Technical Evaluation and Calculations for the Land Application of Drilling Fluids

Permittee Name: SEECO, Inc. **Well Name:** Russell 2-35-H

Authorization Date: 8/20/2008 **Permit No.:** 00097-WG-LA

Geologist: Hanson **AFIN No.:** 73-00000

Approved Application Requirements			
Volume to be applied:	3,187	bbl	These are the approved application requirements for this land application event. Fluids must be distributed over the entire application area.
Application area:	10.0	ac	
Maximum application rate:	2,715	gpm	
	271	gpm/ac	
	13,385	gal/ac	
Maximum application depth:	0.494	in	

Design and Analysis Values (Enter values from design drawings, WMP, and lab analysis)

Drilling Fluids Volume:	3,187	bbl	→ Volume Equivalents		
Available Acreage:	10	ac	Volume:	133,854	gal
Soil Permeability:	0.6	in/hr	Volume:	17,894	ft^3

Drilling Fluids Analysis Data			Soil Analysis Data		
pH	8.9		CEC	10.0	meq/100g
Conductance	4100	µmho/cm	ESP	0.8	% Na sat.
Chlorides	960	mg/l	Conductivity	300	µmho/cm
TPH-DRO	1.0	mg/l	pH	5.4	
Sodium	730	mg/l	Chlorides	130	mg/kg
Arsenic	0.05	mg/l	Arsenic	6.5	mg/kg
Barium	0.86	mg/l	Barium	100	mg/kg
Cadmium	0.004	mg/l	Cadmium	0.4	mg/kg
Copper	0.006	mg/l	Copper	4.3	mg/kg
Lead	0.04	mg/l	Lead	16	mg/kg
Mercury	0.0002	mg/l	Mercury	0.1	mg/kg
Nickel	0.025	mg/l	Nickel	5.9	mg/kg
Selenium	0.07	mg/l	Selenium	7.0	mg/kg
Zinc	0.0035	mg/l	Zinc	19	mg/kg

Well Name: Russell 2-35-H

Evaluation and Calculations

1.a. Acreage Necessary for Disposal Based on Conductivity (EC)

Is the soil conductivity less than 1000 µmho/cm? yes

A_C = 3.173 ac $\qquad A_C = \frac{1.7\times10^{-4}(EC_{dm})(V)}{1000 - EC_S}$

1.b. Acreage Necessary for Disposal Based on Exchangeable Sodium Percent (ESP)

Is the ESP less than 10%? yes

A_{ESP} = 1.871 ac $\qquad A_{ESP} = \frac{7.4\times10^{-7}(Na)(V)}{(0.1 - ESP_S)(CEC)}$

1.c. Minimum Acreage Required

A = 3.173 ac $\qquad$ A = maximum of A_C or A_{ESP}

Is the minimum acreage required less than the available acreage? yes

3. Loading Rate for Disposal Based on Heavy Metals

$$L = \frac{(V)(Metal)_F}{A}\times3.5\times10^{-4} + 2\times(Metal)_S$$

Element	Calculated Value	Allowable Value	Is calculated value less than allowable value?
Arsenic:	L_{Ar} = 13.02 lbs/ac	37 lbs/ac	yes
Barium:	L_{Ba} = 200.30 lbs/ac	1000 lbs/ac	yes
Cadmium:	L_{Cd} = 0.80 lbs/ac	35 lbs/ac	yes
Copper:	L_{Cu} = 8.60 lbs/ac	1350 lbs/ac	yes
Lead:	L_{Pb} = 32.01 lbs/ac	270 lbs/ac	yes
Mercury:	L_{Hg} = 0.20 lbs/ac	15 lbs/ac	yes
Nickel:	L_{Ni} = 11.81 lbs/ac	378 lbs/ac	yes
Selenium:	L_{Se} = 14.02 lbs/ac	90 lbs/ac	yes
Zinc:	L_{Zn} = 38.00 lbs/ac	2520 lbs/ac	yes

4. Maximum Application Rate Based on the Soil Permeability

The allowable application rate of the drilling fluids is calculated based on the soil permeability. This value is the maximum rate at which drilling fluids can be applied over the entire application area without runoff.

GPM = 2,715 gpm $\qquad GPM = \frac{(K_s)(AA)}{2.21\times10^{-3}}$

AR = 271 gpm/ac $\qquad AR = \frac{GPM}{AA}$

5. Maximum Application Depth

D_{max} = 0.494 in $\qquad D_{max} = \left(\frac{V}{AA}\right)(1.55\times10^{-3})$

A_C = area based on EC, ac
EC_{dm} = EC of drilling fluid, µmho/cm
V= volume of pit, bbl
EC_S = EC soil, µmho/cm
A_{ESP} = area based on ESP, ac
Na = Sodium conc. of the drilling fluid, mg/l
ESP_S = ESP of soil, expressed as a percent
C_{metal} = Concentration of metal in drilling fluid, mg/kg
CEC = cation exchange capacity, meq/100g
$(Metal)_F$ = Conc. of Zn, Cr, Pb, etc in the drilling fluid, mg/L
$(Metal)_S$ = Conc. of Zn, Cr, Pb, etc in the soil, mg/kg
A = maximum of A_C or A_{ESP}, ac
GPM = drilling fluid flow rate, gpm
L = loading rate, lbs/ac
AA = Available Acreage
D_{max} = max application depth, in
K_S = soil permeability, in/hr
AR = application rate of drilling fluid, gpm/ac

SITE MANAGEMENT PLAN

RUSSELL 2-35-H

SW¼, SW¼ NE¼, NW¼ SE¼, SW¼ SE¼
SECTION 35 T-10-N R-6-W

WHITE COUNTY

LATITUDE **35.443387°** LONGITUDE **-91.616358°**

NEAREST TOWN: **VELVET RIDGE, AR**

NEAREST STREAM: 650' NE to
BRANCH FOURMILE CREEK

ESTIMATED VOLUME OF FLUID: **3187 BARRELS**

MINIMUM AREA REQUIRED FOR DISPOSAL: **10 ACRES**

SURFACE USAGE AGREEMENT: 280 **ACRES**

MAXIMUM APPLICATION DEPTH OF DRILLING FLUID: **0.5".** Land application operations will be in stages as determined by the water capacity of the soil. Spraying shall cease temporarily when hydraulic capacity of the soil is exceeded, then resume as soil conditions permit.

PREPARED BY

DON L. POTTER, PE

TIM TYLER SURVEYING & MAPPING, INC.
240 SKYLINE DRIVE, SUITE 3000
CONWAY, ARKANSAS 72032

SITE MANAGEMENT PLAN

GENERAL INFORMATION

The previously stripped topsoil from the drill site location and pit area will be used in reclamation of the property. The drill pad size will be reduced and all previously disturbed property that was used in the drilling operations will be reclaimed in accordance with the "Surface Usage Agreement."

The Site Management Plan (SMP) provides provisions for land application of water based drilling fluids associated with natural gas exploration and production activities from one gas well and its associated reserve pit at one site under the conditions of the ADEQ General Permit. Each land application site shall have fluids applied only one time from a pit at that same location or at a nearby location. Fluids shall not be discharged from this operation to the waters of the State or onto the land in any manner that may result in runoff to the waters of the State.

The fluid disposal system will be constructed, operated and maintained in accordance with the General Permit, Notice of Intent (NOI) and SMP. The notification requirements for the NOI are listed in Part I, Section B of the General Permit.

The permittee shall keep copies of the NOI, the approval letter granting coverage under the General Permit and the liner certification at the site or at a specified location.

The SMP includes spraying the drilling fluid contents of the reserve pit from one well onto the designated spray area of the property, to the extent permitted by the Land Use Agreement. The handling and disposal of the residue drilling mud that remains in the pit after being emptied of fluids shall be disposed of and the pit closed in accordance with the reserve pit General Permit.

PERTINENT INFORMATION

The following information is specific for this drilling site:

a. **WASTE GENERATING PROCESS** includes a reserve pit that receives fluids generated or utilized during natural gas drilling operations. The fluid discharged into the reserve pit will not exceed the analytical parameters specified in the General Permit. The fluid may consist of fresh water, water based drilling mud, drill cuttings, produced water, flow-back water, bentontitic clays, chemical additives, barite, foaming agents, lubricants and emulsifiers. Completion fluids, frac water, flow-back water, oil-based drilling fluids and fluids classified or listed as hazardous waste under State or Federal regulations shall not be land applied.

b. **THE STORAGE FACILITY** specifications are included in the reserve pit General Permit. The estimated volume of the reserve pit drilling fluid is

included in this SMP, Technical Information Section (TIS). Location of the reserve pit is shown on the attached maps.

c. **DISPOSAL OF DRILLING FLUID WASTE** will be land applied and vehicle transportation will not be used. The analytical parameters of the fluid will be tested prior to disposal and the liner will be monitored for leaks daily. During waste operations, the drilling fluids will be pumped from the reserve pit and transported to the land application site using surface "tight" piping. The fluid contents from the reserve pit will be land applied by spray irrigation. The pump model used in spraying operations, maximum application flow rate and total available acreage for land application are included in the TIS. Each land site shall have only one application of fluids from the reserve pit. Fluids from other reserve pits or holding ponds shall not be applied. At no time shall the application or loading rate be allowed to exceed the site-specific rate approved by ADEQ. See the TIS for application and loading rates.

d. **ANALYSIS OF THE PHYSICAL AND NUTRIENT PROPERTIES OF THE WASTE** will include all parameters required by the General Permit. Ceiling concentrations of metals in the drilling fluids cannot exceed the allowable concentration shown in this SMP.

e. **PERMEABILITY OF THE SOIL**, (inches/hour), identification and description of the soil by typical name, appropriate proportion of grain sizes, texture, consistency, moisture condition, the minimum permeability range and other pertinent characteristics are included in the TIS. Soil samples are to be provided for every ten (10) acres of waste application area. A copy of the soil map is attached. All soil information to be obtained from the applicable NRCS Soil Survey Book.

f. **MAPS INCLUDED** are copies USGS topographic map(s), AHTD County Map(s) and an aerial photograph are attached. Land use of adjacent properties and nearby land is visible on the aerial photo. The distance and directions from the nearest State Highway intersection or community is included on the County Map. A legal description and location by latitude and longitude is provided for the waste-generating facility in this SMP.

g. All known water wells within one mile radius of the waste-generation facility are shown on an attached USGS topographic map.

GENERAL REQUIREMENTS OF THE SITE MANAGEMENT PLAN

1. **APPLICATION OR LOADING RATE** of drilling fluid will not exceed the site-specific rate approved by ADEQ. Calculations for approved application rate, loading rates, and acreage requirements are included in the TIS.

2. **CEILING CONCENTRATION OF HEAVY METALS IN DRILLING FLUIDS.** None of the pollutant concentrations in the drilling fluids will exceed the allowable concentrations listed in TABLE 1. The drilling fluids will meet the requirements for land application.

TABLE 1	
Element	**Allowable Concentration (mg/kg)**
Arsenic	75
Cadmium	85
Copper	4,300
Lead	840
Mercury	57
Nickel	420
Selenium	100
Zinc	7,500

3. **CONCENTRATION OF CHLORIDES, ESP, CONDUCTIVITY AND TPH-DRO IN THE SOIL**
   - Land application of fluid is prohibited when the chlorides in the soil exceed 1,000 ppm.
   - Land application of fluid is prohibited when the Exchangeable Sodium Percentage (ESP) of the soil is greater than 10%.
   - Land application of fluid is prohibited when the Conductivity of the soil is greater than 1,000 µmho/cm.
   - Land application of fluid is prohibited when the TPH-DRO is greater than 100 ppm.
4. **MAXIMUM LIMITS FOR LAND APPLICATION**

   Drilling fluids applied to land will not exceed the maximum soil limits listed in TABLE 2 below. If background soil element concentrations exceed the limits listed below, land application of drilling fluids is prohibited.

TABLE 2

Element	**Allowable Loading Rate**
	lbs/ac
Arsenic	37
Cadmium	35
Copper	1,350
Lead	270
Mercury	15
Nickel	378
Selenium	90
Zinc	2,520

5. The permittee shall be responsible for assuring that the landowner of any land application site not owned by the permittee and the waste applicator abide by the conditions of this SMP and the General Permit.

6. Care and discretion shall be exercised during spraying operations so as to prevent any runoff of drilling fluids, water or rain water from the application area. Spraying operations shall temporarily cease when ponding or runoff occurs. This shutdown shall remain in effect until the fluid infiltrates into the soil. Waste shall not be discharged from this operation to the waters of the State or onto the land in any manner that may result in runoff to the waters of the State.

7. Immediate corrective action shall be taken in all cases where pollution has occurred. An operator responsible for the facility from which the pollution resulted shall immediately take all necessary steps to abate the source of pollution to minimize adverse effects of any un-permitted release. Such response actions will be at the expense of the operator. The operator shall report such pollution accordance with the requirements of Item 24(c). Additional Reporting and Record Keeping Requirements are included in Part II of the General Permit.

8. Prior to land applying fluid, the operator shall flag the limits of the application area. Then the operator shall develop a plan consisting of approximate equidistant grid lines, as determined by the reaches of the spraying device. Based on the application rate of the spray pump and the maximum allowable application depth of the fluid, the operator shall determine the maximum time to spray within each grid setting area. Drilling fluids shall be applied, as evenly as possible, over the application area. Responsible personnel shall be present at all times during application.

9. Drilling fluids will not be applied to slopes with a gradient greater than 15% or to soils that are saturated, frozen, or covered with snow, and during rain or when precipitation is imminent. All sites shall have vegetative cover prior to application. If drilling muds are to be disked in after the application, proper vegetative cover shall be reseeded and established within six (6) months.

10. Drilling fluids will not be land applied within 50 feet of rock outcrops and property lines; 100 feet of lakes, ponds, springs, streams, and sinkholes; 300 feet of occupied buildings, drinking water wells, water supplies or Extraordinary Resource Waters (ERW), Natural and Scenic Waterways (NSW) and Ecologically Sensitive Waterbody (ESW). Buffer distances for streams, ponds and lakes shall be measured from the ordinary high water mark. ADEQ may require additional buffer distances deemed necessary to protect the waters of the State.

11. Disposal of drilling fluids in a flood plain will not restrict the flow of the base flood, reduce the temporary storage capacity of the flood plan, or result in a washout of fluids, so as to pose a hazard to human life, wildlife or land and water uses.

12. The drilling fluids will have a pH between 6.0 and 9.0 at the time of land application.

13. Land application will not be permitted when chlorides in the drilling fluids exceed 3,000 ppm.

14. Land application will not be permitted when DRO (Diesel Range Organics) in the drilling fluids exceed 100 ppm.

15. The permittee will take all necessary measures to reduce obnoxious odors.

16. Solids collected in the reserve pit shall be disposed by methods outlined in the reserve pit General Permit.

17. Equipment will be properly maintained and operated to prevent spillage, leakage, or discharges.

18. If there is seepage or leakage from a reserve pit, the disposal of drilling fluids into that pit shall cease immediately. All fluids in the reserve pit will be removed and the permittee will replace and/or retrofit the liner before use of that pit is resumed, or will close the pit.

19. The permittee will give 120 days prior notice to the ADEQ of any change planned in waste disposal practice.

20. For each new drilling fluid source, a new drilling fluid analysis will be submitted to ADEQ to obtain written approval and loading rates prior to land application. Changes in the application acreage or drilling fluid volume also require written approval and loading rates from ADEQ prior to land application.

21. The permittee will submit a soil analysis, drilling fluid volume, and application acreage to ADEQ to obtain written approval and loading rates prior to exceeding the approved drilling fluid volume.

22. Any additional or new land-application sites will have a SMP approved by ADEQ before it can be used.

23. The permittee will be responsible for the drilling fluids analyses, reporting, and record keeping schedules that will include the following:

    a. **DRILLING FLUIDS ANALYSIS**
        (1) The drilling fluids samples collected will be representative of the materials to be land-applied. The samples will be stored in appropriate glass or plastic containers and kept refrigerated or frozen to prevent changes in composition.
        (2) Grab samples of the land-applied drilling fluids and/or solids will be analyzed for the parameters listed in Table 3. The analyses must be

performed in accordance with the General Permit. A minimum of one composite sample per 1000 bbl may be submitted. The samples must be taken from a representative depth (minimum 2 feet) from the top of the pit. Results will be expressed in mg/l unless otherwise indicated.

(3) The drilling fluid analyses for each site conducted will include a statement that the analyses were performed in accordance with EPA Document SW-846, "Test Methods for Evaluation of Solid Waste" or other procedures approved by the ADEQ.

TABLE 3		
Arsenic	Copper	Nickel
Barium	Iron	Selenium
Cadmium	Lead	Sodium
Calcium	Magnesium	Total Dissolved Solids
Chlorides	Manganese	TPH-DRO*
Chromium	Mercury	pH (SU)
Conductance (µmho/cm)	Molybdenum	Zinc

*Total Petroleum Hydrocarbons-Diesel Range Organics

b. SOILS ANALYSIS

Each land application site will be soil tested prior to land application of drilling fluids for the following parameters listed in Table 4. At least one soil sample must be taken for every ten acres of waste application area. Results will be expressed in mg/kg unless otherwise indicated. Method of sampling must be in accordance with the University of Arkansas Cooperative Extension Service Guidelines.

TABLE 4	
Arsenic	Mercury
Barium	Nickel
Cadmium	Selenium
Calcium	Sulfates
Chlorides	TPH-DRO*
Chromium	Zinc
Copper	Cation Exchange Capacity (meq/100g)
Iron	Exchangeable Sodium Percent (% Na sat.)
Lead	Conductivity (µmho/cm)
Magnesium	pH (SU)
Manganese	

*Total Petroleum Hydrocarbons-Diesel Range Organics

c. RECORDKEEPING REQUIREMENTS

The operator shall visually monitor and report immediately (within 24 hours) to the ADEQ Water Division any unauthorized discharge from any pit caused by dike or structural failure, equipment breakdown, human error, etc., and shall follow up with a writer report within five (5) days of such occurrence. The written report shall contain the following:

i. A description of the permit violation and its cause;
ii. The period of the violation, including exact times and dates;
iii. If the violation has not been corrected, the anticipated time it is expected to correct the violation; and
iv. Steps taken or planned to reduce, eliminate and prevent the recurrence of the violation.

d. TERMINATION OF OPERATIONS

The permittee must complete and return a Notice of Termination (NOT) within thirty (30) days after activities have ceased. In addition to the NOT, the permittee shall submit a report containing the following:

Description of the land application activities, including a post application soil analysis for the constituents listed in Table 4. At least one soil sample must be taken for every ten acres of waste application area. If more than one sample is taken, each soil sample must be analyzed for the parameters listed. Analytical results are to be expressed in mg/kg unless otherwise indicated.

- The permittee shall also maintain copies of the above records for ADEQ personnel review for a period of three years after a NOT has been submitted. Such records shall be made available to ADEQ upon request.

e. OPERATION AND MAINTENANCE OF POLLUTION CONTROLS

- Proper operation and maintenance includes adequate staffing to ensure that the facilities comply will all conditions of the General Permit.
- It shall not be a defense for an operator in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of the General Permit.

SITE MANAGEMENT PLAN

TECHNICAL INFORMATION SECTION

RUSSELL 2-35-H

a. **PERMEABILITY OF THE SOIL** is estimated to be 0.6 in/hr. The soil is typically Linker fine sandy loam. Normal slopes are 3% to 8%, Liquid Limit <30% and Plasticity Index is NP-7%. This information was obtained from the NRCS County Soil Survey.

b. **USGS TOPOGRAPHIC MAPS AND AHTD COUNTY MAPS** are attached. Land use of adjacent property is visible on the attached aerial photo.

c. **WATER WELLS** known within one mile radius of the site are shown on an attached USGS topographic map.

d. **APPLICATION AREA MAPS:** A USGS topographic map and County Map showing location of the land application site(s) are attached.

e. **SURFACE USAGE AGREEMENT** is attached

f. **CALCULATIONS USED IN THE DESIGN OF THE PROPOSED WASTE DISPOSAL SYSTEM**

- **STORAGE VOLUMES:** The reserve pit facility is a dug pit with approximate average dimensions of 84'x71'x3' deep. All drilling waste is deposited within the pit. The estimated volume of drilling fluids is 3187 barrels. The fluid will be land applied by spray irrigation using a Godwin Dri-Prime Model HL4M pump, 102 HP @ 400 rpm (or equal), located near the reserve pit. The maximum flow rate is 800 gpm. The average application rate will be 325 gpm. Small portable pumps will be used in timber areas to achieve uniform application intent.

- **MINIMUM ACREAGE REQUIRED FOR DISPOSAL** is the maximum of A_{EC}, A_{ESP} or maximum application depth as determined by the Engineer or ADEQ = 10 acres (see attached calculations).
- **CONCENTRATION OF CHLORIDES IN SOIL** = 130 ppm.
- **ALLOWABLE WASTE APPLICATION RATE:**
  See attached calculations.
- **MAXIMUM APPLICATION DEPTH OF DRILLING FLUID:**
  0.5 inches.

g. **SURFACE USAGE AGREEMENT**: 40 acres. The drilling fluids will be pumped from the reserve pit and transported to the land application site using surface "tight" piping.

Technical Evaluation and Calculations for the Land Application of Drilling Fluids

Permittee Name: SEECO, Inc.
Well Name: RUSSELL 2-35-H
Authorization Date:
Permit No.: 00006-WG-LA
Engineer:
AFIN No.: 15-00000

Approved Application Requirements

Volume to be applied:	3,187	bbl
Application area:	10.0	ac
Maximum application rate:	2,715	gpm
	271	gpm/ac
	13,385	gal/ac
Maximum application depth:	0.494	in

These are the approved application requirements for this land application event. Fluids must be distributed over the entire application area.

Design and Analysis Values (Enter values from design drawings, WMP, and lab analysis)

Drilling Fluids Volume:	3,187	bbl	→ Volume Equivalents		
Available Acreage:	10	ac	Volume:	133,854	gal
Soil Permeability:	0.6	in/hr	Volume:	17,894	ft^3

Drilling Fluids Analysis Data			Soil Analysis Data		
pH	8.9		CEC	10.0	meq/100g
Conductance	4100	µmho/cm	ESP	0.8	% Na sat.
Chlorides	960	mg/l	Conductivity	300	µmho/cm
TPH-DRO	1.0	mg/l	pH	5.4	
Sodium	730	mg/l	Chlorides	130	mg/kg
Arsenic	0.05	mg/l	Arsenic	6.5	mg/kg
Barium	0.86	mg/l	Barium	100	mg/kg
Cadmium	0.004	mg/l	Cadmium	0.4	mg/kg
Copper	0.006	mg/l	Copper	4.3	mg/kg
Lead	0.04	mg/l	Lead	16	mg/kg
Mercury	0.0002	mg/l	Mercury	0.1	mg/kg
Nickel	0.025	mg/l	Nickel	5.9	mg/kg
Selenium	0.07	mg/l	Selenium	7.0	mg/kg
Zinc	0.0035	mg/l	Zinc	19	mg/kg

Well Name: RUSSELL 2-35-H

Evaluation and Calculations

1.a. Acreage Necessary for Disposal Based on Conductivity (EC)

Is the soil conductivity less than 1000 µmho/cm? yes

A_C = 3.173 ac $\qquad A_C = \frac{1.7\times10^{-4}(EC_{dm})(V)}{1000-EC_S}$

1.b. Acreage Necessary for Disposal Based on Exchangeable Sodium Percent (ESP)

Is the ESP less than 10%? yes

A_{ESP} = 1.871 ac $\qquad A_{ESP} = \frac{7.4\times10^{-7}(Na)(V)}{(0.1-ESP_S)(CEC)}$

1.c. Minimum Acreage Required

A = 3.173 ac $\qquad$ A = maximum of A_C or A_{ESP}

Is the minimum acreage required less than the available acreage? yes

3. Loading Rate for Disposal Based on Heavy Metals

$L = \frac{(V)(Metal)_F}{A}\times 3.5\times10^{-4} + 2\times(Metal)_S$

Element	Calculated Value	Allowable Value	Is calculated value less than allowable value?
Arsenic:	L_{Ar} = 13.02 lbs/ac	37 lbs/ac	yes
Barium:	L_{Ba} = 200.30 lbs/ac	1000 lbs/ac	yes
Cadmium:	L_{Cd} = 0.80 lbs/ac	35 lbs/ac	yes
Copper:	L_{Cu} = 8.60 lbs/ac	1350 lbs/ac	yes
Lead:	L_{Pb} = 32.01 lbs/ac	270 lbs/ac	yes
Mercury:	L_{Hg} = 0.20 lbs/ac	15 lbs/ac	yes
Nickel:	L_{Ni} = 11.81 lbs/ac	378 lbs/ac	yes
Selenium:	L_{Se} = 14.02 lbs/ac	90 lbs/ac	yes
Zinc:	L_{Zn} = 38.00 lbs/ac	2520 lbs/ac	yes

4. Maximum Application Rate Based on the Soil Permeability

The allowable application rate of the drilling fluids is calculated based on the soil permeability. This value is the maximum rate at which drilling fluids can be applied over the entire application area without runoff.

GPM = 2,715 gpm $\qquad GPM = \frac{(K_S)(A)}{2.21\times10^{-3}}$

AR = 271 gpm/ac $\qquad AR = \frac{GPM}{A}$

5. Maximum Application Depth

D_{max} = 0.494 in $\qquad D_{max} = \left(\frac{V}{A}\right)(1.55\times10^{-3})$

A_C = area based on EC, ac
EC_{dm} = EC of drilling fluid, µmho/cm
V= volume of pit, bbl
EC_S = EC soil, µmho/cm
A_{ESP} = area based on ESP, ac
Na = Sodium conc. of the drilling fluid, mg/l
ESP_S = ESP of soil, expressed as a percent
C_{metal} = Concentration of metal in drilling fluid, mg/kg
CEC = cation exchange capacity, meq/100g
$(Metal)_F$ = Conc. of Zn, Cr, Pb, etc in the drilling fluid, mg/L
$(Metal)_S$ = Conc. of Zn, Cr, Pb, etc in the soil, mg/kg
A = maximum of A_C or A_{ESP}, ac
GPM = drilling fluid flow rate, gpm
L = loading rate, lbs/ac
D_{max} = max application depth, in
K_S = soil permeability, in/hr
AR = application rate of drilling fluid, gpm/ac

AMERICAN INTERPLEX CORPORATION
LABORATORIES

Southwestern Energy Exploration Company
(SEECO)
23 Nabco Avenue
Conway, AR 72032

ANALYTICAL RESULTS

AIC No. 120428-1
Sample Identification: Russell 2-35 6/17/08 230pm FLUID

Analyte	Method	Result	RL	Units	Batch	Qualifier
Total Kjeldahl Nitrogen	**EPA 351.2**	**< 1**	**1**	mg/l	W25493	
pH	EPA 9040B	8.9	-	Units	W25497	H
Specific Conductance	EPA 9050A	4100	2	umho/cm	W25498	
Total Solids	SM 2540B	2200	10	mg/l	W25515	
Total Dissolved Solids	SM 2540C	2100	10	mg/l	W25503	
Volatile Solids	SM 2540E	180	10	mg/l	W25515	
Ammonia as N	SM 4500 NH3-G	< 0.1	0.1	mg/l	W25508	
Total Phosphorus	SM 4500-PBE	0.33	0.02	mg/l	W25502	
Arsenic	EPA 3010A, 6010B	< 0.05	0.05	mg/l	S23300	
Barium	EPA 3010A, 6010B	0.86	0.002	mg/l	S23300	
Cadmium	EPA 3010A, 6010B	< 0.004	0.004	mg/l	S23300	
Calcium	EPA 3010A, 6010B	11	0.1	mg/l	S23300	
Chromium	EPA 3010A, 6010B	< 0.007	0.007	mg/l	S23300	
Copper	EPA 3010A, 6010B	< 0.006	0.006	mg/l	S23300	
Iron	EPA 3010A, 6010B	1.2	0.007	mg/l	S23300	
Lead	EPA 3010A, 6010B	< 0.04	0.04	mg/l	S23300	
Magnesium	EPA 3010A, 6010B	6.9	0.03	mg/l	S23300	
Manganese	EPA 3010A, 6010B	0.029	0.002	mg/l	S23300	
Molybdenum	EPA 3010A, 6010B	0.012	0.008	mg/l	S23300	
Nickel	EPA 3010A, 6010B	0.025	0.01	mg/l	S23300	
Potassium	EPA 3010A, 6010B	9.4	1	mg/l	S23300	
Selenium	EPA 3010A, 6010B	< 0.07	0.07	mg/l	S23300	
Sodium	EPA 3010A, 6010B	730	1	mg/l	S23300	
Zinc	EPA 3010A, 6010B	0.0035	0.002	mg/l	S23300	
Mercury	EPA 7470A	< 0.0002	0.0002	mg/l	S23298	
Chloride	EPA 9056	960	20	mg/l	S23299	D
Nitrate + Nitrite as N	EPA 9056	49	0.05	mg/l	S23299	D
Sulfate	EPA 9056	31	2	mg/l	S23299	D
Diesel Range Organics By EPA 3510C, 8015B						
Diesel Range Organics		< 1	1	mg/l	G6973	
Surrogate Recovery						
n-Decane		38.5	-	%	G6973	

AIC No. 120428-2
Sample Identification: Russell 2-35 6/17/08 230pm SOIL

Analyte	Method	Result	RL	Units	Batch	Qualifier
pH	EPA 9045C	5.4	-	Units	W25537	H
Electrical Conductivity	EPA 9050A	300	2	umho/cm	W25534	
Cation-Exchange Capacity	Mod. EPA 9080	10	0.1	meq/100g	W25505	
Exchangeable Sodium	Mod. EPA 9081	0.80	0.1	meq/100g	W25506	
Arsenic	EPA 3051, 6010B	6.5	5	mg/Kg	S23310	
Barium	EPA 3051, 6010B	100	0.2	mg/Kg	S23310	
Cadmium	EPA 3051, 6010B	< 0.4	0.4	mg/Kg	S23310	
Calcium	EPA 3051, 6010B	730	10	mg/Kg	S23310	
Chromium	EPA 3051, 6010B	19	0.7	mg/Kg	S23310	
Copper	EPA 3051, 6010B	4.3	0.6	mg/Kg	S23310	
Iron	EPA 3051, 6010B	18000	0.7	mg/Kg	S23310	

AMERICAN INTERPLEX CORPORATION
LABORATORIES

Southwestern Energy Exploration Company
(SEECO)
23 Nabco Avenue
Conway, AR 72032

ANALYTICAL RESULTS

AIC No. 120428-2 (Continued)
Sample Identification: Russell 2-35 6/17/08 230pm

Soil (con't)

Analyte	Method	Result	RL	Units	Batch	Qualifier
Lead	EPA 3051, 6010B	16	4	mg/Kg	S23310	
Magnesium	EPA 3051, 6010B	730	3	mg/Kg	S23310	
Manganese	EPA 3051, 6010B	550	0.2	mg/Kg	S23310	
Nickel	EPA 3051, 6010B	5.9	1	mg/Kg	S23310	
Phosphorus	EPA 3051, 6010B	160	10	mg/Kg	S23310	
Potassium	EPA 3051, 6010B	640	100	mg/Kg	S23310	
Selenium	EPA 3051, 6010B	< 7	7	mg/Kg	S23310	
Zinc	EPA 3051, 6010B	19	0.2	mg/Kg	S23310	
Mercury	EPA 7471A	< 0.1	0.1	mg/Kg	S23304	
Chloride	EPA 9056	130	2	mg/Kg	S23303	
Nitrate + Nitrite as N	EPA 9056	0.78	0.5	mg/Kg	S23303	
Sulfate	EPA 9056	62	2	mg/Kg	S23303	
Diesel Range Organics By EPA 3550B, 8015B						
Diesel Range Organics		< 40	40	mg/Kg	G6974	W
Surrogate Recovery						
n-Decane		62.8	-	%	G6974	

SURFACE USAGE AGREEMENT

This agreement is entered into by and between SEECO, Inc., hereinafter referred to as "SEECO", whose address is P.O. Box 789, Conway, Arkansas 72033, and Isabell M. Heard, whose address is 188 Wallis Road, Bald Knob, AR 72010 hereinafter referred to as "Owner".

RECITALS

WHEREAS, Owner is the owner of that certain tract or parcel of real property located in White County, Arkansas, more particularly described in that certain Oil and Gas Lease recorded in Book 2005, at Page 282 of the Official Records of White County, Arkansas (the "Subject Land"), and

WHEREAS, pursuant to the rights granted in said Oil and Gas Lease, SEECO intends to drill, complete and operate a well, located in the SW/4,SW/4 NE/4,NW/4 SE/4,SW/4 SE/4 Section 35 - Township 10N North, Range 6 West, White County, Arkansas and any substitute and/or replacement well therefor and any other wells drilled on the same drilling location (collectively, the "Wells").

AGREEMENT

Owner, in consideration of the sum of [redacted] DOLLARS [redacted] the receipt and sufficiency of which is hereby acknowledged and confessed, on behalf of the "Owner Group" (hereinafter defined) does hereby release, discharge and acquit SEECO, its parent company, subsidiaries, affiliates, successors, assigns, non-operating working interest owners in the Wells, and each of their respective directors, officers, members, partners, shareholders, employees, contractors, subcontractors of any tier, representatives, attorneys, insurers or agents from and against any claims, demands, obligations, liabilities or causes of action for damages to the Subject Land or any improvements, structures, fixtures, personal property of Owner Group, shrubs, trees, crops, other emblements, aquiculture, livestock, aquatic life, wildlife, pasture land or impoundments growing or located thereon, or drainage to and from the Subject Land that are related or otherwise attributable to SEECO's operations on the Subject Land (collectively, "Well Operations") including, but not limited to, (i) the drilling, completion, reworking, reconditioning, deepening, plugging back, repairing, testing, cleaning out, and plugging and abandoning of the Wells, (ii) any operations to establish, re-establish or increase the deliverability of oil, other liquid hydrocarbons or natural gas production therefrom, and (iii) the production, field processing, separation, treatment, storage, compression, gathering and transportation of such production. As used herein, the term the "Owner Group" means and includes Owner, any other person in possession of the Subject Land or with privileges with respect thereto derived by, through or under Owner pursuant to any lease, license, permit or otherwise, and Owner's and all such other persons' respective, heirs, executors, administrators, insurers, successors and assigns.

Without limiting the foregoing or SEECO's rights under the above-mentioned oil and gas lease, Owner agrees and acknowledges that SEECO shall have the right to construct, install, use, maintain, remove, replace, repair and operate an access road, a drill pad (said drill pad to be constructed within a clearing area being 500' x 500' in size and occupying approximately 5.67

acres), pipelines, tanks, power lines, telephone lines, reserve pits, berms, levees, a meter building, and such other improvements and structures on the Subject Land, and to use, maintain, repair and operate thereon temporary surface fuel and water lines, wellhead separators, compressors and such other facilities, equipment, fixtures, supplies and materials, as may be required or desirable for the Well Operations. To the extent reasonably necessary or desirable for the maintenance, use and operation of such improvements, structures, facilities, equipment, fixtures, supplies and materials, SEECO shall have the right to apply herbicides to the Subject Land in accordance with Applicable Law (hereinafter defined).

SEECO will reduce the drill pad and location size and will reclaim all disturbed areas of the Subject Land in accordance with the requirements of "Applicable Law" (hereinafter defined). In connection therewith, Owner hereby consents to the spraying or other land application of the fluid contents of the reserve pit(s) (collectively, "Pit Fluids") for any such well onto the Subject Land, to the extent permitted by Applicable Law, and to the handling and disposal of the residue drilling mud and the cuttings that remain in the pit(s) after the same have been emptied of fluids (collectively, the "Residual Drilling Mud") by SEECO using a land treatment method that will consist of mixing the Residual Drilling Mud with soil from the pit levees or walls or the adjacent areas of the Subject Land. If such land treatment method is not available to SEECO due to the condition of the Residual Drilling Mud or of the Subject Land, and/or due to any changes in Applicable Law, Owner consents to the handling and disposal of the Residual Drilling Mud by SEECO using either of the two following Arkansas Department of Environmental Quality ("ADEQ") approved methods:

(i) Burial by mixing the Residual Drilling Mud with soil and burying or trenching the mixture on the Subject Lands, or

(ii) Solidification of the waste with fly ash or kiln dust and burial of materials on the Subject Lands

or any other method then approved by the ADEQ; provided that all conditions for the utilization of such method established by the ADEQ are satisfied.

All of the foregoing operations shall be performed only after having obtained valid permits in accordance with all then applicable rules and regulations of the ADEQ and in accordance with the conditions of such permits, ADEQ Oilfield Waste Reserve Pit Requirements (including, without limitation, all site soil, Pit Fluids and Residual Drilling Mud analysis required thereby), any special ADEQ requirements identified in the authorization letter from the ADEQ for the reserve pit(s) and all other then applicable laws, rules, regulations and orders of any governmental authorities with jurisdiction over the Subject Lands (collectively "Applicable Law").

If construction material (including, without limitation caliche, clay and gravel) should be needed for the construction of any lease or unit road or any other road providing access to any of the Wells, or the well site locations and such material is located on the Subject Land where excavation is being made on the drilling location for any of the Wells or any substitute or replacement wells therefor or within the right-of-way for any lease or unit road, then such material may be removed and used in the construction of such road or well site location without further compensation to Owner therefor.

As further consideration for the agreements and releases of Owner set forth herein, SEECO agrees:

1. to strip topsoil from the drill site location and pit area for use in SEECO's reclamation of the Subject Land;

2. to allow the members of Owner Group, and their invitees and guests (but not any mining or other mineral lessees, or licensees) use of the lease road so long as such use does not interfere with Operations; provided, however, that, subject to any rights Owner may have as lessor under an oil and gas lease between SEECO and Owner covering the Subject Land, Owner understands and acknowledges that neither the members of Owner Group nor their invitees shall have the right to be present on a well location while Well Operations are being conducted thereon and that the presence of any such person thereon prior to the plugging and abandonment of the well shall be at such person's sole risk;

3. to indemnify and hold harmless Owner from and against any claim, demand or cause of action of any third person (other than the claim of any member of Owner Group for liabilities from which SEECO is released hereby) arising out of SEECO's use of the Subject Land for Well Operations, and

4. the release provided for herein shall not cover any damages to the Subject Land that are determined by a court of competent jurisdiction to be attributable to SEECO's negligence in conducting Well Operations.

Both SEECO and Owner agree not to disclose, discuss or reveal the terms and conditions of this agreement (including the consideration provided to Owner hereunder) to any person or entity, other than their attorneys, accountants, tax advisors or consultants, except that the parties shall be permitted to disclose, discuss or reveal such terms and conditions as required by Court Order or as otherwise required by law.

This agreement reflects the entire agreement between the parties with respect to the subject matter hereof. There are no other agreements, either written or oral, and the execution of this written agreement supersedes any and all prior representations, negotiations or agreements pertaining to the subject matter hereof.

SEECO, Inc.

By: Debbie Derrick

Name: Debbie Derrick

Title: Surface Landman

Date: 4/22/08

OWNER:

Isabell M Heard

Name: ISABELL M. HEARD

Date: 4.22.08

LOCATION CONSTRUCTION REQUIREMENT

Location/Well: **Russell 10-6 #2-35**

County: **White**

Field: **Sharkey**

Land Broker: **Debbie Derrick (903) 780-5322**

Field Supervisor: **Daniel Wright/ Seeco**

Staked/Surveyed: **Hoffman & Assoc.**

Approximate Spud Date (DNSB):

Released to build?

Road Length: 1500 ft.

Fill/Shale:

Culverts:

Fencing: *(include whether barb-wire, safety, panel, pit only, etc.)* **Fence side of lease road (Replacing old fence) 1500 ft.** From Gate follow old fence to end of field. (Will show)

Temporary Sign:

Gates:

Cattle Guards: ~~**1 entrance to pad.**~~

Pits: North

Special Conditions/Extras: *(anything landowner request which is not standard)*
Need to clean up trees from lease road. Don't leave. (Clear area going off #1 to #2)
Tree left from #1

Lat: 35.443386 **Long: -91.616359**

Request for Taxpayer Identification Number and Certification

Name	Social security number
Isabell M. Heard	439.72 1899
Business name, if different from above	Employer identification number

Check appropriate box: ☐ Individual/ Sole proprietor ☐ Corporation ☐ Partnership ☐ Other ► ☐ Exempt from backup withholding

Address (number, street, and apt. or suite no.)	Requesters name and address (optional)
188 Wallis Road	SEECO, INC P.O. BOX 789 CONWAY, AR 72033
City, state, and Zip code	
Bald Knob, AR 72010	

Enter your *TIN* in the appropriate box. The TIN provided must match the name given to avoid backup withholding. For individuals, this is your social security number *(SSN)*. However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number *(EIN)*. If you do not have a number, see How to get a *TIN* on page 3.

Note. If the account is in more than one name, see the chart on page 4 for guidelines on whose number to enter

Under penalties of perjury, I certify that:

1 - The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me), and

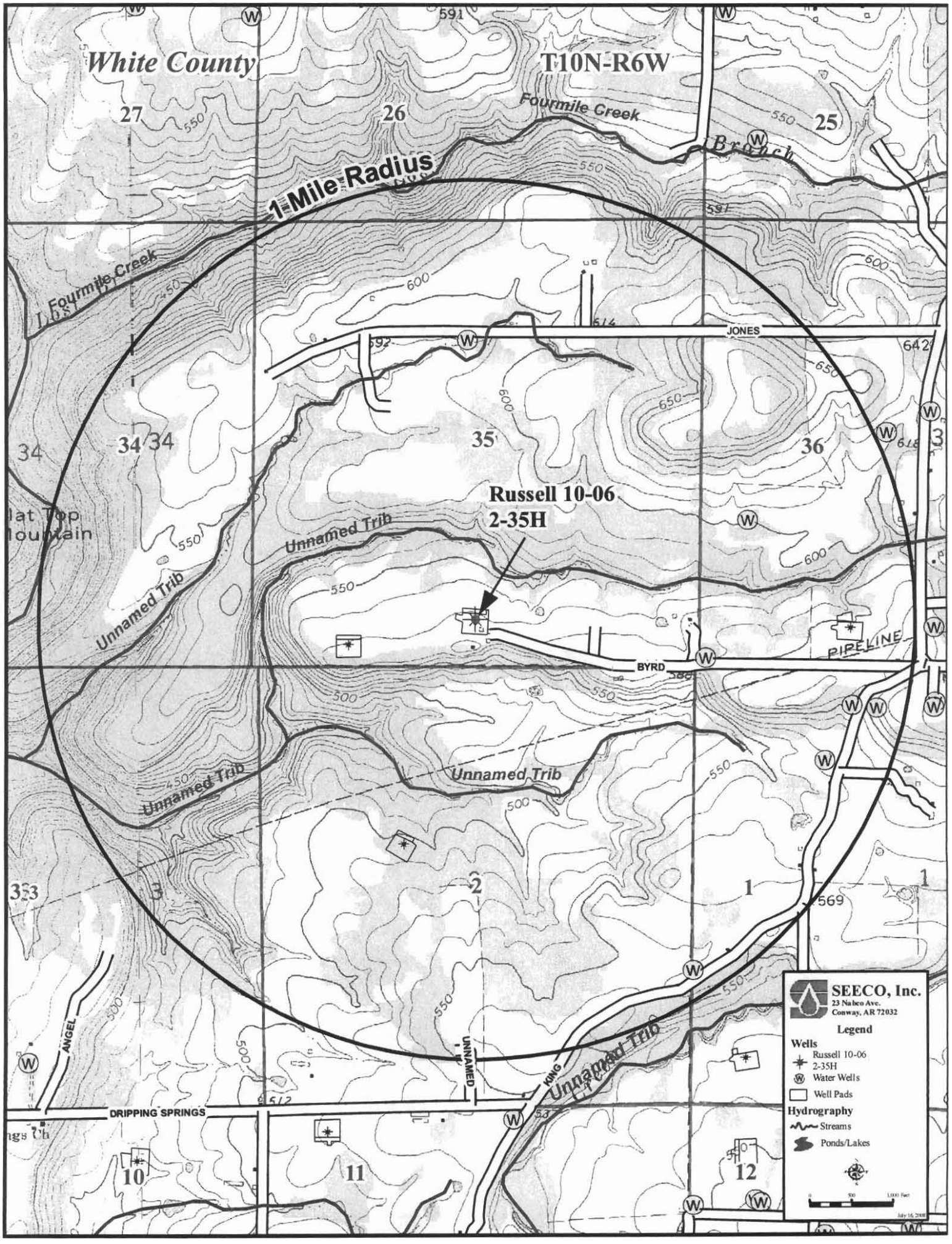
2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding, and

3. I am a U.S. person (including a U.S. resident alien).

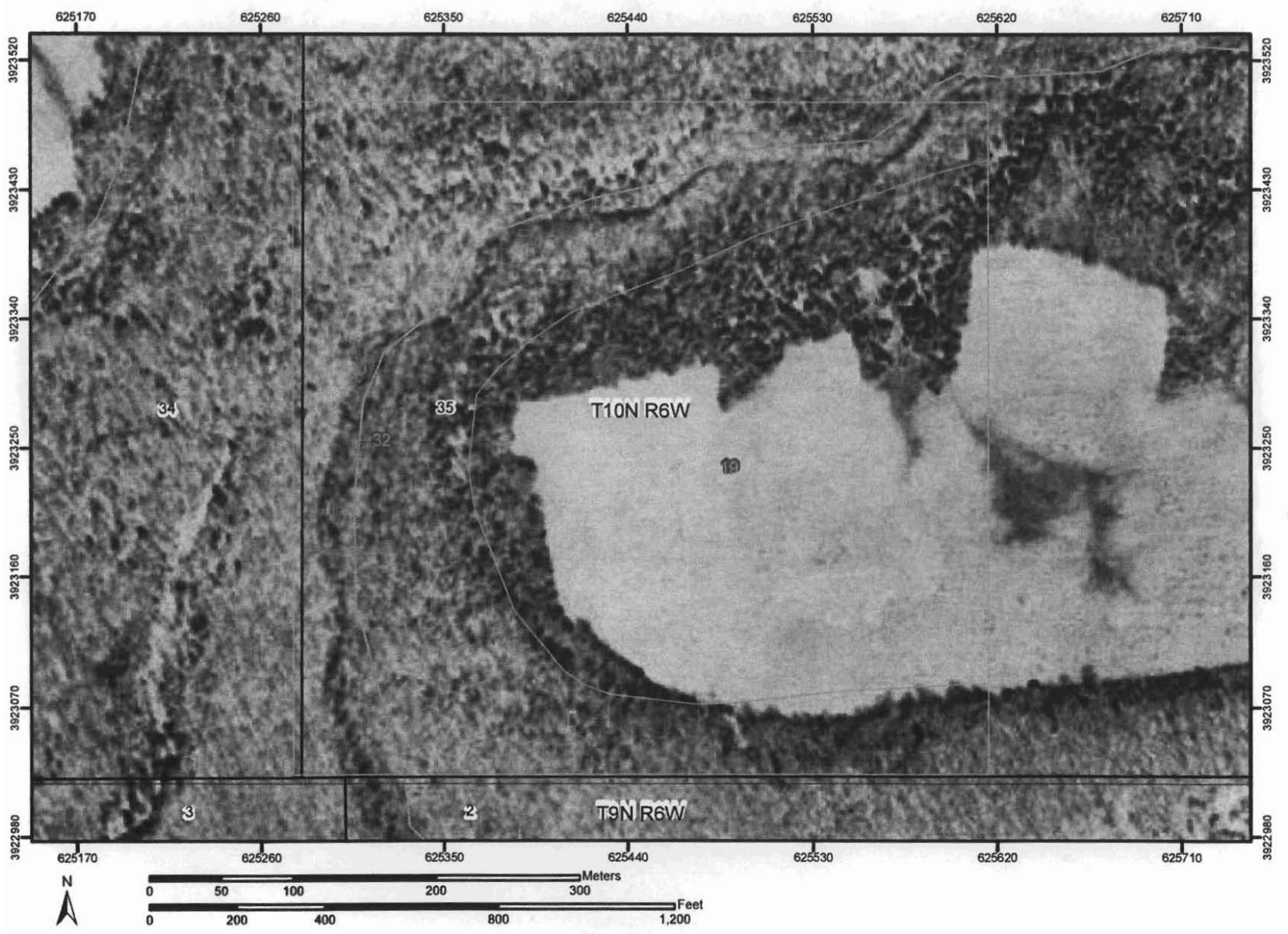
Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholdi because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortga interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), a generally, payments other than interest and dividends, you are not required to sign the Certification, but you must provide your correct TIN. (See t instructions on page 4)

The Internal Revenue Service does not require your consent to any provision of this document other than the certifications required to avoid backup withholdi

Sign Here | Signature of U.S. person Isabell M. Heard | Date 4.22.08


White County
T10N-R6W
1 Mile Radius
Fourmile Creek
Fourmile Creek
Russell 10-06
2-35H
Unnamed Trib
Unnamed Trib
Unnamed Trib
Unnamed Trib
Unnamed Trib
JONES
BYRD
PIPELINE
DRIPPING SPRINGS
ANGEL
KING
UNNAMED
Flat Top Mountain
27
26
25
34
35
36
3
2
1
10
11
12
SEECO, Inc.
23 Nabeo Ave.
Conway, AR 72032
Legend
Wells
Russell 10-06
2-35H
Water Wells
Well Pads
Hydrography
Streams
Ponds/Lakes

Soil Map–White County, Arkansas
(Russell 10-6 #2-35)



Map Unit Legend

White County, Arkansas (AR145)			
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
19	Linker fine sandy loam, 3 to 8 percent slopes	26.0	46.5%
32	Steprock-Enders complex, 12 to 30 percent slopes	29.9	53.5%
Totals for Area of Interest (AOI)		55.9	100.0%

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Units

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features
- Gully
- Short Steep Slope
- Other

Political Features

Public Land Survey
- Township and Range
- Section

Municipalities
- Cities
- Urban Areas

Water Features
- Oceans
- Streams and Canals

Transportation
- Rails

Roads
- Interstate Highways
- US Routes
- State Highways
- Local Roads
- Other Roads

MAP INFORMATION

Original soil survey map sheets were prepared at publication scale. Viewing scale and printing scale, however, may vary from the original. Please rely on the bar scale on each map sheet for proper map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 15N

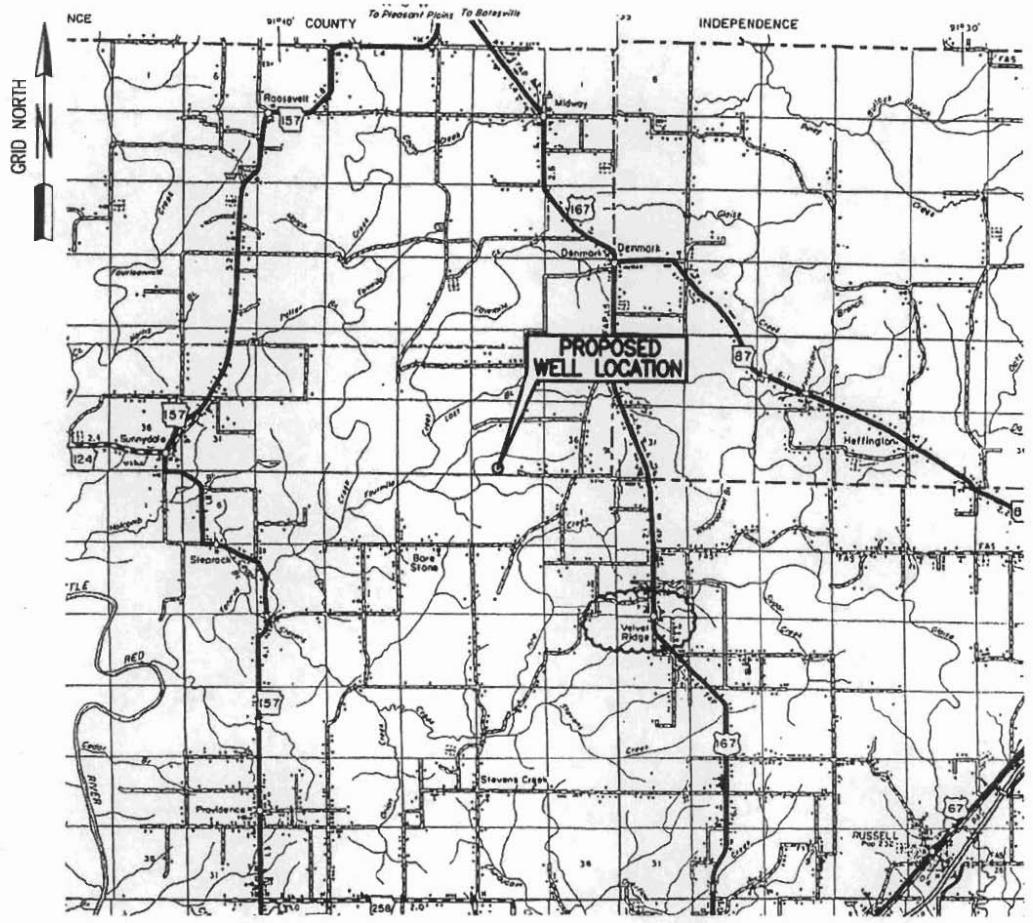
This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: White County, Arkansas
Survey Area Data: Version 9, Mar 13, 2008

Date(s) aerial images were photographed: 1994

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

HOFFMAN & ASSOCIATES, INC.
LAND SURVEYORS · CONSULTING ENGINEERS
320 O'BRYAN LANE · VAN BUREN, AR 72956
TEL: (479) 474-7916 · FAX: (479) 474-2450
WEB ADDRESS · HANDA-INC.COM



2.5mi. E of US167, off Byrd Rd.

GENERAL HIGHWAY MAP
WHITE COUNTY
ARKANSAS
PREPARED BY
ARKANSAS STATE HIGHWAY TRANSPORTATION DEPARTMENT
DIVISION OF PLANNING AND RESEARCH
IN COOPERATION WITH
U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

2 0 2
GRAPHIC SCALE IN MILES

DRIVING DIRECTIONS:
FROM THE INTERSECTION OF STATE HIGHWAY 286 & I-40 (EXIT 129) AT CONWAY, ARKANSAS; TRAVEL WEST ON I-40 FOR ±2.0 MILES TO U.S. HIGHWAY 64 (EXIT 127); TURN RIGHT (EAST) ONTO U.S. HIGHWAY 64 AND TRAVEL ±31.5 MILES TO U.S. HIGHWAY 67; TURN LEFT (NORTHEAST) ONTO U.S. HIGHWAY 67 AND TRAVEL ±27.4 MILES TO U.S. HIGHWAY 167 (EXIT 55) AT BALD KNOB, ARKANSAS; TURN LEFT (NORTH) ONTO U.S. HIGHWAY 167 AND TRAVEL ±7.0 MILES TO VELVET RIDGE, ARKANSAS; CONTINUE NORTH ON U.S. HIGHWAY 167 FOR ±2.0 MILES TO BYRD ROAD; TURN LEFT (WEST) ONTO BYRD ROAD AND TRAVEL ±1.0 MILES TO WALLIS ROAD; CONTINUE STRAIGHT (WEST) ONTO WALLIS ROAD FOR ±1.0 MILES TO EXISTING LEASE ROAD TO SEECO, INC. "RUSSELL 10-06 #1-35H"; CONTINUE STRAIGHT (NORTHWEST) ONTO EXISTING LEASE ROAD AND TRAVEL ±430 FEET TO PROPOSED LEASE ROAD; TURN LEFT (SOUTHWEST) ONTO PROPOSED LEASE ROAD AND TRAVEL ±1685 FEET TO PROPOSED GAS WELL LOCATION.

DISTANCE / DIRECTION FROM NEAREST TOWN:
±3.0 MILES NORTHWEST FROM VELVET RIDGE, ARKANSAS.

LEGEND:
- O PROPOSED SURFACE HOLE / BOTTOM HOLE
- ☼ EXISTING / PRODUCING WELLHEAD
- ⊠ ABANDONED WELL
- ✖ PLUGGED & ABANDONED WELL

COMPANY: SEECO, Inc.

WELL NAME: RUSSELL 10-06
WELL #: 2-35H

LOCATION: SECTION 35, T-10-N, R-06-W
WHITE COUNTY, ARKANSAS

SURFACE HOLE LOCATION:
223 FEET FROM THE SOUTH SECTION LINE
1138 FEET FROM THE WEST SECTION LINE

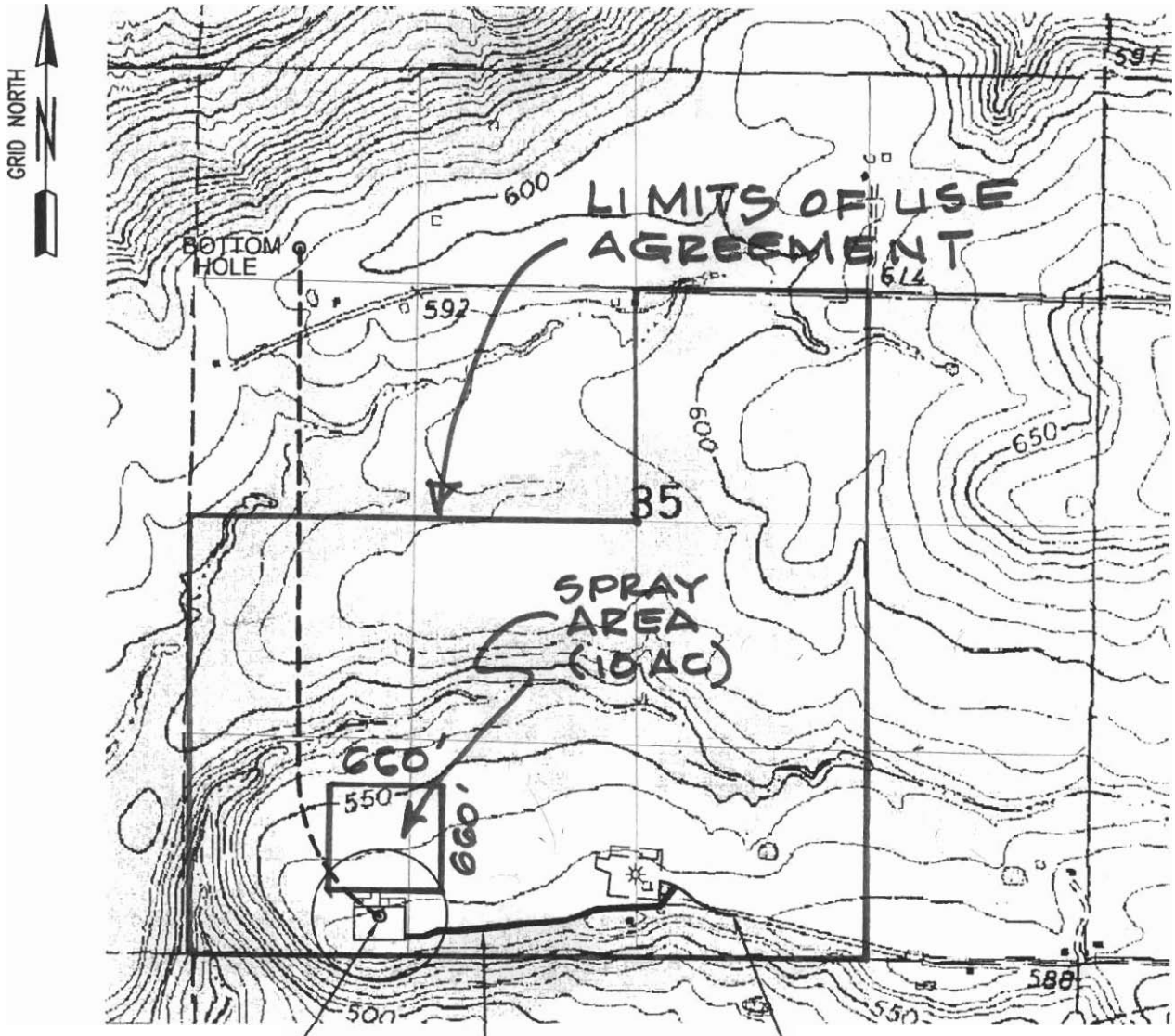
BOTTOM HOLE LOCATION:
4211 FEET FROM THE SOUTH SECTION LINE
660 FEET FROM THE WEST SECTION LINE

REVISIONS	DATE: 04-03-2008
	BK:TYLER31 PG:143-144
	DRAWN BY: J. Smith
	SCALE: 1/2" = 1 MILE
	DRAWING NO. 39324
	SHEET NO. 3 OF 3

S:\GAS WELLS\0-FINAL\39000-39999\39324\39324.dwg
Fri, 09/May/08 10:45am SMITH

11-1053

HOFFMAN & ASSOCIATES, INC.
LAND SURVEYORS · CONSULTING ENGINEERS
320 O'BRYAN LANE · VAN BUREN, AR 72956
TEL: (479) 474-7916 · FAX: (479) 474-2450
WEB ADDRESS · HANDA-INC.COM



SURFACE HOLE SEE INSET

PROPOSED LEASE ROAD ± 1685 LF

EXISTING LEASE ROAD TO SEECO, INC. "RUSSELL 10-06 #1-35H " (± 430 LF)

QUADRANGLE LOCATION
VELVET RIDGE, ARK.
N3522.5–W9130/7.5
1965
AMS 7654 I NE–SERIES V884

1000 0 1000
GRAPHIC SCALE IN FEET

PROPOSED RESERVE PIT ±50' OPEN FIELD

NOTE:
ANY UTILITIES OR IMPROVEMENTS SHOWN ON THIS PLAT ARE FROM REASONABLE VISUAL OBSERVATIONS. NO UTILITY COMPANIES WERE CONTACTED FOR UTILITY LINE

COMPANY: SEECO, Inc.

WELL NAME: RUSSELL 10-06