NM1 - __65___

PART 36 PERMIT APPLICATION

Attachments 7-14

3 of 3

June 28, 2019

Attachment #7

This plan complies with all applicable requirements contained in 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;*

Envirotech will not have any leak detection sumps in the proposed Landfarm #4.

(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*

Based on Drilling that was completed in 2008, 2009, 2014 and 2019 groundwater is deeper than 100 feet, so there are no groundwater monitoring wells associated with Landfarm #4

(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.*

Envirotech will inspect all berms, fences and gates within the Landfarm 4 facility on a quarterly basis, after a significant rain event, and after a high wind event. A significant rain event will be determined to be if the rainstorm causes ponding or water flowing across the Landfarm farmable area. Typically, this is 0.25 inches or greater, however this is also based on duration and intensity. A high wind event will be determined by a High Wind Advisory or Warning as issued by the National Weather Service (NOAA).

Attached to this section is an example of the inspection form that Envirotech will use to determine if any deficiencies are evident. If deficiencies are noted Envirotech will attempt to correct the deficiencies within 24 hours for any ponding or pooling of water and 72 hours of discovery for other deficiencies.

Landfarm Quarterly Inspection Form

Inspection Performed By: _____Date of Inspection:_____

		Yes	No	Comments
Landfarm Sign				
	Visible			
	Repairs Needed			

Fences/Gates		**Good**	**Needs work**	**Repairs Needed/Cells**
	Condition			
	Gate function			
	Gate Lock			

Berms		**Good**	**Needs work**	**Repairs Needed/Cells**
	Exterior Berm and Swale			
	Cell Berms			

Weather		**Yes**	**No**	**Comments/Location**
	Rain, Wind, or Snow Since Last Inspection			
	Any Ponding Water			
	Evidence of Wind Erosion			
	Date of last Rain event _____			
Other		**Yes**	**No**	**Comments/Location**
	Received Material Has Been Spread			
	Is there any Trash in Cells			

Note: This form can be used as the post rain and wind event form as well

Attachment #8

Hydrogen Sulfide Prevention and Contingency Plan

June 2019

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Appendices:

Figures:

1. Introduction

The purpose of this hydrogen sulfide prevention and contingency plan is to provide guidance to landfarm personnel in recognizing, preparing, and mitigating potentially dangerous hydrogen sulfide (H_2S) situations during landfarming operations. This plan was developed in accordance with the requirements in 19.15.36.8.C.8, 19.15.11.9 NMAC and using the guidelines in Section 7.6 of the API publication *Recommended Practices for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide, RP-55*(API RP-55).

Operations at Landfarm #4 consists of acceptance and treatment of hydrocarbon contaminated soils and drill cuttings. Operations at Landfarm #4 do not consist of gas production, processing, drilling, completion, workover or well servicing operations which is where higher concentrations of H_2S are found. However, the following hydrogen sulfide prevention and contingency plan was written utilizing applicable sections of the API RP-55 publication and 19.15.11.9 NMAC requirements. Also, there are no known public areas within the 100-ppm radius of exposure designated by 19.15.11.9.C.

2. Hydrogen Sulfide Contingency Plan

In accordance with NMAC 19.15.11.9 Sub sections B-I a contingency plan was developed to notify the public in the event of a release of hydrogen sulfide above the activation level. This contingency plan outlines the Emergency procedures to follow, duties of the personnel during the emergency as well as the names and phone numbers of the critical personnel and agencies. This plan also discusses the health effects of hydrogen and presents maps showing the areas where hydrogen sulfide may be present. The plan also outlines the training requirements for the staff and critical personnel at the landfarm as well as the requirements for visiting personnel.

2.1. API Guidelines

The full Immediate Action Plan which conforms with the recommended practices set forth in section 7.6 of API RP-55 is presented in Appendix B of this section. The plan outlines the Emergency procedures to follow, duties of the personnel during the emergency as well as the names and phone numbers of the critical personnel and agencies.

2.2. Plan Activation

The plan clearly establishes an activation level of 10 ppm for worker safety and 30 ppm for the closure of public access to the area.

Worker Safety: Concentrations >10 ppm

The activation level for the Immediate Action Plan (Worker Safety) presented in ***Appendix B*** was determined to be 10 ppm for worker safety. The activation level for Landfarm #4 worker safety was determined using applicable OSHA and NIOSH rules and guidelines.

OSHA 8-hr TWA: 10 ppm

The following outlines the Immediate Action Plan that is illustrated in Appendix B in a step by step process.

- If the personnel gas monitor alarms for H2S concentration greater than 10 ppm. Move upwind of Hydrogen Sulfide and out of affected area.
- Notify other Landfarm personnel and visiting personnel of release, initiate evacuation by calling the current Landfarm Field Manager. Notification will be via Air Horn sounded by acting Landfarm Field Manager.
    - *IF PERSONNEL IN DISTRESS NOTIFY LANDARM FIELD MANAGER OF THE NEED FOR EMERGENCY MEDICAL SERVICE
        - Landfarm field manager will notify Emergency Services via 911.
- When Air horn sounds, all personnel working in Landfarm #4 or surrounding Landfarms 2 and 3 must completely shut down all vehicles and machinery such as tractors etc. and begin evacuation to muster point; see Attached Figure 6a. H2S concentrations will be measure at the muster points with the use of personnel H2S monitors.
- Landfarm Field Manager must notify the acting Emergency coordinator (Environmental Manager) of release and evacuation.
- Upon reaching muster point the acting Landfarm Field Manager must account for personnel using the daily sign in sheet. Landfarm field manager will notify designated personnel of anyone missing.
- Emergency coordinator or Safety Manager will don appropriated PPE (SCBA/supplied air) and evaluate the area with a portable H2S meter to determine H2S concentrations.
- No personnel can re-enter area until deemed safe for re-entry by the Envirotech Safety Department.

Restricted Access: Concentrations > 30 ppm

The activation level for the Immediate Action Plan (Restricted Access) presented in ***Appendix B*** was determined to be 30 ppm. The activation level for Landfarm #4 was determined using 7.6.c of API 55 as guidance:

- If alarms show concentrations of 30 ppm or greater first move upwind of Hydrogen Sulfide Source and out of affected area.
- Notify other Landfarm personnel and visiting personnel of release, initiate evacuation by calling the current Landfarm Field Manager. Notification will be via Air Horn sounded by acting Landfarm Field Manager. Landfarm Filed Manager will notify Emergency Services at the numbers listed in the Immediate Action Plan presented in Appendix B.
    - *IF PERSONNEL IN DISTRESS NOTIFY LANDARM FIELD MANAGER OF THE NEED FOR EMERGENCY MEDICAL SERVICE
- When Air horn sounds, all personnel working in Landfarm #4 or surrounding Landfarms 2 and 3 must completely shut down all vehicles and machinery such as tractors etc and begin evacuation to muster point; see Attached Figure 6a.
- The Acting Landfarm Field Manager will blockade angel peak road (CR 7175) at Highway 550 prior to heading to the muster point.
- Acting Landfarm Field Manager must notify the Emergency coordinator (current Environmental Manager) of release and evacuation.

- Upon reaching muster point the acting Landfarm Field Manager must account for personnel using the daily sign in sheet.
- Emergency Services will notify public if necessary via reverse 911 or door to door notifications.
- Acting Emergency coordinator will assist the police and fire department if requested with public notifications, blockades and evacuations as needed, by providing trained Envirotech personnel.
- Acting Emergency coordinator must contact the National Response Center and complete a release report, per CFR 302-335 paragraph 4.4; see Attached National Response Center Notification page.
- No personnel can re-enter area until deemed safe for re-entry by Emergency Services and concurrence by Envirotech's Emergency Coordinator and Safety Manager. Emergency coordinator or Safety Manager will don appropriated PPE (SCBA/supplied air) and evaluate the area with a portable H2S meter to determine H2S concentrations to determine if it is safe for re-entry after Emergency Services has released the scene back to Envirotech's control

Since this is a permit for a new Landfarm; no data exists to calculate the radius of exposure, which determines the affected area from a release of a potentially hazardous volume of H_2S. Per paragraph (K) of 19.15.11.7 (3) NMAC a radius of exposure of 3000 ft will be used at locations where hydrogen sulfide could reasonably be expected to be present in concentrations in excess of 100 ppm; see ***Figure 8, Hydrogen Sulfide Radius of Exposure***.

2.3. Submission

This plan is available at the Landfarm #4 field office as well as the Envirotech main office. Copies of the plan will be distributed to the NMOCD as well as the agencies listed in the Immediate Action Plan presented in Appendix B (restricted access).

3. Discussion of Hydrogen Sulfide

3.1. General Characteristics

General characteristics of Hydrogen Sulfide are described below:

Hydrogen sulfide (H_2S) is 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. 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.

The complete physical data (Excerpts from the National Institute for Occupation Safety and Health (NIOSH) Pocket Guide of Chemical Hazards) for Hydrogen Sulfide and Sulfur Dioxide are attached in ***Appendix A, NIOSH Physical Data for H_2S.***

3.2. Acute and Chronic Effects of Hydrogen Sulfide

This section is a brief discussion of the acute and chronic health effects of hydrogen sulfide and sulfur dioxide exposure. Table 1 describes the acute effects of hydrogen sulfide exposure:

Table 1. Acute effects of H_2S Exposure

Concentration (ppm)	Symptoms/Effects
0.13-5.0	Odor Threshold (rotten egg smell is first noticeable) Odor becomes more offensive at 3-5 ppm.
10	Possible eye irritation. American Conference of Governmental Industrial Hygienists (ACGIH) recommended threshold limit value (TLV, eight-hour time-weighted average, TWA)
15	ACGIH short term exposure level (STEL), averaged over 15 minutes
20	Burning sensation in eyes and irritation of the respiratory tract after one hour or more of exposure
50	Loss of sense of smell after about 15 or more minutes of exposure. Exposure over one hour may lead to headache, dizziness, and/or staggering. Pulmonary edema reported following extended exposure to greater than 50 ppm. Exposure at 50 ppm or greater can cause serious eye irritation or damage.
100	Coughing, eye irritation, loss of smell after 3-15 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. **Concentration considered immediately dangerous to life of health (IDLH)*Revised IDLH, used to be 300 ppm**
300	Marked conjunctivitis and respiratory tract irritation.
500	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.
700	Unconscious quickly. Breathing will stop and death will result if not rescued promptly. Artificial ventilation and/or CPR needed immediately.
1000+	Unconsciousness at once. Permanent brain damage or death may result. Rescue promptly and apply artificial ventilation or CPR.

Table 1, information obtained from Appendix A of the Recommended Practice for Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide, API Recommended Practice 55.

Some long term (chronic) health effects include continued headaches, poor attention span, memory, and motor function. These health effects can occur for people who have inhaled levels of Hydrogen Sulfide at high enough levels to cause unconsciousness. People who have been exposed to levels over the permissible exposure level (PEL) limit have also reported cardiovascular system problems.

Some long term (chronic) health effects of sulfur dioxide may lead to chronic nasopharyngitis; an alteration in sense of smell and taste. Other health effects include shortness of breath on exertion and greater chances of respiratory tract infections when compared to an unexposed person. Decrease in pulmonary function has been noted after acute and chronic exposure.

3.3. **Hydrogen Sulfide at Landfarm #4**

The two areas of possible hydrogen sulfide generation at Landfarm #4 include the farmable area

of Landfarm #4 where soils are being treated and incoming hydrocarbon contaminated soils and drill cuttings/tank bottoms from third party transporters; located at the Landfarm #4 field office.

Determining the hydrogen sulfide concentration in the contaminated soil, drill cuttings and tank bottoms brought into Landfarm #4 by third party transporters is complex. Each load will be visually inspected prior to acceptance. During the visual inspections samples of the load will be collected and screened for hydrogen sulfide by landfarm personnel who are equipped with personal H2S monitors.

Based on the existing Landfarm #2 operation, it is highly unlikely that H_2S levels will exceed 10 ppm for an 8-hour time weighted average (TWA) or 15 ppm for a 15-minute short term exposure limit (STEL). Therefore, per API RP-55 section 4, subsection 4.1 paragraph a, the personal safety provisions of the API RP-55 publication do not apply. However, this plan was written using applicable sections/requirements of the API RP-55 publication and 19.15.11.9 NMAC requirements.

3.4. Release Level Detection

Hydrogen Sulfide levels will be measured at Landfarm #4 using personal H_2S monitors, which will be worn by Lanfarm #4 personnel. Visiting personnel entering Envirotech, Inc.'s Landfarms are required to check in at the field offices, located at Landfarm #2 and/or Landfarm #4 prior to entering and prior to exiting the Landfarms. Upon check in, visiting personnel will be given an H_2S monitor or assigned a Landfarm employee with an H_2S monitor to accompany them during their activities at any of the Landfarms. The personal monitors will help detect releases in areas where personnel are working over the course of the day.

The personal monitors worn by Landfarm #4 personnel are RKI Instruments, four gas monitor, GX-2009 Model; see ***Appendix C, RKI Personal Monitor Data Sheet***. The detection range of Hydrogen Sulfide is 0-100 ppm and will alarm at levels of 10 ppm (TWA) and continue to alarm for concentrations over the TWA; see ***Appendix C, RKI Personal Monitor Data Sheet***.

3.5. Potential Release Events

Events that may lead to a release of H_2S at Landfarm #4 include soils that are placed in Landfarm #4 that are left undisked or third party transporters of the petroleum hydrocarbon contaminated soils or drill cuttings and tank bottoms.

To limit the ingress of H_2S in to Landfarm #4, all transporters of waste must check into the Landfarm #4 field office. Each load of waste will be inspected using individual monitors which detect H_2S. The detection range of Hydrogen Sulfide is 0-100 ppm and will alarm at levels of 10 ppm (TWA) and continue to alarm for concentrations over the TWA.

To limit the formation of H_2S in the soils being treated at Landfarm #4, the cells are disked every two weeks and newly placed soils are disked within 72-hours of placement.

There are two Hilcorp Energy well sites located in the northeastern corner of Landfarm #4. Some well sites and well site processes may cause a release of H_2S. Per Hilcorp Energy none of the well sites located within a one (1) mile radius of Envirotech's facility have H2S present based on the most recent Natural Gas Analysis. Per the letter the gas Analysis is completed on a semi-annual basis; see ***Appendix E, Hilcorp Energy Well site H_2S Verification***. Should H2S become a

potential problem at the well sites it is the duty of the well site owner to notify Envirotech of the potential of H2S to be present.

4. Training and Drills

4.1. Training

All employees are required to take the 40-hour HAZWOPER class upon hire and the annual 8-hour HAZWOPER refresher course. Both the 8-hour refresher and 40-hour HAZWOPER classes discusses the hazards of H_2S, including exposure limits, chronic and acute health effects, possible sources, use of personal H_2S detection monitors and required personal protective equipment (PPE). The 40-hour HAZWOPER class also teaches employees how to don and doff PPE that may not be used on a daily basis such as a self contained breathing apparatus (SCBA).

All Landfarm personnel, receive training upon hire and annually on the contents of this Hydrogen Sulfide Prevention and Contingency Plan and the Immediate Action Plan.
The Hydrogen Sulfide Prevention and Contingency Plan training covers the following subjects:

- Possible sources of H_2S at Landfarm #4
- Instruments used for the detection of H_2S at Landfarm #4
- Activation level of H_2S
- Location and use of PPE during an H_2S release at Landfarm #4
- Review of responsibilities of essential personnel as outlined in the Immediate Action Plan
- Location and list of emergency contacts

The full Immediate Action Plans can be found in **Appendix B** of this document.

In addition, fit tests are completed upon hire and on a yearly basis for each Envirotech employee. The fit tests are scheduled during one of the monthly safety meetings or on a person by person basis in order to maintain an up-to-date fit test for each employee.

The 40-hour HAZWOPER, 8-hour HAZWOPER refresher, and Hydrogen Sulfide Prevention and Contingency Plan training is to be implemented by the current Envirotech Safety Manager. A class roster is signed by each person attending the training and the signed class roster is then files with the employee records.

4.2. Drills

The Immediate Action Plan drill is completed annually by essential Landfarm #4 employees and staff see; ***Appendix B, Immediate Action Plan***.

The following is a brief summary of how the Immediate Action Plan drill is initiated and completed:

1. The current Envirotech Safety Manager notifies Landfarm Personnel of an H_2S release of 30 ppm or greater, with a location to Landfarm #4 personnel (this is in lieu of an actual release, the call is used as the trigger to start the drill).
2. The Landfarm personnel that received the notification with the pertinent information, initiates the Immediate Action Plan.
3. While Landfarm #4 personnel execute either physically (i.e. don and doff PPE, equipment shut down and gathering at muster point) or verbally (i.e. notifying HAZMAT, police or other officials as outlined in the Immediate Action Plan), The

current Envirotech Safety Manager is on site to watch and note how accurately and efficiently the plan is executed.

4. Upon completion of the plan, Landfarm #4 personnel and the current Envirotech Safety Manager meet to discuss what went well and any necessary changes needed in order to better execute the plan.
5. If the Immediate Action Plan needs to be updated as a result of the annual drill and post drill meeting, the current Envirotech Safety Manager will update the plan as needed.

Note:
This can be completed as an onsite drill or a table discussion.

The annual Immediate Action Plan drill is to be implemented by the current Envirotech Safety Manager. A roster is signed by each person attending the drill; the signed roster is then updated in each individual employee file with verification of the drill attendance and completion.

5. Division Notification

A list of emergency responders, public agencies, local government and other appropriate public authorities are included in the Immediate Action Plan in ***Appendix B***. In addition, the New Mexico Oil Conservation Division (NMOCD) must be notified within the first four hours of a release, per 19.15.11.16 NMAC. In an event of an activation level release, i.e. of 100 ppm or more, the NMOCD will be notified by the current Environmental Manager. In addition, a C-141 form will be submitted by the current Environmental Manager to the NMOCD within 15 days following the activation level release; see ***Appendix D, C-141 form***.

Figures

Figure 8: Radius of Exposure

Figure 8a: Evacuation Routes

3000' Buffer

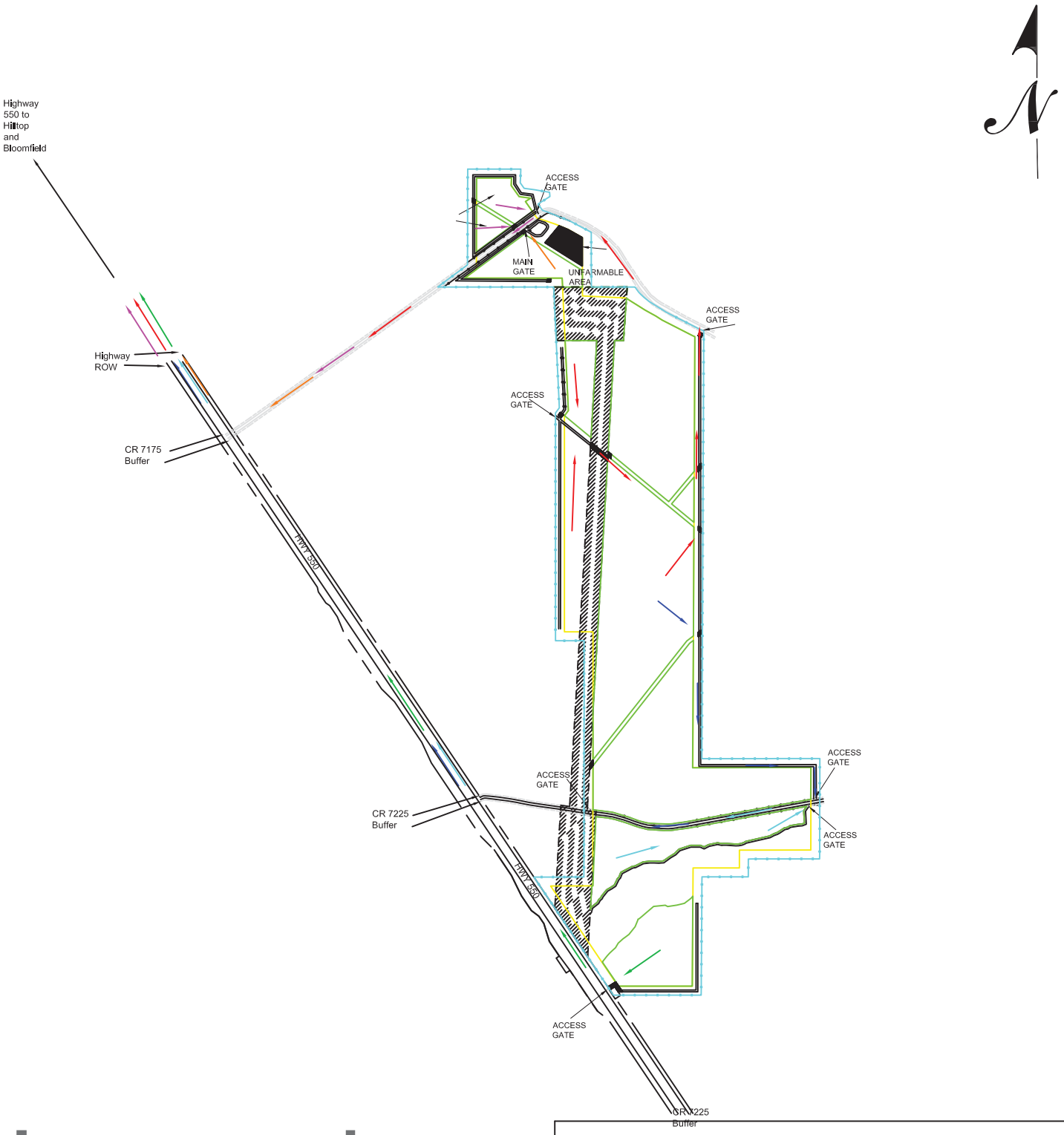
Figure 8: Radius of Exposure

Landfarm 4 Permit

H2S Plan

envirotech

5796 U.S. HIGHWAY 64, FARMINGTON, NM 87401 505-632-0615



Legend

- Farmable Area
- Facility Boundary
- Archeological Buffer
- 100' Buffer
- Cell 1 Route
- Cell 2 Route
- North Route (Cells 3-10)
- South Route (Cells 11-19)
- Cell 20, 21 Route
- Cell 22, 23 Route

Cells can be refrenced in Attachment 4 Figure 4C: Cell Layout

FIGURE 8A
EVACUATION ROUTES
LANDFARM #4 PERMIT

SCALE:					
PROJECT NO.Landfarm 4					
MAP DRWN	GWC		BASE DRWN		

envirotech
5796 U.S. HIGHWAY 64, FARMINGTON, NM 87401 505-632-0615

Appendix A

Physical Data from NIOSH Guide

Hydrogen sulfide

Synonyms & Trade Names Hydrosulfuric acid, Sewer gas, Sulfuretted hydrogen

CAS No.	RTECS No.	DOT ID & Guide
7783-06-4	MX1225000 (/niosh-rtecs/MX12B128.html)	1053 117 (http://wwwapps.tc.gc.ca/saf-sec-sur/3/erg-gmu/erg/guidepage.aspx?guide=117) (http://www.cdc.gov/Other/disclaimer.html)
Formula H_2S	**Conversion** 1 ppm = 1.40 mg/m^3	**IDLH** 100 ppm See: 7783064 (/niosh/idlh/7783064.html)

Exposure Limits
NIOSH REL : C 10 ppm (15 mg/m^3) [10-minute]
OSHA PEL † (nengapdxg.html) : C 20 ppm 50 ppm [10-minute maximum peak]

Measurement Methods
NIOSH 6013 (/niosh/docs/2003-154/pdfs/6013.pdf) ;
OSHA ID141 (http://www.osha.gov/dts/sltc/methods/inorganic/id141/id141.html) (http://www.cdc.gov/Other/disclaimer.html)
See: NMAM (/niosh/docs/2003-154/) or OSHA Methods (http://www.osha.gov/dts/sltc/methods/index.html) (http://www.cdc.gov/Other/disclaimer.html)

Physical Description Colorless gas with a strong odor of rotten eggs. [Note: Sense of smell becomes rapidly fatigued & can NOT be relied upon to warn of the continuous presence of H_2S. Shipped as a liquefied compressed gas.]

MW:	BP:	FRZ:	Sol:	VP:	IP:
34.1	-77°F	-122°F	0.4%	17.6 atm	10.46 eV
	Fl.P: NA (Gas)	UEL: 44.0%	LEL: 4.0%	RGasD: 1.19	

Flammable Gas

Incompatibilities & Reactivities Strong oxidizers, strong nitric acid, metals

Exposure Routes inhalation, skin and/or eye contact

Symptoms irritation eyes, respiratory system; apnea, coma, convulsions; conjunctivitis, eye pain, lacrimation (discharge of tears), photophobia (abnormal visual intolerance to light), corneal vesiculation; dizziness, headache, lassitude (weakness, exhaustion), irritability, insomnia; gastrointestinal disturbance; liquid: frostbite

Target Organs Eyes, respiratory system, central nervous system

Personal Protection/Sanitation	First Aid
(See protection codes (protect.html))	(See procedures (firstaid.html)) **Eye:** Frostbite

Skin: Frostbite **Eyes:** Frostbite **Wash skin:** No recommendation **Remove:** When wet (flammable) **Change:** No recommendation **Provide:** Frostbite wash	**Skin:** Frostbite **Breathing:** Respiratory support

Respirator Recommendations

NIOSH

Up to 100 ppm:
(APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern
(APF = 10) Any supplied-air respirator*
(APF = 50) Any self-contained breathing apparatus with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions:
(APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode
(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape:
(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern
Any appropriate escape-type, self-contained breathing apparatus

Important additional information about respirator selection (pgintrod.html#mustread)

See also: INTRODUCTION (/niosh/npg/pgintrod.html) See ICSC CARD: 0165 (/niosh/ipcsneng/neng0165.html)

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Centers for Disease Control and Prevention 1600 Clifton Rd. Atlanta, GA 30333, USA
800-CDC-INFO (800-232-4636) TTY: (888) 232-6348 - Contact CDC–INFO

Appendix B

Immediate Action Plan

IMMEDIATE ACTION PLAN (Restricted Access)

H2S Concentrations detected at >30 ppm

1. **Move upwind of Hydrogen Sulfide Source and out of affected area**
2. **Notify other Landfarm personnel and visiting personnel of release, initiate evacuation by calling the current Landfarm Field Manager. Notification will be via Air Horn sounded by acting Landfarm Field Manager. Landfarm Filed Manager will notify Emergency Services at the numbers listed below.**
   ***IF PERSONNEL IS IN DISTRESS NOTIFY LANDARM FIELD MANAGER OF THE NEED FOR EMERGENCY MEDICAL SERVICE IN ADDITION TO EMERGENCY SERVICES**
3. **When Air horn sounds, all personnel working in Landfarm #4 or surrounding Landfarms 2 and 3 must completely shut down all vehicles and machinery such as tractors etc and begin evacuation to muster point unless that vehicle ; see Attached Figures 6a and 6b.**
4. **The Acting Landfarm Field Manager must blockade angel peak road at Highway 550 prior to heading to the muster point.**
5. **Acting Landfarm Field Manager must notify the Emergency coordinator, Environmental Manager of release and evacuation.**
6. **Upon reaching muster point the acting Landfarm Field Manager must account for personnel using the daily sign in sheet.**
7. **Acting Emergency coordinator will assist the police and fire department with public notifications, blockades and evacuations as needed, by providing trained Envirotech personnel.**
8. **Acting Emergency coordinator must contact the National Response Center and complete a release report, per CFR 302-335 paragraph 4.4; see Attached National Response Center Notification page.**
9. **No personnel can re-enter area until deemed safe for re-entry by Emergency Services and concurrence of the Envirotech Safety Department.**

Essential Personnel and Emergency Telephone List

ENVIROTECH INTERNAL CONTACT:

Emergency Coordinator	**505-947-9510 or 505-632-0615**
Landfarm Field Manager	**505-320-6195**
Envirotech Safety	**505-486-0898 or 505-632-0615**

EMERGENCY SERVICES:

San Juan Regional Medical Center ER	**505-609-6100**
Ambulance	**911**
AirCare	**911**

GOVERNMENT AGENCIES:

San Juan County Emergency Services	**(505) 334-6622 or 911**
National Response Center	**1-800-424-8802**
New Mexico Oil Conservation District 3	**505-334-6178**
New Mexico Oil Conservation Division Office	**505-476-3440**

NATIONAL RESPONSE CENTER NOTIFICATION

An immediate verbal notification must be made, followed by a written notification. Include the following information in the notifications:

You must make two separate notifications to comply with the emergency release notification requirements of this subpart: an immediate notification, and as soon as practicable thereafter a written follow-up emergency notification (or notifications, as more information becomes available).

(a) *Immediate notification.* The notice required under this section shall include as much of the following information known at the time. However, the retrieval of this information should not cause a delay in the notification on the emergency response.

(1) The chemical name or identity of any substance involved in the release.

(2) Indicate whether the substance is an EHS.

(3) Provide an estimate of the quantity of any such substance that was released into the environment.

(4) State the time and duration of the release.

(5) The medium or media into which the release occurred.

(6) Any known or anticipated acute or chronic health risks associated with the emergency and, where appropriate, advice regarding medical attention necessary for exposed individuals.

(7) Proper precautions to take as a result of the release, including evacuation (unless such information is readily available to the community emergency coordinator pursuant to the emergency plan).

(8) The name and telephone number of the individual (or individuals) to be contacted for further information.

(b) *Written follow-up emergency notification.* Except for releases that occur during transportation or from storage incident to transportation, you must provide a written follow-up emergency notice (or notices, as more information becomes available), as soon as practicable after the release. In the written follow-up emergency notice, you must provide and update the information required in the immediate notification and include additional information with respect to all of the following:

(1) Actions taken to respond and contain the release.

(2) Any known or anticipated acute or chronic health risks associated with the release.

(3) Where appropriate, advice regarding medical attention necessary for exposed individuals.

(c) You are not required to submit a written follow-up notification for a release that occurred during transportation or from storage incident to transportation. See §355.42(b) for requirements for reporting such releases.

IMMEDIATE ACTION PLAN (Worker Safety)

H2S Concentrations detected >10 ppm

1. **Move upwind of Hydrogen Sulfide and out of affected area**
2. **Notify other Landfarm personnel and visiting personnel of release, initiate evacuation by calling the current Landfarm Field Manager. Notification will be via Air Horn sounded by acting Landfarm Field Manager.**
   ***IF PERSONNEL IS IN DISTRESS NOTIFY LANDARM FIELD MANAGER OF THE NEED FOR EMERGENCY MEDICAL SERVICE**
3. **If personnel is in distress and it is safe to do so, retrieve the personal breathing equipment from the Landfarm #4 field office trailer and assist personnel in distress.**
4. **When Air horn sounds, all personnel working in Landfarm #4 or surrounding Landfarms 2 and 3 must completely shut down all vehicles and machinery such as tractors etc. and begin evacuation to muster point; see Attached Figures 6a and 6b.**
5. **Acting Landfarm Field Manager must notify the Emergency coordinator, Environmental Manager of release and evacuation.**
6. **Upon reaching muster point the acting Landfarm Field Manager must account for personnel using the daily sign in sheet.**
7. **No personnel can re-enter area until deemed safe for re-entry by the Envirotech Safety Department.**

Essential Personnel and Emergency Telephone List

Emergency Coordinator	**505-947-9510 or 505-632-0615**
Landfarm Field Manager	**505-320-6195**
Envirotech Safety Department	**505-486-0898 or 505-632-0615**

Appendix C

RKI Personal Monitor Data Sheet

RKI INSTRUMENTS

PERSONAL FOUR GAS MONITOR

Gas Detection For Life

GX-2009 Model

Actual Size

World's Smallest and Lightest 4 Gas Monitor

Features

- **Simultaneous detection of 4 gases**
  - **LEL, O2, H2S & CO**
- **Smallest/Lightest 4 gas monitor on the market**
  - 2.7" H x 3" W x 1" D, 4.6 oz.
- **Dual audible alarm ports (95 db @ 30 cm)**
- **3 visual alarm LED's**
- **Vibration alarm**
- **IP-67 Water resistant/dustproof design**
- **Calibration and bump test lock out or reminder controls**
- **Large capacity data logging standard**
  - 8 alarm trends
  - Log time range of 10 to 300 hours
  - 100 calibration records stored
- **20 hours of operation (NiMH batteries)**
- **Large LCD display screen**
- **Automatic backlighting at alarm**
- **Impact resistant rubber over-mold body**
- **STEL and TWA readouts**
- **Intrinsically safe, CSA, C/US classified IECEx/ATEX approved (optional MSHA version available)**
- **2 year warranty**

Applications

- **Personal monitoring**
- **Confined spaces**
- **Refineries/petrochemical**
- **Utilities**
- **Oil and Gas**
- **Water/wastewater**
- **Fire services**
- **Construction**

RKI is proud to offer the smallest and lightest 4-gas monitor in the world, the GX-2009. Weighing only 4.6 ounces, it fits in the palm of your hand (2.75" H x 2.95" L x .98" D). The GX-2009 simultaneously monitors and displays combustibles, oxygen, carbon monoxide, and hydrogen sulfide. The GX-2009 represents the latest evolution of gas detection technology. Advancements include dual audible alarm ports and alarm LED's on 3 sides of the instrument, so that alarm conditions are obvious from multiple perspectives especially in high noise environments. Other features include a water resistant and dustproof design with IP 67 rating, an impact resistant rubber over-mold body that is RFI resistant, and a large capacity data logging system included as standard.

Other standard features are vibration alarm, auto-calibration, calibration and bump test lock out or reminder control, STEL / TWA readings, peak hold, auto backlighting at alarm on a large LCD display, and it even tells the time! All of these controls and features are operated through 2 simple glove friendly buttons. The NiMH battery set will operate for 20 hours and will fully charge in 3 hours.

A huge capacity data logging function is a standard feature on all GX-2009 instruments. The data logging software will store up to 100 calibration records and is Windows XP, 7, 8, and 10. The GX-2009 is also functional with the SDM-2009 single calibration station and the Data Cal 2000 instrument maintenance system.

The GX-2009 is designed around RKI's compact and proven sensors, utilizing catalytic combustion, electrochemical and galvanic sensor technologies. Each miniaturized sensor is manufactured with the same high quality control that has made RKI sensors and instruments the most reliable and long lasting monitoring devices in the industry.

RKI Instruments, Inc. • 33248 Central Ave. Union City, CA 94587 • Phone (800) 754-5165 • (510) 441-5656 • Fax (510) 441-5650

GX-2009 Model

Gas Detected	Combustible Gases (Methane as standard)	Oxygen (O2)	Hydrogen Sulfide (H2S)	Carbon Monoxide (CO)
Detection Principle	Catalytic combustion	Galvanic cell	Electrochemical cell	
Detection Range (Increments)	0 ~ 100% LEL (1% LEL)	0 ~ 40.0% Vol. (0.1% Vol.)	0 ~ 100.0 ppm (0.5 ppm)	0 ~ 500 ppm (1 ppm)
Accuracy Statement	± 5% of reading or ± 2% LEL (whichever is greater)	± 0.5% O2	± 5% of reading or ± 2 ppm H2S (whichever is greater)	± 5% of reading or ± 5 ppm CO (whichever is greater)
Sampling Method	Diffusion sampling standard / hand aspirator or motorized pump optional			
Display	Digital LCD displays all four gases simultaneously, with auto backlight			
Preset Alarms (User Adjustable) Overscale alarm (Non-adjustable)	1st alarm 10% LEL 2nd alarm 50% LEL Over alarm 100% LEL	Low alarm 19.5% High alarm 23.5% Over alarm 40.0%	1st alarm 10 ppm 2nd alarm 30 ppm TWA alarm 1.0 ppm STEL alarm 5.0 ppm Over alarm 100 ppm	1st alarm 25 ppm 2nd alarm 50 ppm TWA alarm 25 ppm STEL alarm 200 ppm Over alarm 500 ppm
Types of Alarms	Gas Alarm: 2 Increasing alarms, STEL, TWA, overscale alarm. O2 decreasing/increasing. Trouble alarm: Sensor disconnection, low battery, circuit error, calibration range error			
Display of Alarm	Gas Alarm: Flashing LEDs, intermittent buzzer (95 db @ 30 cm), flashing gas value, vibration Trouble alarm: Flashing LEDs, intermittent buzzer (95 db @ 30 cm), display of error message			
Operating Temp. & Humidity	-4°F to 122°F (-20°C ~ +50°C), 0 to 95% RH, non-condensing (splash resistant)			
Response Time	Within 30 seconds (T90)			
Continuous Operation	20 hours after a 3 hour full charge (14 hours after 90 min charge)			
Power Source	Direct charging NiMH batteries, set of 2			
Safety Design / Approvals	IECEx zone 0 Ex ia IIC T4; ATEX II 1G Ex ia IIC T4; (optional MSHA version also available) c CSA us classified, as intrinsically safe. Class I, Division 1, Groups A, B, C, D			
Dimension & Weight	2.7" H x 3" W x 1" D (Approx. 70 H x 75 W x 25 D mm), 4.6 ounces (approx. 130 g)			
Case Material	High impact over molded rubber. Dust and water resistant with IP-67 approval.			
Controls	Two buttons: POWER / MODE, AIR			
Datalogging	Standard with all instruments. Stores 8 alarm trend sessions where readings are recorded 30 minutes before and after an alarm event. 3,600 data point capacity with a log time range of 10 to 300 hours (based on programmable interval times); and stores up to 100 calibration records.			
Required Accessories	Battery charger			
Standard Accessories	Alligator clip ..... 13-0116RK NiMH batteries (set of 2) ..... 49-1609RK Charging station with 115/220 VAC power supply (also available without power supply, 49-2170RK) ..... 49-2170RK-01 Product CD (includes datalogging software) 71-8002RK			
Optional Accessories	Belt Clip ..... 13-0117RK Padded carrying case for GX-2009 and accessories ..... 20-0112RK-01 Charging station, 115/220 VAC powered for 2, 3, 4, or 5 instruments ..... 49-2170RK-XX Charging station with 12 VDC power supply and vehicle adapter plug ..... 49-2171RK 12 VDC adapter with vehicle plug (does not include charger base) ..... 49-2020RK RP-2009 pump with 4" rubber nipple, 10' hose and probe (up to 40' hose available) ..... 81-1177RK RP-6 sample drawing pump with 10' hose and probe (up to 40' hose available) ..... 81-1166RK Hand aspirated sample draw with 10' hose and probe (up to 40' hose available) ..... 81-1160RK USB to IrDA downloading cable ..... 47-5084RK-01 SDM-2009 single calibration station 81-SDM2009-01			
Configurations	• 4 gas, LEL / O2 / H2S / CO • 2 gas, LEL / O2 • Single gas LEL, O2, CO, H2S	• 3 gas, LEL / O2 / H2S • 2 gas, O2 / H2S	• 3 gas, LEL / O2 / CO • 2 gas, O2 / CO	
Warranty	Two years material and workmanship			

Specifications subject to change without notice.

RKI INSTRUMENTS

RKI INSTRUMENTS, INC. UL REGISTERED FIRM ISO 9001 10000363

Toll Free: (800) 754-5165 • Phone: (510) 441-5656
Fax: (510) 441-5650 • www.rkiinstruments.com

Authorized Distributor:

Appendix D

C-141 Form

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: _____

Appendix E

ConocoPhillips Well Site H_2S Verification

PO Box 4700
Farmington NM 87499
505-599-3400

November 9, 2017

Greg Crabtree
Envirotech Inc.
5796 US Hwy 64
Farmington NM 87401

Dear Mr. Crabtree,

Please let this serve as verification that the following Hilcorp Energy well sites are NOT known sources of hydrogen sulfide:

Huerfano 259
Huerfano 067
Huerfano 10R
Huerfano 528
Huerfano 068
Huerfano 070
Huerfano 230
Huerfano 14R
Huerfano 072
Huerfano 06R
Huerfano 006
Huerfano 275
Huerfano 84R

This information was verified by the most recent gas analysis taken within the last six month at a semi-annual frequency. Should you have any questions or require additional information, please contact me at ccardoza@hilcorp.com or 505-564-0733.

Thank you,

Clara Cardoza
Environmental Specialist
Hilcorp Energy

Attachment #9

Closure and Post Closure Plan

June 2019

TABLE OF CONTENTS

1. Introduction

Envirotech Inc.'s (Envirotech) Landfarm #4 is located approximately 20 miles south of Bloomfield, New Mexico, on Angel Peak Road/County Road 7175; see ***Figure 9a, Facility Location***. Envirotech's, proposed Landfarm #4 is a total of 341 acres with 212.4 acres of farmable area; see ***Figure 9b, Farmable Area Map***. Envirotech's Landfarm #4 is used for the remediation of hydrocarbon contaminated soils and drill cuttings. There is one proposed structure at Landfarm #4; this is a portable trailer used as the Landfarm #4 field office. No liquids are accepted at Landfarm #4; therefore, there is no blending facility located at Landfarm #4. Landfarm #4 is surrounded by a fence, perimeter berms, and swales. Additionally, there are berms located in Landfarm #4 constructed to delineate right of ways (ROW) and each 10-acre landfarm cell.

The following plan discusses the closure and post closure plan for Envirotech's Landfarm #4, per applicable sections of *New Mexico Administrative Code (NMAC) 19.15.36.18*. Landfarm #4 will not contain a pond or pit; therefore, *NMAC 19.15.36.18 (D)* is not applicable to the subject closure plans.

2. Closure Notifications

The section below describes the closure notification process for Landfarm #4, per *NMAC 19.15.36.18*. Closure requests can be made by Envirotech (the operator) or can be determined necessary by New Mexico Oil Conservation Division (NMOCD, the division), under certain circumstances. In the event Envirotech is unable to complete closure activities for Landfarm #4, Envirotech will delegate a surety to complete closure activities.

2.1. Closure by Operator (*NMAC 19.15.36.18 (A) 1 through 5*)

When Envirotech is prepared to cease operations at Landfarm #4, Envirotech will notify the division at least 60 days prior to the cessation of Landfarm #4 operations. Upon notice, the division will schedule a site investigation and review the following Closure and Post Closure Plan (the plan) to verify the plan is still valid for Landfarm #4.

Envirotech understands the site investigation and review process of the plan by the division can take up to 60 days, and can be extended, with written notification from the division to Envirotech (extension not to exceed 60 days). Upon receiving comments from the division, Envirotech will review the changes to verify that the request by the division is necessary to the plan and will maintain protection of fresh water, public health and safety, and the environment. Envirotech will then either complete the changes to the plan or request a hearing within 10 days of receiving the comments.

Upon division final approval of the plan, Envirotech will proceed with the approved closure and post closure schedule, including any modifications or additional requirements imposed by the division to maintain protection of fresh water, public health and safety, and the environment.

2.2. Closure by Division (NMAC 19.15.36.18 (C) 1 through 5)

In the event operations at Landfarm #4 endanger fresh water, public health and safety, the environment, or violate division rules or orders, Envirotech understands the division, after a written notice of the violation, may order closure of Landfarm #4.

Envirotech understands that abandonment of Landfarm #4 (no action taken, or operations cease for six months), is also grounds for the division, with written notification, to order closure of Landfarm #4. It is also understood that division can order immediate closure of Landfarm #4, without notice or an opportunity for a hearing, in the event of an emergency, as outlined by *New Mexico Statute Chapter 70, Article 2, Section 23*.

3. Closure and Post Closure Activities (*NMAC 19.15.36.18 (D) 4*)

The following section discusses the closure and post closure activities for Landfarm #4. These activities apply to the entire closure or partial closure of the farmable area within Landfarm #4.

3.1. Closure Activities

Below is a brief outline of closure activities that will be completed during the full or partial closure of Landfarm #4:

1. Disking of soils, until remediation is achieved as outlined in *NMAC 19.15.36.15 (F)*.
2. Removal of soils not remediated as listed in *NMAC 19.15.36.15 (F).*
3. Fill areas of removed contaminated soils with native fill.
4. Removal of berms; including but not limited to:
    a. ROW berms
    b. Perimeter berms
    c. Cell berms
5. Removal of fences; including but not limited to:
    a. Perimeter fence
6. Removal of Landfarm #4 field office trailer and associated foundation materials.
7. Scarify roads used primarily for Landfarm #4 operations.

8. Seed prepared Landfarm#4 remediated soils in farmable area for re-vegetation.
9. Continued monitoring of existing monitor wells, if applicable.
10. Continued annual monitoring and reporting of the vadose and treatment zones of Landfarm #4 farmable area (until closure is granted by the division).

Soils within the farmable area of Landfarm #4 be will disked in order to remediate the soils to the standards per *NMAC 19.15.36.15 (F)* as listed below:

Table 1. Soil Remediation Standards per *NMAC 19.15.36.15 (F)*

Constituents	Remediated Level	Method
Benzene	0.2 mg/kg	EPA SW-846, 8021B, or 8260B
Total BTEX	50 mg/kg	EPA SW-846, 8021B, or 8260B
GRO & DRO	<500 mg/kg	EPA SW-846, 8015M
TPH	< 2500 mg/kg	EPA 418.1
*Chlorides	<500 mg/kg <1000 mg/kg	EPA 300.1

**<500 mg/kg if groundwater is less than 100 feet but greater than 50 feet below lowest elevation at which contaminated soils are placed at Landfarm #4. <1000 mg/kg if groundwater is greater than 100 feet below lowest elevation at which contaminated soils are placed at Landfarm #4.*

In the event the remediation standards listed above cannot be achieved for all contaminated soils within the Landfarm #4 farmable area within 24 months, Envirotech will re-evaluate using disking for remediation and either remove and dispose of the soil at a division approved facility, or discuss alternative remediation options with the division. Soils that reach remediation standards will be left in place and re-vegetated.

Vadose zone/treatment zone sampling, analysis, and annual reporting, as outlined in *NMAC 19.15.36.15 D and E*, will continue throughout closure activities, until the division approves final closure of Landfarm #4.

3.2. Post Closure Activities

Below is a brief outline of post closure activities that will be completed after the full or partial closure of Landfarm #4:

1. Monitor re-vegetation of soils.
2. Re-apply seed or re-evaluate seed mix in areas not meeting *NMAC 19.15.36.18 (A) 6.*
3. Continued vadose zone and treatment zone monitoring and annual reporting.
4. Continued monitoring of existing groundwater wells (if applicable).

Re-vegetation of the remediated soils in the Landfarm #4 farmable area should meet the following standards, per *NMAC 19.15.36.18 (A) 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 notice 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."*

In the event re-vegetation of the remediated soils are not meeting re-vegetation standards per *NMAC 19.15.36.18 (A)6*, Envirotech will re-evaluate the seed mix and or application process in order to achieve re-vegetation standards. Monitoring and re-vegetation is estimated to take 24 months, in the event the re-vegetation process has not reached acceptable standards after the estimated 24-month period, Envirotech will meet with the division to discuss alternative options, per *NMAC 19.15.36.18 (G)*; see ***Appendix A, Re-vegetation Plan.***

4. Financial Assurance (NMAC 19.15.36.18 (B))

The following section discusses the secured financial assurance by Envirotech for closure and post closure activities and the financial assurance release schedule per *NMAC 19.15.36.18*. In the event Envirotech is unable to complete the activities involved with securing and release of the financial assurance, Envirotech will delegate a surety to complete the process on their behalf.

4.1. Secured Financial Assurance

Envirotech has outlined the cost of closure and post closure activities for Landfarm #4; see ***Appendix B, Financial Assurance***. The amount of money secured for closure and post closure activities Landfarm #4 is based on the full closure of 212.4 acres of farmable area. In the event of partial closure or a reduction in farmable area requiring closure the financial assurance will be adjusted to reflect the lower cost required to carry out the closure and post closure activities. All changes to the amount of secured financial assurance by Envirotech will be discussed with the division.

4.2. Partial Financial Release

Upon the completion of closure activities, Envirotech will notify the division. The division will then conduct a site inspection at Landfarm #4, if based on the inspection, the division approves the closure activities completed by Envirotech, a partial release of the financial assurance will be released to Envirotech. The remaining portion of financial assurance retained by the division will be enough money to maintain existing monitor wells (if applicable), perform semi-annual analyses of monitor wells (if applicable) and to re-vegetate the site.

Upon reaching final re-vegetation per *NMAC 19.15.36.18 (A)6*, or an alternative use for Landfarm #4, per *NMAC 19.15.36.18 (G)*, the remainder of the financial assurance will be released to Envirotech. In the event there are existing monitor wells, the remainder of the financial assurance will be released by the division to Envirotech once re-vegetation is reached, as discussed above and the existing monitor wells show no contamination. In the event contamination is still present in the monitor wells (if applicable) or the re-vegetation or approved alternative plan is not meeting requirements of the division, the financial assurance will be retained until contamination is remediated and re-vegetation is met.

In the event re-vegetation requirements are not met within 24 months, Envirotech may propose an alternative site plan use for post closure use of Landfarm #4, per *NMAC 19.15.35.18 (G).* The alternative plan will be discussed and sent for approval to the division.

4.3. Forfeit of Financial Assurance

In the event Envirotech or surety are unable or refuses to conduct operations at Landfarm #4 in compliance with all applicable section of *NMAC 19.15.36.18 (2)* and in a manner that protects fresh water, public health, safety and environment, the division, with written notice, can retain full or partial financial assurance. Envirotech understands that abandonment of Landfarm #4 (no action taken, or operations cease for six months), is also grounds for forfeit of financial assurance.

In the event of financial assurance notification by the division, Envirotech understands that they can request a hearing in writing within 10 days of receiving the written notice from the division. In the event Envirotech does not respond to the division's written notice, then Envirotech understands that collection of the forfeited financial assurance can proceed by the division. All forfeited financial assurance from Envirotech will be deposited by the division into the oil and gas reclamation fund.

Envirotech understands that in the event the forfeited amount is not enough to cover closure and post closure costs, the division will recover the additional cost from Envirotech necessary to complete the closure and post closure activities of Landfarm #4. Alternatively, in the event the forfeited financial assurance is in excess of closure and post closure costs, the division will return the amount in excess to Envirotech or surety.

5. Conclusion

Any changes to this closure and post closure plan, financial assurance secured, or other items that may trigger changes to this plan will be made and brought to the division's attention. Envirotech will work with the division in order to secure sufficient money and complete the appropriate closure and post closure activities for Landfarm #4.

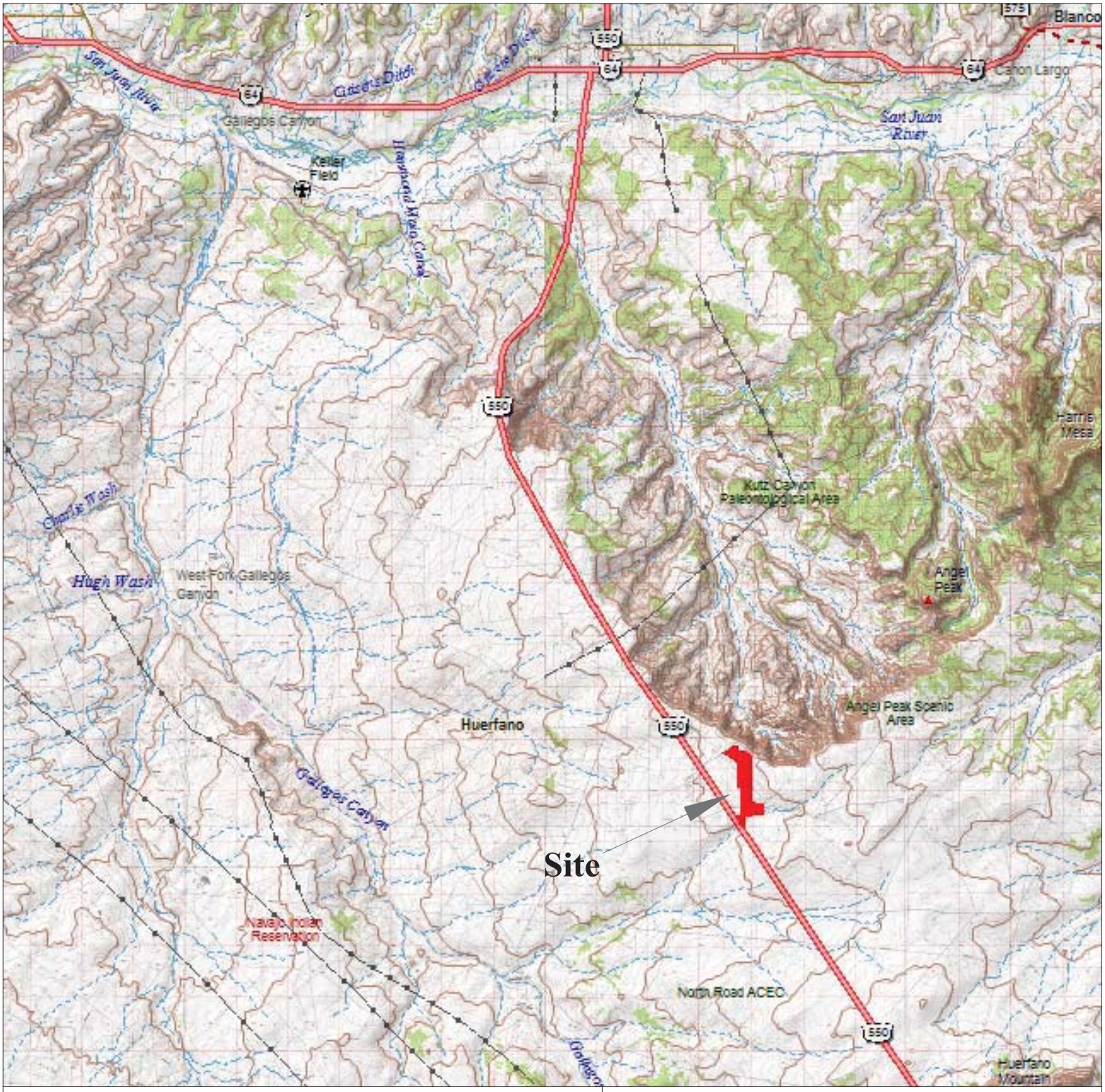
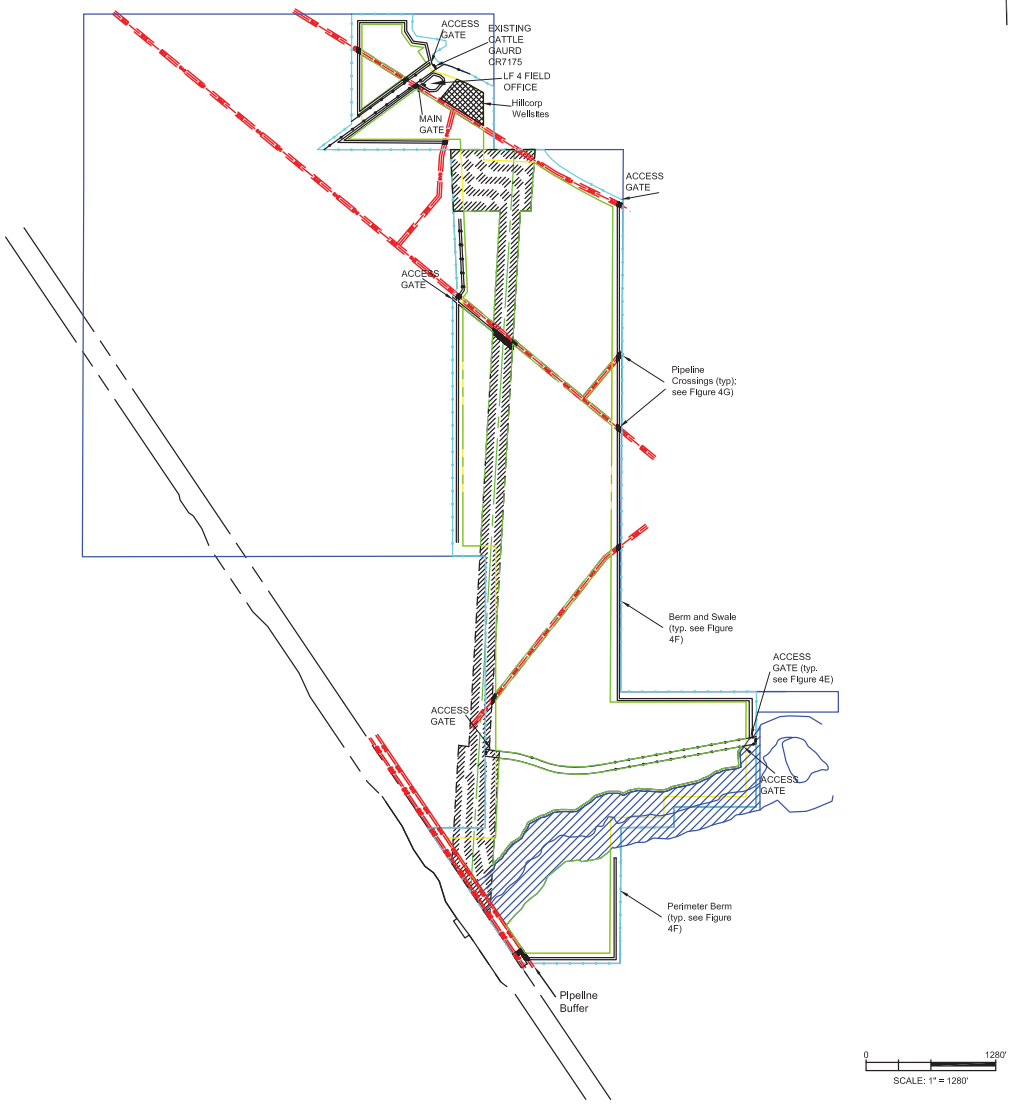


FIGURE 9A
VICINITY MAP
LANDFARM #4 PERMIT
May 13, 2019

SCALE:					
PROJECT NO.					
MAP DRWN	GWC		BASE DRWN		

envirotech
5796 U.S. HIGHWAY 64, FARMINGTON, NM 87401 505-632-0615



Legend

- Facility Boundary
- Farmable Area
- Watercourse Buffer
- Archeological Buffer
- Surveyed Property Line
- Gas Line w/ Buffer
- Unfarmable Area
- 100 Ft Facility Buffer

FIGURE 9B
FARMABLE AREA
LANDFARM #4 PERMIT

SCALE:1" = 1280'					
PROJECT NO.Landfarm 4					
MAP DRWN	GWC		BASE DRWN		

envirotech
5796 U.S. HIGHWAY 64, FARMINGTON, NM 87401 505-632-0615

Appendix A

Re-Vegetation Plan

Landfarm #4 Re-Vegetation Plan

The following plan outlines the re-vegetation plan for Landfarm #4 during closure and post closure activities, per NMAC 19.15.36.18 (A) 6 or NMAC 19.15.36.18 (G), if re-vegetation is not reaching the NMAC requirements.

1. The first growing season after closure of any area within the farmable area of Landfarm #4 will be re-seeded to encourage growth.

2. The seed mixture used will be certified with no primary or secondary noxious weeds in seed mixtures. The seed labels from each bag shall be available for inspection while seed is being sown.

3. Envirotech will accomplish seeding by drilling on the contour whenever practical or by other division-approved methods. Envirotech, Inc. will obtain vegetative cover that equals 70% of the native perennial vegetative cover (un-impacted by overgrazing, fire or other intrusion damaging to native vegetation) consisting of at least three (3) native plant species, including at least one (1) grass, but not including noxious weeds, and maintain that cover through two (2) successive growing seasons. During the two (2) growing seasons that prove viability, there shall be no artificial irrigation of the vegetation.

4. Hand seeding with hydro-mulch, excelsior netting or mulch with netting will be used on the cut/fill slopes of Landfarm #4 that require this type of application. The hydro-mulch will be spread at a rate of 2,000-3,000 pounds per acre.

5. Compacted areas determined by visual inspection will be tilled to a depth of twelve (12) inches below ground surface and disked to a depth of six (6) inches before seeding. Seeding shall be done with a disk type drill with two (2) boxes for various seed sizes. The drill rows shall be eight (8) to ten (10) inches apart. Seed shall be planted at no less than one-half (1/2) inch deep or more than one (1) inch deep. The seeder shall be followed with a drag, packer, or roller to ensure uniform coverage of the seed and adequate compaction. Drilling will be done on the contour where possible, but not up and down the slope.

6. Where slopes are too steep for contour drilling a hand seeder will be used. Seed will be covered to the depth above by whatever means is practical. If the seed is unable to be covered by the means listed above, the prescribed seed mixture amount will be doubled.

7. Envirotech, will repeat seeding or planting until re-vegetation per NMAC 19.15.36.18 (A) 6, is reached or for a period of two successive growing seasons.

8. In the event re-seeding is not proving affective to meet re-vegetation requirements, Envirotech will notify the division and discuss alternative options for post-closure uses for Landfarm #4, per NMAC 19.15.36.18 (G).

Appendix B

Financial Assurance

Financial Assurance is based on at total of 212.4 acres of Farmable area and closure & post closure activities taking 24 months to complete

Activity	Cost	Unit	Quantity		Total Cost
Disking (estimated 5 days to disk 212 acres, disking 2 times per month)					
Mobe tractor and Disk (one time mobe, one time demobe)	$ 1,000.00	each	2	each	2000
Disking - tractor cost per event (52 events)	$ 1,500.00	each	52	each	78000
Fuel (260 days @$120 per day	$ 120.00	dollars/day	260	days	31200
operator (40 hours per week, 52 weeks total)	$ 30.00	hour	2080	man hours	62400
operator pickup to get to and from each day (200 miles/week*52 weeks)	$ 0.58	/mile	10400	miles	6032
Berm Removal/Re-Contour - Scarify roads(10 days)					
Mobe/Demobe Dozer	$ 500.00	each	2	each	1000
Dozer Rental per month	$ 10,900.00	each	0.5	month	5450
Fuel (10 days @$120 per day	$ 120.00	dollars/day	20	days	2400
operator (50 hours per week, 2 weeks total)	$ 30.00	hour	100	man hours	3000
operator pickup to get to and from each day (200 miles/week*2 weeks)	$ 0.58	/mile	400	miles	232
based on the facility diagram there are and estimated 27000LF of 3' Perimeter berm and 51000 feet of 2' interior berm					
Fence Removal (Estimated 27000 Linear feet(LF) of perimeter fence)					
4 man Crew (10 hours per day * 5 days	$ 100.00	Hour	50	man hours	5000
skidsteer (5 days at 10 hours per day)	$ 34.00	hour	50	hours	1700
pickup (40 miles per day *5 days	$ 0.58	/mile	200	miles	116
Building Removal					
Demobe skid mounted office building	$ 500.00	each	1	each	500
Labor (2 guys to remove and disconnect building estimated 2 days)	$ 35.00	/hour	40	man hours	1400
Equipment cost (skidsteer)	$ 34.00	/hour	10	hours	340
pickup (40 miles per day * 2 days)	$ 0.58	/mile	80	miles	46.4
Seeding					
mobe/demobe included in per acre price					
cost per acre for no disk drill with Straw includes seed	$ 125.00	per acre	256	acres	32000
acerage includes farmable area, 100' buffer and office area but excludes the water course buffer , great road, well sites and pipeline					
Semi-annual Treatment Zone Monitoring (Four Random Samples Total) - Sample collection (one composite soil sample per cell)					
mobe/demobe	$ 0.58	/mile	160	miles	92.8
Sample collection labor	$ 43.00	/Hour	10	hours	430
Lab analysis based on cost obtained from Pace Analytical Lab					
TPH (GRO/DRO/ORO) - 23 samples per event * 4 events	$ 75.00	EA	92	each	6900
BTEX - 23 samples per event * 4 events	$ 40.00	EA	92	each	3680
Chloride - 23 samples per event * 4 events	$ 15.00	EA	92	each	1380
Semi-annual Vadose Zone Monitoring (4 events that coincide with the 24 month disking)					
Sample collection (4 independent samples per cell per event)					
mobe/demobe	$ 0.58	/mile	800	miles	464
Sample collection labor	$ 43.00	/Hour	160	hours	6880
Lab analysis based on cost obtained from Pace Analytical Lab					
TPH (GRO/DRO/ORO) - 92 samples per event * 4 events	$ 75.00	EA	368	each	27600
BTEX - 92 samples per event * 4 events	$ 40.00	EA	368	each	14720
Chloride - 92 samples per event * 4 events	$ 15.00	EA	368	each	5520
Annual Reporting (Treatment zone and vadose zone monitoring)					
Scientist	$ 76.00	Hour	4	Hours	304
Report (2 total reports)	$ 1,000.00	fixed fee	2	each	2000
Post Closure Activities					
Re-Vegetation Monitoring					
3 total drone flights to monitor re-vegetation and reporting	$ 1,250.00	each	3	each	3750
			Grand Total		**$ 306,537.20**

Attachment #10

Emergency Contingency Plan

June 2019

TABLE OF CONTENTS

APPENDICES:

Appendix A, RKI Personal Monitor Data Sheet

FIGURE:

Figure 10a, Evacuation Routes

1. Introduction

The purpose of this emergency contingency plan is to minimize hazards that may occur at Envirotech, Inc.'s (Envirotech) Landfarm #4 to fresh water, public health, safety or the environment from fires, explosions or unplanned sudden or non-sudden release of contaminants or oil field waste to the air, soil, surface water or ground water. Steps to limit the extent of damage caused by the hazards mentioned above are outlined in the following report.

2. Emergency Coordinator Contact Information

The Primary Emergency Coordinator for Landfarm #4 is:

Name: Greg Crabtree or Current Environmental Manager
Office Phone: 505-632-0615
Cell Phone: 505-947-9510

In the event the primary emergency coordinator is unavailable, call (505) 632-0615 to report any emergency at Landfarm #4.

3. Contingency Plan Locations

Copies of this contingency plan will be shared and copies provided if requested once the permit is approved with the following agencies:

Landfarm Field Office Located in Landfarm #4 43 Road 7175 (south of mm 137) San Juan County, NM	**Envirotech, Inc.** Current Envirotech Safety Manager's office 5795 U.S. Highway 64 Farmington, New Mexico 87401 (505) 632-0615
San Juan County Office of Emergengy Management 209 S Oliver Street Aztec, NM 87410	**NMOCD District 3-Aztec** 1000 Rio Brazos Road Aztec, NM 87410 (505) 334-6178

4. Contingency Plan Amendment

This contingency plan must be amended within five (5) days of any of the following events:

- Revision or modification of the Landfarm #4 permit
- Changes in design, operations, maintenance of Landfarm #4
- Contingency plan fails as written in the event of an actual emergency
- Emergency coordinator changes or contact information changes
- Emergency equipment for Landfarm #4 changes

A copy of the updated contingency plan must be sent to all locations mentioned in **Section 3** of this report.

5. Landfarm #4 Emergency Equipment

Emergency equipment at Landfarm #4 include the following items; air horn, personal monitors, cellular telephone and spill kit.

The fire extinguisher is a type 20 lb ABC extinguisher and can be used for small fires up to 120 ft^2. In addition, the same type of fire extinguisher is located in each Envirotech vehicle and equipment. The air horn is located in the Landfarm #4 field office; this will be used to initiate evacuation from Landfarm #4.

Visitors to the facility will be required to wear an H2S monitor or will be assigned an Envirotech Employee with a monitor as an escort. Envirotech also owns a portable monitor for the detection of H2S at concentrations between 0-100 ppm. The portable monitor is used in the event an H2S release is above the RKI personal monitor detection limits, the portable monitor will be used to detect Immediate action levels, 100 ppm or greater; see **Appendix A, RKI Eagle High Range H2S Portable Monitor Data Sheet**. The portable monitor will be dispatched from the Envirotech main office.

The spill kit is located at the Landfarm #4 field office. The kit includes the following oil absorbent booms and pads. These items are used for spill containment and or clean up.

6. Training Programs

All employees are required to take Envirotech new hire orientation upon first hire. The new hire orientation is designed as a broad overview of general emergency procedures at Envirotech and Envirotech job sites. The employee is also assigned a field supervisor to mentor the employee for the on the job training.

7. Fires

In the event of a fire at Landfarm #4, the following subsections describe the steps necessary to limit damage to fresh water, public health, safety or the environment.

7.1. Landfarm #4 Personnel Actions

The steps listed below are to be followed by landfarm personnel during a fire emergency at Landfarm #4:

For small fires (fires that can be controlled using hydrant supplied at Landfarm #4 field office):

1. Clear area of personnel and/or visitors.
2. Personnel shall notify emergency coordinator of fire; include location, estimated size, possible cause and name of reporting landfarm personnel.
3. Send someone to retrieve the fire extinguisher and shovel from the landfarm #4 field office (All vehicles and equipment also have fire extinguishers in them, use the closest extinguisher to fire); see ***Figure 10a, Evacuation Routes***, for Landfarm #4 field office location.
4. Use fire extinguisher and shovel to try to extinguish or contain fire.

5. If personnel is safely able to extinguish fire using the fire extinguisher, see **Section 7.4, Post Fire Clean Up,** of this plan.
6. Notify emergency coordinator that fire has been extinguished.

For large fires (fires that cannot be safely controlled using available resources at Landfarm #4):

1. Sound Air horn to initiate evacuation; see ***Figure 10a, Landfarm #4 Evacuation Routes***.
2. Call 911 to notify Emergency Services and request medical services if personnel or visitors have been injured.
3. Notify emergency coordinator of fire, include: location, estimated size, possible cause, name of notifying personnel, if evacuation has begun and if emergency personnel has been contacted.
4. Evacuate landfarm and drive to muster point; Hilltop Gas Station northeast of Landfarm #4; see ***Figure 10a, Landfarm #4 Evacuation Routes***.
5. If safe, have one person stay near Landfarm entrance either Angel Peak road and Highway 550 or safe area to meet and direct fire and emergency personnel to location, notify Emergency Coordinator upon completion of this task and head to muster point.
6. Upon arrival at muster point, take a head count and cross-reference the sign in sheet to verify all personnel and visiting personnel are accounted for; notify Emergency Coordinator of status of personnel at muster point.
7. Upon safe re-entry into the Landfarm, after emergency personnel have deemed it safe, see **Section 7.4, Post Fire Clean Up;** of this plan for post fire clean up.

7.2. Emergency Services

The list below includes numbers to emergency services that may be required during a large fire at Landfarm #4:

Fire Department	**911** or (505) 334-6622
Police Department	**911** or (505) 334-6622
San Juan Regional Medical Center	(505) 609-2000
Emergency Coordinator	(505) 947-9510 or (505) 632-0615

7.3. Evacuation Plan

Landfarm #4 has several options for evacuation routes, depending on which area you are working in and where in the cells you are during the evacuation. The section below describes the various evacuation routes for Landfarm #4.

From Cell One of Landfarm #4 to Muster Point:

Head southeast from within Cell 1of Landfarm #4, from gate turn right, heading southwest on Angel Peak Road/ Road 7175. In 0.7 miles take a right onto Highway 550, heading north. In 2.5 miles turn left into the Hilltop gas station and convenience store; see ***Figure 10a, Landfarm #4 Evacuation Routes***.

Cell 2 Evacuation Route to Muster Point:

Head north from within Cell two of Landfarm #4, from gate (labeled "Main Gate on Figure 10a) turn left, heading southwest on Angel Peak Road/ Road 7175. In approximately, 0.7 miles take a right onto Highway 550, heading north. In 2.5 miles turn left into the Hilltop gas station and convenience store; see ***Figure 10a, Landfarm #4 Evacuation Routes***.

Cells 3-12 Evacuation Route to Muster Point:

While working in Cells 3-12 there are two options for Evacuation. Option 1 assumes that Envirotech's Landfarm #2 is still in operation and the surface owner remains unchanged. There is currently an access gate which exits the proposed Landfarm #4 along the pipeline ROW to the west. For this Route follow the existing road from the Landfarm facility boundary 0.4 miles to CR 7175, turn left on CR 7175 and continue 0.4 miles to Highway 550. Take a right onto Highway 550, heading north. In 2.5 miles turn left into the Hilltop gas station and convenience store; see ***Figure 10a, Landfarm #4 Evacuation Routes***.
Option 2 is the access gate to be installed in the NE corner of Cell 5. Head northeast from within the specified cells to the access gate turn left, heading northwest on Angel Peak Road/ Road 7175 which eventually turn Southwest. From the access gate travel 1.3 miles on CR7175 and take a right onto Highway 550, heading north. In 2.5 miles turn left into the Hilltop gas station and convenience store; see ***Figure 10a, Landfarm #4 Evacuation Routes***.

Cells 13-19 Evacuation Route to Muster Point:

Head southeast from within the designated cells to the access gate located in the SE portion of Cell 19 and turn right on CR 7225 and turn right, heading west on CR 7225. In approximately, 0.75 miles take a right onto Highway 550, heading north. In 3.4 miles turn left into the Hilltop gas station and convenience store; see ***Figure 10a, Landfarm #4 Evacuation***

Cells 20 and 21 Evacuation Route to Muster Point:

Head northeast from within the designated cells to the access gate located in the NE portion of Cell 20 and turn left on CR 7225 and turn right, heading west on CR 7225. In approximately, 0.75 miles take a right onto Highway 550, heading north. In 3.4 miles turn left into the Hilltop gas station and convenience store; see ***Figure 10a, Landfarm #4 Evacuation***

Cells 22 and 23 Evacuation Route to Muster Point:

Head West/Southwest from within the designated cells to the access gate located on the west fence line of Cell 22 and take a right onto Highway 550, heading north. In 3.9 miles turn left into the Hilltop gas station and convenience store; see ***Figure 10a, Landfarm #4 Evacuation***

In the event of a large fire, an air horn will sound to initiate evacuation. Upon hearing the air horn all Landfarm personnel shall stop work, shut down any equipment they are using and begin evacuation using the most sensible evacuation route from Landfarm #4.

7.4. Post Fire Clean up

Upon safe re-entry as verified by Emergency Services personnel, landfarm personnel will begin cleanup activities. Any debris will be sorted by hand and/or using landfarm equipment such as a tractor or dump truck. Any non-oilfield waste will be placed in a dump truck and hauled off for proper disposal at a landfill. Oil field waste such as hydrocarbon contaminated soils and/or drill cuttings that were affected by the fire will be placed in a dump truck and will go through chlorides and paint filter and other waste characterization sampling as necessary to verify if the affected soils can be placed back in Landfarm #4 for treatment.

7.5. Fire Source Determination

In the event the source or cause of the fire was not determined, Envirotech will require a full investigation to be completed by the Fire Department in order to determine source and cause of fire. The source will be investigated in order to prevent the event to re-occur in the future.

8. Explosions

In the event of an explosion at Landfarm #4, the following subsections describe the steps necessary to limit damage to fresh water, public health, safety or the environment.

8.1. Personnel Actions

The steps listed below are to be followed by landfarm personnel during an explosion Landfarm #4:

1. Sound Air horn to initiate evacuation; see ***Figure 10a, Landfarm #4 Evacuation Routes***.
2. Call 911 or notify Emergency Services, and/or request medical services if personnel or visitors have been injured during the explosion.
3. Notify emergency coordinator of explosion, include: location, estimated size, possible cause, name of notifying personnel, if evacuation has begun and if emergency personnel has been contacted.
4. Evacuate landfarm and drive to muster point; Hilltop gas station northeast of Landfarm #4; see ***Figure 10a, Landfarm #4 Evacuation Routes***.
5. If safe have one person stay near landfarm entrance either Angel Peak road and Highway 550 or safe area to meet and direct fire and emergency personnel to location, notify emergency coordinator upon completion of this task and head to muster point.
6. Upon arrival at muster point, take a head count and cross-reference the sign in sheet to verify all personnel and visiting personnel are accounted for; notify emergency coordinator of status of personnel at muster point.
7. Upon safe re-entry into the landfarm, after emergency personnel have deemed it safe, see **Section 8.4, Post Explosion Clean Up;** of this plan for post explosion clean up.

8.2. Emergency Services

The list below includes numbers to emergency services that may be required after an explosion at Landfarm #4:

Fire Department **911** or (505) 334-6622

Police Department	**911** or (505) 334-6622
San Juan Regional Medical Center	(505) 609-2000
Emergency Coordinator	(505) 947-9510 or (505) 632-0615

8.3. Evacuation Plan

Landfarm #4 has several options for evacuation routes, depending on which cell you are working in and where in the cells you are during the evacuation. See **Section 7.3** for descriptions of the various evacuation routes for Landfarm #4. See **Figure 10a, Evacuation Routes**.

8.4. Post Explosion Clean up

Upon safe re-entry a verified by Emergency Services personnel, Envirotech landfarm personnel will begin cleanup activities. Any debris will be loaded into a dump truck, if debris cannot be cleaned up by landfarm personnel, the emergency coordinator will contact the proper company to haul off debris for proper disposal.

8.5. Explosion Source Determination

In the event the source or cause of the explosion could not determined, Envirotech will complete a full investigation, utilizing information from personnel that witnessed explosion and other resources that may have been brought in to help contain the explosion such as the Fire Department. The source will be investigated in order to prevent the event to re-occur in the future.

9. Releases of Contaminants (Sudden or Non-Sudden)

The following sections describe the actions taken by Landfarm #4 personnel, evacuation routes, and post release cleanup required in the event of a release to the air, soil, surface water or groundwater at Landfarm #4.

9.1. Air

In the event of a release to the air at Landfarm #4, the following subsections describe the steps necessary to limit damage to fresh water, public health, safety or the environment. For a release of hydrogen sulfide, see ***Attachment 8, Hydrogen Sulfide Prevention and Contingency Plan***, for a more detailed plan.

9.1.1. Personnel Actions

The major concerns regarding a release to the air at Landfarm #4 are hydrogen sulfide (H_2S). In the event of this type of release please see **Attachment 8**. The steps listed below are a general outline for any detectable release to the air. The following steps should be taken for H_2S releases below immediate action plan initiation levels (100 ppm) and or other releases to air:

1. Evacuate the area where personal monitor alarms sound or a release detected by other methods (smell, visual, etc), moving upwind.
2. Notify emergency coordinator of release, include: location, type of release (if possible to detect) possible cause, name of notifying personnel, if evacuation has begun and if emergency personnel has been contacted.

3. Evacuate landfarm and drive to muster point; Hilltop gas station northeast of Landfarm #4; see ***Figure 10a, Landfarm #4 Evacuation Routes***.
4. If safe have one person stay near Landfarm entrance either Angel Peak road and Highway 550 or safe area to meet and direct Hazmat and emergency personnel to location, notify Emergency Coordinator upon completion of this task and head to muster point.
5. Upon arrival at muster point, take a head count and cross-reference the sign in sheet to verify all personnel and visiting personnel are accounted for; notify emergency coordinator of status of personnel at muster point.
6. Upon safe re-entry into the Landfarm, after emergency personnel have deemed it safe, see **Section 9.1.4 Post Release Clean Up.**

Note: If release registers at max detection level of personal monitor for H_2S immediately reference Attachment 6, Hydrogen Sulfide Prevention and Contingency Plan, and initiate the Immediate Action Plan. See Appendix A, RKI Personal Monitor Data Sheet for personal monitor detection levels.

9.1.2. Emergency Services

The list below includes numbers to emergency services that may be required during a release to the air at Landfarm #4:

Fire Department	**911** or (505) 334-6622
Police Department	**911** or (505) 334-6622
San Juan Regional Medical Center	(505) 609-2000
Emergency Coordinator	(505) 947-9510 or (505) 632-0615
NMED	(505) 827-9329

*****The emergency coordinator is to notify the Air Quality Division of the New Mexico Environmental Department (NMED), use the above number in the event of an emergency; the following numbers are for non-emergency situations; 866-428-6535 or 505-476-6000.

9.1.3. Evacuation Plan

Landfarm #4 has several options for evacuation routes, depending on which cell you are working in and where in the cells you are during the evacuation. See **Section 7.3** for descriptions of the various evacuation routes for Landfarm #4. See **Figure 10a, Evacuation Routes**.

9.1.4. Post Release Clean up

Re-entry into the affected area will be determined by the Emergency Services Personnel team. If a source was determined to cause the release, the Farmington Hazmat team and Envirotech, inc. will coordinate appropriate removal (if possible), in addition continuous monitoring and signage will be placed in area of release to warn of possible future releases. In addition, the emergency coordinator must contact NMED air quality division to discuss proper clean up and/or continued monitoring and proper reporting of the release.

9.1.5. Air Release Source Determination

In the event the source or cause of the release could not determined, Envirotech will complete a full investigation, utilizing information from personnel that witnessed the release and other resources that may have been brought in to help contain the release. The source will be investigated in order to prevent the event to re-occur in the future.

9.2. Soil

In the event of a release to the soil at Landfarm #4, the following subsections describe the steps necessary to limit damage to fresh water, public health, safety or the environment.

9.2.1. Personnel Actions

In the event of a spill/release to the soil that is not deemed acceptable waste for treatment at Landfarm #4, the following steps should be taken:

1. If the name of the substance is known refer to the Emergency Response Guidebook, located in each Envirotech vehicle or the Landfarm #4 emergency spill kit, located in the Landfarm #4 field office; see ***Figure 10a, Evacuation Routes***, for Landfarm #4 field office location. Don proper PPE, based on knowledge of release.
2. If it is safe to do so, stop source of leak/release.
3. Notify emergency coordinator of spill; include estimated size, source, and substance.
4. Retrieve spill kit from the Landfarm #4 field office, and utilize contents to contain leak/release; see ***Figure 10a, Evacuation Routes***, for Landfarm #4 field office location.
5. Flag/barricade area surrounding release to keep personnel out of area.
6. If safe to do so, begin removal of affected soil into an appropriate storage container
7. Seal and clearly label container(s) of content and coordinate appropriate disposal of contaminated soils.
8. If necessary, collect soil samples from affected area to verify all contaminated soil was removed.
9. Maintain flagging/barricade and cover hole of removed soil until verification that contaminated soils have been removed.
10. Upon verification all contaminated soils have been removed, back fill hole with clean native soil.

****In the event a release to the soil cannot be contained or may be a danger to life or health of Landfarm #4 personnel, initiate evacuation and contact emergency coordinator and Emergency Services Personnel.***

9.2.2. Emergency Services

The list below includes numbers to emergency services that may be required during a release to the soil at Landfarm #4:

Fire Department (Hazmat team)	**911** or (505) 334-6622
Police Department	**911** or (505) 334-6622
San Juan Regional Medical Center	(505) 609-2000

Emergency Coordinator	(505) 947-9510 or (505) 632-0615
NMOCD	(505) 334-6178

9.2.3. Evacuation Plan

In the event that a release to the soil warrants evacuation for from Landfarm #4, there are several options for evacuating, depending on which area you are working in and where in the cells you are during the evacuation. See **Section 7.3** for descriptions of the various evacuation routes for Landfarm #4. See **Figure 10a, Evacuation** for a map of the various evacuation routes for Landfarm #4.

9.2.4. Post Release Clean up

The emergency coordinator must contact NMOCD to discuss proper clean up and/or continued monitoring and proper reporting of the release. Upon proper remediation and verification that the area of release has been cleaned/remediated to acceptable levels (this will vary based on substance spilled/released), remove flagging/barricade and backfill open hole with clean fill or clean native soil.

9.2.5. Soil Release Source Determination

In the event the source or cause of the release could not determined, Envirotech will complete a full investigation, utilizing information from personnel that witnessed the release and other resources that may have been brought in to help contain the release. The source will be investigated in order to prevent the event to re-occur in the future.

9.3. Surface Water

In the event of a release to surface waters at Landfarm #4, the following subsections describe the steps necessary to limit damage to fresh water, public health, safety or the environment.

9.3.1. Personnel Actions

In the event of a spill/release to surface water at Landfarm #4, the following steps should be taken:

1. If the name of the substance is known refer to the Emergency Response Guidebook, located in each Envirotech vehicle or the Landfarm #4 emergency spill kit, located in the Landfarm #4 field office; see ***Figure 10a, Evacuation Routes***, for Landfarm #4 field office location. Don proper PPE, based on knowledge of release.
2. If it is safe to do so, stop source of leak/release.
3. Notify emergency coordinator of spill; include estimated size, source, and substance.
4. Retrieve spill kit from the Landfarm #4 field office, and utilize contents to contain leak/release; see ***Figure 10a, Evacuation Routes***, for Landfarm #4 field office location.
5. Flag/barricade area surrounding release to keep personnel out of area.
6. If necessary, collect water samples from affected area to verify level and or type of contamination.
7. Maintain berms, socks and flagging/barricade until verification of type of contamination and appropriate remediation method.

In the event a release to the release to surface water cannot be contained or may be a danger to life or health of Landfarm #4 personnel, initiate evacuation and contact emergency coordinator and Emergency Services. If the release causes a sheen on a navigable water (water of the US) Envirotech Emergency Coordinator must notify the National Response Center.

9.3.2. Emergency Services

The list below includes numbers to emergency services that may be required during a release to the surface water at Landfarm #4:

Fire Department (Hazmat team)	**911** or (505) 334-6622
Police Department	**911** or (505) 334-6622
San Juan Regional Medical Center	(505) 609-2000
Emergency Coordinator	(505) 947-9510 or (505) 632-0615
NMED	(505) 827-9329
National Response Center	(800)424-8802

*****The emergency coordinator is to notify the NMED, use the above number in the event of an emergency; the following numbers are for non-emergency situations; 866-428-6535 or 505-476-6000.

9.3.3. Evacuation Plan

Landfarm #4 has several options for evacuation routes, depending on which cell you are working in and where in the cells you are during the evacuation. See **Section 7.3** for descriptions of the various evacuation routes for Landfarm #4. See **Figure 10a, Evacuation Routes**.

9.3.4. Post Release Clean up

The emergency coordinator must contact NMED to discuss proper clean up and/or continued monitoring and proper reporting of the release. Upon verification that the area of release has been cleaned/remediated to acceptable levels (this will vary based on substance spilled/released), remove flagging/barricade and any other items used to help remediate or contain spill area.

9.3.5. Surface Water Release Source Determination

In the event the source or cause of the release could not determined, Envirotech will complete a full investigation, utilizing information from personnel that witnessed the release and other resources that may have been brought in to help contain the release. The source will be investigated in order to prevent the event to re-occur in the future.

9.4. Ground Water

In the event of a release to ground water at Landfarm #4, the following subsections describe the steps necessary to limit damage to fresh water, public health, safety or the environment.

9.4.1. Personnel Actions

In the event of a spill/release to surface water at Landfarm #4, the following steps should be taken:

1. If the name of the substance is known refer to the Emergency Response Guidebook, located in each Envirotech vehicle or the Landfarm #4 emergency spill kit, located in the Landfarm #4 field office; see ***Figure 10a, Evacuation Routes***, for Landfarm #4 field office location. Don proper PPE, based on knowledge of release.
2. If it is safe to do so, stop source of leak/release.
3. Notify emergency coordinator of spill; include estimated size, source, and substance.
4. Retrieve spill kit from the Landfarm #4 field office, and utilize contents to contain leak/release; see ***Figure 10a, Evacuation Routes***, for Landfarm #4 field office location.
5. Flag/barricade area surrounding release to keep personnel out of area.
6. If necessary collect soil and if possible, groundwater samples from affected area to verify level and or type of contamination.
7. Maintain flagging/barricade until verification of type of contamination and appropriate remediation method.
8. Emergency coordinator shall begin the process of public notification utilizing resources such as the Emergency Services listed in Section 9.4.2 below to notify any homes or drinking sources affected by spill.

9.4.2. Emergency Services

The list below includes numbers to emergency services that may be required during a release to the groundwater at Landfarm #4:

Fire Department	**911** or (505) 334-6622
Police Department	**911** or (505) 334-6622
San Juan Regional Medical Center	(505) 609-2000
Emergency Coordinator	(505) 947-9510 or (505)632-0615
NMED	(505) 827-9329

*****The emergency coordinator is to notify the NMED, use the above number in the event of an emergency; the following numbers are for non-emergency situations; 866-428-6535 or 505-476-6000.

9.4.3. Evacuation Plan

Landfarm #4 has several options for evacuation routes, depending on which cell you are working in and where in the cells you are during the evacuation. See **Section 7.3** for descriptions of the various evacuation routes for Landfarm #4. See **Figure 10a, Evacuation Routes**.

9.4.4. Post Release Clean up

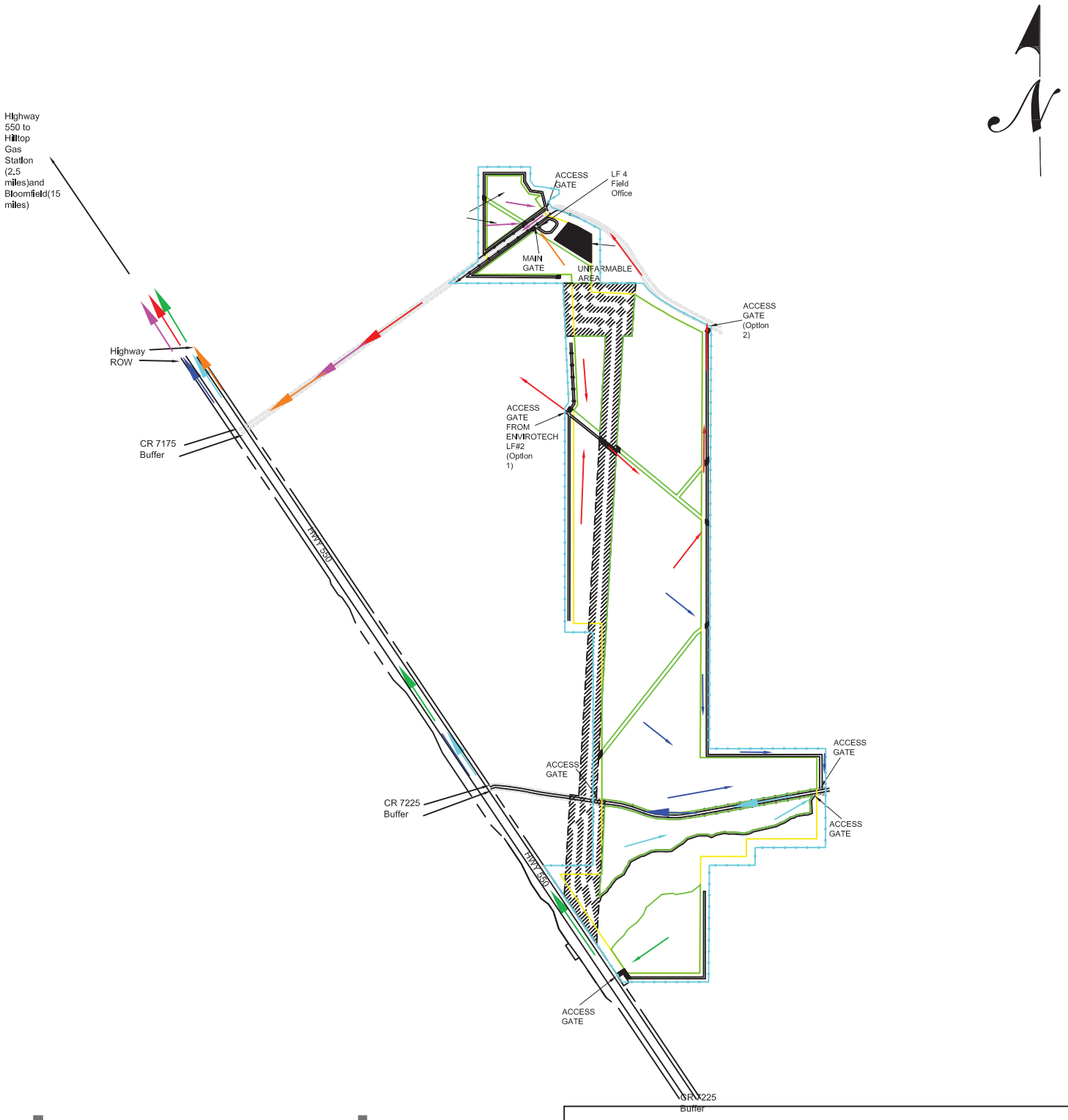
The emergency coordinator must contact NMED to discuss proper clean up and/or continued monitoring and proper reporting of the release. Upon verification that the area of release has been cleaned/remediated to acceptable levels (this will vary based on substance spilled/released), remove flagging/barricade and any other items used to contain spill area.

9.4.5. Groundwater Release Source Determination

In the event the source or cause of the release could not determined, Envirotech will complete a full investigation, utilizing information from personnel that witnessed the release and other resources that may have been brought in to help contain the release. The source will be investigated in order to prevent the event to re-occur in the future.

10. Conclusion

This emergency contingency plan should be referenced in order to minimize hazards that may occur at Envirotech's Landfarm #4 to fresh water, public health, safety or the environment from fires, explosions or unplanned sudden or non-sudden release of contaminants or oil field waste to the air, soil, surface water or ground water. In the event that a release results in immediate danger to life or health, immediate evacuation should be initiated, and proper authorities should be contacted to contain, clean and address the release.



Legend

- Farmable Area
- Facility Boundary
- Archeological Buffer
- 100' Buffer
- Cell 1 Route
- Cell 2 Route
- North Route (Cells 3-10)
- South Route (Cells 11-19)
- Cell 20, 21 Route
- Cell 22, 23 Route

Cells can be refrenced in Attachment 4 Figure 4C: Cell Layout

FIGURE 10A
EVACUATION ROUTES
LANDFARM #4 PERMIT

SCALE:					
PROJECT NO.Landfarm 4					
MAP DRWN	GWC		BASE DRWN		

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Attachment #11

Run-on and Run-off Control and Best Management Practices Plan

June 2019

TABLE OF CONTENTS

Appendices:

Figures:

1. Introduction

The following report describes the control measures put into place at Envirotech Inc.'s (Envirotech) Landfarm #4 to control storm water run-on and run-off. The sections below detail the 25-year-24-hour storm event, berm and swale locations, design drawings, and calculations.

2. 25-year-24-hour Storm Event

The following section discusses the rainfall data for Landfarm #4, as well as the calculated peak run-on and run-off flows for the 25-year-24-hour event.

2.1 Precipitation

The 25-year-24-hour storm event was determined utilizing the National Oceanic and Atmospheric Administration (NOAA) website, and the NOAA Atlas 14-point precipitation frequency estimates for New Mexico. These sources provide the most current data for a location for specific intervals between 1-yr to 1,000-yrs for durations between 5 minutes to 60 days. Based on the NOAA website the 25-year-24-hour precipitation for Landfarm #4 is 2.15 inches; see ***Appendix A, for NOAA website data.***

2.2 Peak Flow Calculation Method

The simplified peak flow method (PFM) was chosen for determining the peak run-on and run-off for Landfarm #4. The PFM is an accurate way to calculate peak flow and volume for drainage basins that are less than 5 square miles (3,200 acres) and the time of concentration (Tc) is less than 8 hours.

The PFM uses the time of concentration, drainage area, curve number, and rainfall depth for a required design frequency to calculate the peak discharge in cubic feet per second (cfs). The time of concentration is the amount of time it takes water to travel overland within that basin. The time of concentration varies with each basin. The curve number is a constant derived from land use, ground cover, hydrologic condition, and hydrologic soil group. The curve number is different for the run-on and run-off conditions of Landfarm #4. The drainage area is determined by existing topographic conditions for run-on and determined by proposed topographic conditions within the boundary of Landfarm #4 for run-off.

Items such as berms delineating right of ways (ROW) and surrounding cells will affect the direction of flow within Landfarm #4 boundaries. The rainfall depth for both run-on and run-off is the same, 2.15 inches.

2.3 Peak Run-On Calculations

The peak run-on was calculated using the PFM and the 2.15 inches of precipitation from NOAA; see ***Appendix B, Run-on Calculations & Background Information***. Run-on was broken into three basins due to the natural topography (East -344 acres, Southeast – 39.8 acres, South – 20.1 acres).

The run-on flow originates from the east on the north side of the landfarm (north of County Road 7225). The topography causes a flow trend toward the west, and ultimately to the southwest towards Landfarm #4. The storm water flow south of County Road 7225 trends northwest towards the unnamed tributary to the West Fork Gallegos Canyon; see ***Figure 11a, Drainage Basins and Figure 11b, General Flow Direction***.

The curve number used for run-on calculations was determined to be 69. The soil survey website was used to determine the hydrologic soil group for each basin. The hydrologic soil group was determined to be B, and based the land use is best described as rangeland, with desert brush ground cover, and good hydrologic condition; see ***Appendix B, Run-on Calculations & Background Information***.

The 25-year-24-hour peak run-on for the East Basin was calculated as 26.38 cfs; South Basin was calculated as 2.15 cfs; and Southeast Basin was calculated as 4.41 cfs. The peak run-on will be used to design a perimeter berm and swale within Landfarm #4 boundary. The perimeter berm and swale will be designed to handle the largest calculated run-on peak flow of 26.38 cfs; see ***Appendix B, Run-on Calculations & Background Information***.

2.4 Peak Run-Off Calculations for Farmable area

The peak run-off was calculated using the PFM and the 2.15 inches of precipitation from NOAA; see ***Appendix C, Run-off Calculations & Background Information***. Run-off was broken into different groups of cells based on size, orientation, and slope. Cells were grouped based on these characteristics to determine if the sizing of the internal berms will retain runoff within the landfarm cell. The cells were grouped as follows: Cell 1 - 7.4 acres; Cell 2 - 8.3 acres; Cells 3 and 4 - 9.5 acres each; Cells 5 through 15 - 10 acres each; Cells 16 through 19 - 10 acres each; Cells 20 and 21 - 9.8 acres; and Cells 22 and 23 - 9.2 acres each; see ***Figure 11a, Drainage Basins and Figure 11b, General Flow Direction***.

The curve number used for run-off calculations was determined to be 75. The hydrologic soil group was identified as B; however, the land use and ground cover reflect the cleared natural vegetation. The land use is best described as agricultural, with contoured soil

cover, and good hydrologic condition; see ***Appendix C, Run-off Calculations & Background Information***.

The 25-year-24-hour peak run-off for the groups of cells is presented in the table below:

Cell	Peak Design Discharge (ft3/s)	Runoff Volume (ac-ft)
1	2.25	.27
2	2.67	.32
3-4	2.54	.36
5-15	2.68	.38
16-19	3.57	.38
20-21	2.62	.37
22-23	3.28	.35

see ***Appendix C, Run-off Calculations & Background Information***.

3. Run-on Control

In order to direct run-on around Landfarm #4 a combination of berm and swale will be constructed inside the fence line of Landfarm #4 along a portion of the east property line; see ***Figure 11c, Run-on Control Features and Figure 11e, Run-on and Run-off Control Feature Details***. This section of berm and swale will be designed to handle the largest 25-year-24-hour run-on peak flow of 33.14 cfs calculated.

Trapezoidal open channel equations were used to size the swale (diversion ditch). The perimeter berm has 1.5:1 side slope and is 3 feet tall. The trapezoidal swale has 2:1 (horizontal/vertical) side slope and a bottom width of 2 feet; see ***Appendix B, Run-on Calculations & Background Information***. Based on trapezoidal swale capacity with a 2-foot flow depth, the velocity of the water will be less than 2.5ft/s which will be slow enough to allow vegetation to establish and not allow for erosion. The velocity is also fast enough to allow solids to stay suspended and not silt in the swale.

A berm will be constructed around the remaining perimeter of Landfarm #4, since the natural direction of flow is away from Landfarm #4 in these areas.

4. Run-off Control

In order to detain run-off within the Landfarm #4 boundary, a perimeter berm will be constructed inside the fence line of Landfarm #4. Internal berms will be constructed to contain run-off. Any pooled water will be collected within 24-hours using a water truck.

All internal perimeter berms will have 1.5:1 side slope and will be 2 feet tall (the internal perimeter berm is the inside of the run-on perimeter berms.

The internal perimeter berm is used to hold back the water from the 100-foot buffer area since each landfarm cell will have its own 2-foot perimeter berm. Each 10-acre landfarm cell inside of Landfarm #4 will be surrounded by a 2-foot perimeter berm with 1.5:1 side slope per *NMAC 19.15.36.7 (6)* requirements. All pipeline ROWs will be a 2-foot berm with 1.5:1 side slope to delineate the extent of the ROW. The Chacoan Great North Road Archeological Protection zone will have a 3-foot berm on each side with 1.5:1 side slope; see ***Figure 11d, Run-off Control Features***.

5. Best Management Practices

The following section describes the best management practices that will be implemented at Landfarm #4.

5.1 Erosion and Sediment Controls

The following erosion and sediment controls will be utilized:

- A 3-foot tall perimeter berm and/or swale to direct sediment and run-on around the Landfarm as well as retaining onsite sediment and run-off.
- Interior berms and grading to direct and slow onsite runoff to minimize erosion, and allow for sediment to settle out.

5.2 Good House Keeping

The following good housekeeping schedule will be implemented:

- The solid waste receptacles will be emptied daily.
- The Landfarm 4 field office and surrounding area is will be kept clear of windblown debris.

5.3 Training

The following employee training scheduled will be implemented:

- Employees will be trained on how to inspect and maintain the berms and swales;
- All new hires will be trained within 1 week of hire date in berm and swale maintenance and inspection.

5.4 Inspection Schedule

All berms and swales will be inspected on a quarterly basis, unless a major rainfall event warrants an earlier inspection. The inspector will look for damage and or debris or anything that may inhibit the berm and or swale to detain and route run-on or run-off. All damaged areas will be repaired within 24 hours. All completed inspections will be recorded on inspections sheets; see ***Appendix F, Inspection Sheets***.

6. Conclusion

All run-on and run-off structures proposed at Landfarm #4 will help separate run-on and run-off flows. Run-off controls will prevent potentially contaminated run-off from exiting Landfarm #4 boundaries. Run-on controls will route run-on around Landfarm #4 boundary to prevent the mixing of run-off and run-on, keeping clean run-on from mixing with potentially contaminated run-off.

FIGURE 11A
RUNON BASINS
LANDFARM #4 PERMIT

SCALE:					
PROJECT NO.Landfarm 4					
MAP DRWN	GWC		BASE DRWN		

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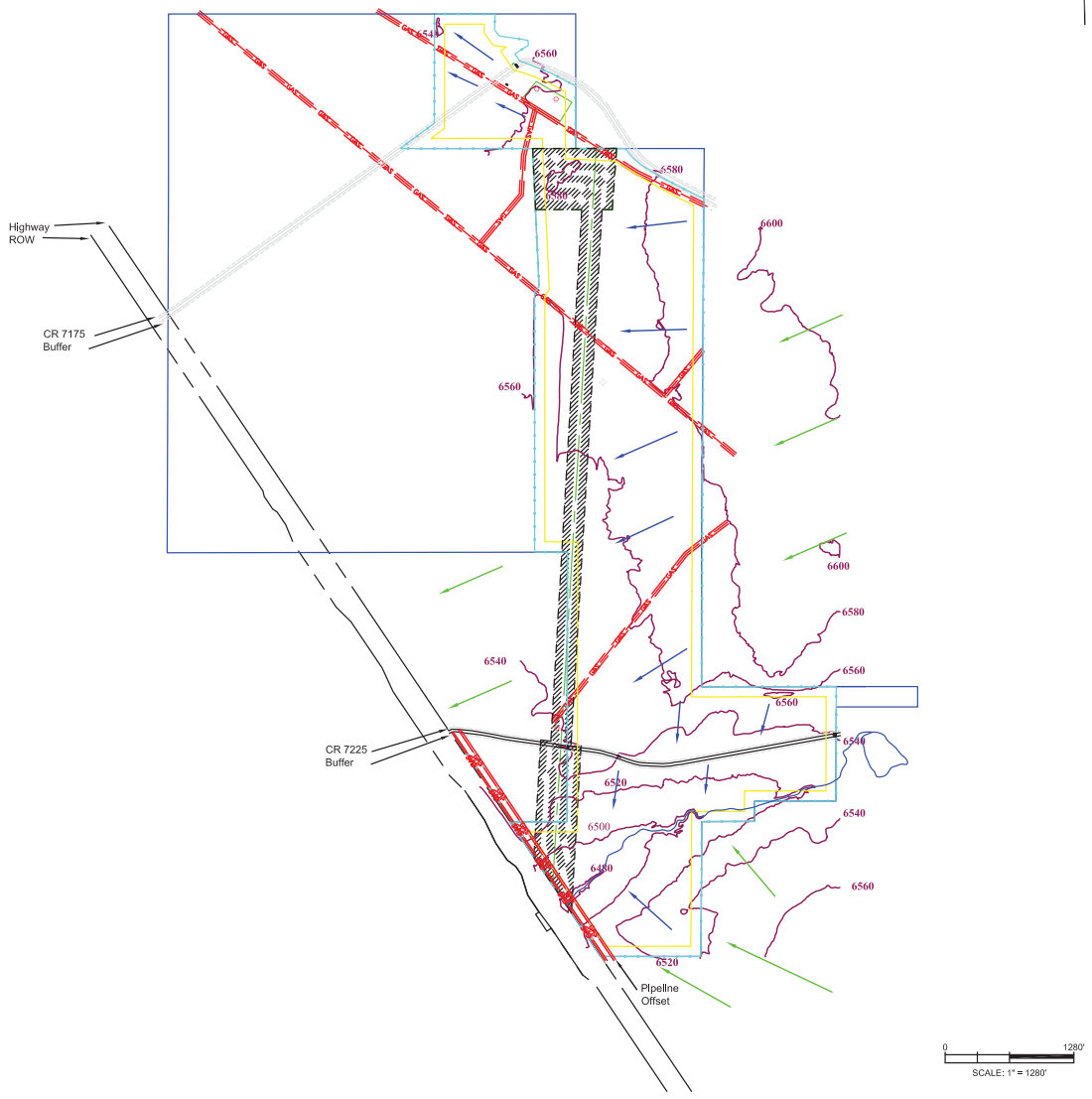

Legend

- Facility Boundary
- 20' Contour Lines
- Archeological Buffer
- Surveyed Property Line
- Gas Line w/ Buffer
- Runon Direction
- Runoff Direction
- 100 Ft Facility Buffer

FIGURE 11B
RUNON AND RUNOFF DIRECTION
LANDFARM #4 PERMIT

SCALE1" = 1280'					
PROJECT NO.Landfarm 4					
MAP DRWN	GWC		BASE DRWN		

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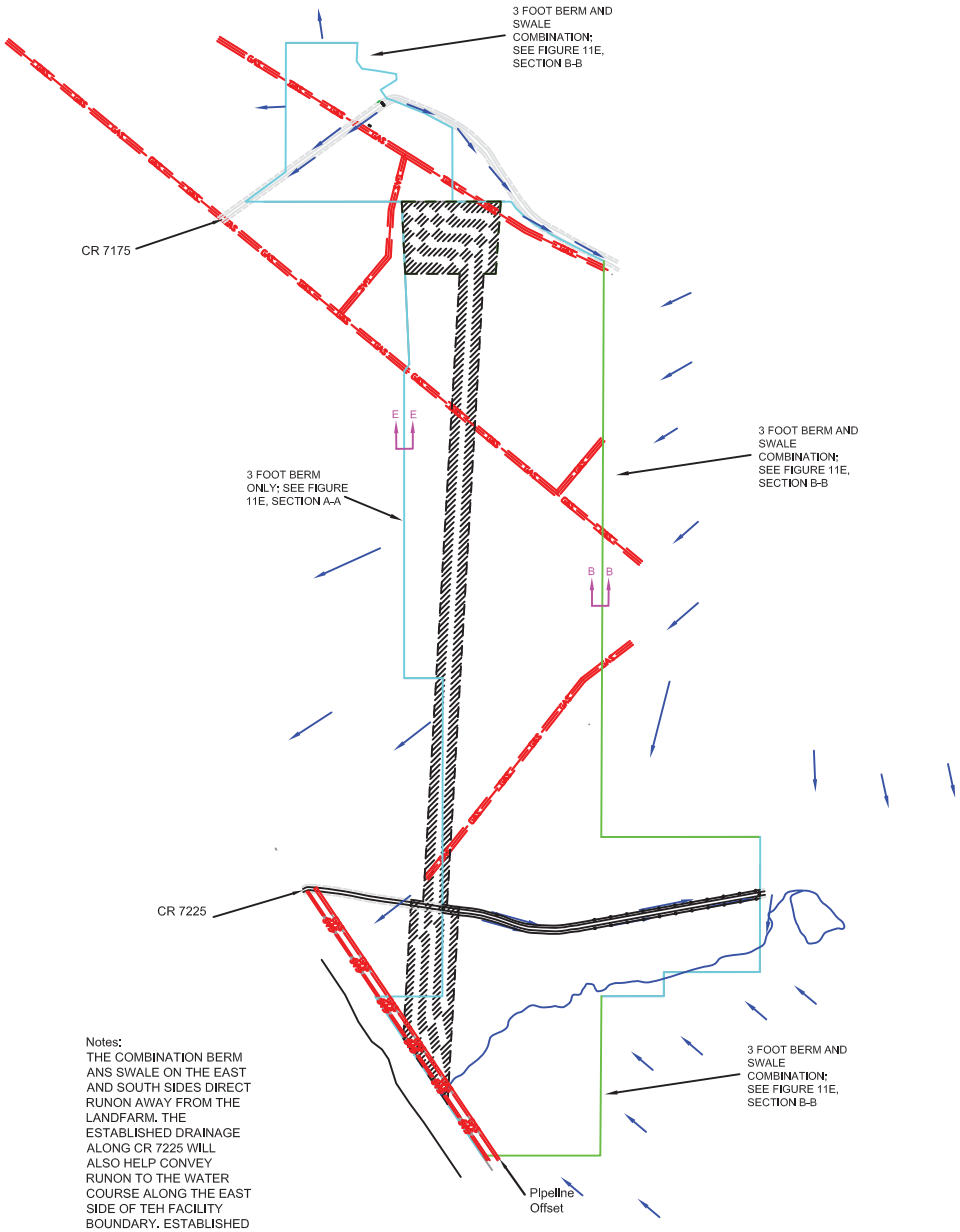

Notes:
THE COMBINATION BERM ANS SWALE ON THE EAST AND SOUTH SIDES DIRECT RUNON AWAY FROM THE LANDFARM. THE ESTABLISHED DRAINAGE ALONG CR 7225 WILL ALSO HELP CONVEY RUNON TO THE WATER COURSE ALONG THE EAST SIDE OF TEH FACILITY BOUNDARY. ESTABLISHED DRAINAGE ALONG CR 7175 WILL ALLOW RONON TO FLOW TO THE HIGHWAY 550 ROW

Legend

- 3 Foot Berm
- 3 Foot Berm and Swale
- Archeological Buffer
- GAS — Gas Line w/ Buffer
- D D — SECTION LABELS(SEE FIGURE 11E FOR DETAILS)

FIGURE 11C
RUNON CONTROL FEATURES
LANDFARM #4 PERMIT

SCALE:					
PROJECT NO.Landfarm 4					
MAP DRWN	GWC		BASE DRWN		

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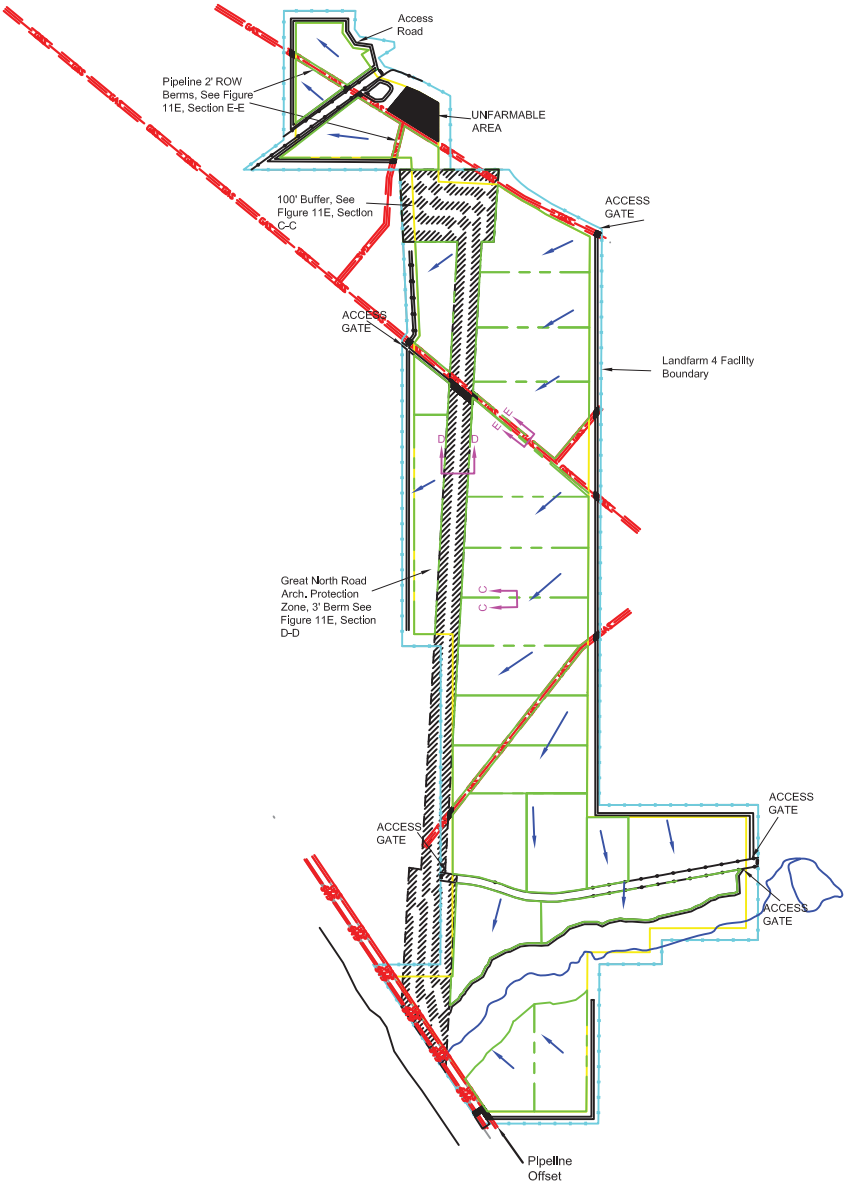

Notes:
The internal 2' tall 10 acre Landfarm Cell berms also delineate the 100' buffer and contain runoff within each cell. The great North Road Arch. protection 3' berm delineates the protection zone as well as keeping flows from farmable and non farmable areas seperate.

Legend

- Facility Boundary
- Unfarmable Area
- Archeological Buffer
- 100 Ft Facility Buffer
- GAS — Gas Line w/ Buffer
- Cell Area
- D D — SECTION LABELS(SEE FIGURE 11E FOR DETAILS)

FIGURE 11D
RUNOFF CONTROL FEATURES
LANDFARM #4 PERMIT

SCALE:

PROJECT NO.Landfarm 4

MAP DRWN	GWC		BASE DRWN		

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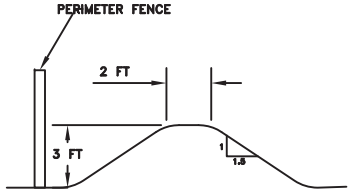
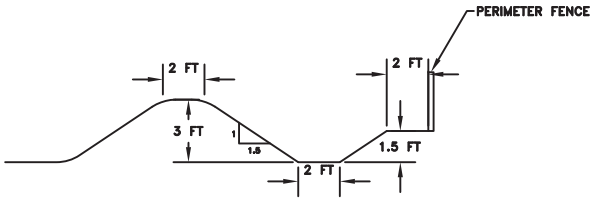
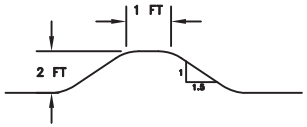


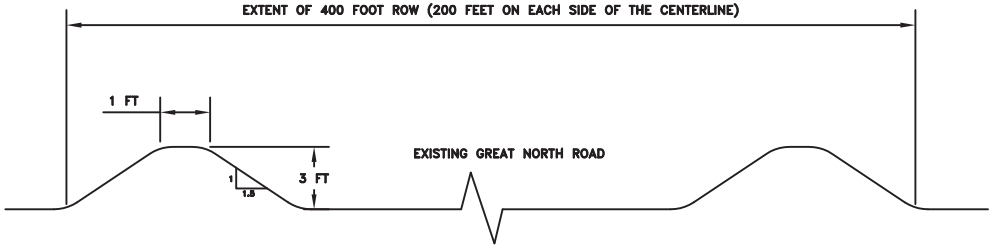
Section A–A: 3 FOOT PERIMETER BERM CONSTRUCTION
To be constructed around Cell 1 of Landfarm #4 and the north, south and west property line of of Lanfarm #4 South of Angel Peak Road



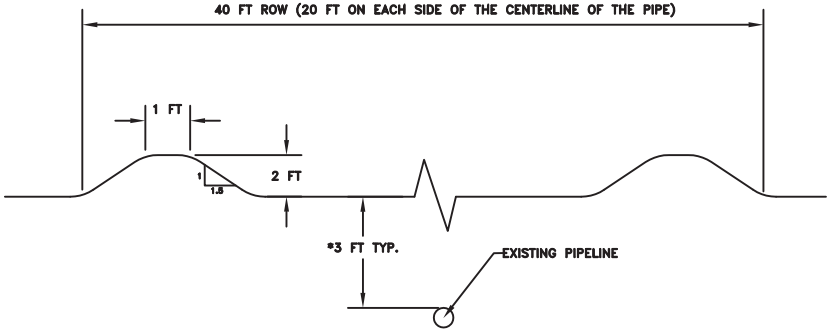
Section B–B: 3 FOOT PERIMETER BERM AND SWALE COMBINATION
To be constructed around east property line of of Landfarm #4 As well as the South and east boundary of Cells 22 and 23



Section C–C: 2 FOOT LANDFARM CELL BERMS
To be constructed around each 10 acre Landfarm Cell in Landfarm #4



Section D–D: 3 FOOT GREAT NORTH ROAD ARCH PROTECTION ZONE BERM



Section E–E: 2 FOOT PIPELINE RIGHT OF WAY BERM
* ACTUAL DEPTH OF EXISTING PIPELINE IS UNKNOWN THEREFORE ONLY FILL OVER PIPELINES, DO NOT DIG.

GENERAL NOTES ON BERM CONSTRUCTION:

PLACE SOILS IN 6 INCH LIFTS AND COMPACT EACH LIFT PRIOR TO ADDING MORE SOIL, UNTIL DESIRED BERM HEIGHT IS REACHED AND TOP LAST FOOT WITH A QUALITY TOPSOIL.

SHAPE OF BERM:

BERMS SHOULD BLENDED INTO THE LANDSCAPE IF POSSIBLE, THE TRANSITION BETWEEN THE EXISTING GRADE AND SLOPE OF THE BERM SHOULD BE GRADUAL, AVOID ABRUPT CHANGES IN GRADE TO HELP LIMIT EROSION.

FIGURE 11E
CONTORL FEATURES DETAILS
LANDFARM #4 PERMIT

SCALE: N.T.S.		FIGURE NO. 11E				
PROJECT NO.						
MAP DRWN	GWC		BASE DRWN			

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Appendix A

NOAA Website Data

NOAA Atlas 14, Volume 1, Version 5
Location name: Bloomfield, New Mexico, USA*
Latitude: 36.5151°, Longitude: -107.9304°
Elevation: 6581.54 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.159** (0.137-0.187)	**0.205** (0.176-0.239)	**0.276** (0.238-0.323)	**0.334** (0.286-0.390)	**0.416** (0.354-0.486)	**0.483** (0.407-0.564)	**0.555** (0.463-0.650)	**0.633** (0.521-0.743)	**0.744** (0.599-0.875)	**0.835** (0.664-0.989)
10-min	**0.242** (0.209-0.284)	**0.312** (0.269-0.364)	**0.420** (0.362-0.491)	**0.508** (0.436-0.593)	**0.633** (0.538-0.740)	**0.736** (0.620-0.859)	**0.845** (0.704-0.988)	**0.964** (0.792-1.13)	**1.13** (0.911-1.33)	**1.27** (1.01-1.51)
15-min	**0.300** (0.259-0.352)	**0.386** (0.333-0.452)	**0.521** (0.448-0.609)	**0.629** (0.540-0.736)	**0.784** (0.667-0.918)	**0.912** (0.768-1.07)	**1.05** (0.873-1.23)	**1.19** (0.982-1.40)	**1.40** (1.13-1.65)	**1.58** (1.25-1.87)
30-min	**0.404** (0.349-0.474)	**0.520** (0.448-0.608)	**0.701** (0.604-0.820)	**0.848** (0.727-0.991)	**1.06** (0.898-1.24)	**1.23** (1.03-1.43)	**1.41** (1.18-1.65)	**1.61** (1.32-1.89)	**1.89** (1.52-2.22)	**2.12** (1.69-2.51)
60-min	**0.500** (0.432-0.587)	**0.644** (0.555-0.753)	**0.867** (0.747-1.01)	**1.05** (0.900-1.23)	**1.31** (1.11-1.53)	**1.52** (1.28-1.77)	**1.75** (1.46-2.04)	**1.99** (1.64-2.34)	**2.34** (1.88-2.75)	**2.63** (2.09-3.11)
2-hr	**0.560** (0.488-0.650)	**0.714** (0.622-0.828)	**0.948** (0.824-1.10)	**1.14** (0.989-1.32)	**1.42** (1.22-1.65)	**1.66** (1.40-1.91)	**1.91** (1.60-2.21)	**2.19** (1.80-2.53)	**2.59** (2.09-3.01)	**2.92** (2.31-3.41)
3-hr	**0.614** (0.543-0.702)	**0.776** (0.684-0.887)	**1.01** (0.890-1.15)	**1.20** (1.05-1.37)	**1.48** (1.29-1.68)	**1.71** (1.48-1.94)	**1.97** (1.67-2.24)	**2.24** (1.88-2.56)	**2.64** (2.17-3.03)	**2.97** (2.39-3.43)
6-hr	**0.720** (0.647-0.812)	**0.898** (0.808-1.01)	**1.14** (1.02-1.28)	**1.34** (1.20-1.50)	**1.62** (1.44-1.82)	**1.86** (1.63-2.09)	**2.11** (1.83-2.38)	**2.38** (2.04-2.69)	**2.77** (2.32-3.16)	**3.10** (2.55-3.54)
12-hr	**0.842** (0.760-0.936)	**1.05** (0.947-1.17)	**1.31** (1.18-1.45)	**1.51** (1.36-1.67)	**1.80** (1.61-1.99)	**2.03** (1.80-2.24)	**2.26** (1.99-2.50)	**2.51** (2.18-2.79)	**2.86** (2.44-3.20)	**3.15** (2.66-3.56)
24-hr	**0.949** (0.858-1.05)	**1.19** (1.08-1.32)	**1.52** (1.37-1.67)	**1.78** (1.60-1.96)	**2.15** (1.92-2.36)	**2.43** (2.17-2.68)	**2.74** (2.43-3.02)	**3.06** (2.70-3.37)	**3.51** (3.06-3.87)	**3.86** (3.34-4.26)
2-day	**1.10** (0.996-1.21)	**1.38** (1.25-1.52)	**1.75** (1.58-1.92)	**2.04** (1.84-2.24)	**2.44** (2.20-2.68)	**2.76** (2.47-3.03)	**3.10** (2.75-3.39)	**3.44** (3.04-3.77)	**3.92** (3.43-4.31)	**4.30** (3.74-4.74)
3-day	**1.19** (1.08-1.31)	**1.49** (1.35-1.64)	**1.88** (1.70-2.07)	**2.19** (1.98-2.40)	**2.61** (2.35-2.87)	**2.95** (2.64-3.24)	**3.29** (2.94-3.62)	**3.65** (3.23-4.01)	**4.14** (3.63-4.56)	**4.52** (3.94-4.99)
4-day	**1.28** (1.16-1.40)	**1.60** (1.45-1.76)	**2.01** (1.82-2.21)	**2.34** (2.12-2.57)	**2.78** (2.51-3.06)	**3.13** (2.81-3.44)	**3.49** (3.12-3.84)	**3.86** (3.42-4.25)	**4.35** (3.83-4.81)	**4.74** (4.14-5.25)
7-day	**1.45** (1.32-1.60)	**1.82** (1.65-2.00)	**2.28** (2.07-2.51)	**2.65** (2.39-2.91)	**3.14** (2.83-3.45)	**3.52** (3.16-3.86)	**3.91** (3.49-4.29)	**4.30** (3.82-4.74)	**4.84** (4.26-5.33)	**5.25** (4.59-5.80)
10-day	**1.65** (1.49-1.80)	**2.07** (1.87-2.27)	**2.58** (2.34-2.83)	**2.99** (2.71-3.28)	**3.53** (3.18-3.87)	**3.94** (3.54-4.32)	**4.35** (3.90-4.78)	**4.77** (4.25-5.24)	**5.33** (4.71-5.87)	**5.75** (5.04-6.36)
20-day	**2.13** (1.94-2.35)	**2.68** (2.43-2.95)	**3.35** (3.03-3.69)	**3.87** (3.49-4.26)	**4.56** (4.11-5.02)	**5.08** (4.56-5.60)	**5.62** (5.02-6.20)	**6.16** (5.48-6.81)	**6.89** (6.08-7.62)	**7.44** (6.53-8.25)
30-day	**2.55** (2.31-2.82)	**3.20** (2.90-3.54)	**3.99** (3.61-4.41)	**4.58** (4.14-5.07)	**5.37** (4.83-5.93)	**5.95** (5.34-6.58)	**6.54** (5.84-7.23)	**7.13** (6.34-7.89)	**7.89** (6.96-8.75)	**8.47** (7.43-9.42)
45-day	**3.07** (2.80-3.38)	**3.86** (3.51-4.24)	**4.79** (4.35-5.27)	**5.50** (4.98-6.04)	**6.41** (5.79-7.06)	**7.09** (6.37-7.81)	**7.77** (6.95-8.57)	**8.45** (7.51-9.34)	**9.34** (8.24-10.3)	**10.0** (8.78-11.1)
60-day	**3.55** (3.21-3.91)	**4.46** (4.04-4.92)	**5.51** (4.99-6.10)	**6.30** (5.69-6.97)	**7.30** (6.58-8.08)	**8.04** (7.22-8.89)	**8.76** (7.84-9.70)	**9.47** (8.44-10.5)	**10.4** (9.20-11.6)	**11.1** (9.76-12.4)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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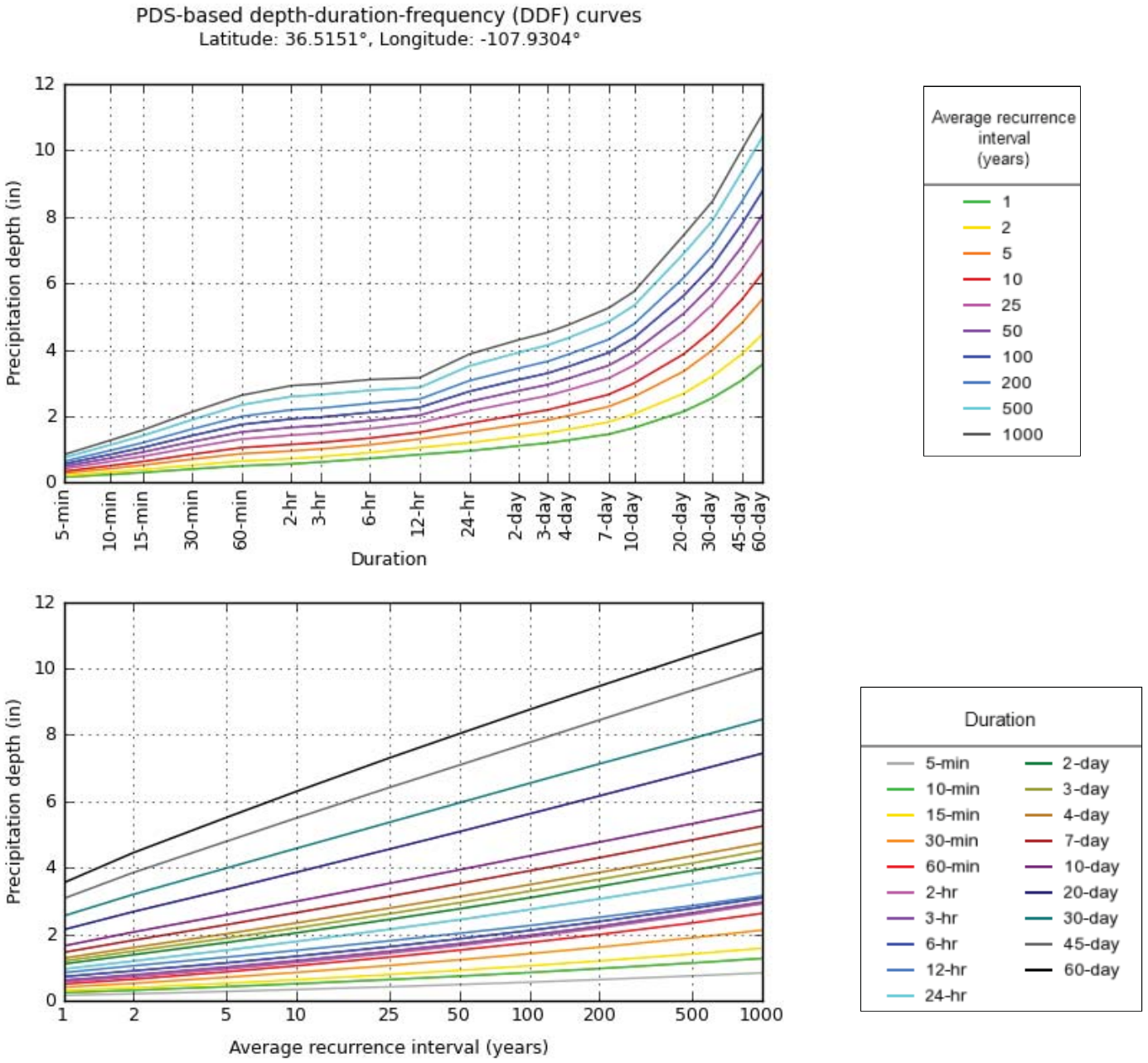
PF graphical



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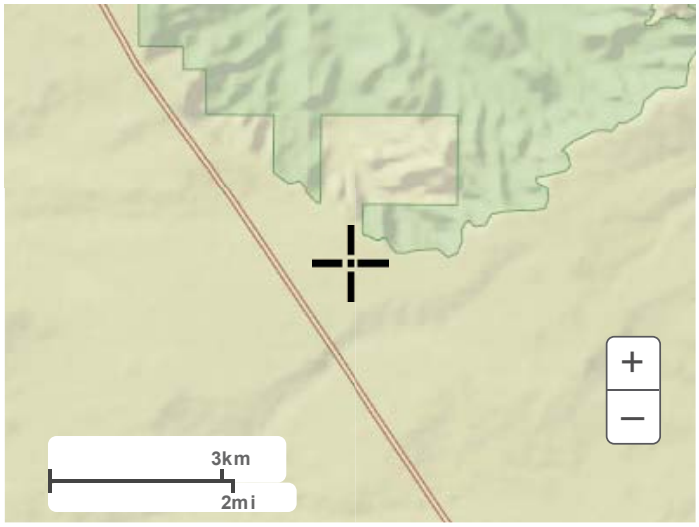
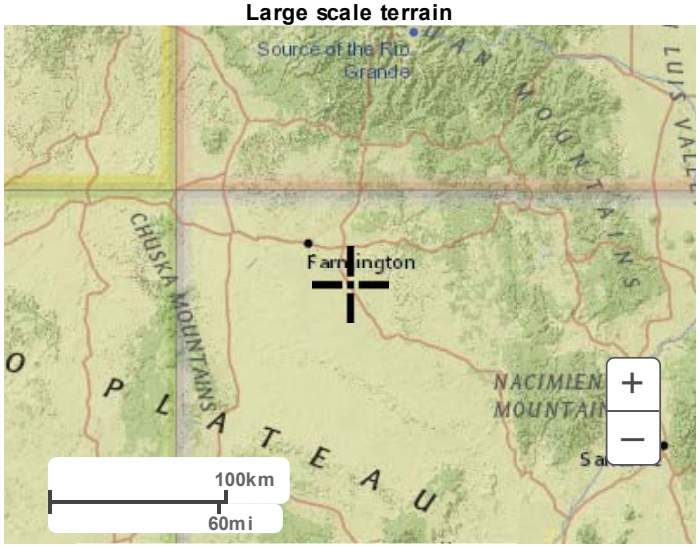
Maps & aerials

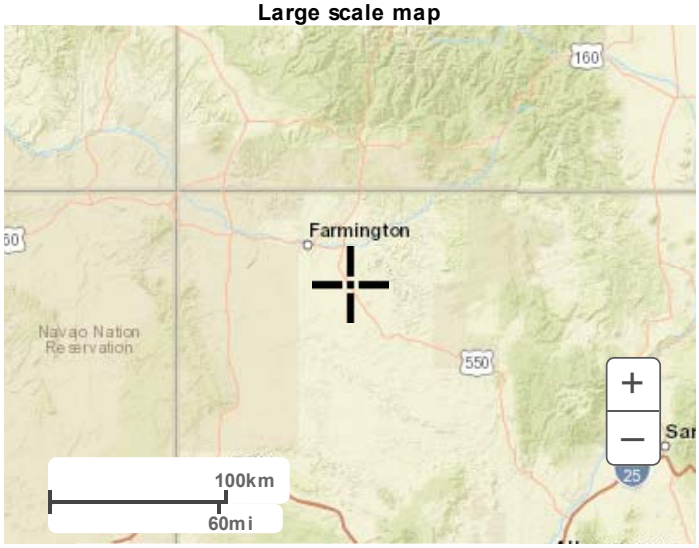
Small scale terrain



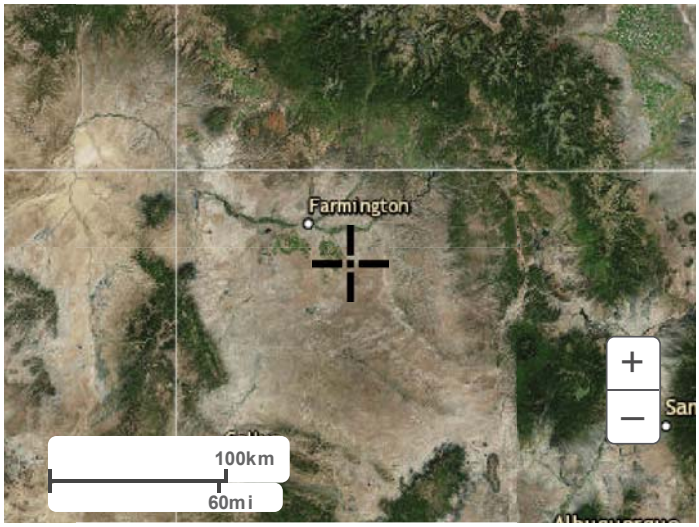
Large scale terrain



Large scale map



Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

Appendix B

Run-On Calculations & Background Information

	Average Recurrence Interval (years)									
Duration (D)	**1-yr**	**2-yr**	**5-yr**	**10-yr**	**25-yr**	**50-yr**	**100-yr**	**200-yr**	**500-yr**	**1000-yr**
	Precipitation, P (inches)									
5-min	0.16	0.2	0.28	0.33	0.41	0.48	0.56	0.63	0.74	0.83
10-min	0.24	0.31	0.42	0.51	0.63	0.73	0.84	0.96	1.13	1.27
15-min	0.3	0.39	0.52	0.63	0.78	0.91	1.05	1.19	1.4	1.57
30-min	0.4	0.52	0.7	0.85	1.05	1.23	1.41	1.61	1.89	2.12
60-min	0.5	0.64	0.87	1.05	1.31	1.52	1.75	1.99	2.34	2.62
2-hr	0.56	0.71	0.94	1.14	1.42	1.65	1.91	2.18	2.58	2.91
3-hr	0.61	0.77	1.01	1.2	1.48	1.71	1.96	2.23	2.64	2.96
6-hr	0.72	0.9	1.13	1.33	1.62	1.86	2.11	2.38	2.77	3.09
12-hr	0.84	1.05	1.3	1.51	1.79	2.02	2.25	2.5	2.85	3.15
24-hr	0.95	1.19	1.51	1.77	2.15	2.43	2.73	3.05	3.5	3.85
2-day	1.1	1.38	1.74	2.03	2.44	2.75	3.09	3.43	3.9	4.28
3-day	1.19	1.49	1.87	2.18	2.6	2.94	3.28	3.64	4.12	4.5
4-day	1.27	1.59	2	2.33	2.77	3.12	3.48	3.84	4.34	4.72
7-day	1.45	1.81	2.27	2.64	3.12	3.5	3.89	4.28	4.82	5.22
10-day	1.64	2.06	2.57	2.98	3.51	3.92	4.33	4.75	5.3	5.72
20-day	2.13	2.67	3.33	3.85	4.54	5.06	5.6	6.14	6.86	7.41
30-day	2.54	3.19	3.97	4.56	5.34	5.92	6.51	7.09	7.85	8.43
45-day	3.06	3.84	4.77	5.47	6.38	7.05	7.73	8.4	9.29	9.96
60-day	3.53	4.44	5.49	6.27	7.27	7.99	8.71	9.42	10.33	11.02

Data Sourc http://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=nm

Runon Curve Number Calculations

Land Use
Rangeland
Agricultural
Urban

Ground Cover	
Percent Impervious	0%
Type	desert brush
Density	50%

Hydrologic Condition
Poor
Fair
Good

Source: ***http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx***

Hydrologic Soil Group
A
B
C
D

Curve Number	**69**

from TR-55 table 2-2c

Time of Concentration (Tc) for South Basin

Upland Method (Use in watersheds less than 2000 acres and when using Rational Method or Simplified Peak Flow Method)

Sheet Flow	***Tt = 0.007*((nL)^0.8)/((P 2)^0.5)*(s^0.4))***		
n (Mannings Roughness)	0.13	Range	Table 3-1 TR-55
L (ft)	300		Must not exceed 300 feet
P_2 (2-yr 24-hr rainfall, inches)	1.19		From NOAA information
s (land slope ft/ft)	0.010		
T_{sheet} (hours)	0.758885		
T_{sheet} (minutes)	45.533		

Shallow Flow		
L (Flow length Ft)	1675	
Slope (ft/ft)	0.031045	
V (Average Velocity ft/s)	2.8	Figure 3-1 from TR-55 manual, use slope and cover unpaved vs paved to find velocity
$T_{shallow}$ (hours)	0.166171	
$T_{shallow}$ (minutes)	9.970238	

Channel Flow (Actual constructed Channel)	***NA***

Time of Concentration Tc (hour)	**0.925**	
Time of Concentration Tc (min)	**55.50**	***Use ten minutes as a default if it is less than 10 minutes***

South Basin SCS Runoff Curve Number Method

Design Frequency	25-yr

Drainage Area (acres)	20.1
Drainage Area (mi^2)	0.0314063

Time of Concentration (hours)	**0.925**

Curve Number	**69**

24-hour rainfall depth for design frequency (inches) P	2.15

Potential Maximum Retention after Runnoff begins (inches)

	S	4.49
Initial Abstraction I_a		0.90
I_a/P		0.42

qu, For Tc	**250.00**	Type II rainfall distribution qu from TR 55 Table 4-II

Direct Runnoff, Q (inches)	**0.27**
Peak Discharge (ft3/s)	**2.14**

Q=((Rainfall-2*S)^2)/(Rainfall+.8*S)
Chapter 2 TR-55
Qp = qu*A*Q

Runoff Volume, Qv (ac-ft)	**0.46**
Runoff Volume, Qv (cubic ft)	**19893**
Runoff Volume, Qv (gallons)	**148799**

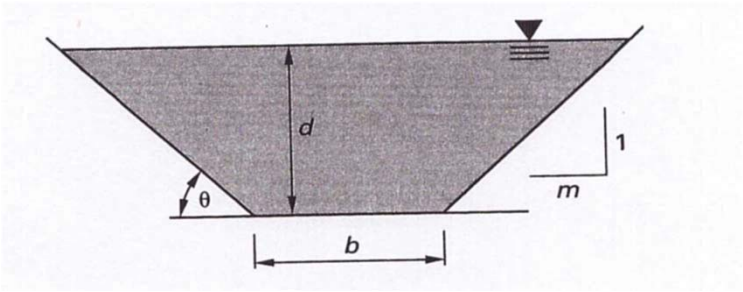
Trapezoidal Swale Capacity South Basin

Q(peak)	2.14	**cfs**	
Q(trap)	**8.105998**	**cfs**	**Capacity of Swale** ***Q(trap)=(K*b$^{8/3}$ * (Sqrt(So))/(n)***
So	0.03	**ft/ft**	***Try to construct swales with a minimum slope of 2%***
n	0.025		***Appendix 19.A CERM***
b	1	**ft**	
K	1.17		***Conveyance Factor, Appendix 19.F CERM***
m	1		
b/d	0.666667		
Ɵ	89.23292		1 radian = 57.2958 degrees

d	1.5	**ft**	**Flow Depth**

Velocity Check

Q(peak)	2.14	**cfs**
A	1.530125	***A=(b+(d/tan))d***
Tan	74.68904	
V	1.399026	**ft/s**



Time of Concentration (Tc) for East Basin

Upland Method (Use in watersheds less than 2000 acres and when using Rational Method or Simplified Peak Flow Method)

Sheet Flow	***Tt = 0.007*((nL)^0.8)/((P 2)^0.5)*(s^0.4))***		
n (Mannings Roughness)	0.13	Range	Table 3-1 TR-55
L (ft)	300		Must not exceed 300 feet
P_2 (2-yr 24-hr rainfall, inches)	1.19		From NOAA information
s (land slope ft/ft)	0.0166		
T_{sheet} (hours)	0.619631		
T_{sheet} (minutes)	37.178		

Shallow Flow		
L (Flow length Ft)	6259	
Slope (ft/ft)	0.018374	
V (Average Velocity ft/s)	2.2	Figure 3-1 from TR-55 manual, use slope and cover unpaved vs paved to find velocity
$T_{shallow}$ (hours)	0.790278	
$T_{shallow}$ (minutes)	47.41667	

Channel Flow (Actual constructed Channel)	***NA***

Time of Concentration Tc (hour)	**1.410**	
Time of Concentration Tc (min)	**84.59**	***Use ten minutes as a default if it is less than 10 minutes***

East Basin SCS Runoff Curve Number Method

Design Frequency	25-yr

Drainage Area (acres)	344
Drainage Area (mi^2)	0.5375

Time of Concentration (hours)	**1.410**

Curve Number	**69**

24-hour rainfall depth for design frequency (inches) P	2.15

Potential Maximum Retention after Runnoff begins (inches)

	S	4.49
Initial Abstraction I_a		0.90
I_a/P		0.42
qu, For Tc		**180.00**

Type II rainfall distribution qu from TR 55 Table 4-II

Direct Runnoff, Q (inches)	**0.27**
Peak Discharge (ft3/s)	**26.38**

Q=((Rainfall-2*S)^2)/(Rainfall+.8*S)
Chapter 2 TR-55
Qp = qu*A*Q

Runoff Volume, Qv (ac-ft)	**7.82**
Runoff Volume, Qv (cubic ft)	**340457**
Runoff Volume, Qv (gallons)	**2546616**

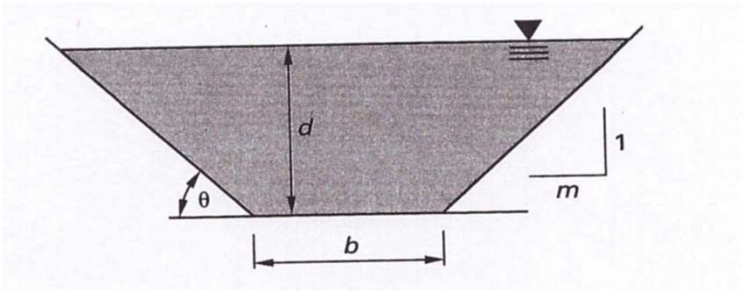
Trapezoidal Swale Capacity East Basin

Q(peak)	26.38	**cfs**	
Q(trap)	**42.02304**	**cfs**	**Capacity of Swale** ***Q(trap)=(K*b$^{8/3}$ * (Sqrt(So))/(n)***
So	0.02	**ft/ft**	***Try to construct swales with a minimum slope of 2%***
n	0.025		***Appendix 19.A CERM***
b	2	**ft**	
K	1.17		***Conveyance Factor, Appendix 19.F CERM***
m	2		
b/d	1		
ϴ	31.30084		1 radian = 57.2958 degrees

d	2	**ft**	**Flow Depth**

Velocity Check

Q(peak)	26.38	**cfs**
A	10.57863	***A=(b+(d/tan))d***
Tan	0.60803	
V	2.493552	**ft/s**



Time of Concentration (Tc) for Southeast Basin

Upland Method (Use in watersheds less than 2000 acres and when using Rational Method or Simplified Peak Flow Method)

Sheet Flow	***Tt = 0.007*((nL)^0.8)/((P 2)^0.5)*(s^0.4))***		
n (Mannings Roughness)	0.13	Range	Table 3-1 TR-55
L (ft)	300		Must not exceed 300 feet
P_2 (2-yr 24-hr rainfall, inches)	1.19		From NOAA information
s (land slope ft/ft)	0.0166		
T_{sheet} (hours)	0.619631		
T_{sheet} (minutes)	37.178		

Shallow Flow		
L (Flow length Ft)	1850	
Slope (ft/ft)	0.030811	
V (Average Velocity ft/s)	2.8	Figure 3-1 from TR-55 manual, use slope and cover unpaved vs paved to find velocity
$T_{shallow}$ (hours)	0.183532	
$T_{shallow}$ (minutes)	11.0119	

Channel Flow (Actual constructed Channel)	***NA***

Time of Concentration Tc (hour)	**0.803**	
Time of Concentration Tc (min)	**48.19**	***Use ten minutes as a default if it is less than 10 minutes***

Southeast SCS Runoff Curve Number Method

Design Frequency	25-yr

Drainage Area (acres)	39.8
Drainage Area (mi^2)	0.0621875

Time of Concentration (hours)	**0.803**

Curve Number	**69**

24-hour rainfall depth for design frequency (inches) P	2.15

Potential Maximum Retention after Runnoff begins (inches)

	S	4.49
Initial Abstraction I_a		0.90
I_a/P		0.42
qu, For Tc		**260.00**

Type II rainfall distribution qu from TR 55 Table 4-II

Direct Runnoff, Q (inches)	**0.27**
Peak Discharge (ft3/s)	**4.41**
Runoff Volume, Qv (ac-ft)	**0.90**
Runoff Volume, Qv (cubic ft)	**39390**
Runoff Volume, Qv (gallons)	**294638**

Q=((Rainfall-2*S)^2)/(Rainfall+.8*S)
Chapter 2 TR-55
Qp = qu*A*Q

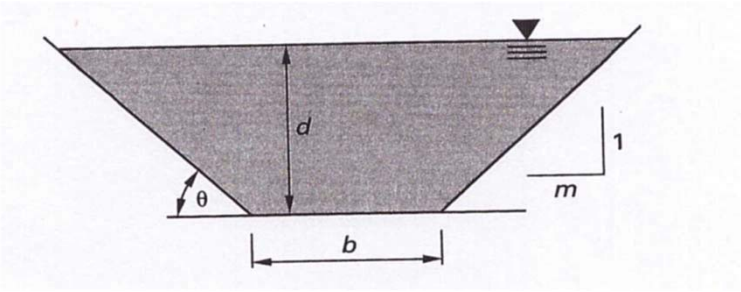
Trapezoidal Swale Capacity Southeast Basin

Q(peak)	4.41	**cfs**	
Q(trap)	**8.105998**	**cfs**	**Capacity of Swale** ***Q(trap)=(K*b$^{8/3}$ * (Sqrt(So))/(n)***
So	0.03	**ft/ft**	***Try to construct swales with a minimum slope of 2%***
n	0.025		***Appendix 19.A CERM***
b	1	**ft**	
K	1.17	***Conveyance Factor, Appendix 19.F CERM***	
m	2		
b/d	0.666667		
Ɵ	31.30084		1 radian = 57.2958 degrees

d	1.5	**ft**	**Flow Depth**

Velocity Check

Q(peak)	4.41	**cfs**
A	5.200478	***A=(b+(d/tan))d***
Tan	0.60803	
V	0.847676	**ft/s**



Appendix C

Run-Off Calculations & Background Information

	Average Recurrence Interval (years)									
Duration (D)	**1-yr**	**2-yr**	**5-yr**	**10-yr**	**25-yr**	**50-yr**	**100-yr**	**200-yr**	**500-yr**	**1000-yr**
	Precipitation, P (inches)									
5-min	0.16	0.2	0.28	0.33	0.41	0.48	0.56	0.63	0.74	0.83
10-min	0.24	0.31	0.42	0.51	0.63	0.73	0.84	0.96	1.13	1.27
15-min	0.3	0.39	0.52	0.63	0.78	0.91	1.05	1.19	1.4	1.57
30-min	0.4	0.52	0.7	0.85	1.05	1.23	1.41	1.61	1.89	2.12
60-min	0.5	0.64	0.87	1.05	1.31	1.52	1.75	1.99	2.34	2.62
2-hr	0.56	0.71	0.94	1.14	1.42	1.65	1.91	2.18	2.58	2.91
3-hr	0.61	0.77	1.01	1.2	1.48	1.71	1.96	2.23	2.64	2.96
6-hr	0.72	0.9	1.13	1.33	1.62	1.86	2.11	2.38	2.77	3.09
12-hr	0.84	1.05	1.3	1.51	1.79	2.02	2.25	2.5	2.85	3.15
24-hr	0.95	1.19	1.51	1.77	2.15	2.43	2.73	3.05	3.5	3.85
2-day	1.1	1.38	1.74	2.03	2.44	2.75	3.09	3.43	3.9	4.28
3-day	1.19	1.49	1.87	2.18	2.6	2.94	3.28	3.64	4.12	4.5
4-day	1.27	1.59	2	2.33	2.77	3.12	3.48	3.84	4.34	4.72
7-day	1.45	1.81	2.27	2.64	3.12	3.5	3.89	4.28	4.82	5.22
10-day	1.64	2.06	2.57	2.98	3.51	3.92	4.33	4.75	5.3	5.72
20-day	2.13	2.67	3.33	3.85	4.54	5.06	5.6	6.14	6.86	7.41
30-day	2.54	3.19	3.97	4.56	5.34	5.92	6.51	7.09	7.85	8.43
45-day	3.06	3.84	4.77	5.47	6.38	7.05	7.73	8.4	9.29	9.96
60-day	3.53	4.44	5.49	6.27	7.27	7.99	8.71	9.42	10.33	11.02

Data Sourc http://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=nm

Runoff Curve Number Calculations

Land Use
Rangeland
Agricultural
Urban

Ground Cover	
Percent Impervious	0%
Type	Contoured
Density	<50%

Hydrologic Condition
Poor
Fair
Good

Source: ***http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx***

Hydrologic Soil Group
A
B
C
D

Curve Number	75

from TR-55 table 2-2b

Time of Concentration (Tc) for Cell 1

Sheet Flow	*Tt = 0.007*((nL)^0.8)/((P $_2$)^0.5)*(s^0.4))*		
		Cultivated Soil	
n (Mannings Roughness)	0.06	<= 20% cover	Table 3-1 TR-55
L (ft)	300		Must not exceed 300 feet
P_2 (2-yr 24-hr rainfall, inches)	1.19		From NOAA information
s (land slope ft/ft)	0.0166		
T_{sheet} (hours)	0.33381		
T_{sheet} (minutes)	20.029		

Shallow Flow		
L (Flow length Ft)	900	
Slope (ft/ft)	0.011111	
V (Average Velocity ft/s)	1.6	Figure 3-1 from TR-55 manual, use slope and cover unpaved vs paved to find velocity
$T_{shallow}$ (hours)	0.15625	
$T_{shallow}$ (minutes)	9.375	

Channel Flow (Actual constructed Channel)	
	NA

Time of Concentration Tc (hour)	**0.490**	
Time of Concentration Tc (min)	**29.40**	***Use ten minutes as a default if it is less than 10 minutes***

Cell 1 SCS Runoff Curve Number Method

Design Frequency	25-yr

Drainage Area (acres)	7
Drainage Area (mi^2)	0.0109375

Time of Concentration (hours)	**0.490**

Curve Number	**75**

24-hour rainfall depth for design frequency (inches) P	2.15

Potential Maximum Retention after Runnoff begins (inches)

	S	3.33
Initial Abstraction I_a		0.67
I_a/P		0.31
qu, For Tc		**450.00**

Type II rainfall distribution qu from TR 55 Table 4-II

Direct Runnoff, Q (inches)	**0.46**
Peak Discharge (ft3/s)	**2.25**

Q=((Rainfall-2*S)^2)/(Rainfall+.8*S)
Chapter 2 TR-55
Qp = qu*A*Q

Runoff Volume, Qv (ac-ft)	**0.27**
Runoff Volume, Qv (cubic ft)	**11607**
Runoff Volume, Qv (gallons)	**86823**

Time of Concentration (Tc) for Cell 2

Sheet Flow	***Tt = 0.007*((nL)^0.8)/((P $_2$)^0.5)*(s^0.4))***		
		Cultivated Soil	
n (Mannings Roughness)	0.06	<= 20% cover	Table 3-1 TR-55
L (ft)	300		Must not exceed 300 feet
P_2 (2-yr 24-hr rainfall, inches)	1.19		From NOAA information
s (land slope ft/ft)	0.0166		
T_{sheet} (hours)	0.33381		
T_{sheet} (minutes)	20.029		

Shallow Flow		
L (Flow length Ft)	1041	
Slope (ft/ft)	0.013449	
V (Average Velocity ft/s)	1.6	Figure 3-1 from TR-55 manual, use slope and cover unpaved vs paved to find velocity
$T_{shallow}$ (hours)	0.180729	
$T_{shallow}$ (minutes)	10.84375	

Channel Flow (Actual constructed Channel)	***NA***

Time of Concentration Tc (hour)	**0.515**	
Time of Concentration Tc (min)	**30.87**	***Use ten minutes as a default if it is less than 10 minutes***

Cell 2 SCS Runoff Curve Number Method

Design Frequency	25-yr

Drainage Area (acres)	8.3
Drainage Area (mi^2)	0.0129688

Time of Concentration (hours)	**0.515**

Curve Number	**75**

24-hour rainfall depth for design frequency (inches) P	2.15

Potential Maximum Retention after Runnoff begins (inches)

	S	3.33
Initial Abstraction I_a		0.67
I_a/P		0.31
qu, For Tc		**450.00**

Type II rainfall distribution qu from TR 55 Table 4-II

Direct Runnoff, Q (inches)	**0.46**
Peak Discharge (ft3/s)	**2.67**

Q=((Rainfall-2*S)^2)/(Rainfall+.8*S)
Chapter 2 TR-55
Qp = qu*A*Q

Runoff Volume, Qv (ac-ft)	**0.32**
Runoff Volume, Qv (cubic ft)	**13763**
Runoff Volume, Qv (gallons)	**102948**

Time of Concentration (Tc) for Cells 3-4

Sheet Flow	*Tt = 0.007*((nL)^0.8)/((P $_2$)^0.5)*(s^0.4))*		
		Cultivated Soil	
n (Mannings Roughness)	0.06	<= 20% cover	Table 3-1 TR-55
L (ft)	300		Must not exceed 300 feet
P_2 (2-yr 24-hr rainfall, inches)	1.19		From NOAA information
s (land slope ft/ft)	0.0166		
T_{sheet} (hours)	0.33381		
T_{sheet} (minutes)	20.029		

Shallow Flow		
L (Flow length Ft)	1630	
Slope (ft/ft)	0.01227	
V (Average Velocity ft/s)	1.6	Figure 3-1 from TR-55 manual, use slope and cover unpaved vs paved to find velocity
$T_{shallow}$ (hours)	0.282986	
$T_{shallow}$ (minutes)	16.97917	

Channel Flow (Actual constructed Channel)	***NA***

Time of Concentration Tc (hour)	**0.617**	
Time of Concentration Tc (min)	**37.01**	***Use ten minutes as a default if it is less than 10 minutes***

Cells 3-4 SCS Runoff Curve Number Method

Design Frequency	25-yr

Drainage Area (acres)	9.5
Drainage Area (mi^2)	0.0148438

Time of Concentration (hours)	**0.617**

Curve Number	**75**

24-hour rainfall depth for design frequency (inches) P	2.15

Potential Maximum Retention after Runnoff begins (inches)

	S	3.33
Initial Abstraction I_a		0.67
I_a/P		0.31
qu, For Tc		**375.00**

Type II rainfall distribution qu from TR 55 Table 4-II

Direct Runnoff, Q (inches)	**0.46**
Peak Discharge (ft3/s)	**2.54**

Q=((Rainfall-2*S)^2)/(Rainfall+.8*S)
Chapter 2 TR-55
Qp = qu*A*Q

Runoff Volume, Qv (ac-ft)	**0.36**
Runoff Volume, Qv (cubic ft)	**15753**
Runoff Volume, Qv (gallons)	**117832**

Time of Concentration (Tc) for Cells 5-15

Sheet Flow	*Tt = 0.007*((nL)^0.8)/((P $_2$)^0.5)*(s^0.4))*		
		Cultivated Soil	
n (Mannings Roughness)	0.06	<= 20% cover	Table 3-1 TR-55
L (ft)	300		Must not exceed 300 feet
P_2 (2-yr 24-hr rainfall, inches)	1.19		From NOAA information
s (land slope ft/ft)	0.0166		
T_{sheet} (hours)	0.33381		
T_{sheet} (minutes)	20.029		

Shallow Flow		
L (Flow length Ft)	1630	
Slope (ft/ft)	0.01227	
V (Average Velocity ft/s)	1.6	Figure 3-1 from TR-55 manual, use slope and cover unpaved vs paved to find velocity
$T_{shallow}$ (hours)	0.282986	
$T_{shallow}$ (minutes)	16.97917	

Channel Flow (Actual constructed Channel)	***NA***

Time of Concentration Tc (hour)	**0.617**	
Time of Concentration Tc (min)	**37.01**	***Use ten minutes as a default if it is less than 10 minutes***

Cells 5-15 SCS Runoff Curve Number Method

Design Frequency	25-yr

Drainage Area (acres)	10
Drainage Area (mi^2)	0.015625

Time of Concentration (hours)	**0.617**

Curve Number	**75**

24-hour rainfall depth for design frequency (inches) P	2.15

Potential Maximum Retention after Runnoff begins (inches)

	S	3.33
Initial Abstraction I_a		0.67
I_a/P		0.31
qu, For Tc		**375.00**

Type II rainfall distribution qu from TR 55 Table 4-II

Direct Runnoff, Q (inches)	**0.46**
Peak Discharge (ft3/s)	**2.68**

Q=((Rainfall-2*S)^2)/(Rainfall+.8*S)
Chapter 2 TR-55
Qp = qu*A*Q

Runoff Volume, Qv (ac-ft)	**0.38**
Runoff Volume, Qv (cubic ft)	**16582**
Runoff Volume, Qv (gallons)	**124034**

Time of Concentration (Tc) for Cells 16-19

Sheet Flow	*Tt = 0.007*((nL)^0.8)/((P $_2$)^0.5)*(s^0.4))*		
		Cultivated Soil	
n (Mannings Roughness)	0.06	<= 20% cover	Table 3-1 TR-55
L (ft)	300		Must not exceed 300 feet
P_2 (2-yr 24-hr rainfall, inches)	1.19		From NOAA information
s (land slope ft/ft)	0.0166		
T_{sheet} (hours)	0.33381		
T_{sheet} (minutes)	20.029		

Shallow Flow		
L (Flow length Ft)	800	
Slope (ft/ft)	0.035	
V (Average Velocity ft/s)	3	Figure 3-1 from TR-55 manual, use slope and cover unpaved vs paved to find velocity
$T_{shallow}$ (hours)	0.074074	
$T_{shallow}$ (minutes)	4.444444	

Channel Flow (Actual constructed Channel)	***NA***

Time of Concentration Tc (hour)	**0.408**	
Time of Concentration Tc (min)	**24.47**	***Use ten minutes as a default if it is less than 10 minutes***

Cell 16-19 SCS Runoff Curve Number Method

Design Frequency	25-yr

Drainage Area (acres)	10
Drainage Area (mi^2)	0.015625

Time of Concentration (hours)	**0.408**

Curve Number	**75**

24-hour rainfall depth for design frequency (inches) P	2.15

Potential Maximum Retention after Runnoff begins (inches)

	S	3.33
Initial Abstraction I_a		0.67
I_a/P		0.31

qu, For Tc	**500.00**	Type II rainfall distribution qu from TR 55 Table 4-II

Direct Runnoff, Q (inches)	**0.46**

Q=((Rainfall-2*S)^2)/(Rainfall+.8*S)
Chapter 2 TR-55

Peak Discharge (ft3/s)	**3.57**

Qp = qu*A*Q

Runoff Volume, Qv (ac-ft)	**0.38**
Runoff Volume, Qv (cubic ft)	**16582**
Runoff Volume, Qv (gallons)	**124034**

Time of Concentration (Tc) for Cells 20-21

Sheet Flow	***Tt = 0.007*((nL)^0.8)/((P $_2$)^0.5)*(s^0.4))***		
		Cultivated Soil	
n (Mannings Roughness)	0.06	<= 20% cover	Table 3-1 TR-55
L (ft)	300		Must not exceed 300 feet
P_2 (2-yr 24-hr rainfall, inches)	1.19		From NOAA information
s (land slope ft/ft)	0.0166		
T_{sheet} (hours)	0.33381		
T_{sheet} (minutes)	20.029		

Shallow Flow		
L (Flow length Ft)	1720	
Slope (ft/ft)	0.011628	
V (Average Velocity ft/s)	1.6	Figure 3-1 from TR-55 manual, use slope and cover unpaved vs paved to find velocity
$T_{shallow}$ (hours)	0.298611	
$T_{shallow}$ (minutes)	17.91667	

Channel Flow (Actual constructed Channel)	***NA***

Time of Concentration Tc (hour)	**0.632**	
Time of Concentration Tc (min)	**37.95**	***Use ten minutes as a default if it is less than 10 minutes***

Cells 20-21SCS Runoff Curve Number Method

Design Frequency	25-yr

Drainage Area (acres)	9.8
Drainage Area (mi^2)	0.0153125

Time of Concentration (hours)	**0.632**

Curve Number	**75**

24-hour rainfall depth for design frequency (inches) P	2.15

Potential Maximum Retention after Runnoff begins (inches)

	S	3.33
Initial Abstraction I_a		0.67
I_a/P		0.31
qu, For Tc		**375.00**

Type II rainfall distribution qu from TR 55 Table 4-II

Direct Runnoff, Q (inches)	**0.46**
Peak Discharge (ft3/s)	**2.62**

Q=((Rainfall-2*S)^2)/(Rainfall+.8*S)
Chapter 2 TR-55
Qp = qu*A*Q

Runoff Volume, Qv (ac-ft)	**0.37**
Runoff Volume, Qv (cubic ft)	**16250**
Runoff Volume, Qv (gallons)	**121553**

Time of Concentration (Tc) for Cells 22-23

Sheet Flow	***Tt = 0.007*((nL)^0.8)/((P $_2$)^0.5)*(s^0.4))***		
		Cultivated Soil	
n (Mannings Roughness)	0.06	<= 20% cover	Table 3-1 TR-55
L (ft)	300		Must not exceed 300 feet
P_2 (2-yr 24-hr rainfall, inches)	1.19		From NOAA information
s (land slope ft/ft)	0.0166		
T_{sheet} (hours)	0.33381		
T_{sheet} (minutes)	20.029		

Shallow Flow		
L (Flow length Ft)	907	
Slope (ft/ft)	0.044101	
V (Average Velocity ft/s)	3.4	Figure 3-1 from TR-55 manual, use slope and cover unpaved vs paved to find velocity
$T_{shallow}$ (hours)	0.074101	
$T_{shallow}$ (minutes)	4.446078	

Channel Flow (Actual constructed Channel)	***NA***

Time of Concentration Tc (hour)	**0.408**	
Time of Concentration Tc (min)	**24.47**	***Use ten minutes as a default if it is less than 10 minutes***

Cells 22-23 SCS Runoff Curve Number Method

Design Frequency	25-yr

Drainage Area (acres)	9.2
Drainage Area (mi^2)	0.014375

Time of Concentration (hours)	**0.408**

Curve Number	**75**

24-hour rainfall depth for design frequency (inches) P	2.15

Potential Maximum Retention after Runnoff begins (inches)

	S	3.33
Initial Abstraction I_a		0.67
I_a/P		0.31
qu, For Tc		**500.00**

Type II rainfall distribution qu from TR 55 Table 4-II

Direct Runnoff, Q (inches)	**0.46**
Peak Discharge (ft3/s)	**3.28**

Q=((Rainfall-2*S)^2)/(Rainfall+.8*S)
Chapter 2 TR-55
Qp = qu*A*Q

Runoff Volume, Qv (ac-ft)	**0.35**
Runoff Volume, Qv (cubic ft)	**15255**
Runoff Volume, Qv (gallons)	**114111**

Appendix D

Inspection Sheet

Landfarm Quarterly Inspection Form

Inspection Performed By: _____Date of Inspection:_____

	Yes	No	Comments
Landfarm Sign			
Visible			
Repairs Needed			

Fences/Gates	Good	Needs work	Repairs Needed/Cells
Condition			
Gate function			
Gate Lock			

Berms	Good	Needs work	Repairs Needed/Cells
Exterior Berm and Swale			
Cell Berms			

Weather	**Yes**	**No**	**Comments/Location**
Rain, Wind, or Snow Since Last Inspection			
Any Ponding Water			
Evidence of Wind Erosion			
Date of last Rain event _____			

Other	Yes	No	Comments/Location
Received Material Has Been Spread			
Is there any Trash in Cells			

Note: This form can be used as the post rain and wind event form as well

Attachment #12

Best Management Practices Plan

June 2019

TABLE OF CONTENTS

1. Introduction

The purpose of this Best Management Practices Plan (BMP) is to outline practices that will be follow in order to protect human health, fresh water and the environment. Envirotech is committed to ensure our activities are conducted in a manner the protects the environment while preventing waste of resources and minimizing waste.

2. Runon and Runoff Management

Envirotech has developed a runon and runoff management plan that is presented in as attachment 11 of this application. Based on the calculations the 3' berm and swale design on the east and southern portions on the Facility boundary are adequate to redirect all runon around the Landfarm 4 facility. Storm water on the north and west sides of the proposed Landfarm facility flow away from the facility boundary and are therefor not taken into account. As an added measure the entire facility boundary will have a at a minimum 3' high berm inside the perimeter fence line.

Each 10-acre Landfarm cell which will contain soils for remediation will also be surrounded with a 2' high berm which is adequate to contain the 25-year 24-hour storm event. This will also prevent any cross contamination and will not allow runon and runoff to mix.

In addition to the cell berms the pipeline crossings and great north road will also be protected by berms. There will be a 3' berm place on the east and west sides on the great north road ROW and each pipeline ROW (40') will have a 2' high berm. The farmable area the boarders both County roads (CR 7175 and 7225) will be protected with a 3' high berm inside the fence line.

Prior to placing contaminated soils in each cell Envirotech will attempt to make the cells as level as possible to prevent the drainage of runoff from gathering in specific areas along the berms. This will spread the water distribution around the cell and prevent larger areas of infiltration and also prevent certain areas of the 2' containment berm from being compromised by large flows. In areas where leveling is not feasible Envirotech will utilize contour farming which is a proven technique to farm on sloped land. This technique will prevent erosion and allow water to collect in the furrows.

Any water that collects in cell areas post rain event will be removed within 24 hours and sent to a permitted disposal facility capable of handling the contaminated water. Envirotech also has a maintenance and inspection plan for inspection after a rain event that causes ponding. This inspection will allow Envirotech personnel to inspect berms for erosion and weak points as well as assess the condition and effectiveness of the berm and swale system that is preventing the runon.

3. Groundwater Protection

Groundwater at Envirotech's proposed Landfarm #4 facility is greater than 100 feet below the lowest elevation within the farmable area. Envirotech will insure groundwater protection through the required semi-annual vadose zone sampling. Vadose zone samples will be compared to the native background concentrations presented in Attachment 6. As long as the contaminated of concern are within the concentrations established by statistical analysis this will prove that migration of contaminates is not occurring and therefor groundwater is being protected.

4. Landfarm #4 Emergency Equipment

The fire extinguisher is a type 20 lb ABC extinguisher and can be used for small fires up to 120 ft^2. In addition, the same type of fire extinguisher is located in each Envirotech vehicle and equipment. The air horn is located in the Landfarm #4 field office; this will be used to initiate evacuation from Landfarm #4.

The spill kit is located at the Landfarm #4 field office. The kit includes the following oil absorbent booms and pads. These items are used for spill containment and or clean up. These items will aid in containing small spills of equipment fluids such as failed hydraulic lines or motor oil spills from equipment failures. These spills are small in nature an usually do not exceed 5-10 gallons.

5. Conclusion

This Best Management Practices plan should be referenced in order to minimize hazards that may occur at Envirotech's Landfarm #4 to fresh water, public health, safety or the environment from as it relates to runon and runoff as well as small spills that may occur due to onsite mobile equipment failure.

Attachment #13

This serves to prove that Envirotech's proposed Landfarm facility complies with the siting requirements set forth in 19.15.36.13 (A) and (B)

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.*

This section is not applicable since Envirotech is not applying for a Landfill permit.

(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.*

Attachment 14 Hydrogeologic descriptions shows that the boring drilled in 2008, 2009, 2014 and 2019 were drilled to depths of 100 feet or greater is various portions of the proposed Landfarm facility and no groundwater was encountered.

(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.*

Attachment 14 Hydrogeologic descriptions shows that the boring drilled in 2008, 2009, 2014 and 2019 were drilled to depths of 100 feet or greater is various portions of the proposed Landfarm facility and no groundwater was encountered.

(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.*

Envirotech is not applying for a small landfarm.

(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.*

Attachment 14 Hydrogeologic descriptions shows that the boring drilled in 2008, 2014 and 2019 were drilled to depths of 100 feet or greater is various portions of the proposed Landfarm facility and no groundwater was encountered.

B. *No surface waste management facility shall be located:*

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

There is one (1) un-named water course that transected the southern portion of the Landfarm facility boundary. The water course enters on the east side near CR 7225 and flows west/southwest across the facility and exits the facility at the Highway 550 ROW where it travels under the road via a culvert. Envirotech has placed a buffer of 200' from the edge of the bank of the wash to the boundary of the farmable area see Figure 4C – Cell Diagram.

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

See Attachment 6, Figure 6B – FEMA Floodplain map and Attachment 2, Figure 3 for the well head protection zone

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

see Attachment 6, Figure 6D and supporting documentation from the US Army Corps of Engineers presented as supplemental information to Figure 6D. The USACE did not notate any wetlands in the proposed area.

(4) *within the area overlying a subsurface mine;*

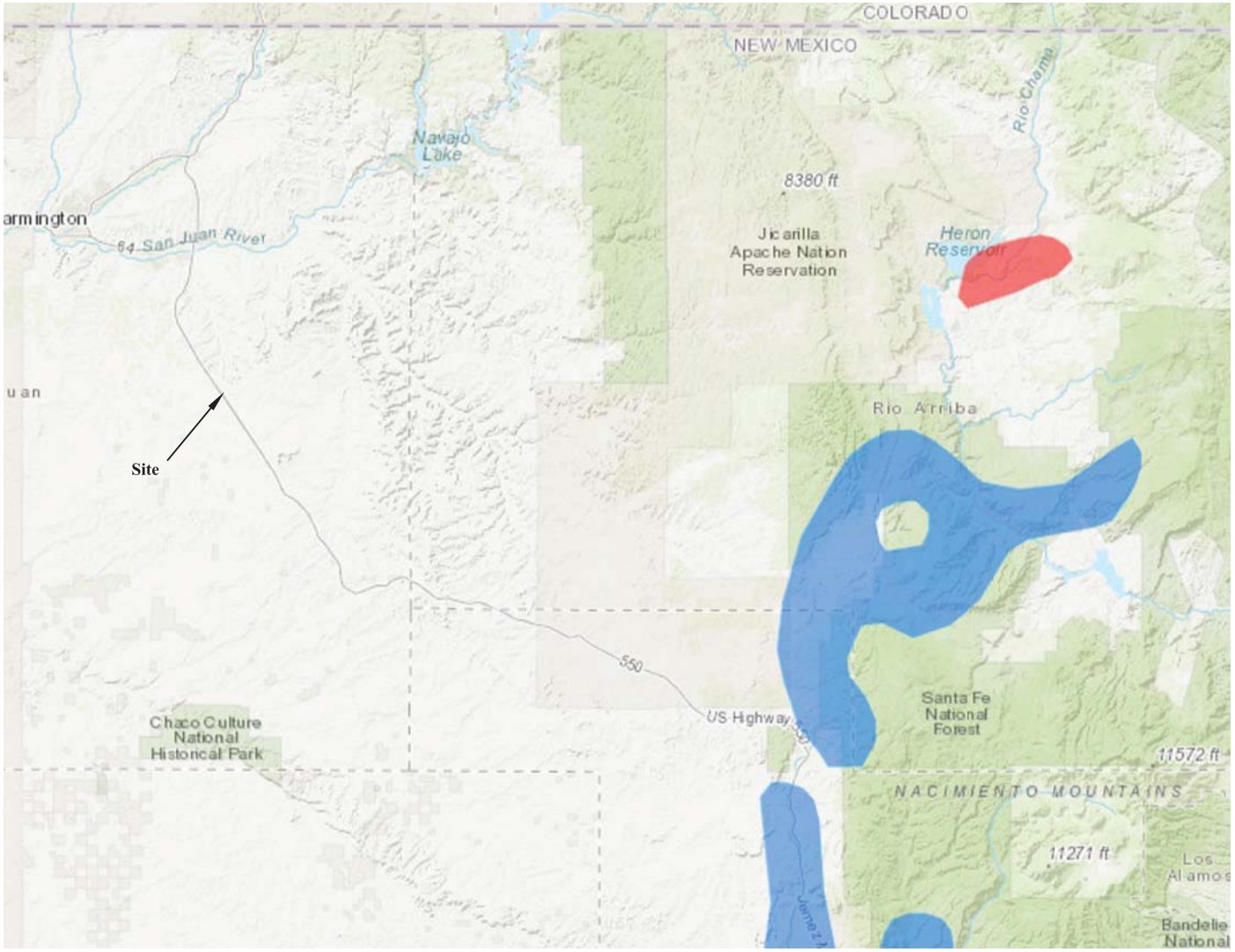
See figure 6E in Attachment 6 for the active mines in San Juan county. There are no mines illustrated within approximately 10 miles of the facility.

(5) *within 500 feet from the nearest permanent residence, school, hospital, institution or church in existence at the time of initial application; or*

The nearest occupied building or occupied structure is the Hilltop gas station located 2.4 miles straight-line distance to the north west. The nearest known homes are located approximately 3.8 miles to the southwest of the facility. See figure 8A of the H2S Plan which shows there are no occupied structures within 3000 feet of the facility boundary.

(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.*

See Figure 13A of this attachment which shows there are no Karst (unstable areas) near the proposed facility.



LEGEND

VOLCANIC

CARBONATE

USGS_KARST_AREAS
ENVIROTECH
LANDFARM_4
HILLTOP,NM
Facility Number: LF4

FIGURE NUMBER: FIGURE_13A	MAP DRAWN: GWC 6/12/19
PROJECT NUMBER: LANDAFRM_4	REVISIONS
MAP SCALE: 1"= _	
WORKPLAN ID: N/A	
DELIVERABLE ID: N/A	

NO.	DATE	BY	DESCRIPTION
1			//
2			//
3			//

envirotech
ENVIRONMENTAL SCIENTISTS & ENGINEERS
5796 U.S. HIGHWAY 64
Farmington, New Mexico 87401
505.632.0615

Attachment #14

Hydro-Geological Data

June 2019

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Appendices:

Figures:

1. Introduction

The following report discusses the shallowest freshwater aquifer, formation, and soils on Envirotech Inc.'s (Envirotech's) Landfarm #4. Data discussed below was obtained using iWaters, Soil Survey, and actual on-site investigation completed in 2008, 2009, 2014 and most recently in June 2019.

2. Surface Water

The following section discusses surface water located within a one-mile perimeter of Landfarm #4 surveyed boundary per NMAC 19.15.36.8 (C) 15a. In addition, there is a brief discussion of distance of surface waters from Landfarm #4 farmable boundary, per NMAC 19.15.36.13 (B) paragraph 1.

2.1. Streams and Springs

There are two ephemeral washes and one unnamed pond, within the one-mile perimeter of Landfarm #4 surveyed boundary. One ephemeral wash is located to the northeast of Landfarm #4, it is a tributary to the San Juan River, the second ephemeral wash is located in the southern portion of Landfarm #4 surveyed boundary and is a tributary to the Gallegos Canyon Wash. The unnamed pond is located off the southeastern tip of Landfarm #4 surveyed boundary; *see* ***Figure 14a, Surface Water Locations***. The San Juan River tributary has a mean annual flow of 0.7 feet per second (fps), the Gallegos Canyon River tributary has a mean annual flow of 0.8 fps, no information was found for the unnamed pond; *see* ***Appendix A, Surface Water and Well information***.

The San Juan River tributary located northeast of Lanfarm #4, is approximately 2,839 feet from the northeast point of Landfarm #4 farmable area. The un-named tributary transects the southern portion of the proposed Landfarm facility from east to west. Envirotech has established a minimum of 200-foot buffer on each side of the tributary bank as a required set back. The unnamed pond is approximately 380 feet from the southeast point of Landfarm #4 farmable area and located hydraulically upgradient; *see* ***Figure 14a, Surface Water Locations.***

3. Fresh Water Aquifer

The following section discusses the information gathered from onsite investigation during the 2008, 2009, 2014 and 2019 drilling events, a comprehensive search completed on the New Mexico Office of the State Engineer's New Mexico Water Rights Reporting System database (iWaters) and New Mexico Oil Conservation District Website (NMOCD).

3.1. Site Specific Groundwater Investigation

There was a total of five (5) borings drilled at Landfarm #4, in order to investigate the subsurface of Landfarm #4. Four of the five boring holes were drilled to a depth of 100 ft or greater in order to satisfy requirement 19.15.36.13 (A) 1 through 5. The four boring holes were drilled on the following dates Soil Boring #1; total depth, 100 ft on September 2nd and 4th in 2008, Soil Boring #2; total depth, 100 ft on March 9th and 10th in 2009 and Soil Boring #4, total depth of 110 ft on November 19, 2014; *see* ***Figure 14b, Boring Locations***.

Soil boring #1 was drilled within the northern portion of Landfarm #4, near the Great North Road right of way (ROW); *see* ***Figure 14b, Boring Locations***. Soil boring #1 was drilled to 100 ft on September 2, 2008 and left open until September 4, 2008 to allow for any groundwater to accumulate. No groundwater was encountered during drilling and no groundwater accumulated in Soil Boring #1; *see* ***Appendix B, Soil Boring Lithology Logs***.

Soil boring #2 was drilled in the southwest portion of Landfarm #4; *see* ***Figure 14b, Boring Locations***. Soil boring #2 was drilled to a depth of 80 ft on March 9, 2009 before a broken drill bit halted drilling activity. Drilling of Soil boring #2 continued on March 10, 2009 to the depth of 100 ft. No groundwater was encountered during drilling of Soil boring #2; *see* ***Appendix B, Soil Boring Lithology Logs***.

Soil boring #4 was drilled in the southern portion of Landfarm #4; *see* ***Figure 14b, Boring Locations***. Soil boring #4 was drilled to a depth of 110 ft on November 19, 2014; *see* ***Appendix B, Soil Boring Lithology Logs***.

3.2. Water Wells

Due to the limited information gathered from the onsite subsurface investigations an in-depth search on iWaters was completed, a 10-kilometer radius was used. A total of eleven wells were found in the search. A total of five wells with log data were found; SJ01626, SJ02734, SJ00032, SJ00033 and SJ00034. A total of six wells without log data were found; SJ00077, SJ01206, SJ00193, SJ02377, SJ00194 and SJ03918 POD1. Eight of the eleven wells were used to determine the average depth to water; SJ00077, SJ01626, SJ00193, SJ02734, SJ00194, SJ00032, SJ00033 and SJ00034. The average depth to water was determined to be 306 ft below ground surface (bgs); *see* ***Appendix A, Surface Water and Well information***.

None of the water wells found in the in-depth search were within Landfarm #4 surveyed boundary; therefore this information gave an overall average depth to groundwater of the area. The closest well, SJ00077 was 1.14 miles northwest of Landfarm #4, with a depth of groundwater of 550 feet; *see* ***Figure 14c, Water and Cathodic Well Locations***.

3.3. Cathodic Wells

Since none of the water wells were within one mile of Landfarm #4 surveyed boundary a cathodic well search was completed. Two cathodic wells were found: Huerfano Unit #68 and Huerfano Unit #270. The Huerfano Unit #68 is approximately 89 feet (0.017 miles) west of the west boundary of Landfarm #4 and the Huerfano Unit #270 is approximately 3,414 feet (0.65 miles) southwest of the southwest corner of Landfarm#4; *see* ***Figure 14c, Water and Cathodic Well Locations***. The Huerfano Unit #68 data sheet indicates water was reached at 275 feet and the Huerfano Unit #270 indicates fresh water was reached at 140 feet; *see* ***Appendix A, Surface Water and Well information***.

3.4. Summary of Findings

The estimated depth to groundwater was determined by finding the lowest surface elevation within the farmable area of Landfarm #4 from the survey information and comparing that elevation to the cathodic well information from the Huerfano Unit #68. This is the most accurate information since none of the soil boring within the facility boundary encountered groundwater. The lowest surface elevation in the farmable area was determined to be 6494 feet. The surface elevation of the Huerfano Unit #68 cathodic well was 6535 feet. Based on the cathodic well information obtained for the Huerfano Unit #68, groundwater was encountered at 275 feet bgs. Based on this information and lack of groundwater found in the Landfarm #4 site investigation, it is believed that groundwater is approximately 234 feet bgs or approximately at an elevation of 6260 feet.

4. Soils

The following section discusses soil information gathered from a site-specific investigation completed during the October/November, 2014 drilling event and data gathered from United States Department of Agriculture Web Soil Survey website (Web Soil Survey).

4.1. Web Soil Survey Information

Based on the Web Soil Survey, there are a total of four different soil types within the Landfarm #4 surveyed boundary; *see* ***Figure 14d, Web Soil Survey Map***. These soils are; Sheppard-Mayqueen (31.2%), Doak-Sheppard (33.7%), Blancot-notal (30.1%) and Fruitland-Persayo (4.9%).

4.2. Site Specific Soil Investigation

There was a total of five (5) borings drilled at Landfarm #4, field notes were taken for all soil borings, in order to obtain general information regarding subsurface soil information. One of the five soil borings, Soil Boring #4 was drilled to a total depth of 110 and several samples were collected from 3.0 to 7.5 feet bgs in order to satisfy requirement 19.15.36.8 (g), determining porosity, permeability, conductivity, compaction ratios and swelling characteristics of the soil; *see* ***Appendix B, Soil Boring #4 Data***. The remaining boring holes were drilled on the following dates Soil Boring #1; total depth, 100 ft on September

2nd and 4th in 2008, Soil Boring #2; total depth, 100 ft on March 9th and 10th in 2009 and Soil Boring #4 was completed to a total depth of 105 ft on November 19, 2014; *see* ***Figure 14b, Boring Locations*** and ***Appendix B, Soil Boring Lithology Logs***. Soil bring 5 was drilled to a depth of 105 feet in the lowest elevation within the farmable are on June 26-27, 2019. The purpose of this boring was to prove groundwater in deeper than 100 feet blow the proposed facility and to provide information to complete a geologic cross section of the soils across the facility.

5. Summary of Findings

Based on the information obtained from web soil survey, all four soil types that make up Landfarm #4 are derived from sandstone and shale, are excessive to well drained soils with moderate to low available water capacity. Based on the completed lithology logs, the northern portion of Landfarm #4 consists of fine sandy loam which turns to clay which overlays a thick layer of mudstone. The southern portion of Landfarm #4 consists of sandy-loam overlaying a thick layer of dense shale.

6. Formation

Landfarm #4 is located above the Nacimiento Formation (Tn), which is Paleocene in age and outcrops in a broad bans inside the southern and western boundaries of the central basin.

6.1. Depth

Based on Drilling Envirotech has conducted within the facility boundary the depth of the fresh water aquifer is greater than 100 feet below the lowest elevation of the farmable area. The closest cathodic well (Huerfano 68) lists groundwater at 275 feet bgs. Based on the surface elevation change and the lowest point in Landfarm #4 farmable area it is estimated that groundwater could be encountered at approximately 234 feet bgs.

6.2. Type

The Nacimiento formation is a heterogenous non-marine formation comprised of sandstone, shale and siltstone.

6.3. Thickness

Research suggests that the Nacimiento formation ranges from 500 to 1300 feet thick. This information was obtained U.S Geological Survey Professional Paper 1420.

7. Soil Types Below the Surface Waste Management Facility

All soil borings that have been drilled at the proposed Landfarm 4 facility have shown fairly consistent results as far as soil types encountered. The first 10 feet show silty sands which gives way to more of a clayey soil from 10 to 20 bgs. After 20 feet it turns to a hard Mudstone with interbedded sandstone layers. Shale layers were noted as shallow as 15 feet in Soil boring 2 and occurred slightly deeper in soil boring 4 on the southern end of Landfarm 4. All four (4) of the borings that were drilled to depths of 100 feet or

greater showed competent layers of bedrock that is approximately 75 feet in thickness; see ***Figure 11E: Geologic Cross Section and Appendix B, Soil Boring Lithology Logs***

8. Geologic Cross Section

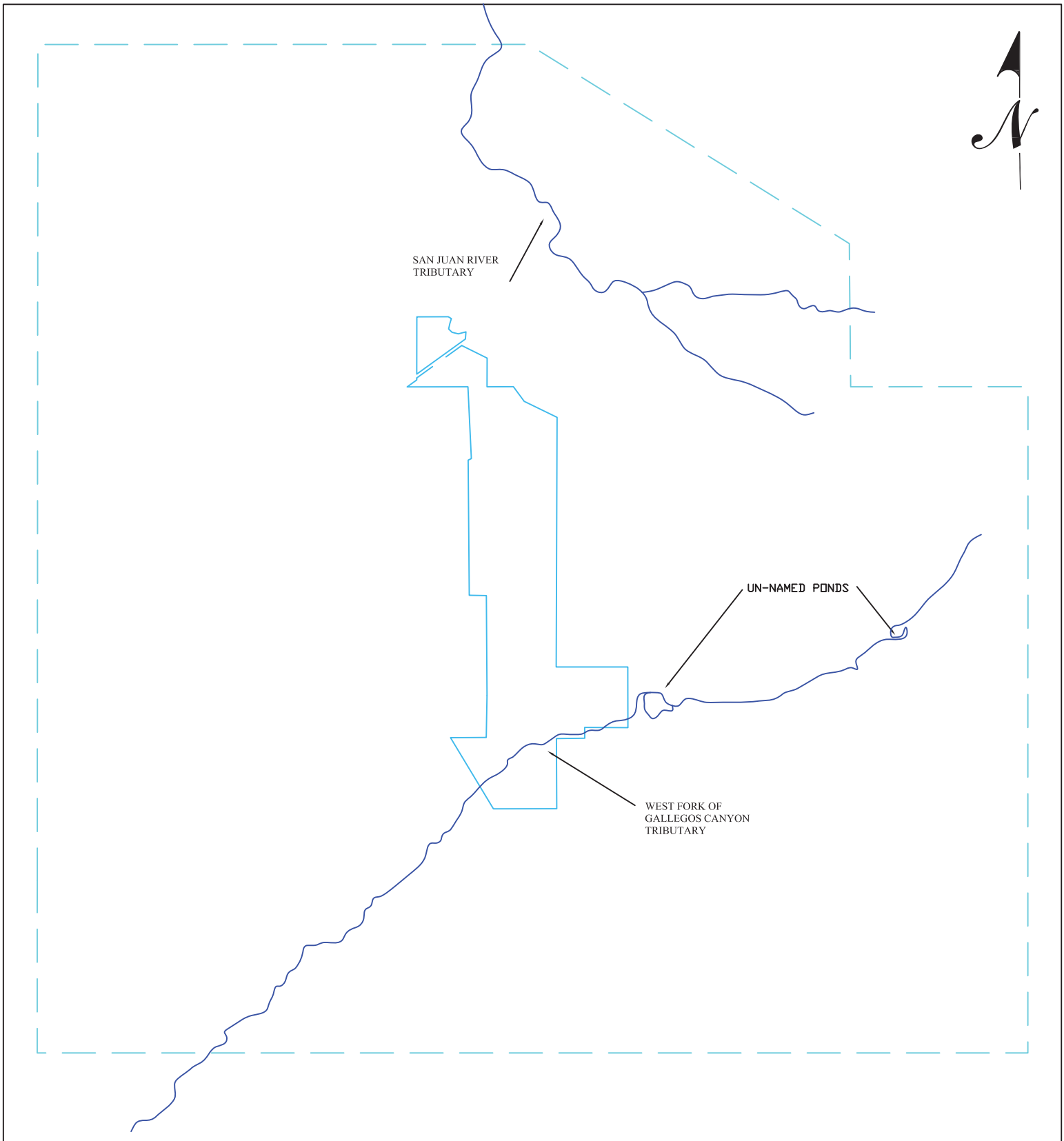
See Figure 14E: Geologic Cross Section

9. Potentiometric Maps

Little is known about the type of aquifer that exists below the proposed Landfarm facility. The cathodic well information sheet for the Huerfano 270 identifies the aquifer as a fresh water source. If this is the same aquifer which the Hilltop gas station gets its water from it would appear that the water source is a fresh water source. The closest water well with recorded water levels is located near the Hilltop Gas Station. The depth to water at this well is 550 feet. Based on cathodic well information and groundwater wells in the area it is anticipated that the general groundwater flow will be to the north/northwest assuming that all the wells are drilled into the same aquifer.

10. Soil Geologic Parameters

Samples were collected from 3-7.5 feet in soil boring #4 to assess the conditions of the soil per 19.15.36.8 (g). Results of this analysis is presented in Appendix C of this attachment.



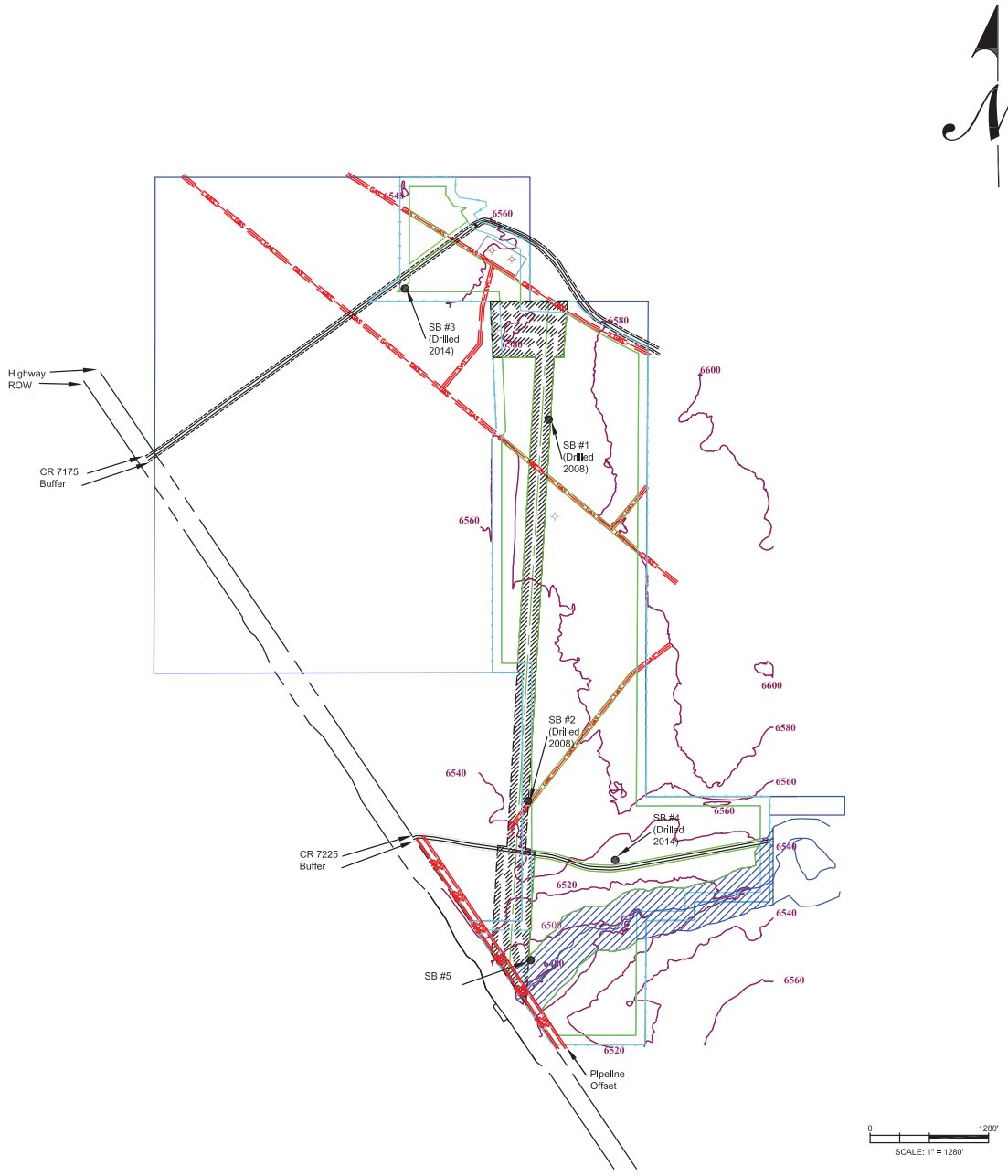
KEY

- APPROX ONE MILE BOUNDARY
- WATER COURSES
- SURVEYED LANDFARM #4 BOUNDARY

FIGURE 14A
SURFACE WATER MAP
LANDFARM #4 PERMIT

DRWN BY: GWC	DATE DRWN:6/19	PROJECT NO:----

envirotech
5796 U.S. HIGHWAY 64, FARMINGTON, NM 87401 505-632-0615



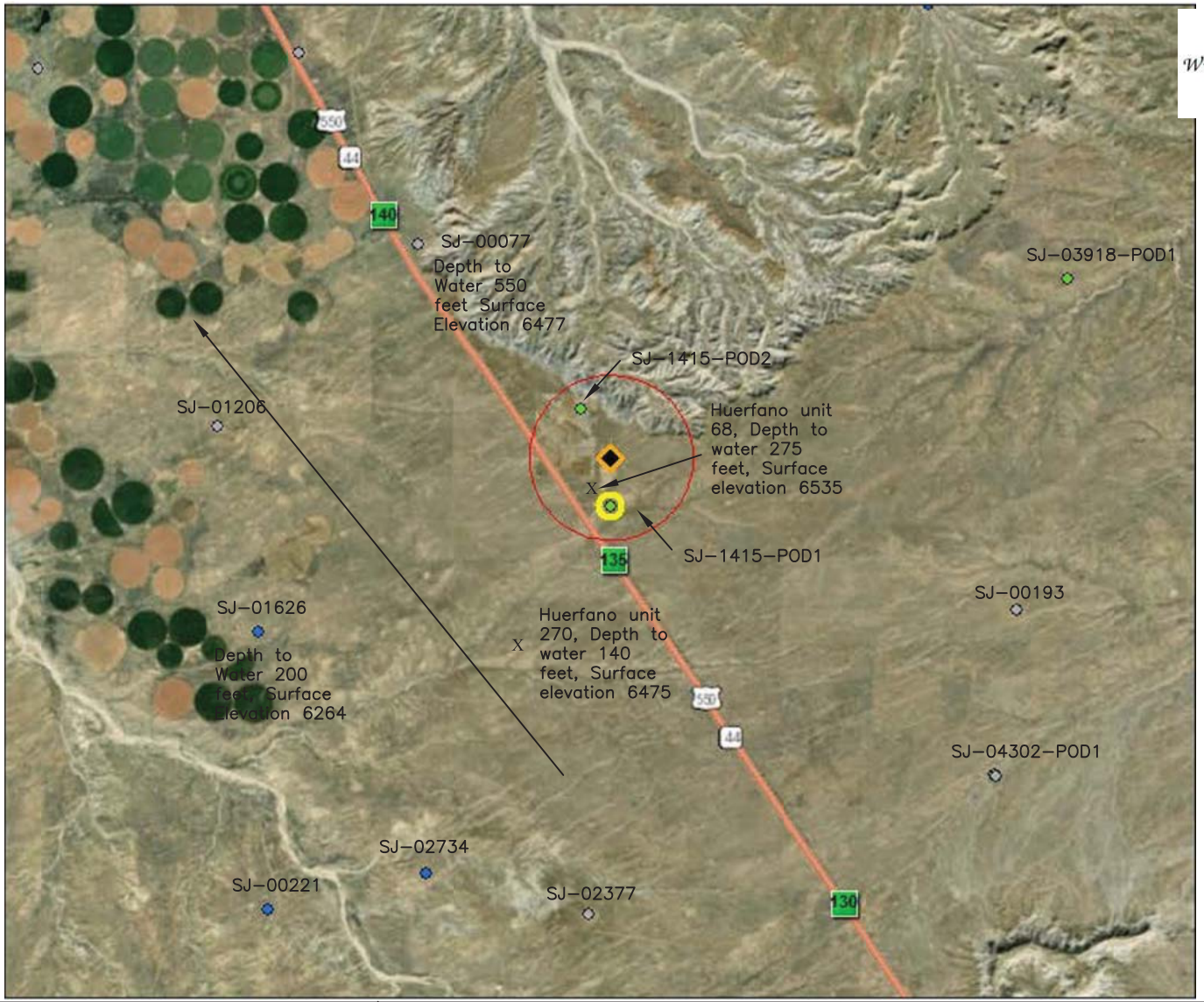
Legend

- Facility Boundary
- Farmable Area
- Watercourse Buffer
- Archeological Buffer
- Surveyed Property Line
- Gas Line w/ Buffer
- Soil Boring
- P&A Wellsite
- Active Wellsite
- Contour Line

FIGURE 14B
CONTOUR MAP WITH BORING LOCATIONS
LANDFARM #4 PERMIT
June 28, 2019

SCALE: 1" = 1280'					
PROJECT NO. Landfarm 4					
MAP DRWN	GWC		BASE DRWN		

envirotech
5796 U.S. HIGHWAY 64, FARMINGTON, NM 87401 505-632-0615



LEGEND

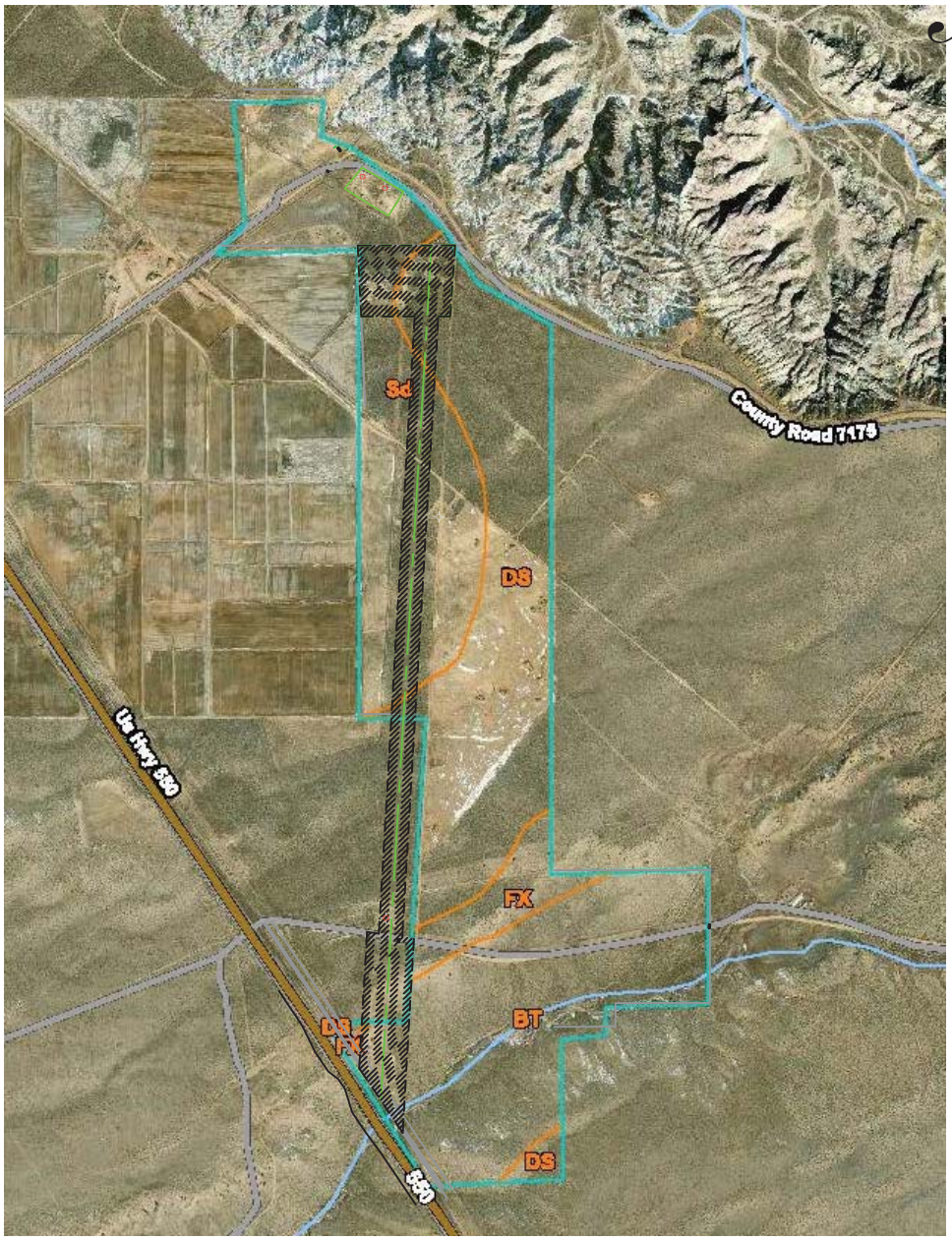
- HWY 550 Mile Markers
- 1 Mile Buffer
- Active Water Wells
- Pending Permits
- Other
- x O&G Well Site w/ Cathodic Information
- Anticipated groundwater direction

GROUNDWATER_INFORMATION
ENVIROTECH
LANDFARM_4
HILLTOP,NM
Facility Number: LF4

FIGURE NUMBER: FIGURE_14C	MAP DRAWN: GWC 6/12/19
PROJECT NUMBER: LANDAFRM_4	REVISIONS
MAP SCALE: 1"= _	
WORKPLAN ID: N/A	
DELIVERABLE ID: N/A	

NO.	DATE	BY	DESCRIPTION
1			//
2			//
3			//

envirotech
ENVIRONMENTAL SCIENTISTS & ENGINEERS
5796 U.S. HIGHWAY 64
Farmington, New Mexico 87401
505.632.0615



Legend

FACILITY BOUNDARY

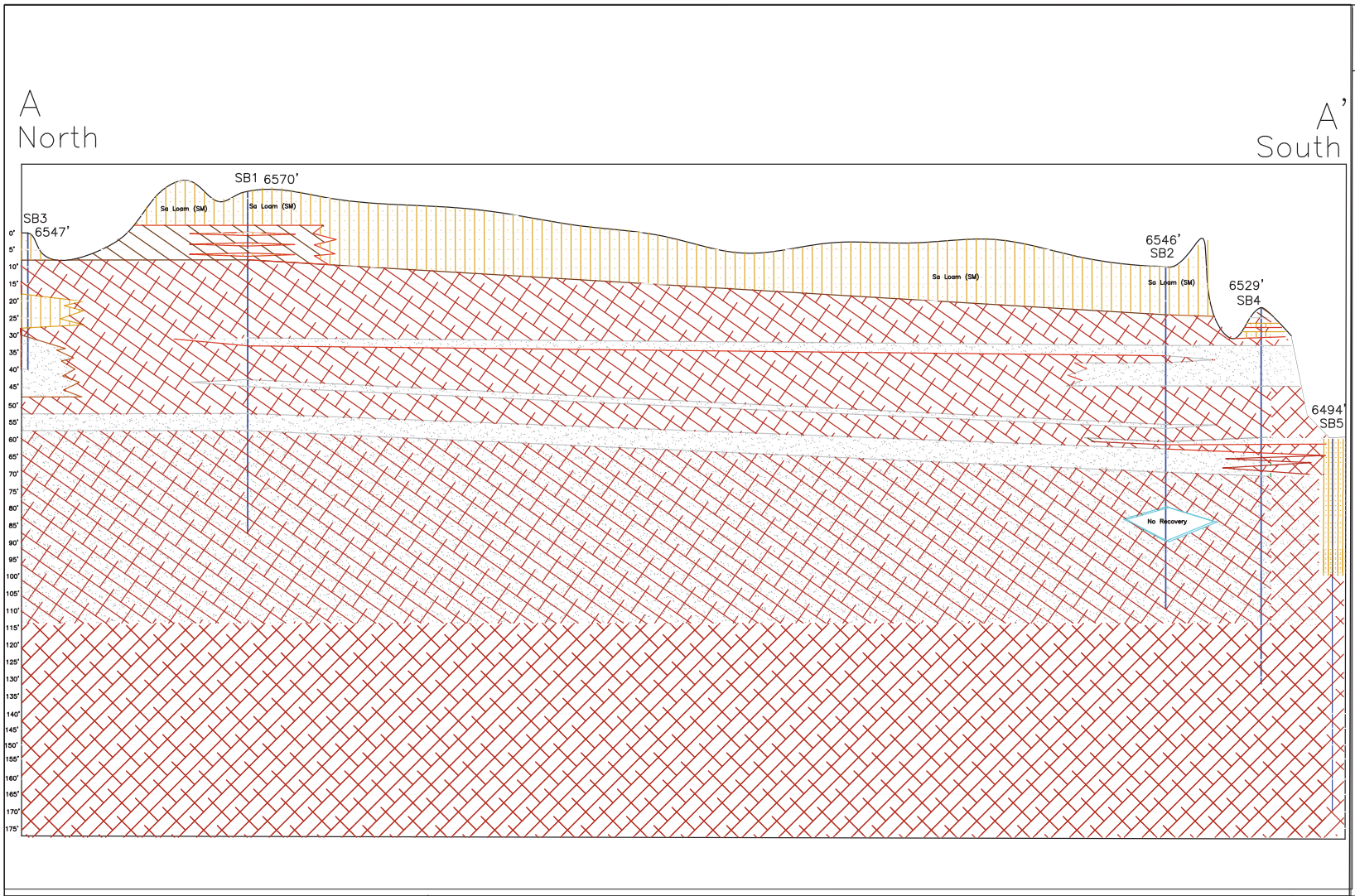
GREAT NORTH ROAD

FIGURE 14D
WEB SOIL SURVEY MAP
LANDFARM #4 PERMIT

SCALE:					
PROJECT NO.Landfarm 4					
MAP DRWN	GWC		BASE DRWN		

envirotech

5796 U.S. HIGHWAY 64, FARMINGTON, NM 87401 505-632-0615



LEGEND

- Soil Boring
- Mudstone
- Sandstone
- Silty Sand (SM)
- Clay (CL)

CL, SM, SW – USCS Classification

6567' – Elevation

GEOLIGICAL CROSS SECTION
PROPOSED LANDFARM #4
ANGEL PEAK LANDFARM
HILL TOP, NEW MEXICO

PROJECT NUMBER:

MAP SCALE: 1"= 500' Horizontal

MAP DRAWN: GWC 5/12/19

REVISIONS

NO.	DATE	BY	DESCRIPTION
1	6/27/19	BH	SB5 addition

envirotech
ENVIRONMENTAL SCIENTISTS & ENGINEERS
5796 U.S. HIGHWAY 64
Farmington, New Mexico 87401
505.632.0615

Appendix A

Surface Water and Well Information

30-045-21397

DATA SHEET FOR DEEP GROUND BED CATHODIC PROTECTION WELLS
NORTHWESTERN NEW MEXICO
(Submit 3 copies to OCD Aztec Office)

Operator MERIDIAN OIL Location: Unit NE Sec. 7 Twp 25 Rng 10

Name of Well/Wells or Pipeline Serviced HUERFANO UNIT #68

cps 953w

Elevation 6535' Completion Date 8/20/75 Total Depth 480' Land Type* N/A

Casing, Sizes, Types & Depths N/A

If Casing is cemented, show amounts & types used N/A

If Cement or Bentonite Plugs have been placed, show depths & amounts used

N/A

Depths & thickness of water zones with description of water when possible:

Fresh, Clear, Salty, Sulphur, Etc. 275'

RECEIVED
MAY 31 1991
OIL CON. DIV.

Depths gas encountered: N/A

Type & amount of coke breeze used: 4600 lbs.

Depths anodes placed: 440', 430', 420', 410', 400', 390', 350', 340', 300', 290'

Depths vent pipes placed: N/A

Vent pipe perforations: 200'

Remarks: gb #1

If any of the above data is unavailable, please indicate so. Copies of all logs, including Drillers Log, Water Analyses & Well Bore Schematics should be submitted when available. Unplugged abandoned wells are to be included.

*Land Type may be shown: F-Federal; I-Indian; S-State; P-Fee.
If Federal or Indian, add Lease Number.

#270 30-045-23836

DATA SHEET FOR DEEP GROUND BED CATHODIC PROTECTION WELLS
NORTHWESTERN NEW MEXICO

Operator Meridian Oil Co. Location: Unit N Sec. 07 Twp 26 Rng 10

Name of Well/Wells or Pipeline Serviced

Huerfano Unit #270

Elevation 6475 Completion Date 2-28-93 Total Depth 415 Land Type F

Casing Strings, Sizes, Types & Depths 2/245et 98' of 8" PVC Casing.

No Gas, Water, or Boulders were Encountered During Casing.

If Casing Strings are cemented, show amounts & types used Cemented

with 20 sacks.

If Cement or Bentonite Plugs have been placed, show depths & amounts used

No

Depths & thickness of water zones with description of water: Fresh, Clear,

Salty, Sulphur, Etc. 140'

Depths gas encountered: No

Ground bed depth with type & amount of coke breeze used: 415'

56 sacks of Loresco type SW coke breeze.

Depths anodes placed: 402', 392', 383', 374', 365', 340', 330', 320', 310', 245', 220', 210', 190', 180', 170'

Depths vent pipes placed: 415'

Vent pipe perforations: Bottom 290'

Remarks:

RECEIVED
JAN 31 1994
OIL CON. DIV.
DIST. 3

If any of the above data is unavailable, please indicate so. Copies of all logs, including Drillers Log, Water Analyses & Well Bore Schematics should be submitted when available. Unplugged abandoned wells are to be included.

Land Type may be shown: F-Federal; I-Indian; S-State; P-Fee.
If Federal or Indian, add Lease Number.

New Mexico Office of the State Engineer
Water Column/Average Depth to Water

(A CLW##### in the POD suffix indicates the POD has been replaced & no longer serves a water right file.)

(R=POD has been replaced, O=orphaned, C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)
(quarters are smallest to largest)

(NAD83 UTM in meters)

(In feet)

POD Number	POD Sub-basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Distance	Depth Well	Depth Water	Water Column
SJ 00077		SJ	3	1	2	26	27N	11W	233964	4049155*	6025	1102	550	552
SJ 01626		SJ		3	4	16	26N	11W	230607	4041673*	7607	255	200	55
SJ 00193		SJ		2	4	13	26N	10W	245500	4041657*	8278	2287	500	1787
SJ 02734		SJ	2	3	4	35	26N	11W	233750	4036858*	8536	275	165	110
SJ 00194		SJ		1	4	25	26N	10W	244996	4038454*	9429	2105	500	1605
SJ 00032		SJ	3	2	2	08	27N	10W	239378	4053822*	9544	235	60	175
SJ 00033		SJ	3	2	2	08	27N	10W	239378	4053822*	9544	204		
SJ 00034		SJ	3	2	2	08	27N	10W	239378	4053822*	9544	235	170	65

Average Depth to Water: **306 feet**

Minimum Depth: **60 feet**

Maximum Depth: **550 feet**

Record Count: 8

UTMNAD83 Radius Search (in meters):

Easting (X): 237698.83 **Northing (Y):** 4044426.46 **Radius:** 10000

***UTM location was derived from PLSS - see Help**

San Juan River Tributary (Northeast)

Watershed Characterization Report

At the watershed outlet:

- Stream Name: Not Available
- Stream Order: 1
- Stream Level: 8

- Mean annual flow volume (UROM): 0 cfs
- Mean annual flow volume (Vogel): Not Applicable
- Mean annual flow velocity (UROM): .7 fps
- Mean annual flow velocity (Vogel): Not Applicable

For the catchment (local area draining directly to the selected stream segment):

- Drainage area measurement: 2.3 km2

- Area weighted temperature: 10.23 C
- Area weighted precipitation: 270.4 mm

- Land Cover:
  - Open Water: 0%
  - Low Intensity Residential: 0%
  - Commercial: 0%
  - Deciduous Forest: 0%
  - Deciduous Forest: 1%
  - Mixed Forest: 0%
  - Urban/Recreational Grasses: 0%
  - Other: 99%

For the watershed (drainage area extending from the outlet upstream to the headwaters):

- Since this is a headwater stream segment, its catchment and watershed are the same.

Detailed information on NHDPlus 1.0 and the watershed characterization data (125 pp, 2.2MB, About PDF)
EXIT Disclaimer

Gallegos Canyon Tributary
Watershed Characterization Report

At the watershed outlet:

- Stream Name: Not Available
- Stream Order: 1
- Stream Level: 9

- Mean annual flow volume (UROM): .1 cfs
- Mean annual flow volume (Vogel): Not Applicable
- Mean annual flow velocity (UROM): .8 fps
- Mean annual flow velocity (Vogel): Not Applicable

For the catchment (local area draining directly to the selected stream segment):

- Drainage area measurement: 6.9 km2

- Area weighted temperature: 9.99 C
- Area weighted precipitation: 271.5 mm

- Land Cover:
  - Open Water: 0%
  - Low Intensity Residential: 0%
  - Commercial: 0%
  - Deciduous Forest: 0%
  - Deciduous Forest: 29%
  - Mixed Forest: 0%
  - Urban/Recreational Grasses: 0%
  - Other: 71%

For the watershed (drainage area extending from the outlet upstream to the headwaters):

- Since this is a headwater stream segment, its catchment and watershed are the same.

Detailed information on NHDPlus 1.0 and the watershed characterization data (125 pp, 2.2MB, About PDF)
EXIT Disclaimer

Appendix C

Soil Geologic Analysis

GEOMAT INC
915 Malta Avenue ◆ Farmington, NM 87401 ◆ Tel (505) 327-7928 ◆ Fax (505) 326-5721

December 12, 2014

Greg Crabtree, P.E.
Envirotech, Inc.
5796 U.S. Highway 64
Farmington, New Mexico 87401

RE: Laboratory Test Results
Envirotech Landfarm
San Juan County, New Mexico
GEOMAT Project No. 141-2129

GEOMAT Inc. (GEOMAT) has completed the laboratory testing for the samples submitted to our laboratory on October 17, 2014. The purpose of this letter is to transmit the results of the tests.

The samples submitted to our laboratory were sampled by Envirotech personnel from an exploratory auger boring on October 17, 2014. As you requested, laboratory testing was performed in general accordance with the attached document provided to us entitled "*OCD Requirements for Soil Testing Pursuant to 19.15.36 NMAC*". The following tests were performed:

- Moisture Content (ASTM D2216)
- Dry Bulk Density (ASTM D6836)
- Specific Gravity (ASTM D854)
- Calculated Porosity
- Permeability, flexible wall method (ASTM D5084)
- Proctor Compaction Test (ASTM D698)
- Atterberg Limits (ASTM D4318)

A rigid wall permeability test was attempted by our subcontracted laboratory (AMEC). The test was terminated because the material appeared to be essentially impermeable using the rigid wall apparatus at the specified remolded density. A flexible wall permeability test was completed, and the results are attached to this report.

The results of all laboratory tests are presented in the attached **Summary of Soil Tests** Table.

Thank you for the opportunity to be of service to you on this project. If you have any questions regarding the attached laboratory results, please contact us.

Respectfully submitted,
GEOMAT Inc.

Donald R. Baldwin

Donald R. Baldwin
Geologist

Attachments

LAB NO.	BORING NO.	SAMPLE DEPTH (ft)	ASTM D698		IN-SITU MOISTURE CONTENT (%)	IN-SITU DENSITY		ATTERBERG LIMITS ASTM D4318			Specific Gravity ASTM D854	PERMEABILITY (flex-wall) ASTM D5084 (cm/sec)	POROSITY (%)	VISUAL CLASSIFICATION ASTM D2488
			Density (pcf)	Moisture (%)		WET (pcf)	DRY (pcf)	LL	PL	PI				
1531	SB-4	3 - 3.5	--	--	14.1	130.2	114.1	--	--	--	2.589	--	29.4	
1532	SB-4	3.5 - 4	--	--	15.5	123.7	107.1	--	--	--	2.554	--	32.8	
1533	SB-4	2.5 - 7.5 (composite)	98.5	11.8	14.8	127.0	110.6	48	13	35	--	3.3×10^{-8}		Lean **CLAY** (CL) (or shale/siltstone)

GEOMAT INC.

SUMMARY OF SOIL TESTS

Project	Envirotech Laboratory Testing
Job No.	141-2129
Location	San Juan County, New Mexico
Sample Date	10/17/2014

Client:	GEOMAT, Inc. 915 Malta Avenue Farmington, NM 87401-	**Report Date:**	November 18, 2014
		Project #:	14-519-00452
		Work Order #:	6
Attn:	George Madrid	**Lab #:**	14-0945-01
Project Name:	Geomat 2014 Misc. Testing	**Sampled By:**	Client
		Date Sampled:	10/17/2014
	Albuquerque, NM	**Visual Description of Material:**	Clay
		Sample Source:	BH-SB-4@2.5'-7.5'
Project Manager:	Jason Olivar	**SOILS / AGGREGATES**	

Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (ASTM D5084-10)

Method: F

Sample Preparation: Remolded to 127.0 Wet Density @ 14.8%
Compaction Method: Hand Compacted

Initial Diameter (cm):	6.03	**Final Diameter (cm):**	6.24
Initial Length (cm):	7.75	**Final Length (cm):**	8.24
Initial Moisture:	14.6%	**Final Moisture:**	25.3%
Initial Unit Weight (pcf):	110.4	**Final Unit Weight (pcf):**	97.0
Initial Volume (in³):	13.5	**Final Volume (in³):**	15.4
Initial Degree of Saturation:	78%	**Final Degree of Saturation:**	95%

Permeant Liquid:	Tap Water
Magnitude of Total Backpressure:	73.0
Effective Stress:	2.0
Range of Hydraulic Gradient Used:	25.81 **To** 27.18
Estimated Specific Gravity:	2.65

Time Interval (sec)	Corrected Hydraulic Conductivity (cm/sec)
116	3.35E-08
129	3.16E-08
117	3.34E-08
126	3.26E-08
Average:	3.3E-08

Note: All final sample dimensions are subject to sample deformation caused by exsolution of air in pore water and handling during removal from cell.

Reviewed By: JG

Distribution: **Client** ☐ **File:** ☑ **Supplier:** ☑ **Email:** ☐ **Other:** George Madrid (email) (1)

AMEC Environment & Infrastructure, Inc.
8519 Jefferson NE
Albuquerque, NM 87113
Tel 5058211801
Fax 5058217371
www.amec.com

OCD Requirements for Soil Testing Pursuant to 19.15.36 NMAC

Total Porosity:

- Initial Properties: Moisture Content (ASTMD2216 - 10; ASTM D6836 – 68(2006)); Dry Bulk Density (ASTM D6836); Calculated Porosity (ASTM D6836 – 68(2006)).

Permeability/Saturated Hydraulic Conductivity:

- Standard Test Method for Measurement of Hydraulic Conductivity of Porous Material Using a Rigid-Wall, Compaction-Mold Permeameter (ASTM D5856 - 95(2007))
- Standard Test Methods for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter. (ASTM D5084 – 10)

Compaction Ratios:

- Proctor Compaction Test. (ASTM698 – 07e1)

Swelling Characteristics:

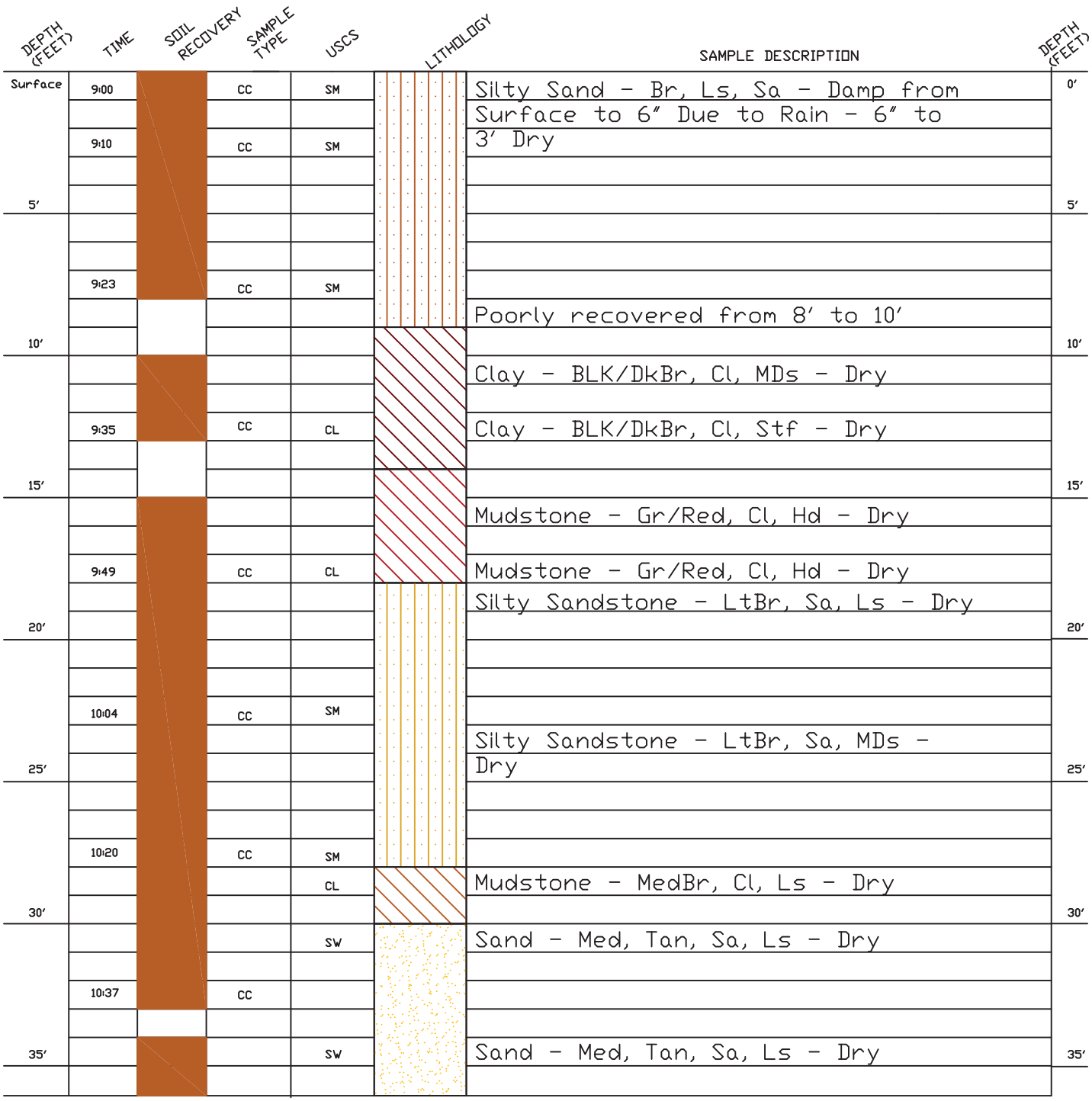
- Atterberg Limits. (ASTM D4318 - 10)

Appendix B

Soil Boring Lithology Logs

SOIL BORING
LITHOLOGY LOG

SB #3



DRILLER: Tim Rose
HELPER: Robert Husted
DRILLING COMPANY: Precision Drilling
DRILLING METHOD: Hollow Stem Auger

BIT SIZE: 7 7/8"
TOTAL BORING DEPTH: 40'
DATE STARTED: 12/4/14
SAMPLER TYPE: Continuos Core

LOCATION: Angel Peak - Proposed Landfarm #4
ELEVATION: 6,548'
DATE COMPLETED 12/4/14
GEOLOGIST: Toni McKnight

Note: CC = Continuous Core A = Auger c5 = 5 foot composite from air cuttings

Latitude: N36.521248
Longitude: W107.937286

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JOB # 14027-0002

DATE 12/8/14 DRAWN TLM
SCALE NA APPROVED GWC

SOIL BORING
LITHOLOGY LOG

SB #3

DEPTH (FEET)	TIME	SOIL RECOVERY	SAMPLE TYPE	USCS	LITHOLOGY	SAMPLE DESCRIPTION	DEPTH (FEET)
35′						Sand - Med, Tan, Sa, Ls - Dry	35′
	11:02		CC			Sand - Med, Tan, Sa, Ls - Dry	
40′	11:16		CC	SW		Sand - Med, Tan, Sa, Ls - Dry	40′

DRILLER: Tim Rose
HELPER: Robert Husted
DRILLING COMPANY: Precision Drilling
DRILLING METHOD: Hollow Stem Auger

BIT SIZE: 7 7/8″
TOTAL BORING DEPTH: 40′
DATE STARTED: 12/4/14
SAMPLER TYPE: Continuos Core

LOCATION: Angel Peak - Proposed Landfarm #4
ELEVATION: 6,548′
DATE COMPLETED 12/4/14
GEOLOGIST: Toni McKnight

Note: CC = Continuous Core A = Auger c5 = 5 foot composite from air cuttings

Latitude: N36.521248
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SOIL BORING
LITHOLOGY LOG

SB #4

DEPTH (FEET)	TIME	SOIL RECOVERY	SAMPLE TYPE	USCS	LITHOLOGY	SAMPLE DESCRIPTION	DEPTH (FEET)
Surface	10:25		CC	CL		Silty Clay - Tan/Red, Ls, Cl - Dry	0′
	10:28		CC	CL		Sample - Blow Counts 12/14/14/14/ Every 6″	
5′	10:44		CC	CL		Shale - Gr/White Precipitate, Ls, Cl-Dry	5′
				SM		Silty Sand - Tan/LtBr, Ls, Sa-Dry	
				CL		Shale - Lenses 1″ thick - Dry	
				SM		Silty Sand - Tan/LtBr, Ls, Sa-Dry	
10′	11:24		CC	CL		Mudstone - Red/Br, Hd, Cl - Dry	10′
				SW		Sandstone - Tan, MDs, Sa - Dry	
15′	12:05		CC	SW		Sandstone - Tan, MDs, Sa - Dry	15′
				SW		Sandstone - Tan, Ls, Sa - Dry	
20′	12:17		CC	CL		Sand/Silty Sand/Shale-Tan/LtBr, Hd, Sa/Cl-Dry	20′
				SW		Sandstone - Med, Tan, MDs, Sa - Dry	
				CL		Shale - Gr, Hd, Cl - Dry	
25′	12:32		CC				25′
				CL		Shale - Blk, Hd, Cl - Dry	
30′	12:53		CC				30′
				CL		Shale - Tan/LtBr, Hd, Cl - Dry	
				CL		Shale - Blk/Red, Hd, Cl - Dry	
35′	13:10		CC				35′

DRILLER: Dave Toney
HELPER: Robert Husted
DRILLING COMPANY: Precision Drilling
DRILLING METHOD: Hollow Stem Auger

BIT SIZE: 7 7/8″
TOTAL BORING DEPTH: 110′
DATE STARTED: 10/17/14
SAMPLER TYPE: Continuos Core

LOCATION: Angel Peak - Proposed Landfarm #4
ELEVATION: 6,528′
DATE COMPLETED 11/19/14
GEOLOGIST: Toni McKnight

Note: CC = Continuous Core A = Auger c5 = 5 foot composite from air cuttings

Latitude: N36.504869
Longitude: W107.928133

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SOIL BORING
LITHOLOGY LOG

SB #4

DEPTH (FEET)	TIME	SOIL RECOVERY	SAMPLE TYPE	USCS	LITHOLOGY	SAMPLE DESCRIPTION	DEPTH (FEET)
35′	13:10		CC	CL		Sandy Shale - Gr/Red, Fi, Hd, Cl - Dry	35′
				SM		Silty Sandstone - Gr/Grn, Fi, Hd, Sa - Dry	
40′	13:30		CC				40′
(10/18/14)						Switched over to HQ Coring (10/18/14)	
				CL		Shale - Blk/Red, Hd, Cl - Dry	
				CL		Shale - Grn/Red, Hd, Cl - Dry	
45′	9:49		CC				45′
				SM		Shale with Intermittent Sandstone -	
						Blk/Grn/Red, Hd, Cl/Sa - Dry	
				SM			
50′	11:37		CC				50′
				CL		Sandy Shale - Gr/Grn, Hd, Cl - Dry	
	15:00		CC				
(10/19/14)						Difficult Drilling - Not hard enough for HQ - Too Hard for Hollow Stem - Had to add water to bring cuttings up with Hollow Stem - Only way to drill to get core samples.	
55′	9:20		CC	CL		10/19/14 - Shale - Gr/Red, Ls, Cl - Dry	55′
						Poor Recoveries - Barrel only 1/2 full	
				CL		Sandy Shale - Gr, Ls, Cl - Dry	
60′	10:01		CC				60′
				CL		Shale - Gr, Ls, Cl - Dry	
				SM		Clayey Sandstone - Gr/White, Ls, Sa - Dry	
65′	11:37		CC				65′
				SW		Sandstone - Med, White, Ls, Sa - Dry	
70′	14:16		CC				70′

DRILLER: Dave Toney
HELPER: Robert Husted
DRILLING COMPANY: Precision Drilling
DRILLING METHOD: Hollow Stem Auger

BIT SIZE: 7 7/8″
TOTAL BORING DEPTH: 110′
DATE STARTED: 10/17/14
SAMPLER TYPE: Continuos Core

LOCATION: Angel Peak - Proposed Landfarm #4
ELEVATION: 6,528′
DATE COMPLETED 11/19/14
GEOLOGIST: Toni McKnight

Note: CC = Continuous Core A = Auger c5 = 5 foot composite from air cuttings

Latitude: N36.504869
Longitude: W107.928133

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SOIL BORING
LITHOLOGY LOG

SB #4

DEPTH (FEET)	TIME	SOIL RECOVERY	SAMPLE TYPE	USCS	LITHOLOGY	SAMPLE DESCRIPTION	DEPTH (FEET)
75′	14:16		CC	SW		Sandstone - Med, White, Ls, Sa - Dry	75′
80′	15:05		CC	SW		Sandstone - Med, White, Ls, Sa - Dry	80′
(10/21/14)	12:53		CC	SW		Sandstone - Med, White, Ls, Sa - Dry	
85′	13:01		CC	SW		Sandstone - Med, White, Ls, Sa - Dry	85′
90′	13:35		CC			Auger Refusal	90′
(11/19/14)	11:40		CC			Switch Back to HQ Core System	
Driller:				SW		Sandstone - Med, White, Ls, Sa - Dry	
Tim Rose				CL		Shale - Blk/Grn, Hd, Cl - Dry	
95′	11:53		CC			Shale - Red, Hd, Cl - Dry	95′
	15:00		CC	CL		Shale - Blk/Grn, Hd, Cl - Dry	
100′	15:16		CC	CL		Shale - Blk/Grn, Hd, Cl - Dry	100′
105′	15:27		CC	CL		Shale - Red, Hd, Cl - Dry	105′
	15:52		CC			Shale - Red, Hd, Cl - Dry	
110′	16:32		CC	CL		Shale - Red, Hd, Cl - Dry	110′

DRILLER: Dave Toney/Tim Rose
HELPER: Robert Husted
DRILLING COMPANY: Precision Drilling
DRILLING METHOD: Hollow Stem Auger

BIT SIZE: 7 7/8″
TOTAL BORING DEPTH: 110′
DATE STARTED: 10/17/14
SAMPLER TYPE: Continuos Core

LOCATION: Angel Peak - Proposed Landfarm #4
ELEVATION: 6,528′
DATE COMPLETED 11/19/14
GEOLOGIST: Toni McKnight

Note: CC = Continuous Core A = Auger c5 = 5 foot composite from air cuttings

Latitude: N36.504869
Longitude: W107.928133

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SOIL BORING
LITHOLOGY LOG

SB #5

DEPTH (FEET)	TIME	SOIL RECOVERY	SAMPLE TYPE	USCS	LITHOLOGY	SAMPLE DESCRIPTION	DEPTH (FEET)
Surface	10:16		CC	SM		Silty Sand - Very loose, tan, fine grain, dry, non-plastic, non-cohesive	0′
5′			CC				5′
10′	10:16		CC			Decrease in grain size	10′
15′			CC				15′
20′	12:00		CC				20′
25′			CC				25′
30′	14:10		CC				30′
35′			CC			Slight increase in grain size	35′

DRILLER: Mark Bailey
HELPER: _____
DRILLING COMPANY: Bailey Drilling
DRILLING METHOD: Air Rotary

BIT SIZE: 3.25′
TOTAL BORING DEPTH: _____
DATE STARTED: 6/26/2019
SAMPLER TYPE: Continuos Core

LOCATION: Angel Peak - Proposed Landfarm #4
ELEVATION: 6,494′
DATE COMPLETED 6/27/2019
GEOLOGIST: Michael Wicker

Note: CC = Continuous Core A = Auger c5 = 5 foot composite from air cuttings

Latitude: N36.50200
Longitude: W107.932238

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JOB # 14027-0002

DATE 6/27/2019 DRAWN BAH
SCALE NA APPROVED GWC

SOIL BORING
LITHOLOGY LOG

SB #5

DEPTH (FEET)	TIME	SOIL RECOVERY	SAMPLE TYPE	USCS	LITHOLOGY	SAMPLE DESCRIPTION	DEPTH (FEET)
35′			CC	SM			35′
40′	15:00		CC				40′
				CL		Mudstone- dark grey to red brown	
45′			CC				45′
50′	16:30		CC	CL		Mudstone- dark grey to red brown	50′
55′			CC				55′
60′	18:00		CC	CL		Mudstone- dark grey to red brown	60′
(6/27/2019)							
65′	10:30		CC				65′
70′	10:45		CC	CL		Mudstone- dark grey to red brown	70′

DRILLER: Mark Bailey
HELPER: _____
DRILLING COMPANY: Bailey Drilling
DRILLING METHOD: Rotary

BIT SIZE: 3.25″
TOTAL BORING DEPTH: _____
DATE STARTED: 6/26/2019
SAMPLER TYPE: Continuos Core

LOCATION: Angel Peak - Proposed Landfarm #4
ELEVATION: 6,494′
DATE COMPLETED 6/27/2019
GEOLOGIST: Michael Wicker

Note: CC = Continuous Core A = Auger c5 = 5 foot composite from air cuttings

Latitude: N36.50200
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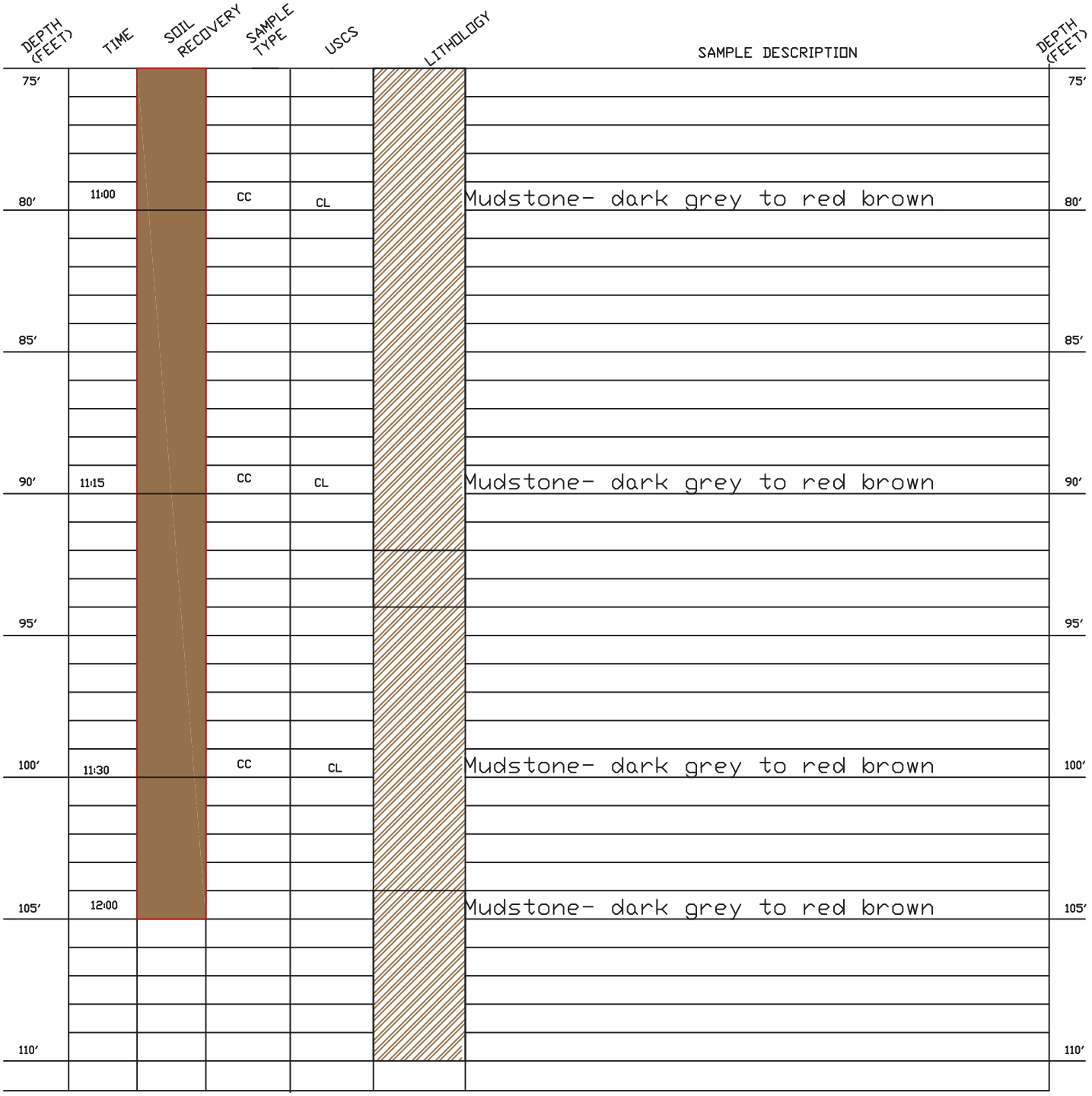
SOIL BORING
LITHOLOGY LOG

SB #5



DRILLER: MArk Bailey
HELPER: _____
DRILLING COMPANY: Bailey Drilling
DRILLING METHOD: Rotary

BIT SIZE: _____
TOTAL BORING DEPTH: _____
DATE STARTED: 6/26/2019
SAMPLER TYPE: Continuos Core

LOCATION: Angel Peak - Proposed Landfarm #4
ELEVATION: 6,494'
DATE COMPLETED 6/27/2019
GEOLOGIST: Michael Wicker

Note: CC = Continuous Core A = Auger c5 = 5 foot composite from air cuttings

Latitude: N36.504869
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