



April 20, 2007

Proposal No. M2007P066  
Via eMail and Fax (409-385-4202)

Mr. Buford Curtis  
Buford Curtis, Inc.  
P.O. Box 1236  
Silsbee, Texas 77656

**RE:    *Work Plan***  
***Limited Soil & Groundwater Investigation and Pit Closure***  
***Rafferty Fee Lease – Well No. 1 (#19053)***  
***Silsbee North (Yegua 2) Field***  
***NPS Site 181***  
***Big Thicket National Preserve***  
***Hardin County, Texas***

Dear Mr. Curtis:

SKA Consulting, L.P. (SKA) is pleased to present this Work Plan to perform limited soil and groundwater investigations and pit closure activities at the Rafferty Fee Lease – Well No. 1 site located in the Big Thicket National Preserve (BITH) in Hardin County, Texas (Site) (aka: National Park Service Site 181).

This Work Plan is being submitted based on the findings and conclusions of a report prepared by Michael Baker, Jr., Inc. (Baker) for the Site entitled "Report for the Focused Site Investigation, Oil and Gas Sites, Big Thicket National Preserve, Beaumont, Texas" dated April 2006 and edited by Haigler "Dusty" Pate, Oil and Gas Program Manager, Big Thicket National Preserve; and a Railroad Commission of Texas (RRC) violation letter dated December 19, 2006 which was submitted to Buford Curtis, Inc. pertaining to the Site.

Based on Baker's report and the RRC's notice of violation letter, the National Park Service concluded that additional soil and groundwater investigations and pit closure activities are warranted at the Site. Therefore, SKA prepared this Work Plan on behalf of Buford Curtis, Inc. (Client) to perform limited soil and groundwater investigations and pit closure activities at the Site. A summary of our Work Plan is further described in subsequent sections of this letter.

## **BACKGROUND**

The site is located at the end of Zig Zag Road, an unimproved road traversing through the Jack Gore Baygall Unit of the Big Thicket National Preserve (BITH) located north of Beaumont, Texas. The site consists of a former well pad (approximately 38,000 square feet) that is generally overgrown with native vegetation. The former well bore located on the site was reportedly plugged and abandoned on December 2, 2002. Currently, no remnants of historical oil/gas exploration and production (E&P) equipment is located on the site.

In August 2005, Baker conducted a Focused Site Investigation (FSI) at the Site in an effort to “provide recommendations for the restoration of the site to natural conditions to the extent practical.” Baker proposed to “approximately delineate the horizontal and vertical extent of soil contamination” and identify any possible contamination migration pathways and/or receptors. Additionally, at the request of the Water Resources Division (WDR) of the National Park Service (NPS), Baker proposed to assess possible impacts to surface water and groundwater at the Site. To accomplish these objectives, Baker advanced a total of 8 soil borings (SB01, SB02, SB03, SB04, SB05, TW01, TW02, and TW03) at the Site. Three of these soil borings (TW01, TW02, and TW03) were converted into temporary groundwater monitoring wells. Additionally, Baker collected 3 surface samples (SS01, SS02, and SS03) from the Site and collected one water sample from the pit located at the Site.

Based on the results of their field investigations, Baker concluded the following:

- Crude oil impacted approximately 100-cubic-yards of soil located near the well bore and south of the former well pad; however, additional delineation activities were warranted on this area of the Site.
- Polycyclic-aromatic hydrocarbons (PAHs) are not chemicals of concern at the Site;
- There is no naturally occurring radioactive material (NORM) located at the Site;
- Groundwater exhibited low levels of benzene only;
- The surface water in the pit is uncontaminated;
- Contamination migration pathways include soil-to-groundwater, groundwater migration, and human/ecological uptake.
- Impacts to receptors appear limited to flora and fauna exposure to surface soil. Human contact to surface soil is possible, but limited due to the use and location of the Site.

On December 19, 2006, the RRC submitted a notice of violation letter to Burford Curtis, Inc. citing the following:

- Violation of Statewide Rule 8: “An inspection by our field inspector indicated that a pit measuring approximately 20 feet in diameter has not been closed. The pit should be closed and the area cleaned-up/remediated to facilitate natural attenuation.”
- “The surface owner has furnished analytical identifying an area south of the former well bore that has a TPH [total petroleum hydrocarbon] reading higher than the state required limit of 10,000 ppm. This area should be cleaned-up/remediated to facilitate natural attenuation.”

Based on these findings and conclusions and subsequent letters from the National Park Service BITH dated November 15, 2006, February 26, 2007, and March 30, 2007, additional site investigations and/or remedial actions were requested at the Site. As such, SKA was retained by the Client to provide a detailed scope of work to address these concerns.

## SCOPE OF WORK

The objective of the limited soil and groundwater investigations and pit closure activities will be to: (1) Confirm or deny if shallow groundwater beneath the Site is adversely impacted in one previously identified area of concern; (2) Define the horizontal and vertical extent of previously reported soil impacts in areas where soil concentrations exceed 10,000 parts per million (ppm) "crude oil"; and (3) Close the surface impoundment (pit) per RRC guidance.

The sampling and data evaluation plan prepared by SKA as outlined below was developed based on RRC guidance outlined within Title 16 Chapter 3 Oil and Gas Division, Statewide Rules 8, 20, and 91 (16 TAC §3.8, §3.20, §3.91), including the *Field Guide for the Assessment and Cleanup of Soil and Groundwater Contaminated with Condensate from a Spill Incident*, and *Guideline for Spills, Releases, and Risk Based Decision Making for Oil Field Related Sites in Texas, Table 1-2 Chemicals of Concern*. All activities and work products associated with this Scope of Work will be conducted and produced under the direct supervision and direction of a State of Texas registered Professional Geoscientist.

### **Task No: 1 – Soil Boring & Temporary Monitoring Well Installations:**

SKA proposes to install one (1) temporary monitoring well and complete up to (10) shallow soil borings across the Site. Specifically, the location of the proposed temporary monitoring well will coincide with previous temporary monitoring well TW03 completed by Baker in an effort to confirm or deny if adverse environmental impacts within the uppermost transmissive zone (shallow groundwater) are present at the Site. The proposed soil borings will be completed adjacent to and within the presumed boundaries of the area of concern south of the former well bore location in an effort to vertically and horizontally delineate concentrations of petroleum hydrocarbons in shallow soil reportedly exceeding applicable RRC guidelines. A proposed sampling location map depicting the locations of the temporary monitoring well and soil borings is shown on the attached **Figure 1**.

The temporary monitoring well will be completed on the subject property utilizing a truck-mounted drill rig equipped with hollow-stem augers and 4-foot long split-spoon core samplers. SKA personnel will perform all drilling oversight and sampling activities. The soil sampler will be recovered and the soil samples will be given to SKA's on-site Geologist for screening and classification utilizing the Unified Soils Classification System (USCS). To aid in the selection of soil samples ultimately submitted for laboratory analysis, field screening will be conducted for organic vapor concentrations using a Photo-ionization Detector (PID) equipped with a 10.6-electron Volt (eV) bulb calibrated to 100 ppm isobutylene.

Generally, the temporary monitoring well will be advanced up to 10 feet beyond the contact with the uppermost transmissive zone (shallow groundwater) estimated at approximately 10 feet below ground surface (ft-bgs) in an effort to obtain representative groundwater samples. For the purposes of this proposal, SKA estimates the maximum depth of the temporary monitoring well will not exceed 30 ft-bgs.

The shallow soil borings will be completed on the subject property by SKA personnel utilizing a stainless steel hand auger. The soil borings will be completed up to a depth of 3 ft-bgs. The soil sampler will be recovered and the soil samples will be given to SKA's on-site Geologist for screening and classification utilizing the USCS. To aid in the selection of soil samples ultimately

submitted for laboratory analysis, field screening will be conducted for organic vapor concentrations using a PID equipped with a 10.6-(eV bulb calibrated to 100 ppm isobutylene.

Equipment decontamination will be continuously performed during all drilling activities in accordance with applicable Texas Commission on Environmental Quality (TCEQ), United States Environmental Protection Agency (USEPA), and Occupational Safety & Health Administration (OSHA) guidelines. Soil sampling core barrels will be washed with Alconox soap and rinsed with potable water prior to the collection of each new soil sample. All SKA personnel on-site will be Title 29 Code of Federal Regulations (CFR) 1910.120 40-Hour OSHA trained.

**Soil:**

The testing protocol for each soil boring and temporary monitoring well will consist of:

- Testing of the surficial or near surficial soil sample (0-1, 1-2, and/or 2-3 ft-bgs); and/or
- Testing of the soil sample with the highest PID field screening result; and/or
- Testing of the soil sample from the soil-water interface.

SKA will collect additional soil samples at other intervals within the soil column (i.e., at random depths and/or terminal depth of the boring); however, these soil samples will be placed on a "Hold" status in the testing laboratory pending the results of the initial soil testing results. If these additional soil samples require analytical testing, additional unit rates for laboratory testing (not included in this Cost Estimate) will apply. However, approval from the Client will be requested prior to performing any additional analytical testing.

Furthermore, if no significant PID field screening results above atmospheric background are reported for any of the soil samples collected from the borings, the soil samples exhibiting possible adverse environmental impacts based on visual observations and/or the randomly selected soil samples will be analyzed in the testing laboratory.

After each soil sample is visually logged by SKA's on-site personnel, the soil sample will be divided into two representative portions. One portion of the soil sample will be immediately placed into a laboratory-supplied glass jar, labeled, and placed into a ice-filled chest for preservation and delivery to the testing laboratory. The second portion of the soil sample will be placed into a sealed plastic container and set in the sunlight for approximately 20 minutes to enhance the volatilization of environmentally sensitive constituents possibly present in the soil. PID readings will be collected from the samples placed in the sunlight and recorded on the Soil Boring Logs.

Excess soil cuttings and personnel protective equipment (PPE) generated during the installations of the soil borings will be temporarily stored in sealed and properly labeled 55-gallon drums on-site. For purposes of this proposal, SKA has not included any costs for waste profiling/classification or disposal.

Following completion of all field sampling activities, the boreholes completed as soil borings will be immediately backfilled to original grade with an impermeable bentonite grout.

**Groundwater:**

Based on the soil type and field observations, SKA's on-site Geologist will determine the completion depth and screen interval for the temporary monitoring well in the field. The

temporary monitoring well will be constructed of 2-inch inner-diameter (ID), Schedule 40 PVC pipe, consisting of 0.010-inch factory-slotted PVC screen and blank riser pipe. The borehole annulus around the screened section will then be filled with 20/40 grade silica sand to approximately 2 feet above the screened interval for a proper filter pack. Following completion of all field sampling activities, the PVC well casings will be removed from the ground and the boreholes will be immediately backfilled to original grade with an impermeable bentonite grout.

Once installed, the temporary monitoring well will be checked by SKA's on-site personnel for depth to water and Phase Separated Hydrocarbons (PSH), if present, with an electronic oil/water interface meter. The temporary monitoring well will be initially developed with a downhole pump to remove the fine particles from the well screen, filter pack, and surrounding formation. A total of 3 to 5 well volumes of groundwater will initially be removed from the temporary monitoring well and temporarily stored in 55-gallon drums on-site. Once the temporary monitoring well has been properly developed, the temporary monitoring well will be allowed to recharge and/or equilibrate to near static conditions (12-18 hours minimum) prior to collecting a groundwater sample.

SKA will collect a groundwater sample utilizing EPA-approved Low Flow sampling techniques. During low flow groundwater purging, the groundwater from the temporary monitoring well will be continuously monitored in the field for pH, turbidity, specific conductivity, dissolved oxygen, temperature, and oxidation/reduction potential (ORP) with a portable water quality meter equipped with an in-line flow-through cell. Additionally, the depth to water and flow (pumping) rate will also be monitored by our on-site personnel. The data collected during low flow sampling activities will be recorded by our on-site personnel on a Groundwater Sampling Log. Once a minimum of one well volume has been removed and at least three parameters are stable (within their respective variances) for three consecutive measurements, a groundwater sample will be collected from the temporary monitoring well and placed into an appropriately preserved laboratory-supplied container, labeled, and stored in an ice-filled chest for preservation and delivery to the testing laboratory.

Groundwater generated from the development and purging of the temporary monitoring well will be temporarily stored in sealed and properly labeled 55-gallon drums on-site. For purposes of this proposal, SKA has not included any costs for waste profiling/classification or disposal.

#### **Laboratory Analyses:**

The soil and groundwater samples selected from the soil borings and temporary monitoring well will be analyzed at eLab Analytical, Inc. located in Houston, Texas, which is an EPA-approved laboratory and inspected by the TCEQ. All analyses will be performed in accordance with EPA approved methods referenced in Title 40 of the Code of Federal Regulations (40 CFR) and "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods" (EPA SW-846). Appropriate Chain-of-Custody documentation will be maintained for all samples shipped to the testing laboratory. The analytical methods for all of the analyses will be performed based on achieving laboratory detection limits that are at or below the TCEQ's Texas Risk Reduction Program (TRRP) Tier 1 critical Soil and Groundwater Protective Concentration Levels (PCLs). Analytical testing for all of the soil and groundwater samples will be performed in the testing laboratory on a Standard 7-Day Turn-Around-Time (TAT).

Soil Borings:

One (1) surficial or near surficial composite soil sample will be selected for analytical testing from each shallow soil boring. As a result, ten (10) soil samples will be analyzed in the testing laboratory for TPH by TCEQ TX Method 1005 and benzene, toluene, ethylbenzene, and total xylenes (BTEX) by EPA Method 8021B. Based on the TPH analytical testing results, further analytical testing for polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270C may be warranted. As a result and for purposes of this proposal, SKA has included up to one soil sample to be further analyzed in the testing laboratory for PAHs. Additionally, based on the TPH and PAH testing results, further analytical testing for TPH Speciation by TCEQ TX Method 1006 may be required to further quantify possible hydrocarbons in soil. For purposes of this proposal, SKA has included one soil sample to be further analyzed in the testing laboratory for TPH Speciation.

Temporary Monitoring Well:

Up to two (2) composite soil samples will be selected for analytical testing from the soil boring converted to a temporary monitoring well. The soil samples will be analyzed in the testing laboratory for TPH by TCEQ TX Method 1005 and BTEX by EPA Method 8021B.

Groundwater:

One groundwater sample will be collected from the temporary monitoring well and analyzed in the testing laboratory for TPH by TCEQ TX Method 1005 and BTEX by EPA Method 8021B.

Quality Assurance / Quality Control Program

Additionally, for Quality Assurance (QA) purposes, SKA proposes to collect up to one water sample to ensure proper decontamination procedures were followed during groundwater sampling activities. As such, one equipment rinsate (water) sample is proposed to be collected and analyzed in the testing laboratory for TPH and BTEX.

**Task No. 2 – Pit Closure**

An earthen bermed surface impoundment (pit) that was reportedly utilized for oil/gas exploration and/or production activities is located south of the former well pad at the site. At the time of a recent site inspection performed by SKA personnel on April 11, 2007, the surface impoundment (pit) measured 22 feet by 19 feet by 2 feet deep and contained apparent rainwater totaling approximately 6,200 gallons. Based on previous analytical data (Baker), SKA assumes the surface water contained within the pit would be profiled/classified as Non-Hazardous.

SKA proposes to close the surface impoundment by first removing all the free liquids from within the pit, collecting representative confirmation soil samples from the bottom of the pit, evaluating the analytical testing results of the confirmation soil samples to RRC guidance, and backfilling the open pit to surrounding grade with existing (bermed soils) and/or imported soils.

For purposes of this proposal, SKA assumes Buford Curtis, Inc. will provide the necessary equipment (i.e., backhoe, vacuum truck, hoses, etc.) and site personnel to remove and properly dispose of all liquids contained within the pit at an approved off-site disposal facility. Once the fluids are removed, SKA personnel will collect up to two grab confirmation soil samples from the bottom of the pit for laboratory analysis. The two confirmation soil samples will be analyzed in the testing laboratory for TPH by TCEQ TX Method 1005 and BTEX by EPA Method 8021B.



The confirmation soil samples selected from the bottom of the pit will be analyzed at eLab Analytical, Inc. located in Houston, Texas, which is an EPA-approved laboratory and inspected by the TCEQ. The confirmation soil samples will be placed into an appropriately preserved laboratory-supplied container, labeled, and stored in an ice-filled chest for preservation and delivery to the testing laboratory. Analytical testing for all of the soil samples will be performed in the testing laboratory on a Standard 7-Day TAT.

Equipment decontamination will be continuously performed during all sampling activities in accordance with applicable TCEQ, USEPA, and OSHA guidelines. Soil sampling equipment will be washed with Alconox soap and rinsed with potable water prior to the collection of each new soil sample.

Ultimately, the analytical testing results will determine if additional confirmation soil sampling/testing or remedial activities are warranted for the surface impoundment. For the purposes of this proposal, SKA has not included any additional (out-of-scope) remedial activities (i.e., soil excavations, over-excavations, soil removal and/or disposal, or additional confirmation soil sampling/testing) for the surface impoundment located at the Site. Should these additional (out-of-scope) services be required, additional fees will be incurred.

Once the confirmation soil samples report concentrations of chemicals of concern (COCs) below applicable RRC soil standards, SKA proposes to backfill the open pit with existing (bermed soils) and/or imported soils to bring the pit to surrounding grade. For the purposes of this proposal, SKA assumes Buford Curtis, Inc. will provide all the backfill soils and necessary machinery (i.e., backhoe, dump trucks, etc.) and site personnel to properly backfill the pit to surrounding grade.

### **Task No. 3 - Data Evaluation and Letter Report of Findings**

Upon completion of Task Nos. 1 and 2 of this Work Plan, SKA will prepare a Letter Report of findings summarizing assessment activities and resultant conclusions/recommendations. The Letter Report of findings will include site plans, sampling location maps, soil and groundwater concentration maps, tabulated soil and groundwater analytical data summary tables, photographs, and final laboratory analytical reports. In addition, any recommendations (if warranted) for additional soil and/or groundwater investigations or remedial activities will also be included in our Letter Report. All analytical testing results will be compared to applicable RRC soil and/or groundwater standards as previously noted. SKA will provide the Client two copies of our Letter Report. In addition, SKA will provide the RRC District 3 office and the National Park Service BITH each one copy of our report for their review and/or approval.

### **PROPOSED BUDGET AND SCHEDULE**

SKA's estimated budget to perform the above-referenced Work Plan is shown in attached **Table 1**. The costs present in **Table 1** will be billed on a Time and Materials basis and will not be exceeded without a change in scope and prior authorization. We anticipate that the soil boring/temporary monitoring well installations, soil/groundwater sampling, and analytical testing (**Task No. 1**) can be completed within approximately 10 business days. The pit closure activities (**Task No. 2**) can be completed within 10 business days. It is anticipated the Data Evaluation and Letter Report of Findings (**Task No. 3**) can be submitted to you within 20 business days of receiving the final laboratory analytical reports. As a result, the scope of work

presented herein can be completed within approximately 40 business days. We can begin work on this project immediately upon your written notification to proceed.

## **ASSUMPTIONS**

SKA assumes the following in support of this assessment:

- Client will provide full access to the subject property;
- Client will notify all appropriate surface Lessee's and/or owners prior to on-site work commencing;
- No site delays and/or standby time during the field portions of the Scope of Work due to inclement weather or hazardous site conditions;
- No soil profiling for waste classification;
- No soil remediation (i.e., excavation, loading, or off-site disposal of soils); and,
- No Land Surveying (i.e., by a Registered Professional Land Surveyor).

## **CLOSING REMARKS**

SKA appreciates this opportunity to be of service to Buford Curtis, Inc. on this project. To authorize commencement of the Scope of services, please sign the attached Authorization for Services form and return a copy to SKA via facsimile at (713) 266-0996. Should you have any questions regarding this proposal, please do not hesitate to contact me at (713) 266-6056.

Sincerely,

### **SKA CONSULTING, L.P.**



Adam Taylor  
Project Manager

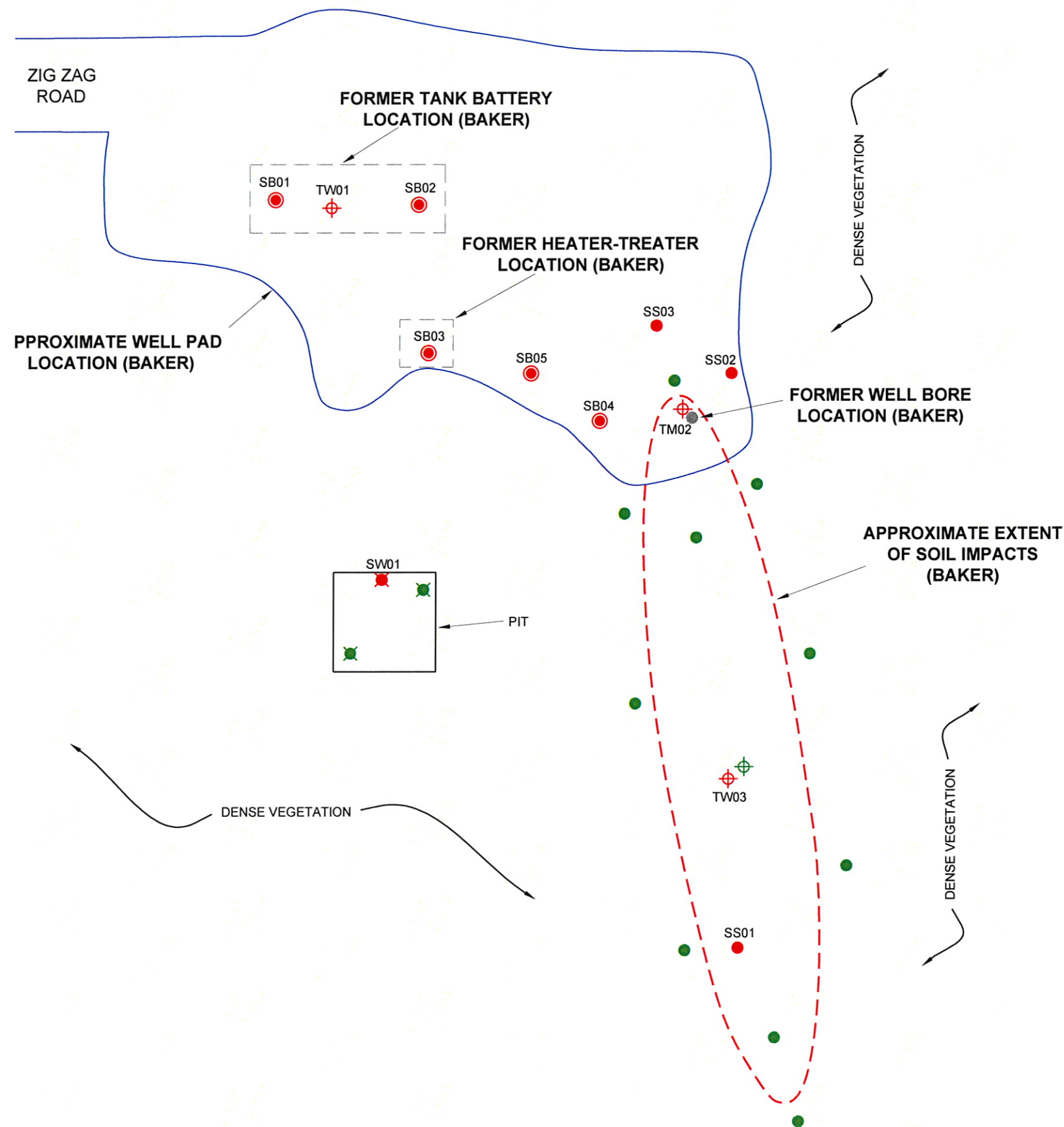


Brian T. Weaver, P.G.  
Senior Project Manager

Attachments: Authorization for Services  
Table 1 – Cost Estimate  
Figure 1 – Sampling Location Map

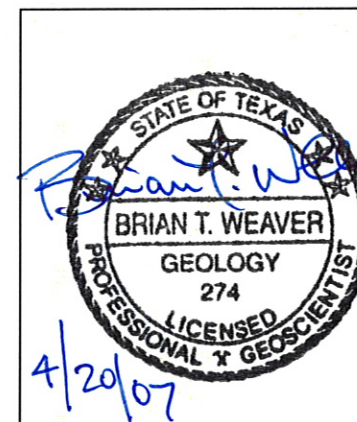
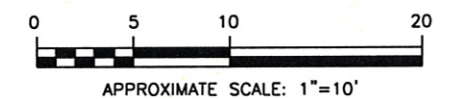
Cc: Haigler "Dusty" Pate, National Park Service (w/attachments)  
David J. Fisher, Orgain, Bell, & Tucker, LLP (w/attachments)  
Guy Grossman, District 3 RRC of Texas (w/attachments)  
Ron Smelley, District 3 RRC of Texas (w/attachments)





#### LEGEND

- SOIL BORING LOCATION (BAKER-AUGUST 2006)
- SURFACE SOIL SAMPLE LOCATION (BAKER-AUGUST 2006)
- TEMPORARY MONITORING WELL LOCATION (BAKER-AUGUST 2006)
- SURFACE WATER SAMPLE LOCATION (BAKER-AUGUST 2006)
- PROPOSED SHALLOW SOIL BORING LOCATION (SKA)
- PROPOSED TEMPORARY MONITORING WELL LOCATION (SKA)
- PROPOSED PIT CONFIRMATION SOIL SAMPLE (SKA)



SKA CONSULTING, L.P.  
10260 WESTHEIMER, SUITE 605  
HOUSTON TEXAS 77042

#### SAMPLING LOCATION MAP

RAFFERTY FEE LEASE - WELL NO. 1 (#19053)  
SILSBEE NORTH (YEGUA 2) FIELD  
NPS SITE 181  
BIG THICKET NATIONAL PRESERVE  
HARDIN COUNTY, TEXAS

DATE:	APRIL 2007	JOB NO:	7007-0001	SCALE:	AS SHOWN
1	FIRST REVISION	04-19-07	DRAWN BY:	NRL	
2	SECOND REVISION	-	CHECKED BY:	AET	
3	THIRD REVISION	-	APPROVED BY:	AET	

FIGURE  
1

