1R - 214

REPORTS

DATE:

07-16-2003

Cover Letter to NMOCD

Junction Box Upgrade
Work Plan

Initial Assessment
Assessment Criteria
Documentation Requirements

Chloride Flowchart
Chloride Concentration Curves

Clay Layer Barrier

Final Reports
Disclosure Reports

Quality Procedures

Notes

RICE Operating Company
122 West Taylor • Hobbs, New Mexico 88240
Phone: (505)393-9174 • Fax: (505) 397-1471

July 16, 2003

Certified Mail Return Receipt No.
7002 2410 0000 4940 1077

Mr. Wayne Price
NM Energy, Minerals and Natural Resources Department
Oil Conservation Division, Environmental Bureau
1220 S. St. Francis Drive
Santa Fe, NM 87504

Re: Revised Junction Box Upgrade Work Plan Project

Dear Mr. Price:

Rice Operating Company (ROC) is submitting the revised work plan for upgrading junction boxes presently used in the ROC-operated SWD systems in Lea County. ROC has no ownership of pipelines, wells, or facilities. Each system is owned by a consortium of oil producers, System Partners, who provide operating capital based on percent ownership or usage. This type of capital improvement project requires System Partner AFE approval and pre-work funding.

The site assessments, work schedules, impacted soil handling, replacement junction boxes, etc. will be specifically conformed to the particular site, but will follow this generic plan. NMOCD will be notified in advance by email of work schedule and timing of significant events and will be consulted throughout the work plan process for concurrence of any significant plan alterations, analytical interpretations, etc. NMOCD will be given specific advance notice of sites located within a city limits or ¼ mile from a residence, business, school, public water source, etc. Work plan activities and results at any of these sites will be immediately communicated to the Santa Fe NMOCD office for concurrence or conditions of strategy.

The impact target values of this work plan reflect the present NMOCD guidelines for Clean-up Target Concentrations of TPH and BTEX. Chloride impact will be evaluated according to concentration-decline trending and where deemed warranted, by further boring-delineation.

Thank you for your attention to the details of this work plan and for acknowledging issues ROC faces with landowners, System Partners and operations of an aging infrastructure. Modifications that we discussed are incorporated into this revision. ROC asks that the NMOCD review this plan revision for approval. We look forward to hearing from you soon. If there are any additional questions, please contact me at the above phone number.

Carolyn Doran Haynes

Carolyn Doran Haynes
Engineering Manager

Attachments
cc: LBG, SC, KF, file; NMOCD: Roger Anderson, Larry Johnson, Paul Sheeley

RICE *Operating Company*

Junction Box Upgrade Work Plan

1. Notify NM OneCall and spot area pipelines. Use caution to ensure pipeline integrity or temporarily re-route pipeline. Remove junction box. Per NMED guidelines, remove and contain NORM impacted soils for export to a NORM-permitted disposal facility.

2. Evaluate site by "Initial Assessment", "Assessment Criteria" and record on "Initial Report".

3. Submit by email the weekly environmental-work schedule of sites: legal description, scheduled work and groundwater depth, to both NMOCD Hobbs and Santa Fe offices. The Santa Fe NMOCD office will be given special notice of sites within a city limits or ¼ mile from a residence, business, school, public water source, etc. At these sites, work activities and results will be immediately communicated to NMOCD for concurrence or conditions of strategy.

4. Begin site work activities. Maximum suggested excavation dimension is 30 feet x 30 feet x 12 feet deep, however, do not excavate under vegetated areas. Highly impacted soils (>10,000 ppm TPH) will be properly disposed at an OCD approved facility with remaining soils remediated or blended on-site to use as backfill. During vertical and lateral excavation, procure samples at regular intervals of depth and breadth and conduct field-testing using "Quality Procedures" included in this plan. When results indicate NMOCD "Clean-up Target Concentrations" for TPH and BTEX can be met, stop excavation and review field data for chloride concentration decline trend. Graph the site "Chloride Concentration Curve" and compare to "Closure Curve Examples" and "Disclosure Curve Examples." Follow "Chloride Impact Flowchart" for closure strategy. Complete and file *FINAL REPORT* with NMOCD.

   If 12 feet vertical delineation at the source reveals Target Concentrations for TPH or BTEX will not meet NMOCD guidelines or TPH and BTEX will meet guidelines but there is not a significant decline vs depth in chloride concentration, the site-impact is judged to be outside the scope of this work plan and will become a risk-based corrective action (RBCA) project-site. (RBCA project-sites will be "GPS"-defined, evaluated, and prioritized with individual work plans submitted in due course to the NMOCD; 6-8 of these sites will be worked each year.) Procure bottom sample for lab confirmation. File *DISCLOSURE REPORT* and notify NMOCD Environmental Bureau Chief of the potential for groundwater impact.

5. Using "Quality Procedures," procure bottom and side grab-samples for BTEX PID testing* and composite-samples of bottom (5-point) and sides (4-point) for lab analysis of TPH, Chlorides using approved laboratory-testing procedures as per NMOCD guidelines.

6. Install as warranted for inhibition of downward migration of impact remaining in-place at closure locations (TPH, BTEX or chlorides), a 10-12" thick clay layer (as diagramed in "Clay Layer Barrier"); compact to meet or exceed 95% of a Proctor Test ASTM-D-698 with permeability (hydraulic conductivity) $\leq 1x10^{-7}$ cm/sec. Verify compaction compliance at each closure site by performing at least one compaction test.

7. Backfill with clean/remediated soil that meets NMOCD TPH/BTEX guidelines and will support vegetation: Chloride concentration remaining in the backfill soil will be at a level that will not inhibit the growth of vegetation, generally <1000ppm. Compact to within 2 feet below pipeline. Line junction area with 20-mil poly or compacted clay to provide secondary containment for new junction box. Construct watertight junction box around pipeline connections. Complete backfill, mounding soil away from box to prevent moisture accumulation at the box. Fertilize and seed site to restore surface vegetation. Monitor surface re-vegetation results. If warranted, conduct further surface re-vegetation activities to insure re-vegetation. Cross-sectional view in "Completed Box Site."

8. Submit Annual Report to NMOCD of site "Final Report" or "Disclosure Report" by April 1.

*Field PID tests <100ppm are considered final for BTEX. If PID is >100ppm, the BTEX composite-sample will be collected in accordance to "Quality Procedure-08" and will be composited under laboratory conditions to prevent excessive volatilization. A 15-box, 30-sample study will be made to compare field-compositing with lab-compositing BTEX results.

July 16, 2003

RICE *Operating Company*

Junction Box Upgrade Work Plan

INITIAL ASSESSMENT AND DOCUMENTATION REQUIREMENTS

Junction Box site is transferred to Environmental Group for TPH and Salt remediation when de-contamination for NORM has been completed.

1. **Initial Observation: arrive on location and make visual assessment and GPS recording. Include the following on the Initial Report form:**
   - All pipelines, facilities, oil and gas wells and production batteries
   - Vegetation condition, surface staining and other obvious staining
   - Disturbed surface areas, work space, near-surface lithology (caliche, sand, etc.)
   - Windmills, water wells, surface water, roads, housing, cattle, public access areas

2. **Initial Sampling**
   - Procure samples for on-site testing:
     - Below pipeline at surface and as deep as is practical in 1-2 feet increments
     - Walls: individual samples to identify most to least impacted
     - Surface surrounding box where bare soil or stressed vegetation is obvious
       - Continue as deep as is practical in 1-2 feet increments
     - Background: near-surface at a point obviously never impacted
   - Test samples on-site as is practical
   - Record results on the site map of Initial Report
     - Site parameters, perhaps even cross-sectional, including reference points
     - Record sample sites and associated results
   - Install site sign if further excavation if necessary

3. **If excavation is probable, record driving directions for one-call.**

4. **Perform reconnaissance of junction box history**
   - Confirm landowner
   - Review history for boot or vent presence
   - Review history for leaks and spills
   - Confirm groundwater depth and any other available aquifer information
   - On topographical map, confirm nearest wells or surface water within 1 mile

5. Bring all information to the discussion-table to discuss closure options

Decide if further action at the site is warranted
Estimate width, length, and possibly depth of excavation
Identify equipment most practical to excavate and contractor to use
Evaluate line interference problems – if need to relocate lines
Discuss on-site soil remediation or soil disposal, importation, replacement source
Begin worksheet with all information including sections for costs, activity updates

6. If necessary, take work plan to operations: looping, re-plumbing, or relocating box

7. Documentation of Site Work Activities

NMOCD notification by E-Mail of work schedule
Landowner notification and Contractor scheduling
Safety meeting on-site and record
Sample, test on-site as excavation continues: record developments on worksheet
Daily, collect all manifests, work tickets, daily costs and record
Regularly update project board of all significant events
Table discussion of project and developments, possible plan adjustments
Pictures of all significant events during workplan
Final samples of bottom and sidewalls to lab for confirmation
If clay barrier is required, move in clay and compact; test for compaction
Backfill/compact to within 2 feet below line or as proscribed by Operations

8. Documentation Requirements to Complete Report

Complete Final Report or Disclosure Report (in triplicate) with:
- Accurate measurements of excavation and worksite dimensions
- Photos of significant events (added after photos are returned)
- "Chloride Concentration Curve"
- Copy manifests as needed
- Update final site diagram with sample points, borings, liners, MWs, etc.
- Discuss completed form and comments with team before filing

Archive appropriate samples of bottom, walls, borings, backfill etc.
Compare field sample results with lab confirmation results
Copy field log notes into file
File original manifests in file
Complete total cost
Pass-on camera and information to operations for completion of junction box
Complete annual report to NMOCD

9. Disclosure Junction Box Sites

Place RICE Identification marker at source point and record GPS data.
Compare site priority with other existing SWD System Disclosure Sites
Assign a timeline for RBCA workplan development

Site Assessment Criteria (NMOCD)

Depth to Ground Water (Vertical distance from contaminants to seasonal high water elevation of ground water)	Less than 50 feet	(20 points)	
	50 feet to 99 feet	(10 points)	
	Greater than 100 feet	(0 points)	_____
Wellhead Protection Area (Less than 200 feet from a private domestic water source, or; less than 1000 feet from all other water sources)	Yes	(20 points)	
	No	(0 points)	_____
Distance to Surface Water Body: (Horizontal distance to perennial lakes, ponds, rivers, streams, creeks, irrigation canals and ditches)	Less than 200 feet	(20 points)	
	200 feet to 1000 feet	(10 points)	
	Greater than 1000 feet	(0 points)	_____

RANKING SCORE (TOTAL POINTS): _____

Clean-up Target Concentrations for "Site Closure" (NMOCD)

IF RANKING SCORE IS:	**>19**	**10-19**	**0-9**
Benzene (ppm) *	**10**	**10**	**10**
BTEX (ppm) *	**50**	**50**	**50**
TPH (ppm) **	**100**	**1000**	**5000**

* A field vapor headspace measurement of 100 ppm may be substitued for a laboratory analysis.

** The contaminant concentration for TPH is the concentration above background levels.

RICE OPERATING COMPANY
JUNCTION BOX INITIAL REPORT

BOX LOCATION

SWD SYSTEM	JUNCTION	UNIT	SECTION	TOWNSHIP	RANGE	COUNTY	ORIGINAL BOX DIMENSIONS - FEET		
							Length	Width	Depth

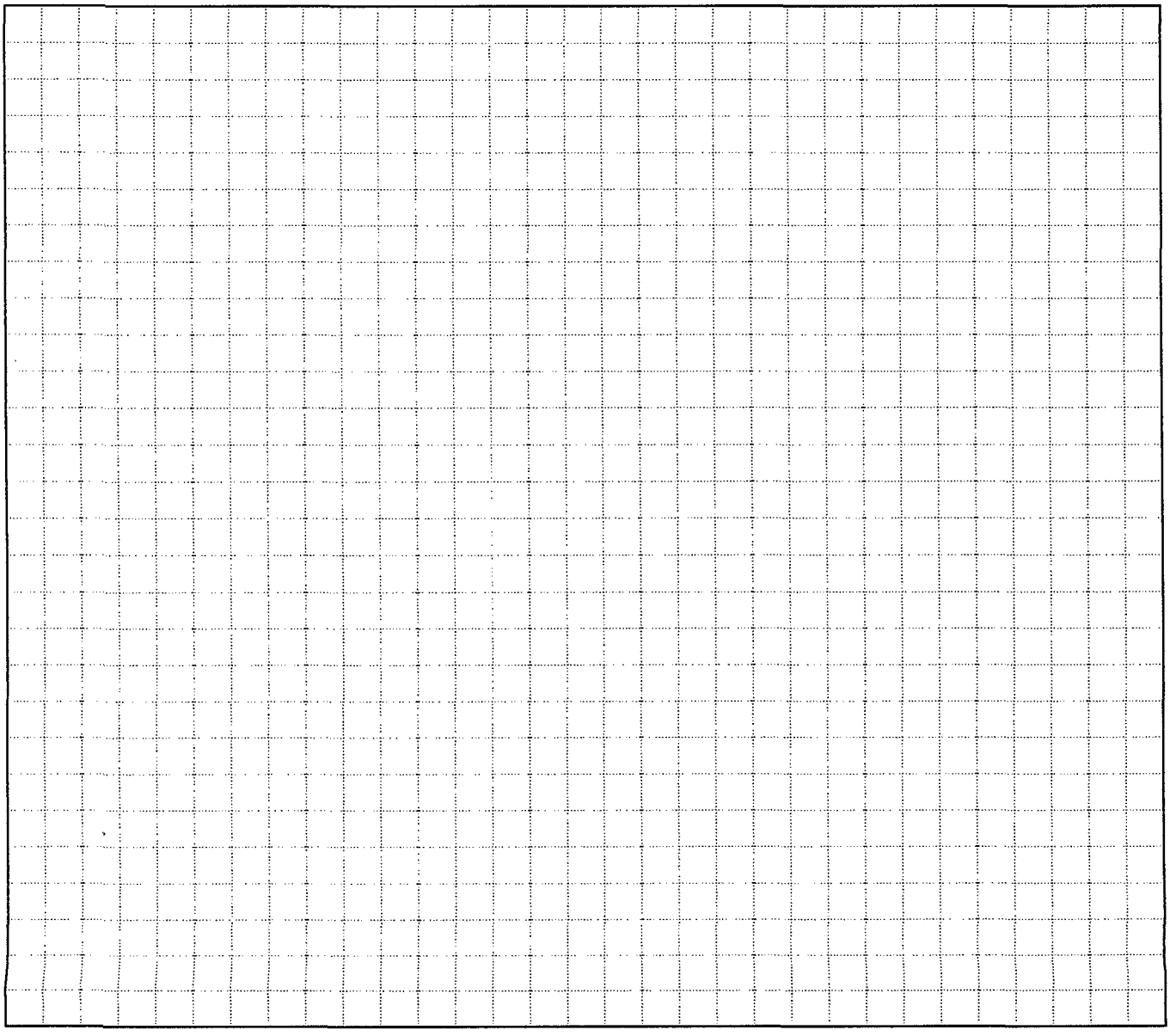
LAND TYPE: BLM ☐ STATE ☐ FEE LANDOWNER _____ OTHER _____

Depth to Groundwater _____ feet Move or Replace Box? _____

Date Initial _____ Boot or Vent? _____ New or Loop Line? _____

Depth of Pipeline _____ Pipeline Material _____ Past Leaks? _____

Initial Observation: Arial View Sketch of location as it appears upon arrival: as applicable to remediation plans: include all wells and surface water sources, roads, stressed vegetation, cattle, houses, oil wells, pipelines, facilities, dirt piles, fences, measurements, reference point, sample locations, etc.



FIELD TESTS FOR INITIAL DELINEATION

TEST POINT NO. *Background*				
DEPTH	TPH	Cl^-	Soil	H_2O

TEST POINT NO. *Original Bottom*				
DEPTH	TPH	Cl^-	Soil	H_2O

TEST POINT NO.				
DEPTH	TPH	Cl^-	Soil	H_2O

TEST POINT NO.				
DEPTH	TPH	Cl^-	Soil	H_2O

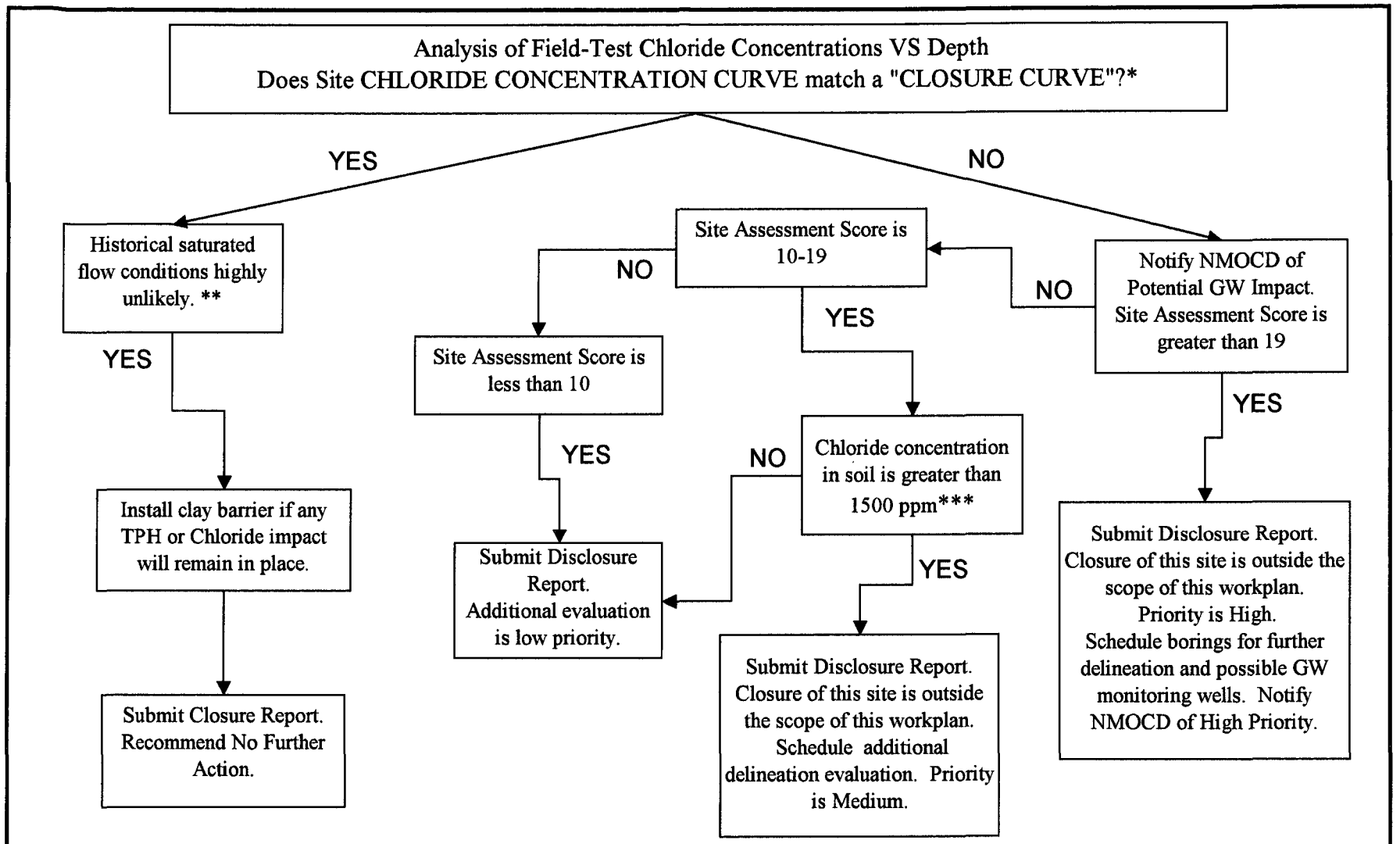
TEST POINT NO.				
DEPTH	TPH	Cl^-	Soil	H_2O

TEST POINT NO.				
DEPTH	TPH	Cl^-	Soil	H_2O

TEST POINT NO.				
DEPTH	TPH	Cl^-	Soil	H_2O

TEST POINT NO.				
DEPTH	TPH	Cl^-	Soil	H_2O

TEST POINT NO.				
DEPTH	TPH	Cl^-	Soil	H_2O



* Closure Curve and Disclosure Curve examples accompany this flowchart.

** If question remains about historical saturated-flow condition, a vertical delineation boring may be conducted to illustrate further chloride impact documentation.

*** Through evaluation of ROC experience with salt-impacted junction box sites, the median chloride concentration for Disclosure Sites is approx. 1500 ppm. Using this number as a discriminating guideline will aid ROC in prioritizing the Disclosure Sites for RBCA Plans.

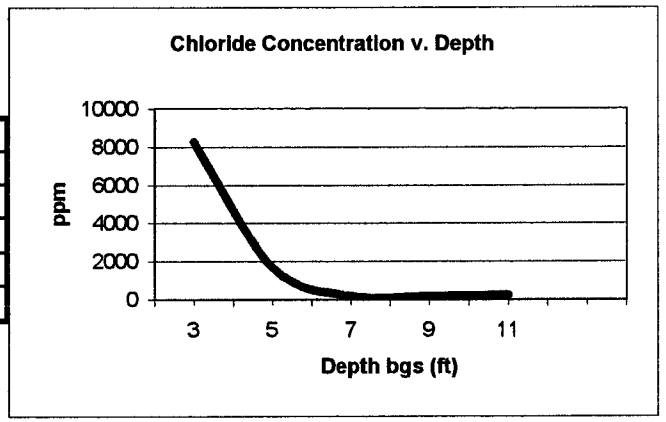
RICE Operating Company 122 West Taylor Hobbs, NM 88240 505-393-9174	**CHLORIDE IMPACT FLOWCHART**	**ROC Junction Box Work Plan Closure/Disclosure Strategy**

CLOSURE CURVE EXAMPLES

CLOSED SITES THAT EXHIBIT A SIGNIFICANT CHLORIDE DECLINE WITH DEPTH

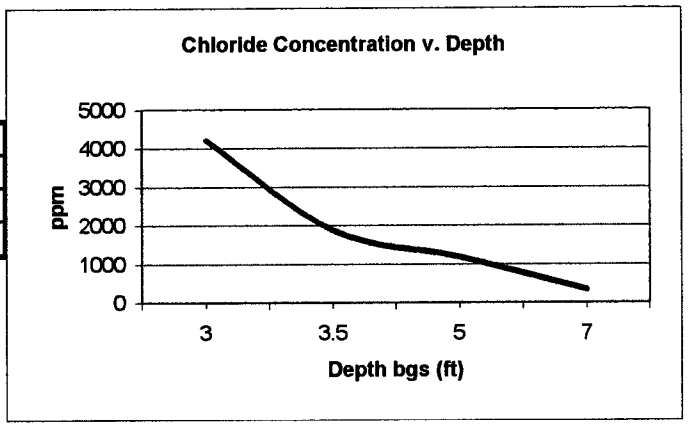
EME jct. H-10-1
T20S, R36E

Depth bgs (ft)	[Cl-] ppm
3	8300
5	1716
7	199
9	201
11	284



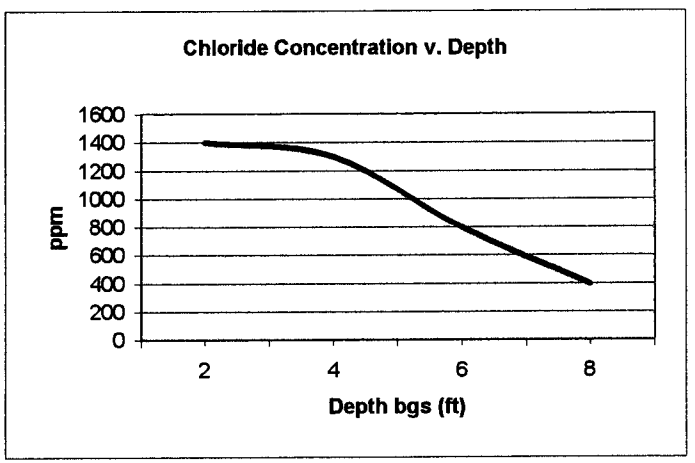
EME jct. H-2
T20S, R37E

Depth bgs (ft)	[Cl-] ppm
3.5	1895
5	1200
7	350



EME jct. C-12-1 North
T20S, R36E

Depth bgs (ft)	[Cl-] ppm
2	1400
4	1300
6	800
8	400



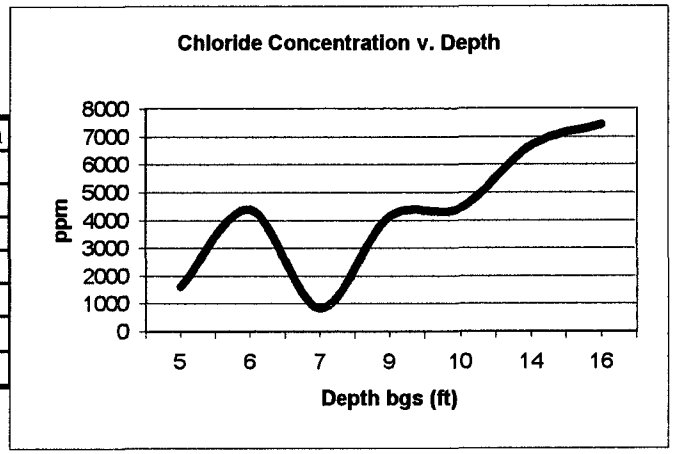
RICE *Operating Company*

DISCLOSURE CURVE EXAMPLES

DISCLOSED SITES THAT DID NOT EXHIBIT A SIGNIFICANT CHLORIDE DECLINE WITH DEPTH

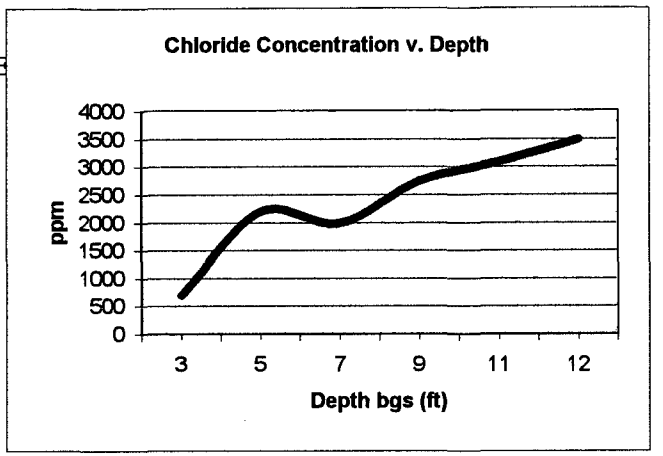
BD jct. I-8
T22S, R37E

Depth bgs (ft)	[Cl-] ppm
5	1617
6	4397
7	837
9	4157
10	4450
14	6700
16	7450



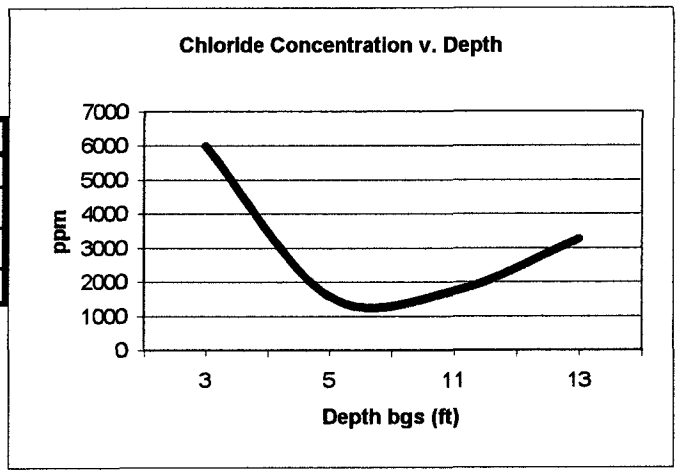
BD Brunson EOL
UL 'P', Sec. 4, T22S, R37E

Depth bgs (ft)	[Cl-] ppm
3	700
5	2200
7	2000
9	2750
11	3100
12	3500



BD jct. F-17
T21S, R37E

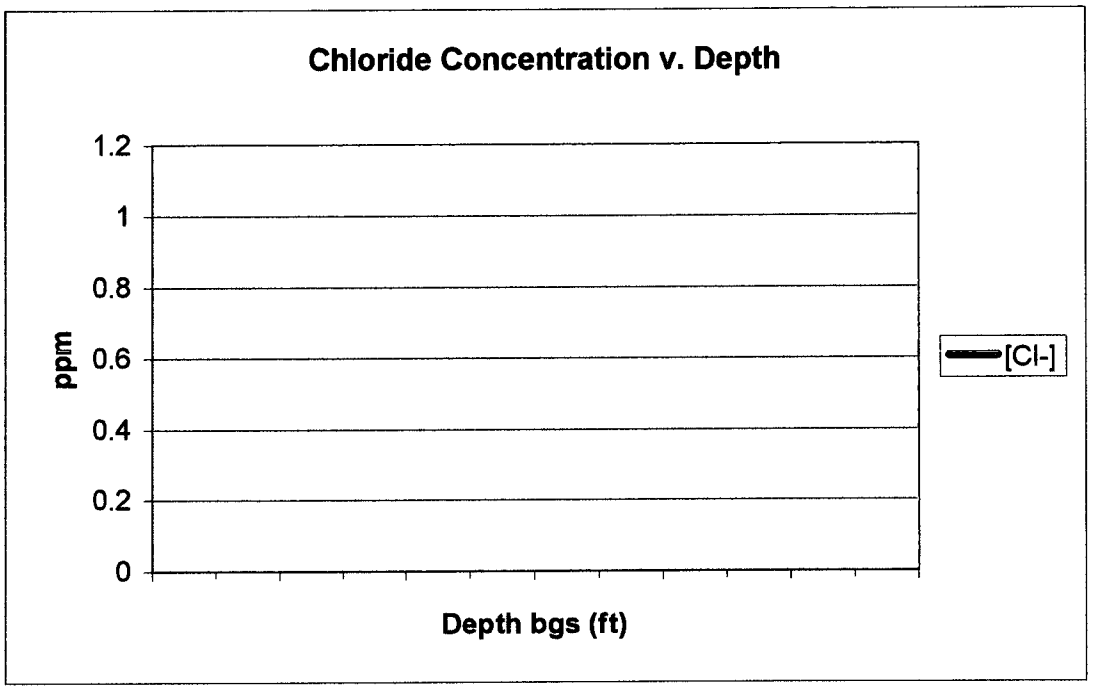
Depth bgs (ft)	[Cl-] ppm
3	6001
5	1591
11	1749
13	3273

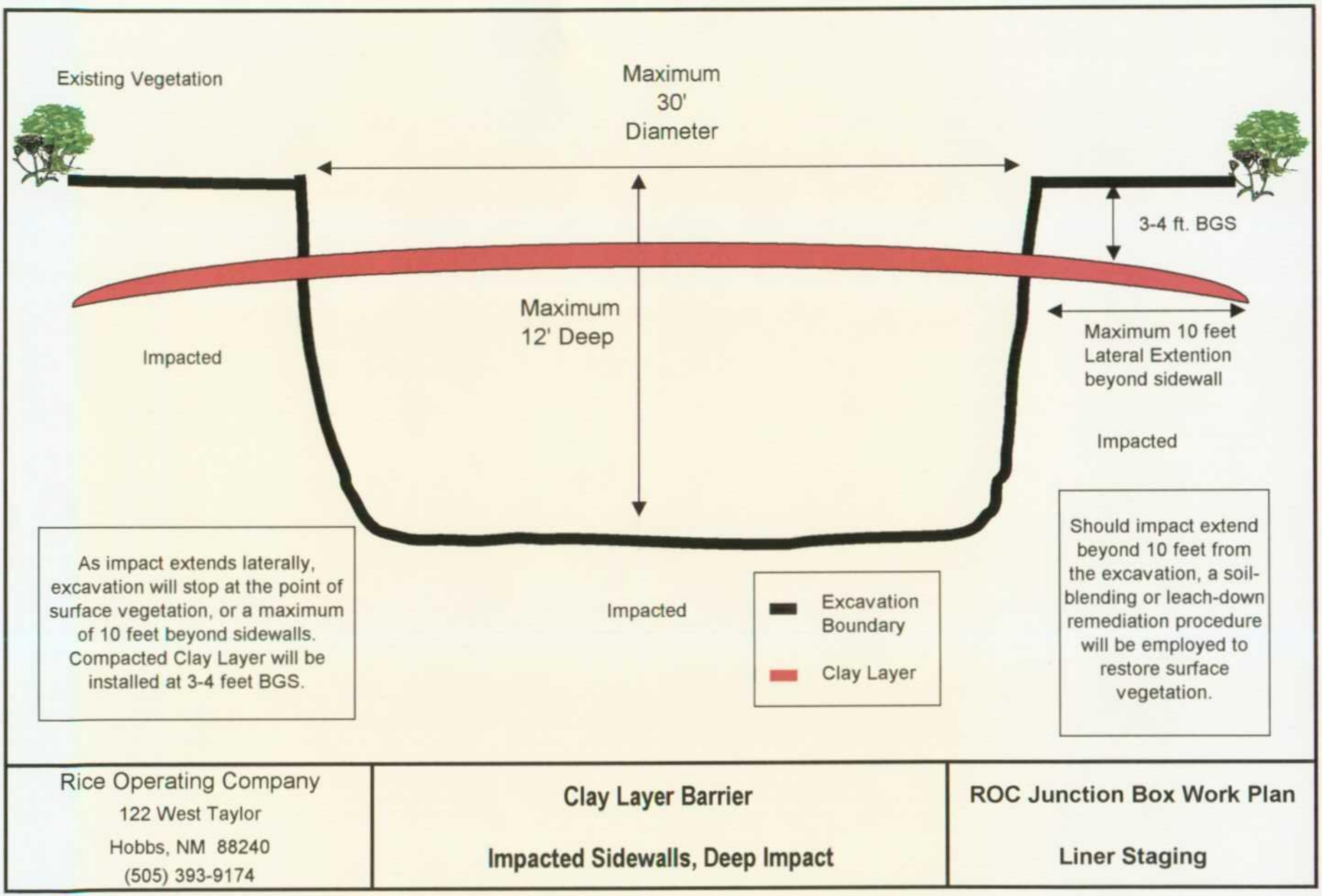


A soil bore was conducted at this location and the site was found to have chloride impact to groundwater.

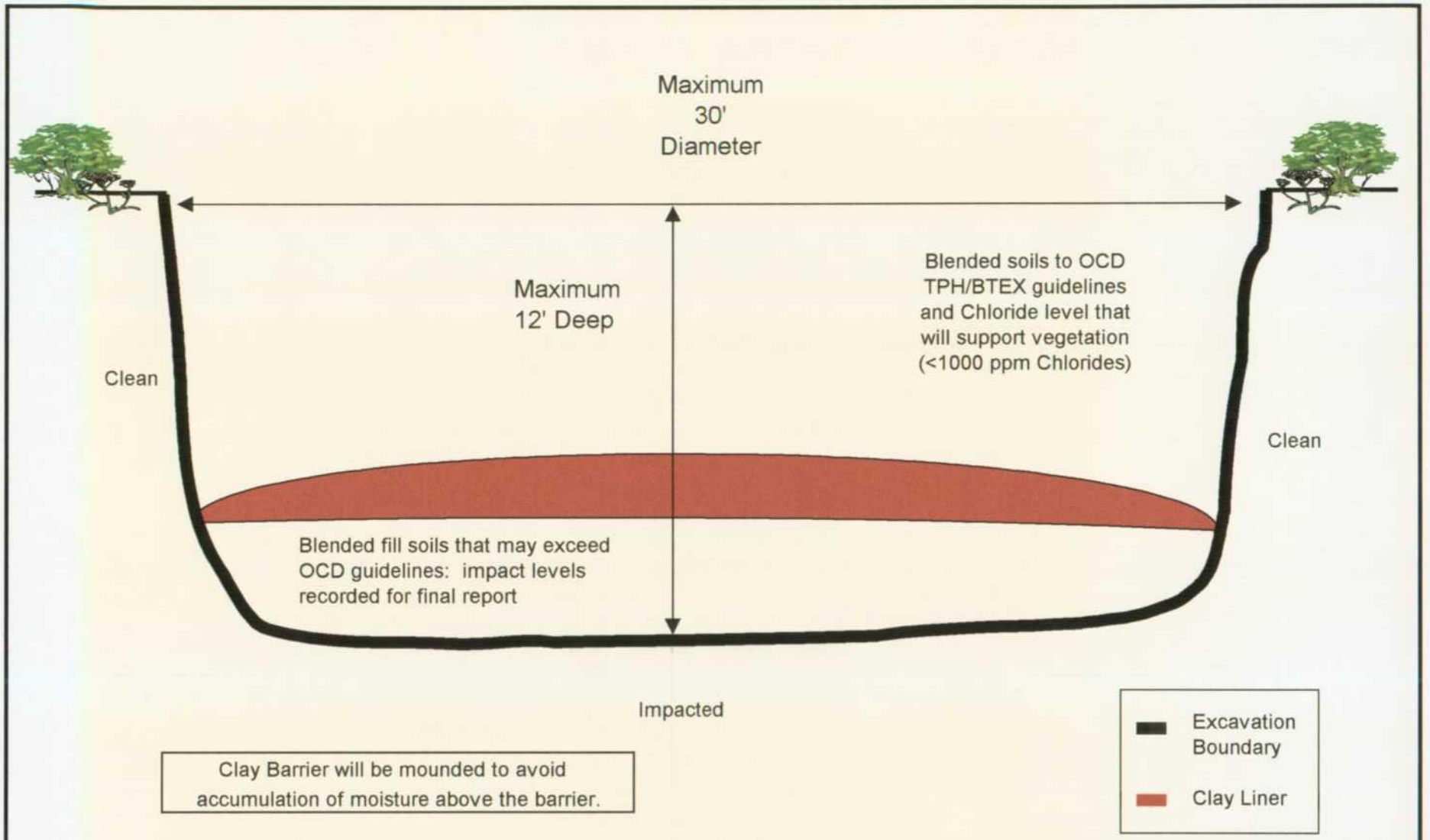
Site Name
Legal Description

Depth bgs (ft)	[Cl-] ppm

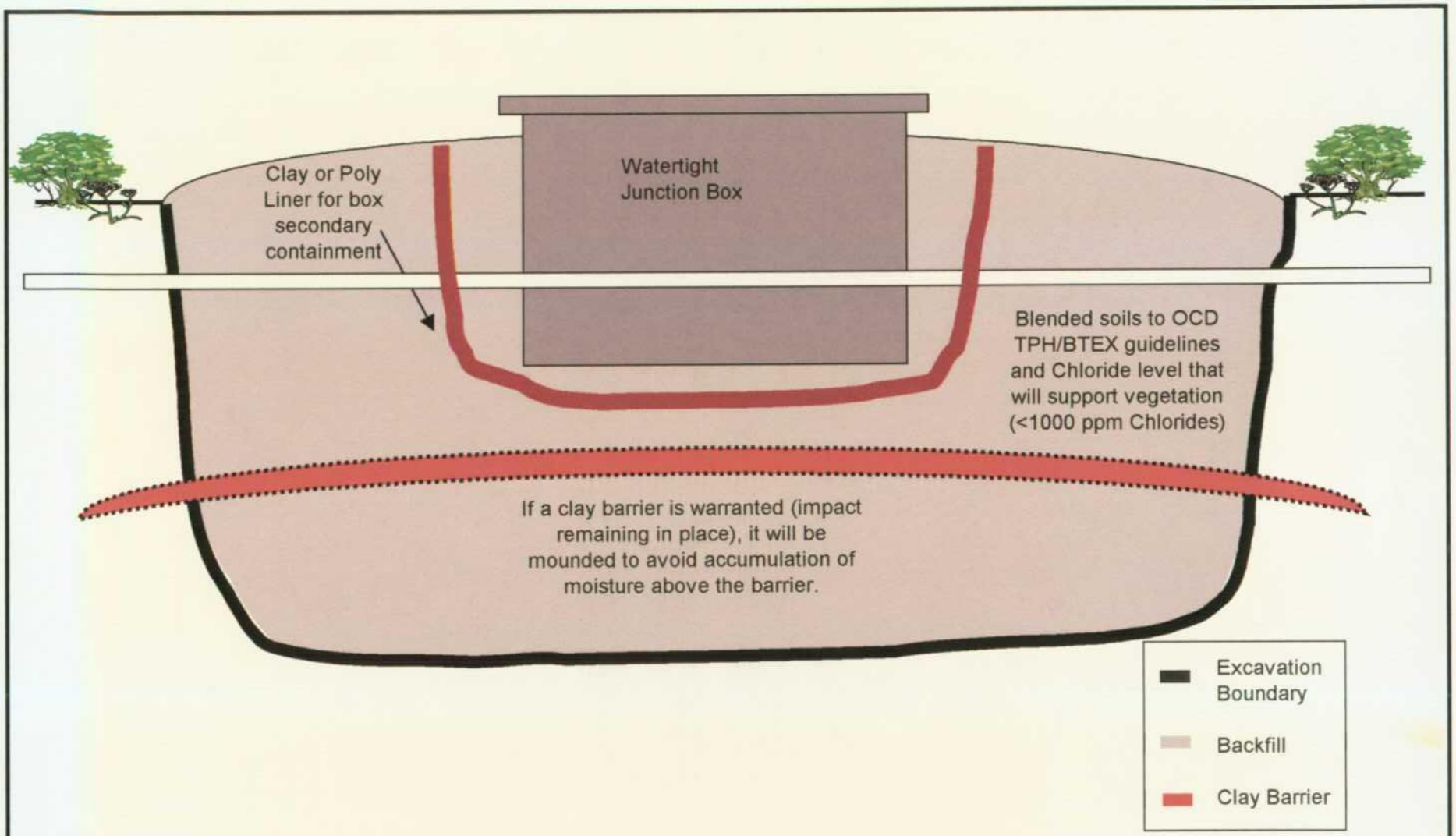




Rice Operating Company 122 West Taylor Hobbs, NM 88240 (505) 393-9174	**Clay Layer Barrier** **Impacted Sidewalls, Deep Impact**	**ROC Junction Box Work Plan** **Liner Staging**



Rice Operating Company 122 West Taylor Hobbs, NM 88240 (505) 393-9174	Clay Layer Barrier for Clean Sidewalls, Deep Impact	ROC Junction Box Work Plan Liner Staging



Rice Operating Company 122 West Taylor Hobbs, NM 88240 (505) 393-9174	CrossSectional View	ROC Junction Box Work Plan Completed Box Site

RICE OPERATING COMPANY
JUNCTION BOX FINAL REPORT

BOX LOCATION

SWD SYSTEM	JUNCTION	UNIT	SECTION	TOWNSHIP	RANGE	COUNTY	BOX DIMENSIONS - FEET		
							Length	Width	Depth

LAND TYPE: BLM ☐ STATE ☐ FEE LANDOWNER _____ OTHER _____

Depth to Groundwater _____ feet NMOCD SITE ASSESSMENT RANKING SCORE: _____

Date Started _____ Date Completed _____ OCD Witness _____

Soil Excavated _____ cubic yards Excavation Length _____ Width _____ Depth _____ feet

Soil Disposed _____ cubic yards Offsite Facility _____ Location _____

FINAL ANALYTICAL RESULTS: **Sample Date** _____ **Sample Depth** _____

Procure 5-point composite sample of bottom and 4-point composite sample of sidewalls. TPH, BTEX and Chloride laboratory test results completed by using an approved lab and testing procedures pursuant to NMOCD guidelines.

Sample Location	Benzene mg/kg	Toluene mg/kg	Ethyl Benzene mg/kg	Total Xylenes mg/kg	OVM ppm	GRO mg/kg	DRO mg/kg	Chlorides mg/kg
SIDEWALLS								
BOTTOM								
BACKFILL								

General Description of Remedial Action: _____

CHLORIDE FIELD TESTS

LOCATION	DEPTH	mg/kg

I HEREBY CERTIFY THAT THE INFORMATION ABOVE IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

DATE _____ PRINTED NAME _____

SIGNATURE _____ TITLE _____

RICE OPERATING COMPANY
JUNCTION BOX DISCLOSURE* REPORT

BOX LOCATION

SWD SYSTEM	JUNCTION	UNIT	SECTION	TOWNSHIP	RANGE	COUNTY	BOX DIMENSIONS - FEET		
							Length	Width	Depth

LAND TYPE: BLM ☐ STATE ☐ FEE LANDOWNER _____ OTHER _____

Depth to Groundwater _____ feet NMOCD SITE ASSESSMENT RANKING SCORE: _____

Date Started _____ Date Completed _____ OCD Witness _____

Soil Excavated _____ cubic yards Excavation Length _____ Width _____ Depth _____ feet

Soil Disposed _____ cubic yards Offsite Facility _____ Location _____

FINAL ANALYTICAL RESULTS: **Sample Date** _____ **Sample Depth** _____

Procure 5-point composite sample of bottom and 4-point composite sample of sidewalls. TPH, BTEX and Chloride laboratory test results completed by using an approved lab and testing procedures pursuant to NMOCD guidelines.

Sample Location	Benzene mg/kg	Toluene mg/kg	Ethyl Benzene mg/kg	Total Xylenes mg/kg	OVM ppm	GRO mg/kg	DRO mg/kg	Chlorides mg/kg
SIDEWALLS								
BOTTOM								
BACKFILL								

General Description of Remedial Action: _____

CHLORIDE FIELD TESTS

LOCATION	DEPTH	mg/kg

I HEREBY CERTIFY THAT THE INFORMATION ABOVE IS TRUE AND COMPLETE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

DATE _____ PRINTED NAME _____

SIGNATURE _____ TITLE _____

This site is a "DISCLOSURE." It will be placed on a prioritized list of similar sites for further consideration.

Rice Operating Company

Quality Procedure
Field TPH Analysis

1.0 Purpose

To define the procedure to be used in conducting total percentage hydrocarbon testing in accordance with EPA Method 418.1 (modified) using the "MEGA" TPH Analyzer.

2.0 Scope

This procedure is to be used for field testing and on site remediation information.

3.0 Procedure

1.1 The G.A.C. "MEGA" TPH analyzer is an instrument that measures concentrations of aliphatic hydrocarbons by means of infra-red spectrometry. It is manufactured to specifications and can accurately measure concentrations from two parts per million through 100,000 parts per million. The unit is factory calibrated however minor calibration adjustments may be made in the field. Quality Procedure 25 defines the field calibration methods to be employed.

1.2 Prior to taking the machine into the field, insert a 500 ppm and 5,000 ppm calibration standard into the sample port of the machine. Zero out the Range dial until the instrument records the exact standard reading.

1.3 Once in the field, insert a large and small cuvette filled with clean Freon 113 into the sample port of the machine. Use the range dial to zero in the reading. If the machine does not zero, do not attempt to adjust the span dial. Immediately implement Quality Procedure 25.

1.4 Place a 100 g weight standard on the field scale to insure accuracy. Zero out the scale as necessary.

1.5 Tare a clean 100 ml sample vial with the Teflon cap removed. Add 10 g (+/-.01g), of sample soil into the vial taking care to remove rocks or vegetable matter from the sample to be tested. If the sample is wet, add up to 5 g silica gel or anhydrous sodium sulfate to the sample after weighing.

1.6 Dispense 10 ml Freon 113 into the sample vial.

1.7 Cap the vial and shake for five minutes.

1.8 Carefully decant the liquid contents of the vial into a filter/desiccant cartridge and affix the cartridge cap. Recap the sample vial and set aside.

1.9 Insert the metal tip of the pressure syringe into the cap opening and slowly pressurize. **WARNING: APPLY ONLY ENOUGH PRESSURE ON THE SYRINGE TO EFFECT FLOW THROUGH THE FILTERS. TOO MUCH PRESSURE MAY CAUSE THE CAP TO SEPARATE FROM THE BODY OF THE CARTRIDGE.** Once flow is established through the cartridge, direct the flow into the 5 cm cuvette until the cuvette is full. Reverse the pressure on the syringe and remove the syringe tip form the cartridge cap. Set the cartridge aside in vertical position.

1.10 The cuvette has two clear and two frosted sides. Hold the cuvette by the frosted sides and carefully insert into the sample port of the machine. Read the right hand digital read-out of the instrument. If the reading is less than 1,000 ppm, the results shall be recorded in the field Soil Analysis Report. If the result is higher than 1,000 ppm, continue with the dilution procedure.

4.0 Dilution Procedure

1.11 When initial readings are greater than 1,000 ppm using the 5 cm cuvette, pour the contents of the 5 cm cuvette into a 1 cm cuvette. Insert the 1 cm cuvette into the metal holder and place into the test port of the instrument.

1.12 Read the left hand read-out of the machine. If the results are less than 10,000 ppm, record the results into the field Soil Analysis Reports. If greater than 10,000 ppm, continue the dilution process. **Concentrations >10,000 ppm are to be used for field screen purposes only.**

1.13 Pour the contents of the small cuvette into a graduated glass pipette. Add 10 ml pure Freon 113 into the pipette. Shake the contents and pour into the 1cm. cuvette. Repeat step 4.2 adding two zeros to the end of the displayed number. If the reported result is greater than 100,000 ppm, the accuracy of further readings through additional dilutions is extremely questionable. **Do not use for reporting purposes.**

1.14 **Pour all sample Freon into the recycling container.**

5.0 Split Samples

1.15 Each tenth test sample shall be a split sample. Decant approximately one half of the extraction solvent through a filter cartridge and insert into the instrument to obtain a concentration reading. Clean and rinse the cuvette and decant the remainder of the fluid to obtain a second concentration reading from the same sample. If the second reading varies by more than 1% from the original, it will be necessary to completely recalibrate the instrument.

Rice Operating Company

Quality Procedure
Soil Samples for Transportation to a Laboratory

1.0 Purpose

This procedure outlines the methods to be employed when obtaining soil samples to be taken to a laboratory for analysis.

2.0 Scope

This procedure is to be used when collecting soil samples intended for ultimate transfer to a testing laboratory.

3.0 Preliminary

3.1 Obtain sterile sampling containers from the testing laboratory designated to conduct analyses of the soil. The shipment should include a Certificate of Compliance from the manufacturer of the collection bottle or vial and a Serial Number for the lot of containers. Retain this Certificate for future documentation purposes.

3.2 If collecting TPH, BTEX, RCRA 8 metals, cation /anions or O&G, the sample jar may be a clear 4 oz. container with Teflon lid. If collecting PAH's, use an amber 4 oz. container.

4.0 Chain of Custody

4.1 Prepare a Sample Plan. The plan will list the number, location and designation of each planned sample and the individual tests to be performed on the sample. The sampler will check the list against the available inventory of appropriate sample collection bottles to insure against shortage.

4.2 Transfer the data to the Laboratory Chain of Custody Form. Complete all sections of the form except those that relate to the time of delivery of the samples to the laboratory.

4.3 Pre-label the sample collection jars. Include all requested information except time of collection. (Use a fine point Sharpie to insure that the ink remains on the label.) Affix the labels to the jars.

5.0 Sampling Procedure

5.1.Do not touch the soil with your bare hands. Use new latex gloves with each sample to help minimize any cross-contamination.

5.2. Go to the sampling point with the sample container. If not analyzing for ions or metals, use a trowel to obtain the soil.

5.3. Pack the soil tightly into the container leaving the top slightly domed. Screw the lid down tightly. Enter the time of collection onto the sample collection jar label.

5.4. Place the sample directly on ice for transport to the laboratory if required.

5.5. Complete the Chain of Custody form to include the collection times for each sample. Deliver all samples to the laboratory.

6.0 Documentation

6.1 The testing laboratory shall provide the following minimum information:

a. Project and sample name.
b. Signed copy of the original Chain of Custody Form including the time the sample was received by the lab.
c. Results of the requested analyses
d. Test Methods employed
e. Quality Control methods and results

Rice Operating Company

QUALITY PROCEDURE
Chloride Titration Using
0.282 Normal Silver Nitrate Solution

1.0 Purpose

This procedure is to be used to determine the concentration of chloride in soil.

2.0 Scope

This procedure is to be used as the standard field measurement for soil chloride concentrations.

3.0 Sample Collection and Preparation

3.1 Collect at least 80 grams of soil from the sample collection point. Take care to insure that the sample is representative of the general background to include visible concentrations of hydrocarbons and soil types. If necessary, prepare a composite sample for soils obtained at several points in the sample area. Take care to insure that no loose vegetation, rocks or liquids are included in the sample(s).

3.2 The soil sample(s) shall be immediately inserted into a one-quart or larger polyethylene freezer bag. Care should be taken to insure that no cross-contamination occurs between the soil sample and the collection tools or sample processing equipment.

3.3 The sealed sample bag should be massaged to break up any clods.

4.0 Sample Preparation

4.1 Tare a clean glass vial having a minimum 40 ml capacity. Add at least 10 grams of the soil sample and record the weight.

4.2 Add at least 10 grams of reverse osmosis water to the soil sample and shake for 20 seconds.

4.3 Allow the sample to set for a period of 5 minutes or until the separation of soil and water.

4.4 Carefully pour the free liquid extract from the sample through a paper filter into a clean plastic cup if necessary.

5.0 Titration Procedure

5.1 Using a graduated pipette, remove 10 ml extract and dispense into a clean plastic cup.

5.2 Add 2-3 drops potassium chromate (K_2CrO_4) to mixture.

5.3 If the sample contains any sulfides (hydrogen or iron sulfides are common to oilfield soil samples) add 2-3 drops of hydrogen peroxide (H_2O_2) to mixture.

5.4 Using a 1 ml pipette, carefully add .282 normal silver nitrate (one drop at a time) to the sample while constantly agitating it. Stop adding silver nitrate when the solution begins to change from yellow to red. Be consistent with endpoint recognition.

5.5 Record the ml of silver nitrate used.

6.0 Calculation

To obtain the chloride concentration, insert measured data into the following formula:

$$\frac{.282 \times 35{,}450 \times \text{ml } AgNO_3}{\text{ml water extract}} \times \frac{\text{grams of water in mixture}}{\text{grams of soil in mixture}}$$

Using Step 5.0, determine the chloride concentration of the RO water used to mix with the soil sample. Record this concentration and subtract it from the formula results to find the net chloride in the soil sample.

Record all results on the delineation form.

Rice Operating Company

Quality Procedure
Development of Cased Water-Monitoring Wells

1.0 Purpose

This procedure outlines the methods to be employed to develop cased monitoring wells.

2.0 Scope

This procedure shall be used for developed, cased water monitoring wells. It is not to be used for standing water samples such as ponds or streams.

3.0 Sample Collection and Preparation

3.1 Prior to development, the static water level and height of the water column within the well casing will be measured with the use of an electric D.C. probe or a steel engineer's tape and water sensitive paste.

3.2 All measurements will be recorded within a field log notebook.

3.3 All equipment used to measure the static water level will be decontaminated after each use by means of Liquinox, a phosphate free laboratory detergent, and water to reduce the possibility of cross-contamination. The volume of water in each well casing will be calculated.

4.0 Purging

4.1 Wells will be purged by using a 2" decontaminated submersible pump or dedicated one liter Teflon bailer. Wells should be purged until the pH and conductivity are stabilized and the turbidity has been reduced to the greatest extent possible.

4.2 If a submersible is used the pump will be decontaminated prior to use by scrubbing the outside surface of tubing and wiring with a Liquinox water mixture, pumping a Liquinox-water mixture through the pump, and a final flush with fresh water.

5.0 Water Disposal

5.1 All purge and decontamination water will be temporarily stored within a portable tank to be later disposed of in an appropriate manner.

6.0 Records

6.1 Rice Operating Company will record the amount of water removed from the well during development procedures. The purge volume will be reported to the appropriate regulatory authority when filing the closure report.

Rice Operating Company

Quality Procedure
Sampling of Cased Water-Monitoring Well
Using One-Liter Bailer

1.0 Purpose

This procedure outlines the methods to be employed in obtaining water samples from cased monitoring wells.

2.0 Scope

This procedure shall be used for developed, cased water monitoring wells. It is not to be used for standing water samples such as ponds or streams.

3.0 Preliminary

3.1 Obtain sterile sampling containers from the testing laboratory designated to conduct analyses of the water. The shipment should include a Certificate of Compliance from the manufacturer of the collection bottle or vial and a Serial Number for the lot of containers. Retain this Certificate for future documentation purposes.

3.2 The following table shall be used to select the appropriate sampling container, preservative method and holding times for the various elements and compounds to be analyzed.

Compound to be Analyzed	Sample Container Size	Sample Container Description	Cap Requirements	Preservative	Maximum Hold Time
BTEX	40 ml	VOA Container	Teflon Lined	HCl	7 days
TPH	1 liter	clear glass	Teflon Lined	HCl	28 days
PAH	1 liter	amber glass	Teflon Lined	Ice	7 days
Cation/Anion	1 liter	clear glass	Teflon Lined	None	48 Hrs
Metals	1 liter	HD polyethylene	Any Plastic	Ice/HNO_3	28 Days
TDS	300 ml	clear glass	Any Plastic	Ice	7 Days

4.0 Chain of Custody

4.1 Prepare a Sample Plan. The plan will list the well identification and the individual tests to be performed at that location. The sampler will check the list against the available inventory of appropriate sample collection bottles to insure against shortage.

4.2 Transfer the data to the Laboratory Chain of Custody Form. Complete all sections of the form except those that relate to the time of delivery of the samples to the laboratory.

4.3 Pre-label the sample collection jars. Include all requested information except time of collection. (Use a fine point Sharpie to insure that the ink remains on the label). Affix the labels to the jars.

5.0 Bailing Procedure

5.1 Identify the well from the sites schematics. Place pre-labeled jar(s) next to the well. Remove the plastic cap from the well bore by first lifting the metal lever and then unscrewing the entire assembly.

5.2 Using a dedicated one liter Teflon bailer, purge a minimum of three well volumes. Place the water in storage container for transport to a ROC disposal facility.

5.3 Take care to insure that the bailing device and string do not become cross-contaminated. A clean pair of rubber gloves should be used when handling either the retrieval string or bailer. The retrieval string should not be allowed to come into contact with the ground.

6.0 Sampling Procedure

6.1 Once the well has been bailed in accordance with 5.2 of this procedure, a sample may be decanted into the appropriate sample collection jar directly from the bailer. The collection jar should be filled to the brim. Once the jar is sealed, turn the jar over to detect any bubbles that may be present. Add additional water to remove all bubbles from the sample container.

6.2 Note the time of collection on the sample jar with a fine Sharpie.

6.3 Place the sample directly on ice for transport to the laboratory. The preceding table shows the maximum hold times between collection and testing for the various analyses.

6.4 Complete the Chain of Custody form to include the collection times for each sample. Deliver all samples to the laboratory.

7.0 Documentation

7.1 The testing laboratory shall provide the following minimum information:

A. Project and sample name.
B. Signed copy of the original Chain of Custody Form including the time the sample was received by the lab.
C. Results of the requested analyses
D. Test Methods employed
E. Quality Control methods and results

Calculation for Determining the Minimum Bailing Volume for Monitor Wells
Formula V= ($\pi r^2 h$)
2" well [V/231=gal] X 3 = Purge Volume

V=Volume
π=pi
r=inside radius of the well bore
h=maximum height of well bore in water table

Example:

π	r^2	h(in)	V(cu.in)	V(gal)	X 3 Volumes	Actual
3.1416	1	180	565.488	2.448	7.34 gal	>10 gal

Rice Operating Company

Quality Procedure
Composite Sampling of Excavation Sidewalls and Bottoms For TPH and Chloride Analysis

1.0 Purpose

This procedure outlines the methods to be employed when obtaining final composite soil samples for TPH and Chloride analysis.

2.0 Scope

This procedure is to be used in conjunction with ***Quality Procedure – 02: Soil Samples for Transportation to a Laboratory*** and will be inserted at subparagraph 5.2 of Section 5.0: Sampling Procedure.

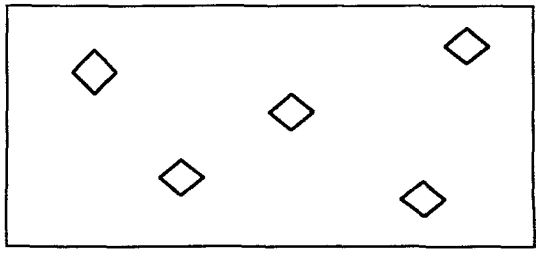
3.0 Sampling Procedure

Follow ***Quality Procedure – 02: Soil Samples for Transportation to a Laboratory*** for all Sections and subparagraphs until subparagraph 5.2 of Section 5.0: Sampling Procedure. Instead of 5.2 instructions, perform the composite sample collection procedure as follows:

3.1 Go to the excavation with a clean large blending bowl or new plastic baggie. If not analyzing for ions or metals, use a trowel to obtain the soil. If the excavation is deeper than 6' BGS, do not enter the pit, but use a backhoe to assist in procurement of the sample. (If a backhoe is used, the backhoe will obtain an amount of soil from each composite point, bring the purchase to the surface staging area where a sample-portion of soil will be extracted from the backhoe purchase. The remainder of the backhoe purchase will be staged on the surface with other staged soils.)

3.2 Sidewall samples

3.2.1 On each sidewall, procure a 5oz sample from each of five distinct points on the sidewall with distinct points resembling the "W" pattern:



3.2.2 Thoroughly blend these five samples in the blending bowl.
3.2.3 Pour blended sample into sifter and sift into labeled baggie.
3.2.4 Repeat steps 3.2.1 through 3.2.4 for each remaining sidewall, using a clean blending bowl for each sidewall.
3.2.5 From each labeled baggie, procure a 5 oz portion and pour into a baggie labeled "Sidewall Composite". Blend this soil mixture completely.
3.2.6 Obtain proper laboratory sample container for "Sidewall Composite" and continue with subparagraph 5.3 of QP – 02.

3.3 Bottom Sample

3.3.1 From bottom of excavation, procure a 5oz sample from each of five distinct points with distinct points resembling the "W" pattern as illustrated above.
3.3.2 Thoroughly blend these five samples in a clean blending bowl.
3.2.3 Pour blended sample into sifter and sift into baggie labeled "Bottom Composite".
3.2.6 Obtain proper laboratory sample container for "Bottom Composite" and continue with subparagraph 5.3 of QP – 02.

Rice Operating Company

QUALITY PROCEDURE
Sampling and Testing Protocol for VOC in Soil

1.0 Purpose

This procedure is to be used to determine the concentrations of Volatile Organic Compounds in soils.

2.0 Scope

This procedure is to be used as the standard field measurement for soil VOC concentrations. It is not to be used as a substitute for full spectrographic speciation of organic compounds.

3.0 Procedure

3.1 Sample Collection and Preparation

3.1.1 Collect at least 500 g. of soil from the sample collection point. Take care to insure that the sample is representative of the general background to include visible concentrations of hydrocarbons and soil types. If necessary, prepare a composite sample of soils obtained at several points in the sample area. Take care to insure that no loose vegetation, rocks or liquids are included in the sample(s).

3.1.2 The soil sample(s) shall be immediately inserted into a one-quart or larger polyethylene freezer bag and sealed. When sealed, the bag should contain a nearly equal space between the soil sample and trapped air. Record the sample name and the time that the sample was collected on the Field Analytical Report Form.

3.1.3 The sealed samples shall be allowed to set for a minimum of five minutes at a temperature of between 10-15 Celsius, (59-77^{0}F). The sample temperatures may be adjusted by cooling the sample in ice, or by heating the sample within a generally controlled environment such as the inside of a vehicle. The samples should not be placed directly on heated surfaces or placed in direct heat sources such as lamps or heater vents.

3.1.4 The sealed sample bag should be massaged to break up any clods, and to provide the soil sample with as much exposed surface area as practically possible.

3.2 Sampling Procedure

3.2.1 The instrument to be used in conducting VOC concentration testing shall be an Environmental Instruments 13471 OVM / Datalogger or a similar PID-type instrument. (Device will be identified on VOC Field Test Report Form.) Prior to use, the instrument shall be zeroed-out in accordance with the appropriate maintenance and calibration procedure outlined in the instrument operation manual. The PID device will be calibrated each day it's used.

3.2.2 Carefully open one end of the collection bag and insert the probe tip into the bag taking care that the probe tip not touch the soil sample or the sidewalls of the bag.

3.2.3 Set the instrument to retain the highest result reading value. Record the reading onto the Field Test Report Form.

3.2.4 If the instrument provides a reading exceeding 100 ppm, proceed to conduct BTEX Speciation in accordance with **QP-02 and QP-06. If the reading is 100 ppm or less, NMOCD BTEX guideline has been met and no further testing for BTEX is necessary. File the Field Test Report Form in the project file.**

4.0 Clean-up

After testing, the soil samples shall be returned to the sampling location, and the bags collected for off-site disposal. **IN NO CASE SHALL THE SAME BAG BE USED TWICE. EACH SAMPLE CONTAINER MUST BE DISCARDED AFTER EACH USE.**

Rice Operating Company

Quality Procedure
Composite Sampling of Excavation Sidewalls and Bottoms For BTEX Analysis

1.0 Purpose

This procedure outlines the methods to be employed when obtaining final composite soil samples for BTEX analysis.

2.0 Scope

This procedure is to be used when collecting soil samples intended for ultimate transfer to a testing laboratory for BTEX analysis. This procedure is to be used only when the PID field-test results for OVM exceeds 100 ppm.

3.0 Preliminary

3.1 Obtain sterile, clear, 2 oz. glass containers with Teflon lid from a laboratory supply company or the testing laboratory designated to conduct analyses of the soil.

3.2 The container shipment should include a Certificate of Compliance from the manufacturer of the collection bottle or vial and a Serial Number for the lot of containers. Retain this Certificate for future documentation purposes.

4.0 Chain of Custody

4.1 Prepare a Sample Plan. The plan will list the number, location and designation of each planned sample and the individual tests to be performed on the sample. The sampler will check the list against the available inventory of appropriate sample collection bottles to insure against shortage.

4.2 Transfer the data to the Laboratory Chain of Custody Form. Complete all sections of the form except those that relate to the time of delivery of the samples to the laboratory.

4.3 Pre-label the sample collection jars. Include all requested information except time of collection. (Use a fine point Sharpie to insure that the ink remains on the label.) Affix the labels to the jars.

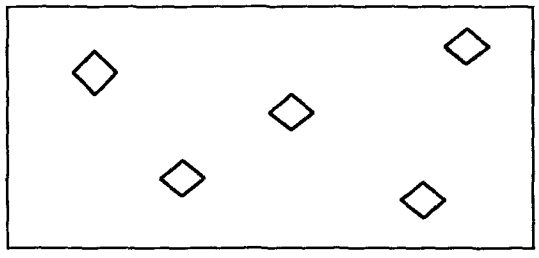
5.0 Sampling Procedure

5.1. Do not touch the soil with your bare hands. Use new latex gloves with each sample to help minimize any cross-contamination.

5.2. If safe and within OSHA regulations, go to the sampling point with the sample container. If not analyzing for ions or metals, use a trowel to obtain the soil. If the excavation is deeper than 6' BGS, do not enter the pit, but use a backhoe to assist in procurement of the sample. (If a backhoe is used, the backhoe will obtain an amount of soil from each composite point, bring the purchase to the surface staging area where a sample-portion of soil will be extracted from the backhoe purchase. The remainder of the backhoe purchase will be staged on the surface with other staged soils.)

5.3. Sidewall Samples

5.3.1. On each sidewall, procure a 2oz sample from each of five distinct points on the sidewall with distinct points resembling the "W" pattern:



5.4. Pack the soil tightly into the container leaving the top slightly domed. Screw the lid down tightly. Enter the time of collection onto the sample collection jar label. Repeat for each sampling point.

5.5. Place the samples directly on ice for transport to the laboratory if required.

5.6. Complete the Chain of Custody form to include the collection times for each sample. Deliver all samples to the laboratory.

6.0 Documentation

6.1 The testing laboratory shall provide the following minimum information:

a. Project and sample name.
b. Signed copy of the original Chain of Custody Form including the time the sample was received by the lab.
c. Results of the requested analyses
d. Test Methods employed
e. Quality Control methods and results