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FOR  
ORDER NO(s).  
LEXAM Exhibits

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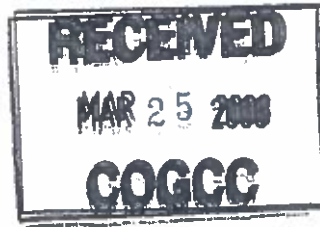
**CARVER SCHWARZ MCNAB & BAILEY, LLC**

L A W Y E R S

HUDSON'S BAY CENTRE  
1600 STOUT STREET, SUITE 1700  
DENVER, COLORADO 80202

MAIN LINE: 303.893.1815  
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DAVID A. BAILEY  
dbailey@cksmb.com  
303.893.1827



March 25, 2008

**BY MESSENGER**

Ms. Patricia Beaver  
Colorado Oil and Gas Conservation Commission  
1120 Lincoln Street, Suite 801  
Denver, Colorado 80203

Re: Lexam Explorations (U.S.A.) Inc. – Copies of Documents to be Provided to  
Commissioners

Dear Tricia:

On behalf of Lexam Explorations (U.S.A.) Inc., I have enclosed fourteen copies of certain of Lexam's exhibits that should be provided to the Commissioners prior to the hearing on April 1, 2008.

Thanks very much for your assistance. Please give me a call if you have any questions or wish to discuss this matter further.

Yours very truly,

David A. Bailey

DAB/ek-s  
Enclosures

Ian J. Ball  
99 George St. 3<sup>rd</sup> Floor  
Toronto, ON M5A 2N4 Canada

Contact: Tel: 647-258-0395 Fax: 647-258-0408 E-mail: [ian@lexamexplorations.com](mailto:ian@lexamexplorations.com)

**Work Experience**

**McEwen Capital Corporation (2005-Present)**

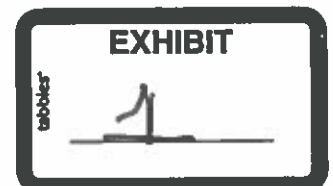
Position: VP, Corporate Development

- Helped establish McEwen Capital. McEwen Capital has large equity interest in several public and private companies. Two of the companies are actively managed (Lexam Explorations & US Gold)
- Oversee exploration programs in Colorado (oil and gas) and Quebec (uranium) for Lexam
- Manage US Gold's Magistral Mine and regional Mexican projects. Oversee exploration, resource estimations and optimization studies to place mine into production.
- March 2007: Closed the only known simultaneous hostile takeover of three separate companies. Approximate value \$500 million.
- March 2007: Structured and lead a three way combination that created Rubicon Minerals Corporation. Approximate value \$150 million.
- October 2007: Unsuccessfully challenged Goldcorp's \$21 billion combination with Glamis Gold.
- August 2006: Raised \$4.4 million for Lexam Explorations
- February 2006: Raised \$75.15 million for US Gold
- 2005-Present: Lead investments totaling \$150 million into other resource companies.

**Goldcorp Inc. (2004-2005)**

Position: Assistant to Chairman and CEO

- Successfully combined Goldcorp Inc. and Wheaton River Minerals. Approximate value \$5.5 billion.
- Successfully defended Goldcorp from a \$3.5 billion hostile takeover from Glamis Gold.



## **Education**

### **Ryerson University (2002-2004)**

Toronto, ON

Bachelors of Commerce Degree (Honors)

- Graduated first in class (1,200 students)
- Graduated as a member of the Golden Key International Honour Society
- Awarded Philosophy Award of Merit for top philosophy student

### **Durham College (1999-2002)**

Oshawa, ON

Diploma, Business Administration (Honors)

- Graduated first in class (final year)
- Youngest recipient of the Alumnus of Distinction Award
- Class President (Third year)

## RESUME

**W. Jack Clark**  
**Clark Mining Services, LLC**  
**6052 South Newport Street, Centennial CO 80111**  
**303/221-6588 (voice & FAX)**  
**wjackclark@comcast.net**

### OBJECTIVE

Conservation of resources by ensuring that activities comply with environmental regulations and follow sound environmental practices and also by securing permits in a timely and cost effective manner.

### SUMMARY

My education and experience have given me solid understandings of environmental management systems, diverse regulatory agency structures, the role of public interaction, and the techniques of permit acquisition and compliance. Throughout my career of thirteen years in national and international consulting, eight years at large mines in Colorado, two years managing corporate environmental programs, and ten years as an independent consultant, I have been successful in achieving meaningful results acceptable to all concerned parties.

### CAREER HISTORY

#### CLARK MINING SERVICES, LLC

Denver, Colorado

#### **Environmental Consultant**

(1998 to Present)

Clients include hardrock and aggregate mining companies, oil and gas companies, landowners, major engineering companies, and other sole proprietors. Conduct environmental compliance and due diligence audits, secure construction and operating permits, represent clients with regulatory agencies, prepare feasibility and planning studies, prepare reclamation/remediation plans, prepare documents in accordance with the National Environmental Policy Act (NEPA).

#### WESTEC

Denver, Colorado

#### **Branch Office Manager**

(1991 to 1998)

Responsible for overall Branch Office operations specializing in mine design, environmental audits, and permitting worldwide. Responsibilities included: overseeing work of geotechnical and civil engineers and of environmental professionals, marketing, proposal preparation, and ensuring profitability; continued role as Project Manager securing local, state, and federal environmental permits for clients in many western states. Interacted with professionals on diverse projects worldwide.

#### WESTEC

Reno, Nevada

#### **Project Manager**

(1989 to 1991)

Conducted mine permitting and compliance on local, state, and federal levels. Secured operating permits for mines in several western states. Produced documents in compliance with NEPA.

#### GALACTIC SERVICES, INC.

Reno, Nevada

#### **Director, Environmental Programs**

(1987 to 1989)

Acquired or oversaw the acquisition of environmental permits for precious metal mining operations. Worked with third-party contractors in production of NEPA documents. Developed and maintained strong working relationships with environmental regulatory agencies in four states.

#### GALACTIC RESOURCES, INC.

Del Norte, Colorado

#### **Environmental Coordinator**

(1986 to 1987)

Assured that mine operations during early development followed environmental permit stipulations. Acquired regulatory agency confidence and acceptance of environmental programs developed to ensure compliance. Restored disturbed lands by using innovative reclamation techniques designed to be effective at the 11,500 feet elevation mine site. Received commendations from state and federal agencies and industry professionals; presented technical paper on reclamation/remediation activities.

**EXHIBIT**

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Resume  
W. Jack Clark  
Page 2

**INDEPENDENT CONTRACTOR**

Rifle, Colorado

**Environmental Consultant**

(1985 to 1986)

Provided environmental consulting services to several clients in the fields of reclamation, wildlife management, and water quality.

**GULF OIL CORPORATION**

Rifle, Colorado

**Environmental Coordinator**

(1981 to 1985)

Continued supervisory role described below and also insured that oil shale mine development followed environmental permit stipulations, which allowed mining to proceed with regulatory agency approvals. Developed strong relationships among mine operation groups, employees, contracted personnel, and environmental regulators resulting in cost effective reduction in non-permitted activities and non-compliance citations. Obtained the confidence of local, state, and federal regulatory agency personnel, which facilitated permit acquisition and compliance. Prepared wildlife sections of NEPA documents for a major federal land/resource lease to allow further mine development.

**GULF OIL CORPORATION**

Rifle, Colorado

**Ecological Studies Supervisor**

(1979 to 1981)

Supervised personnel responsible for data collection to determine oil shale mining impacts in the areas of water quality/hydrology, air quality/meteorology, and plant ecology. Developed and implemented monitoring programs to determine impacts on game and non-game wildlife. Used results of the programs in designing and achieving prudent reclamation and vegetation manipulation strategies for habitat replacement and enhancement.

**NUS CORPORATION**

Los Angeles, California

**Senior Ecologist**

(1977 to 1979)

Managed and coordinated the preparation of environmental impact statements and other permit related documents for a number of diverse clients and projects, including electric power generation and mining, that resulted in client satisfaction and strong company credibility.

**NUS CORPORATION**

Pittsburgh, Pennsylvania

**Ecologist, Associate Ecologist, Assistant Ecologist**

(1974 to 1977)

Prepared and supervised the preparation of regulatory document sections for permitting of nuclear, hydro, and fossil fueled electric generating plants and associated transmission lines; for coal, oil shale, trona, and uranium mines; and for other natural resource development activities across the United States.

**EDUCATION**

B.S. – Biology and Chemistry – Delta State University

M.S. – Entomology and Botany – Mississippi State University

Ph.D. – Entomology and Wildlife Management – Mississippi State University

**REFERENCES**

Provided upon request



COLORADO  
HISTORICAL  
SOCIETY

The Colorado History Museum 1300 Broadway Denver, Colorado 80203-2137

December 7, 2006

Meg Van Ness  
Regional Archaeologist  
US Fish and Wildlife Service  
PO Box 25486  
Denver Federal Center  
Denver, CO 80225

Re: Lexam Exploration's Baca #5, Baca #5 Alternate and Baca #6 well pads & access roads (CHS #49181)

Dear Ms. Van Ness:

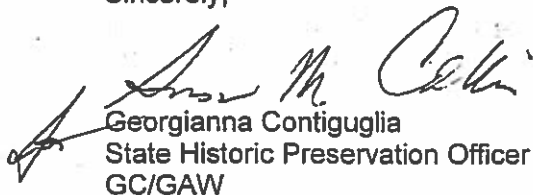
Thank you for your correspondence dated November 28, 2006 (received by our office on November 30) and documentation regarding the project noted above.

Based on our review of the information provided, we concur with your determination that site 5SH3146 and isolated finds 5SH3148 through 5SH3151 are **not eligible** for the National Register of Historic Places (NRHP). In addition, we concur with your determination that the segment of Irrigation Ditch #15 of Baca Grant #4 (5SH3147.1) recorded within the area of potential effect supports the NRHP eligibility of the ditch as a whole.

We concur with your determination that placement of a culvert in a short section of the ditch segment to allow vehicular traffic to and from the well pads will have no adverse effect on 5SH3147.1. Given the nature of soil deposition in the area and the potential for buried cultural resources, we also agree with your recommendation for monitoring any earth moving during construction activities associated with the project.

If we may be of further assistance, please contact Greg Wolff, Section 106 Compliance Coordinator, at (303) 866-4674.

Sincerely,

  
Georgianna Contiguglia  
State Historic Preservation Officer  
GC/GAW

EXHIBIT

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UNITED STATES DEPARTMENT OF THE INTERIOR  
FISH AND WILDLIFE SERVICE  
BACA NATIONAL WILDLIFE REFUGE/ SAN LUIS VALLEY NWR COMPLEX

Ian J. Ball  
Vice President, Corporate Development  
Lexam Explorations Inc.  
99 George St. 3<sup>rd</sup> Floor  
Toronto, Ontario Canada M5A2N4

December 8, 2006

Dear Ian,

This letter is in reference to the Lexam Explorations Inc. (Lexam) intention to carry out a 3-D Seismic survey and drill 2 exploratory oil/gas wells on the Baca National Wildlife Refuge (Refuge).

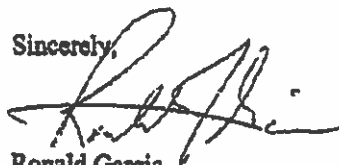
Because Lexam is owner of the oil and gas rights underlying the Refuge, a property right which pre-dates the acquisition of the Baca Ranch by the U.S. and the establishment of the Refuge, The U.S. Fish and Wildlife Service (Service) does not have the discretion to prohibit Lexam's intended activities in exercising its exploration and extraction rights. Therefore, compliance with the National Environmental Policy Act of 1969, 42 U.S.C. § 4332(C). (NEPA) cannot be made a requirement under this circumstance.

However, The Service feels strongly that capturing the intent of NEPA, that is, to assess impacts of activities on federal lands and the environment is certainly justifiable and appropriate in this case. Therefore, we are asking that Lexam undertake an analysis to determine potential affects and to consider options that would lessen any negative impacts on the resources and surrounding environment. The Service is willing to partner in this effort to insure that all important resources and factors are considered.

The Service fully appreciates Lexam's willingness to consider alternative operating methods designed to lessen impacts to resources and the environment, as Lexam has demonstrated this through our conversations and with recent actions taken. It is because of this willingness, we are comfortable, that together we can arrive at solutions for carrying out Lexam's intentions, which will have the least impact on the important resources of the Refuge and the San Luis Valley.

As in the past, we thank you for your consideration and cooperation on this sensitive issue.

Sincerely,

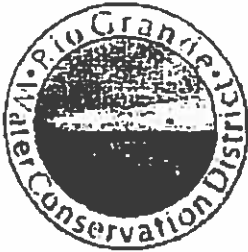


Ronald Garcia  
Refuge Manager  
Baca National Wildlife Refuge

cc: Jack Clark  
Jim Donaldson  
Bill McNab  
Brian Macke  
Mike Blenden  
Dave Wiseman  
Lisa Cyriaks

EXHIBIT

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## Rio Grande Water Conservation District

10900 Highway 160 East • Alamosa, Colorado 81101

Phone: (719) 589-6301 • Fax: (719) 589-4331

*Protecting & Conserving San Luis Valley Water*

Ron Garcia, Manager  
US Fish and Wildlife Service  
Baca National Wildlife Refuge  
8249 Emperys Road  
Alamosa, CO 81101

December 14, 2006

RE: Lexam Well Construction

Dear Ron,

This letter is in regard to the Rio Grande Water Conservation District's concern over the construction of the proposed Lexam exploratory well(s) that may be drilled on the Baca National Wildlife Refuge. These proposed wells are apparently going to be completed to depths well below the base of the active confined aquifer and there is much concern from a number of people and entities over their construction. The Rio Grande Water Conservation District shares that concern. The District was created by the legislature, C.R.S. 37-48-101, to insure the conservation of the waters of the Rio Grande Basin. Our concern relates to the potential for contamination of the confined and unconfined aquifers which are used extensively for irrigation, domestic and municipal uses throughout the San Luis Valley. The potential for contamination exists from the escape of drilling materials into the aquifers or the escape of hydrocarbons into the aquifers if the test wells were to be at all successful.

After having gone through the AWDI trial and the recent Confined Aquifer Rules and Regulations trial and reviewing modeling data in those cases, it is our belief that there is potential that the confined aquifer could be active as deep as the approximately 3,000' level below ground surface. It would only be the prudent and correct thing to do to solid case and grout any deep exploratory well to at least that level to prevent any contaminants, which may exist in the exploration process or result from the process, from contaminating the aquifer. Since the conventional wisdom is that the water in the confined aquifer may have a vertical flow component above that level, any contamination to the aquifer in the zones above the 3,000' level could have the affect of impacting the quality of the water in that area throughout the aquifer above that level. Many of the Refuge wells as well as a large number of individual stock, domestic and irrigation wells and perhaps a municipal well could be affected if contamination were to occur.

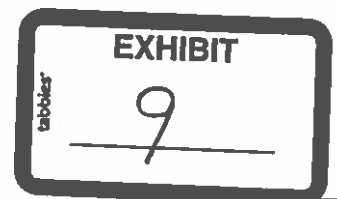
We would therefore recommend that the US Fish and Wildlife Service encourage the appropriate agencies to require that the proposed exploratory well(s) be constructed in a manner that would insure the prevention of any contamination of the aquifers, especially within the first 3,000' of depth of the well. This would include requirement for the installation of solid casing to that depth and that the annulus of the borehole outside that casing be grouted to prevent the transfer of contaminants into the active portion of the confined aquifer.

This resource is unique in regards to the pristine water quality in the upper portion of the aquifer and it is incumbent on us all that we all attempt to preserve this valuable asset.

Sincerely,

Ray Wright, President, RGWCD

cc: RGWCD Board of Directors  
David Robbins, RGWCD counsel  
County Commissioners  
Colorado Oil and Gas Commission





COLORADO  
HISTORICAL  
SOCIETY

The Colorado History Museum 1300 Broadway Denver, Colorado 80203-2137

06.CO.BAC.004  
Lexam - Seismic

January 29, 2007

Meg Van Ness  
Regional Archaeologist  
US Fish and Wildlife Service  
PO Box 25486  
Denver Federal Center  
Denver, CO 80225

Re: Lexam Exploration's Baca 3-D Seismic project (CHS #49461)

Dear Ms. Van Ness:

Thank you for your correspondence dated January 24, 2007 (received by our office on January 25) and documentation regarding the project noted above.

Based on our review of the information provided, we concur with your determination that nine sites (5SH3195, 5SH3201, 5SH3205, 5SH3209, 5SH3210, 5SH3211, 5SH3220, 5SH3221, and 5SH3224) and the 96 isolated finds (5SH3238 through 5SH3333) are **not eligible** for the National Register of Historic Places (NRHP).

Given the nature of soil deposition in the area and the potential for buried cultural deposits, we also concur that **additional information** is necessary to determine the eligibility of 38 sites (5SH3191 through 5SH3194, 5SH3196 through 5SH3200, 5SH3202 through 5SH3204, 5SH3206 through 5SH3208, 5SH3212 through 5SH3219, 5SH3222, 5SH3223, and 5SH3225 through 5SH3237). Because the vehicular access routes have been rerouted to avoid these sites, we concur that the undertaking will have no effect on them.

In addition, we concur with your determination that the 14 ditches identified during the inventory (5SH3334 through 5SH3347) are historically significant, and the various segments of those ditches recorded within the area of potential effect retain sufficient integrity to support the NRHP eligibility of the ditches as a whole under Criterion A. We also concur with your determination that allowing vehicular

Re: Lexam Exploration's Baca 3-D Seismic project (CHS #49461)

EXHIBIT

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traffic in these limited sections of the ditches will have **no adverse effect** since vehicular traffic will take place when the ground is frozen.

However, clarification is needed regarding apparent discrepancies between the plotted locations of many ditch segments (e.g., Baca Ditch 15 Segment 5 [5SH3339.9], Willow Creek Ditch South Segment 2 [5SH3347.2], etc.) and the locations of the ditches as a whole.

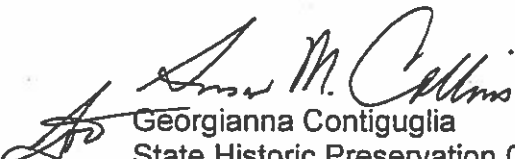
Also, in December 2006 the consultant previously recorded a segment of Irrigation Ditch #15 of Baca Grant #4 (5SH3147.1) which does not correspond to the location of this ditch (identified in the current project documentation as 5SH3339).

As a result, the undertaking may proceed as planned but we request that the consultant contact our office at the number below to clarify these discrepancies.

Should unidentified archaeological resources be discovered during the course of the project, work must be interrupted until the resources have been evaluated in terms of the National Register of Historic Places eligibility criteria (36 CFR 60.4) in consultation with our office.

If we may be of further assistance, please contact Greg Wolff, Section 106 Compliance Coordinator, at (303) 866-4674.

Sincerely,

  
Georgianna Contiguglia  
State Historic Preservation Officer  
GC/GAW

**Negotiated Operating Plan**  
**for**  
**Conducting Hydrocarbon Exploration**  
**and Development Activities**  
**on the**  
**Baca National Wildlife Refuge**

*Prepared By:*  
**U.S. Fish & Wildlife Service**  
**and**  
**Lexam Explorations (U.S.A.) Inc.**

**March 2007**



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## **1.0 INTRODUCTION**

Lexam Explorations (U.S.A.) Inc. (Lexam) owns the mineral interest, including the right to explore for and develop oil and gas, from beneath land now included within the Baca National Wildlife Refuge (Refuge). The Refuge is owned and managed by the Fish and Wildlife Service (Service) of the United States Department of the Interior and is located in the San Luis Valley, in Saguache County, Colorado (Figure 1). When Lexam acquired its mineral interest, the surface property was known as the "Luis Maria Baca Grant No. 4," and was commonly referred to as the "Baca Ranch." Lexam acquired its mineral interest prior to acquisition of the surface interest in the Baca Ranch by the Service and inclusion of the surface in the National Wildlife Refuge System.

Lexam has commenced a program on the Refuge to explore the potential for development of natural gas resources. The program consists of a 3-D seismic survey to explore the subsurface mineral estate on portions of the Refuge and the drilling of two explorations wells, all consistent with permits issued by the Colorado Oil and Gas Conservation Commission (COGCC). The 3-D seismic survey will occur on approximately 16,000 acres of the Refuge (Figure 2). The first well to be drilled, known as the Baca Well No. 5, will be approximately 14,000 feet deep. Unless new information is obtained from Baca Well No. 5, the second well, the Baca Well No. 6, will be approximately 14,000 feet deep also. Maps showing the location of the seismic survey and the two wells are included in this Negotiated Operating Plan as Figures 2 and 3. The COGCC sets all terms and conditions which govern site preparation, drilling, casing, equipping, and reclamation of the wells and the drill sites. Lexam has agreed to use a "closed loop" drilling system that will eliminate the need for mud pits adjacent to the drilling pad.

The purpose of this Negotiated Operating Plan is to document the coordination and cooperation between the Service and Lexam with respect to terms and conditions agreed to by them for the seismic survey and the drilling program. Among other things, the parties have agreed to collect baseline surface- and ground-water quality data for comparison to post-drilling conditions. In

## ***WORKING DRAFT***

addition, a cultural resources survey will be conducted prior to the seismic survey so that cultural resource sites can be identified and avoided. The water resources sampling plan is described in Section 5.4.1, and the cultural resources survey is described in Section 5.7.1.

## **2.0 LEGAL FRAMEWORK**

### **2.1 Oil and Gas Ownership Rights**

Lexam leased the mineral interest underlying the Baca Ranch before it acquired its ownership interest. The mineral interest, including oil and gas, was conveyed to Lexam before acquisition of the surface estate by the United States. Lexam obtained ownership of the mineral interest through the following instruments:

1. Special Warranty Deed, dated October 14, 1997, from The Newhall Land and Farming Company to Lexam Explorations (U.S.A.) Inc.; and
2. Quitclaim Deed, dated November 2, 1998, from Jim Donaldson to Lexam Explorations (U.S.A.) Inc.

Lexam's mineral interest is subject to that certain Surface Use Agreement, dated April 1, 1992 and a Supplement thereto of the same date that expressly includes development of oil and gas resources. The Surface Use Agreement was extended for an additional ten-year term by letter dated December 11, 2001. The Surface Use Agreement was entered into by a predecessor-in-interest to the Service and, therefore, is binding on the Service as the current owner of the surface. All mineral interest-related documents are contained in Attachment A.

Colorado case law establishes that a mineral owner (including oil and gas) has the right to use so much of the surface as is necessary to explore for and develop its mineral interest. *See, e.g., Gerrity Oil and Gas Corp. v. Magness*, 946 P.2d 913 (Colo. 1997). Correlatively, the mineral owner is obligated to use the surface in a manner that minimizes the impact on the surface estate. *Id.*

## 2.2 U.S. Fish and Wildlife Service Regulations

### 2.21 U.S. Fish and Wildlife Service (612 FW 2) Oil and Gas,

U.S. Fish and Wildlife Service Manual, Land Use Series (612 FW 2) Oil and Gas (Manual) provides standard policy guidance and background information on management of oil and gas activities on Service lands. In this Manual the Service provides for the exercise of non federally owned mineral rights while protecting Service resources to the maximum extent possible (FWS 1993 (a)). The provisions of the Manual applicable to Lexam's mineral interests, which are discussed below, recognize and incorporate these concepts.

Pursuant to the Manual, Lexam holds "excepted rights," which are sometimes referred to in the Manual as "private rights" or "outstanding rights." Specifically, "excepted rights" are defined in section 2.6.D of the Manual as:

**D. Excepted Rights.** Oil and gas rights outstanding in third parties when the United States (Service) acquires title to the lands.

In accordance with this same provision of the Manual:

The owner of excepted (outstanding) oil and gas rights has the right to sell, lease, explore for, and remove those minerals subject to the terms of the instrument by which that interest was acquired or reserved and to the State laws governing protection of the surface and the rights of the surface owner. The project leader is responsible for obtaining proof of legal right to enter for oil and gas operations, (deed, lease agreement, title evidence, etc.). Close cooperation with the operator is necessary to minimize disturbance and damage to the project area. Conditions found during inspections should be documented.

Other provisions of the Manual also incorporate the Colorado common law rule that the mineral owner can use the surface to develop its mineral interest, but has a duty to minimize surface disturbance. For example, section 2.9.A states that a plan of operations can be requested from a

## ***WORKING DRAFT***

holder of excepted rights and specifies the documentation that can be requested. Lexam has previously provided this information to the Service. Section 2.9.B of the Manual states “[t]he mineral holder has a responsibility to show reasonable regard for the surface estate as required by State law” and suggests that the Service seek “voluntary permitting arrangements with the mineral interest owner to specify the reasonable limits of his/her intended operations” (section 2.9.B(3)).

### **2.22 50 CFR 29.32. Mineral Operations on NWRS Lands.**

In addition to the provisions of Service Manual 612 FW 2, Oil and Gas (Manual), reserved and excepted rights are addressed in the National Wildlife Refuge System Administration Act of 1966 (16 USC 668 [dd] , FWS regulations **50 CFR 29.32. Mineral Operations on NWRS Lands**. This regulation sets forth general rules governing the exercise of reserved and excepted mineral rights on NWRS lands. Provisions of 50 CFR 29.32 state the following:

#### **§ 29.32 Mineral rights reserved and excepted.**

Persons holding mineral rights in wildlife refuge lands by reservation in the conveyance to the United States and persons holding mineral rights in such lands which rights vested prior to the acquisition of the lands by the United States shall, to the greatest extent practicable, conduct all exploration, development, and production operations in such a manner as to prevent damage, erosion, pollution, or contamination to the lands, waters, facilities and vegetation of the area. So far as is practicable, such operations must also be conducted without interference with the operation of the refuge or disturbance to the wildlife thereon. Physical occupancy of the area must be kept to the minimum space compatible with the conduct of efficient mineral operations. Persons conducting mineral operations on refuge areas must comply with all applicable Federal and State laws and regulations for the protection of wildlife and the administration of the area. Oil field brine, slag, and all other waste and contaminating substances must be kept in the smallest practicable area, must be confined so as to prevent escape as a result of rains and high water or otherwise, and must be removed from the area as quickly as practicable in such a manner as to prevent contamination, pollution, damage, or injury to the lands, waters, facilities, or vegetation of the refuge or to wildlife. Structures and equipment must be removed from the area when the need for them has ended. Upon the cessation of operations the area shall be restored as nearly as possible to its condition prior to the commencement of operations. Nothing in this section shall be applied so as to contravene or nullify rights vested in holders of mineral interests on refuge lands.

## 2.23 603 FW 2 Compatible Uses Policy

The National Wildlife Refuge System Administration Act of 1966 (16 USC 668 [dd]), Policy 603 FW 2 Compatible Uses Policy, sets forth general rules and provides guidelines for determining compatibility of proposed and existing uses of national wildlife refuges.

The concept of refuge compatibility originated before 1920, but the National Wildlife Refuge System Administration Act of 1966 (16 USC 668 [dd]) established that “any use of the refuge must be compatible with the purposes for which the area was established.” The act requires the Secretary to determine that the use is compatible **before** allowing it. The Secretary does not have to evaluate compatibility unless he or she intends to allow the use. The passage of the National Wildlife Refuge System Improvement Act in 1997 required the Service to adopt regulations regarding compatibility determinations. Regulations and Service policy on compatibility were finalized in 2000. For the purpose of this section, “refuge” means all land holdings within the NWRS, except for coordination areas. Examples of refuges include national wildlife refuges; waterfowl production areas (fee and easement); and wetland, grassland, Farmers Home Administration and other conservation easements. A compatible use is defined as “a use that, in the sound professional judgment of the Director, will not materially interfere with or detract from the fulfillment of the mission of the NWRS or the purpose(s) of the refuge.” (NWRS Improvement Act of 1997, Section 5, Definitions [1]) **The refuge compatibility standard applies only when the Service has jurisdiction over the use.** Jurisdiction in this situation is not a matter of whether the Service has law enforcement jurisdiction over the refuge (i.e., proprietary or concurrent). Rather, jurisdiction in this sense involves whether the Service has the legal authority to **completely prohibit** a use

Provisions of 630 FW 2, as they relate the compatibility standard of the National Wildlife Refuge System Administration Act to the exercise of reserved and excepted mineral rights on NWRS lands, state the following:

**The Service must recognize and allow owners’ property rights that are not vested in the federal government, such as reserved or excepted rights, to explore and develop minerals or oil and gas beneath a refuge, regardless of whether the use is compatible.** In these situations, a compatibility determination is not required and should not be completed.

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The compatibility standard of the National Wildlife Refuge System Administration Act, does not apply to Lexam's exploration program on the Refuge because exercise of the subsurface mineral holders' (Lexam's) rights is not at the Service's discretion or jurisdiction. By law then, the Service must allow oil, gas and mineral activities, with the exception of surface coal mining on refuges where the subsurface rights are privately owned.

### **2.24 603 FW 1 Appropriate Refuge Use Policy**

The National Wildlife Refuge System Administration Act of 1966 (16 USC 668 [dd]), Policy 603 FW 1 Appropriate Refuge Uses Policy, sets forth general rules and provides guidelines for determining appropriate uses of national wildlife refuges.

The purpose of this policy is to establish a procedure for finding when uses other than the six wildlife dependent recreational uses are appropriate for further consideration to be allowed on a refuge. This policy also provides procedures for review of existing uses. It is designed to help fulfill individual refuge purpose(s) and the Refuge System mission, as well as afford priority to compatible wildlife dependent recreational uses within the Refuge System. This policy applies to all proposed and existing uses in the National Wildlife Refuge System only when the Service has jurisdiction over the use. It does not apply to situations where reserved rights or legal mandates provide that the Service must allow certain uses, such as privately-owned minerals on NWRS lands or in the case of easements.

The Appropriate Refuge Use Policy of the National Wildlife Refuge System Administration Act, does not apply to Lexam's exploration program on the Refuge because exercise of the subsurface mineral holders' (Lexam's) rights is not at the Service's discretion and within the Service's jurisdiction.

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### **2.3 Other Laws Relating to Oil and Gas Activity on NWRS Lands.**

#### **2.31 National Environmental Policy Act of 1969. (42 U.S.C. 4321 et seq.)**

NEPA requires Federal Agencies to examine the environmental impact of their actions, incorporate environmental information, and utilize public participation, as appropriate, in the planning and implementation of their actions. NEPA compliance is required only whenever a Federal Agency takes an action. A federal action typically takes the form of a permit or other explicit land use authorization without which the activity cannot proceed. As discussed above, the Manual explicitly recognizes that there is no federal decision or authorization required for Lexam to proceed with its exploration and development program. Manual, section 2.6, states that “[t]he owner of excepted (outstanding) oil and gas rights has the right to sell, lease, explore for, and remove those minerals subject to the terms of the instrument by which that interest was acquired or reserved and to the State laws governing protection of the surface and the rights of the surface owner”. This provision clearly indicates that there is no federal decision to be made about whether a private mineral owner such as Lexam, which owned its mineral interest before the federal government acquired its surface interest, can explore and develop the minerals. The Manual also establishes that the Service occupies the same status as any other surface owner in Colorado in the instance in which the mineral and surface ownership is split and the mineral interest is privately held at the time the federal government acquires its surface interest.

Notwithstanding the foregoing, the Manual (section 2.9.B(7)) concludes:

The key factors in successfully balancing the development of private mineral interests and the protection of wildlife and other resources on Service lands are early and frequent communication and cooperation between the Service and the mineral rights owner, and a commitment to reasonableness on the part of both parties.

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The Service and Lexam have engaged in the “early and frequent communication and cooperation” described in the Manual, much of which is documented in this Negotiated Operating Plan.

2.32 Archaeological Resources Protection Act of 1979. (16 U.S.C. 470aa-470ee).

2.33 Migratory Bird Conservation Act of 1929. (16 U.S.C. 715 et seq)

. Section 715e provides statutory authority for regulation of reserved mineral rights on refuge lands (it subordinates oil and gas interests to such rules and regulations as may be prescribed by the Secretary from time to time.)

2.34 Endangered Species Act of 1973. (16 U.S.C. 1531 et seq.)

2.35 Wilderness Act of 1964. (16 U.S.C. 1131 et seq.).

### **3.0 THE BACA NATIONAL WILDLIFE REFUGE**

Authorized in 2000, the Baca National Wildlife Refuge is one of the largest and most recent additions to the National Wildlife Refuge System. The Refuge, at 92,500 acres, is located in Saguache and Alamosa counties in the San Luis Valley of south-central Colorado (Figure 1). Congress authorized acquisition of land within the Refuge with passage of Public Law 106-530, also known as the "Great Sand Dunes National Park and Preserve Act of 2000." This legislation, which received widespread support, focused not only on protecting the region's hydrology, which the incredibly unique sand dunes ecosystem depends upon, but also on protecting the exceptional ecological, cultural, and wildlife resources of the area.

Situated in the San Luis Valley, a high mountain desert surrounded by two 14,000 foot mountain ranges, the Refuge contains a highly diverse suite of habitats including desert shrublands, grasslands, wet meadows, playa wetlands, and riparian areas. Fed largely by melting mountain

## ***WORKING DRAFT***

snow, numerous streams crisscross the Refuge providing an abundance of life in an otherwise arid landscape. The Refuge is home to a multitude of wildlife and plant species, some of which only occur in the San Luis Valley.

Adding to the uniqueness and importance of the Refuge is its position in comparison to other conservation lands in the area. The Refuge abuts lands owned or controlled by other conservation entities including The Nature Conservancy (TNC), the National Park Service (NPS), the USDA Forest Service (USFS), and the Colorado State Land Board (SLB). This complex of lands, totaling more than 500,000 acres, contains one of the largest and most diverse assemblages of wetland habitats remaining in Colorado. In addition to the incredible plant and animal resources contained on the Refuge, the area is also tremendously rich in cultural resource sites, some of which date over 12,000 years ago. Many of these sites have been added to the National Register of Historic Places.

### **4.0 DESCRIPTION OF LEXAM'S EXPLORATION PROGRAM**

#### **4.1 The Seismic Survey**

Lexam plans to conduct a 3-D seismic survey on the Refuge commencing in January 2007. Lexam applied for and was granted a seismic survey permit by the COGCC to conduct the survey. The seismic permit is presented in Attachment B which shows the \$25,000 seismic surety Lexam has posted as required by the COGCC to cover any potential damages. The project area includes a total area of approximately 25 square miles and includes approximately 16,000 acres within the Refuge (Figure 2). The seismic program will be conducted by Lexam, with Polaris Explorer U.S.A. Inc. (Polaris) as the survey contractor. The proposed project is a state-of-the-art 3-D seismic survey which will provide a high-resolution image of the subsurface geological features. The data gathered from this survey will allow Lexam to more accurately map and interpret subsurface geology and faulting, and thereby confirm the siting of the proposed Baca #5 and Baca #6 exploratory wells, while keeping the surface disruption of the Refuge at a minimum.

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The seismic survey will acquire data on subsurface geological features by developing a grid for a vibroseis operation and receiving the resultant reflected energy signal with geophones or hydrophones placed in a grid at approximately 165 ft intervals along lines separated by a minimum of 825 ft between adjacent receiver lines. As many as 12 receiver lines will be active at one time, with one line being deployed and one line being picked up as the spread generally progresses from southwest to northeast. Each portion of the program will be occupied for about 7 days as the 5.6-mile long active spread traverses the program area.

As requested by the Service, the seismic survey program within the Refuge will be completed in an approximate 30-day period beginning on or about January 15, 2007. The main goals of this schedule are to:

- 1) initiate and finish the program before the majority of migratory waterbirds and other migratory birds return from southern latitudes and begin utilizing the area for nesting, foraging and resting;
- 2) initiate and finish the program during the coldest part of the year to ensure that any potentially wet areas are as frozen as possible, thus reducing the surface impact on these areas; and
- 3) minimize overall time spent on the Refuge conducting the survey.

A description of the proposed seismic survey, including equipment, methods of operation, and schedule is set forth below, with more detailed information presented in Attachment C.

Passenger vehicle access will be limited to designated roads. No vehicles will be allowed in standing water either in streams, ditches or wet meadow areas. Equipment will be walked out along receiver lines in documented sensitive areas.

Hydrologic conditions, vegetative cover, and wetland habitat types within the project area will determine the equipment types proposed for use during the seismic survey. Prior to entering an area, the conditions will be evaluated by the Service, Lexam, Polaris, and an environmental monitor to determine which equipment type is suitable for use and how to best access the sites. In general:

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- For submerged lands and shallow water conditions (18-inches or less), no vehicles will be allowed for operations and transportation of personnel and seismic equipment unless the ground is frozen.
- For general travel in upland operations support, ATV's will be used to minimize environmental impact. Pickups and larger support equipment will be confined to designated roadways, unless required to address specific situations such as breakdowns, malfunctions, remedial work etc... and only with consent of refuge manager or on-site environmental monitor. All vehicular use, including operations (Vibroseis trucks), and support (pickups/ATV's), will be prohibited in creek bottom areas due to habitat, water quality, and archeological concerns. Creek crossings for all operations and support vehicles, including ATV's will be limited to existing road and bridge crossings, unless the distance required to utilize these will result in excess unreasonable damage to the surface resources, in which case necessary crossings will be identified by refuge manager and archeologists. All permitted crossings will be identified on maps and seismic technician's responsible for scouting "real time" paths will be made familiar with these crossings.
- Whenever possible, the layout, trouble shooting, and pick up of receiver lines will be carried out on foot.
- Additional support vehicles will include fuel truck, utility trucks and vans for operations, logistics, and personnel transportation to and from the crew accommodation site. As stated above, these vehicles will be restricted to designated roadways. In addition, all refueling of vibroseis trucks and other equipment/vehicles will occur only on designated roadways, requiring careful coordination of timing and location. Approval from the biological monitor and/or Refuge Manager will be requested, on a case-by-case basis, in the event that off-road access for support vehicles becomes necessary.

The proposed seismic survey program will require approximately 21 days from the date work commences in the field. Lexam has already completed hazard/access mapping and topographic survey operations through the completion of acquisition recording and cultural resource identification, and sensitive area identification. Re-surveying of avoidance areas due to findings of cultural resource and sensitive area identification surveys will follow.

Polaris plans to use equipment that is well suited for seismic acquisition work in sensitive wetlands areas. Representatives of Polaris have met with the Refuge Managers and understand their responsibility for minimizing the effect of operations on the resources of the Refuge to the extent practical and to keep their occupancy to a minimum that is compatible with safe and

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efficient operation. Polaris is committed to using low ground pressure vehicles as much as possible within the Refuge and to travel in wetter areas only when the ground is frozen.

The seismic survey will require a continuous effort during the project by the: 1) surveying crew; 2) archeological crew 3) source crew; and 4) recording crew. Before each crew enters any Refuge area they shall meet with the Refuge Manager. Environmental monitors, approved by the Refuge Manager, will observe crew activities during the project and report directly to the Refuge Manager. Polaris and the environmental monitors will make evaluations of ground conditions as equipment is removed from areas within the Refuge.

Project personnel shall perform contract operations in a careful and conscientious manner and will establish offsets for the protection of sensitive cultural resource sites and sensitive habitats and wildlife areas.

The receiver station layout will be done utilizing 1-ton trucks for staging equipment in centralized locations for layout by ATV's. Use of trucks for receiver layout in low impact areas may be approved by Refuge Manager or environmental monitor. In sensitive areas, the equipment will be walked out and set along receiver lines by the recording crew. Geophysical data acquisition will be conducted utilizing an ARAM ARIES 24-bit digital telemetry recording system which is the latest technology in recording systems. Recording crew operations will be coordinated from a staging area approved by the Refuge Manager. The staging area serves as a base for operations and equipment repair and will be located on a highland site to facilitate the movement of trucks and trailers. Data acquisition will be managed from the main instrumentation truck (recorder), which will be located at various road accessible sites around the survey area. Data collection will be performed on a continuous basis as part of the data acquisition operation.

During surveying, and when recording operations are completed, the geophones, cable, survey markers, and all other equipment and materials will be removed. A final inventory of ground equipment will be made to ensure that no equipment is left in the field.

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Crew personnel will be accommodated offsite. A recording crew office may be established locally (typically, at the same staging location) to administer and manage crew operations. Approximately 30 personnel will be working during the recording phase of the project. Polaris intends to locate the staging area and storage of equipment on Refuge property on a site approved by the Refuge Manager. Polaris will coordinate any need to establish additional staging areas on the Refuge with the Refuge Manager.

### **4.1.1 Mitigation of Potential Impacts from the Seismic Survey**

Potential environmental impacts of the 3-D seismic survey, which have been addressed and mitigated in this Negotiated Operating Plan, include the following: (11)

- 1) Introduction of noxious weeds to the Refuge
- 2) Disturbance impacts to migratory birds and other wildlife (especially during fall and spring migrations and summer breeding).
- 3) Not using trained environmental monitors who are responsible for serving as daily liaison between the Refuge Manager and seismic survey personnel and ensuring that all operations are conducted in adherence to this Negotiated Operating Plan, i.e., in a manner which minimizes environmental impacts.
- 4) Impacting sensitive habitat, wildlife, or other natural resource features while laying source and receiver lines and conducting operations
- 5) Increased use of types of equipment for operations such as those which might have higher ground pressure than other specialized equipment, and which are generally more available and can be used at a lower cost than other specialized equipment.
- 6) Increased travel using a variety of mechanized equipment along the source and receiver lines and for cross-country travel between shot and receiver lines.
- 7) Soil and vegetation damages along source and receiver lines and at specific locations such as waterway crossings and pond shorelines which are particularly susceptible to soil and vegetation damage when not frozen.
- 8) Conflicts with other uses of the Refuge.
- 9) Disturbance and potential damage to sensitive Rio Grande suckers (Colorado endangered), Rio Grande Chub (Colorado species of concern) and their habitats in Crestone Creek.
- 10) Disturbance of cultural resources.

To minimize the potential impacts listed above, the following operational procedures will be implemented during the seismic survey:

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- 1) All seismic survey vehicles and equipment will be decontaminated (per Service procedures) prior to entering the refuge, to prevent the introduction of noxious weeds to the Refuge
- 2) Conduct Seismic survey during winter months when most migratory birds are not using refuge habitats and when disturbance to other wildlife will be minimized.
- 3) Trained environmental monitors will serve as daily liaisons between the Refuge Manager and seismic survey personnel and ensure that all operations are conducted in adherence to this Negotiated Operating Plan, i.e., in a manner which minimizes environmental impacts.
- 4) Full consideration will be given to avoid impacting sensitive habitat, wildlife, or other natural resource features while laying source and receiver lines and while conducting operations.
- 5) Limit use of types of equipment for operations such as those which might have higher ground pressure than other specialized equipment.
- 6) Limit travel using a variety of mechanized equipment along the source and receiver lines and for cross-country travel between shot and receiver lines.
- 7) Conduct seismic survey when the ground is frozen to limit soil and vegetation damages along source and receiver lines and at specific locations such as waterway crossings and pond shorelines which are particularly susceptible to soil and vegetation damage.
- 8) Conduct Seismic survey during winter months to lessen impacts and potential conflicts with regular refuge operations .
- 9) Completely prohibit all vehicle access and operations within the immediate corridor (fenced) of Crestone Creek to prevent potential damage or disturbance to sensitive fish species and their habitats.
- 10) Conduct cultural resources inventory prior to seismic activity, mark cultural resource sites, re-survey seismic lines around cultural resource sites, avoid cultural resource sites with all seismic activities.

In addition to those listed above, and as a result of this Negotiated Operating Plan between Lexam and the Service, other operational procedures, such as altering daily hours of operation will be implemented as needed to avoid or reduce potential environmental impacts.

### **4.2 Protection of the Baca Refuge**

By agreeing to conduct the seismic survey within all proposed areas of the Baca Refuge under this Negotiated Operating Plan, Lexam is agreeing to conduct all operations within the Refuge while protecting natural and cultural resources and minimizing conflicts with other uses of the Refuge. Under this Negotiated Operating Plan, the overall environmental impacts of the

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proposed seismic survey will be reduced. For example, the seismic survey will be conducted within the seasonal timeframe specified by the Service in order to reduce disturbance during the periods of highest migratory bird use on the Refuge, and during a timeframe of maximum freeze-over resulting in little/less impact on sensitive wet meadow wetland habitats. The Negotiated Operating Plan also allows for the utilization of trained environmental monitors to serve as liaisons with Refuge staff, monitor adherence to this Negotiated Operating Plan, provide on-site guidance, and document any damages to Refuge resources. It also may require the use of specialized equipment and special operational procedures aimed at reducing habitat damages and disturbance impacts to wildlife, and will be required to the maximum extent practicable to avoid sensitive habitat and wildlife features. All unreasonable/unnecessary surface damages to soils and vegetation and infrastructure will be documented. Under the COGCC Permits, Lexam will be responsible for restoration and/or mitigation for all habitat and infrastructure damages caused by the 3-D seismic survey.

### **4.3 Additional Considerations Applicable to the 3-D Seismic Project**

The proposed seismic survey project is described in detail above. Briefly, the proposed project calls for a 3-D seismic survey covering approximately 25 square miles, which includes approximately 16,000 acres within the Refuge (Figures 1 and 2). The seismic survey will be acquired by utilizing vibroseis trucks and receiving the resultant reflected energy with geophones or hydrophones placed in a grid at approximately 165 ft intervals separated by a minimum of 825 ft between adjacent receiver lines. As many as 12 receiver lines will be active at any one time, with one line being deployed and one line being picked up as the spread generally progresses from southwest to northeast.

#### **4.3.1 Area of Operations**

The project area is described above, as an area comprising approximately 25 square miles (16,000 acres) all within the Refuge boundaries including portions of the Crestone Creek, Willow Creek, Spanish Creek and Cottonwood Creek drainages (Figure 2).. In addition, the boundary of the area of operations and the actual layout of source and receiver lines and

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subsequent operations along those lines (including specialized equipment) will be modified as needed to the maximum extent possible in order to avoid sensitive habitat, wildlife, and cultural resource features on the Refuge.

### **4.3.2 Alternative Operational Methods**

The Service and Lexam considered various alternatives in operational methods including: 1) alternative source/receiver layout patterns; 2) alternative energy sources; and 3) the use of existing 2-D seismic data. The rationale for the proposed operational design, which has been incorporated in this Negotiated Operating Plan, is presented below.

#### ***Alternative Source/Receiver Layout Patterns***

The orientation of receiver lines and source lines within the Refuge has been laid out in a manner which is least obvious from the ground.

#### ***Alternative Energy Sources***

Alternative energy sources for geophysical exploration are known, and the "least-impact" source has been selected.

#### ***3-D Seismic Data***

Part or all of the project area covered in this Negotiated Operating Plan was covered by previous 2-D seismic surveys. The data obtained from the 2-D surveys is of lesser quality than proposed 3-D seismic technology, is not considered sufficient to adequately describe potential hydrocarbon source material, and therefore is not considered a viable option by Lexam. The recent advancements in seismic technologies from 2-D to 3-D provide the required type and quality of data.

#### **4.4 The Drilling Program**

Once the well site and target depth are determined, a survey crew is required to stake the well, layout the drill site and road, and prepare the cut and fill diagrams as required by state and or federal regulations.

Lexam has submitted its applications, including all proposed well information, to drill the wells with the COGCC. Landowners, county governments and any other agencies requiring notification were copied with these documents. Environmental concerns, cultural surveys, water sources, access, and surface issues are agreed to or specified as permit terms and conditions by the COGCC before any land-altering operations begin. In addition, all drilling activities will comply with a Storm-Water Management Plan and a Spill Prevention Control and Countermeasures Plan, which will be provided by, and specific to, the drilling company contracted by Lexam. Drilling operations will also comply with any other applicable state and/or federal regulations.

#### **LOCATION PREPARATION**

Lexam will contract an excavation contractor to build the access road and well pad. This may take from one week to a month to complete depending upon the terrain and soil conditions. The equipment may consist of trucks to haul dirt movers and plating material. Water trucks may be required to wet down the location for dust control. For a flat drill site 2-3 D-7 bulldozers could be utilized. Top soil will be stockpiled on site. The pad and road will be plated as necessary to support the rig and the ongoing operations. This is a daylight operation

#### **RATHOLE RIG**

With the pad completed, a "rathole" rig will move in, set a 6' x 8' cellar ring, drill and set +50' of 20" conductor pipe and drill the mouse hole and "rathole" for the drilling rig( We will need to include a definition and explanation of the need of the various rigs etc... We should also have a glossary section to define all the industry terms and "stuff") . These are lined holes 40' deep.

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This should take 3 days. The equipment typically consists of a water well size rig, 2-3 pickups, a skidster and 2 gooseneck pipe trailers. This is a daylight operation.

### **RIG MOVE**

At this point the rig can be brought to the Refuge. The rig will be transported a long distance so it will be necessary to break down all components of the rig to meet highway weight, height and width standards; however, there may be some exceptions. It is estimated that there could be as many as 60 truckloads of equipment. Estimated move in and rig up time is 5 days. There will also be living quarters for the tool pusher, drilling engineer, mud logger/geologist and mud engineer. Additional necessary equipment is expected to include: septic facilities, drilling mud, water tanks and other equipment and supplies. Normally moving in and rigging up is a daylight operation.

### **DRILLING**

When drilling commences the operation becomes continuous until the well is drilled, and production casing is run or the well is plugged and abandoned. Personnel and their time necessary to be on location are presented in Attachment D. The current estimate is 75 days per well assuming no problems arise.

Once the total depth is reached, logs and tests (if required) are run, a determination as to the potential of the well will be made. If it is a dry hole the well will be plugged and abandoned per state regulations. If a completion attempt is to be made then production casing will be run. The drilling rig will be rigged down and moved off to the next well or returned to its point of origin. Rig down and move off should take an estimated five days subject to weather conditions and truck availability.

## **COMPLETION**

For a completion attempt the location will be cleaned up and prepared for a completion rig. Depending on the number of zones to be tested a completion could take a month or longer.

### **Mitigation of Potential Impacts from Drilling**

Potential environmental impacts of the drilling, which have been addressed and mitigated in this Negotiated Operating Plan, include the following:

- 1) Introduction of noxious weeds to the Refuge due to increased travel using a variety of mechanized equipment.
- 2) Not using trained environmental or archeological monitors who are responsible for serving as a liaison between the Refuge Manager and drill rig personnel and ensuring that all operations are conducted in adherence to this Negotiated Operating Plan, i.e., in a manner which minimizes environmental impacts.
- 3) Impacting sensitive habitat, wildlife, or other natural resource features while constructing the access road and well pads.
- 4) Soil and vegetation damages from road and well pad construction.
- 5) Ground or surface water contamination from drilling operations.
- 6) Surface disturbance or contamination of surrounding habitats from drill operations (e.g. drill muds, drill cuttings, etc.)
- 7) Conflicts with other uses of the Refuge.

To minimize the potential impacts listed above, the following operational procedures will be implemented during drilling:

- 1) All vehicles and equipment from outside the refuge will be decontaminated per Service procedures to prevent the introduction of noxious weeds to the Refuge
- 2) All ground disturbing activities associated with drilling operations and setup will require on-site archeological monitoring. In addition, once timing of road and pad construction activities is determined biologists will pre-sweep affected areas to document current wildlife activity and sensitivities to be addressed and/or avoided.
- 3) Trained environmental monitors will continue to serve as liaisons between the Refuge Manager, construction contractor and drill rig personnel and ensure that all operations are conducted in adherence to this Negotiated Operating Plan, i.e., in a manner which minimizes environmental impacts. ~~In addition, a full-time archeological monitor will be on-site for all ground disturbing activities.~~

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- 3) Full consideration will be given to avoid impacting sensitive habitat, wildlife, or other natural resource features while constructing the access road and well pads.
- 4) All Construction of roads and pads will occur in a way which best facilitates their complete removal and reclamation once Lexam activities have ceased at these sites. This includes, This includes separating and stockpiling topsoil layers onsite to be replaced during reclamation. All disturbed areas will be reclaimed per the COGCC permit requirements and with Service input.
- 5) A baseline water quality study of near surface (unconfined aquifer), deeper aquifers, and surface water in proximity to proposed well locations will be conducted prior to drilling. In addition, at least 3 monitoring wells will be installed near each well pad in case of spills or releases (see 5.4.1). Casing will be grouted with concrete to 3000 feet below the surface.depth<sub>121</sub>.
- 6) A closed loop mud and cutting system will be used to minimize impacts to surrounding habitats. In addition, drill cuttings will be isolated in an aboveground lined enclosure during drilling. Cuttings will be removed from the Refuge and disposed of per state regulations.
- 7) Modify drilling operations, as necessary, to reduce conflicts with other uses of the Refuge.
- 8) A gate guard will be provided by Lexam, and approved by the Service to document traffic entering and exiting the refuge and to eliminate potential illegal entry onto the refuge.
- 9) Arrangements for excess Service Law Enforcement personnel will be made in the event it is deemed necessary to effectively enforce state, federal, refuge and wildlife laws as a result of drilling activities.
- 10) Refuge Access Conditions :

- Negotiated access is to allow Lexam Explorations (USA) Inc, and/or it's assignee, access to portions of the Baca National Wildlife Refuge for the purpose of carrying out drilling of oil/gas exploration wells Baca #5 and Baca#6.

- All State, Federal and refuge specific regulations will be in force

- A summary of all results generated from the work permitted shall be provided to the Service Manager upon completion and summation.

- Operators are expected to act in a manner that is respectful of Refuge habitats, wildlife, and property. Please leave gates locked or unlocked as found.

- All Vehicle access is restricted to developed roads and two-tracks. ATV use and deviations to vehicle use must be pre-approved by Refuge Manager in writing previous to any action taken.

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- No pets are allowed in the field away from vehicles.
- Possession of firearms is strictly prohibited on the Refuge.
- Campfires are strictly prohibited in any areas of the Refuge
- Operators are not to be considered agents of the U.S. Fish and Wildlife Service (Service), and are not to represent the Service in any matters.
- Operators shall perform all work required under this contract in accordance with the highest standards of the permittee's profession or craft and to the satisfaction of the U.S. Fish and Wildlife Service.
- Operators shall perform all work in accordance with all laws and regulations and shall obtain any necessary permits or licenses required to do so.
- The work to be performed under this NOP shall be performed entirely at the Operator's risk. The Operator agrees to indemnify and hold the Service harmless for any and all liability or loss arising in any way out of the performance of work associated with this permit.

In addition to those listed above, and as a result of this Negotiated Operating Plan between Lexam and the Service, other operational procedures will be implemented as needed to avoid or reduce potential environmental impacts.

Permits, with specific terms and conditions, to conduct the drilling operation on the Refuge will be issued by the COGCC and included in this Negotiated Operating Plan as Attachment E. The permits will be issued under the Rules and Regulations of the COGCC, and after full consideration of the environmental conditions on the Refuge and comments received from concerned entities.

## **5.0 DESCRIPTION OF THE BACA NATIONAL WILDLIFE REFUGE**

### **5.1. Introduction**

Authorized in 2000, the Baca National Wildlife Refuge is one of the largest and most recent additions to the National Wildlife Refuge System. The Refuge, at 92,500 acres, is located in Saguache and Alamosa counties in the San Luis Valley (SLV) of south-central Colorado (Figure 1). Congress authorized acquisition of land within the Refuge with passage of Public Law 106-530, also known as the "Great Sand Dunes National Park and Preserve Act of 2000." This legislation, which received widespread support, focused not only on protecting the region's hydrology, which the incredibly unique sand dunes ecosystem depends upon, but also at protecting the exceptional ecological, cultural, and wildlife resources of the area.

The Refuge lies in the San Luis Valley, a high mountain desert averaging only 7 inches of precipitation annually, is surrounded by towering 14,000 foot peaks of the Sangre de Cristo Mountains on the east and the San Juan Mountains to the west. In contrast to the valley floor, higher elevations of the mountains receive more than 30 inches of precipitation annually, mostly as winter snow. Nearly everything and everyone in the valley depends upon these mountain snow packs. The Refuge contains a diversity of habitat types including desert shrublands,

grasslands, wet meadows, playa wetlands, and riparian areas, and is home to a multitude of wildlife and plant species, some of which only occur in the San Luis Valley

Adding to the uniqueness and importance of the Refuge is its juxtaposition to other conservation lands in the area. The Refuge abuts lands owned or controlled by other conservation entities including The Nature Conservancy (TNC), the National Park Service (NPS), the USDA Forest Service (USFS), and the Colorado State Land Board (SLB). This complex of lands, totaling more than 500,000 acres, contains one of the largest and most diverse assemblages of wetland habitats remaining in Colorado.

In addition to the incredible plant and animal resources contained on the Refuge, the area is also tremendously rich in cultural resource sites, some of which date over 12,000 years ago. Many of these sites have been added to the National Register of Historic Places.

## **5.2 Geology and Soils**

The San Luis Valley is part of the much larger Rio Grande Rift Zone which extends from southern New Mexico northward through the San Luis and Upper Arkansas Valleys to its northern termination near Leadville, Colorado (Figure 4). The SLV is bordered on the east by the linear Sangre de Cristo Mountains, which resulted from extensive block faulting during the Laramide Orogeny. The western side of the SLV is flanked by the San Juan Mountains, the result of extensive tertiary volcanism. In sharp contrast with the steeply faulted eastern side of the Valley floor, the Oligocene volcanic rocks of the San Juans gently dip eastward into the Valley floor where they are interbedded with Valley-fill deposits (USDI, BLM 1989).

## **5.3 Climate**

The following is from "Soil Survey of Saguache County Area, Colorado", USDA Soil Conservation Service (currently the Natural Resource Conservation Service)...(add citation to lit. cited – need to get year published, etc.) United States Department of Agriculture, Soil Conservation Service "Soil Survey of Saguache County Area, Colorado" Issued November 1984. 203 pages.

In the immediate areas of the Refuge, summers are warm or hot on the valley floor and much cooler in the mountains. Winters are cold in the mountains. Valleys are colder than the lower slopes of adjacent mountains because of cold air drainage. Precipitation occurs in the mountains throughout the year, and a deep snowpack usually accumulates during the winter. Snowmelt usually supplies much more water than can be used for agriculture in the area. Precipitation in the valley in summer falls as showers, and some thunderstorms occur. In winter, the ground is covered with snow much of the time. Chinook winds, which blow downslope and are warm and dry, often melt and evaporate the snow.

In winter the average temperature is 22 degrees F, and the average daily minimum temperature is 7 degrees. The lowest temperature on record which occurred in Saguache on January 7, 1971, is -34 degrees. In summer, the average temperature is 62 degrees, and the average maximum daily temperature is 80 degrees. The highest recorded temperature, which occurred on June 23, 1954, is 93 degrees.

The total annual precipitation is 8.64 inches. Of this, 6 inches, or 70 percent, usually falls in April through September. In 2 years out of 10, the rainfall in April through September is less than 5 inches. The heaviest 1-day rainfall during the 1954-1978 period of record was 1.50 inches at Saguache on June 17, 1969. Thunderstorms occur on about 60 days each year, and most occur in summer.

The average seasonal snowfall is 29 inches. The greatest snow depth at any one time during the period of record was 14 inches. On an average of 21 days, at least one inch of snow is on the ground. The number of such days varies greatly from year to year.

The average relative humidity in mid afternoon is about 40 percent. Humidity is higher at night, and the average at dawn is about 60 percent. The sun shines 80 percent of the time possible in summer and 60 percent in winter. The prevailing wind is from the southeast. Average windspeed is highest, about 11 miles per hour, in spring.

## 5.4 Hydrology

The Refuge lies within a topographic basin referred to as the “Closed Basin.” The lowest portion of the Closed Basin is known locally as the “sump,” which occurs on part of the Refuge. Historically, the sump area was described by early explorers as “a vast swamp or bog with a few small lakes, one of which is said to be three miles in length” (Hayden 1869). Hayden went on to note that “although entirely disconnected from any other water system the little streams are full of trout,” referring to the unusual isolation of the Closed Basin in relation to the Rio Grande drainage. Maps generated during the Wheeler Survey in 1871 described the same area of the valley as the “San Luis Valley Marshes.” Presently, the Closed Basin covers approximately 2,940 square miles in the northern part of the valley and is separated from the rest of the valley by a low alluvial fan. Water enters the closed basin through precipitation and snowmelt, and exits primarily through evapotranspiration.

The Refuge is underlain by two relatively distinct aquifers, the unconfined or shallow aquifer, and the confined or deep aquifer. In most areas, the unconfined aquifer ranges to a depth of about 100 feet. Where the unconfined aquifer comes to the surface, natural seeps, wet meadows, and interdunal wetlands typically result. Below the unconfined aquifer are a number of clay-based layers that serve to separate, although not disconnect entirely, the unconfined aquifer from the deeper layers of sands and gravels containing water in the confined aquifer. The clay layers reduce upward movement of water from the deeper layers creating water pressure. In areas where water from the deep aquifer can access the surface through either fractures in the clay layers or wells, artesian water pressure is common. The aquifers are recharged by infiltration of irrigation waters, canal leakage, seepage from mountain streams that flow across permeable alluvial fans, and infiltration from precipitation.

Lexam contracted Telesto Solutions, Inc. (Telesto), a hydrological consulting firm, to conduct baseline water sampling on and around the Refuge. The following sections describe their studies to date.

#### 5.4.1 Water Resources Baseline

##### *Sampling Plan*

The following description has been prepared by Telesto to provide Lexam with a baseline water quality sampling plan for the Lexam Baca project, located near Crestone, Colorado. Lexam plans to drill two deep oil & gas exploration wells within the Refuge. The Service owns the surface rights and Lexam owns the subsurface mineral rights, which include oil and gas resources.

Based on discussions with Lexam, the Service, U.S. National Park Service (USNPS), and the Baca Grande Water & Sanitation District (BGWSD), Table 1 summarizes proposed wells and surface water locations to be sampled for baseline characterization. The locations of sampling points close to the proposed Lexam oil & gas wells are shown on Figure 5. Note that the actual location of well SW-5 may be about 2000 feet east-northeast of the location shown on Figure 5. Lexam will use a GPS to more accurately locate this well. Lexam conducted all ground water baseline sampling during the week of December 4, 2006. In addition, two surface water sites were sampled in December 2006, but the rest were frozen. Additional surface water sites will be sampled prior to drilling.

Many of the water wells are either free flowing at ground surface or have operating pumps. However, some of the wells are open and have static ground water levels below ground surface, so a purging pump will be required. Telesto will rent an electric submersible pump and generator for purging the non-flowing wells that do not have existing operating pumps. After purging, all non-flowing wells will be sampled using a disposable bailer.

Based on discussions with the Service, chemical monitoring of shallow ground water close to the drill pads is not considered part of the baseline evaluation. Installation of well points or monitoring wells in the immediate vicinity of the drill pads will be discussed with the Service and BGWSD when the drill pad locations and layouts are finalized. This will occur after the baseline sampling program.

The BGWSD uses four “primary” water wells and an infiltration gallery on Cottonwood Creek to provide source water for its municipal drinking water system. In addition, the BGWSD owns a water right for diverting flow from South Crestone Creek and has the right to pump four “second-tier” wells in the future. Telesto will sample all of these locations for baseline water quality. As necessary for sampling, the BGWSD will remove any non-operating pumps or provide access for a sampling bailer in wells with operating pumps. All of the BGWSD wells are completed in the unconfined aquifer.

Lexam previously agreed to sample selected USNPS wells at Great Sand Dunes National Park, which is located south of the Refuge. The USNPS identified three wells and will provide information on the well configurations. The USNPS also requested that a surface water sample be taken from Deadman Creek. These sampling locations are listed in Table 1. All of the USNPS wells are completed in the confined aquifer. One of the wells is non-flowing and will require use of a purge pump prior to sampling.

Due to issues regarding site access and well configurations, Telesto may recommend that certain wells be added to or omitted from the sampling plan. The decision to add or subtract wells from the plan will be based on mutual agreement between Lexam, the Service, BGWSD, and/or USNPS.

Water samples will be obtained from ground water and surface water locations using standard protocols established by the U.S. Environmental Protection Agency (USEPA) and the State of Colorado. To the extent practicable, three saturated wellbore volumes will be removed from a water well prior to sampling. Field-measured parameters will include temperature, pH, and specific conductance. Chain of custody procedures will be followed in transporting water samples from the field to the analytical laboratory. Government or water district representatives, familiar with water sampling, will accompany Telesto site personnel during the field sampling activities.

Water samples will be shipped to and analyzed by a USEPA-approved analytical laboratory. The recommended list of constituents for analysis is provided in Table 2. The constituent concentrations will provide basic information on the water quality in the area and specific

information on constituents that could be associated with oil and gas drilling/production. The water quality data will provide an environmental baseline for evaluating the effects of exploratory drilling and future oil and gas development if it occurs. Raw analytical results will be transmitted by the laboratory directly to the Service, either electronically or in hard copy. Telesto will conduct a QA/QC review of the laboratory data and report these findings to the Service.

At the request of the Service, chemical analysis of surface water samples will include both total and dissolved constituents.

### ***Field Sampling***

From December 4<sup>th</sup> through 8<sup>th</sup>, 2006, Telesto, in cooperation with the Service, the BGWSD, and the USNPS conducted the first phase of a baseline water quality sampling/analysis on the Baca Refuge and surrounding areas. The first phase of sampling consisted of ground water collected from confined and unconfined wells within and adjacent to the Refuge. Two surface water sampling locations were accessible and samples were collected; however, the remaining surface water sampling locations were frozen and unavailable for sample collection. The inaccessible surface water locations will be sampled during spring or early summer of 2007.

All sampling conducted on the Refuge was performed in the presence of Laura Archuleta of the Service and ground water wells administered by the BGWSD were sampled in the presence of Deb Phenicie of the BGWSD. Although an effort was made to have USNPS representatives present during the sampling of wells within Great Sand Dunes National Park, logistical problems prevented their participation.

On Monday December 4<sup>th</sup>, Telesto personnel met with Ron Garcia, Refuge Manager, to discuss sampling logistics and determine access to the sampling wells within the Refuge.

Field measurements of water quality (temperature, pH, and electrical conductance) were recorded at each site and the amount of water purged from each nonflowing well prior to sampling was also recorded (Table 3).

All ground water samples were filtered using a peristaltic pump, new flexible tubing, and a disposable 0.45 micron cartridge filter. Filtered (dissolved) and unfiltered (total) samples were collected from the surface water locations. All samples were submitted to SVL Laboratory for analysis of Profile 1 constituents (less nitrogen species), ethane/methane, volatile organics (VOC), as well as gas range (GRO) and diesel range (DRO) total petroleum hydrocarbons. Results of laboratory analyses on the sampled water wells and surface water sites are presented in Table 4 (Jack to send Laura electronically)

**Table 3 (cont.) Sample Collection Summary**

Location	Date/Time Sampled	Purged Volume (gal)	Field Parameters	Comments
SW-5	5-Dec-06 1510	1600	pH = 8.11 E.C. = 117.7 $\mu\text{S/cm}$ T = 10.6° C	
C-22	5-Dec-06 1350	Flowing	pH = 8.50 E.C. = 280 $\mu\text{S/cm}$ T = 15.5° C	
Well 15	6-Dec-06 1054	4100	pH = 7.81 E.C. = 214 $\mu\text{S/cm}$ T = 10.6° C	
Motel Well	6-Dec-06 1035	Installed pump	pH = 7.62 E.C. = 134.1 $\mu\text{S/cm}$ T = 9.3° C	
Well 2	6-Dec-06 1540	7400	pH = 6.97 E.C. = 313 $\mu\text{S/cm}$ T = 11.3° C	
Cottonwood Intake (surface water)	6-Dec-06 1054	From faucet in pumphouse	pH = 7.46 E.C. = 80.2 $\mu\text{S/cm}$ T = 4.5° C	Total and dissolved
Well 17	7-Dec-06 850	1300	pH = 7.43 E.C. = 95.4 $\mu\text{S/cm}$ T = 10.0° C	
Well 14	7-Dec-06 1125	3300	pH = 7.73 E.C. = 141.8 $\mu\text{S/cm}$ T = 10.50° C	
Well 18	7-Dec-06 1100	Fireplug – 5 minutes flow wide open)	pH = 7.03 E.C. = 112.4 $\mu\text{S/cm}$ T = 8.8° C	
375307	8-Dec-06 1030	2000	pH = 8.39 E.C. = 1127 $\mu\text{S/cm}$ T = 25.7° C	
FL 4	7-Dec-06 1020	Flowing	pH = 8.16 E.C. = 325 $\mu\text{S/cm}$ T = 15.8° C	
FL 3	7-Dec-06 1030	Flowing	pH = 8.39 E.C. = 1113 $\mu\text{S/cm}$ T = 24.4° C	

#### 5.4.2 Water Quality Monitoring Plan for Drilling Operations

A minimum of three alarm wells will be installed at each drill pad; one upgradient (east to northeast of the pad) and two downgradient (west to southwest of the pad). Telesto, Lexam's contractor, will perform calculations to estimate the optimal locations of the alarm wells. These calculations will be presented to the Service and BGWSD (or their designated representatives) for review and concurrence. The alarm wells will be completed to a depth of 30 to 40 feet below ground surface and each well will be constructed with 4-inch schedule 40 PVC casing and slotted screen. The screen and sand pack interval will extend from above the expected seasonal high water table to the bottom of the borehole. Regardless of the water table position, a borehole seal extending to a depth of 4 to 8 feet below ground surface is recommended based on conversations with personnel at the Colorado Division of Water Resources.

Water sampling and laboratory analysis will be consistent with the baseline water quality sampling plan (see 5.4.1), with the exception that SVOCs will be sampled/analyzed at all alarm wells. The alarm wells will be sampled on a monthly basis from before oil and gas well drilling to 1 to 2 months after drilling. The alarm wells will then be sampled one time between 6 to 12 months after drilling, and one time 1 to 2 years after drilling. The actual sampling dates will be mutually agreed upon by the Service, BGWSD, and Lexam. Further, if a significant spill event occurs at a drill pad, or if drilling-related contamination is found in any alarm well, the sampling frequency may be increased based on mutual agreement between the Service, BGWSD, and Lexam.

Baseline wells C-22, C-57, and C-24, located relatively close to the pads, will be sampled 6 to 12 months after completion of the oil & gas well drilling, and then 1 to 2 years after drilling. All

other baseline wells will be sampled 1 to 2 years after drilling. If significant drilling impacts are identified in any well, the sampling frequency may be modified based on mutual agreement among USFWS, BGWSD, and Lexam.

Well SW-5 will likely be used as a water supply well during oil and gas well drilling and if it is used for water supply, the ground water pumped from this well will be sampled on a monthly basis during drilling. SW-5 will then be sampled 6 to 12 months after drilling, and 1 to 2 years after drilling. If SW-5 is not used for water supply, it will be sampled 1 to 2 years after drilling.

## 5.5 Vegetation and Habitats

Vegetation communities on the Refuge are primarily determined by soil type, water table, water depth, and salinity. These vegetation communities (Table 4) are important habitats for reptiles, amphibians, mammals, waterfowl, shorebirds, wading birds, and other waterbirds breeding, foraging and migrating through the Refuge.

### 5.5.1 Wetland and Aquatic Habitats

#### ***Wet Meadow Wetlands***

Wet meadows (the majority being temporary and seasonal wetlands) comprise the largest wetland type on the Refuge covering over 10,000 acres (Figure 6). The wet meadows on the Refuge tend to be dominated by sedges (*Carex spp.*), baltic rush (*Juncus balticus*), and hairgrass (*Deschampsia cespitosa*) plant communities. These communities are common in the northern portion of the San Luis Valley and occupy more area than all other wetland types in the valley (Cooper and Severn 1992). These communities tend to occur where the water table just reaches the soil surface during the early part of the growing season or inundates the surface for short periods. Wet meadows occur predominately in the central and northeast portion of the Refuge along all of the creeks, and to a lesser extent in the southeast portion of the Refuge along Sand Creek and Big Spring Creek.

Depending on plant structure and density, and water depth and duration, wet meadows offer tremendous foraging and nesting opportunities for a variety of wetland avian species including numerous species of waterfowl, the sora (*Porzana carolina*) and Virginia rail (*Rallus limicola*), white-faced ibis, American avocet, Wilson's snipe (*Gallinago delicata*), and Wilson's phalarope (*Phalaropus tricolor*). Wet meadows also provide critical roosting and foraging areas for a segment of the Rocky Mountain population of greater sandhill cranes, which migrate through the valley in the spring and fall. Wet meadows provide habitat for a variety of rare or unique amphibian species such as northern leopard frog (*Rana pipiens*) and plains spadefoot toad (*Scaphiopus bombifrons*).

In the transition areas between the wet meadows and the adjacent salt grass/greasewood uplands, the globally rare slender spiderflower thrives in the moist, slightly saline conditions (Rondeau et al. 1998). Although once widespread in the southern Rocky Mountains, this species now occur almost exclusively in the San Luis Valley. Significant populations of this rare plant are known to occur on the Refuge.

### **Playa Wetlands**

Playa wetlands on the Refuge generally occur to the west of the wet meadows along Saguache and San Luis Creeks. These wetlands have an intermittent or ephemeral water regime. In some cases, especially during years of below average precipitation, many of these wetlands remain dry. The ephemeral nature of these wetlands adds to their uniqueness and high productivity when water does return. During wet years, playas will fill during spring runoff and thunderstorms, and slowly dry up over summer. This drying and wetting cycle provides for the nutrient cycling conditions ideal for the production of invertebrates, a valuable food resource for numerous vertebrate species. During times of above average precipitation, these wetlands are some of the most productive wetlands in the valley (Cooper and Severn 1992). Greasewood and rabbitbrush with an understory of saltgrass (*Distichlis stricta*) and western wheat grass typically surround playa wetlands. Salt grass pans are an important habitat for several rare species of small mammals and a rare butterfly. Barren salt flats are also a component of playa wetland systems and can be important to foraging and nesting shorebirds.

### 5.5.2 Upland Habitats

#### *Semi-desert Shrublands and Grasslands*

Semi-desert shrublands and grasslands are typical of arid continental interior basins and are widespread in areas affected by rain shadows in western North America where mean annual precipitation is less than 10 inches. This habitat type is widespread on the valley floor, where only 7 inches of precipitation falls annually. Approximately 77 percent of the Refuge, or over 71,700 acres, fall into this habitat type (figure 6 Do we have this map[13]?) (CDOW 2004a). The dominate shrubs include rubber rabbitbrush (*Ericameria nauseosa*), greasewood (*Sarcobatus vermiculatus*), fourwing saltbush (*Atriplex canescens*), shadscale (*Atriplex confertifolia*), and winterfat (*Krascheninnikovia lanata*). Native grasses occurring in association with these and other shrubs typically include Indian ricegrass (*Oryzopsis hymenoides*), Alkali sacaton (*Sporobolus airoides*), western wheat grass (*Pascopyrum smithii*), and blue grama (*Bouteloua gracilis*). Annual plants tend to be more abundant in this habitat type; however, many of these are exotic species including cheat grass (*Bromus tectorum*). Crested wheatgrass (*Agropyron desertorum*), an exotic perennial grass, also may be common. Many of the plants within this habitat type are drought resistant and tolerant to a range of soil salinity, conditions common on the valley floor.

Bird diversity and densities tend to be relatively low in semi-desert shrublands due to structural and floristic simplicity (Wiens and Rotenberry 1981). Species common to this habitat include the horned lark (*Eremophila alpestris*), mourning dove (*Zenaida macroura*), western meadowlark (*Sturnella neglecta*), and loggerhead shrike (*Lanius ludovicianus*). Upland grassland habitats, depending on the amount and type of vegetation, have the potential to support rare grassland-dependent species such as the burrowing owl (*Athene cunicularia*), mountain plover (*Charadrius montanus*), long-billed curlew (*Numenius americanus*) and several sparrow species. Another habitat type found in association with the playa wetlands portion of the shrublands are salt grass pans. These areas, depending on the hydrologic conditions and juxtaposition to other habitat types, can support a range of invertebrate, mammal, and bird species including nesting American avocets (*Recurvirostra americana*). Two globally vulnerable subspecies of small mammals, the silky pocket mouse (*Perognathus flavus sanluisi*), and the thirteen-lined ground squirrel (*Spermophilus tridecemlineatus blanca*); and one globally vulnerable subspecies of butterfly

(sandhills skipper; *Polites sabuleti ministigma*) were found in greasewood/salt grass dominated areas of the White Ranch (Rondeau et al. 1998). This subspecies of sandhill skipper is endemic to the San Luis Valley. Also, the globally rare slender spiderflower (*Cleome multicaulis*) can be found in the transition zone between the shrubland and salt grass pans.

### 5.5.3 Riparian Habitats

The Refuge contains a variety of woody and non-woody riparian habitats along six main creeks flowing from the Sangre de Cristo Mountains. These creeks (from north to south) are North Crestone, South Crestone, Willow, Spanish, Cottonwood, and Deadman creeks. Riparian zones are the transition areas between aquatic and terrestrial habitats. In arid climates like that in the San Luis Valley, riparian zones typically compose a very small percentage of the overall landscape. However, they can contain some of the richest species diversity of any habitat type.

Riparian habitats with a tree and shrub component are located primarily along North Crestone and South Crestone Creeks (and associated irrigation ditches) in the north and northeastern portion of the Refuge. Narrowleaf cottonwood (*Populus angustifolia*) is the dominant tree species with understory vegetation of willows (*Salix* spp.), red-osier dogwood (*Cornus stolonifera*), and greasewood (figure 6?? If we do a habitat map....) (CDOW 2004a). Healthy riparian vegetation plays a major role to stabilize and shade stream banks, thereby reducing sedimentation and providing quality habitat for aquatic species including the Rio Grande sucker and Rio Grande chub. Riparian vegetation along these creeks may provide habitat for the endangered southwestern willow flycatcher (*Empidonax trailii extimus*). This small songbird migrates and nests in dense willow and cottonwood areas throughout the San Luis Valley, primarily at elevations below 8,500 feet, and may use similar habitat on the Refuge. Another riparian-obligate species, the yellow-billed cuckoo, which is a candidate species for federal listing under the Endangered Species Act, has been documented in dense, old-growth cottonwood forests on McIntire Springs (BLM) in the valley (Lucero, pers. comm. 2004). This species may also occur on the Refuge, if the appropriate habitat type and structure exists. Riparian habitats also host a large number of migrating and nesting neotropical songbirds and raptors. In addition, several plant communities associated with riparian habitats of global importance have been identified by CNHP in close proximity to the Refuge including rare

examples of narrowleaf cottonwood/rocky mountain juniper (*Populus angustifolia/Juniperus scopulorum*) and aspen/rocky mountain maple (*Populus tremuloides/Acer glabrum*) (Rondeau et al. 1998).

The remainder of the riparian habitats along Willow, Spanish, Cottonwood, Deadman, and Sand Creeks are dominated by sedges and other herbaceous plant species. Historically, these creeks may have contained a larger component of woody species, such as willows, especially in the upper reaches within the Refuge.

## 5.6 Wildlife

The Baca National Wildlife Refuge provides important habitats for numerous fish and wildlife species.

### 5.6.1 Shorebirds

Several species of shorebirds breed on the Refuge and some noted species are American avocet, common snipe, killdeer, Wilson's phalarope, and spotted sandpipers. These species use a variety of nesting habitats from wet meadow wetlands to unvegetated flats and uplands, to playa-like wetland fringes and even gravel road banks.

The San Luis Valley is not a major migratory path for shorebirds. In the intermountain west and prairies, this group of birds is often widely distributed across the landscape in small to medium flocks, and on a collective basis, an area such as the SLV, supports thousands of shorebirds and is key to conserving these species on a large scale. At least 24 species of shorebirds migrate through the SLV Refuges. Common migrants include the species breeding in the area as well as greater and lesser yellowlegs, dowitchers, long-billed curlews, Baird's sandpipers, least sandpipers, semipalmated sandpipers, and other *Calidris* species.

### 5.6.2 Marshbirds

As is the case in most areas, very little is known about habitat use and nesting success of secretive marshbirds such as rails, soras, and others in the SLV. Virginia and sora rails are commonly seen during spring, summer, and fall in wet meadow and marsh communities. The

number of rails produced on the Refuge is unknown; however, these species have been documented on the Refuge during the breeding season.

American bitterns are a species of management concern within the USFWS's Region 6 and on a national level. Although not officially documented on the Refuge this species is common in the San Luis Valley and feed along a variety of wetland types all of which occur on the Baca Refuge. No quantitative data exists on this or other marshbird species on the Baca Refuge.

### **5.6.3 Colonial Water Birds**

Black-crowned night-herons, white-faced ibis, and snowy and cattle egrets nest in the San Luis Valley, which supports some of the largest nesting colonies of white-faced ibis and snowy egrets in the State. Ibis and egret utilize the Refuge primarily for foraging, especially during late summer months. Black-crowned night-herons nest in willow dominated habitat along Crestone Creek and forage readily throughout the wet areas of the Refuge.

Foraging ibis use wet meadow and marsh communities during the spring, summer, and fall. Snowy egrets use open, shallow water as well as wet meadows and marshes for foraging. Black-crowned night-heron forage along canals and other waterways as well as wet meadows and marshes.

Great blue herons do not nest on the Refuge or in the SLV; however, small numbers occur on the Refuge year round in areas where there is running or open water.

### **5.6.4 Raptors**

The San Luis Valley and the Refuge host an array of hawks, falcons, owls, eagles, and other raptors throughout the year.

Peregrine falcons hunt for shorebirds and other small water birds in the wetlands and short-emergent vegetation wetlands of the Refuge during spring and fall migration. Prairie falcons are common year round residents on the Refuge at use various habitats extensively for feeding and resting.

Red-tailed hawks, Swainson's hawks, and American kestrels nest on the Refuge, primarily in trees and snags scattered along creeks and water delivery canals. Northern harriers and short-eared owls nest in dense vegetation in wet meadows, Great horned and long-eared owls nest in the deciduous and evergreen trees and likely in the banks of incised creeks and water delivery ditches.

In the winter, ferruginous hawks, rough-legged hawks, northern harriers, short-eared owls, and golden and bald eagles are common winter residents on the Refuge. The hawks, owls, and golden eagles find rodents, small mammals, and other prey on the Refuge farm fields (abandoned), uplands and short-emergent wetlands where cover is abundant. Bald eagles spend the winter feeding on sick or weak waterfowl or on carrion. Most of the bald eagle use is along the Closed Basin canal on the west or along Crestone Creek on the NE corner of the Refuge.

Burrowing owls are declining in Colorado and are also a species of management concern in USFWS's Region 6 and other western regions. This species uses grasslands especially in or near prairie dog towns where abandoned prairie dog tunnels are used for nesting. This species is rare-to-uncommon in the San Luis Valley as it is in most western valleys and mountain parks of Colorado (Andrews and Righter 1992). Burrowing owls have been documented nesting in several locations on the Refuge, however, they are still considered uncommon. Habitat loss is responsible for some of the declines in the State. Prairie dog colonies on the Refuge are encouraged to provide habitat for burrowing owls and other avian species dependent upon them. Typically, prairie dog colonies are located in sparsely vegetated prairies and uplands.

### 5.6.5 Songbirds

The Refuge provides habitat for a variety of migrating, nesting, and wintering songbirds. The riparian habitat along the creek systems support the greatest diversity of passerine species.

Species nesting in the riparian include yellow warbler, western wood peewee, Bullock's oriole, song sparrow, and others. Many of these species are neotropical migrants; they breed in one hemisphere and winter in the other. The endangered race of the southwestern willow flycatcher may nest within stands of willows on the Crestone creek system of the Refuge. All riparian

obligate species face a multitude of threats from loss of habitat; therefore, it is critical that riparian habitat on the Refuge is encouraged, protected and conserved.

#### 5.6.6 Corvids

Magpies, ravens, and crows are common on the Refuge throughout the year.

#### 5.6.7 Mammals

Forty-eight species of mammals have been identified on the Refuge. Beaver, muskrat, and raccoon range from common to abundant in wetland habitat. Coyotes and skunks are abundant and use all the vegetative communities found on the Refuge.

The only prairie dog on the Refuge is a subspecies of the Gunnison prairie dog (*Cynomys gunnisoni gunnisoni*). It is uncommon and is only found in small colonies in the SLV and south-central Colorado (Fitzgerald et al. 1994). Small prairie dog towns are scattered throughout the Refuge and will be protected to ensure habitat for the prairie dog as well as any burrowing owls that may be nesting in abandoned tunnels.

Mule deer and elk use most of the habitat types on the Refuge year-round. Deer feed in riparian areas and abandoned agriculture fields on the Refuge as well as in other upland and wetland communities. The Refuge also offers fawning and winter cover for deer.

A large herd of resident elk exists on the Refuge. Elk use a variety of habitat types on the Refuge primarily spending time on the wet meadow and sandy rabbitbush dominated habitats. Elk populations on the Refuge usually peak during winter months with numbers apparently as high as 3,000 animals. The currently un-hunted Refuge serves as a winter range for these animals providing an abundance of feed and protection from disturbance. Wet Meadow habitats serve as ideal calving grounds for a large portion of the elk that utilize the Refuge.

These animals are managed in a partnership with the Colorado Division of Wildlife.

### 5.6.8 Amphibians and Reptiles

The altitude, climate, and relative isolation of the San Luis Valley limits the number of amphibians and reptiles to 3 species of lizards, 3 species of snakes, 1 salamander, 3 toads, and 1 frog species (L. Harvey, pers comm). Species fairly common on the Refuge include tiger salamander, great plain's toad, Woodhouse's toad, plains spadefoot toad, western chorus frog, short-horned lizard, and western garter snake. Several amphibian and reptile species, such as the variable skink, have not been documented on the Refuge but may occur here.

### 5.6.9 Avian Species of Conservation Concern

Conservation priorities for North American avian species and recommendations for habitat protection, management and restoration in support of conservation of these species have been developed and identified recently through several international, national, and regional avian conservation plans. These plans include the North American Waterfowl Management Plan, the U.S. Shorebird Conservation Plan, the North American Waterbird Conservation Plan, and the Partners in Flight Landbird Conservation Plan.

In 2002, the Service published a national list of "Avian Species of Conservation Concern" (USFWS, 2002).

### 5.6.10 Fish and other Aquatic Resources

Crestone Creek is inhabited by four native fish species (Rio Grande sucker (*Catostomus plebeius*), Rio Grande chub (*Gila Pandora*), fathead minnow (*Pimephales promelas*) and longnose dace (*Rhinichthys cataractae*). The Rio Grande sucker and Rio Grande chub are endemic to the Rio Grande drainage and this rare fish assemblage probably represents the native fish community of the Rio Grande prior to the influence of Spanish and American settlement (Alves 2007). Rio Grande sucker is a Colorado state endangered species, while Rio Grande chub is a species of special concern.

### 5.6.11 Invertebrates

Invertebrate populations are an essential food resource for migratory birds and estuarine fishery species. Various amphipods, crayfish, and numerous crabs are present within all marsh habitats in the project area. Some of these invertebrate populations occur in tremendous quantities. Mosquitoes, beetles, spiders, and ants are other common invertebrates .

### 5.6.12 Threatened and Endangered Species

Federally listed species that are known to occur or have historically occurred in Saguache county include bald eagle (*Haliaeetus leucocephalus*), black-footed ferret (*Mustela nigripes*), Canada lynx (*Lynx Canadensis*), Mexican spotted owl (*Strix occidentalis*), southwestern willow flycatcher (*Empidonax traillii extimus*), and Uncompahgre fritillary butterfly (*Boloria acrocnema*). While all these species may occur in the county, only the bald eagle and southwestern willow flycatcher are likely to occur on the Refuge.

Although the bald eagle is occasionally seen in the area, it is not known to roost or nest on the Refuge. Generally, bald eagles do not nest in the SLV. They winter in the SLV and tend to concentrate in waterfowl wintering areas with open water, or near flowing water on major streams/rivers, and/or in areas where livestock (e.g. sheep) are located.

Surveys to document the presence of southwestern willow flycatcher on the Refuge have not been conducted to date. Southwestern willow flycatcher habitat likely exists on the Refuge; therefore, since potential habitat exists, no seismic activity or drilling will be conducted in those immediate areas.

## 5.7 Historical and Archaeological Resources

The Refuge and neighboring lands are known to contain a tremendous amount of cultural resources dating to at least 11,500 years ago. The earliest known inhabitants of the San Luis Valley were the Clovis people who occupied the area around 11,500 to 10,900 years before present (BP) (Jodry 1999). Ancient mammoth sites and tools used by Clovis have been discovered in the region. The Folsom people followed the Clovis around 10,900 to 10,200 years BP. Some prominent Folsom sites in the vicinity include the Linger Folsom site, Zapata Folsom

site, and Stewart's Cattle Guard site (Jodry 1999). A succession of other groups utilized the San Luis Valley from 10,000 to 1,450 years BP, at least seasonally to hunt big game and gather food items like pinon nuts and Indian ricegrass (Jodry 1999; Hoefer 1999). The abundance of water in this region is believed to have attracted a multitude of wildlife, which were in turn used extensively by these early peoples (Jodry 1999).

The Late Prehistoric period, which is typically characterized by the development of some form of agricultural activities in addition to hunting and gathering, occurred between 1,450 to 400 years BP (Martorano 1999). Many sites discovered from this time period occurred near wetlands, streams, and springs, further signifying the importance of water to the survival of early peoples. Remains including projectile points, ceramics, ground stone, fire-cracked rock, and other lithic items are common in these sites (Martorano 1999).

The Protohistoric period began around the mid-1600s to the late-1800s and included the first contact between existing cultural groups and Spanish and Euro-American groups (Martorano 1999). These existing cultural groups included the Ute, Comanche, Apache, Navajo, Arapaho, Cheyenne, and northern Pueblo including the Taos, Tewa, and Tesuque (Martorano 1999). The Ute are considered the primary inhabitants during this period.

The influence of Mexican and Spanish peoples in the area is also quite evident during this time period. Mexican and Spanish settlers established San Luis, the oldest town in Colorado, in 1851. The Trujillo Homestead, located near the Refuge, was built in 1879 and recently was added to the National Register of Historic Places. The Trujillo Homestead was representative of typical small-scale ranches in the area.

The protection of known culturally significant structures and sites is a priority for Refuge staff. The Service coordinates with the NPS, TNC, and local law enforcement authorities to develop strategies to coordinate law enforcement activities to protect cultural resources.

Over time, the Service will evaluate and inventory additional areas within the Refuge that have not been surveyed. The only area surveyed within the Refuge was the White Ranch property, which was surveyed in 1995 (Mabry et al. 1997). As a result of this effort, 64 new sites, two

previously known sites, and 83 isolated occurrence sites were documented, many of which may be eligible for the National Register of Historic Places (Mabry et al. 1997). Section 106 of the National Historic Preservation will be followed in association with the Lexam seismic and drilling programs as federally assisted undertakings, and also prior to any future undertakings.

### 5.7.1 Cultural Resources Inventory

TRC Mariah Associates Inc. conducted the cultural resource investigations for the Baca #5 and #6 well pads and access roads as well as the Baca 3-D seismic project. Below is a brief summary of field methods used to conduct this inventory:

- A cultural resource site was defined as a discrete locus of interpretable, patterned human;
- Behavior more than 50 years old, and exhibits the one or more of the following; and
- Characteristics: 1) one or more features; 2) more than five artifacts (including more than five pieces of heat-altered rock); or 3) more than two classes of artifacts (e.g., flaked stone artifacts, groundstone, heat-altered rock, burned bone/enamel, ceramics).

Cultural resource locations not meeting these definitions were recorded as isolated finds (IFs).

Where cultural resources were identified in the inventoried area, a barrier was erected and an avoidance reroute was inspected and flagged accordingly. When artifacts were encountered, pin flags were used to mark locations, a site map was drawn, overview photographs were taken, and a Colorado Cultural Resource Survey form was completed. A datum consisting of a metal spike with an attached aluminum tag was placed at each site. Site and isolate locations were recorded using handheld global positioning system (GPS) units and all UTM coordinates reported here are in NAD 27 and are not differentially corrected. All diagnostic and obsidian artifacts were collected for this project. The Service will be responsible for the obsidian sourcing studies. Collected artifacts will be curated at the Anasazi Heritage Center in Dolores, Colorado.

Further, it is highly possible that significant cultural remains have been buried by shifting sands due to the nature and location of the sites and of erosional surfaces.

The Baca #5 and #6 well pad inventories required a 10-acre block inventory centered on the well pad centerstake and a 100-ft wide corridor for the access roads. This inventory resulted in the recording of two archaeological sites and four IFs. The sites include a prehistoric lithic scatter and an historic canal. The lithic scatter has been determined by the Service, and concurred by the Colorado State Historic Preservation Office, as not eligible to the National Register of Historic Places (NRHP) and the canal has been determined as eligible to the NRHP, with the portion of the canal crossed by the project as non-contributing to the sites eligibility and no adverse effects will occur to the canal.

The seismic inventory required a single zigzag 20-m (66-ft) wide transect centered on source lines, receiver lines, roads, and flagged access roads. A full 20-m wide transect was walked on each side of fences. A total of 47 archaeological sites, 96 IFs, and portions of four historic canals were recorded. All of the sites will be avoided by project re-routes and there will be no effect to these resources. The canal segments will be crossed by project vehicles, but those crossings will have no adverse effects due to the non-contributing segments within the project area.

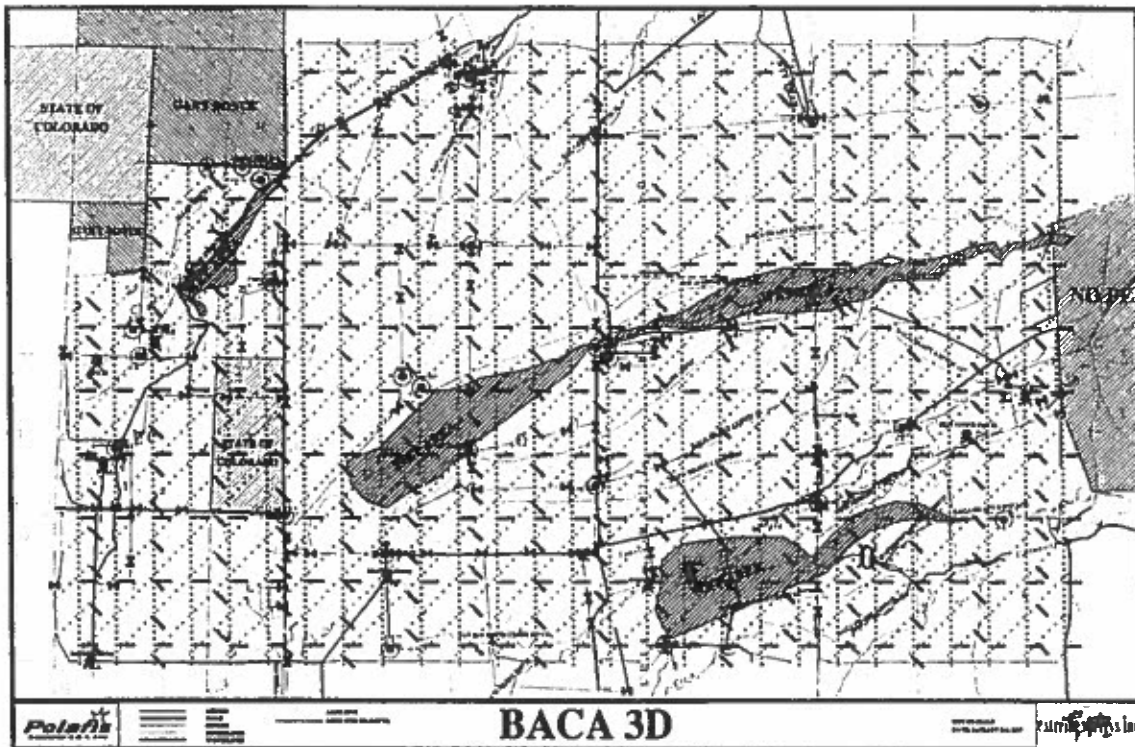
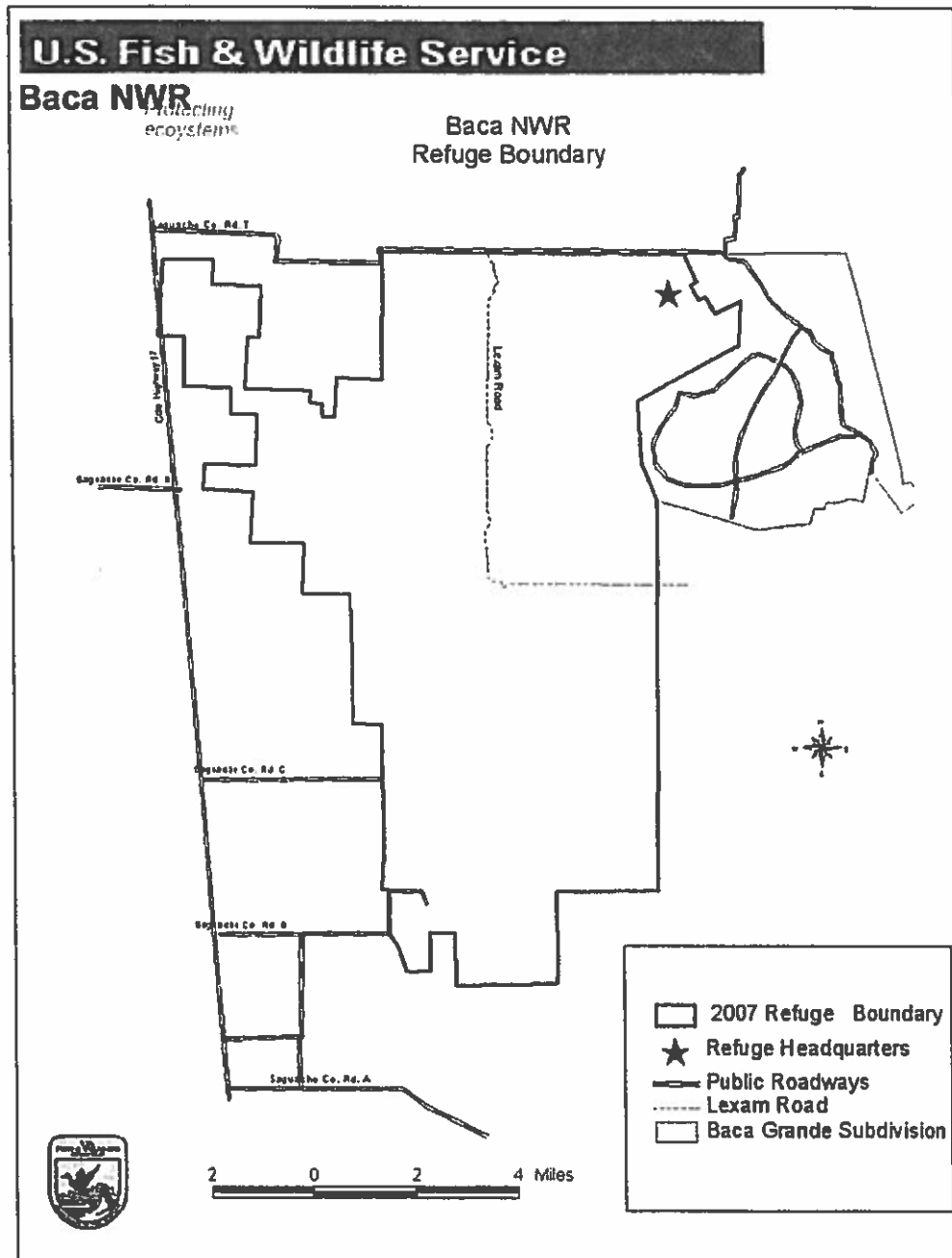


Figure 1  
Map of Baca NWR



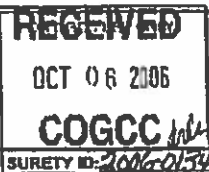
## Attachment B

Permit issued by the Colorado Oil & Gas Conservation Commission to Conduct 3D Seismic Survey on the Baca National Wildlife Refuge

FORM  
20  
Rev 2/93

State of Colorado  
Oil and Gas Conservation Commission

1120 Lincoln Street, Suite 801, Denver, Colorado 80203 (303)894-7100 Fax: (303)894-2100



## NOTICE OF INTENT TO CONDUCT SEISMIC OPERATIONS

Submit this Notice for each seismic program to be conducted within the State. A bond is required on State and fee lands in the amount of \$25,000 per Rule 706. OGCC Rule 333 is the guideline for all seismic operations. Submit Form 20A (Completion Report for Seismic Operations) to the Commission within 60 days after the completion of the project.

Complete the  
Attachment Checklist

	OGC	OGCC
Program map(s)		<input checked="" type="checkbox"/>
Seismic lines		<input checked="" type="checkbox"/>

## Seismic Program

Project Name and/or Number: \_\_\_\_\_

Acquisition Method: ☐ 2-D ☒ 3-D

Energy Source: ☐ Shot-hole ☒ Vibroseis ☐ Other (Describe): \_\_\_\_\_

Location: Township(s), Range(s) and Meridian(s) TWP 42-43 N RGE 10-11 E

County(ies): \_\_\_\_\_

Approximate Start Date: OCTOBER 15, 2006 Estimated Date of Completion: APRIL 30, 2007

Proposed Number of Line Miles: 260.80 Number of Holes/Wells: N/A

## Shot Hole Information

Size of Hole (inches): \_\_\_\_\_ Approximate Depth of Holes (feet): \_\_\_\_\_

Approximate Size of Charge (pounds): \_\_\_\_\_

Identifying Marks on Non-Metallic Plug: \_\_\_\_\_

Line Numbers: \_\_\_\_\_

Description of Hole Plugging Procedure: (If different than Rule 333, must obtain prior Director approval)

## Bonding Information

Bonded Party: LEXAM EXPLORATIONS (U.S.A.) INC. Bonding Company: \$25,000 TIME DEPOSIT WELLS FARGO BANK

## Seismic Contractor Information

Seismic Contractor & Crew Number: POLARIS EXPLORER USA INC CREW 503

Permanent Address & Phone Number: 10390 BRADFORD ROAD, SUITE 215, LITTLETON, CO 80127 303 834-8780

Name of Local Contact & Phone Number (when available): MYLES CORROY CELL: 484 500-3928

## Client Information

Client Company: LEXAM EXPLORATIONS (U.S.A.) INC. C/O: V. W. MCKNAB II

Permanent Address: 2375 GARLAND STREET, LAKEWOOD, CO 80127

Contact Name: BILL MCKNAB or JIM DONALDSON Phone: MCKNAB 303-162-1124 JIM 303-830-8895

## Plugging Company Information

Name of Hole Plugging Company: \_\_\_\_\_

Address: \_\_\_\_\_

Contact Name: \_\_\_\_\_ Phone: \_\_\_\_\_

I hereby certify that the statements made in this form are, to the best of my knowledge, true, correct, and complete.

Print Name: JAMES N. DONALDSON

Signed: *James N. Donaldson*

Title: GENERAL MANAGER

Date: OCTOBER 5, 2006

OGCC Approved: *Thomas J. Kern*

Title: *Data Systems Mgr.*

Date: 1/3/07

CONDITIONS OF APPROVAL, IF ANY:

## **Attachment C**

### **Summary Description of Seismic Activities**

#### **Polaris Explorer USA Recording Crew Operation Plan**

##### **Baca 3D Baca National Wildlife Refuge**

Crew Size: 29 Crew members, 3 Crew members are Administration will not be on site all the time.

1 Recording Crew Manager

1 Office Administrator

##### **Field Crew**

1 Senior Observer

1 Observer

1 Coordinator

1 Truck Mechanic

2 Crew leaders

8 Helpers

4 Trouble Shooters

2 Truck Drivers

##### **Vibrator Crew**

1 Vibrator Technician

1 Vibe Shepard

5 Vibe Operators

##### **Vehicles**

3 Pick Up Trucks

2 Mechanic's Trucks

4 1-ton Line Trucks with Equipment Racks

2 Personnel Carriers

6 ATV (Quads)

1 Battery Charging Trailer, Coordinator Shack

1 1-Ton Recorder

5 44,000 Lb'd Vibrator

1 Fuel Truck

##### **Recording Equipment**

1 ARAM Areis System  
297 Ram Boxes (Every 8 Receiver Station)  
594 Ram Batteries (One per Ram Boxes, attached with Short cable)  
594 Receiver line Interconnect cables (one every 880 feet, two between Ram Boxes)  
34 Line taps  
68 Line tap Cables

### **Mobilization of Equipment**

Prior to the first day of work on the Refuge, recording equipment, Battery Charging Trailer, Mechanic's trailer will arrive at designated staging area on the Refuge. This normally takes place the evening before actual field work is to begin.

Depending on availability of Semi-Trucks with the proper 40 foot drop decks, Vibrators will arrive in advance of Recording Crew normally two days prior. There will be five trucks and trailers that will drop Vibrators, than depart area; trailer will not stay on site. To unload vibrators is normally a 30 minute operation. Polaris Explorer will have a person on site to coordinate these activities with Elk Refuge.

### **Daily Operations**

Crew Location: Alamosa, Colorado  
Daily Safety Meeting 6:00 AM (Start up time will be determine by RCM)  
Attendances Full Crew  
Discussion will include but not limited to:  
Do's and Don't on Wildlife Refuge  
Cultural Resource Guidelines and stipulations  
HSE Concerns  
Daily game plan  
Meetings are normally 30 minutes or less

Crew will depart to Refuge Area, before entering on site; the Refuge Manager will be contacted and informed of daily operation plan (RCM or SOB)

### **Beginning Operations:**

Lay out crews will begin on Furthest East lines R-106, R-112, R-118 working north to south. Receiver line spacing is 1320 feet between each north-south line; receivers are 220 feet apart. Each north-south receiver line has 99 receiver stations on it.

During normal Operations:

Vibe Shepard will scout and determine best route to flagged Source Point, each Source point is 220 feet apart. Source line direction is NE-SW. Each source line is 1320 feet apart.

When arriving at Source Point: 4 Vibrator Trucks will be centered on the Source point. They'll alert Recorder that they are ready for recording. At this time there "Vibrator Pad will be set on ground" Recorder will send start code, pad will vibrate ground for 12 seconds, Recorder will record vibrations for 6 seconds, this is called "Sweep One". Recorder will acquire 6 of these sweeps at one source point. Than all four Vibrators will travel to next Source point following the Vibe Shepard's directions.

Vibrator Parameters:

6 Sweeps at 12 Seconds with 6 second listen time. Each Source point is anticipated to take "3 minutes and 13 Seconds per point."

### ***Normal Daily Production***

As we start production, we add one line on the west side "this is called rolling onto spread. We need 8 Receiver line in front of vibrator to continue recording. Once we are in full production, we'll be recording 16 receiver lines; with the vibrator located in-between Receiver lines 8 and 9.

They'll be one lay out crew (1 Truck, 1 crew boss & 4 Helpers) in front of active spread. Than one pick up crew (1 Truck, 1 Crew Boss & 4 Helpers) behind active spread. Pick up crews duties are to pick up line equipment and also pick up any trash or flagging. Once truck is filled with picked up equipment the truck will drive ahead of active spread and relay equipment.

Hours of Operation: 6:00 AM to 7:00 PM, this is very dependant on production, weather and day light hours.

Anticipated production: Source Point per day 136 Source points per day; this equals 7 hours of actual pad time on ground.

Receiver lay out per day 141 geophone groups laid out per day.

Receiver Pick up per day 141 geophone group per day.  
It is estimated to be 30 day job including delays for adverse weather conditions.

This is a generic operation plan. When crew arrives in field and reviews maps they could change operational plan, what end of program to start with. The Recording Crew Manager and Senior Observer will assess the physical area, maps and concerns of Refuge Manager. At that point they'll make a determination of Ops plan. At that point they'll inform Refuge Manager with daily operation plan. During any point of the project the Refuge Manager can visit Recorder for updates and to check progress. Prior to crew arrival, The Refuge Manager will be supplied a contact list and Vehicle Identification list.

#### Lexam Seismic QC Personnel

In addition to the Polaris personnel on site, Lexam will have one or two representatives on site for the duration of the survey to monitor the operation and ensure data quality. The Refuge Manager will be supplied a list of these personnel and a Vehicle Identification list.



DAVIS  
ENGINEERING  
SERVICE, INC.

RECEIVED  
MAR - 3  
SLV NWR COMPLEX

March 2, 2008

U.S. Fish and Wildlife Service  
ATTN: Michael Blenden  
9383 El Rancho Lane  
Alamosa, Colorado 81101

Re: Environmental Assessment of Proposed Gas and Oil Exploration  
Baca National Wildlife Refuge, Saguache County, Colorado (January 2008)

Dear Mr. Blenden:

This letter contains comments regarding the referenced Environmental Assessment (EA). I am a registered professional engineer in the State of Colorado and have specialized in the surface and groundwater hydrology of the San Luis Valley including the area encompassed by the Baca National Wildlife Refuge. I have provided consulting engineering services to the Rio Grande Water Conservation District (RGWCD) since the late 1970's.

These comments are focused on the protection of the groundwater aquifer system during the exploration well drilling process. My review of the referenced EA has verified that all wells drilled shall have RGWCD's recommended well surface casing depth to 3,000 feet below land surface. Casing to this depth is very important to prevent contamination as a result of drilling operations. It is also reasonable when considering the structure of the Valley's valuable groundwater aquifer system.

Based on existence of numerous high yielding water wells drilled to depths less than 2,500 feet and located in the vicinity of the proposed wells, it is evident the active portion of the aquifer is above 3,000 feet. The transmissivity of the aquifer decreases with depth with the highest yielding wells drawing their supply at depths commonly in the range of 500 feet to 2,000 feet below the surface. Transmissivity is a measure of the potential rate of flow from an aquifer. Only a few water wells extend to depths below 3,000 feet and studies of several of these wells indicate very low yield from the greater depths. The usability of water in the aquifers also declines with greater depths due to increased concentrations of dissolved minerals measured as total dissolved solids (TDS).

Water bearing formations at depths above  $\pm 2,700$  feet below land surface were described as the "upper confined aquifer" in an extensive study by HRS Water Consultants, Inc. entitled *San Luis Valley Confined Aquifer Study*, dated August 1987. Information from most of the deep oil, gas and geothermal test wells in the San Luis Valley was collected and reviewed during the study. In summary, this study estimated aquifer transmissivity of 1,500 to 1,500,000 gpd/ft. and TDS concentrations of 60 to 2440 mg/l. within the upper confined aquifer. Water with TDS concentrations above 1,000 mg/l is difficult to use for agricultural purposes.

Page 2

ATTN: Michael Blenden

March 2, 2008

Water bearing formations at depths from  $\pm 2,700$  feet to  $\pm 5,000$  feet below the surface were described in the referenced study as the "deep confined aquifer". Within the deep confined aquifer, estimates of transmissivity were 10,000 to 50,000 gpd/ft and TDS concentrations were greater than 3,000 mg/l.

Based upon the very low transmissivities and poor water quality observed at depths greater than 3,000 feet below ground surface it does appear that a surface casing regime to that depth will protect the active aquifers in the San Luis Valley.

Thank you for giving us an opportunity to comment on the Environment Assessment. If you have questions regarding our comments, please contact me.

Sincerely,  
Davis Engineering Service, Inc.



John Allen Davey, P.E.

xc: Steve Vandiver, Manager RGWCD

**AGREEMENT BETWEEN SAGUACHE COUNTY AND LEXAM  
EXPLORATIONS (U.S.A.) INC. RELATING TO DRILLING AND  
EXPLORATION ACTIVITIES IN SAGUACHE COUNTY, COLORADO**

This Agreement is entered into this 17 day of April, 2007, by and between the County of Saguache, Colorado, a governmental entity ("County"), and Lexam Explorations (U.S.A.) Inc. ("Lexam").

WHEREAS, the County has the legal authority to adopt regulations establishing weight limitations and usage restrictions for roads which belong to the County; and

WHEREAS, the County had adopted a series of Resolutions in 1990 establishing weight limitations on County roads and certain usage restrictions. These Resolutions also established a permitting system and an excessive weight impact fee. The County and Lexam had entered into an agreement relating to those impact fees and certain activities then being conducted by Lexam in Saguache County; and

WHEREAS, those Resolutions, permit requirements and weight limitations have remained in effect since 1990; and

WHEREAS, Lexam is conducting certain activities with the County which have and will result in certain services being provided by the County which are not normally supplied to private entities and certain of Lexam activities will place an undue burden on the County roads; and

WHEREAS, the County adopted Resolution No. 2007 G- 2 to update the weight limitations for the County road system and update the impact fees for use of the system to reflect current costs associated with undue impact by special activities and usage. The Resolution also provides that the County and entities whose activities will have an undue impact on the County roads may enter into an Agreement to address that impact; and

WHEREAS, the County and Lexam desire to enter into an Agreement to address the impact that Lexam's activities will and may have on the County roads and services, as well as other matters affecting the County created by Lexam's activities.

EXHIBIT

tabbies

12

**THEREFORE, in consideration for the mutual promises and covenants contained herein, and for such other good consideration, the sufficiency of which is hereby acknowledged, the parties agree as follows:**

- 1. That the County will provide certain signage, at specified locations, as may be agreed to by Lexam and the County and that Lexam will pay the County Road and Bridge Department the sum of a minimum of \$100.00 for that signage.**
- 2. That Lexam, to comply with the County road weight limitations, will weigh each truck that it owns, contracts for, or controls and uses for its activities within the County, and that will use any road in the County road system.**
- 3. Lexam or its contractors will provide a copy of the weight ticket for each vehicle used or participating in its activities within the County, for each trip that the subject vehicle makes on the County road system, to the County's Road and Bridge Department.**
- 4. Lexam agrees to pay to the County the sum of \$4.29 for each ton of weight that the vehicles subject to this Agreement exceed the County road weight limit of 54,000 pounds.**
- 5. That Lexam agrees to purchase a County Road Access Permit for accessing Saguache County Roads, from the Saguache County Road & Bridge Department, at the same cost charged by the County to other, similar users of County roads.**
- 6. Said sum will be paid to the County on a monthly basis.**
- 7. In order to minimize the cost and effort involved in disposing of cuttings from the drill sites and to minimize the impact that the drilling activities may have on Saguache County, Lexam further agrees that it will voluntarily test the "cuttings" which arise from the drilling of any exploration well or other exploration activities within the County of Saguache. Such testing shall be limited to those cuttings that visually exhibit substances other than dirt and rocks and for which Lexam proposes to permanently dispose in the County. These tests will be in addition to, or concurrent with, any other testing which may be required by Federal or State authority. The purpose of this testing is to determine if the cuttings can be safely used as wellsite cover and/or road base materials, as well as to assist in determining if any special precautions are required for the permanent disposal of the cuttings. The testing will include:**
  - Total petroleum hydrocarbons (TPH),**
  - Sodium Adsorption Ratio (SAR),**
  - Heavy metal concentrations,**
  - pH level, and**
  - Conductivity.**

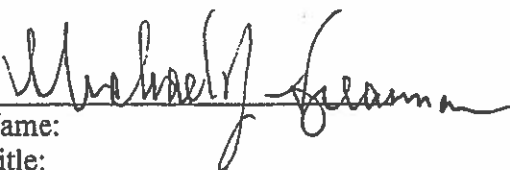
Lexam agrees that it will provide a report of the above tests and all other tests performed on the cuttings and fluids produced results from the drilling operation, as required by Federal or State agencies, to the County Land Use Department. Said testing will conform to the generally acceptable testing standards for the industry.

8. The County will discuss, following the receipt of the above tests, the possibility of potential uses for the cuttings from the drilling activities with Lexam.

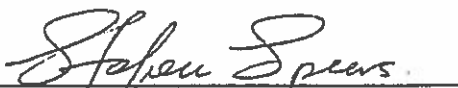
9. The parties may modify the terms of this Agreement in a writing signed by authorized agents of both parties.

The undersigned, by executing this Agreement, hereby affirm that they have the authority to enter into this Agreement and to be bound by the terms contained herein.

SAGUACHE COUNTY:

  
Name:  
Title:

LEXAM EXPLORATIONS  
(U.S.A.) INC.:

  
Name: Stefan M. Spears.  
Title: VP Strategic Dev.