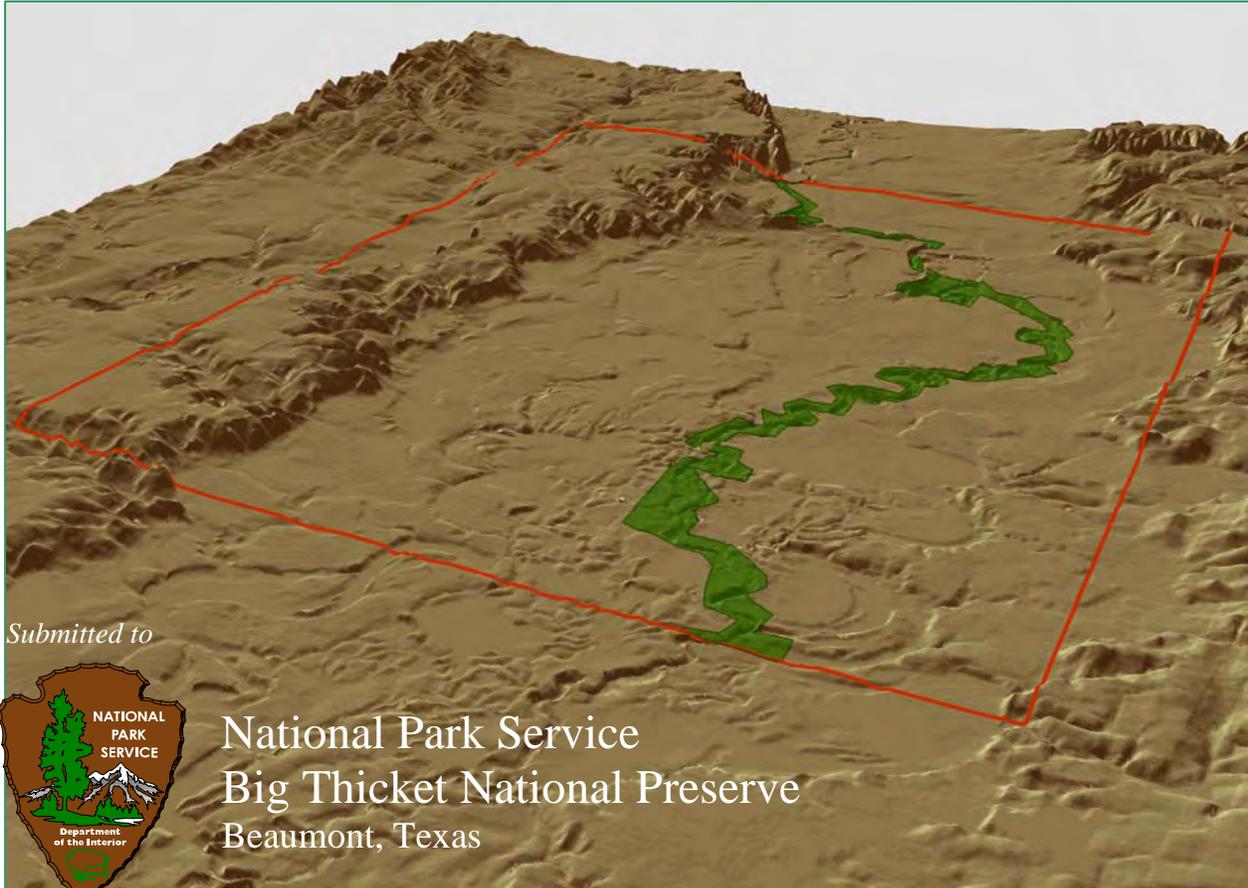


Plan of Operations for Krescent Energy Company, LLC/  
Krescent Energy Partners II LP Proposed Cable-only Three-  
Dimensional Seismic Survey within the Upper Neches River  
Corridor Unit, Big Thicket National Preserve



Prepared by



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ENVIRONMENTAL CONSULTING • PLANNING • PROJECT MANAGEMENT

August 2005

Plan of Operations for  
Krescent Energy Company, LLC/Krescent Energy Partners II LP  
Proposed Cable-only Three-dimensional Seismic Survey within  
the Upper Neches River Corridor Unit,  
Big Thicket National Preserve



*Submitted to*

**National Park Service**  
**Big Thicket National Preserve**  
Beaumont, Texas

*Prepared by*



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## 1.0 INTRODUCTION

Krescent Energy Company, LLC/Krescent Energy Partners II LP (Operator or Krescent) is proposing to conduct a three-dimensional (3-D) geophysical exploration program in and adjacent to the Upper Neches River Corridor Unit of the Big Thicket National Preserve (BTNP or Preserve) in southeast Texas (**Figure 1**). The portion of the seismic survey within the BTNP is proposed as a “cable only” operation. Outside the Preserve explosives will be detonated at source stations, but only receiver stations will be placed in the BTNP. The National Park Service (NPS) requires a Plan of Operations be prepared for cable only geophysical surveys within the Preserve that provides ownership and operational information and outlines measures to avoid and/or minimize potential surface impacts and ensure human safety.

This Plan of Operations follows the outline provided in the NPS’s document titled *Plan of Operations Information Requirements for “Cable Only” Geophysical Operations in Big Thicket National Preserve*. An introduction to the operation, including the name of the Preserve unit covered by the proposed operation was provided in **Section 1.0** followed by a list of pertinent names, addresses, and telephone numbers of the surface owner, mineral owners, lessees, operator(s), field representatives, and contact person in case of an emergency in **Section 2.0**. Mineral lease and ownership information is provided in **Section 3.0**, followed by a discussion of pertinent maps in **Section 4.0**. A description of the proposed operation is provided in **Section 5.0** followed by a description of proposed mitigative measures to ensure public safety and minimize surface impacts in **Section 6.0**. **Section 7.0** provides a Compliance Agreement that outlines the standards, stipulations, and conditions required by the NPS for operations within the Preserve. A discussion of the performance bond or other type of security required for all approved plans of operations is provided in **Section 8.0**. A discussion of relevant permits required by federal, state, or local agencies is provided in **Section 9.0** followed by a statement from the operator ensuring the BTNP Superintendent or representative would have access to the operation within the Preserve to monitor the operation in **Section 10.0**.

The proposed project site as defined in this Plan of Operations and in the accompanying Categorical Exclusion (CE) includes the lands and waters within the BTNP where the 3-D survey would be conducted. The proposed layout of the seismic shoot is shown relative to the BTNP on topographic and aerial-based maps (**Maps 1 and 2**) in **Appendix A**.

## 2.0 OPERATOR/OWNERSHIP CONTACT INFORMATION

### 2.1 Surface Owner

The surface owner of the Upper Neches River Corridor Unit of the BTNP is the National Park Service (NPS). The primary NPS contact person for this project is Mr. Haigler (Dusty) Pate, who is the Oil & Gas Program Manager at BTNP. Mr. Pate can be reached by telephone at (409) 951-6822 (Beaumont – BTNP office). The address of the BTNP is:

Big Thicket National Preserve  
3785 Milam  
Beaumont, TX 77701-4724

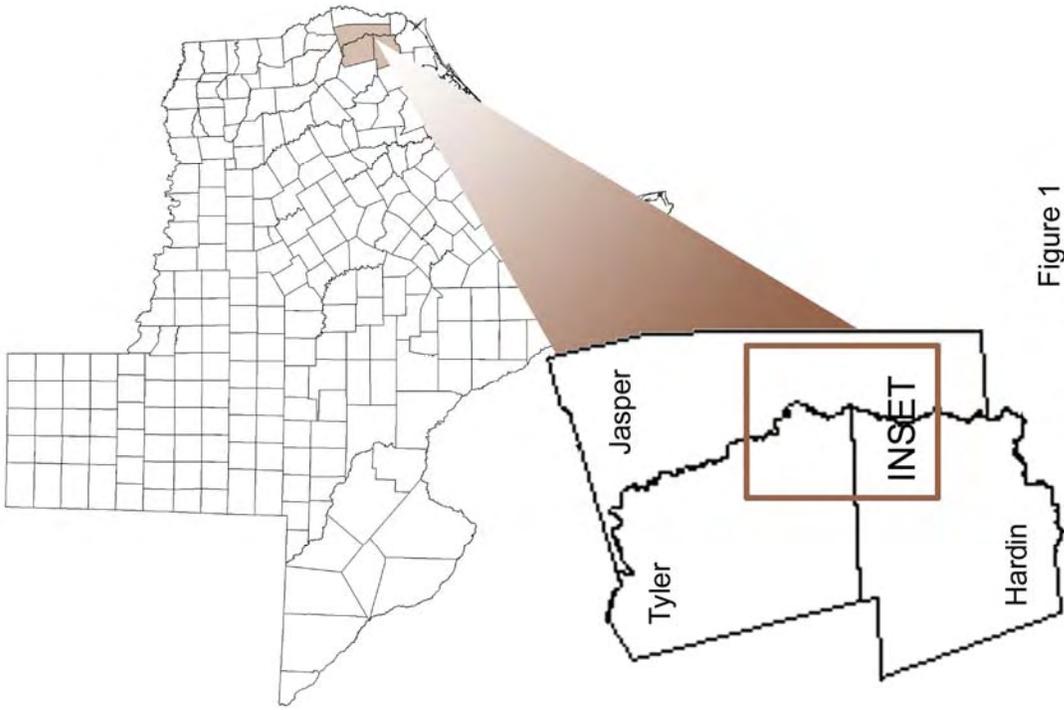
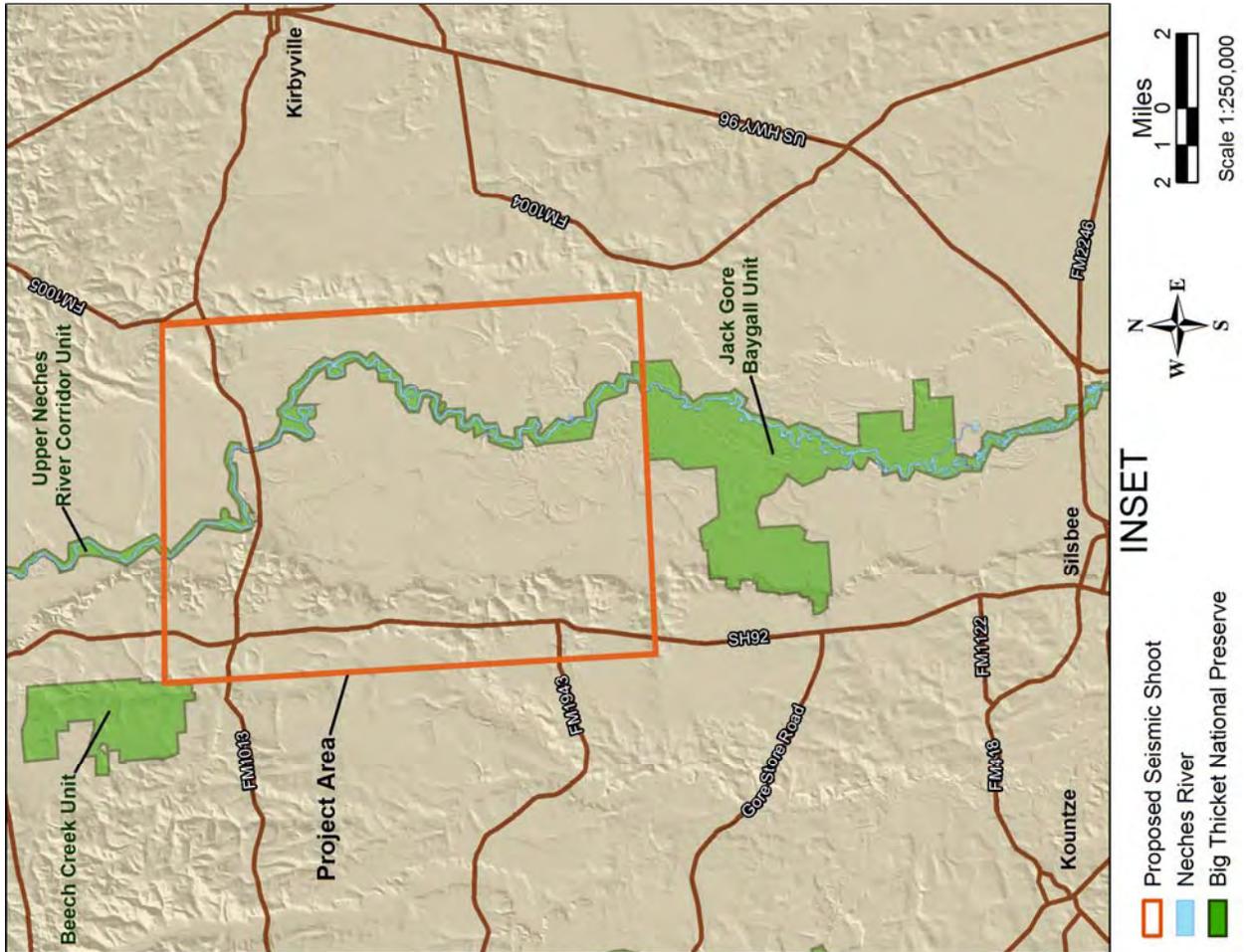


Figure 1  
Project Location  
Krescent Energy Proposed Cable-only  
Three-dimensional Seismic Survey

## 2.2 Unit Operator

The operator of the Tyler 3-D Seismic Survey is Krescent Energy Company, LLC/Krescent Energy Partners II LP (Krescent). The primary contact person for Krescent is Bob Burton (COO). Krescent's address and Mr. Burton's contact numbers are as follows:

Krescent Energy Company, LLC/Krescent Energy Partners II LP  
5005 Riverway STE 550  
Houston, TX 77056  
Phone: (713) 993-0000, Ext 3  
Fax: (713) 993-0011

## 2.3 Mineral Owners

Pertinent mineral owners within the Upper Neches River Corridor Unit of the BTNP are listed below. The mineral permit number is included in parenthesis after each mineral owner. The corresponding tracts relative to these owners within the Upper Neches River Corridor Unit of BTNP are as set forth on **Map 3** in **Appendix A**.

Black Stone Minerals Company, L.P. (1000) Permitted  
Joseph A. Mills Sr., Vice President, Operations  
1001 Fannin, Suite 2020  
Houston, Texas 77002  
(713) 658-1917

BP American Production Company (1002) Permitted  
Gulf Coast Performance Unit  
Terry Stanislav  
P.O. Box 3092  
Houston, TX 77253-3092  
(281) 366-0376

Temple-Inland (1003) Permitted  
Kenneth G. Christopher, Vice President, Minerals Division  
P.O. Drawer 576  
Diboll, Texas 75941  
(936) 829-5511

ADJ Partnership LTD (3001) Permitted/Leased  
Virginia H. Adams, Manager  
1209 Woodland Park  
Jasper, Texas 75951  
(409) 384-3798

Arthur N. Sample (3000) Permitted  
729 Coachlight Road  
Shreveport, Louisiana 71106  
(318) 429-2025

|   |                         |
|---|-------------------------|
| <p>Thomas Jeffcoat (3006)<br/> Route 1, Box 100 AND/OR 882 S. Loading Dock Rd.<br/> Silsbee, Texas 77656 Silsbee, Texas 77656<br/> (409) 385-0454</p> | <p>Permitted/Leased</p> |
| <p>Reid O'Brien Mineral Trust (3002)<br/> William Pfluger<br/> P.O. Box 830650<br/> Richardson, Texas 75083<br/> (325) 944-8621</p>                   | <p>Permitted</p>        |
| <p>Lucille Ramer (3003)<br/> P.O. Box 322<br/> Spurger, Texas 77660<br/> (409) 429-3360</p>   | <p>Permitted/Leased</p> |
| <p>The Perry Britton Trust (3005)<br/> Perry W. Britton<br/> 4601 Country Club View<br/> Baytown, Texas 77521<br/> (281) 424-2020</p>                 | <p>Permitted/Leased</p> |
| <p>Mason-Martindale Group, LP (3007)<br/> Attn: Garry Mason<br/> 311 North Zavala Street<br/> Jasper, Texas 75951<br/> (409) 384-6879</p>             | <p>Permitted/Leased</p> |
| <p>L.M. Hooks (3008)<br/> 865 North Sixth Street<br/> Silsbee, Texas 77656<br/> (409) 385-2675</p>  | <p>Permitted</p>        |
| <p>Dr. Frank Bean (3009)<br/> 2502 Barton Hills Drive<br/> Austin, Texas 78704<br/> (512) 441-1230</p>  | <p>Permitted</p>        |
| <p>Richard N. Evans II (3010)<br/> 2528 Calder Avenue<br/> Beaumont, Texas 77702<br/> (409) 892-2617</p>  | <p>Permitted</p>        |
| <p>L. Cartwright Production Co., LTD (3011)<br/> P.O. Drawer C<br/> Terrell, Texas 75160<br/> (972) 563-0506</p>                                      | <p>Permitted</p>        |

|   |                |
|---|----------------|
| John D. Corse (3012)<br>3588 Richmond Street<br>Jacksonville, Florida 32205<br>(904) 246-7287                       | Permitted      |
| M.M. Kelly (3020)<br>Highway 96<br>Buna, Texas 77612<br>(409) 994-2724  | Permitted      |
| Sharon Cannon, et al. (3022A)<br>P.O. Box 369<br>Ingram, Texas 78025<br>(830) 367-2496 OR (830) 367-4777            | Permit Pending |
| Gene Edward Ratcliff, Jr. (3021)<br>P.O. Box 46<br>Gordon, Texas 76453<br>(254) 693-5380                            | Permit Pending |
| Edith Siau (3023)<br>Route 1, Box 41 A<br>Call, Texas 75933<br>(409) 423-3560                                       | Permit Pending |
| Marilyn Siau Dinklage (3023A)<br>2315 72nd. Street<br>Galveston, Texas  | Permit Pending |
| Bay State Exploration Inc. (3044)<br>P.O. Box 2612<br>Beaumont, Texas 77704<br>Attn: Jim McFaddin<br>(409) 833-3367 | Permit Pending |
| T.R. Hannon Jr. (3013)<br>9646 East Arkansas Place<br>Denver Colorado 80247<br>(303) 745-4100                       | Permitted      |
| W.W. Hicks (3014)<br>P.O. Box 262<br>Spurger, Texas 77660<br>(409) 429-3437   | Permitted      |

#### **2.4 Operator for the Geophysical Operations**

Quantum Geophysical, Inc. (Quantum) is the operator for the seismic survey within and adjacent to the BTNP. The primary contact person for Quantum is Bruce Fulker. Quantum's address and Mr. Fulker's phone numbers are as follows:

Quantum Geophysical, Inc.  
1 Riverway, Suite 2100  
Houston, TX 77056  
(713) 850-9799  
(713) 806-2024 (cell)

## **2.5 Field Representative for Operator**

Seismic Acquisition Consultants, Inc. (SAC) is the field representative for Krescent. The primary contact person for SAC is Bruce Lindsey, Geophysical Consultant. Mr. Lindsey can be reached by telephone at (713) 408-8695.

## **2.6 Spill, Emergency Response Contractor**

Garner Environmental Services, Inc.  
5048 Houston Avenue  
Port Arthur, Texas 77640  
(409) 983-5646  
(800) 983-7634

## **3.0 MINERAL OWNERSHIP AND AGREEMENTS**

Krescent and/or Quantum as Krescent's operator of the geophysical operations currently hold numerous mineral permits; oil, gas, and mineral leases; and exclusive lease options from various mineral owners within the Upper Neches River Corridor Unit of the BTNP. More than 97 percent of all agreements with pertinent mineral owners owning lands within the Upper Neches River Corridor Unit of the BTNP have been finalized as of the date of this Plan of Operations, with the remainder pending. Some of the information contained in the agreements between Krescent, Quantum, and such mineral owners is confidential and not provided in this Plan. The approved agreements pertinent to the Upper Neches River Corridor Unit of the BTNP are on file at the BTNP. The pending agreements will be forwarded to the BTNP and approved by the NPS prior to collecting the seismic data. The corresponding tracts relative to the mineral owners within the Upper Neches River Corridor Unit of BTNP are as set forth on **Map 3** in **Appendix A**. An updated **Map 3** showing the mineral ownership of the BTNP relative to the finalized mineral agreements will be forwarded to the BTNP once all mineral agreements are finalized and approved. No receiver stations would be placed on the surface of the Preserve where a mineral permit and/or oil and gas lease is not secured by Krescent and/or Quantum granting such access. Krescent would not use data from tracts that are not permitted or leased or covered by other documents granting such mineral access.

## **4.0 PERTINENT MAPS**

The following maps are provided in **Appendix A**.

### **Map 1 Topographic View of Krescent's Proposed 3-D Seismic Survey within and adjacent to the Upper Neches River Corridor Unit of the Big Thicket National Preserve**

This map shows the proposed 3-D survey relative to the BTNP on a USGS 7.5 minute topographic map. Information provided includes the boundaries of the proposed Tyler 3-D seismic survey, source points and receiver stations outside the BTNP (including those source points offset outside the Preserve), and receiver stations within the Preserve.

### **Map 2 Aerial View of Krescent's Proposed 3-D Seismic Survey Within and Adjacent to the Upper Neches River Corridor Unit of the Big Thicket National Preserve**

This map provides an aerial view of the proposed Tyler 3-D seismic survey relative to the BTNP. Information provided includes the boundaries of the proposed Tyler 3-D seismic survey, source points and receiver stations outside the BTNP (including those source points offset outside the Preserve), and receiver stations within the Preserve.

### **Map 3 Lease and Ownership – Upper Neches River Corridor Unit of the BTNP**

Map 3 provides the boundaries of mineral leases within the Upper Neches River Corridor Unit of the BTNP. Information pertaining to pertinent leases and ownership is discussed in Section 3.0.

## **5.0 DESCRIPTION OF THE PROPOSED PROJECT**

The 3-D seismic project was designed to evaluate multiple structural and stratigraphic traps based on review and analysis of previous 2-D seismic surveys conducted in the area, the 1999 3-D seismic survey conducted by Seismic Exchange, Inc. just south of the proposed survey, and data from recent exploratory wells drilled in the vicinity. The project provides an opportunity to thoroughly evaluate privately held minerals with 3-D seismic prior to implementing a drilling program. The primary geological objectives of the project are the Vicksburg (5,500 feet to 6,000 feet), Yegua (7,000 to 9,800 feet), Cook Mountain (8,000 to 12,500 feet), and Wilcox (below 12,500 feet) Formations.

The proposed project, both within and outside the Preserve, encompasses approximately 127 square miles. The seismic survey would utilize diagonal source lines and north-south receiver lines as shown on **Maps 1 and 2, Appendix A**. The grid spacing for source points outside the Preserve is 220 feet, but the actual distance between points along the diagonal source lines is 246 feet. The receiver station interval is 220 feet. The receiver line spacing is 1,320 feet, and the source line spacing is 1,760 feet. Outside the BTNP shot holes will be drilled to 100 foot depth and loaded with either 5.5-pound, 3.5-pound, 2.5-pound, or 1-pound charges depending on their proximity to residences and other structures, water wells, utilities and other constraints.

The proposed project within the Preserve includes surveying and marking receiver stations along linear alignments; laying out recording boxes, cables and geophones (sensors) along receiver lines; detonating charges outside the Preserve and recording data both inside and outside the preserve; and cleaning up survey evidence and reclaiming the land surface. The following paragraphs describe the surveying, recording, clean-up, and reclamation phases within the Preserve in detail.

## **5.1 Surveying Phase**

In this phase, up to ten survey crews consisting of three to five crew members each would survey in and mark the proposed locations of receiver stations using conventional survey techniques. Vegetation cutting would be minimized to the extent possible by conforming to a detailed set of conditions outlined in the Plan Compliance Agreement and Summary of NPS – Stipulated Field Guidelines (**Appendix B**). The maximum allowable size of trees or shrubs to be cut is 3 inches in diameter measured 1 foot above the ground. An exception to the size rule is made for Chinese tallow, an invasive species that can be cut without regard for a minimum size. No bald cypress (*Taxodium distichum*) knees will be cut. Vegetation must be cut according to standard pruning methods (e.g., branches cut at stem collar, trunks cut at ground level). The remaining stumps shall be no higher than 2 inches above the ground. The remaining limbs shall not extend more than 1 inch beyond the main trunk. Trees which are already dead and down may be cut and moved for line of sight purposes. The use of motorized cutting equipment is permitted.

Survey evidence, including wooden lath, survey paint, and flagging would be placed at every receiver station. Flagging would also be tied at random intervals down receiver lines and on receiver line offsets to help identify the locations of the surveyed lines. Clearing of vegetation will be limited to receiver lines, unless absolutely necessary to avoid obstacles (i.e., creeks, large trees, etc.), and will be minimized to the extent possible to accommodate necessary foot traffic. No survey line should exceed a maximum width of 48 inches. The cutting or slicing of vegetation to accommodate or hold flagging or other survey markers or equipment is strictly prohibited.

Areas identified by the NPS as avoidance areas throughout all operational phases of the project would be mapped and provided to all crew members. Survey monuments, witness corners, reference monuments, and bearing trees would be protected. Contractors and subcontractors would be held accountable for compliance with the requirements of this Plan of Operations once the NPS has approved it.

## **5.2 Layout and Recording Phase**

The layout and recording phase includes hand carrying recording boxes, cables and geophones. Recording boxes would be placed at varying intervals (typically every quarter mile) along receiver lines such that cables and up to six sets of geophones could be deployed from each box. Each set of geophones consists of six individual sensor units strung together by small electrical wire. The geophones deployed at each station would be set out so that they form a small box pattern. Outside the Preserve, a shooter with a backpack-mounted shooting system would attach a firing line to each shot hole detonating cap at source point locations previously drilled and loaded with explosive charges. The caps and charges would then be remotely detonated from a recording truck located outside the Preserve. The energy waves produced by the charges and reflected back from geological layers within the earth would be recorded by geophones. The information would then be transmitted to and stored in recording boxes for subsequent retrieval.

## **5.3 Cleanup and Reclamation Phase**

This phase, which includes implementing the various components of the mitigation and reclamation plan (**Section 6.0**), will be conducted during the entire project in the Preserve. When recording operations are

completed, the boxes, geophones, cables, survey markers, and all other equipment and materials would be removed from the BTNP by hand.

#### **5.4 Access Equipment**

Boats will be used on the Neches River and other navigable waters to transport materials, equipment, and crew members. Refueling of boats would occur on uplands outside of the Preserve.

Helicopter operations would be used for transporting equipment (e.g., recording equipment such as recording boxes, cables, geophones, etc.) via a cargo container and long-line to supply work crews operating within the BTNP boundaries. All ancillary helicopter operations, including but not limited to maintenance functions, fuel storage and refueling, supplies and equipment storage, landing zone, etc., would be conducted on private property adjacent to the BTNP. By virtue of the proposed helicopter long-line operation, the helicopter itself would never touch ground or come within 100 feet of the surface of BTNP property, except perhaps for a life-threatening emergency. The use of a helicopter for transporting equipment is designed to increase efficiency.

Helicopter operations would be conducted in accordance with 14 CFR Ch. 1, §91.119. Paragraph (d) *Helicopters* of this section permits the flight of helicopters at less than 500 feet “if the operation is conducted without hazard to persons or property on the surface.” Furthermore, AC 91-36C-Visual Flight Rules (VFR) Flight near Noise Sensitive Areas addresses lands administered by the NPS, U.S. Fish and Wildlife Service, or the U.S. Forest Service. This FAA advisory circular prohibits many activities involving airborne equipment or personnel deliveries “without authorization.” Finally, 36 CFR – Parks, Forests, and Public Property, Part 2, sec. 2.17 (3) permits the delivery or retrieval of a person or object by helicopter “pursuant to the terms and conditions of a permit.”

#### **5.5 Timetable for Operations Within the BTNP**

The timetable for operations is dependent on a number of factors including but not limited to regulatory requirements (authorizations and permits), crew availabilities, weather, and economic trends. A discussion of the scheduling issues outlined in the Plan of Operations guidance is presented below.

Survey equipment would be moved to the BTNP during the first part of September. Surveying within the Preserve would be conducted under a Temporary Access Permit subject to NPS approval of the Plan of Operations and issuance of the findings. The estimated time to complete the survey phase is 45 days within the Preserve.

Approximately 30 to 45 days would be required to lay out receiving equipment, detonate charges outside the Preserve, and record data within the BTNP. The layout crews would begin setting up their network along receiver lines approximately 30 to 45 days after the survey phase starts depending on the approval of the Plan of Operations.

Reclamation would begin at the completion of recording operations. Upon completion of recording, all geophones, cables, pin flags, flagging, lath, and other temporary markers and project waste would be removed. No debris of any sort related to the seismic survey would be left in the Preserve.

Reclamation activities would be considered to be complete upon compliance with reclamation requirements as specified in 36 CFR 9.39 and 9.48(f). Subsection 9.48(3)(f) states:

(f) Within thirty (30) days after determining that all reclamation requirements of an approved plan of operations are completed ..., the Regional Director shall notify the operator that the period of liability under the bond or security deposit has been terminated.

## **6.0 MITIGATIVE MEASURES TO ENSURE PUBLIC SAFETY AND MINIMIZE SURFACE IMPACTS**

### **6.1 3-D Seismic Method Within BTNP**

The primary measure utilized in this project to ensure public safety and minimize surface impacts is the “Cable Only” method proposed in the BTNP. This method avoids the need to drill several hundred shot holes within the Preserve. This also avoids loading source point holes with explosives and detonating them as a source of energy for recording the seismic data within the Preserve. As an alternative, only recording equipment consisting of recording boxes, cables and geophones would be used in the Preserve. The receiver lines and stations are shown on **Maps 1** and **2** in **Appendix A**.

### **6.2 Conditions for Clearing Vegetation**

The vegetation along receiver lines would be hand cut with no mechanized land clearing within the Preserve. Motorized chainsaws would be used to cut woody vegetation. In addition, the maximum size of woody plants that will be cut in the BTNP is 3 inches in diameter measured 1 foot above the ground. All trees and shrubs will be cut flush with the ground to avoid hazards to the public and wildlife. Clearing of the receiver lines will be limited to that necessary for the sighting of survey equipment and to layout the recording equipment. No bald cypress knees would be cut within the BTNP.

Additional specific actions to prevent the influx of exotic plant species, if needed, would be determined by the NPS consistent with applicable NPS regulations and in coordination with the consulting biologist. The 3-inch diameter limit on cut vegetation should eliminate any changes to the canopy and, as such, should minimize the potential influx of most invasive exotics, including Chinese tallow.

### **6.3 Measures to Minimize Impacts Associated with Petroleum Spills**

Fluids that have potential for leakage or spill that would be used within the boundaries of the BTNP include fuel and lubricants for chainsaws. These fluids would be limited to unleaded gasoline and petroleum-based lubricants for the blades. Gasoline contains materials that are defined as “hazardous substances” by the U.S. Environmental Protection Agency (EPA). These include benzene (Chemical Abstract Service [CAS]#71-43-2), xylenes (CAS#1330-20-7), toluene (CAS#108-88-3), ethylbenzene (CAS#100-41-4), methyl tert-butyl ether (CAS#1634-04-4), and isooctane (CAS#540-84-1). Gasoline typically contains one to three percent of each of these chemicals.

To minimize potential impacts, the following measures would be implemented in the BTNP:

1. Quantities of fuel and lubricants within the Preserve would be limited to the volume necessary for a day's activities.
2. If refueling or lubricating must take place within the BTNP, the activity would be conducted over appropriate containment such as impenetrable polyvinyl covered by absorbent materials. Contaminated materials would be stored in plastic bags and then placed in bag packs and transferred off-site. Contaminated absorbent materials would be transferred to Garner Environmental Services for storage and/or disposal.
3. Refueling and lubricating would be attended by a minimum of two persons.
4. Material safety data sheets, which would be obtained for all fuels and substances to be used during the operations, would be made available to all personnel. Copies of these material safety data sheets would be kept at the field headquarters of the geophysical operator.
5. No waste oil, drilling muds, or chemicals will be stored, impounded, or disposed of within or near the BTNP.
6. Absorbent materials, fire extinguishers, first aid kits, shovels, and portable radios would be available throughout the project area.
7. In accordance with 36 CFR §9.46, the NPS Superintendent would be notified within 24 hours of any accident involving serious personal injury or death or any fires within the Preserve. The appropriate written report would follow within 90 days of any such accident or fire.

The U.S. EPA and TCEQ regulations require notification if a spill or release of certain materials occurs. The materials spilled or released that trigger notification are petroleum products (oil, gasoline, etc.), crude oil, and various other hazardous substances and wastes. The reportable quantity of a petroleum (including gasoline) spill is 25 gallons (land spill) or enough to cause sheen on nearby surface water. Small spills, if any, would be abated by the use of absorbents. Gasoline and lubricants within the Preserve would be limited to much less than 25 gallons at any single location.

The contact information for various types of emergencies is provided in **Table 1**.

#### **6.4 Conditions Associated with Materials, Equipment, and Wastes**

Equipment within the Preserve would be limited to the necessary survey and recording equipment. Surveyors would have instruments, rods, and vegetation-clearing equipment such as machetes and chainsaws. The recording crew would carry in geophones, sensor boxes and cable. The recording crew would carry in (or retrieve from helicopter drop locations along a receiver line) recording boxes, cables and geophones. When recording operations are completed, the boxes, cables, geophones, survey markers, and all other equipment and materials will be cleaned prior to accessing the BTNP to prevent the spread of exotic and invasive species. When recording operations are completed, the recording boxes, geophones, cable, survey markers, and all other equipment and materials, including flagging, stakes, and temporary markers would then be removed by hand.

**Table 1 Contacts for Emergency Action**

| <b>AGENCY/INSTITUTION (OR PERSON)</b>   | <b>LOCATION</b>   | <b>TELEPHONE</b>   |
|---|---|--|
| Hospitals and Clinics<br>Columbia Doctors Hospital<br>St. Elizabeth Family Practice Clinic<br>St. Elizabeth Family Practice Clinic<br>Tyler County Hospital<br>Silsbee Doctors Hospital | Silsbee<br>Kountze<br>Silsbee<br>Woodville<br>Silsbee   | (409) 385-5531<br>(409) 246-8579<br>(409) 386-1200<br>(409) 283-8141<br>(409) 385-5531 |
| Fire Department<br>Woodville Volunteer Fire Department<br>Silsbee Volunteer Fire Department   | Woodville<br>Silsbee  | 911<br>(409) 283-2234<br>(409) 385-4761  |
| Police Department<br>Woodville Police Department<br>Tyler County Sheriff<br>Silsbee Police Department   | Woodville<br>Woodville<br>Silsbee   | 911<br>(409) 283-5262<br>(409) 283-2172<br>(409) 385-371                               |
| Texas Commission on Environmental Quality (TCEQ)  | 3870 Eastex Freeway, Suite 110<br>Beaumont, Texas 77703-1892                                  | (409) 898-3838<br>(409) 892-2119 fax   |
| Texas Emergency Response Center (24 hours)  | Austin, Texas   | (512) 463-7727   |
| U.S. EPA National Response Center   |   | (800) 424-8802   |
| Quantum Geophysical<br>Bruce Fulker   | Houston, Texas  | (713) 850-9799<br>(713) 806-2024 cell  |
| Krescent Energy Company, LLC/Krescent Energy Partners II LP, Operator<br>Bob Burton   | Houston, Texas  | (713) 993-0000, Ext. 3<br>(940) 781-5764 cell<br>(713) 993-0011 fax                    |
| Seismic Acquisition Consultants, Inc., Krescent Field Representative<br>Bruce Lindsey   |   | (713) 408-8695   |
| Environmental Contractor:<br>Garner Environmental Services, Inc.  | Port Arthur, Texas  | (800) 983-7634<br>(409) 983-5646   |
| Big Thicket National Preserve<br>Haigler (Dusty) Pate   | Beaumont, Texas<br>Beaumont, Texas  | (409) 839-2689<br>(409) 839-2690,<br>Ext. 232<br>(409) 656-1645                        |
| Texas Railroad Commission<br>Guy Grossman   | Houston, Texas  | (713) 869-5001   |
| Poison Control Center   | Kountze Police Department Sheriff<br>Silsbee Police Department<br>Sour Lake Police Department | 1-800-764-7661   |
| Toxic Chemical and Oil Spill  |   | 1-800-424-8802   |

Non-sanitary solid wastes and trash such as lunch debris would be removed from the Preserve on a daily basis. Within the Preserve, non-sanitary human waste is proposed to be disposed in conformance with NPS Back Country Use Regulations. A spot at least 25 feet away from any creek bank or trail would be

located. A hole 6 inches to 8 inches deep would be kicked out by foot. After use the hole would be covered with soil.

## **6.5 Monitoring Operations**

Third-party monitors and NPS representatives would observe and document the completion of each phase of the seismic survey in the BTNP. One to four monitors would be in the field at any given time during the operation. The number of monitors depends upon how many survey or equipment layout crews are actively working in the Preserve at a given time. The monitors would report to the NPS on a regular basis, depending on the level of compliance and other factors. Compliance forms will be completed on a daily basis and compiled into a Compliance Log at the end of the project. Copies of the compliance forms for this project are included in **Appendix C**.

## **7.0 COMPLIANCE WITH THE PLAN OF OPERATIONS**

A number of mitigation measures have been incorporated into the project. A document titled *Plan of Operations Compliance Agreement and Summary of NPS Stipulated Field Guidelines (Agreement)* outlines important compliance issues and is provided in **Appendix B**. This *Agreement* would be distributed to all project personnel and used by third-party project monitors to ensure the operation is being conducted in accordance with this Plan of Operations. Note that the *Agreement* is intended to supplement the Plan of Operations and is not intended to replace this document.

Krescent would fully comply with this approved Plan of Operations and would further comply with all standards, stipulations, demands, and orders issued by the NPS Regional Director pursuant to applicable NPS regulations. Krescent or third-party monitors would train the geophysical contractor and its representatives according to all methods, conditions, and stipulations agreed to by Krescent and the NPS. No person would enter the BTNP to participate in the seismic survey without receiving training from the third-party monitors.

## **8.0 SECURITY BOND**

A performance bond or other acceptable type of security in an amount up to \$25,000 will be made payable to the Director, National Park Service, by Krescent once this Plan of Operations is approved.

## **9.0 PERMITS**

The operation would comply with all pertinent local, state, and federal regulations, laws, and ordinances. The following paragraphs describe regulatory issues that must be addressed for this operation.

This Plan of Operations is being prepared in part to assist the NPS with compliance responsibilities under the **National Environmental Policy Act (NEPA)**. The project information and measures to ensure public safety and minimize surface impacts will be used to prepare a NEPA document. This document will address the purpose of and need for the project, alternative actions evaluated, the existing conditions of the human and natural environment, and impacts of the project on these resources. The document will

provide information on the entire project conducted on both private and public property, but will focus on the activities within the Preserve.

Pursuant to compliance with the **Clean Water Act** (CWA), potential impacts of the proposed project on waters of the U.S. are authorized under the U.S. Army Corps of Engineers (USACE) Nationwide Permit (NWP) No. 6 (Survey and Seismic Activities). This authorization permits standard seismic operations within waters of the U.S. without notification to the USACE provided there are no discharges of dredge and fill into waters of the U.S. The project would not include activities that would constitute dredge or fill activities as defined in 33 CFR 332.2(c). Therefore, the project would be in compliance with the CWA without written approval from the USACE.

The **Endangered Species Act** (ESA) provides certain protections for federally listed threatened and endangered species. The project, as proposed would be in compliance with the ESA. No known federally listed threatened or endangered species would be adversely affected by the proposed project based on a review of existing literature, knowledge of the project area, and operational information. No documented occurrences of any federally listed species occur in the project area based on a review of the Texas Parks and Wildlife Department's Natural Diversity Database and discussions with BTNP biologists. If evidence of a federally listed threatened or endangered species is discovered during the seismic survey, operations would cease in the area appropriate for the species encountered until an assessment can be made by qualified biologists and BTNP staff.

The Railroad Commission of Texas regulates oil and gas exploration through **Statewide Oil and Gas Rules**. Statewide Rule 100 requires the protection of usable groundwater during exploration and production activities. In the study area, the depth of usable-quality water extends from the land surface to between 1,600 and 2,925 feet. The 100-foot seismic shotholes located outside the Preserve will not penetrate the base of the usable groundwater zone; therefore the project would comply with SWR 100. A letter from the TCEQ regarding the depth of usable groundwater in the project area is provided in **Appendix D**.

## **10.0 SUPERINTENDENT ACCESS**

The superintendent (or representative) of the BTNP would be assured access to the seismic survey as necessary to properly monitor the operation and to ensure compliance with the Plan of Operations.

## Appendix A

### Maps

(THE TOPO AND AERIAL MAPS ARE AVAILABLE FOR DOWNLOAD  
SEPARATELY)



## Appendix B

### Summary of NPS-Stipulated Field Guidelines Big Thicket 3D Seismic Operations

## Summary of NPS-Stipulated Field Guidelines Big Thicket 3D Seismic Operations

September 9, 2005

**Subject: Compliance with Plan of Operations for 3D Seismic Survey in the Upper Neches River Corridor Unit, Big Thicket National Preserve**

Krescent Energy Company, LLC/Krescent Energy Partners II LP (Krescent or Operator) proposes to conduct seismic operations on the Upper Neches River Corridor Unit of the Big Thicket National Preserve (BTNP) as set forth in an approved Plan of Operations (Plan) and Categorical Exclusion. Quantum Geophysical (Quantum) would conduct the seismic survey and Seismic Acquisition Consultants, Inc. (SAC) will assist with quality control. Both Quantum and SAC will act as the operator's agents. In order to assure compliance with the Plan, the following steps will be taken:

1. The Operator will hold daily meetings with all field personnel throughout the operational phases of the project. Subjects to be covered daily:
  - a. Safety of personnel.
  - b. Areas where operations are to be conducted.
  - c. Areas in the proximity of the operations that have been designated as "off limits" areas and are to be avoided.
  - d. Problems crews anticipate may be encountered; resolve these problems in a manner that complies with the Plan.
  - e. Determine any need to vary from the Plan or Plan Compliance Agreement (Agreement). No variance will be made from the Plan or Agreement without the advance written approval of the National Park Service ("NPS").
  - f. Re-emphasize limitations set forth in the Plan. (See "Summary of NPS-Stipulated Field Guidelines")
  - g. Oral reports from crewmembers confirming that all activities and operations completed the prior day complied with the Plan. Non-compliance incidents, if any, reported by crewmembers will be reported to the NPS on the daily compliance report.
  - h. Krescent, or other persons designated by Krescent and approved by the NPS, will personally check or monitor operations in the field to document compliance with the Plan. Krescent, Quantum, and SAC have the authority over all personnel in the field and are responsible for maintaining proper conduct on the BTNP in accordance with the Plan. This responsibility and authority, in cooperation with the third-party monitoring team, should be the most efficient way to manage and monitor compliance with the Plan.

2. A third-party monitoring team, approved by the NPS, will oversee the field operations on the BTNP and will monitor compliance with the Plan. Following consultation with the Operator, the NPS will determine the number of third-party monitors necessary for this project, based on, but not limited to, the operation's schedule, potential for adverse impact, knowledge of the operator's work habits, operator's compliance history, and/or phase(s) of operations.
3. A third-party monitor will attend the field supervisor's meeting on a daily basis to provide the Operator with a verbal status report, and to coordinate monitoring activities.
4. A compliance report (Attachment 1) will be submitted by the monitor team to the Operator and the BTNP Superintendent, or his representative prior to the start of each workday. Work log and progress reports (Attachments 2-4) will be submitted by the Operator to the third-party monitors prior to the start of each workday. This information will be used to plan monitoring activities and to assist the monitor team with their responsibility of keeping the NPS informed of the project status.
5. The Operator will provide adequate communications to the third-party monitor team throughout all phases of operations. Such communications will assist the monitors with their responsibilities and will help with safety concerns.
6. Pictures will be taken on an as-needed basis to demonstrate compliance and to record any noncompliant activities. Any noncompliance with the Plan will be reported promptly to the BTNP Superintendent or his representative. The Operator will take immediate action to remedy any noncompliance. Representative photographs will be forwarded to the BTNP Superintendent or his representative on a weekly basis.
7. The Neches River will be used by the operator's to access the BTNP.
8. Access to field operations will be open to all NPS employees or designated agents at all times. All meetings with field personnel will be open to the third-party monitor team and all NPS employees or designated agents.
9. Any NPS concern regarding compliance with the Plan will be directed to Bruce Fulker, Quantum [(713) 850-9799], Bruce Lindsey, SAC [(713)408-8695] and/or Bob Burton, Krecent [(713) 993-0000].
10. The NPS may suspend operations of the project if the quality of the monitoring performed by the Operator with respect to compliance with the Plan is unsatisfactory to the NPS.
11. If the third-party monitor observes operations or practices that the monitor believes constitute a significant threat to BTNP resources, the monitor shall immediately contact the BTNP Superintendent or his representative and report the threat to the NPS and the Operator. A significant threat to BTNP resources shall include, but not be limited to: oil or contaminating substances spill; fire hazards; release of a hazardous substance; improper handling, transport, or storage of explosives; cutting, removing or destroying vegetation outside the designated receiver lines (unless otherwise approved by an item of this Compliance Agreement); and injury or damage to cultural resources. The NPS may issue a suspension order, if necessary, to protect the BTNP.

## **Project Design**

Project design and layout will be the responsibility of the Operator. This will be done in accordance with the Plan and discussions with the BTNP.

## Surveying

1. Survey crews will cut a path wide enough for sighting of survey instruments and the layout of cables and geophones. Clearing of vegetation will be limited to receiver lines, unless absolutely necessary to avoid obstacles (i.e., creeks, large trees, etc.), and will be minimized to the extent possible to accommodate necessary foot traffic. No survey line should exceed a maximum width of 50 inches.
2. The cutting or slicing of vegetation to accommodate or hold flagging or other survey markers or equipment is strictly prohibited.
3. Other than Chinese tallow, the cutting of live or dead vegetation larger than 3 inches in diameter, measured 1 foot above the ground level, is strictly prohibited. All cuts must be made flush with the ground or, for limbs, flush with the main trunk. The remaining stumps shall be no higher than 2 inches above the ground. The remaining limbs shall not extend more than 1 inch beyond the main trunk. Trees which are already dead and down may be cut for line of sight purposes. The use of motorized cutting equipment is permitted.
4. All cutting of vegetation shall be accomplished so as to comply with item 1 of this section, and all cuts shall be made so as to be in compliance when the vegetation is initially cut. There shall be no instances where tree stumps or limbs are allowed to remain in excess of what is specified under item 1 of this section beyond the date of the original cut.
5. No cypress knees will be cut.
6. Areas designated as “off limits” by the NPS or Krescent’s environmental consultants will be identified on a map and will be absolutely avoided throughout the operation. There will be no entry to and/or transit through the areas designated as excluded areas.
7. Offsetting receiver locations will be the responsibility of the Operator per criteria set forth at the beginning of the project and in a manner consistent with the Plan. Offset receiver locations will be documented in applicable daily reports (Attachment 2) by the Operator and submitted to the third-party monitor prior to the start of each workday.
8. Offset receiver locations shall be shown on a project area map. The cutting of vegetation necessary for survey and/or access to offset locations shall be documented in applicable daily reports (Attachment 2) by the Operator and submitted to the third-party monitors prior to the start of each workday.
9. The quantities of fuel and lubricants brought within the BTNP will be limited to the volume necessary for motorized cutting equipment. Lines of sight on receiver lines would be cut primarily using machetes, but could involve some limited use of motorized equipment. If refueling or lubricating must take place within the BTNP, it will be conducted over appropriate containment such as impenetrable polyvinyl covered by absorbent materials. Refueling and lubricating will be attended by a minimum of two persons. MSDS sheets for all fuels and lubricants will be available to all personnel.
10. All spills will be removed from the BTNP promptly in accordance with the requirements of the Plan and will be reported to the NPS and the Operator on the daily compliance report (Attachment 1). Any spill of a reportable quantity will also be reported to the appropriate agencies, as specified in the Plan.
11. Absolutely no trash will be left on the BTNP at any time.

12. Crews will be monitored for compliance with these criteria by the Operator and the third party monitors throughout all phases of the operations.

### **Layout and Recording**

1. Areas designated as “off limits” by the NPS or Krescent’s environmental consultants will be identified on a map and will be absolutely avoided throughout the operation. There will be no entry to and/or transit through the areas designated as excluded areas.
2. Helicopters will be permitted for the express use of transporting equipment (i.e., recording equipment such as recording boxes, cables, geophones, etc.) via a cargo container and long-line; to supply work crews operating within the BTNP boundaries. All ancillary helicopter operations, including but not limited to maintenance functions, fuel storage and refueling, supplies and equipment storage, landing zone, etc., will not be conducted on BTNP property. By virtue of the proposed helicopter long-line operation, the helicopter itself will never touch ground or come within 100 feet of the surface of BTNP property, except perhaps for a life-threatening emergency. The use of a helicopter for transporting equipment is designed to increase efficiency.
3. All stakes, pin flags, and flagging will be removed.
4. Absolutely no trash will be left on the BTNP at any time.
5. Crews will be monitored for compliance with these criteria by the operator and the third party monitors throughout all phases of the operations.

The Operator hereby agrees to comply with the conditions of the Plan of Operations within the Big Thicket National Preserve.



Bob Burton, Krescent Energy Company, LLC/Krescent Energy Partners II LP

*The NPS may issue a suspension order for the Operator’s failure to comply with any item under this Agreement.*

## Appendix C

### Daily Compliance Forms



**Krescent Energy Company, LLC/Krescent Energy Partners II LP  
Upper Neches River Corridor Unit of the Big Thicket National Preserve  
DAILY SURVEY REPORT**

Date \_\_\_\_\_ Onsite Operations Supervisor(s) \_\_\_\_\_

Weather \_\_\_\_\_ Ground Conditions \_\_\_\_\_

| Surveyor | Receiver Line | Station Range                    | # of Stations Completed |
|----------|---------------|----------------------------------|-------------------------|
|          |               |                                  |                         |
|          |               |                                  |                         |
|          |               |                                  |                         |
|          |               |                                  |                         |
|          |               |                                  |                         |
|          |               |                                  |                         |
|          |               |                                  |                         |
|          |               |                                  |                         |
|          |               | Total Stations Completed Today   |                         |
|          |               | Total Stations Completed To Date |                         |
|          |               | Percent Complete                 |                         |

Comments Regarding Plan Compliance \_\_\_\_\_

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**Tomorrow's (date \_\_\_\_\_) Survey Assignments**

*Surveyor*

*Approximate Receiver Station Range*

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**Krescent Energy Company, LLC/Krescent Energy Partners II LP  
Upper Neches River Corridor Unit of the Big Thicket National Preserve  
DAILY RECORDING/CLEAN-UP REPORT**

Date \_\_\_\_\_ Onsite Operations Supervisor(s) \_\_\_\_\_

Weather \_\_\_\_\_ Ground Conditions \_\_\_\_\_

| Recording Crew | Receiver Line | Station Range | # of Stations Completed | Clean-up Progress |
|----------------|---------------|---------------|-------------------------|-------------------|
|                |               |               |                         |                   |
|                |               |               |                         |                   |
|                |               |               |                         |                   |
|                |               |               |                         |                   |
|                |               |               |                         |                   |
|                |               |               |                         |                   |
|                |               |               |                         |                   |
|                |               |               |                         |                   |
|                |               |               |                         |                   |

Comments Regarding Plan Compliance \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Tomorrow's (date \_\_\_\_\_) Recording/Clean-up Assignments**

*Crew*

*Approximate Receiver Station Range*

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## Appendix D

### Correspondence from TCEQ Regarding Protection of Usable Groundwater

Kathleen Hartnett White, *Chairman*  
R. B. "Ralph" Marquez, *Commissioner*  
Larry R. Soward, *Commissioner*  
Glenn Shankle, *Executive Director*



## TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

July 21, 2005

QUANTUM GEOPHYSICAL INC  
1 RIVERWAY STE 2100  
HOUSTON, TX 77056

Attention: ROYCE HAMMER

Re: Depth to protect usable-quality ground water for seismic shotholes  
Seismic Line(s): TYLER COUNTY 3D PROSPECT  
County: TYLER AND JASPER

Dear Mr. Hammer:

This letter is in response to your letter of 07 JULY 2005, requesting the base of usable-quality ground water in the captioned area involving the use of seismic shot holes. Pursuant to RRC Statewide Rule 100, effective 01 September 1992, this Agency offers the following recommendation for the protection of usable-quality ground water

Usable-quality ground water occurs from the surface to a depth of 1600 feet to 2925 feet. Your 100-foot shotholes will not penetrate the base of usable-quality ground water

If you have any questions concerning this recommendation, please call me at 512/239-0523.

Sincerely,

A handwritten signature in blue ink that reads "Karen F. Scott".

Karen F. Scott, P.G.  
Surface Casing MC-151

KFS:jh  
cc: RRC District Office



UNITED STATES DEPARTMENT OF THE INTERIOR  
National Park Service

Special Use Permit

Name of Use Quantum (SAL) Knight Phase III 3D Seismic Cable Only Date Permit Reviewed 2005 08/01  
Reviewed 200  
Reviewed 200  
Expires 2005 12/31

Long Term

Permit # IMR\_BITH\_5300\_05-08  
Region Park Type No. #

Short Term

Big Thicket National Preserve  
Name of Area

Quantum Geophysical, Inc. of One Riverway, Suite 2100, Houston, TX 77056 713 850-9799  
Name or Permittee Address Phone

is hereby authorized during the period from (Time 0800 day 01 Month 08 2005 ), through (Time 1700  
day 31 Month 12 2005 ), to use the following described land or facilities in the above named area:

Existing access routes and the proposed receiver lines crossing the Big Sandy Creek Corridor Unit, described as Village Creek Corridor Unit in the permit application from Quantum Geophysical, Inc., to Big Thicket National Preserve dated July 18, 2005.

For the purpose(s) of:

Exploration for oil and gas resources by 3D seismic geophysical surveying methods.

Authorizing legislation or other authority (RE - DO-53):

NEPA Compliance: CATEGORICALLY EXCLUDED  EA/FONSI  EIS  OTHER APPROVED PLANS

PERFORMANCE BOND: Required  Not Required  Amount \$ 5,000.00

LIABILITY INSURANCE: Required  Not Required  Amount \$

ISSUANCE of this permit is subject to the conditions on the reverse hereof and appended pages and when appropriate to the payment to the U.S. Dept. of the Interior, National Park Service of the sum of \$ WAIVED

The undersigned hereby accepts this permit subject to the terms, covenants, obligations, and reservations, expressed or implied herein.

PERMITTEE

Authorizing Official [Signature] Art Hutchinson 8/2/05  
Signature Superintendent Date

Additional Authorizing Official \_\_\_\_\_  
(if Required) Signature Title Date

## CONDITIONS OF THIS PERMIT

1. The permittee shall exercise this privilege subject to the supervision of the Superintendent, and shall comply with all applicable laws and regulations of the area.
2. Damages - The permittee shall pay the United States for any damage resulting from this use which would not reasonably be inherent in the use which the permittee is authorized to make of the land described in this permit.
3. Benefit - Neither Members of, nor Delegates to Congress, or Resident Commissioners shall be admitted to any share or part of this permit or derive, either directly or indirectly, any pecuniary benefits to arise therefrom: Provided, however, that nothing herein contained shall be construed to extend to any incorporated company, if the permit be for the benefit of such corporation.
4. Assignment - This permit may not be transferred or assigned without the consent of the Superintendent, in writing.
5. Revocation - This permit may be terminated upon breach of any of the conditions herein or at the discretion of the Superintendent.
6. The permittee is prohibited from giving false information; to do so will be considered a breach of conditions and be grounds for revocation [Re: 36 CFR 2.32(a)(4)].
7. Permittee will comply with applicable public health and sanitation standards and codes.
8. Seismic exploration shall be performed as described in the permit application and attachments from Quantum Geophysical, Inc., to Big Thicket National Preserve dated July 18, 2005.
9. At the discretion of the Superintendent or his representative, the permittee shall provide and use board mats or similar materials within the permitted area to minimize surface disturbance during operations.
10. The permittee shall reasonably restore disturbed soils to pre-disturbance contours.
11. Erosion control materials, acceptable to the Superintendent or his representative, shall be provided and used by the permittee to cover disturbed or bare soils upon completion of work or as soon thereafter as possible.
12. In the event of a release or spill into the environment of more than five (5) gallons of crude oil or other contaminating substances, the permittee shall report the following to the Superintendent or his representative within 24 hours of the release or spill: time the spill was discovered; type of product(s) released; location; estimated spill volume; cause of spill; physical description of the area affected by the spill or release; estimated rate of release if spill is ongoing; direction of spill movement; proximity to surface waters and roads; what steps are being taken to contain and remedy the spill or release; and initial response equipment required. For spills or releases exceeding five (5) barrels of crude oil or other contaminating substances, the permittee shall notify the appropriate regulatory agencies and report the above information to the Superintendent or his representative within 24 hours of the release or spill. At Permittee's sole expense, site characterization and/or remediation of contaminated soils, surface water, ground water, or other affected resources shall be determined on a case-by-case basis according to National Park Service guidelines and other applicable Federal and State regulations.
13. If the permittee is required to file a suitable performance bond or other acceptable type of security, payable to the National Park Service, the amount of the bond or security shall be set by the

**Superintendent. This amount shall be based on, but not limited to: proposed timetable for operations; potential for adverse impact on Preserve resources, values, or uses; knowledge of the permittee's work habits; permittee's compliance history; type of operation; and phase(s) of operation. The Superintendent reserves the right to later require the permittee to file a bond or security, payable to the National Park Service, under circumstances the Superintendent deems appropriate.**

**14. Permittee's responsibility and liability under the performance bond or other security shall remain in effect until such time as the National Park Service notifies the permittee in writing that successful reclamation of the area of operations has occurred. The Superintendent shall release the permittee's bond or security within 30 days following the Superintendent's notification to Permittee of successful reclamation.**

