous Release (Daylight)

Determine the $ROE_{100\text{ ppm}}$ for a continuous release of 100 percent hydrogen sulfide gas at a rate of 11,170 SCFH in daylight (PG D stability) conditions and 5 mph wind speed. Using Table C-1, the coefficients applicable to this scenario are: A = 0.58; B = 0.45. Using the equation in Par. C.8:

$$ROE_{100\text{ ppm}} = \text{Antilog } [0.58 \times \log (11{,}170) + 0.45] = 628 \text{ feet.}$$

C.10 Sample Calculation—Continuous Release (Nighttime)

Determine the $ROE_{100\text{ ppm}}$ for a continuous release of 100 percent hydrogen sulfide gas at a rate of 11,170 SCFH in nighttime (PG F stability) conditions and 2.2 mph wind speed. Using Table C-1, the coefficients applicable to this scenario are: A = 0.66; B = 0.69. Using the equation in Par. C.8:

$$ROE_{100\text{ppm}} = \text{Antilog } [0.66 \times \log (11{,}170) + 0.69]$$
$$= 2{,}300 \text{ feet}$$

C.11 Sample Calculation—Instantaneous Release (Daylight)

Determine the ROE_{100ppm} for an instantaneous release of 100 percent hydrogen sulfide gas of 1,117 SCF in daylight (Slade A stability) conditions and 5 mph wind speed. Using Table C-1, the coefficients applicable to this scenario are: A = 0.39; B = 1.91. Using the equation in Par. C.8:

ROE_{100ppm} = Antilog [0.39 × log (1,117) + 1.91] = 1,255 feet.

C.12 Sample Calculation—Instantaneous Release (Nighttime)

Determine the ROE_{100ppm} for an instantaneous release of 100 percent hydrogen sulfide gas of 1,117 SCF in nighttime (Slade B stability) conditions and 2.2 mph wind speed. From Table C-1, the coefficients applicable to this scenario are: A = 0.40; B = 2.40. Using the equation in Par. C.8:

ROE_{100ppm} = Antilog [0.40 × log (1,117) + 2.40] = 4,161 feet.

C.13 Descriptions of Gaussian and Puff Dispersion Models

C.13.1 INTRODUCTION

The emergency response Gaussian and Puff screening models are designed to predict the downwind dispersion (plume-centerline, ground-level concentration and maximum ground-level plume width as a function of downwind distance) of a neutrally-buoyant, steady-state point source gaseous release under steady-state meteorological conditions. Classical EPA-approved Gaussian dispersion theory is applied in the models. The programs are in BASIC and are designed for use on personal computers. The models are described below. The program listings and runs should use the IDLH, ERPG-2, and TLV and STEL levels as the concentrations of interest because they usually are the concentration values of concern. Both models can be run for other concentrations by substituting the values of interest in place of the values for IDLH, ERPG-2, and TLV and STEL in the computer programs. Copies of the example program listings and computer runs are available on request from American Petroleum Institute, Exploration & Production Department, 700 North Pearl Street, Suite 1840, Dallas, Texas 75201-2845.

C.13.2 Gaussian Model

This model calculates the plume-centerline, ground-level concentration, and maximum ground-level plume width for a single, steady-state, continuous-point release at user-specified, steady-state meteorological conditions and downwind distances. The model uses standard Gaussian dispersion modeling with Pasquill-Gifford dispersion coefficients. The user inputs the release rate, effective release height (release height plus plume rise), nominal wind speed, incremental downwind distance for which calculations are to be made, type of material released, and the stability class. A total of eight compounds are currently accepted by this model. Additional compounds can be entered by replacing compounds presently in the model. The model uses a default D Stability Class; but, can be run with any of the standard six Pasquill-Gifford Stability Classes (A, B, C, D, E, or F—with A being the most unstable and F being the most stable).

C.13.3 Puff Model

This model calculates the plume-centerline, ground-level concentration, and maximum ground-level plume width for a single, instantaneous-point release at user-specified, steady-state meteorological conditions and downwind distances. The model uses standard Gaussian dispersion theory for an instantaneous (puff) release with Slade dispersion coefficients. User inputs to the model are the same as those used in the Gaussian model except that the total amount of material released is entered rather than the rate of release. Three values are accepted for the Stability Class (A, B, or C—with A being unstable, B being neutral, and C being stable).

APPENDIX D—DEFINITION OF A SOUR ENVIRONMENT (REPRINTED FROM *NACE STANDARD MR0175-94: STANDARD MATERIAL REQUIREMENTS SULFIDE STRESS CRACKING RESISTANT METALLIC MATERIALS FOR OILFIELD EQUIPMENT*[24])

D.1 Sour Environments

D.1.1 Sour Environments are defined as fluids containing water as a liquid and hydrogen sulfide exceeding the limits defined in Pars. D.1.1.1 and D.1.1.2; these environments may cause sulfide stress cracking (SSC) of susceptible materials.

CAUTION: It should be noted that highly susceptible materials may fail in less severe environments. The SSC phenomenon is affected by complex interactions of parameters including:

a. chemical composition, strength, heat treatment, and microstructure of the material;
b. hydrogen ion concentration (pH) of the environment;
c. hydrogen sulfide concentration and total pressure;
d. total tensile stress (applied plus residual);
e. temperature; and
f. time.

The user shall determine whether the environmental conditions fall within the scope of this standard. (*Editorial Comment:* The critical hydrogen sulfide levels in D.1.1.1 and D.1.1.2 and Figures D-1 and D-2 were developed from data derived from low alloy steel.)

D.1.1.1 Sour Gas

Materials shall be selected to be resistant to SSC or the environment should be controlled if the gas being handled is at a total pressure of 0.4 MPa (65 psia) or greater and if the partial pressure of hydrogen sulfide in the gas is greater than 0.0003 MPa (0.05 psia). Systems operating below 0.4 MPa (65 psia) total pressure or below 0.0003 MPa (0.05 psia) hydrogen sulfide partial pressure are outside the scope of this standard. Partial pressure is determined by multiplying the mole fraction (mol % ÷ 100) of hydrogen sulfide in the gas by the total system pressure. Figure D-1 provides a convenient method for determining whether the partial pressure of hydrogen sulfide in a sour environment exceeds 0.0003 MPa (0.05 psia). A few examples are provided:

a. partial pressure of hydrogen sulfide in a system containing 0.01 mol % hydrogen sulfide (100 ppm or 6.7 grains per 100 standard cubic feet [SCF]) at a total pressure of 7 MPa (1,000 psia) exceeds 0.0003 MPa (0.05 psia) (Point A on Figure D-1).
b. partial pressure of hydrogen sulfide in a system containing 0.005 mol % hydrogen sulfide (50 ppm or 3.3 grains per 100 SCF) at a total pressure of 1.4 Mpa (200 psia) does not exceed 0.0003 Mpa (0.05 psia) (Point B on Figure D-1).

D.1.1.2 Sour Oil and Multiphases

Sour crude oil systems that have operated satisfactorily using standard equipment are outside the scope of this standard when the fluids being handled are either crude oil, or two- or three-phase crude, water, and gas when:

a. the maximum gas:oil ratio is 5000 SCF:bbl (barrel of oil);
b. the gas phase contains a maximum of 15% hydrogen sulfide;
c. the partial pressure of hydrogen sulfide in the gas phases is a maximum of 0.07 MPa (10 psia);
d. the surface operating pressure is a maximum of 1.8 MPa (265 psia) (see Figure D-2); and
e. when pressure exceeds 1.8 MPa (265 psia), refer back to D.1.1.1.

The satisfactory service of the standard equipment in these low-pressure systems is believed to be a result of the inhibitive effect of the oil and the low stresses encountered under the low-pressure conditions.

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[24] *NACE Standard MR0175* is revised annually. Users are cautioned to obtain the latest edition; information in an outdated version of the standard may not be accurate.

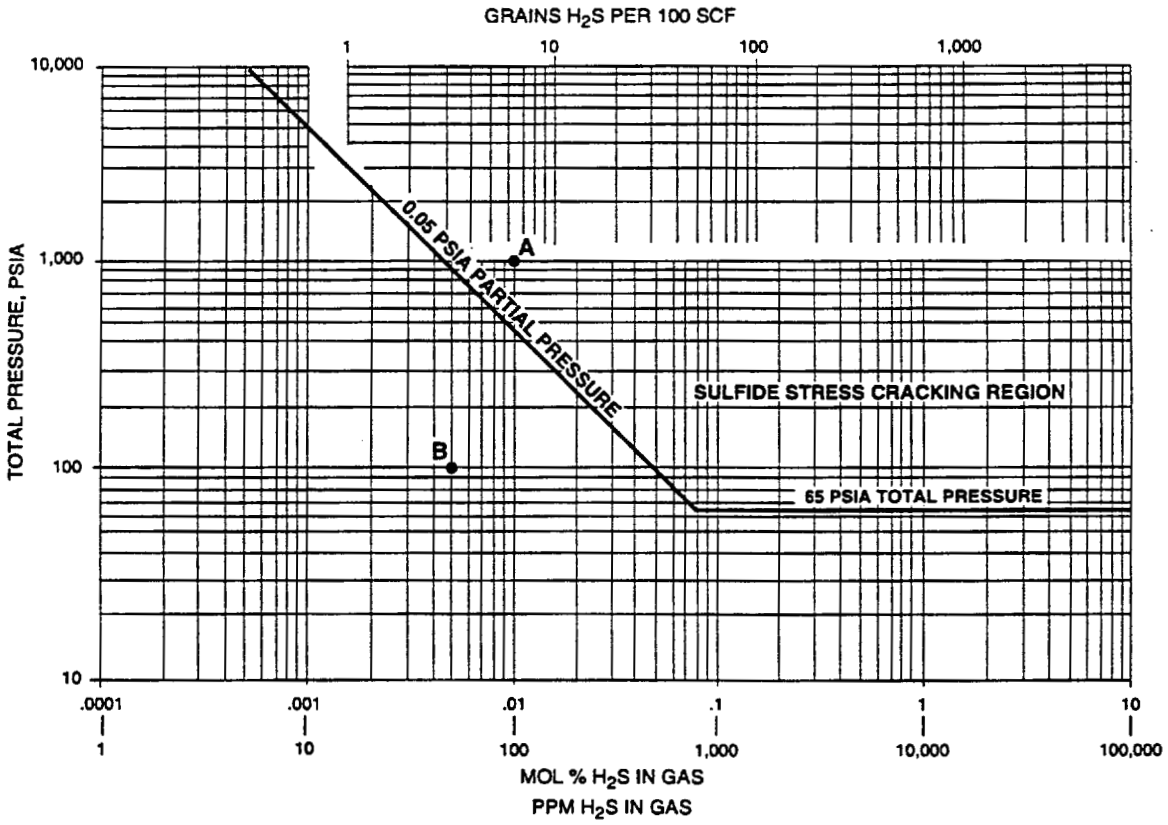
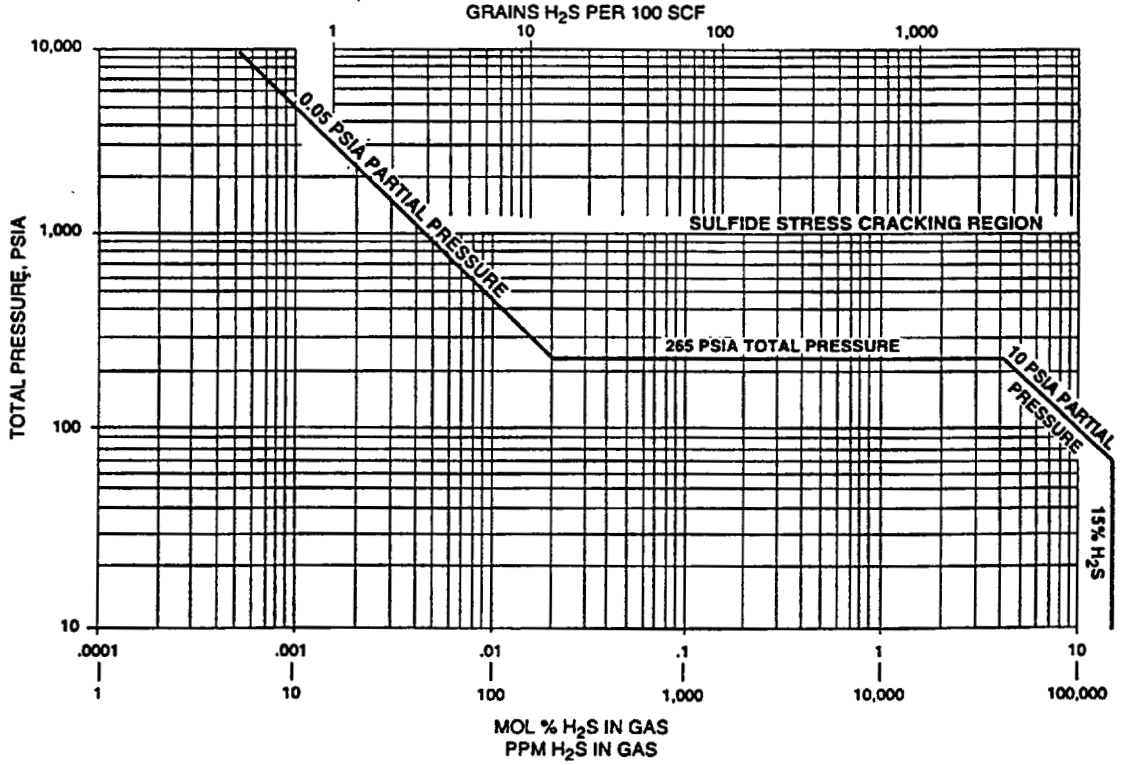


Figure D1*—Sour Gas Systems (Refer to Par. D.1.1.1)



Metric Conversion Factor: 1 MPa = 145.089 psia

Figure D2*—Sour Multiphase Systems (Refer to Par. D.1.1.2)

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	GE4002	Bull E4, Release Reporting for the Oil and Gas Exploration and Production Industry as Required by the CWA, CERCLA, and SARA Title III		$151.00	
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ATTACHMENT B

INCIDENT REPORT FORM

North Ranch Surface Waste Management Facility
Incident Report Form

Type of Incident and General Information	
[ ] Work Related Injury/Illness	[ ] Unsafe Act/Near Miss
[ ] Property Damage	[ ] Vandalism/Criminal Activity
[ ] Vehicular Accident	[ ] Other _____ (i.e. spill, release, fire, explosion, hot load, etc.)

Employee Name: _____ Job Title: _____

Phone No.: _____ Date of Incident: _____ Time of Incident: _____AM/PM

Location of Incident: _____ Weather: _____

Date and Time Reported to Management: Date: _____Time: _____AM/PM

Reported to: _____Title: _____ Reported by: _____

Injury Category of Incident when first reported?
[ ] N/A Employee was not injured
[ ] Notice of injury only, medical treatment declined at this time
[ ] First aid performed onsite, medical treatment declined at this time
[ ] Medical Treatment - transported by _____ to _____
[ ] Employee Fatality

(Section below to be filled out by employee)

Employee's Description of Incident
Were you injured? [ ] yes [ ] no
Type of injury?
Area of body?
In your own words, explain the incident:

Employee Signature: _____ Date: _____

ATTACHMENT C

FORM C-141

District I
1625 N. French Dr., Hobbs, NM 88240
District II
811 S. First St., Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources Department

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-141
Revised August 24, 2018
Submit to appropriate OCD District office

Incident ID	
District RP	
Facility ID	
Application ID	

Release Notification

Responsible Party

Responsible Party	OGRID
Contact Name	Contact Telephone
Contact email	Incident # *(assigned by OCD)*
Contact mailing address	

Location of Release Source

Latitude _____ Longitude _____
(NAD 83 in decimal degrees to 5 decimal places)

Site Name	Site Type
Date Release Discovered	API# *(if applicable)*

Unit Letter	Section	Township	Range	County

Surface Owner: ☐ State ☐ Federal ☐ Tribal ☐ Private (*Name:* _____)

Nature and Volume of Release

Material(s) Released (Select all that apply and attach calculations or specific justification for the volumes provided below)

☐ Crude Oil	Volume Released (bbls)	Volume Recovered (bbls)
☐ Produced Water	Volume Released (bbls)	Volume Recovered (bbls)
	Is the concentration of dissolved chloride in the produced water >10,000 mg/l?	☐ Yes ☐ No
☐ Condensate	Volume Released (bbls)	Volume Recovered (bbls)
☐ Natural Gas	Volume Released (Mcf)	Volume Recovered (Mcf)
☐ Other (describe)	Volume/Weight Released (provide units)	Volume/Weight Recovered (provide units)
Cause of Release		

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

Was this a major release as defined by 19.15.29.7(A) NMAC? ☐ Yes ☐ No	If YES, for what reason(s) does the responsible party consider this a major release?
If YES, was immediate notice given to the OCD? By whom? To whom? When and by what means (phone, email, etc)?	

Initial Response

The responsible party must undertake the following actions immediately unless they could create a safety hazard that would result in injury

☐ The source of the release has been stopped.

☐ The impacted area has been secured to protect human health and the environment.

☐ Released materials have been contained via the use of berms or dikes, absorbent pads, or other containment devices.

☐ All free liquids and recoverable materials have been removed and managed appropriately.

If all the actions described above have not been undertaken, explain why:

Per 19.15.29.8 B. (4) NMAC the responsible party may commence remediation immediately after discovery of a release. If remediation has begun, please attach a narrative of actions to date. If remedial efforts have been successfully completed or if the release occurred within a lined containment area (see 19.15.29.11(A)(5)(a) NMAC), please attach all information needed for closure evaluation.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Printed Name: _____ Title: _____

Signature: _____ Date: _____

email: _____ Telephone: _____

OCD Only

Received by: _____ Date: _____

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

Site Assessment/Characterization

This information must be provided to the appropriate district office no later than 90 days after the release discovery date.

What is the shallowest depth to groundwater beneath the area affected by the release?	_____ (ft bgs)
Did this release impact groundwater or surface water?	☐ Yes ☐ No
Are the lateral extents of the release within 300 feet of a continuously flowing watercourse or any other significant watercourse?	☐ Yes ☐ No
Are the lateral extents of the release within 200 feet of any lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark)?	☐ Yes ☐ No
Are the lateral extents of the release within 300 feet of an occupied permanent residence, school, hospital, institution, or church?	☐ Yes ☐ No
Are the lateral extents of the release within 500 horizontal feet of a spring or a private domestic fresh water well used by less than five households for domestic or stock watering purposes?	☐ Yes ☐ No
Are the lateral extents of the release within 1000 feet of any other fresh water well or spring?	☐ Yes ☐ No
Are the lateral extents of the release within incorporated municipal boundaries or within a defined municipal fresh water well field?	☐ Yes ☐ No
Are the lateral extents of the release within 300 feet of a wetland?	☐ Yes ☐ No
Are the lateral extents of the release overlying a subsurface mine?	☐ Yes ☐ No
Are the lateral extents of the release overlying an unstable area such as karst geology?	☐ Yes ☐ No
Are the lateral extents of the release within a 100-year floodplain?	☐ Yes ☐ No
Did the release impact areas **not** on an exploration, development, production, or storage site?	☐ Yes ☐ No

Attach a comprehensive report (electronic submittals in .pdf format are preferred) demonstrating the lateral and vertical extents of soil contamination associated with the release have been determined. Refer to 19.15.29.11 NMAC for specifics.

Characterization Report Checklist: ***Each of the following items must be included in the report.***

- ☐ Scaled site map showing impacted area, surface features, subsurface features, delineation points, and monitoring wells.
- ☐ Field data
- ☐ Data table of soil contaminant concentration data
- ☐ Depth to water determination
- ☐ Determination of water sources and significant watercourses within ½-mile of the lateral extents of the release
- ☐ Boring or excavation logs
- ☐ Photographs including date and GIS information
- ☐ Topographic/Aerial maps
- ☐ Laboratory data including chain of custody

If the site characterization report does not include completed efforts at remediation of the release, the report must include a proposed remediation plan. That plan must include the estimated volume of material to be remediated, the proposed remediation technique, proposed sampling plan and methods, anticipated timelines for beginning and completing the remediation. The closure criteria for a release are contained in Table 1 of 19.15.29.12 NMAC, however, use of the table is modified by site- and release-specific parameters.

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Printed Name: _____ Title: _____

Signature:_____ Date: _____

email: _____ Telephone: _____

OCD Only

Received by: _____ Date**:** _____

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
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Remediation Plan

Remediation Plan Checklist: ***Each of the following items must be included in the plan.***

- ☐ Detailed description of proposed remediation technique
- ☐ Scaled sitemap with GPS coordinates showing delineation points
- ☐ Estimated volume of material to be remediated
- ☐ Closure criteria is to Table 1 specifications subject to 19.15.29.12(C)(4) NMAC
- ☐ Proposed schedule for remediation (note if remediation plan timeline is more than 90 days OCD approval is required)

Deferral Requests Only: ***Each of the following items must be confirmed as part of any request for deferral of remediation.***

☐ Contamination must be in areas immediately under or around production equipment where remediation could cause a major facility deconstruction.

☐ Extents of contamination must be fully delineated.

☐ Contamination does not cause an imminent risk to human health, the environment, or groundwater.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Printed Name: _____ Title: _____

Signature: _____ Date: _____

email: _____ Telephone: _____

OCD Only

Received by: _____ Date: _____

☐ Approved ☐ Approved with Attached Conditions of Approval ☐ Denied ☐ Deferral Approved

Signature: _____ Date: _____

State of New Mexico
Oil Conservation Division

Incident ID	
District RP	
Facility ID	
Application ID	

Closure

The responsible party must attach information demonstrating they have complied with all applicable closure requirements and any conditions or directives of the OCD. This demonstration should be in the form of a comprehensive report (electronic submittals in .pdf format are preferred) including a scaled site map, sampling diagrams, relevant field notes, photographs of any excavation prior to backfilling, laboratory data including chain of custody documents of final sampling, and a narrative of the remedial activities. Refer to 19.15.29.12 NMAC.

Closure Report Attachment Checklist: *Each of the following items must be included in the closure report.*

☐ A scaled site and sampling diagram as described in 19.15.29.11 NMAC

☐ Photographs of the remediated site prior to backfill or photos of the liner integrity if applicable (Note: appropriate OCD District office must be notified 2 days prior to liner inspection)

☐ Laboratory analyses of final sampling (Note: appropriate ODC District office must be notified 2 days prior to final sampling)

☐ Description of remediation activities

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations. The responsible party acknowledges they must substantially restore, reclaim, and re-vegetate the impacted surface area to the conditions that existed prior to the release or their final land use in accordance with 19.15.29.13 NMAC including notification to the OCD when reclamation and re-vegetation are complete.

Printed Name: _____ Title: _____

Signature: _____ Date: _____

email: _____ Telephone: _____

OCD Only

Received by: _____ Date: _____

Closure approval by the OCD does not relieve the responsible party of liability should their operations have failed to adequately investigate and remediate contamination that poses a threat to groundwater, surface water, human health, or the environment nor does not relieve the responsible party of compliance with any other federal, state, or local laws and/or regulations.

Closure Approved by: _____ Date: _____

Printed Name: _____ Title: _____

Appendix G
Leachate Management Plan

Leachate Management Plan

North Ranch Surface Waste Management Facility
Lea County, New Mexico

September 2019
Project No. 35187378

Prepared for:
NGL Waste Services, LLC
3773 Cherry Creek Dr., Suite 1000
Denver, CO 80209
303-815-1010

Prepared by:
Terracon Consultants, Inc.
25809 Interstate 30 South
Bryant, Arkansas 72022
(501) 847-9292

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Figures

1.0 INTRODUCTION

This Leachate Management Plan (LMP) pursuant to **19.15.36.8.C** for the NGL North Ranch Surface Waste Management Facility (Facility) presents information for leachate collection, handling, storage, treatment and disposal. Design drawings for the leachate collection system, related to the proposed SWMF, are presented in **Appendix K** of the permit application (PA) narrative. A site plan illustrating the general layout of the Leachate Collection System (LCS) and storage facilities at the site is shown on **Figure 1** attached.

This LMP includes the following:

- Collection System and Collection Pipe Design **19.15.36.14.C.5**;
- Leak Detection System Design **19.15.36.14.C.3**;
- Secondary Containment Outside Lined Areas;
- On-site leachate storage and evaporation design **19.15.36.17.B**; and
- Certification of Construction.

The primary LCS conveys leachate to a perforated collection pipe imbedded within washed gravel and wrapped in a geotextile. The six-inch diameter perforated leachate collection pipes are sloped at a minimum grade of about 2%. The lines drain leachate to side-slope riser sumps/pump systems where the leachate is then sent to the leachate evaporation pond via a 4-inch dual contained forcemain.

2.0 COLLECTION SYSTEM/DETECTION SYSTEM DESIGN AND DOCUMENTATION

2.1 Leachate Collection System, Pipe and Riser Design

The leachate collection system was designed and existing components have been constructed to comply with NMOCD **19.15.36.14.C** and **F** requirements. Design calculations and construction details are available in **Appendices J** and **K**, respectively. According to the Hydrologic Evaluation of the Landfill Performance (HELP) analyses contained in the Design and Construction Plan in Appendix J, the peak leachate amount expected to be generated from the landfill is 5,640 gallons per acre per day for the worst open cell case. This is a nominal generation rate assuming the largest waste cell is open with no waste placed and all precipitation from a 25-year, 24-hour storm is collected and pumped to the evaporation pond. Due to the inorganic, non-putrescible nature of the waste being filled and that all waste will pass a paint filter test prior to placement, insignificant volumes of leachate being generated from the waste is anticipated. As the waste mass becomes deeper over the liner system, the annual leachate generation rate is expected to decrease.

3.0 NEW LEACHATE DESIGN SYSTEMS

3.1 General Requirements

In accordance with **19.15.36.14.C** and **19.15.36.14.F** of NMAC, the design of a leachate collection system associated with the waste disposal area includes a lateral drainage layer and a series of pipes, sumps, and pumps designed to provide a positive means for rapid removal of leachate from the waste mass to prevent buildup of leachate head on the liner system.

In accordance with **19.15.36.14.F**, the leachate collection system is designed and operated to maintain less than 12 inches of leachate head on the liner system at any time.

The Permit Drawings contain figures depicting the layout of the leachate collection system and general cross sections of the bottom liner and leachate collection and leak detection system. As shown, the leachate collection system generally consists of a 12-inch thick protection/drainage layer and a six-inch diameter perforated High Density Polyethylene (HDPE) leachate collection pipe encompassed by at least 6-12 inches of clean washed gravel and an eight-ounce non-woven geotextile. Alternative performance-based bottom liner system designs utilizing GCL are included as part of the Permit Application. Design calculations related to the alternative bottom liner system are included in **Appendix J** of the PA narrative.

The lateral drainage layer is designed to drain leachate to a main collection header. The leachate collection header is sloped at a minimum 2% grade longitudinally along each cell (six-inch diameter perforated HDPE pipe). The collection header line drains leachate to an individual side slope riser sump/pump system.

3.2 Gravity Flow and Pump Systems

The leachate collection system within each cell of the Landfill is designed to gravity drain to a sump that is equipped with a pump system. Leachate is automatically pumped from the sump of each cell to an above ground evaporation pond storage system using submersible leachate pumps. The Landfill sump, pumps and pond system are designed to provide adequate peak flow storage to assure continual removal of leachate from the landfill. The leachate pumps will be designed to handle the anticipated peak flow. A portable back-up pump may be provided in case of pump problems or electrical outages. Sump and pump systems will be provided with a remote notification telemetry system to bring attention to high level alarm status to both Facility operators and to NGL control center personnel.

3.3 Evaporation Pond

The leachate evaporation pond, designed in accordance with **19.15.36.17**, will be provided with adequate peak and reserve storage plus adequate freeboard. The leachate evaporation pond

will be equipped with visual high-water indicator and alarms as a means to easily measure leachate levels and provide for high water level indication. The pond will also be provided with a remote notification telemetry system to bring attention to high level alarm status to both Facility operators and to NGL control center personnel.

The leachate evaporation pond at the Facility is a 3.03 million gallon, double-lined impoundment located north of the landfill near the site entrance. All leachate is conveyed from the landfill cells to the evaporation pond through dual contained HDPE pipes which ensures the safe movement of liquids and greatly reduces the potential for leakage. Leachate is evaporated from the pond to take advantage of the high potential evaporation desertic environment.

3.4 Safety and Maintenance

The leachate sump, pump and evaporation pond systems will be designed with automatic controls, alarms, and trouble lights to indicate the need for servicing, as well as automatic cut-off devices to prevent overfilling of the evaporation pond. Spare parts and back-up equipment will be maintained at the site in the event of equipment failure or loss of power.

The evaporation pond will be monitored for protection of migratory bird as discussed in **Appendix D** of the permit narrative.

3.5 Secondary Containment

In accordance with **19.15.36.17.B**, the leachate evaporation pond will have a primary liner and a secondary liner with a leak detection system. Piping that is outside the lined area of the landfill and evaporation pond will be designed and constructed with secondary containment. Leachate force main piping outside the lined area will be dual contained HDPE piping.

19.15.36.17.C.2 states that the operator shall monitor leak detection systems pursuant to the approved surface waste management facility permit conditions, maintain monitoring records in a form readily accessible for Division inspection and report discovery of liquids in the leak detection system to the Division within 24 hours.

4.0 CERTIFICATION OF CONSTRUCTION

Each leachate collection system, sump system and the evaporation pond at the Facility will be designed and constructed in accordance with engineering plans and specifications. New construction will be documented in the form of a certification report prepared by a professional engineer registered in the State of New Mexico. The certification report will include summaries of construction activities, testing data sheets and summaries, and other documentation required by the Construction Quality Assurance (CQA) Plan contained in **Appendix J** of the PA narrative.

The certification report shall include "as-constructed" or record drawings certified in the same manner as liner or cover systems.

"As constructed" features for leachate collection systems will include the following:

- Leachate collection pipe size, type, horizontal and vertical locations, and slope;
- Leachate collection trench and sump locations with elevations;
- Manhole, skimmer or riser locations with top and invert elevations;
- Leachate pump station locations and elevations of the bottom of the wet well, inlet invert, pump on, and pump alarm;
- Location and description of the leachate evaporation pond and other handling facilities; and
- Certification that the leachate system was constructed in accordance with the permit drawings and narrative.

5.0 LEACHATE MANAGEMENT AND DISPOSAL

5.1 Evaporation Pond Disposal

The primary leachate disposal mechanism for the landfill will be evaporation from the evaporation pond. The evaporation pond will be operated in accordance with the approved permit drawings and narrative and the NMOCD permit conditions.

5.2 Salt Water Disposal Well Disposal

The secondary disposal method of piping the leachate to an operator owned SWD well will be used if desired, or if made necessary during normal operations or maintenance.

6.0 POST CLOSURE MANAGEMENT

It is expected that during post-closure care of the landfill, leachate production will decrease until no pumped liquids are accumulating in the landfill cell sumps. Once the entire landfill is closed with the final cover barrier system, the HELP model analysis presented in **Appendix J** of the PA narrative indicates that an imperceptible amount of leachate will be collected in the lateral drainage layer (layer 9) of the bottom liner system. At a point one year after pumping of landfill leachate has ceased, the Facility proposes to close the evaporation pond in accordance with **19.15.36.17.E** and begin the post closure care period for the pond.

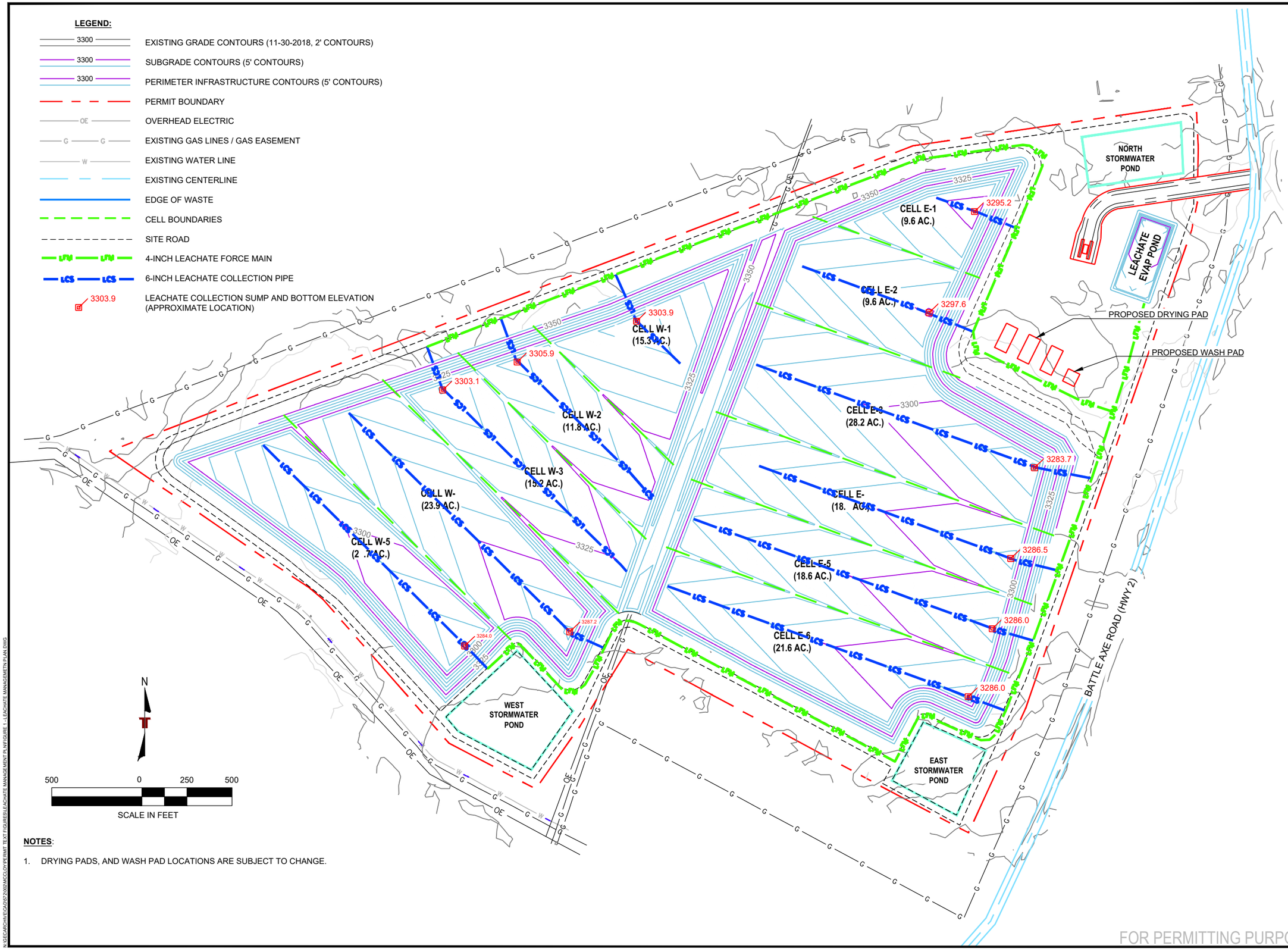
During post closure care for the evaporation pond, leachate levels in the landfill leachate collection sumps will be monitored for leachate head depth. Closure of the evaporation pond can only occur after the landfill's post closure period has begun. The operator will demonstrate to the Division that leachate generation has decreased to the point that a pond in unnecessary and request

authorization to close. The operator will not close the pond without Division authorization. Once the pond has been removed and if, during semi-annual inspections of the landfill, high levels of leachate are observed, the leachate will be pumped from the sumps with a vac-truck and disposed of in accordance with section 5.2 above.

Figure 1

LEGEND:

- 3300 — EXISTING GRADE CONTOURS (11-30-2018, 2' CONTOURS)
- 3300 — SUBGRADE CONTOURS (5' CONTOURS)
- 3300 — PERIMETER INFRASTRUCTURE CONTOURS (5' CONTOURS)
- PERMIT BOUNDARY
- OE — OVERHEAD ELECTRIC
- G — EXISTING GAS LINES / GAS EASEMENT
- W — EXISTING WATER LINE
- EXISTING CENTERLINE
- EDGE OF WASTE
- CELL BOUNDARIES
- SITE ROAD
- LFM — 4-INCH LEACHATE FORCE MAIN
- LCS — 6-INCH LEACHATE COLLECTION PIPE
- 3303.9 — LEACHATE COLLECTION SUMP AND BOTTOM ELEVATION (APPROXIMATE LOCATION)



N

500 0 250 500

SCALE IN FEET

NOTES:

1. DRYING PADS, AND WASH PAD LOCATIONS ARE SUBJECT TO CHANGE.

FOR PERMITTING PURPOSES ONLY

REV.	DATE	BY	DESCRIPTION
1	9/19	KHJ	UPDATED PER JIM JORDAN COMMENTS

LEACHATE MANAGEMENT SYSTEM PLAN
NORTH RANCH SURFACE WASTE MANAGEMENT FACILITY
NGL WASTE SERVICES, LLC
PERMIT APPLICATION DRAWING
LEA COUNTY NEW MEXICO

Terracon
Consulting Engineers and Scientists
2809 I-30 SOUTH BRYANT, AR 72022
PH: (501) 847-9292 FAX: (501) 847-9210

FIGURE 1

DESIGNED BY:	MPB
DRAWN BY:	DEW
APPVD. BY:	MPB
SCALE:	SEE SCALEBAR
DATE:	SEPT. 2019
JOB NO.	35187378
ACAD NO.	572-002
SHEET NO.:	OF

N:\ENC\ARCHIVE\CAD\572\002\MCCLOY\PERMIT TEXT FIGURES\LE\ACHATE MANAGEMENT PLN\FIGURE 1 - LEACHATE MANAGEMENT PLAN.DWG

Appendix H
Closure and Post-Closure Care Plan

Closure and Post-Closure Care Plan

North Ranch Surface Waste Management Facility
Lea County, New Mexico

September 2019
Project No. 35187378

Prepared for:
NGL Waste Services, LLC
3773 Cherry Creek Dr., Suite 1000
Denver, CO 80209
303-815-1010

Prepared by:
Terracon Consultants, Inc.
25809 Interstate 30 South
Bryant, Arkansas 72022
(501) 847-9292

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FIGURES

ATTACHMENTS

1.0 INTRODUCTION

1.1 Purpose, Scope, and Applicability

This Closure and Post-Closure Care Plan addresses sections **19.15.36.8.C.9**, **19.15.36.11**, **19.15.36.14.A.8**, **19.15.36.14.C.8** and **19.15.36.18** of NMAC **19.15.36** Surface Waste Management Facilities for the North Ranch SWMF (Facility) located near Jal, Lea County, New Mexico. This plan assumes the operating permit will terminate after the 10-year term and unclosed portions of the Facility still open at that time will be closed. This plan includes a description of the steps that will be taken to close each Facility closure area, a general schedule for closure, a description of the landfill final cover system and the methods used to install the cover, and a description of post-closure care activities. Information supplemental to this closure plan, such as Permit Drawings (**Appendix K** of the Permit Narrative), are included as part of the permit application (PA). A copy of the Closure and Post-Closure Care Plan will be placed in the Facility permanent operating record (POR).

1.2 Facility Description and Design

NGL Waste Services, LLC owns and operates the North Ranch Surface Waste Management Facility (Facility) located near Jal, Lea County, New Mexico. The site is generally located in portions of Sections 9 and 10 of Township 25 South, Range 34 East in Lea County. The Facility includes an approximately 205-acre oil field waste landfill and a 2.2-acre leachate evaporation pond. The facility has been designed to accept all eligible wastes as outlined in **19.15.36.13**. The primary source of waste will be derived from within Lea County and surrounding oil field areas. For specific design information, see **Appendices J** and **K** of the PA narrative. See **Figure 1** for a site location map.

2.0 CLOSURE PLAN

The following sections describe the general layout, design, and operations of the North Ranch facility. This Closure Plan has been developed as a Facility plan that addresses the landfill and leachate evaporation pond surface waste management and disposal areas at the Facility.

2.1 General Site Layout

The North Ranch Facility consists of approximately 303 acres and includes an oil field waste landfill; a leachate evaporation pond; and various support facilities including the entrance/scale facilities, wet waste drying areas, vehicle/equipment routing areas, borrow area(s), and surface water drainage systems.

2.2 Solid Waste Landfill Area, Leachate Evaporation Pond, Waste Drying Pads, and Truck Wash Pad

The Facility's solid waste landfill area currently includes approximately 205 acres of Oil Field Waste landfill footprint. The bottom liner system, leachate collection system, stormwater control system, and final cover system design are in accordance with **19.15.36** requirements and as described in the PA narrative and incorporated appendices.

An approximately 2.2 acre leachate evaporation pond is associated with the landfill area and will be used as the primary means for disposal of landfill leachate. The pond consists of a lined impoundment designed in accordance with **19.15.36** requirements and as described in the PA narrative and incorporated appendices.

The Facility will be equipped with wet waste drying pad(s). These pads will be concrete with a liquid collection sump and geomembrane leak detection/collection secondary containment underlayment.

The Facility will be equipped with a truck wash pad to allow customers to wash tires and undercarriage prior to exiting the Facility to minimize contaminant transport. The wash pad will be concrete with a liquids collection sump and geomembrane leak detection/collection secondary containment underlayment.

2.3 Landfill Closure Requirements

In accordance with **19.15.36.18,** this Closure Plan contains the following:

- A final cover system, designed in accordance with **19.15.36.14.C.8** and the methods and procedures to be used to install the cover;

- An estimate of the approximate area that will be open and needing closure after a 10-year permit term, including closure of the evaporation pond, drying pads, and truck wash pad.
- A preliminary schedule for completing all activities necessary to satisfy the closure criteria in this section.

The following sections discuss how the Facility conforms to the above requirements. The steps that are necessary to close all of the Oil Field Waste landfill areas at any point during its active life in accordance with the proposed cover design are presented.

*2.3.1 Description of Oil Field Waste Landfill Final Cover System - (*19.15.36.14.C.8*)*

The landfill will be closed when the facility has reached the design grades and/or the capacity of the landfill within the current cell(s). The final cover system for the Landfill includes elements to promote final cover system stability while minimizing infiltration into the waste mass. The various components of the final cover system permitted for the Landfill are listed below and include the following from top to bottom:

- A soil erosion/vegetation layer composed of at least 12-inches of vegetated soil. A 70% coverage of at least two native grasses shall be maintained in accordance with the post closure provisions of 19.15.36.18.C.2.b. The seed list shall conform to the most recent list from NMDOT Revegetation Zone 5 – Southern Desertic Basins, Plains, and Mountains.
- A compacted soil infiltration barrier layer composed of at least 36-inches of soil with a permeability of 1x10-5 cm/s or less.
- A compacted soil intermediate cover layer composed of at least 12-inches of soil with a permeability of 1x10 5 cm/s or less.

A typical detail of the final cover system showing the thickness of each layer is included in **Figure 2**. The closure cost estimates included in **Attachment A** for the Facility will be adjusted annually to account for any partial closures or modified permit conditions. Closure construction will be monitored and documented in accordance with the Facility's Construction Quality Assurance Plan found in **Appendix J** to the permit narrative. Documents related to the final cover system construction activities will be placed in the POR and be subject to NMOCD inspection.

The current planned use of the Facility after final closure is open range-land. If the applicant considers an alternative land-use that requires an alternative surface treatment of closed cells, the NMOCD will be notified and approval of the alternative capping requested.

2.3.2 Estimate of Largest Closure Area

The estimated largest area of a landfill unit requiring closure at the end of the Facility's 10-year permit term is as indicated on the closure cost estimate presented in **Attachment A** to this Closure Plan. The costs provided in **Attachment** A are developed by Terracon Consultants, Inc., a third-party contractor. This acreage represents the Oil Field Waste landfill footprint that is active and/or has intermediate cover only and has not already undergone final certified closure, plus any previous cell with final cover applied that has not had closure financial assurance released in accordance with **19.15.36.18.B**. This maximum area is used for calculation of the closure cost financial assurance obligation.

2.3.3 Schedule for Closure

When cessation of operations is anticipated within a unit or at the Facility. The operator shall follow the closure notification and schedule requirements of 19.15.36.18.A. This includes Division notification 60 days prior to cessation, which includes a proposed schedule for closure. The operator will not begin closure without Division authorization. However, if the Division fails to respond within 60 days of cessation with approval, additional requirements, hearing notification, or an extension notification, the operator may proceed with closure. In any case, the Operator will close in accordance with the approved Closure and Post Closure Plan, schedule, additional Division requirements, if any.

Table 1 Estimated Oil Field Waste Landfill Final Closure Schedule

Closure Area	**Maximum Acreage Requiring Closure**
Cells E1, E2 and half of E3. Assumed 10-year Term.	38
Closure Activity/Task	**Number Of Days To Complete**
Notify the NMOCD of intent to perform final closure	60
NMOCD Response Period	60
Begin closure activities	14
Perform grading of waste	10
Install final cover system	120
Seed and mulch	14
Installation of erosion and sediment control structures	14
Complete certification report	14
Estimated Total Time To Complete Closure Event	**306**

NOTE: The sequence and size of actual closure of the Landfill may vary.

It is estimated that closure of the Facility will be completed no later than 306 days following notification to the NMOCD of the beginning of Facility final closure activities. If necessary, due to inclement weather or other circumstances, a request to extend this schedule may be made to the NMOCD.

2.3.4 Notification Requirements

The NMOCD will be notified when a landfill cell stops receiving waste for disposal and requires closure. The operator shall provide a minimum of three working days' notice to the NMOCD in advance of the top landfill cover's installation to allow the Division to witness the top landfill cover's installation. The NMOCD will be notified should the SWMF cease operations. The operator will notify the NMOCD at least 60 days prior to cessation of operations. All notifications will be placed in the POR.

2.3.5 Estimated Closure Costs

In accordance with **19.15.36.8.C.9**, estimated costs for closing the Facility have been developed, based on hiring a third-party contractor to close the largest area requiring final cover at any given time during the operation of the Facility. The current estimated Closure Cost for the Facility is included in **Attachment A** of this document. The costs provided in **Attachment A** are developed by Terracon Consultants, Inc., a third party contractor.

2.3.6 Facility Recordkeeping and Report Requirements

A copy of the approved Closure and Post-Closure Plan will be kept in the POR. The records will be permanently maintained in the Facility POR unless destruction of the records is authorized by the director of the NMOCD following the completion of the post-closure monitoring period. The NMOCD will be provided with the initial and any required, updated Closure and Post-Closure Cost Estimates for the Oil Field Waste landfill. These estimates will also be placed within the POR.

2.3.7 Financial Assurance for Closure

Evidence of a financial assurance mechanism consistent with **19.15.36.11.E** for closure and post-closure care will be provided to the NMOCD and placed in the POR.

2.3.8 Site Survey

Upon completion of installing the final cover system, the site will be surveyed by a registered professional engineer or surveyor to document the final elevations of the Oil Field Waste landfill, the location of the surface improvements, site boundaries, and areas that received waste. Final closure of the site will be achieved when all permitted cells have been filled

and have the final cover system installed. Closure will be considered complete after the final cover has been inspected and approved by the NMOCD.

2.3.9 Best Management Practices

The surface of the landfill will be shaped and contoured to have 4% minimum top deck slopes and maximum 4:1 side slopes to promote proper drainage away from the landfill. A series of intermediate and internal ditches will be necessary to divert stormwater run-off from the landfill to the perimeter ditches. The final cover system will also include a series of mid-slope drainage conveyances designed to control drainage off the landfill surface while minimizing erosion. All surface water run-off will be directed to area specific no-discharge stormwater sedimentation ponds located outside the active disposal area.

2.3.9.1 Seeding

Seeding of the landfill cover shall be conducted as necessary to maintain 70% vegetation coverage in the spring and fall (typically during February through April and September through November) on recently completed waste cells and areas requiring additional vegetative cover. Operations are typically timed to provide the maximum area available for seeding operations.

Selection of the appropriate vegetative species for the final cover surface is an important consideration for landfill closures. The seed list shall conform to the most recent list from NMDOT Revegetation Zone 5 – Southern Desertic Basins, Plains, and Mountains.

Seed mixtures used in conjunction with the closure of the landfill will be applied using hydro mulching or other suitable technologies. Rolled erosion control products and other stabilization measures will be installed as needed in support of establishment of vegetation at the site.

2.3.9.2 Erosion Control Measures

Because exposed earth fill is subject to erosion, temporary and permanent erosion control measures are used to mitigate the potential for severe erosion and are part of the active maintenance program at the Landfill. In addition to seeding, other erosion control measures include, but may not be limited to, the following:

- Terracing;
- Slope drains;
- Rock-lined ditches and swales; and
- Grass-lined ditches and swales.

Temporary erosion control measures are used as necessary to reduce erosion of exposed slopes on waste disposal areas, berms, or stockpiles. Temporary erosion control measures include the following (use will depend on the time of year and the length of time it is anticipated the soil will remain exposed):

- Seeding;
- Tracking slopes perpendicular to the fall line;
- Covering with mulch;
- Terracing; and
- Diversion ditches and slope drains.

Tracking of slopes (bulldozer tracks made perpendicular to the fall line of the slope) is completed as soon as the slope is finished, regardless of the time of year. Mulching of exposed slopes is done during wet weather conditions when seeding is not possible, or in conjunction with seeding as necessary to establish vegetation. Diversion ditches and slope drains will be constructed as necessary to prevent surface water flow from eroding exposed and covered slopes as well as preventing runoff generated on surrounding land from running into the active areas of the landfill.

2.3.9.3 Sedimentation Control

The erosion control measures described in Section 2.3.9.2 will mitigate offsite sedimentation by reducing the amount of soil carried away in the runoff. Additional sedimentation controls include sediment barriers and the sediment basins are discussed below.

2.3.9.4 Sediment Barriers

Sediment barriers include rock check dams, sediment logs and silt fencing. They are placed as needed during operations. They are most frequently placed below disturbed slopes to prevent silt in overland flow from reaching channels or ditches. The barriers will be installed as necessary. Sediment control fences will also be constructed and maintained in the drainage channels of the active areas of the site. Sediment shall be removed to keep channels open and the soil replaced at the source as required.

2.3.9.5 Sediment Basins

The Facility was designed to have three sedimentation ponds that collect sediments from the landfill prior to releasing stormwater from the site. Water is released when necessary through controlled discharge devices from the ponds.

2.3.10 System Maintenance Procedures

It is very important that the stormwater management components of the cover system be maintained so that they may function properly during a storm event. The following maintenance is recommended, especially after large storm events.

- Keep all ditches and swales unobstructed;
- Remove sediment from ditches, swales, sediment basins, and sediment barriers routinely. Sediment controls are most effective when sediment is removed regularly;
- Inspect and clean check dams and outlet control structures of sediment and other materials that may restrict flow;
- Periodically inspect the stormwater system for damage and repair immediately; and
- Inspect and clean the stormwater system following a major storm event.

Additional inspection and maintenance requirements and procedures are included in the Facility Inspection and Maintenance Plan (see **Appendix E** of the permit narrative)

2.4 Leachate Evaporation Pond, Waste Drying Pad, and Truck Wash Closure Requirements

2.4.1 Description of Closure Requirements

Closure of the leachate evaporation pond will include the following:

- Liquids, sludges, and residual sediments shall be removed and disposed of at a permitted and lined oil field waste management facility;
- Liners can be shredded and recycled or disposed of in a permitted and lined solid waste management facility.;
- Concrete, piping, and appurtenances shall be removed and disposed of at a permitted and lined solid waste management facility;

- The subgrade is sampled, in accordance with the procedures specified in chapter nine of EPA publication SW-846, test methods for evaluating solid waste, physical/chemical methods for TPH, BTEX, metals and other inorganics listed in Subsections A and B of 20.6.2.3103, in accordance with a gridded plat of the pond containing at least four equal sections per Figure 3 and 4.
- Sample results are submitted to the environmental bureau in the Division's Santa Fe office.

2.4.2 Schedule for Closure

19.15.36.17.E requires that the operator shall properly close the evaporation pond within six months after cessation of use.

2.5 Closure Certification

Following closure of the Facility, NMOCD will be provided a certification, signed by a registered professional engineer, verifying that closure has been completed in accordance with the closure plan, and that the certification has been placed in the POR. A final closure report shall accompany the certification that includes:

- The final survey;
- Quality control and quality assurance data documenting proper construction and installation of the cover system, in accordance with the Facility CQA Plan; and
- Other information that the NMOCD may deem necessary to making the certification of construction criteria described in **19.15.36.14.C.8**.

3.0 POST-CLOSURE PLAN

The post-closure period shall be 30 years immediately following the date of written confirmation by the NMOCD that the Facility has been closed in accordance with the approved closure plan, unless the period is decreased or increased by the NMOCD. The period may be decreased if the Facility demonstrates that the reduced period is sufficient to protect fresh water, public health and the environment and this demonstration is approved by the director of the NMOCD. During the post-closure care period, the closure cover shall be maintained and monitoring activities will be performed as described in the following subsections.

The post-closure care period for a pond or pit shall be three years if the operator has achieved clean closure. During that period the operator or other responsible entity shall regularly inspect and maintain required re-vegetation. If there has been a release to the vadose zone or to ground water, then the operator shall comply with the applicable requirements of **19.15.29** and **19.15.30**.

3.1 Post-Closure Inspection, Monitoring, and Maintenance (19.15.36.18.D)

After closure, the Facility will be inspected on a semi-annual basis using the forms provided in the Inspection and Maintenance Plan (**Appendix E** of the PA narrative). The inspections will note areas of the facility that need maintenance and repairs, if any.

Access to the site after closure will be controlled through maintenance of existing fencing and signs, and all access gates will be locked to discourage unauthorized entry.

The integrity of the final cover shall be maintained, including the repair of the cover, as necessary to correct the effects of settlement, subsidence, and erosion, and prevent run-off and run-on from damaging the cover. Vegetation shall be maintained at least annually to control the growth of unwanted vegetation that may interfere with the integrity of the final cover. All cracked, eroded and uneven cover areas must be filled and reseeded and integral ditches maintained. A 70% coverage of natural vegetative cover must be maintained. The seed list shall conform to the most recent list from NMDOT Revegetation Zone 5 – Southern Desertic Basins, Plains, and Mountains.

The leachate collection system will be maintained and properly operated to maintain less than one foot of head on the liner system during the post-closure care period in accordance with the requirements of **19.15.36.14.C** and **F**. The Facility may demonstrate to the director of the NMOCD that the leachate no longer poses a threat to fresh water, public health and the environment in order to stop managing leachate.

If applicable, the Facility will continue to monitor the vadose zone, and groundwater if needed, semi-annually unless a less frequency has been authorized by NMOCD in

accordance with the requirements of the Inspection and Maintenance Plan (**Appendix E** of the PA narrative).

During the post-closure period, the Facility will continue to maintain and monitor perimeter landfill gas probes, if applicable, during the post-closure period.

3.2 Contact Persons

The name, address, and telephone number of the person to contact about the Facility during the post-closure period will be provided upon notice of closure**.**

3.3 Post-Closure Cost Estimate

An estimate of the cost to perform post-closure activities is based on the estimated cost of hiring a third party to conduct the activities. The cost estimate is based on the most expensive costs of post-closure care during the post-closure care period. **Attachment A** presents the current Estimated Post-Closure cost for the Facility (in 2019 dollars). The Post-Closure Cost estimate will be updated upon request by the NMOCD during the life of the Facility to account for inflation.

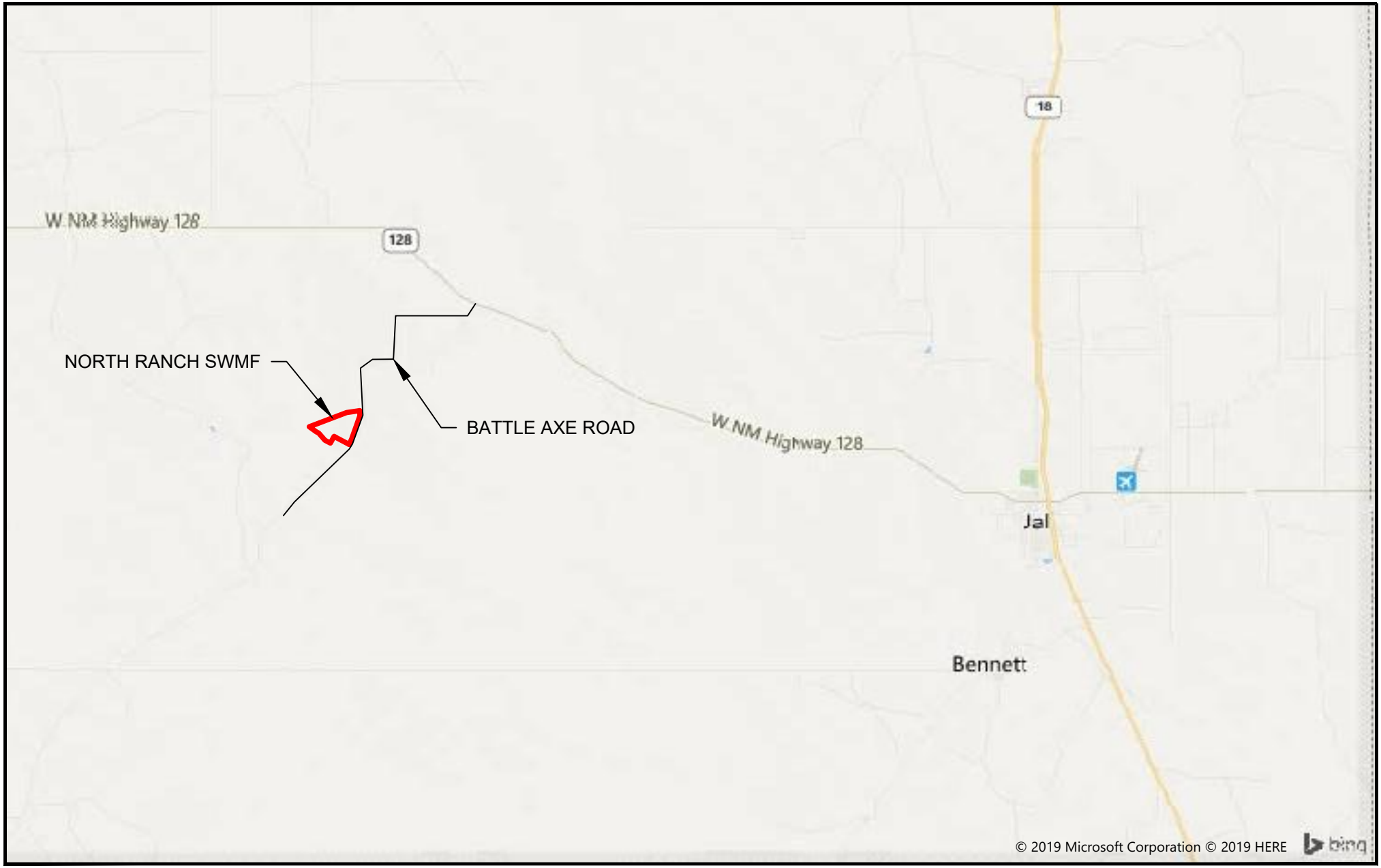
3.4 Certification of Completion

Following the completion of the post-closure care period for the Facility, the NMOCD will be notified that a certification has been placed in the POR. The certification, signed by an independent registered engineer and approved by the NMOCD, will verify that post-closure care has been completed in accordance with the Post-Closure Care Plan.

3.5 Site Management and Use

It is anticipated that upon completion of post-closure care, the Facility site will become open range-land. The actual long-term use of the land will be determined upon notice of closure. The final Facility cover will not be disturbed without prior approval from the NMOCD.

Figures



REV.	DATE	BY	DESCRIPTION

Terracon
Consulting Engineers and Scientists
25809 I-30 SOUTH BRYANT, AR 72022
PH. (501) 847-9292 FAX. (501) 847-9210

SITE LOCATION MAP

PERMIT APPLICATION FIGURE

SURFACE WASTE MANAGEMENT FACILITY

NORTH RANCH

LEA COUNTY NEW MEXICO

FIG. 1

DESIGNED BY:	-
DRAWN BY:	DEW
APPVD. BY:	MPB
SCALE:	1" = 100'
DATE:	SEPTEMBER 2019
JOB NO.	35187378
ACAD NO.	572/002
SHEET NO.:	1 OF 1

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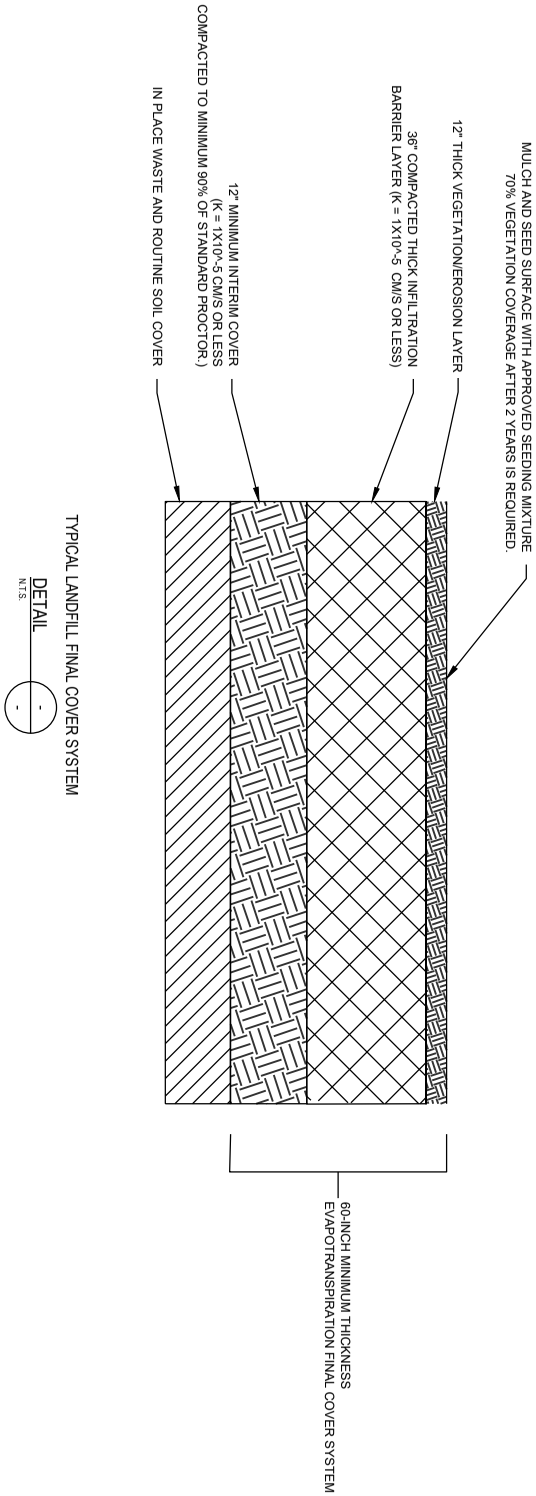

TYPICAL LANDFILL FINAL COVER SYSTEM

DETAIL

N.T.S.

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Project Mngr:	MPB
Drawn By:	DEW
Checked By:	MPB
Approved By:	FOC

Project No.	35187378
Scale:	AS SHOWN
File No.	572-002
Date:	APRIL 2019

Terracon
Consulting Engineers and Scientists
25809 INTERSTATE 30 S BRYANT, ARKANSAS 72022
PH. (501) 847-9292 FAX. (501) 847-2910

FINAL COVER SYSTEM

PERMIT APPLICATION FIGURE

NGL WATER SOLUTIONS PERMIAN, LLC

NORTH RANCH SURFACE WASTE MANAGEMENT FACILITY

LEA COUNTY NEW MEXICO

FIG. No.

2

NORTH STORMWATER POND

SCALE HOUSE

EXISTING GAS/OIL PIPELINE

BATTLE AXE ROAD

LEGEND:

- 3300 — EXISTING GRADE CONTOURS (11/30/2018) (2' INTERVALS)
- 3300 — PROPOSED SUBGRADE CONTOURS (1' INTERVALS)
- PERMIT BOUNDARY/FENCE
- ANCHOR TRENCH
- PERIMETER ROAD
- 100 SAMPLING GRID AND SAMPLE POINT

N

SCALE IN FEET

100 0 50 100

REV.	DATE	BY	DESCRIPTION

LEACHATE POND TYPICAL SAMPLING GRID

PERMIT DRAWING

NGL WASTE SERVICES, LLC

NORTH RANCH SURFACE WASTE MANAGEMENT FACILITY

LEA COUNTY NEW MEXICO

Terracon
Consulting Engineers and Scientists
2809 I-30 SOUTH
BRYANT, AR 72022
PH: (501) 847-9292
FAX: (501) 847-9210

FIGURE 3

DESIGNED BY:	MPB
DRAWN BY:	DEW
APPVD. BY:	MPB
SCALE:	SEE SCALEBAR
DATE:	APRIL 2019
JOB NO.	35187378
ACAD NO.	572-002
SHEET NO.:	OF

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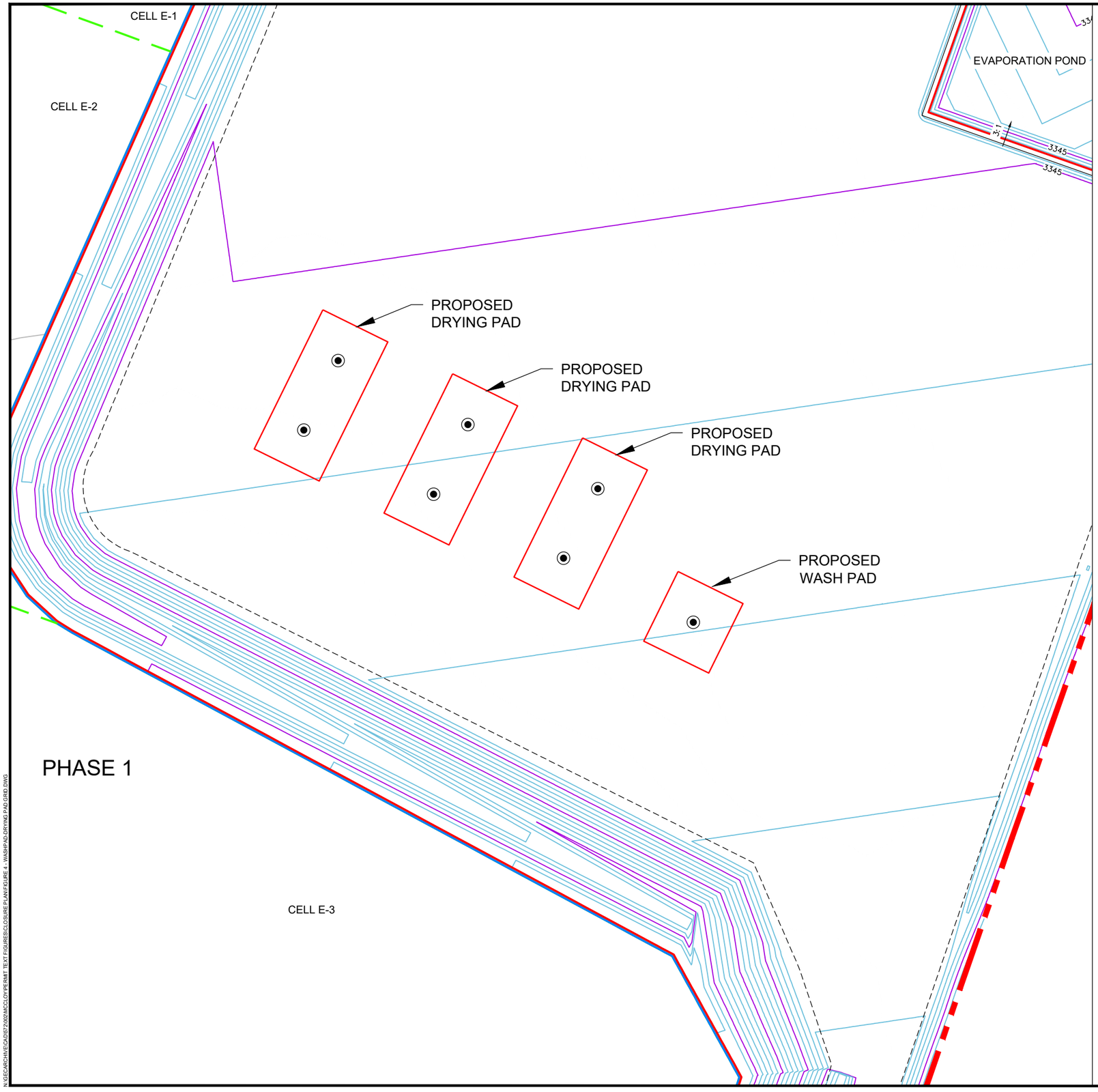

LEGEND:

- 3300 — EXISTING GRADE CONTOURS (11/30/2018) (2' INTERVALS)
- 3300 — PROPOSED SUBGRADE CONTOURS (1' INTERVALS)
- PERMIT BOUNDARY/FENCE
- SAMPLE POINT

NOTE:

PAD SHOWN MAY BE CONSTRUCTED IN A DIFFERENT LOCATION THAN WHAT IS SHOWN AT THE OPERATORS DISCRETION. SAMPLING POINTS SHOWN WILL REMAIN IN THE SAME LOCATIONS SHOWN IN RELATION TO THE ASSOCIATED PAD REGARDLESS OF ORIENTATION AND LOCATION.

N

100 0 50 100

SCALE IN FEET

REV.	DATE	BY	DESCRIPTION

WASTE DRYING PAD AND TRUCK WASH PAD SUBSURFACE SAMPLING POINTS

PERMIT DRAWING

NGL WASTE SERVICES, LLC

NORTH RANCH SURFACE WASTE MANAGEMENT FACILITY

LEA COUNTY NEW MEXICO

Terracon
Consulting Engineers and Scientists
25809 I-30 SOUTH BRYANT, AR 72022
PH. (501) 847-9292 FAX. (501) 847-9210

FIGURE 4

DESIGNED BY:	MPB
DRAWN BY:	DEW
APPVD. BY:	MPB
SCALE:	SEE SCALEBAR
DATE:	APRIL 2019
JOB NO.	35187378
ACAD NO.	572-002
SHEET NO.:	OF

N:\GEICARCHIVE\CAD\572\002\MCCLOY PERMIT TEXT FIGURES\CLOSURE PLAN\FIGURE 4 - WASH PAD-DRYING PAD GRID.DWG

Attachment A
Estimated Closure and Post-Closure Cost

NORTH RANCH SURFACE WASTE MANAGEMENT FACILTIY
CLOSURE COST ESTIMATE WORKSHEET

OWNER: NGL WASTE SERVICES, LLC	PERMIT No.:
OPERATOR: Same	ESTIMATOR: F. Owen Carpenter, PE* (* AR, CO, OK) DATE: SEPTEMBER 2019
TOTAL PERMITTED WASTE DISPOSAL ACRES: 205	
TOTAL PERMITTED ACRES CERTIFIED CLOSED: 0	ACRES CURRENTLY OPEN:_____ (i.e., "open" means areas constructed with waste fill that have not been certified closed)
ACREAGE ASSUMED TO REQUIRE FINAL COVER AT THE END OF 10 YEAR PERMIT TERM: 38	

SUMMARY OF CLOSURE COST ESTIMATE

ITEM No.	ITEM	TOTALS
1	PROFESSIONAL SERVICES	$ 254,600
2	FINAL COVER	$ 868,500
3	EROSION CONTROL	$ 413,248
4	DRYING AND WASH PADS	$ 316,800
5	MISCELLANEOUS	$ 285,315
	TOTAL CLOSURE COST (2019 Dollars)	$ 2,138,463

DETAIL OF CLOSURE COST ESTIMATE

ITEM No.	ITEM	QUANTITY	UNITS	UNIT COST	COST	SUBTOTALS	NMOCD COMMENTS
1.0.0	PROFESSIONAL SERVICES						
1.1.0	Engineering (Design, Bid Documents, Procurement, Bid Phase Management)	1	Lump Sum	$35,000.00	$ 35,000		
1.2.0	Topographic and Boundary Survey	1	Lump Sum	$10,000.00	$ 10,000		
1.3.0	Engineering Services (Construction Oversight, Survey, Testing, Reporting, Certification)	1	Lump Sum	$50,000.00	$ 50,000		
1.4.0	Construction Quality Assurance - Field Services	38	ACRE	$4,200.00	$ 159,600		
	Professional Services Subtotal					$ 254,600	
2.0.0	FINAL COVER						
2.1.0	intermediate cover surface)	38	ACRE	$2,500.00	$ 95,000		
2.2.0	Infiltration Barrier Layer (excavate, transport, place, compact 36-inches from onsite stockpiles)	208,000	CU. YD.	$2.50	$ 520,000		
2.5.0	Erosion/Vegetative Layer (excavate, transport, place 12-inches forn onsite stockpiles)	63,400	CU. YD.	$2.50	$ 158,500		
2.6.0	Seeding and mulching	38	ACRE	$1,500.00	$ 57,000		
2.7.0	Soil Amendments including Fertilizer	38	ACRE	$1,000.00	$ 38,000		
	Protective Soil and Vegetative Layer Subtotal					$ 868,500	
3.0.0	EROSION CONTROL (estimated as a percentage of all required features for the overall 210 acre landfill closure)						
3.1.0	Rip-rap Letdown Structures	532	Lin. FT.	$50.00	$ 26,600		
3.2.0	Checkdams and filters	14	EACH	$6,384.00	$ 86,640		
3.3.0	Tack-on Berms/Channels with RECP	15,000	Lin. FT.	$20.00	$ 300,008		
	Erosion Control Subtotal					$ 413,248	
4.0.0	DRYING AND WASH PADS						
4.1.0	Demolition and Removal of Concrete and Geosynthetics, Piping, Appurtenances, and Base Soils (Assume 2 pads and 1 wash pad)	1	Lump Sum	$300,000.00	$ 300,000		
4.2.0	Residual Leachate Disposal Costs	5,000	GAL.	$0.05	$ 250		
4.3.0	Backfill and Final Grading	5,500	CU. YD.	$2.50	$ 13,750		
4.4.0	Sampling and Analysis for Clean Closure (Two rounds of 12 samples for 3 areas)	7	EACH	$400.00	$ 2,800		
	Drying and Wash Pads Subtotal					$ 316,800	
					Total Closure Cost Subtotal	$ 1,853,148	
5.0.0	MISCELLANEOUS						
5.1.0	10% Administration and Contingency (Total Closure Cost Subtotal x 10%)	1	Lump Sum	$185,314.82	$ 185,315		
5.2.0	Mobilization	1	Lump Sum	$100,000.00	$ 100,000		
	Misc. Subtotal					$ 285,315	
					TOTAL CURRENT CLOSURE COST	$ 2,138,463	

NORTH RANCH SURFACE WASTE MANAGEMENT FACILTIY
POST-CLOSURE CARE COST ESTIMATE WORKSHEET

OWNER: NGL WASTE SERVICES, LLC	PERMIT No.:
OPERATOR: Same	ESTIMATOR: F. Owen Carpenter, PE* (* AR, CO, OK) DATE: SEPTEMBER 2019
TOTAL PERMITTED WASTE DISPOSAL ACRES: 205	
TOTAL PERMITTED ACRES CERTIFIED CLOSED: 0	ACRES CURRENTLY OPEN: _____ (i.e., "open" means areas constructed with waste fill that have not been certified closed)
ACREAGE ASSUMED TO REQUIRE FINAL COVER AT THE END OF 10 YEAR PERMIT TERM: 38	

SUMMARY OF CLOSURE COST ESTIMATE

ITEM No.	ITEM	TOTALS
1	PROFESSIONAL SERVICES	$22,500.00
2	FINAL COVER ROUTINE MAINTENANCE	$3,200.00
3	FINAL COVER REPAIRS	$8,500.00
4	ACCESS ROADS REPAIRS	$6,000.00
5	SURFACE WATER MANAGEMENT OPERATION AND MAINTENANCE (O&M)	$9,000.00
6	LEACHATE COLLECTION SYSTEM O&M	$13,076.00
7	CORRECTIVE ACTION EVALUATION AND IMPLEMENTATION	$0.00
8	MISCELLANEOUS	$6,227.60
	ESTIMATED ANNUAL POST-CLOSURE CARE COST (2019 Dollars)	$68,503.60
	ESTIMATED 30-YEAR POST CLOSURE CARE COST SUBTOTAL (2019 DOLLARS)	$2,055,108.00
9	EVAPORATION POND CLOSURE (1-TIME CAPITOL COST)	$286,375.00
	TOTAL POST CLOSURE CARE COST (2019 DOLLARS)	$2,341,483.00

LANDFILL POST-CLOSURE CARE COST ESTIMATE

ITEM No.	ITEM	QUANTITY	UNITS	UNIT COST	COST	SUBTOTALS	NMOCD COMMENTS
1.0.0	PROFESSIONAL SERVICES						
1.1.0	Engineering (Semi-Annual inspection and reporting, corrective action design and bid, contract management)	2	Lump Sum	$7,500.00	$15,000.00		
1.2.0	Vadose Zone Monitoring	3	Lump Sum	$2,500.00	$7,500.00		
	Professional Services Annual Subtotal					$22,500.00	
2.0.0	FINAL COVER ROUTINE MAINTENANCE						
2.1.0	Inspect soil cover, culverts, drainage letdowns and outfalls, etc...	2	Event	$1,500.00	$3,000.00		
2.3.0	Clean Drain/Culvert Openings	2	Event	$100.00	$200.00		
					$0.00		
	Final Cover Routine Maintenance Annual Subtotal					$3,200.00	
3.0.0	FINAL COVER REPAIRS						
3.1.0	Remove/incorporate unacceptable materials (e.g., dead vegetation, solid waste)		ACRE		$0.00		
3.2.0	Scarify and prepare surface		ACRE		$0.00		
3.3.0	Soil, On-Site (excavate, transport, place, compact)	100	CU. YD.	$2.50	$250.00		
3.4.0	Soil, Off-site (excavate, transport, place, compact)		CU. YD.		$0.00		
3.5.0	Seeding and mulching	5	ACRE	$1,500.00	$7,500.00		
3.6.0	Soil Amendments including Fertilizer	5	ACRE	$150.00	$750.00		
	Final Cover Repairs Annual Subtotal					$8,500.00	
4.0.0	ACCESS ROADS REPAIRS						
4.1.0	Reshape/regrade subgrade		SQ. YD.		0		
4.2.0	Gravel (transport, place, compact)	100	TON	$30.00	$3,000.00		
4.3.0	Drainage Structures (e.g., culverts,	50	Lin. FT.	$10.00	$500.00		
4.4.0	Riprap ditching/channels	100	Lin. FT.	$25.00	$2,500.00		
	Access Roads Repair Annual Subtotal					$6,000.00	

LANDFILL POST-CLOSURE CARE COST ESTIMATE

ITEM No.	ITEM	QUANTITY	UNITS	UNIT COST	COST	SUBTOTALS	NMOCD COMMENTS
5.0.0	SURFACE WATER MANAGEMENT OPERATION AND MAINTENANCE (O&M)						
5.1.0	Collection system operation and maintenance (ditches, piping conveyances, outfalls, sampling points repair/replace)	3	Lump Sum	$1,500.00	$4,500.00		
5.2.0	Stormwater storage (sediment pond) operation/repairs	3	Lump Sum	$1,500.00	$4,500.00		
	Surface Water Management O&M Annual Subtotal					$9,000.00	
6.0.0	LEACHATE COLLECTION SYSTEM O&M						
	Generation Rate = 100 gal./ac./yr.						
6.1.0	Collection operation/maintenance (pump, piping, skimmer, storage operation/repair/replace)	12	Months	$250.00	$3,000.00		
6.2.0	Leachate loading, off-loading and off-site transportation	1	Event	$5,000.00	$5,000.00		
6.3.0	Leachate Treatment/Disposal	3,800	Gal.	$0.02	$76.00		
6.5.0	Leachate sample collection	1	EACH	$2,500.00	$2,500.00		
6.6.0	Leachate sample analysis and reporting	1	EACH	$2,500.00	$2,500.00		
	Leachate Collection System O&M Annual Subtotal					$13,076.00	
7.0.0	CORRECTIVE ACTION EVALUATION AND IMPLEMENTATION						
7.1.0	Resurvey vadose zone well reference points and site benchmarks		EACH		$0.00		
7.2.0	Remove sediments from stormwater basins		EACH		$0.00		
7.3.0	Vadose Zone exceedances evaluation		EACH		$0.00		
7.4.0	Groundwater exceedances notifications		EACH		$0.00		
7.4.0	Groundwater compliance monitoring		EACH		$0.00		
7.6.0	Abate exceedances in subsurface water		EACH		$0.00		
	Corrective Action Evaluation and Implementation Annual Subtotal					$0.00	
	Total Post Closure Care Annual Cost Subtotal					$62,276.00	
8.0.0	MISCELLANEOUS						
8.1.0	10% Administration and Contingency (Total Closure Cost Subtotal x 10%)				$6,227.60		
	Misc. Subtotal					$6,227.60	
	TOTAL ESTIMATED ANNUAL POST CLOSURE CARE COST					$68,503.60	
	ESTIMATED 30 YEAR POST CLOSURE CARE PERIOD SUBTOTAL		30 x "Total Estimated Annual Post Closure Care Cost".			$2,055,108.00	
9.0.0	EVAPORATION POND CLOSURE (1-TIME CAPITAL COST)						
9.1.0	Excavation and Disposal of Residual Sludges, Protective Soil, Piping, and Geosynthetics	1	Lump Sum	$100,000.00	$ 100,000		
9.2.0	Residual Leachate Disposal Costs	1,000,000	GAL.	$0.05	$ 50,000		
9.3.0	Pond Backfill and Final Grading	16,150	CU. YD.	$2.50	$ 40,375		
9.4.0	Sampling and Analysis for Clean Closure (Two rounds of 12 samples)	15	EACH	$400.00	$ 6,000		
9.5.0	Infrastructure Removal and Disposition (including facility scales, etc.)	1	Lump Sum	$90,000.00	$ 90,000		
	Evaporation Pond Subtotal					$ 286,375	
	ESTIMATED 30 YEAR POST CLOSURE CARE PERIOD SUBTOTAL					$2,341,483.00	