Environmental Assessment for Sapphire Energy, Inc.'s Integrated Algal Biorefinery (IABR) Facility In Columbus, New Mexico

Prepared by USDA RD PSS

September 21, 2009

Sapphire Energy

USDA Biorefinery Assistance Loan Guarantee

Section 9003

Table of Contents

List of Figures

List of Exhibits (Oversized)

Exhibit 1: IABR Location Map (Topographic Base)

Exhibit 2: IABR Location Map (Aerial Photographic Base)

Exhibit 3: Generalized Facilities Layout; IABR

Exhibit 4: FEMA FIRM Map, Proposed IABR Facility

Attachments

- Attachment F-1 – Form RD 1940-20 and Correspondence with Regulatory Agencies
- Attachment F-2 – Soils Report, including SCS CPA 026 Forms
    - Soil Sampling Field Forms
    - Soil Sampling Photographs
    - Laboratory Report
    - NRCS Custom Soil Resource Reports
    - USDA Highly Erodible Land Determinations
    - Permeability Testing Data
- Attachment F-3 – Groundwater Data (USGS hydrographs and Analytical Results)
    - GW laboratory Data for onsite Wells
    - Hydrographs for onsite Wells
    - Well Map Western Parcel (adjacent site)_
    - Well Map Eastern Parcel (subject site)
    - Transmissivity Graphs for onsite wells
- Attachment F-4 – T&E Species and Wetlands Report
    - Final Biological Field Survey Report
    - Rare Plant Species List
    - Threatened and Endangered Species - Table 1 Mimbres Basin
    - March 5, 2009 Photograph Log
    - Site Map
    - USACE Jurisdictional Determination Request Submission
- Attachment F-5 – Cultural Resource Survey Report
- Attachment F-6 –Attachment F-8 – Public Notice
    - Preliminary Notice for EA Published for 3 days ending August 21, 2009
    - Public Notice for Wastewater Discharge Permit
    - FONSI Notice for EA Published for 3 days ending September 28,2009
    - Signed FONSI

F. Environmental Assessment

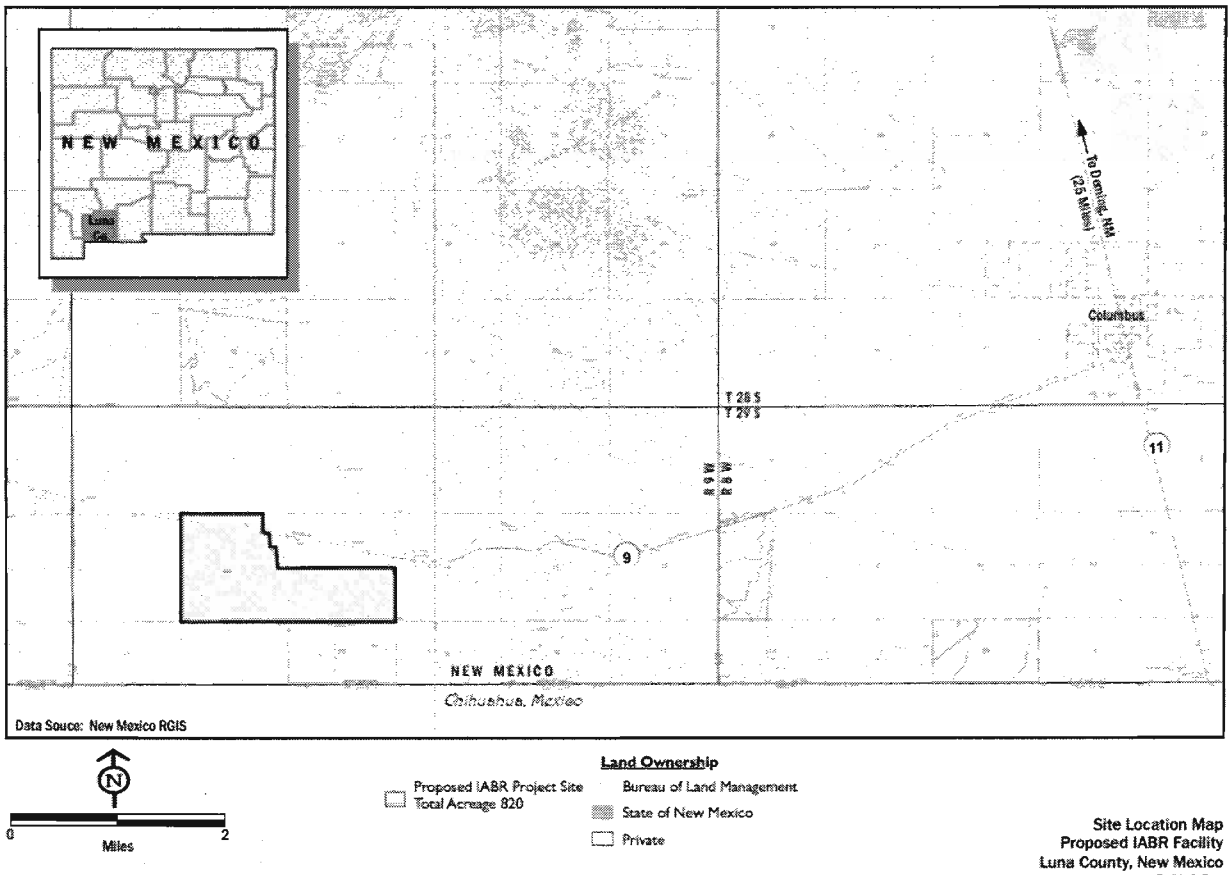
This section of the loan application describes the proposed Integrated Algal Biorefinery (IABR) project, the existing environment, and potential impacts to the environment related to the construction of the facility. In accordance with USDA guidance, this environmental evaluation was prepared pursuant to 7 CFR, Part 1940, Subpart G, Exhibit H.

F.1. Project Description and Need

F.1.1. General Project Description and Purpose

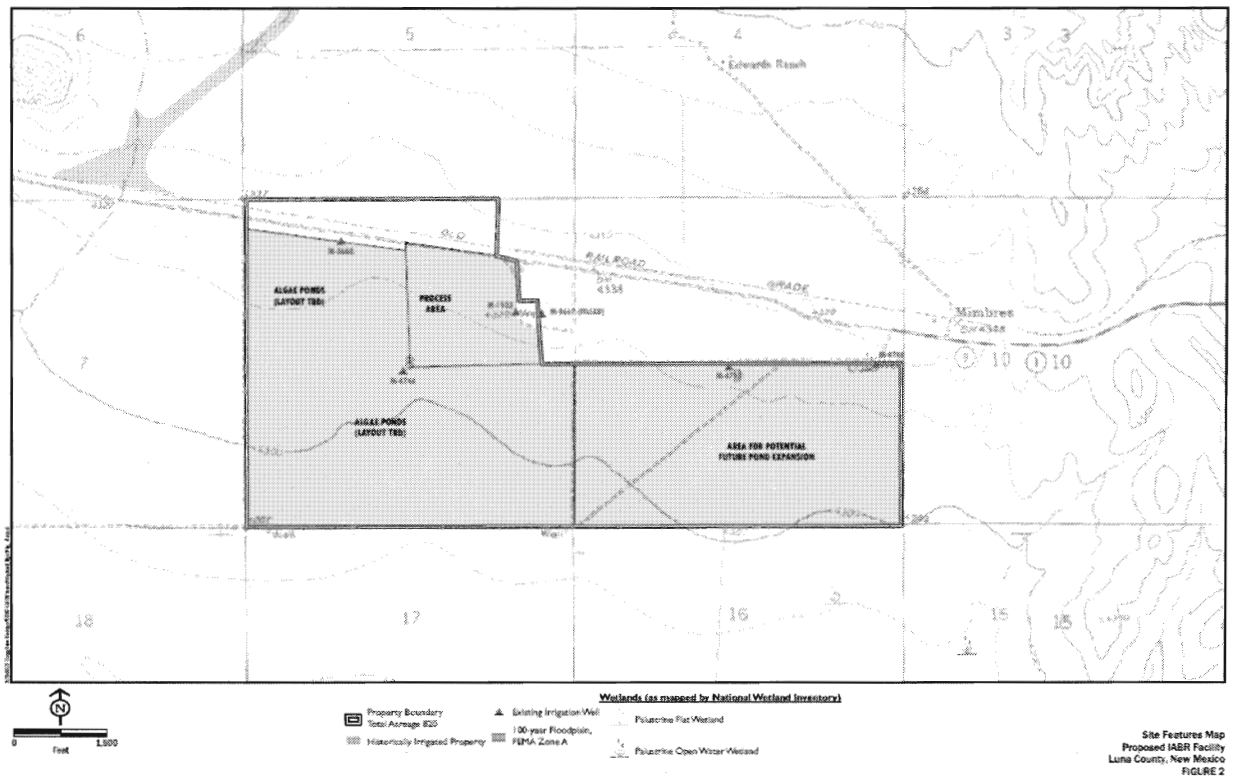
The applicant, Sapphire Energy Company (Sapphire), proposes to construct and operate an Integrated Algal Bio-Refinery Facility (IABR) to produce oil from algae, ultimately refining the oil into various types of transportation fuel. Sapphire is proposing to construct the IABR southwest of the community of Columbus in Luna County, New Mexico (Figure 1 and 2 and Exhibits 1 and 2, Oversized).

Figure 1: Map of IABR Project Site and Surrounding Area



Site Location Map
Proposed IABR Facility
Luna County, New Mexico
FIGURE 1

Figure 2: Detailed Map of Western Parcel for IABR Project



The algae to be used in the proposed project, which are various strains of microalgae, do not meet the definition of "genetically modified organisms." The applicant's IABR algae strain development program does not use any recombinant DNA and is therefore not classified as genetic engineering according to the 1986 Coordinated Framework for Regulation of Biotechnology. The applicant's algae strains are not listed as a plant pest and are therefore not subject to regulations on their importation, interstate movement, and field release as administered by USDA's Animal and Plant Health Inspection Service (APHIS).

The IABR will propagate and harvest algal biomass, extract oil from the algae and convert it into liquid fuels. The purpose of the project is to construct and operate a demonstration-scale facility in the United States (US) that produces jet and diesel fuel, derived from renewable algae sources, effectively reducing our country's dependence on foreign oil and fossil fuels. The IABR facility will be capable of producing 100 barrels (bbl) of refined algal oil per day.

Current plans provide for operating the IABR for a three year test period. Should additional time be required to obtain the necessary data to support project decisions, the facility may be operated an additional 2 years.

A generalized layout of key components associated with the proposed IABR facility, including approximately 300 acres of ponds, is illustrated in Figure 2 and Exhibit 3 (oversized). Existing wells on the property will be used to supply the water necessary to fill and maintain the ponds. General specifications for the IABR facility are provided in **Figure 3.**

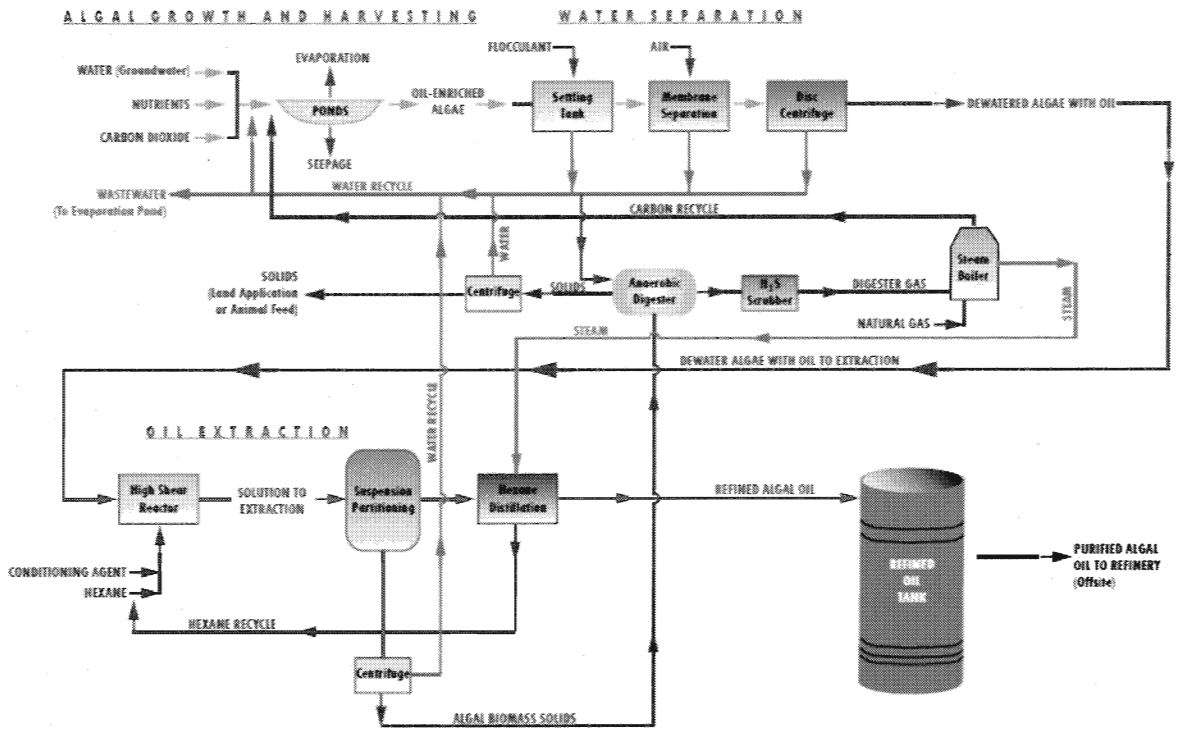
Figure 3: General Design Parameters for Sapphire Energy's IABR Algae Processing Facility

Parameter	Quantity
Algae Pond Acreage	300
CO_2 Used (metric tones/day)	56
CO_2 Utilization	60%
Extractable Liquid Fraction	50%
Refined Oil (bbl/day)	100

F.1.2. Process Description

Figure 4 is a flow chart of the general process to be used to produce refined fuel from algae at the IABR facility. The oil generation process generally involves four distinct sub-processes: algae growth and harvesting; water separation; oil extraction; and oil refining. At IABR's demonstration-scale facility, algae will be grown, harvested, separated from the water, and extracted. The extracted oil will then be sent off-site to be refined at the Dynamic Fuels, LLC facility located in Geismar, Louisiana, which will operate under contract to Sapphire. The entire process will be engineered to recapture and reuse solid and aqueous waste streams to the greatest extent possible. Additional details of each sub-process are discussed in more detail below.

Figure 4: IABR Process Flow Chart



F.1.2.1. Algal Growth and Harvesting

Algae will be grown in shallow ponds at the IABR to maximize exposure to sunlight. Nutrients and carbon dioxide (CO_2) will be continually fed to the influent water stream to the ponds. The CO_2 and nutrient-enriched water will be circulated from one end of the ponds to the other to enhance algal growth and keep the algae near the water surface to improve harvesting. Algae-containing water will be constantly removed at the distal end of the pond for harvesting, water separation and oil extraction. CO_2 used in the process will be purchased from off-site sources and hauled by truck to the demonstration facility and stored on-site. Approximately 56 metric tons/day of carbon dioxide will be added to the ponds. Approximately 60 percent of the CO_2 added to the water will be consumed by the algae, the remainder emitted to the atmosphere **(Figure 3).**

F.1.2.2. Algae/Water Separation

To produce a fuel, algae from the ponds will be dewatered by settling, membrane separation, and centrifuge separation. A flocculent is added to the settling tank to improve the settling process. The membrane system concentrates the algae. The centrifuge decreases the algal water content and separates the algae from the water. Water captured during settling, membrane, and centrifuge separation will be recycled back to the influent to the ponds (Figure 4), directly reducing the amount of make-up water required from the aquifer at the site. Periodically, a small portion of this recycled water will be directed to a lined evaporation pond to remove excess salt and metals in the water stream. The frequency of diversion and the volume of water diverted to the evaporation pond will be dependent on chemical analysis of samples collected during operation of the IABR; the goal is to not discharge any water to the evaporation pond.

F.1.2.3. Oil Extraction

Algal oil will be extracted using a wet extraction process that utilizes hexane. Unused hexane will be recovered during the oil extraction process. Any remaining biomass from the oil extraction process will be recycled in the on-site anaerobic digester, where it will be converted to a biogas and reused to generate steam for the hexane distillation process. Algal oil extracted from the biomass will be stored and transported daily off-site for the final refining at the Dynamic Fuels, LLC facility in Geismar, Louisiana.

F.1.2.4. Ancillary Components

Beyond the process components described above, several other ancillary components will be necessary to support the IABR facility, including:

- Steam boiler. Steam is needed for the SRS extraction process. Exhaust from the steam boiler is routed back to the influent flow to the ponds to capture CO_2 required for algae growth.
- Compressed air system (air compressor, air dryer and receivers)
- Storage tanks and transfer pumps for products and raw materials. Products to be stored include hexane, flocculating and conditioning agents, propane, CO_2, and refined algal oil.

F.1.2.5. Dynamic Fuels, LLC Refining (Off-site)

Algal oil extracted from the biomass at the IABR will be refined at the existing Dynamic Fuels facility in Geismar, Louisiana. Dynamic Fuels is an independent company that operates its Louisiana facility under separate environmental and operating permits. The process used at the Dynamic Fuels facility will produce a green jet fuel in addition to a green diesel with a higher cetane value and lower cloud point than traditional diesel. This component of the proposed project is not part of this environmental assessment because it is considered to have independent utility but is described for completeness purposes.

F.1.3. Site Abandonment and Closure

Once the decision to permanently discontinue IABR test operations is made, decommissioning activities will commence. Buildings and other permanent structure that can be re-used for general industrial purposes will be left in place once cleaned. All process equipment will be removed and salvaged. The pond system will be closed in-place with permanent infrastructure removed. Piping for carbon dioxide delivery and electrical infrastructure for pond mixing will be removed. Any additional work on the land will be done to return it to a condition similar to the situation before development.

The IABR refinery process will have all working materials removed and equipment cleaned. Removable process equipment will be removed and sold to the secondary equipment market. Permanent structures such as buildings will be left in place once cleaned. The land will be returned to its previous condition. It is expected that the cost of decommissioning will be covered by the salvage value of the equipment by an experienced decommissioning contractor. As salvageable equipment is expected to be worth nearly $10 million, sufficient value is expected to be available to cover the cost of decommissioning.

F.2. Primary Beneficiaries and Related Activities

Several parties will benefit from the IABR project. In the short-term (project due diligence through construction), the beneficiaries will include local drilling companies, local and regional environmental and engineering firms, local construction and excavation companies, local contractors (welders, steel fabricators), equipment rental companies, supply companies, local restaurants and fuel stations, and the owner of the property that was purchased by the applicant. At an expected development cost of approximately $80 million, the IABR project will provide a considerable economic boost to these companies and individuals in the short term.

In the longer-term, the primary beneficiaries of development of the IABR will include Luna County and the State of New Mexico through increased tax revenues, a fertilizer manufacturer, a CO_2 supplier, a local security company, local and/or regional trucking companies, and Dynamic Fuels, LLC, who will be retained to refine the algal oil. Based on an estimated 10-11 truck trips per day (2 trucks of CO_2, six trucks transporting anaerobic digester solids to area farmers, and one truck transporting oil to the Dynamic Fuels refinery), expansion of the capabilities of an existing trucking company or creation of an additional company is anticipated. The IABR facilities will utilize approximately 2 to 3 tons per day of fertilizer and 56 tons per day of CO_2. The applicant will also hire a local security company to provide full-time protection of the facility due to its proximity to the US/Mexico border.

Other beneficiaries of the proposed project will include realtors, residential home builders, and other service sector businesses that will support the infusion of 30 additional scientists, engineers, and laborers retained to operate the IABR and connected facilities. The economic boost from the facility is expected to have a greater impact on Columbus, New Mexico as compared to that of the larger communities in New Mexico. Increasing the workforce by 30 in a community of 1,600 (Columbus) will have a substantial ripple effect to the economic and social fabric of the community (see further discussion under Human Population).

After approximately 3 years of operation of the IABR, results of the pilot tests will be evaluated by the applicant to assess the feasibility of the process and the financial viability of the project. At that point, a decision will be made on developing a commercial-scale facility. In concept, the commercial-scale facility would include development of a pond system that would cover approximately 25,500 acres, resulting in oil production of approximately 10,000 barrels per day. The economic stimulus anticipated by this development would provide approximately 2,000 jobs and more than $1 billion in start up investment in the local and regional economy.

The location of such a commercial-scale facility is currently unknown but, should the development proceed, the location will be determined following evaluation of the feasibility of the process implemented at the IABR. Some of the more important criteria to be evaluated in siting of a commercial-scale facility include climate, latitude, water and CO_2 availability, topography, land use, land ownership, socioeconomic and cultural conditions, availability of appropriate labor force, and environmental and cultural sensitivities. Further discussion of the commercial-scale facility as a reasonably foreseeable action is included in Section F.6.2, Cumulative Impacts.

F.3. Description of Project Area

F.3.1. General Description

The IABR facility will be constructed on land optioned for purchase by the applicant in Luna County approximately two miles southwest of Columbus, New Mexico (Sections 8 and 9 Township 29 South Range 8 and 9 West) (Figure 2 and Exhibit 3). The applicant owns approximately 2,200 acres in this area of southern New Mexico within two parcels, separated by approximately 3 miles of public land administered by the USDI Bureau of Land Management (BLM)(Figure 5). The proposed IABR facility will be located on the western parcel of the property, approximately one-half mile north of the US/Mexico border. The project site is bordered by the State of New Mexico Highway 9 and private land to the north, private land to the west, private and State land to the south, and two private residents (May and Cook properties) and public land (BLM) to the east (Figure 1, Figure 2, and Exhibits 1, 2, and 3). Some of the private land, particularly to the west, is irrigated, while the majority of the adjacent land is non-irrigated desert.

The IABR facility ponds and process equipment will be constructed on approximately 400 acres of land as illustrated in Figure 2 and Exhibit 3. Ponds will be constructed on about 300 acres to grow algae and another 100 acres will be used to house the process equipment required to dry algae and purify algal oil and an evaporation pond. Process equipment will be installed at the IABR facility, including an anaerobic

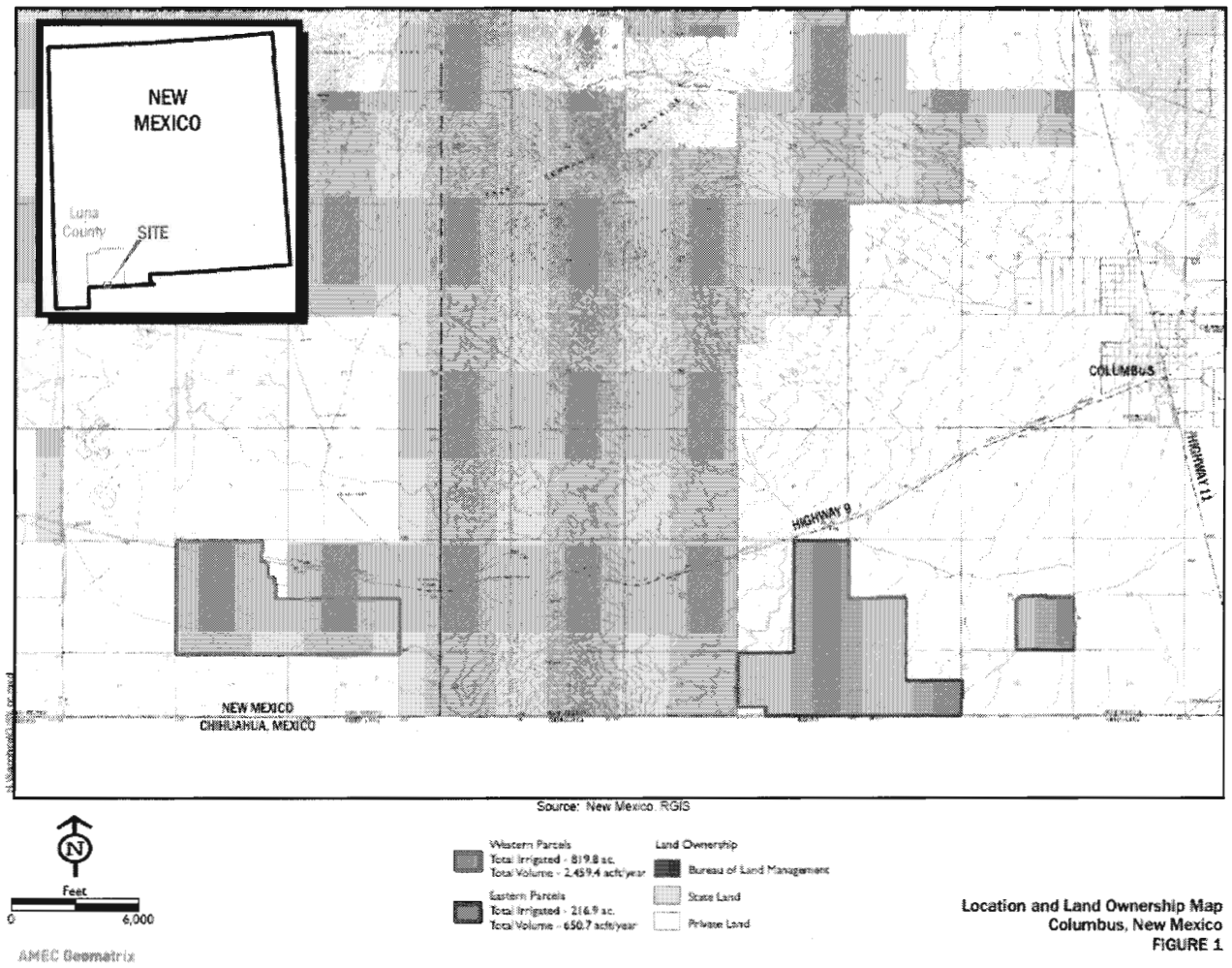
digester, membrane filter system, disc centrifuge, boiler, hexane distiller, several process and holding tanks (recycle water, algae oil and refined oil),and CO_2 storage tanks, and miscellaneous conveyors and pumps.

The IABR facility fronts State of New Mexico Highway 9 to allow for efficient access to the broader commerce area (Figure 2). Existing gravel roads on the property will be used to lessen land disturbance during project development. The property is bordered on the west by a County road that separates Sections 7 and 8. This road ends at the southwest corner of the property. Another gravel road runs east along the southern margin of Section 8 to the center of Section 9. A poorly-maintained gravel road accesses the northeast corner of the property in Section 9 then turns and trends west along the property boundary. These roads will be upgraded, as necessary, to promote efficient construction and operation of the of the IABR facility.

F.3.2. Unique and Sensitive Areas

The proposed IABR facility in Luna County is located within the Basin and Range physiographic province, which is characterized by low parallel mountain ranges separated by flat desert plains. The terrain is relatively flat, with drainage flowing to the southeast. Field evaluations were performed to assess onsite soil resources, the potential for wetland and waterway resources, and a Level 1 cultural and archaeological survey was also completed on the property in March 2009. Wetland and waterway surveys were conducted in March and June 2009. Results of these surveys are provided in Attachment F-4. In summary, no floodplains, wetlands or other waters of the United States, or unique sensitive areas were identified in the proposed project area.

Figure 5: Cooper Property Map



F.4. Environmental Impact

F.4.1. Air Quality

The potential area of impact to air resources as a result of the IABR project includes areas within the dispersion zone for the project site.

F.4.1.1. Existing Air Quality of Project Area

Figure summarizes the air quality status of Luna County, New Mexico, as published in the Code of Federal Regulations (40 CFR §81.332 – New Mexico Southern Border Intrastate Air Quality Control Region). A review of the PM_{10} data from the Deming, New Mexico Airport for the calendar year 2007 showed an average 24-hour PM_{10} concentration of 27.1 $\mu g/m^3$, based on the raw hourly data. The existing 24-hour PM_{10} regulatory standard is 150 $\mu g/m^3$.

A Class 1 air quality airshed is defined as an area in which visibility is protected more stringently than under the national ambient air quality standards. Class I areas include national parks (greater than 6,000 acres), wilderness areas (greater than 5,000 acres), monuments, international areas (trans-boundary

sites) and other areas of special national and cultural significance. The Class I designation provides the most protection to pristine areas.

No Class 1 air quality airsheds are located within 100 miles of the project site. The three closest Class 1 airsheds are the Chiricahua Wilderness (approximately 100 miles from the site), the Chiricahua National Monument (102 miles from the site), and Gila Wilderness (111 miles from the site).

Figure 6: Air Quality Status - Luna County, New Mexico

Pollutant	USEPA Designation
SO_2	Cannot be classified or better than national standards
CO	Unclassifiable/Attainment
Ozone (1 hr standard)	Unclassifiable/Attainment
Ozone (8 hr standard)	Unclassifiable/Attainment
NO_2	Cannot be classified or better than national standards
Particulate Matter less than 10 microns (PM_{10})	Unclassifiable

F.4.1.2. Air Emissions from Facility and Connected Facilities

Air emissions expected from the IABR facility include:

- **Heat and Hydrocarbons** – From the steam boiler.
- **CO_2** – Fugitive emissions from the ponds. It's estimated that approximately 20-40 percent of the CO_2 injected into the ponds will be emitted fugitively to the atmosphere; 60-80 percent will be consumed by algae.
- **Particulate** – Fugitive emissions associated with facility construction and with truck traffic on approach or service roads at the facility during operation. It is estimated there will be five truck trips to/from the facility daily and 60 trips weekly.
- **Hexane** – Some fugitive emissions of hexane are expected to occur; however, the IABR is designed to recover hexane. Less than 50 ppm of hexane will remain in the algal solids after the hexane recovery process. This residual hexane will be emitted fugitively from the algal solids to the atmosphere during conveyance to the IABR oil purification process.

CO_2, the primary green house gas associated with the facility, will be emitted fugitively from the ponds at a rate of approximately 6,720 metric tons annually. This amount represents approximately 0.01138 percent of the carbon dioxide emitted in the State of New Mexico in 2007 (59 million metric tons) and 0.0000112 percent of that emitted in the United States in 2007 (6 billion metric tons) (Energy Information Administration 2009). Currently there is no federal, state, or local regulatory standard for CO_2 emissions. Based on these data, the relative contribution of the IABR facility to the total carbon dioxide load in the State of New Mexico would be minor.

F.4.1.3. Consistency with New Mexico's Air Quality Management Plans

Based upon the existing air quality data and air quality status for Luna County, New Mexico, air impacts associated with the IABR will be within guidelines included in New Mexico's air quality implementation plan and will comply with air quality standards within the region, including those administered by the government of Mexico. An air permit for the IABR facility will be required under New Mexico's Air Quality Control Act (N.M. Stat. Ann. §§ 74-2-1).

Approval of any air permit required to operate the IABR will not encounter undue delays due to attainment issues or Class 1 impact issues since the project site is not located within a non-attainment area. Likewise, the site topography will not affect the dispersal of any air emissions from the IABR facility.

Determination of whether the facility will require a New Source Review air quality permit and/or a Clean Air Act (CAA) Title V permit will be completed when final design plans for the IABR are developed in concert with the State of New Mexico Air Quality Bureau (Bureau). Depending on the level of emissions expected from the IABR, emissions may exceed the Potential to Emit (PTE) thresholds discussed in NMAC § 20.2.72.200 and a New Source Review (NSR) air quality permit may be necessary. The procedure for determining the necessity of a NSR permit requires the applicant to file emissions calculations for review by the Bureau.

A No Permit Required (NPR) determination will follow if the facility's potential emissions rate (PER) is less than 10 pounds per hour (pph) and 10 tons per year (tpy) of any regulated contaminant or 1 tpy of lead. If the facility has a PER of less than 10 pph but greater than 10 tpy of a regulated air contaminant, a Notice of Intent to construct (NOI) is required. If the PER is greater than 10 pph and 25 tpy, an air quality permit will be required. Determination of whether the facility will be a CAA Title V source is completed during the Air Quality Bureau's evaluation of the need for an air NSR permit. On March 9, 2009, the applicant solicited comments from the Air Quality Bureau concerning air permitting issues (Attachment F-1). To date, no written comments have been received from the Bureau.

F.4.2. Water Quality

The potential area of impact associated with water resources for this project includes the proposed IABR facility site and adjacent areas and groundwater resources underlying the site and adjacent areas. The area of potential impact associated with water rights includes adjacent land tracts and wells.

F.4.2.1. IABR Wastewater Effluent

Groundwater at the IABR facility will be used as the source of water to charge and maintain the ponds. The ponds will be continually fed at a rate approximately equal to the amount of water that evaporates (approximately 1,900 ac-ft/year) from the shallow impoundments. Algae harvested from the ponds will contain water; however, this water will be removed from the algae and recycled back to the influent stream to the ponds to limit how much water is pumped from the aquifer (Figure 4). A portion of this recycled water will also serve as influent to the anaerobic digester and be discharged to a lined evaporation pond to remove excess salt and metals. Approximately 97 percent of the water in the cellular make up of the algae removed from the ponds will be recaptured during the water separation

process. The remaining 3 percent will be retained in the membrane filter system of the separation process.

As discussed above, the IABR process generates little wastewater and no wastewater will be discharged to surface water. Wastewater discharges associated the facility include:

- Water leakage from the pond bottoms
- Water leakage from the lined evaporation pond
- Storm water
- Septic waste from an on-site septic system for the office

Pond System

Some water will seep from the ponds and infiltrate to underlying soil. Based on the design elements of the pond bottom which will be comprised of an amended soil layer approximately 2-feet thick, such seepage is not anticipated to break through to underlying soil during the 3-year expected life of the IABR. In the event the pond system associated with the IABR continues to exist beyond the projected 3-year life, the amount of seepage and its effects on groundwater beneath the IABR facility are dependent on the infiltration rate from the pond bottom and the quality of water discharged from the pond. The applicant has collected soil samples at the project site and has conducted a preliminary evaluation of the soil infiltration rates of both natural soils and amended soils. Results of soil testing are provided in Appendix F of Attachment F-2 and indicate natural soils at the site exhibit an average permeability of approximately 1×10^{-6} cm/sec. A 94 percent reduction in permeability of the material was achieved through incorporation of an amendment to the soil and subsequent compaction. This phenomenon is discussed further below.

The applicant met with the New Mexico Environmental Department (NMED) to determine the regulatory needs in accordance with NMAC § 20.6.2.1201 of the intention to permit discharge of water from the proposed ponds to the underlying soil and aquifer. Results of this meeting (included in Attachment F-1) were that the agency will require a detailed technical analysis of the pond bottom design to demonstrate that leakage from the ponds would not increase concentrations of constituents of concern (most prominent of which is total dissolved solids) to levels above state standards in groundwater, in order to issue a NMED discharge permit. These results are to be presented in a groundwater management plan, a document that will include liner design performance information, which is to be approved by NMED prior to issuance of a discharge permit. This plan is currently being prepared and will be submitted to NMED later in 2009. Public notice for this discharge permit is also required under state of New Mexico regulations (NMAC § 20.6.2.3108). Public notice was posted according to the regulations (NMAC § 20.6.2.3108) for the proposed discharge permit from July 13, 2009 to August 13, 2009 (Attachment F-8). There were no comments which resulted from this public notice.

The applicant conducted pilot testing of various methods of soil amendment to line the ponds to prevent impacts to the underlying aquifer as well as reduce the amount of groundwater consumed in the process. The preferred design incorporates the use of a proprietary substance to amend the pond bottom soil to reduce the hydraulic conductivity of the material. Results of the pilot testing conducted by the applicant using soil samples obtained from the site indicate a hydraulic conductivity of 1×10^{-7}

cm/sec can be consistently achieved using this approach (Attachment F-2 – permeability testing). Using a design configuration incorporating an amended 2-foot layer of pond bottom material and an average hydraulic head of 2-feet maintained in each pond, the time required for breakthrough of water from the amended soil liner system is approximately 19 years. Recycling of water from the processing plant is expected to build up a salt crust in the pond bottom that would further reduce the permeability of the pond base and increase the time until breakthrough is realized. Based on a 300-acre pond footprint, the rate of effluent movement from the base of the amended soil liner following breakthrough would be 3,704 cubic feet/day, resulting in an annual volume of effluent emanating from the pond system of 31 acre-feet.

Depth to the regional groundwater system beneath the ponds is approximately 400 feet. The unsaturated zone beneath the proposed ponds and the water table consists of layers of mostly fine-grained material with a few gravel lenses. The estimated vertical hydraulic conductivity of the stratigraphic units above the regional groundwater system is 1×10^{-5} cm/sec. Based on a vertical hydraulic gradient of 0.9, the travel time for water to move through the amended soil liner to the regional groundwater system is 55 years.

Based on sampling conducted on existing irrigation wells at the site and in adjacent areas, the concentration of total dissolved solids (TDS), the primary constituent of concern relative to the proposed project, ranges from 526 to 794 milligrams per liter (mg/L) in the regional aquifer (Attachment F-3). Based on lab-scale testing of the process to be used in the IABR (data not included in this EA) and the expected increased residence time of the water in the ponds as a result of recycling, the TDS concentration in the effluent that would leak from the ponds is estimated to be 1,400 mg/L. In consideration of conversations held with NMED regulators, the upper 15 feet of the regional aquifer can be considered as a mixing zone relative to determining impacts of the addition of effluent and compliance with state water quality standards. Using the volume of effluent that would enter the groundwater system from the pond system of 3,704 cubic feet/day and the calculated flux of groundwater movement in the upper 15 feet of the regional aquifer of 10,485 cubic feet/day as well as the estimated TDS concentrations in the effluent and concentrations measured in receiving groundwater of 1,400 and 700 mg/L, respectively, the net effect on water quality in the groundwater system would be the addition of 180 mg/L to the existing TDS concentration in the aquifer. The resultant water quality condition would achieve compliance with the New Mexico standards, which allows for an increase of TDS up to 1,000 mg/L.

Evaporation Pond

Periodically, a portion of this recycled water from the IABR process would be directed to a lined evaporation pond to remove excess salt and metals in the water stream (Figure 4). The frequency of diversion and the volume of water diverted to the evaporation pond is dependent on chemical analysis of samples collected during operation of the IABR. No wastewater would be discharged to the environment with the exception of the small amount that may leach through the liner to the underlying soil. Over time, it is anticipated that the bottom of the ponds would seal as salt precipitates in the pond. A discharge permit from the NMED would be obtained for the lined evaporation pond, and the applicant will demonstrate to the satisfaction of the NMED that underlying groundwater would not be affected.

Stormwater

A 2-year, 24-hour storm event would result in approximately 1.57 inches of precipitation at the project site. During such a storm event, runoff prior to development of the IABR would be approximately 0.47 inches/acre and following development of the site the runoff would be reduced to approximately 0.38 inches/acre. The difference in stormwater runoff volume would be contained in the pond system at the IABR facility. Stormwater generated from paved parking lots and the approach road will be discharged to swales via sheet flow and will be infiltrated. A National Pollution Discharge Elimination System (NPDES) stormwater permit from USEPA Region VI, which includes a Storm Water Pollution Prevention Plan (SWPPP,) will be required for the project, particularly during IABR construction. Owners of sites where construction activities will disturb more than one acre must develop and implement construction site erosion control and storm water management plans, SWPPP, to obtain a Construction General Permit (CGP) from USEPA Region VI. The CGP can be converted into an operating General Permit. New Mexico reviews and certifies all EPA permits issued in the state per CWA Section 401. In addition, a Spill Prevention, Control, and Countermeasure Plan will also be required for the IABR facility due to storage of oil and other chemicals to prevent releases of hazardous substance at the IABR facility.

Septic Effluent

A septic system will be installed to treat wastewater from bathrooms at the IABR facility. The bathrooms will be designed to accommodate workers at the site. A liquid waste (septic tank) permit (NMAC § 20.7.3) will be obtained from the NMED's District III office in Las Cruces. No local or Luna County permitting requirements for septic system installation have been identified.

F.4.2.2. Water Rights

The applicant has worked directly with the New Mexico Office of the State Engineer (OSE) to evaluate water rights in the Mimbres Basin and to secure water necessary for the project. The project will require water rights of approximately 3,000 ac-ft per year. These rights will be comprised of a combination of existing water rights of the site (approximately 1,658 ac-ft per year of consumptive right) and the long-term leasing of water rights from adjacent properties within the basin (a minimum addition of approximately 1,342 ac-ft per year of consumptive right). Allocation of these water rights is under the jurisdiction of the OSE. The applicant will fulfill requirements of the OSE to secure the necessary water to support the project. Status of the water rights and communication with the OSE are described in this section.

F.4.2.2.1. Legal Considerations

Article XVI of the New Mexico Constitution establishes the basic principles underlying New Mexico water law, including prior appropriation and beneficial use -- until appropriated, all water belongs to the State of New Mexico. Thus, the State has the sole authority to grant or recognize rights to use water. Water rights which "are subject to appropriation for beneficial use, in accordance with the laws of the state" and "priority of appropriation shall give the better right" are two tenets arising out of the Constitution (N.M. Constitution, Article XVI, Section 2).

The concept underlying the *principle of prior appropriation* is that the first person to use water for a beneficial purpose has a prior right to use that water against subsequent appropriators. "First in time, first in right" is the phrase often used to describe prior appropriation. Water rights acquired through this system of prior appropriation are a type of property right and may be sold or leased. In all cases, however, the essential basis of water right ownership is "beneficial use".

The *principle of beneficial use* is that a water right arises out of a use that is productive or beneficial, such as agricultural, municipal, industrial, and domestic uses, among others. "Beneficial use shall be the basis, the measure, and the limit of a water right" (N.M. Constitution, Article XVI, Section 3). This provision has also been incorporated into case law, which is the law developed by New Mexico courts. As recognized in *State ex rel.*

To actively manage groundwater resources in New Mexico, the Office of the State Engineer (OSE) has the authority, as set forth in the Water Code, to delineate groundwater basins that require a permit for groundwater withdrawals, referred to as "declared underground water basins," such as the Mimbres Basin which hosts the Cooper Property in which the IABR site is located. To withdraw water from these declared basins, a user must have put water to beneficial use prior to the declaration of the basin or must obtain a water permit from the OSE that specifies (1) how much water a user can withdraw within any given year, (2) the location and type of well that will be used to withdraw the water, and (3) the use to which the water will be put. Many water right permits have special conditions that further define the use and quantity of water allowed under the permit.

Transfers of valid water rights must not be "contrary to the conservation of water within the state and not detrimental to public welfare of the state" (NMSA 72-5-23, 72-12-3(D)). Further, any transfers may not impair existing rights.

Water rights transactions include transfers to other users, through sales or leases, and changes in point of diversion or in purpose or place of use. These transactions must follow an administrative procedure similar to the one used for appropriating a new water right. An application is filed, and notice is published within a certain time limit within which a protest must be submitted. The standards for reviewing these applications are impairment, public welfare, and conservation.

Other legal considerations specific to the Cooper Property (IABR site) include the following:

- In the Mimbres Basin, points of diversion (POD - in this case wells) can be changed within the same administrative block as the original well but cannot be moved to other administrative blocks.
- Points of diversion (POD - in this case wells) can be changed within the same "administrative block" as the original well. Each block is comprised of four sections of land. The Cooper Property (IABR site) spans several administrative blocks. A POD cannot be moved from one administrative block to another.
- Diversion rights in the Mimbres Basin for the purposes of irrigation are granted at 3 ac-ft/acre; groundwater rights for all other beneficial uses are consumptive rights and are granted 1.6 ac-ft/acre.
- Exempt wells can be installed for domestic (1 ac-ft) and stock (3 ac-ft) purposes.

- Well repair/replacement requires a permit from the OSE but does not require public notification.
- Supplemental well permits are available from the OSE that allow drilling of a well to meet full appropriation.
- According to Mr. Tom Whatley (Water Resource Specialist – Water Resource Allocation Program; Water Rights Unit – Office of the State Engineer), the unconsolidated aquifer in the Mimbres Basin is fully appropriated and new appropriations will not be granted in the basin.
- The adjudication is listed in a nine-volume publication; no water rights summary is available for the Mimbres Basin (DBSA, 2005).

F.4.2.2.2. Water Rights Appurtenant to the Cooper Property (IABR Site)

Water rights appurtenant to the Cooper Property (IABR site) being considered in the transaction are summarized in **Figure 7.** The Cooper Property water rights are contained in seven sub files that constitute separate "farms", five on the western parcels and two on the eastern parcels. Nine wells supply water to the 7 farms. Irrigated acres total 819.8 on the five western farms and 216.9 acres on the eastern farms, resulting in a total of 1,036.7 irrigated acres associated with the property.

The original water right for the farm contained in Sub File 29.9.8C was for 46.6 irrigated acres. When Mr. Robert Cook purchased his property, 4.2 irrigated acres of the original right were appurtenant to his property. As the IABR is considered a non-irrigation consumptive beneficial use, water rights are granted at 1.6 ac-ft/acre per year.

Figure 7. Summary of Cooper Property Water Rights

OSE Subfile Number	Use	Irrigated Area (acres)	Wells Supplying Right	Consumption Volume (ac-ft)
East Parcels				
S.F. 29.8.17	Irrigation	70.0	M-1621	112.0
S.F.29.8.9	Irrigation	146.9	M-1598, M-1598-S	235.0
West Parcels				
S.F. 29.9.9	Irrigation	313.3	M4747, M-4748	501.3
S.F. 29.9.8	Irrigation	150.1	M-3367, M-3668	240.2
S.F. 29.9.8B	Irrigation	159.2	M-1933	254.7
S.F. 29.9.8C	Irrigation	42.2	M-1933, M-3667, M-3668	67.5
S.F. 29.9.8D	Irrigation	155.0	M-4746	248.0
Total		1,036.7		1,658.7

F.4.2.2.3. Cooper Water Rights Issues

Water rights associated with the Cooper Property are for irrigation purposes, allocated at 3 ac-ft/acre. The OSE considers the IABR's proposed use of water as a beneficial use for purposes other than irrigation. Therefore, this project has a "consumptive" right of 1.6 ac-ft/acre according to the OSE. When the applicant purchases the property, the water rights can be used without having to file any changes if the water from each well is used within the boundaries of the farm (sub file) which it supplies. At 1.6 ac-ft/acre, the total volume of consumptive water rights appurtenant to the property would be 1,658.7 ac-feet (Figure 7). This volume of water applied to 300 acres of ponds would equate to 5.5 ac-ft/acre. To meet the 3,000 ac-ft needed for the IABR project, additional water will be obtained from an outside leased source, as described below.

F.4.2.2.4. Additional Water Rights Leases

In addition to the water rights associated with the Cooper Property (IABR site), the applicant is in late-stage negotiations with an adjacent property owner to acquire water rights by leasing additional property. The targeted property is 1,050 acres, located west of Columbus, New Mexico adjacent to the Cooper Property. The "consumptive" water right applies to this property as well, yielding an additional 1.6 ac-ft/acre per year which equates to approximately 1,342 ac-ft per year of consumptive right or use by the IABR facility. These water rights would be used on the Cooper Property for the IABR facility in order to make the total volume of consumptive rights approximately 3,000 ac-ft per year. The OSE has verified that these water rights are transferable to the project.

According to discussions with the OSE, the State of New Mexico will allow the applicant to use leased water rights. The OSE will require the applicant to conform to the overall basin management policies and fulfill all other requirements of the OSE to use the leased water for the project. These items were confirmed via personal communication on August 19, 2009 with John D'Antonio, the State Engineer at OSE.

F.4.2.3. Aquifer Characteristics

F.4.2.3.1. General Aquifer Data

Groundwater occurrence in the Mimbres Basin is limited to near-surface basin-fill sediment. The thickness, character, and extent of the basin-fill sediment within the basin is controlled by the subsurface structural history (Hanson et al., 1994). The basin contains consolidated and unconsolidated alluvium and Bolson deposits that can be as much as 5,000 feet thick depending on local structure and depositional history (Harsharger, 1978). Groundwater predominantly occurs within basin-fill materials consisting of Quaternary-age alluvium and the Tertiary Gila Group (DBSA, 2005). Basin-fill deposits contain sand, gravel, and clay deposits that are stratigraphically and lithologically undefined. Quaternary-age basaltic volcanics are interbedded with basin-fill materials in some locations and can be locally important aquifers near the village of Columbus, New Mexico (Hanson et al., 1994).

Groundwater in the Mimbres Basin occurs in confined, unconfined and semi-confined aquifers, depending on location. In general, groundwater flows from north to south, across the US/Mexico international boundary. Hanson et al., (1994) estimated the pre-development groundwater discharge at

the border to be 6,500 acre-feet/year. Recent groundwater development near Columbus, New Mexico has resulted in a reversal of groundwater flow across the border from south to north (DBSA, 2005).

Hanson et al. (1994) calculated the transmissivity of the Mimbres Basin basin-fill aquifer using aquifer test data, specific capacities of wells, and lithologic logs of wells within the basin. Using these data, the transmissivity of the basin was estimated to range from 54 to 50,000 ft^2/d. The transmissivity computed from well specific capacities had a similar range with values of 10 to 50,000 ft^2/d and a mean of 4,050 ft^2/d. The broad range of transmissivity values indicates variability in transmissivity and hydraulic conductivity with depth (Hanson et al., 1994). The average hydraulic conductivity of the Mimbres Basin aquifer was calculated from the transmissivity estimates. In the area around Deming, the median hydraulic conductivity was found to be 18 feet/day. In areas of the basin, excluding Deming, the median hydraulic conductivity was found to be 6 feet/day (Hanson et al., 1994).

F.4.2.3.2. Site-Specific Aquifer Data

In March 2009, the applicant completed an evaluation of aquifer and well characteristics at the project site and surrounding property (Attachment F-3). These studies determined that depth to groundwater at the site where the IABR will be located is about 400 feet below surface. The combined capacity of the three wells on the IABR property (M-3668, M-4667, M-4668) is greater than 8,000 gallons per minute. Aquifer tests performed on the three wells on the IABR property indicate the transmissivity of the aquifer beneath the project site ranges from 960 ft^2/day to 19,500 ft^2/day. Based on the well testing results and assuming no major drawdown of groundwater levels in the area occurs through external means, the aquifer and the existing wells at the project site are capable of providing the full diversion volume (as allowed by secured and leased water rights – see Section F.4.2.2.2 above) necessary to support the project.

A Phase I Environmental Site Assessment was completed on a 938- acre project area which encompasses the 400-acre IABR site. The search of several environmental data bases showed no evidence of groundwater contamination within the 938-acre project area. Samples were collected from wells on the facility in March 2009 (Attachment F-3). The results indicate that groundwater beneath the facility meets New Mexico Water Quality Standards.

F.4.2.3.3. Potential Impacts to Groundwater Aquifer and Water Right Holders

In an effort to evaluate the degree of potential impact from the proposed IABR project on groundwater quantity in the area, groundwater table elevation trends were evaluated by reviewing U.S. Geological Survey (USGS) data and data collected by AMEC Geomatrix, from wells on the proposed project site and surrounding area (Attachment F-3). The USGS measured depth to groundwater in well M-4748 located on the project site (Figure 2 and Exhibit 3 between 1972 and 2002 and in well M-1598, located about 4 miles east of the project site, between 1955 and 1997 is presented in Attachment F-3. Hydrographs for well M-4748) indicate water levels in the aquifer at the proposed project site declined about 60 feet from the early 1970s to the early 1980s but have since stabilized (Attachment F-3). Depth to water measured by AMEC Geomatrix in well M-4748 in March 2009 was similar to that measured in 2002, indicating that water levels in that area have remained stable since that time (Attachment F-3). The hydrograph for well M-1598 indicates that water levels in the aquifer 4 miles east of the site declined

about 70 feet from the mid 1950s to the late 1990s. The water level measured by AMEC Geomatrix in well M-1598 during March 2009 was similar to that measured by the USGS in 1997, also indicating that water levels in this area have stabilized.

Estimates of the sustainable yield of the portion of the aquifer within and near the proposed IABR site are not available to definitively determine if pumping of groundwater at the site will result in additional long-term groundwater drawdown and/or impacts to other users of the groundwater resource. In New Mexico, this determination is made by the Office of the State Engineer (OSE). A request has been made to the OSE to make this sustainable yield determination in response to the applicant's proposal to transfer water rights to the project site. For the State Engineer to approve the transfer of water rights to the project site, a determination must be made that the transfer will not be "contrary to the conservation of water within the state and not detrimental to public welfare of the state", as required by NMSA 72-5-23, 72-12-3(D), and that such use of groundwater at the site for the IABR will not impair existing water rights. While this determination has not been formally made as of the date of this submittal, the OSE has indicated that there are sufficient water rights within the basin that can be leased and transferred to the project site, indirectly indicating the degree of impact caused by the proposed withdrawal of water to support the IABR is acceptable (Personal Communication on August 19, 2009 with John D'Antonio, the State Engineer, at OSE). In consideration of this, it is not anticipated that impacts to the rights of neighbors to the project site (including adjacent public land and Mexico) to draw groundwater from the local aquifer at the site will result through development of the IABR project.

F.4.2.4. Waters of the US and Floodplain

According to a review of the National Wetland Inventory (NWI) Maps, review of the soil map, previously-completed Highly Erodible Land and Wetland Conservation Forms (SCS CPA 026) completed by NRCS, and a visual survey of the project site completed by AMEC Geomatrix, the proposed IABR site does not appear to contain swales or depressions that will retain water, nor are there areas containing hydric soil and/or hydrophytic vegetation(Attachment F-4 and Figure 2). Surface water drains primarily via overland flow, although two ephemeral washes cross the northern boundary of Section 9. These washes have no defined bed or bank and do not contain parameters that warrant U.S. Army Corps of Engineers (ACOE) jurisdiction. In the extreme southeast corner of Section 9, a drainage empties into a roadside ditch and a bed and bank has formed. However, this does not represent a nexus to a navigable water of the US and therefore is not expected to be considered jurisdictional by the ACOE. The ACOE has been contacted to obtain an official jurisdictional determination from ACOE for the IABR project site (see Attachment F-4). There are no 100-year or 500-year floodplains mapped within the IABR project area according to the FEMA Flood Insurance Rate Maps (Exhibit 4).

F.4.3. Solid Waste Management

With exception of a small volume of solid waste generated from the new on-site office, the IABR facility will generate only one solid waste stream that is disposed of off site – solid wastes from the anaerobic digester. The anaerobic digester will generate solid waste that will be applied as fertilizer at nearby agriculture properties. Preliminary testing confirms the suitability for use as fertilizer. Additionally, no hazardous wastes are anticipated to be generated by the IABR facility.

F.4.4. Land Use

The area of potential impact that could result from implementation of the IABR project on land use includes the project site, adjacent public land tracts administered by BLM and the state of New Mexico, adjacent private property owners, and Mexico.

F.4.4.1. Existing Land Use

In general, property ownership adjacent to the IABR and throughout Luna County consists of privately held land, public land managed by the USDI Bureau of Land Management (BLM) and State of New Mexico trust land (Figure 1). Several state trust properties adjacent to the project are held in agricultural leases.

In 2007, Luna County reported having 206 farms consisting of 653,558 combined acres with an average farm size of 3,173 acres. Depending on location and soil type, land in this area of New Mexico is irrigated to grow crops or left as non-irrigated desert scrubland. Information from the US Department of Agriculture (USDA) indicates that wheat, upland cotton, grain sorghum, and barley are the typical crops grown in the basin. The market value of land and buildings in Luna County in 2007 was estimated at $350 dollars per acre (USDA, 2007).

The proposed IABR project site consists of land held in the conservation reserve program (CRP) and historically irrigated land. It is not known when irrigation on the land ceased, but current vegetation on the project site consists primarily of grasses and noxious weeds, with few shrubs. In addition, several irrigation wells and concrete conveyance structures are present on the site attesting to historical use of the site for agriculture (Figure 2). Photographs of typical landscapes within the IABR site are included in Attachment F-4.

The Natural Resources Conservation Service and Farm Service Agency have been contacted (see Attachment F-1) to seek their concurrence that the property does not qualify as being designated "Farmland of Statewide Importance." The IABR project site (Sect 9-T29S R8W) is comprised of two farms identified by the Farm Service Agency (FSA) as farm number 540 and Tract 248. Although FSA has designated this area as having both Prime Farmland and Additional Farmland status (Attachment F-1), the NRCS State Soil Scientist has verified that there are no prime farmland, unique, statewide or locally designated cropland located within the 400-acre project area (NRSC Form 1006-Attachment F-1).

F.4.4.2. Land Use Planning Documents

Luna County has adopted (as revised in December of 2006) Ordinance Number 37 Luna County Building, Land Use, Development and Performance Standards, and Ground Water Protection. This ordinance grants the County jurisdiction to govern all buildings, structures, manufactured homes, mobile homes, recreational vehicles, salvage yards, properties, and generally all use and development within the County, but not within the boundaries of municipalities. Therefore, the IABR facility will be required to comply with this ordinance and obtain a permit to construct the facility from Luna County. A building permit from Luna County will be obtained prior to construction. No other formal land use plan for Luna County is known to exist.

F.4.4.3. Highly Erodible Soil and Wetlands

NRCS has mapped two soil units on the property (Attachment F-2) including the Stellar silty clay loam (SU), which comprises the vast majority of the project area, and a smaller percentage of the relatively coarse-grained Nickel-Tres Hermanas complex (NT). A field survey of soil types at the project site was completed in March 2009 to evaluate soil critical to the construction of the proposed algal ponds. Results of the field survey are included in Attachment F-2. The observed soil conditions in the NT soil unit were consistent with the general NRCS description for that unit as a gravelly loam. By contrast, the SU map unit was more coarse-grained when compared to the NRCS description. Sandy silt was the primary texture class observed in the SU, with gravel layers near the western end of the property. Potential soil changes within the SU map unit were indicated by areas dominated by thistle vegetation, in contrast to the majority of the SU map unit that was covered with bentgrass, cheatgrass, and minor amounts of yucca.

Through review of previously-completed Highly Erodible Land and Wetland Conservation Forms (SCS CPA 026) by NRCS for the property, erodible soil is located on the project site. In fact, nearly all soil in Luna County is considered highly erodible by the NRCS. A completed SCS CPA 026 form is included in Attachment F-2. These conditions will be taken into account when finalizing designs for surface facilities associated with the project. The Natural Resources Conservation Service and Farm Service Agency have been contacted to seek their concurrence that the property associated with the IABR is classified as Highly Erodible (Attachment F-1).

To evaluate potential for wetlands on the proposed project site, the following was completed:

- Review of National Wetland Inventory (NWI) Maps.
- Review of soil maps and previously-completed Highly Erodible Land and Wetland Conservation Forms (SCS CPA 026) by NRCS for the property.
- Visual surveys of the project site in June and September 2009.

The USFWS National Wetland Inventory (NWI) online database (Wetlands Mapper) was reviewed to determine potential for the presence of wetlands in the project area. The National Wetland Inventory (NWI) maps indicate that one palustrine open water (POW) wetland was mapped outside of the 400 acre IABR project area on the east central portion of Section 9 (Figure 2 and Exhibit 3), in an area of land not proposed for IABR development. NRCS soil maps and previously completed SCS CPA 026 Forms of the area were also reviewed. These forms indicate that no delineated hydric soil types or wetlands are present on the 400-acre IABR facility site (Attachment F-2).

To complement the literature and database search, a field survey of the proposed IABR property was conducted on March 5 and 6 and June 2 through 5, 2009. Natural drainage patterns within the project area have been modified by construction of concrete irrigation ditches, paved highway, access roads, irrigated crop fields, and a railroad right-of-way (abandoned). Topographically, the land slopes gently to the south and overland flow paths are largely determined by openings in the railroad embankment or under the concrete irrigation ditches and in roadside ditches. Incised, eroded drainages are present where overland flows are concentrated by the railroad embankment, highway, and concrete irrigation

ditches. These eroded, incised drainages are most prominent at the northern part of the IABR site, becoming barely discernable at the southern edge of the property.

Wetlands and other waters of the U.S. were surveyed along 100-meter transects within the property boundaries. Special attention was directed towards drainages and areas identified as low spots on the topographic maps or indicated as a National Wetland Inventory (NWI) wetland.

As indicated previously, one POW wetland was indicated on NWI maps for the area. This wetland was investigated and assessed for Clean Water Act applicability. The POW was determined to be a man-made pond associated with a historical windmill and stock tank located immediately north and outside of the property boundaries. Neither the windmill or stock tank is currently functional, nor did the POW contain water. A Routine Wetland Determination form was not completed because the POW was determined to be outside of the property.

One palustrine emergent wetland (PEM) was observed within the 400-acre IABR property, north of Highway 9, abutting the north side of the proposed project. The PEM is present along parts of the abandoned railroad grade within the northwestern portion of the Cooper Property, outside of the proposed area for development but within the 400-acre project site (Figure 2). A Routine Wetland Determination Form was completed for this wetland and is included in Attachment F-4. The wetland is presumed to be a result of man-made conditions in which overland surface flow is intercepted and collected by the railroad grade. The wetland has a hydrologic connection to areas down-slope through a wash that has truncated the railroad grade and currently flows north to south, through the property. This wash continues south through the property, where it has breached the historical irrigation canal running east to west (Figure 2). Rainwater is collected within the canal and upslope of the canal and is funneled to various breaks in the structure, where the soil becomes saturated creating a large sink up-slope of the break, and eroding channels down-slope. This wash eventually adjoins a roadside ditch along the central-southern border of the proposed project site. Flow in the roadside ditch eventually discharges through four culverts emerging as overland flow, dispersed into a large field. The water is not discharged into a channel containing defined bed or banks. Therefore, this wash and the associated upstream wetland were determined not to contain a significant nexus to navigable waters of the United States, and therefore would not be considered jurisdictional by the ACOE or the NMED (New Mexico Environment Department). A Jurisdictional Determination request was submitted to the USACE to verify this determination and is pending approval (Attachment F-4).

F.4.4.4. Potential Impacts to Land Use

Construction or operation of the IABR facility will require site clearing necessary to accommodate approximately 300 acres of ponds and approximately 100 acres of related facilities. Soil will be disturbed and vegetation destroyed within the footprint of the facility. While soil at the facility is highly erodible, construction of the ponds is not expected to increase soil erosion and appropriate measures will be taken to manage surface runoff to control erosion at the site. Potential impacts common to ground disturbance, including dust generation, increased erosion, and stream sedimentation will be effectively managed through the implementation of best management practices. Site surveying and historical

NRCS mapping indicate that there are no jurisdictional wetlands or waterways where the facility will be constructed. Historical use of the site for agriculture as well as the current vegetated cover is reflective of a previous land disturbance to support crop production. Concurrence as to the status of jurisdictional wetlands/waterways located on the property has been solicited from the USACOE (see Attachment F-4).

F.4.5. Transportation

The area of potential impact that could result from implementation of the IABR on transportation systems is described under Section F.4.5.1 below.

F.4.5.1. Existing Highways and Rail Lines

Luna County is bisected by Interstate 10, which runs east and west connecting the City of Deming with Las Cruces to the east (Dona Ana County) and Lordsburg to the west (Hidalgo County). This route is generally paralleled by State Highway 549 to the east of Deming and State Highway 418 to the west. State Highway 11 connects Deming with Sunshine and Columbus to the south (Figure 1). State Highway 9 passes east-west along the border with Mexico (NMDOT 2005), and acts as the northern boundary of the proposed IABR facility.

In addition to Highway 9, several unpaved roads are located on the site (Figure 2). The project site is bordered on the west by a County road that separates Sections 7 and 8. This road ends at the southwest corner of the property. Another gravel road runs east along the southern margin of Section 8 to the center of Section 9. A poorly-maintained gravel road accesses the northeast corner of the property in Section 9 then turns and trends west along the property boundary. A two-track road runs from northeast to southwest across the SW ¼ of Section 9. There is a "drag" road adjacent to and south of Highway 9 that is reportedly used by the border patrol to detect illegal foot traffic crossing from Mexico.

The closest rail line to the IABR facility is located in Deming, New Mexico (Figure 1) approximately 40 miles from the facility. Deming represents the convergence of several rail lines, including a Union Pacific route running east-west through the central portion of Luna County. This route also represents the Amtrak Southern Route through the region. Two additional active railroad lines are also present in the county. The first (Southwestern RR) extends from Deming to the northwest through the community of Whitewater and beyond. The second (Burlington Northern/Santa Fe) extends to the northeast from Deming to the community of Hatch and beyond. Other routes extend from Deming to the south and another passes along the border with Mexico but these routes either are dismantled or abandoned (NMDOT 2005).

F.4.5.2. Existing Transportation Plans

The New Mexico Department of Transportation prepared the Statewide Transportation Improvement Program FY 2008 - FY 2011, Amendment 9, as approved on March 11, 2009. This plan indicated proposed or planned route improvements though 2011. In addition, the State also prepared the New Mexico 2025 Statewide Multimodal Transportation Plan. Both of these plans address the public road and transportation systems for the state. No other transportation plans are known to exist in Luna County or at a local level.

According to the New Mexico Department of Transportation Statewide Transportation Improvement Plan (STIP) Amendment 9, as prepared for fiscal years 2008-2011, planned route improvements in Luna County for the period include the following:

- Bridge Replacement – 23.9 Miles East of Loop-22/Deming – Programmed Funds 2011
- Bridge Replacement – 1.8 Miles East of NM 549 – Programmed Funds 2008
- Pavement Preservation – I-10, MP 78 to 86.5 (8.5 miles) – Programmed Funds 2008
- New Construction – Cedar Street Extension – City of Deming – Programmed Funds 2008
- Reconstruction – Pearl Street to, 1st Street to Pine Street – City of Deming – Programmed Funds 2009
- Reconstruction – (Boarder Patrol Checkpoint) – NM 11, MP 12.5 to 12.8 (0.3 miles) – Village of Columbus – Programmed Funds 2009
- Pavement Preservation and Reconstruction – NM 26, MP 25.9 to 45.3 and MP 26 to MP 45.3 (19.4 miles) – Programmed Funds 2008
- New Construction – Village of Columbus Truck Bypass – Programmed Funds 2009
- Safe Routes to Schools – City of Deming – Programmed Funds 2008

With the exceptions of improvements to county infrastructure as planned for the town of Columbus, no improvements are planned for routes near the project at the state level.

F.4.5.3. Potential Transportation – Related Impacts

Motor vehicle traffic will increase at the project site as a result of construction and operation of the IABR. The construction phase of the project will initially require workers, supplies, and equipment to mobilize to the site for site clearing, pond construction, and the construction of ancillary facilities. During project operation, an estimated 30 workers will commute to the project from surrounding communities, the majority of them likely from Columbus.

In addition to the new commuter traffic, up to 12 round trips per day for trucks will be required from the site to facilities supporting the IABR (see discussion below). Transportation to and from the project site is expected to take place along existing roads and infrastructure. Transport of the biomass, CO_2 and other inputs to the facility and outputs generated by the facility will occur at varying frequencies. With the exception of occasionally heavier loads during construction, transport equipment will generally be of tractor/trailer type. Loaded gross vehicle weight (GVW) is not expected to exceed 25 tons, Process input/output travel will generally entail travel along the following routes:

- **Algal Oil from IABR to Refinery:** Transport to follow a route initiating from the project site to State Highway 9, continuing on to State Highway 11 terminating at a rail loading facility in Deming, New Mexico, then railed to Dynamic Fuels processing facility in Geismar, Louisiana. Frequency to the rail loading facility is estimated to be 6 round trips per week. One train carrying products produced by the IABR will travel to Louisiana per month.
- **Anaerobic Digester Solid Waste:** Transport to follow a route initiating from site to State Highway 9, continuing to nearby farms within Luna County. Frequency is estimated to be 20 - 30 round trips per week.

- **CO_2:** Transport to follow a route initiating from Praxair's CO_2 production facility, entering the region on State Highway 9 and terminating at the project site. Frequency is estimated to be 12 round trips per week.

Possible impacts associated with increased traffic associated with the IABR development include:

- Increased atmospheric loading of particulate associated with tractor trailer and smaller vehicle travel on roads to and within the facility (if unpaved).
- Increased emissions of hydrocarbons to the air associated with diesel-fueled tractor trailer engines and rail locomotives.
- Increased wear of roadways, in particular New Mexico Highway 9.

The New Mexico Department of Transportation (NMDOT) has been contacted (see Attachment F-1) to solicit any input regarding potential impacts that may affect transportation systems or plans as a result of the development of the IABR. No comments have been received from NMDOT to date.

F.4.6. Natural Environment

The area of potential impact for the natural environment as a result of the Proposed Action varies by resource or resource uses described in this section. In general, potential impacts to existing flora communities is limited to the disturbance area associated with the IABR. Potential effects to fauna that were considered include areas within the IABR site and on adjacent areas and are dependent on the species being evaluated.

F.4.6.1. Existing Natural Environment

The proposed project area lies within the Basin and Range physiographic province, which is characterized by low parallel mountain ranges separated by flat desert plains. The general terrain exhibits low relief with drainage flowing to the southeast. The site occurs within the Chihuahuan Desert Ecoregion (New Mexico Department of Game and Fish, 2006), and habitat is ecotonal between Chihuahuan semi-desert grassland and Chihuahuan desertscrub.

A biological field Survey Report was prepared on the IABR property in September of 2009 (Attachment F-4). This report summarized the vegetation and wildlife field surveys of the project site which were performed in June and September of 2009. Ecological conditions of the project area have been altered by past land uses that have removed the original cover of native vegetation from the site. Nearly all of the property was used to produce irrigated crops until 1971, when farming was discontinued and the site was allowed to colonize with invasive plants typical of soil that has been tilled. Much of the property contains dense stands of invasive species with low densities of native plants.

The species composition and canopy structure of vegetation on the property differs from native plant communities on adjacent state and federally managed public land. Native vegetation on adjacent land is typical of the Semidesert Grassland and Chihuahuan Desertscrub (Brown 1982). Dominant native species include soaptree yucca (*Yucca elata*), creosote bush (*Larrea tridentata*), honey mesquite (*Prosopis glandulosa*), tarbush (*Flourencia cernua*), Mormon tea (*Ephedra trifurca*), tobosa (*Hilaria*

mutica), vine mesquite (Panicum obtusum), and a diversity of other forbs, grasses, and cacti. The canopy structure of the native plant communities, with an upper tier of shrubs and a lower tier of herbaceous species, supports much higher levels of biodiversity than the project area, which is dominated by herbaceous invasive species interspersed with patches of bare ground (see photos in Attachment F-4).

Based on the June and September 2009 onsite surveys, it can be assumed that diversity of wildlife in the project area is low, reflecting degraded habitat conditions with limited breeding and foraging capacity for many species. Birds observed in the Project Area include the loggerhead shrike (*Lanius ludovicianus*), mourning dove (*Zenaida macroura*), horned lark (*Eremophila alpestris strigata*), cactus wren (*Campylorhynchus brunneicapillus*), black-throated sparrow (*Amphispiza bilineata*) , burrowing owl (*Athene cunicul*aria), long-billed curlew (*Numenius americanus*), white-winged dove (*Zenaida asiatica*), ash-throated flycatcher (*Myiarchus cinerascens*), western kingbird (*Tyrannus vericalis*), Gambel's quail (*Callipepla gambelii*) and roadrunner (*Geococcyx californianus*). Raptors including Swainson's hawk, northern harriers (*Circus cyaneus*), American kestrels (*Falco sparverius*), prairie falcons (*Falco mexicanus*), and red-tailed hawks (*Buteo jamaicensis*) were observed roosting and hunting within or near the project area.

Mammals or their signs were observed including coyote (Canis latrans), black-tailed jackrabbit (Lepus californicus), and burrowing rodents, including wood rats (Neotoma sp.) pocket gophers (Geomys arenarius), and banner-tailed kangaroo rat (Dipodomys spectabalis).

Other species of wildlife or their sign encountered during the site visit include the roundtail horned lizard (*Phrynosoma modestum*), Texas horned lizard (*Phrynosoma cornutum*), prairie rattlesnake (*Crotalus viridis*), green cicada (*Sphecius grandis*), tarantula wasp (*Pepsis* sp.), grasshoppers, harvester ants, northern earless lizard (*Holbrookia maculata maculata*), and tarantulas (*Aphonopelma* sp).

F.4.6.2. Endangered or Threatened Fauna

A biological field Survey Report was prepared on the IABR property in September of 2009 (Attachment F-4). As stated in this report, USFWS published 56 federally listed species of animals in New Mexico with 12 of these being present in the Mimbres Basin (Dona Ana, Hidalgo, and Luna Counties). Of these 12 species , five are endangered, five are threatened, and two are experimental, non-essential population listings by the US Fish & Wildlife Service (USFWS). As stated in the report, based on current distribution and habitat characteristics, only one of these species, the Northern aplomado falcon (*Falco femoralis septentrionalis),* has the potential to utilize habitat in the project area.

During the June and September 2009 survey biologists searched for suitable northern aplomado falcon habitat within the project area and adjacent state and federal land within visual and aural range of proposed project activities. The area surveyed included a one-mile radius from the Property. Suitable habitat includes semi-desert grassland habitat interspersed with large yuccas and/or trees containing raptor and/or corvid nests (aplomado falcons do not build their own nests). Typically, yuccas and trees suitable as nesting substrates are over six-feet tall and have a platform formed by branches or flowering stalks. Potential nesting habitat was assessed by driving roads and surveying the area with binoculars and/or a spotting scope.

Potentially suitable nests for the northern aplomado falcon were identified within the Property and on BLM and state-administered public land adjacent to the Property (Attachment F-4 – Biological Field Survey Report **Figure 1**). Raptor and/or corvid nests observed during the June and September 2009 surveys are depicted in Attachment F-4's **Figure 1**. A small patch of suitable habitat consisting of large yuccas also occurs approximately 0.8 miles southwest of the southwest Property boundary on private land.

The aplomado falcon (endangered, non-essential, experimental population) has the potential to use habitat in the Project Area. The northern aplomado falcon has been re-introduced into New Mexico and may use habitat on or near the Property; however field studies performed in June and September of 2009 did not detect its presence. One active aplomado falcon nest is known in New Mexico.

Habitat for the state endangered Great Plains narrowmouth toad is limited within the project area. Suitable habitat includes grassland and desert grassland habitats, principally those containing tobosa grass and aquatic habitat in spring and summer for reproduction. Aquatic habitat for reproduction may consist of swales and/or roadside ditches. Tobosa grass was sparse on the Property, although other grasses that occur on site may provide the same type of refuge, such as blue panic grass. Tobosa grass and other suitable grasses occur north of Highway 9 within the Property boundaries. Rodent burrows which may also be used as refuges by this toad are extensive throughout the Property. Aquatic habitat was not observed during the site visit, but several swales and roadside ditches may be suitable for breeding. It is unlikely that this species would occur in the project area due to the limited amount of suitable habitat.

F.4.6.3. Endangered or Threatened Flora

Based on site surveys and published flora lists, there are no plant species protected under the Endangered Species Act likely to inhabit the Project Area. Federally designated critical habitat does not occur in the project area.

Twenty-two species are listed by the state of New Mexico as endangered and 37 species are classified as threatened (Department of Game and Fish, 2009). Attachment F-4 lists federal and state species of conservation concern. Of these, 54 have been identified as species of greatest conservation need by New Mexico (New Mexico Department of Game and Fish, 2006).

According to the New Mexico Rare Plant Technical Council (NMRPTC), five special status species are known to occur within the project vicinity. Three of these species are considered *Species of Concern* by the USFWS and the State of New Mexico. Species that have been confirmed to be present in the northeast portion of the Mimbres Basin (NMRPTC, 2009) are the grayish-white giant hyssop (*Agastache cana),* Orcutt pincushion cactus *(Escobaria orcuttii),* Chihuahua scurf pea (*Pediomelum pentaphyllum*), and Griffith's saltbush (*Atriplex griffithsii).* The dune prickly pear (*Opuntia arenaria)* and night-blooming cereus (*Peniocereus greggii var. greggii),* have documented occurrences near the Cooper Property and are considered *Species of Concern* by the USFWS and *Endangered* by the State of New Mexico.

Surveys for federal and state-listed plant species potentially occurring on the Property were conducted in June and September of 2009 along transects 100 meters apart. No federal or state plant species of conservation concern were found.

F.4.6.4. Potential Impacts to the Natural Environment

Direct effects to wildlife and wildlife habitat would result from habitat alteration and displacement of species sensitive to human activities as a result of the proposed action. Approximately, 300 acres of degraded upland habitats would be converted to ponds to grow and harvest algae and 100 acres would be disturbed to support ancillary facilities. Adjacent state and federally managed public land supports native plant communities and wildlife habitats typical of the Chihuahuan Desert. Although there would be no direct disturbance to these habitats from the proposed project, indirect effects from nearby human activities could displace species sensitive to human presence and project activities.

Of the animal species identified above, none were observed during field surveys. Figure 8 describes the general habitat and possibility of occurrence in the project area for each of these animal species. Biologists found limited potential for the presence of threatened and or endangered (T&E) animal species (other than potential Aplomado falcon nesting and foraging habitat) or their prime habitats at the project site during the field survey.

Three suitable Aplomado falcon nests (two are located on one yucca) occur immediately north of the highway in the northwestern-most portion of the Property between the old railroad grade and Highway 9 (Figure 1). The other nest is located in the northeastern-most portion of the east half of the Cooper Property, adjacent to the eastern property fence line. Additional potentially suitable nesting habitat on adjacent public land could be indirectly affected by increased levels of human activity in the project area.

Removal of yuccas and associated nests may be avoidable due to their location on the periphery of the property (although noise and visual disturbance would not be avoidable). Due to the presence of suitable Aplomado falcon nesting habitat nests on the periphery of and/or adjacent to the Property, field surveys for the Aplomado falcon were performed on the property in June and September of 2009. Since no Aplomado falcons were identified during the survey, Section 7 consultation with the U.S. Fish and Wildlife Service (USFWS) was not initiated. The Biological Surveys completed in June and September of 2009 found no adverse effect to T&E species. The USDA made a determination the project proposed no adverse effect on T&E species in a letter to USFWS dated August 17, 2009. The USFWS concurred with USDA's determination of no adverse effect to threatened and endangered species, by sending no response within the 30 day comment period.

Figure 8-. Federal and State Species of Concern Known or with the Potential to be Present in the Mimbres Basin

Species	Status*	Habitat	Possible Occurrence in the Project Area	Reason for yes/no occurrence in Project Area
Amphibians				
Chiricahua leopard frog	FT	Permanent aquatic habitats between 2,800 and 7,300 ft. amsl	No	No habitat
Great Plains narrowmouth toad	SE	Grassland and desert grassland, tobosa grass, requires wet habitat in summer	Yes	Small amounts of suitable upland habitat may be present
New Mexico ridge-nose rattlesnake	FW	Montane woodlands and Madrean evergreen woodlands	No	No habitat
Fish				
Loach minnow	FT	Streams with riffle habitat	No	No habitat
Spikedace	FT	Streams with riffle habitat	No	No habitat
Beautiful shiner	FT	Rivers and streams	No	No habitat
Birds				
Bald eagle	BGEPA	Large trees or cliffs within one mile of foraging habitat.	No	No habitat

Species	Status*	Habitat	Possible Occurrence in the Project Area	Reason for yes/no occurrence in Project Area
Golden eagle	BGEPA	Grassland habitats	Yes	Foraging habitat present, no nesting habitat
Northern aplomado falcon	NEXP, SE	Grassy plains interspersed with mesquite, cactus, and yucca	Yes	Foraging habitat present limited nesting habitat
Common black-hawk	ST	Riparian woodlands	No	No habitat
Peregrine falcon	ST	Forages in desert, shrubland, chaparral, and woodlands; nests in rocky cliffs.	Yes, resident and summer migrants	Foraging habitat present, no nesting habitat
Southwestern willow flycatcher	FE, SE	Riparian woodlands, tamarisk stands	No	No habitat
Broad-billed hummingbird	ST	Varied habitat, including riparian woodlands and Chihuahuan desert scrub	No	Suitable nesting habitat not present
Costa's hummingbird	ST	Desertscrub, chaparral, deciduous forests	No	Suitable nesting habitat not present
Lucifer hummingbird	ST	Arid deserts with preferred nectaring plants	No	Suitable nesting habitat not present

Species	Status*	Habitat	Possible Occurrence in the Project Area	Reason for yes/no occurrence in Project Area
Violet-crowned hummingbird	ST	Riparian woodlands, forests, scrub-oak adjacent to xeric habitats	No	No habitat; there are no riparian woodlands
White-eared hummingbird	ST	Montane habitats, woodlands, forests	No	No habitat
Yellow-eyed junco	ST	High-elevation mixed coniferous and Ponderosa pine forests	No	No habitat
Thick-billed kingbird	SE	Riparian canyons, deciduous forests, thornscrub, woodlands.	No	Known to forage in desert scrub adjacent to habitat; however, no nesting habitat
Buff-collared nightjar	SE	In New Mexico, generally in canyons and washes with mesquite and other small trees	No	Preferred habitat absent, will likely occur only as a transient
Whiskered screech-owl	ST	Dense oak and pine-oak woodlands in canyon bottoms	No	No habitat
Mexican spotted owl	FE	Montane forests	No	No habitat
Arizona grasshopper sparrow	SE	Typically well-developed grasslands lacking woody vegetation	Unlikely	Marginal habitat, project area is invaded by shrubs or contains weeds.
Mammals				

Species	Status*	Habitat	Possible Occurrence in the Project Area	Reason for yes/no occurrence in Project Area
Spotted bat	ST	Roost in cliffs, found in higher elevation habitats during summer, lower elevations in winter	No	No habitat
Mexican long-nosed bat	FE	Desert scrub vegetation with century plants, creosotebush, and cacti. Roosts in mines, caves, and old buildings	No	No habitat
Lesser long-nosed bat	FE	Requires mines and caves for roost sites and saguaro cactus and paniculate agave for foraging	No	No habitat
Western yellow bat	ST	Wooded riparian habitats	No	No habitat
Southern pocket gopher	ST	Typically occur in 5,800 to 8,000 feet in rabbitbrush riparian, oak savanna, oak woodland, pinon-juniper, chapparal, and coniferous forest habitats	No	Site below elevational range; no habitat
Jaguar	FE	Chihuahuan desert scrub and semi-desert grassland within 10 square miles of water	No	No hiding or escape cover

Species	Status*	Habitat	Possible Occurrence in the Project Area	Reason for yes/no occurrence in Project Area
Gray wolf	NEXP	Variety of habitats with abundant prey populations	No	No hiding cover and prey base very limited
Arizona shrew	SE	Mesic wooded habitats	No	Site is not mesic, no trees
Molluscs				
Hacheta Grande Woodlandsnail	ST	Rock outcrops and talus slopes, typically montane	No	No habitat

*FE = federally endangered; FT = federally threatened; NEXP = federally endangered/non-essential experimental; SE = state endangered; ST = state threatened; BGEPA – Bald and Golden Eagle Protection Act
Source: USFWS Website http://www.fws.gov/southwest/es/EndangeredSpecies/lists/ListSpecies.cfm

In order to minimize impact to all birds protected under the Migratory Bird Treaty Act (MBTA), in their April 1, 2009 letter, the USFWS recommended the following mitigation measures. Ground clearing activities would be conducted prior to the breeding season (March through August) to avoid egg destruction and bird deaths. The potential for the presence of nesting burrowing owls, within the project area, may require mitigation measures be employed by the applicant, as these owls are protected under the MBTA. Burrowing owls could occur throughout the property during the breeding and non-breeding seasons and could be killed during construction activities at any time of the year. The New Mexico Department of Game and Fish (NMDGF), in coordination with the New Mexico Burrowing Owl Working Group, California Burrowing Owl Consortium, and the California Department of Fish and Game, developed "Guidelines and Recommendations for Burrowing Owl Surveys and Mitigation" (July 2007). These guidelines were established to provide direction for conducting burrowing owl surveys and designing mitigation during the preparation of environmental assessment reports and environmental impact statements. When burrowing owls are confirmed on a project site, these guidelines outline three general approaches to mitigation:

- Design and implement project activities to spatially avoid negative impacts and disturbance to burrowing owls and their habitat;
- Design and implement project activities to seasonally avoid negative impacts and disturbances to burrowing owls (although confirmation of unoccupied burrows will still be required); and/or,
- Relocate burrowing owls that will be negatively impacted to protected areas.

It is possible that the creation of ponds on the project site may alter the behavior of some birds and bats that may be attracted to the water and insects that may use the ponds. Non-threatened and endangered bird species may also be attracted to the ponds.

Correspondence with the State Forester (New Mexico Division of Energy, Minerals, Forestry, and Resources Conservation), the USFWS, and the New Mexico Department of Game and Fish regarding the site is included in Attachment F-1. . Based on the Biological Surveys which were completed in June and September of 2009, on August 17, 2009 the USDA determined the project proposed no adverse effect on threatened and endangered species. USFWS concurred with this determination on September 17, 2009 by not responding within the 30 day comment period to USDA's finding of no adverse effect. The USDA recommends that the applicant coordinate with the USFWS and New Mexico Department of Game and Fish (NMDGF) in order to coordinate mitigation measures for potential impact to MBTA species.

F.4.7. Human Population

The area of potential impact with regards to the human population (social and economic values) includes the local communities, county level government, state level government, and Mexico.

F.4.7.1. Existing Population

The IABR facility will be constructed on land owned by the applicant in Luna County approximately two miles southwest of Columbus, New Mexico (Sections 8 and 9 Township 29 South Range 8 and 9 West) and one-half mile north of the US-Mexico border (Figure 2). Luna County shares borders with Dona Ana County to the east, Sierra County to the northeast, Grant County to the northwest and west, and small portion of Hidalgo County to the southwest. The US – Mexico border is located along the southern end of the county. Collectively, these counties represent the Human Population Study Area (HPSA) or area of potential impact for the IABR project.

Major communities within Luna County include Deming, located in the central portion of the county and the town of Columbus, located near the border with Mexico along State Highway 11 approximately three miles northeast of the project area. The community of Sunshine is located south of Deming approximately 23 miles from Columbus. Waterloo is just off State Highway 11 situated between Sunshine and Columbus. The community of Hermanas is situated east of Columbus and approximately 10 miles to the west of the project site along State Highway 9.

Communities across the US-Mexico border include Puerto Palomas (approximately four miles south of Columbus), the community of Guadalupe Victoria (approximately 19 miles due south of the project) and Ascension, the capital of Chihuahua (approximately 50 miles south southwest of the project). In 2005, Puerto Palomas has an estimated population of 5,748 and the communities of Guadalupe Victoria and Ascension were 1,345 and 10,961 respectively (Wikipedia, 2009).

General social and demographic information for the HPSA Area is presented in Figures 9 and 10. The data show that the populations of Sierra, Grant and Hildalgo counties have decreased during the period 2000 to 2007. Dona Ana County exhibited the highest rate of growth for the period of 13.8 percent followed by the State of New Mexico at 8.3 percent and Luna County at 7.9 percent. For nearly every

economic indicator, economic conditions within the Study Area are poorer than the average conditions of the State of New Mexico. For example, the unemployment rate for the State of New Mexico was 4.2 percent in 2006, while in Luna County it was 10.6 percent.

F.4.7.2. Schools

Luna County hosts 13 public schools in Deming and one elementary school in Columbus. Specific schools within the county include the following:

- Bell Elementary
- Chaparral Elementary
- Columbus Elementary
- Deming Detention Center
- Deming High School
- Deming Middle School
- Deming Secure School
- Hofacket High School
- Martin Elementary
- Memorial Elementary
- My Little School
- Smith Elementary
- Sunshine Elementary

Figure 9. Social Characteristics for the Multi-County Area and New Mexico

Social Attribute	Luna County	Dona Ana County	Sierra County	Grant County	Hidalgo County	State of New Mexico
Population						
Population, 2007 estimate	26,996	198,791	12,316	29,699	4,945	1,969,915
Population, 2000 Census	25,016	174,682	13,270	31,002	5,932	1,819,046
Population, percent change, April 1, 2000 to July 1, 2007	7.9	13.8	-7.2	-4.2	-16.6	8.3
Demographics						
Female persons, percent, 2006	51.2	50.5	50.8	51.3	50.1	50.6
Persons under 18 years old, percent, 2006	28.0	28.4	18.8	23.2	27.4	26.0
Persons 65 years old and over, percent, 2006	19.4	11.6	28.1	18.9	15.7	12.4
White persons not Hispanic, percent, 2006	37.7	31.0	67.3	48.9	41.5	84.6
Persons of Hispanic or Latino origin, percent 2006	59.7	65.0	29.5	48.1	57.0	44.0
Black persons, percent, 2006	1.6	2.6	0.6	1.0	0.6	2.5

Foreign born persons, percent, 2000	19.5	18.7	6.6	3.3	11.1	8.2
Language other than English spoken at home, percent age 5+, 2000	49.5	54.4	21.6	36.7	43.6	36.5
High school graduates, percent of persons age 25+, 2000	59.8	70.0	76.1	79.4	68.8	78.9
Bachelor's degree or higher, percent of persons age 25+, 2000	10.4	22.3	13.1	20.5	9.9	23.5
Housing						
Housing units, 2006	11,840	9,444	9,151	14,521	3,072	850,095
Housing units, percent change, April 1, 2000 to July, 2006	4.9	14.5	4.9	3.2	7.9	8.9

Source: U.S. Census Bureau, 2008 and New Mexico Economic Development 2009

F.4.7.3. Fire Protection

Three volunteer fire departments (VFD) serve Luna County: Cookes Peak, Sunshine and Florida Mountain. The Cookes Peak VFD is located just north of Deming. Sunshine VFD is located approximately 9 miles south of Deming and the Florida Mountain VFD is approximately 12 miles east of Deming. The closest VFD responding to the proposed IABR site in the event of an emergency will be the Sunshine VFD, which is approximately 25 miles from the project site.

Figure 10. Economic Characteristics for the Multi-County Study Area and State of New Mexico

Social Attribute	Luna County	Dona Ana County	Sierra County	Grant County	Hidalgo County	State of New Mexico
Personal income per capita, 2005	$19,165	$23,070	$20,786	$22,983	$20,589	$27,889
Median household income, 2004	$22,888	$30,740	$23,821	$29,926	$23,702	$37,838
Median value of owner-occupied housing units, 2000	$66,000	$90,900	$77,800	$87,900	$53,900	$108,100
Persons below poverty, percent, 2004	24.3	23.0	20.4	17.9	21.2	16.7
Average earnings per job, 2005	$28,881	$33,086	$23,073	$27,418	$25,106	$37,387
Unemployment rate, percent, 2006	10.6	4.7	4.6	4.4	3.4	4.2
Civilian labor force, 2006	12,960	86,216	5,524	12,455	2,768	935,350

Source: U.S. Census Bureau, 2008.

F.4.7.4. Police Protection

The Village of Columbus represents the closest community to the IABR project area. With a population of approximately 1,600, Columbus recently disbanded its five member police force and is now under the jurisdiction of the Luna County Sheriff based in Deming, approximately 31 miles north of Columbus.

Minutes from the January 8, 2009 meeting of the Luna County Board of County Commissioners indicate a Joint Protection Agreement (JPA) was agreed to by the County Attorney and the County Sheriff for a six month period that provides Sheriff jurisdictional coverage of Columbus. However, Columbus has not formally adopted the JPA and is researching the possibility of reforming a police force. Columbus also agreed to fund over $26,000 for the construction of a Sheriff substation in the community.

Based on recent field visits to the site, the US Border Patrol is known to have agents operating near and within the project area (including an observation station). These agents are responsible for monitoring human movement across the border as well as maintaining safe conditions.

F.4.7.5. Health Care

Medical centers in Luna County include the Ben Archer Health Center located in the community of Hatch, the Gila Regional Medical Center located in Silver City and the Mimbres Medical Center located in Deming. The Mimbres Medical Center specializes in family practice with ability to perform surgeries on-site. The hospital has an average patient volume of approximately 25 per day with one physician (Health Grades, 2009).

Ambulance services in Deming and the surrounding area are secured through expenditures from the City of Deming and supplemented by Luna County (Luna County Commissioners, 2007).

F.4.7.6. Environmental Justice

On February 11, 1994, President Clinton issued Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations.* The purpose of the order was to avoid disproportionate placement of adverse environmental, economic, social, or health effects from federal actions and policies on minority and low-income populations. The first step in analyzing this issue is to identify minority and low-income populations that might be affected by implementation of the proposed project.

The Council on Environmental Quality identifies groups of people as environmental justice populations when either (1) the minority or low-income population of the affected area exceeds 50 percent or (2) the minority or low-income population percentage in the affected area is meaningfully greater than the minority population percentage in the general population or appropriate unit of geographical analysis (EPA, Council on Environmental Quality, 1997). In order to be classified as *meaningfully greater*, a formula describing the environmental justice threshold as being 10 percent above the State of Mexico rate is applied to local minority and low-income rates. For purposes of this section, minority and low-income populations are defined as follows:

- **Minority populations** are persons of Hispanic or Latino origin of any race, Blacks or African Americans, American Indians or Alaska Natives, Asians, and Native Hawaiian and other Pacific Islanders.
- **Low-income populations** are persons living below the poverty level. In 2000, the poverty weighted average threshold for a family of four in the United States was $17,603 and $8,794 for an unrelated individual (US Census Bureau, 2000).

As shown in Figure 9 above, the relative size of the Hispanic or Latino populations in Luna, Dona Ana and Hidalgo counties in 2006 will be considered environmental justice populations based on the minority population criteria. Figure 10, above, indicates that the estimated number of persons below the poverty rate in Luna County in 2004 was 24.3 percent, the highest in the Study Area. Dona Ana County had the next highest rate at 23.0 percent followed by Hidalgo County at 21.2 percent, Sierra County at 20.4 percent, and Grant County at 17.9 percent. The State of New Mexico had the lowest rate overall of 16.7 percent. No county in the Study Area had a sufficient percentage of persons living below the poverty line to establish the county as an environmental justice population based on the low income criteria. However, the high percentage of minority populations in multiple counties in the region indicates that the Project Area, in general, is economically depressed as compared to Grant County and the State of New Mexico and will qualify as an environmental justice population based on the minority population criteria.

F.4.7.7. Potential Impacts to Population and Services

Luna County will be positively impacted directly and indirectly by the project primarily through development of many relatively high-salary jobs. Positive impacts to the rest of the region will also be realized through employment of people and purchase of goods and services from regional markets.

The IABR project is expected to employ up to 120 workers during the construction phase of the project for an extended period, providing a significant boost to the local economy. During the operational phase, the IABR is anticipated to employ 30 workers at the facility for the test period. Relocation of microbiologists and engineers who will reside in the area is anticipated to support the IABR project.

Indirect positive impacts to the surrounding populations will be realized through an increase in direct and indirect employment resulting from new jobs generated as a result of the project. Luna County will benefit by receipt of additional county and local taxes, benefiting schools, road users, and other functions provided by government.

Increased employment associated with the IABR is not anticipated to increase school enrollment or place unacceptable demands on health care facilities in Luna County. Fire and police protection may not be adequate for the IABR facility, due to considerable distance of these services to the site or lack of human resources. The applicant is considering several options to overcome this shortfall in emergency services including retaining a private security company who would coordinate with local and federal law enforcement agencies.

F.4.8. Construction

The construction of the IABR facility will result in a temporary increase in emissions of dust, increased potential for soil erosion and siltation, and increased noise. All of these impacts will be lowered to non-significant levels through implementation of best management practices. Dust generation will be reduced by application of water during land disturbance activities. The frequency of water application will be dictated by level of disturbance and wind speeds.

Erosion control will be achieved through controlling escarpments and slopes, avoidance of wash areas, and implementation of concurrent re-vegetation practices. A storm water management plan will be

prepared outlining the best management practices to be followed during construction of the IABR. Noise-related impacts will be controlled by limiting equipment delivery trips and management of work hours to reduce impacts on neighbors. The use of "jake brakes" by trucks will be prohibited to lower noise levels. In addition, noise reduction mufflers for trucks hauling equipment to the site could be employed, if necessary.

F.4.9. Energy Impacts

Area of potential impact associated with energy requirements of the project is limited to current electrical service to the site.

F.4.9.1. Existing Energy supplies to the Facility

Columbus Electrical Cooperative located in Deming serves the IABR project area. Above-ground power lines are present at the IABR site. A power line runs north-south along the western side of the County road bordering the IABR site. Two sets of power lines also run parallel to Highway 9 just south of the highway.

A fiber optic line runs south of Highway 9 along the IABR site. No other utilities are present at the site The closest natural gas line is located approximately 30 miles north of the site in Deming. New Mexico Gas Co-operative has indicated their plans to extend service to the area of the IABR Facility along public right of way along Highway 9.

F.4.9.2. Project Energy Requirements

Preliminary estimates indicate the required power for the IABR facility will be approximately 3.4 Megawatts (Mw) at a delivery voltage of 480 volts (V). Natural gas will be required for algal biomass drying and other heated operations at the IABR site. It is estimated approximately 7.5 tones/day of natural gas will be required daily. Natural gas produced from anaerobic digestion of algal solids will be utilized at the facility. In addition, fuel (diesel and gasoline) will be required to fuel tractor trailers and commuter vehicles necessary for the construction and operation of the facility.

F.4.9.3. Potential Impacts to Energy Supplies

It is not anticipated that there will be significant impact to the energy supplies required to operate the IABR facility. Columbus Electrical Cooperative has indicated that current service lines to the facility can accommodate the power required.

F.4.9.4. Energy Conservation

The applicant is committed to incorporating energy conservation best management practices and best engineering controls at the IABR facility to the greatest extent possible. The applicant intends to hire energy conservation specialists that will be intricately involved in the facility design. Several design elements (see discussions in the Primary Beneficiaries and Project Description sections) involve innovative resource recovery in an effort to reduce energy consumption.

F.4.10. Other Potential Impacts (Noise, Vibrations, Safety, Radiation, Aesthetics)

The applicant does not anticipate impacts associated with the IABR and connected facilities with respect to noise, vibration, radiation, or aesthetics. With the exceptions of increased truck traffic during construction and operation, the IABR process is not noisy and vibration is limited to that associated with periodic truck traffic. Radiation is not a component of the project. In addition, while the equipment associated with the facility may be visible from Highway 9, much of the site will be comprised of shallow ponds which will only be visible from the air.

Safety is an important aspect of the IABR and connected facilities, particularly with respect to increased fire risks associated with processing of combustible oils. These fire risks will be managed by the applicant, adopting proper and sufficient fire controls and coordination with fire protection personnel. Construction of the facility near the US-Mexico border is an added security risk that the applicant is addressing in its planning, considering options including retaining a private security company who would coordinate with local and federal law enforcement agencies.

F.5. Compliance with Various Environmental Regulations

Figure 11 summarizes the various permit requirements associated with the IABR and the status of efforts to secure such permits. The applicant intends to secure all necessary permits prior to commencing activities associated with development of the IABR.

Figure 11. Permit Requirement Summary (Updated 29 July 2009)

WATER RIGHTS	
Existing Well Repair Permit	
Issuing Agency:	Office of the State Engineer
Requirement:	Applies to any repair performed on existing well
Public Notice Req:	None
Status:	No Application: Expected turn around time by agency - 5 days
New Well Permit	
Issuing Agency:	Office of the State Engineer
Requirement:	Applies to installation of any new commercial well
Public Notice Req:	Yes: 60 - 90 day public notice period
Status:	No Application: Expected turn around time by agency - 90 days

Change in Water Right Authorization	
Issuing Agency:	Office of the State Engineer
Requirement:	Applies to any change in the type of use, place of use, or point of diversion for water rights purchased
Public Notice Req:	Yes: 10 days
Status:	No Application: Time period can be 2-3 years, State Engineer will expedite to 2-3 months.
WATER QUALITY	
Stormwater Discharge Permit (includes Construction General Permit [CGP], General Permit [GP], and Stormwater Pollution Prevention Plan [SWPPP]).	
Issuing Agency:	US EPA Region 6 / Clean Water Act (CWA) §402(p) Part 122.26
Requirement:	Applies to construction activities which disturb more than one acre
Public Notice Req:	None
Status:	No Application: CGP data must be submitted to the USEPA Region 6, a SWPPP must be prepared and kept on site for review if required.
Spill Prevention, Control, and Countermeasure (SPCC) Plan	
Issuing Agency:	US EPA Region 6 / 40 CFR § 112.7
Requirement:	Facilities that could reasonably be expected to discharge oil in quantities that may be harmful into navigable waters of the United States and adjoining shorelines to develop and implement SPCC Plans.
Public Notice Req:	None
Status:	No Application: SPCC Plan required of any commercial enterprise that has potential to discharge oil into Navigable Waters of the US.
404 (Wetlands) Permit	

Issuing Agency:	U.S. Army Corps of Engineers El Paso District. The State of New Mexico's New Mexico Environmental Department (NMED) reviews and certifies all EPA permits issued in the state per CWA Section 401 / Clean Water Act (CWA) §404.
Requirement:	Required if wetlands are present and impacted
Public Notice Req:	Possible. Likely a month.
Status:	An official Jurisdictional Determination request for the property was submitted to the COE on September 18, 2009.
Groundwater Discharge Permit	
Issuing Agency:	New Mexico Environmental Department (NMED) / New Mexico Water Quality Act (WQA) NMAC 20.6.2.3103 and NMAC 20.6.2.3104.
Requirement:	A discharge permit will be required for expected seepage from the production ponds and the evaporation pond(s) at the IABR.
Public Notice Req:	Yes: Public notice is required (NMAC § 20.6.2.3108).
Status:	No Application: A discharge permit will be required for expected seepage from the production ponds and the evaporation pond(s) at the IABR. If TDS of the first intercepting (receiving) groundwater is greater than 10,000 mg/L, no permit required. If the receiving groundwater is <1,000 mg/L TDS, applicant can get a groundwater discharge permit. If the receiving groundwater is >1,000 TDS, New Mexico's non-degradation statute (NMAC 20.6.2.3101) requires no degradation of that groundwater can occur. Presently awaiting final engineering data to submit to NMED for analysis; preliminary calculations have been completed indicating project would comply with non-degradation statute.
Septic System Permit	
Issuing Agency:	New Mexico Environmental Department (NMED) - District III Office in Las Cruces / NMAC § 20.7.3.
Requirement:	If a septic system is planned for the IABR facility, a liquid waste (septic tank) permit must be obtained.
Public Notice Req:	None
Status:	No Application: Expected less than one week turnaround by regulators

AIR QUALITY	
Air Quality Permit	
Issuing Agency:	New Mexico Environmental Department - Air Quality Bureau / NM. Stat. Ann. §§ 74-2-1
Requirement:	Operation of certain equipment presently planned for use at the IABR facility will require the facility to obtain an air quality permit.
Public Notice Req:	30 days after NSR; 30 days after department' analysis.
Status:	No Application: Need to quantify emissions in a Potential Emissions Rate (PER). Determination of permit requirement will be made by AQB. Permit must be in place before start of construction.
SPECIAL STATUS SPECIES	
New Mexico Protect Wildlife Species	
Issuing Agency:	New Mexico Game and Fish Department / NM. Wildlife Conservation Act (WCA) NMAC § 17.2.37 through 46
Requirement:	None unless there are known Threatened or Endangered Species effected.
Public Notice Req:	None
Status:	No Application: USDA concluded no adverse effect to Threatened or Endangered Species. USFWS concurred with this determination on September 17, 2009.
US Fish and Wildlife Service Consultation	
Issuing Agency:	US Fish and Wildlife Service / Endangered Species Act (ESA) (7 USC §136 and 16 USC §1531 et. seq.)
Requirement:	If federally listed fauna species are determined to be present and takings are unavoidable, or if these species are present and activities proposed at the IABR site are determined to be an action requiring a federal decision, consultation with the U.S. Fish and Wildlife Service will be required.
Public Notice Req:	None if informal consultation is allowed.

Status:	No Application: USDA concluded no adverse effect to Threatened or Endangered Species. USFWS concurred with this determination on September 17, 2009.
Migratory Bird Treaty Act (MBTA) / Bald and Golden Eagle Protection Act (BGEPA)	
Issuing Agency:	US Fish and Wildlife Service / Migratory Bird Treaty Act / Bald and Golden Eagle Protection Act
Requirement:	If there is potential for golden eagles to occur on site. Surveys should be conducted during breeding season.
Public Notice Req:	None: No formal permit issued
Status:	No Application: USDA concluded no adverse effect to Threatened or Endangered Species. USFWS concurred with this determination on September 17, 2009.
Endangered Plants Act (EPA)	
Issuing Agency:	New Mexico Energy, Minerals and Natural Resources Department / NM Stat. Ann. §§ 75-6-1 et. Seq. and NMAC Part 21
Requirement:	Applies if any Special Status flora species are affected by the Project.
Public Notice Req:	None if informal consultation is allowed.
Status:	No Application: There are no special status flora or fauna species affected by the project. USDA concluded no effect to Threatened or Endangered Species. USFWS concurred with this determination on September 17, 2009.
HISTORIC PRESERVATION	
Eligibility for Listing on the National Register of Historic Places (National Register)	
Issuing Agency:	New Mexico State Historic Preservation Officer (SHPO) / Section 106 of the National Historic Preservation Act of 1966 as amended (PL 89-665) the Archaeological Resource Protection Act of 1979 (PL 96-95), and Executive Order 11593.
Requirement:	The "lead agency" is the federal or state entity responsible for consulting with the SHPO to make sure that appropriate cultural resource laws and regulations are followed for the project.
Public Notice Req:	Yes. If NHPA Section 106 consultation is required.

Status:	SHPO concurs proposed project will have no effect as long as project is constructed in Area 1. If Area 2 is used consultation required. SHPO notified USDA that Section 106 consultation with 5 tribes was required. These tribes were notified and no comments were received within 30 day comment period.
SOLID AND HAZARDOUS WASTE	
Hazardous Waste Permit	
Issuing Agency:	New Mexico Environmental Department / US Department of Agriculture / New Mexico's Hazardous Waste Act (HWA) and associated regulation (NMAC § 20.4.1) - based on US EPA Resource Conservation and Recovery Act (RCRA) definitions and requirements.
Requirement:	Applies if any hazardous solid waste is generated at the Site or if solid waste is disposed at the Site.
Public Notice Req:	None
Status:	No Application: Solid waste will be disposed off site. Must do a determination to see if the process will generate hazardous waste.
NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) ANALYSIS	
Environmental Assessment or Environmental Impact Statement	
Issuing Agency:	US Department of Agriculture, Rural Development / Council on Environmental Quality Regulations (40 CFR Parts §§ 1500-1508)
Requirement:	A NEPA analysis will be required if there is a federal decision associated with the proposed action or if one of the following occurs: (a) federal money is being used to fund a portion or all of the project; (b) an individual CWA §404 permit is required; or (c) a linear connected action is required (e.g., a pipeline corridor that will traverse federally managed land). Applicable since the Project will use Federal funds.
Public Notice Req:	Yes.
Status:	This requirement is met through the completion of the USDA's Class II Environmental Assessment and issuance of a FONSI.
LOCAL AND COUNTY PERMITS	

Issuing Agency:	Luna County / Ordinance No. 37
Requirement:	If a substantial building of any is constructed within Luna County, a building permit is required. Periodic inspection by county required during construction.
Public Notice Req:	None.
Status:	No Application: Turnaround time for building permits is approximately 1 week.

PERMITS CONSIDERED BUT NOT REQUIRED

NPDES (National Pollution Discharge Elimination System) Permit

Issuing Agency:	US EPA (State of New Mexico does not have primacy) / Clean Water Act (CWA) §402 NPDES (USC title 33, §1251)
Requirement:	Required for any planned discharge to surface water
Public Notice Req:	None
Status:	No Application: Because the applicant does not expect any discharge of wastewater to a surface water course, this permit will not be required.

Clean Air Act (CAA) Title V Determination

Issuing Agency:	US EPA/Clean Air Act (CAA) CFR Parts 50-99
Requirement:	Review Title V threshold limits
Public Notice Req:	Yes
Status:	Determination of whether the facility will require a New Source Review air quality permit and/or a Clean Air Act (CAA) Title V permit will be completed when final design plans for the IABR are developed in concert with the State of New Mexico Air Quality Bureau.

Solid Waste Permit

Issuing Agency:	

Requirement:	
Public Notice Req:	
Status:	This permit will be unnecessary as all solid waste will be transported and disposed of by licensed vendors and facilities as long as the applicant does not produce more than 220 pounds of non-acute hazardous wastes per month.

F.5.1. Coastal Zone Management Act

This act is not applicable to the proposed project since the IABR facility will not be constructed in coastal areas or a Great Lakes State.

F.5.2. Compliance with Advisory Council on Historic Preservation's Regulations

Impacts to cultural or historical resources are not anticipated with the project. On August 31, 2009, the SHPO concurred that the project will have no effect on cultural or historic resources, as long as the project is constructed in Area 1 (400-acre Project Area - eastern parcel). If there is any change in plans and Area 2 (adjacent property - western parcel) will be used, then consultation with SHPO will be required.

A Cultural Resource Survey was completed at the proposed IABR facility by a qualified New Mexico-certified archaeological firm. The property identified for the Cultural Resource Survey included two parcels of land; a western parcel identified in the Survey as Project Area 1 and an eastern parcel identified in the Survey report as Project Area 2 (Attachment F-5). As part of this assessment, archaeological records maintained at the Archaeological Records Management Section (ARMS) of the New Mexico Historic Preservation Division were consulted and a field survey of the property was completed. The records revealed four previously recorded sites within a 500 meter radius around the perimeter of the Project Areas; however, none of the sites occur on the IABR property (identified as Project Area 1 in the Cultural Resources Survey report). A review of the State Register of Cultural Properties and the National Register of Historic Properties (NRHP) also revealed that no properties on either register are located near the project area.

An Area of Potential Effect (APE) was designated for the project that corresponds to Project Area 1 (green shaded area in Figure 2). The archaeological field survey of the proposed APE identified a series of agricultural ditches and associated features and materials (Attachment F-5). Artifacts were observed associated with the ditch system. Materials observed included cement, metal pipe, and railroad tailing. These artifacts are believed to be part of a mid-twentieth century irrigation system. Although local informants date the concrete lined ditch to the early 1950s, an inscription indicates that at least a portion of the ditches may have been constructed in 1935. Based on date of construction, the site (ditches and affiliated materials) has a New Mexico Statehood-World War II to recent (AD 1935 to 1985) affiliation. The Phase I archaeological report stated that the site does not appear to be associated with significant historical events or people, doesn't retain any characteristic workmanship, and is not likely to

yield any additional information concerning the mid-twentieth century development of the area and its therefore recommended ineligible for nomination to the National Record of Historic Places (NRHP) under any of the four criteria.

In addition to consultation with SHPO, letters were issued to governors of the Pueblo of Nambe and Pueblo of Zuni seeking input regarding any cultural or other issues of concern (see Attachment F-1). To date, no responses have been issued by these entities. USDA also contacted the SHPO-designated tribal contacts for Luna County, (Fort Sill Apache, Hopi, White Mountain Apache, Mescalero Apache, Ysleta del Sur Pueblo) notifying them of the project and requesting comment within 30 days. One response was received from the Hopi Tribe indicating concurrence there would be no adverse effect. No other responses were received therefore we can assume that no adverse effect determination were made by these tribes.

F.5.3. Compliance with the Wild and Scenic Rivers Act

The IABR project will not affect a river or portion of it which is either included in the National Wild and Scenic Rivers Systems or designated for potential additional to the system. Waters of the US are not present on the IABR facility.

F.5.4. Compliance with the Endangered Species Act

The IABR project is not projected to affect listed endangered or threatened species. A listing of T&E species for the project area is provided in Attachment F-4. Of the animal species listed, nearly all are unlikely to occur within the IABR project site. Figure 8 provides a description of the general habitat and possibility of occurrence in the project area for each of these animal species. Little to no indication of the presence of threatened and or endangered (T&E) animal species or their prime habitats were identified at the project site during a field survey.

Due to the historic agricultural disturbance of the project site, there is limited potential for plants listed as endangered by the state of New Mexico and as a federal Species of Concern to occur on the proposed IABR site. These include the night blooming cereus (*Peniocereus greggii* var. *greggii*) and dune prickly pear (*Opuntia arenaria)*. The New Mexico Rare Plant Council and New Mexico Energy, Minerals and Natural Resources Department were contacted for information concerning the location of these species within the Mimbres Basin. Based on the field surveys completed on the site USDA determined that the project proposed no adverse effect to threatened or endangered species. The USFWS concurred with this determination on September 17, 2009 (see Attachment F-1).

F.5.5. Compliance with Farmland Protection Policy Act and Departmental Regulation 9500–3, Land Use Policy

The IABR project will not either directly or indirectly convert an important land resource identified in the Farmland Protection Policy Act and Department Regulation 9500-3, Land Use Policy. Additional information about the proposed location of the IABR is presented in Project Description section of this document. Information concerning land use and soils are presented in the Land Use section of this document. The Natural Resources Conservation Service and Farm Service Agency have been contacted (see Attachment F-1). The IABR site is not exceptional farmland worthy of land management restrictions.

Specifically, the NRCS Web Soil Survey database (found at http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx) does not include the site as an area shown to be "prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland". Based on communication with the NRCS, prior to construction, the applicant will register as the new owner with the Deming Field Office of FSA/NRCS, and either have NRCS create a new Conservation Plan applicable to the proposed future land use (IABR and surroundings), or obtain from NRCS documentation that the proposed future land use would not need a Conservation Plan.

F.5.6. Compliance with Executive Order 11988, Floodplain Management, and Executive Order 11990, Protection of Wetlands

The proposed IABR project is not located within a 100-year flood plain (500-year floodplain for a critical action) or a wetland, and the project will not impact a floodplain or wetland. The floodplain map for the project area can be seen in Figure 2. Additional discussion of wetlands is included in the Natural Environment section and in Attachment F-4.

F.5.7. Compliance with Coastal Barrier Resources Act

The IABR Project is not located within the Coastal Barrier Resources System.

F.5.8. State Environmental Policy Act

New Mexico does not have a State Environmental Policy Act, and therefore, the project is not subject to a New Mexico Environmental Policy Act review. Because of the possibility of federal funding being secured to support costs associated with the IABR, USDA's decision regarding the project is subject to conformance with the National Environmental Policy Act.

F.5.9. Consultation Requirements of Executive Order 12372, Intergovernmental Review of Federal Programs

On March 10, 2009, the applicant submitted Form RD 1940-20 to Mr. Mike McDow, USDA Rural Development in Albuquerque, New Mexico of their intent to submit a loan application (Attachment F-1). In addition, the applicant sent letters notifying several agencies requesting their advice as to whether the project will affect any regulations under their jurisdiction. A list of the agencies that were sent a request letter is included in Attachment F-1. The applicant requested a response from the agencies by no later than April 10, 2009.

To date, the applicant has received only three responses from the agencies. One comment was from the US Fish Wildlife Service (USFWS) concerning protection of threatened and endangered species, received April 1, 2009. The Natural Environment section and the Compliance with Endangered Species section of this application describe what has been done with respect to the evaluation of threatened and endangered species. USFWS concurred with USDA's determination that the project will have no adverse effect on threatened and endangered species on September 17, 2009. The second comment was from the New Mexico State Historic Preservation Office (SHPO). SHPO's March 16, 2009 response indicated that consultation with the agency is required under Section 106 of National Historic Preservation Act if federal funding was being sought. Subsequently, SHPO sent in a response dated

August 31, 2009, where SHPO concurred that the project will have no effect on cultural or historic resources, as long as the project is constructed in Area 1 (400-acre Project Area - western parcel). If there is any change in plans and Area 2 (adjacent property - eastern parcel) will be used, then consultation with SHPO will be required (Attachment F-1). The third comment was from New Mexico Environmental Department (NWED) outlining the requirements of the Ground Water Quality Bureau and the Surface Water Quality Bureau with respect to obtaining approved discharge permits, NPDES compliance, and public notice requirements. All of these items have been addressed by the applicant and are documented in this Environmental Assessment.

In addition to the initial solicitation of input from the various regulatory and governmental agencies described above, contacts have been made via telephone and through face-to-face meetings with these agencies as described in Attachment F-1 Environmental Assessment Contact Information Table. This table summarizes all contacts made to various agencies and the resulting correspondence, meeting notes, and phone logs. Copies of electronic mail and other contact sheets are also included in Attachment F-1.

BLM administers public land which borders the project area and the applicant has submitted an application for development grant with the DOE for the IABR. The applicant has been in contact with both agencies and intends to maintain active dialogue with these agencies as well as the USDA to ensure all parties are informed as to the status of project activities. The USDA is the agency completing this environmental assessment and will provide copies to the BLM and DOE, upon request.

F.5.10. Environmental Analysis of Participating Federal Agency

The applicant received a congressional earmark of $951,000 in March 2009 for the IABR project. Currently, no other federal agency besides USDA is participating in the project by providing funds or serving as a companion, although the applicant has applied for a grant from the US Department of Energy (DOE). Federal agencies having possible review authority of portions of this project include:

- US Army Corps of Engineers: filling or modification of waters of the US, including wetlands
- US Fish Wildlife Service: threatened or endangered species
- US Environmental Protection Agency: New Source Review and Title V Air permit review (although they have delegated this authority to the State of New Mexico) and storm water permit

F.6. Reactions to and Impacts of IABR Project

F.6.1. Reaction to Project

Comments from state, regional, and local agencies received at the time of this submittal are included in Attachment F-1. Comments were requested from several agencies on March 10, 2009. Written comments were received from the USFWS and SHPO on May 7, 2009 and March 16, 2009 respectively.

A preliminary public notice of the Environmental Assessment was published on August 19, 20 and 21, 2009 (Attachment F-6). No comments were received at the conclusion of the 30-day review period which ended on September 21, 2009. A public hearing or public information meeting concerning the

project has not been held to date. Public awareness of the project has grown considerably since due diligence of the proposed IABR site was initiated by the applicant and regulatory agencies were made aware of the prospect of this enterprise in March 2009. This awareness has increased interest in the project with local residents learning of the potential job opportunities. The applicant's field staff conducting various studies within the project area are continually asked about the project. News sources have an increased awareness of the applicants other activities and articles have been recently published in periodicals, including the following:

- Algae Startup Sapphire Energy Eyes New Mexico Facility After $50 Million Capital Raise (Biofuels Digest 2008)
- Sapphire Energy Aims For 1.5 Billion Gallons Of Algae Fuel By 2020; 150 Million By 2013 (Biofuels Digest 2009)
- Sapphire Energy Algae to Fuel Demonstration Project - $951,000 (Udall, 2009)

F.6.2. Cumulative Impacts

Cumulative impacts associated with the construction of the IABR include two main areas: transportation and socioeconomics. The project will cumulatively impact roads in the area, particularly New Mexico Highway 9. Increased heavy truck traffic on Highway 9 will cause a cumulative increase in traffic regionally and may degrade the roadway.

The cumulative impact associated with socioeconomics will generally be positive, as the IABR will increase jobs and tax revenues for local counties and the State of New Mexico and provide greater economic stability for the region by increasing the demand on goods and services needed to support the project.

Cumulative impacts to other resource areas will be minimal. Discharges associated with the IABR will not cumulatively result in adverse impacts to water and air resources. The air shed in southern New Mexico is not a Class 1 area (not a non-attainment area), and the process necessary to permit the air emissions will not allow for impacts to exceed regulatory standards. Discharge of water associated with the leakage from the ponds will also require a permit from the New Mexico Environmental Department (NMED). To obtain the discharge permit from the NMED, the applicant will demonstrate that the discharge will not result in exceedance of water quality standards in groundwater beneath the site therefore eliminating the potential for cumulative impacts. Impacts to threatened and endangered species are not anticipated due to lack of species of concern and/or suitable habitat at the facility. Waters of the US, including wetlands, will also not be impacted because they are not present on the proposed site. The IABR will remove 400 acres of land previously used for traditional agriculture and replace it with non-traditional agriculture. Sufficient agricultural land is available in Luna County, however, such that the loss of this relatively small area is not anticipated to result in a cumulative impact. Likewise, impacts to cultural and archeological sites are not anticipated because National Register-eligible sites were not discovered at the facility during a field survey.

The past and current land use in the region around the project area is primarily agricultural, including grazing and irrigated cropland. These activities will likely continue into the future as no industrial, recreational, or other developments are being considered for the area.

The location of a commercial-scale facility is currently unknown but will be determined following evaluation of the feasibility of the process implemented at the IABR, assumed to require approximately 3 years to complete. The findings of the IABR project will largely dictate the size, nature, and location of a commercial enterprise. Some of the more important criteria to be evaluated in siting of a commercial-scale facility include climate, latitude, availability of sufficient water, topography, land use, land ownership, socioeconomic and cultural conditions, availability of appropriate labor force, and environmental sensitivities. Areas proximal to the IABR will be considered in such a siting analysis but it is premature to evaluate potential impacts associated with a commercial-scale facility until the technology has been proven at a pilot-scale and the feasibility of the process has been proven.

The degree of governmental review and analysis of any commercial-scale facility developed will depend largely on the location of the site with respect to public land. The types of permits and impact analyses to be completed to support a commercial-scale facility are expected to be similar to that completed for the IABR, although the scale of the project may require a greater depth and breadth of analysis. In addition, it is probable that such a facility would have connected actions associated with it that would require further regulatory scrutiny, such as construction of pipeline and utility corridors and possible expansion of transportation infrastructure. For the purposes of this EA, any future development of an off-site commercial-scale facility is considered to be independent of the IABR pilot-scale project. In addition, it is recognized that any future expansion of the IABR pilot-scale project facility onto adjacent properties would be reviewed cumulatively with the findings of this EA, but is not addressed in this EA since plans for expansion are speculative.

F.6.3. Potential Adverse Effects

Potential adverse environmental and social impacts associated with construction of the IABR include:

- Loss of 400 acres of habitat for fauna potentially utilizing the area while the IABR facility is being constructed and operated
- Increased air emissions of hydrocarbons from increased truck traffic transporting chemicals and supplies to and from the IABR facility
- Increased emissions of particulate associated with the increase in truck traffic to and from the IABR
- Increased demand on local services associated with fire and security protection
- Increased demand for housing
- Degraded groundwater quality from infiltration of water from ponds

A discussion of all of these impacts is provided in the appropriate sections above.

F.6.4. Alternatives

Several other alternative locations for the IABR were evaluated in arriving at the preferred location in Luna County. Particular effort was placed on evaluating candidate sites in New Mexico, an area that exhibits climatic conditions conducive to fostering algal growth. Sites in southeastern and central New Mexico were considered and dismissed primarily because of the desire of the applicant to site the facility on private land, a situation that presented itself with the property in Luna County. The benefit of

locating this demonstration project on private land was primarily because of the relatively short time required to secure necessary permits to support the development as well as secure the water rights necessary for the operation. In addition, the Luna County site presented relatively favorable conditions for minimizing impacts to flora, fauna, water resources, and air quality, and presented a direct opportunity to improve local economic conditions. Locating the project within the preferred alternative western parcel was chosen over the eastern parcel (also owned by the applicant) due to potential for adverse affects to cultural resources, availability of water rights, and site access issues.

Several alternative designs were evaluated by the applicant for the process it is promoting, in both its laboratory in San Diego as well as a research and development facility in Las Cruces, New Mexico. The various alternative process designs have all been carefully evaluated and adjusted to optimize the efficiency of the operation while recycling as much of the various components used in the process as possible. Because the IABR, as proposed, is a demonstration project, the applicant fully expects that additional adjustments in the design of the facility will be necessary as more is learned about process components that add value and those that do not.

With respect to other types of processes, the applicant has completed exhaustive research of various biofuels technologies in developing the type of processes that will be applied at the IABR. The benefit of the process this project is promoting over other biofuel technologies is that this process can be used on non-productive land and can use non-potable water, particularly saline water when brought to the full-scale commercial level. These factors provide a considerable relative advantage over other biofuel technologies in that productive land is maintained and scarce fresh water resources are preserved.

The "No Project" alternative will provide no direct benefit to the local communities in Luna County, the State of New Mexico, or the United States. Opportunities to develop a viable alternative fuel source for the country will be lost under this alternative and the economic stimulus that will accompany such an enterprise will be forfeited. In addition, advancement of the science and engineering for efficiently and effectively producing green crude will be curbed by not acting on this proposal.

F.6.5. Mitigation Measures

Possible mitigation measures that could be taken to overcome the environmental and social impacts associated with the IABR, as described above are listed in Figure 11.

Figure 12. Potential Environmental Impact and Proposed Mitigation Methods

Potential Impact	Proposed Mitigations
Migratory Bird Treaty Act Species and Raptors including aplomado falcon	• The USFWS recommends that in order to minimize the likelihood of adverse impacts to all birds protected under the Migratory Bird Treaty Act (MBTA), construction activities should occur outside the general migratory bird nesting season of March through August, or that areas proposed for construction during nesting season be surveyed, and when occupied, avoided until nesting is completed.

	It is highly recommended to have a biomonitor onsite during bulldozing and clearing activities to ensure birds were not nesting or being harmed.
Burrowing owls	• The applicant should coordinate with the USFWS and NMDGF in order to minimize potential impacts to any burrowing owls located on the site as outlined in the ""Guidelines and Recommendations for Burrowing Owl Surveys and Mitigation" (July 2007). "
Loss of 350-400 acres of habitat for fauna potentially utilizing the area while the IABR facility is being constructed and operated	• Construction of a series of ponds may enhance habitat for certain types of fauna, potentially offsetting destruction of habitat. • Salvage topsoil from the site prior to development; use soil as growth medium to support reclamation of property. • Develop a reclamation plan that restores habitat to at least pre-project conditions.
Increased air emissions of hydrocarbons associated with exhaust from increased truck traffic transporting chemicals and supplies to and from the IABR facility.	• Design systems such that aerial emissions achieve compliance with applicable air quality standards. • Incorporate into the system design means to capture and reuse emissions to the extent possible. • Combine trips, promote car pooling, or utilize buses to reduce vehicular emissions.
Increased emissions of particulate associated with the increase in vehicle and truck traffic to and from the IABR.	• Pave the approach road and access roads within the IABR site to limit emissions. • Combine trips, promote car pooling, and utilize buses to reduce total particulate created by vehicle traffic.
Increased demand on local services associated with fire and security protection.	• Retain a private security company to provide services specific to the IABR. • Work with Luna County officials to secure fire response equipment in Columbus. • Install fire response equipment at IABR and develop a training program for employees.
Increased demand for housing.	• Hire locally, to the extent possible. • Operate buses, to the extent practicable, to bring workers to site from larger communities in the region that are more able to accommodate influx of workers.
Degraded groundwater quality from infiltration of water from ponds.	• Modify pond bottoms through amendment to achieve compliance with groundwater discharge permits. • Monitor leakage to provide for early detection

of any excursions.

F.7. Consistency with Rural Development's Environmental Policies

As discussed throughout the environmental evaluation sections of this application, the IABR project will be consistent with USDA environmental polices (§§1940.304 and 1940.305) and the New Mexico Resource Management Guide. The proposed IABR will not adversely impact waters of the U.S. including wetlands, floodplains, important or prime farmlands, T&E species, fisheries, cultural or archeological sites, air quality, or water quality. The IABR will remove 400 acres of land previously used for traditional agriculture and replace it with non-traditional agriculture. Non-threatened and non-endangered flora and fauna that currently utilize the acreage where the IABR will be located will be impacted; however, sufficient land of equal or better value exists surrounding the property to accommodate these species. Additional details to support the claim that the IABR project will be consistent with the Resource Management Guide are included with this submittal.

F.8. Environmental Determinations

Based on an examination and review of the foregoing information and such supplemental information attached hereto, I recommend that the approving official determine that this project will not have a significant effect on the quality of the human environment.

I recommend that the approving official make the following compliance determinations for the below-listed environmental requirements.

Not in Compliance	In Compliance	Unknown	Federal of State Law
	X [1]		Clean Air Act
	X		Federal Water Pollution Control Act
	X		Safe Drinking Water Act—Section 1424(e)
	X [2]		Endangered Species Act
	X		Coastal Barrier Resources Act
	X		Coastal Zone Management Act—Section 307(c) (1) and (2)
	X		Wild and Scenic Rivers Act.
	X		National Historic Preservation Act
	X		Archeological and Historic Preservation Act
	X		Subpart B, Highly Erodible Land Conservation
	X		Subpart C, Wetland Conservation, of the Food Security Act
	X		Executive Order 11988, Floodplain Management

	X		Executive Order 11990, Protection of Wetlands
	X		Farmland Protection Policy Act.
	X		Departmental Regulation 9500–3, Land Use Policy.
	X		State Office Natural Resource Management Guide.

1 – An air permit will likely be required; 2 Coordination required related to plant species.

I have reviewed and considered the types and degrees of adverse environmental impacts identified by this assessment. I have also analyzed the proposal for its consistency with USDA Rural Development's environmental policies, particularly those related to important farmland protection, and have considered the potential benefits of the proposal. Based upon a consideration and balancing of these factors, I recommend from an environmental standpoint that the project be approved.

Juliet C. Bochicchio — 09-21-2009

Prepared By, Juliet C. Bochicchio — Date
Environmental Protection Specialist
Program Support Staff

Linda J. Rodgers — 09-21-2009

Recommended By, Linda Rodgers — Date
Acting Director
Program Support Staff

Judith A. Canales — 9/21/09

Approved By, Judith A. Canales, — Date
Administrator
Business and Cooperative Programs

References

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EXHIBITS

h:\14821 Sapphire Energy\5000 GIS\Projects\grant_figs\Exhibit_1.mxd

Site Map
Proposed IABR Facility
Luna County, New Mexico
EXHIBIT 1

9

LUNA COUNTY, NEW MEXICO

CHIHUAHUA, MEXICO

h:\14821 Sapphire Energy\5000 GIS\Projects\grant_fgs\Exhibit_1.mxd

N

0 Feet 2,000

Columbus Western Parcel
Cook Property
May Property
Other Private
Bureau of Land Management
State of New Mexico

Site Map - Air Photo Base
Proposed IABR Facility
Luna County, New Mexico
EXHIBIT 2

Innoculation Pond

Pond Influent Distribution Channel

M-3668

OLD RAILROAD GRADE

Well Pipeline

I1 - 1

Production Pond (typ)

A1 - 2 | B1 - 9 | C1 - 16 | D1 - 23

A2 - 3 | B2 - 10 | C2 - 17 | D2 - 24

A3 - 4 | B3 - 11 | C3 - 18 | D3 - 25

A4 - 5 | B4 - 12 | C4 - 19 | D4 - 26

A5 - 6 | B5 - 13 | C5 - 20 | D5 - 27

A6 - 7 | B6 - 14 | C6 - 21 | D6 - 28 | E6 - 35

A7 - 8 | B7 - 15 | C7 - 22 | D7 - 29 | E7 - 36

M-1933 Production Well (typ)

M-3667 (FILLED)

M-4746

M-4747

M-4748

PROCESS FACILITIES

Pond Effluent Distribution Channel

Pond Waste Distribution Channel

4337 4368 4340 BM 4338 4339 4329 4336 4300 4287 4301 4300

Well

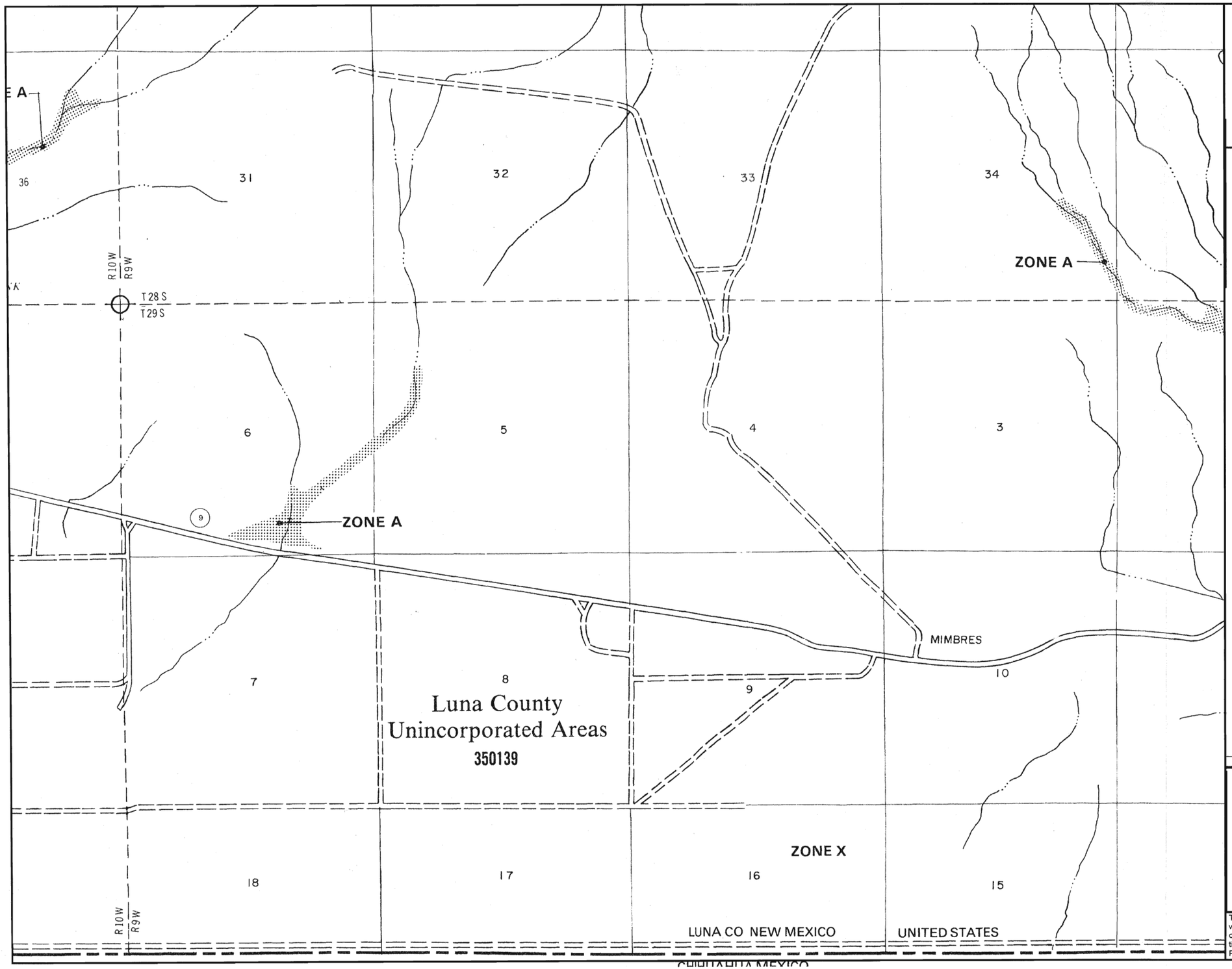
H:\14821 Sapphire Energy\5000 GIS\CADPRO\PondLayout.dwg

N

0 Feet 800

Project/Property Boundary

General Facilities Layout
Proposed IABR Facility
Luna County, New Mexico
EXHIBIT 3



To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at

APPROXIMATE SCALE

2000 0 2

Special Flood Hazard Areas
Inundated By 100-Year Flood
ZONE A - No Base Flood
Elevation Determined

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

LUNA COUNTY, NEW MEXICO AND INCORPORATED AREAS

PANEL 800 OF 850

(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
COLUMBUS, VILLAGE OF	350037	0800	B
UNINCORPORATED AREAS	350139	0800	B

PANEL LOCATION

MAP NUMBER

35029C0800 B

EFFECTIVE DATE:
SEPTEMBER 14, 1990

Federal Emergency Management Agency

Columbus Western Parcel

FEMA FIRM Map
Proposed IABR Facility
Luna County, New Mexico
EXHIBIT 4

ATTACHMENT F-1

USDA
Form RD 1940-20
(Rev. 6-99)

Position 3

REQUEST FOR ENVIRONMENTAL INFORMATION

FORM APPROVED
OMB No. 0575-0094

Name of Project: Sapphire Energy Integrated Algal Bio-Refinery
Location: Luna County New Mexico, U.S.A.

Item 1a. Has a Federal, State, or Local Environmental Impact Statement or Analysis been prepared for this project?
☐ Yes ☒ No ☐ Copy attached as EXHIBIT I-A.

1b. If "No," provide the information requested in Instructions as EXHIBIT I.

Item 2. The State Historic Preservation Officer (SHOP) has been provided a detailed project description and has been requested to submit comments to the appropriate Rural Development Office. ☐ Yes ☒ No Date description submitted to SHPO ____

Item 3. Are any of the following land uses or environmental resources either to be affected by the proposal or located within or adjacent to the project site(s)? *(Check appropriate box for every item of the following checklist).*

	Yes	No	Unknown		Yes	No	Unknown
1. Industrial	☐	☒	☐	19. Dunes	☐	☒	☐
2. Commercial	☐	☒	☐	20. Estuary	☐	☒	☐
3. Residential	☐	☒	☐	21. Wetlands	☐	☐	☒
4. Agricultural	☒	☐	☐	22. Floodplain	☐	☒	☐
5. Grazing	☒	☐	☐	23. Wilderness *(designated or proposed under the Wilderness Act)*	☐	☒	☐
6. Mining, Quarrying	☐	☒	☐				
7. Forests	☐	☒	☐	24. Wild or Scenic River *(proposed or designated under the Wild and Scenic Rivers Act)*	☐	☒	☐
8. Recreational	☐	☒	☐				
9. Transportation	☒	☒	☐	25. Historical, Archeological Sites *(Listed on the National Register of Historic Places or which may be eligible for listing)*	☐	☒	☐
10. Parks	☐	☒	☐				
11. Hospital	☐	☒	☐	26. Critical Habitats *(endangered /threatened species)*	☐	☒	☐
12. Schools	☐	☒	☐				
13. Open spaces	☐	☒	☐	27. Wildlife	☒	☐	☐
14. Aquifer Recharge Area	☐	☒	☐	28. Air Quality	☐	☒	☐
15. Steep Slopes	☐	☒	☐	29. Solid Waste Management	☐	☒	☐
16. Wildlife Refuge	☐	☒	☐	30. Energy Supplies	☐	☒	☐
17. Shoreline	☐	☒	☐	31. Natural Landmark *(Listed on National Registry of Natural Landmarks)*	☐	☒	☐
18. Beaches	☐	☒	☐	32. Coastal Barrier Resources System	☐	☒	☐

Item 4. Are any facilities under your ownership, lease, or supervision to be utilized in the accomplishment of this project, either listed or under consideration for listing on the Environmental Protection Agency's List of Violating Facilities? ☐ Yes ☒ No

March 6 2009
(Date)

Signed: _____
(Applicant)

VICE PRESIDENT, SAPPHIRE ENERGY
(Title)

According to the Paperwork Reduction Act of 1995, an agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a valid OMB control number. The valid OMB control number for this information collections is 0575-0094. The time required to complete this information collection is estimated to average 15 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information.

Environmental Assessment Contact Information

Updated September 18, 2009

Agency/tribe	To Whom	Street or PO	Letter / Project Description / Map Provided	Comments Received	Other Items Provided	Contact by Phone	Contact by Email	Contact by Meeting	Comments
Energy, Minerals, Forestry and Resources Conservation Division	State Forester Butch Blazer 505.476.3200 arthur.blazer@state.nm.us	P.O. Box 1948, Santa Fe, NM 87504	03/10/09	No	---	07/22/09 Conversation Record	---	---	No follow-up required if no endangered or threatened flora/fauna impacted
Fort Sill Apache Tribe	Jeff Houser, Chairman	Rt.2, Box 121 Apache, OK 73006	07/30/09	No	---	---	---	---	---
Hopi Tribe	Benjamin Nuvamsa, Chairman	P.O. Box 123 Kykotsmovi, AZ 86039	07/30/09	No	---	---	---	---	---
White Mountain Apache Tribe	Ronnie Lupe, Chairman	P.O. Box 700 Whiteriver, AZ 85941	07/30/09	No	---	---	---	---	---
Mescalero Apache Tribe			07/30/09	No	---	---	---	---	---
Ysleta del Sur Pueblo	Frank Paiz, Governor	P.O. Box 17579 – Ysleta Station El Paso, TX 79917	07/30/09	No	---	---	---	---	---
Governor of the Pueblo of Nambe	Lela Kaskalla 505.455.2036	Route 1, Box 117-BB Santa Fe, NM 87501	03/10/09	No	---	---	---	---	---
Governor of the Pueblo of Zuni	Donald Eriacho 505.282.7000	P.O. Box 339 Zuni, New Mexico	03/10/09	No	---	---	---	---	---
National Park Service	Regional Director 505.988.6888	P.O. Box 728 Santa Fe, New Mexico 87504	03/10/09	No	---	---	---	---	---
New Mexico Department of Game and Fish	Director 505.476.8000	P.O. Box 25112, Santa Fe, New Mexico 87504	03/10/09	No	---	06/5/09 Conversation Record	---	---	No follow-up required if no endangered or threatened flora/fauna impacted
New Mexico Environment Department	Air Quality Bureau Ted Schooley 505.827.1494 505.827.2855 505.476.4334 ted.schooley@state.nm.us	P.O. Box 26110, Santa Fe, NM 26110	03/10/09	No	---	07/22/09 left message	---	No	An air permit (New Source Review air quality permit and/or a Clean Air Act (CAA) Title V permit) for the IABR facility will be required under New Mexico's Air Quality Control Act

Environmental Assessment Contact Information

Updated September 18, 2009

Agency/tribe	To Whom	Street or PO	Letter / Project Description / Map Provided	Comments Received	Other Items Provided	Contact by Phone	Contact by Email	Contact by Meeting	Comments
New Mexico Environment Department	Water and Waste Management Division George Schuman Marcy Leavitt 505.476.3728 marcy.leavitt@state.nm.us	P.O. Box 26110, Santa Fe, NM 26110	03/10/09	Yes	---	---	---	04/16/09 See attached	Groundwater management plan to be approved by NMED prior to issuance of a discharge permit. A liquid waste permit will be obtained from the NMED's District III office in Las Cruces to treat wastewater from bathrooms at the IABR facility. NPDES permit to be obtained and SWPPP prepared
New Mexico State Highway and Transportation Department	District Engineer, NMSHTP Frank Guzman, PE 575.544.6621	2912 E. Pine Street Deming, NM 88030	3/10/2009	No	---	---	---	---	---
Office of the State Engineer	State Engineer John D'Antonio, PE 505.827.6091	Bataan Memorial Building, Room 101, P.O. Box 25102, Santa Fe, NM 87504-5102	03/10/09	No	---	---	---	Yes 08/19/09 Conference Call	OSE will issue water rights permit upon conditions.
State Historic Preservation Officer	Michelle Ensey Archaeologist 505.827.4064 michelle.ensey@state.nm.us Katherine Slick 505.827.4044 katherine.slick@state.nm.us	Bataan Memorial Building, 407 Galisteo Street, Suite 236, Santa Fe, NM 87501	03/10/09	Yes 08/13/09 Yes 08/31/09	---	---	Michelle Ensey 05/07/09	---	SHPO concurs proposed project will have no effect as long as project is constructed in Area 1. If Area 2 is used consultation required.
U.S. Army Corps of Engineers	Construction Operations Division, Regulatory Office Kelly Allen 505.342.3216 Kelly.e.allen@usace.army.mil Richard Gatewood 505.554.7943	4101 Jefferson Plaza, NE, Albuquerque, NM 87109-3435	03/10/09	No	JD Checklist Submission Packet submitted on September 18, 2009	06/24/09 07/22/09 Conversation Records	06/24/09 06/25/09	---	JD Checklist Submission Packet submitted on September 18, 2009

Environmental Assessment Contact Information

Updated September 18, 2009

Agency/tribe	To Whom	Street or PO	Letter / Project Description / Map Provided	Comments Received	Other Items Provided	Contact by Phone	Contact by Email	Contact by Meeting	Comments
U.S. Bureau of Land Management	Las Cruces District Office Lori Allen	1800 Marquess Street Las Cruces, New Mexico	---	No	Notification of Land Access 5/30/2009	---	---	---	---
U.S. Environmental Protection Agency	Director 800.887.6063	1445 Ross Avenue, Suite 1200, Dallas, Texas 75202-2733	3/10/2009	No	---	---	---	---	Stormwater Discharge Permit Construction General Permit data must be submitted to the USEPA Region 6, a SWPPP must be prepared and kept on site for review if required.
U.S. Department of Agriculture	Farm Service Agency 575.546.9692	405 E. Florida St, Deming, NM 88030-5235	---	No	---	07/24/09 Wilhelm Welzenbach	---	---	FSA provided the Conservation Plan, including HEL for the project site.
U.S. Department of Agriculture	Natural Resource Conservation Service Luis Garcia 575.546.9692 Luis.Garcia@nm.usda.gov	405 E Florida Street Deming, NM 88030-5235	03/10/09	No	Form AD-1006 8/14/2009 Revised 08/31/2009 Kenneth Scheffe State Soil Scientist	VM - 07/23/09	07/24/09	---	State Soil Scientist confirmed there are no prime, unique, statewide or locally designated cropland on the property.
U.S. Fish & Wildlife Service	Field Supervisor Eric Hine Wally Murphy 505.248.6911	2105 Osuna Rd NE, Albuquerque, New Mexico 87113-1001	03/10/09	Yes 04/01/09	No response to 30-day notice of No adverse effect determination dated August 17, 2009	05/5/09 Shelly Adams 5/6/2009 Patricia Zenone 07/24/09	05/7/09		USFWS concurred that no adverse effect to endangered or threatened flora/fauna.

Sapphire Energy

3115 Merryfield Row
San Diego, California 92121
858.530.3690 ph | 888.501.8353 fax

March 10, 2009

Mr. Mike McDow
Director, Business and Cooperative Programs
USDA Rural Development
6200 Jefferson NE, Room 255
Albuquerque, NM 87109

RE: Initial Application for Loan Guarantee; Section 9003 BioRefinery Assistance Loan Guarantees

Dear Mr. McDow:

By this letter and associated attachments, Sapphire Energy Company is initiating the process for securing a loan guarantee as described above in support of our proposed Integrated Algal Biorefinery Project in Luna County, New Mexico. In accordance with your direction, we have attached the following information:

- Form 1920-40 (Request for Environmental Information).
- A generalized project description.
- A map showing the locations of the proposed facilities.

Our team is currently soliciting input from the list of various local, state, and federal governmental entities you provided us to support completion of the environmental assessment of the proposed project. Our project team is also in the throes of preparing an environmental information document pursuant to 7 CFR Part 1940, Subpart G, Exhibit H. This information will be forward to you to assist you in completing your portion of the analysis of our application as soon as possible.

Sapphire Energy appreciates your attention to this matter. Please contact me if you have any questions regarding our submittal.

Sincerely,

Brian Goodall, Ph.D.
Vice President of Downstream Technology

Attachments

Conversation Record

Project name: Sapphire Bio-Algal Fuel Farm
Date: July 14, 2009
Contact: Ann Swanberg-Mee
Agency: USDA - Rural Development - Business and Cooperative Programs
Phone: 505.761.4972
By: Tom Tangen, AMEC Geomatrix
Subject: Understanding of EA Section F Comments

Existing Section F will be revised into a stand-alone EA that meets USDA requirements. Must not rely on information in any of the other sections. Will schedule another call to determine how we get from present format to a format that meets USDA requirements (assume compatible with CEQ guidance for EA's).

Example of additional information required: How does Sapphire anticipates development of the site (from 300 acres of ponds to a 25,000 acre production site.

Discussed documentation of calls with other agencies to this point. Discussed documentation of contacts with letters moving forward.

Informed her that we have a good handle on flora / fauna species on the site, including potentially T&E species. Revised biological assessment being prepared.

Cory Abraham (717-237-2291) sits in Pennsylvania, and will have input into details about conversion of Section F to an EA that can meet requirements.

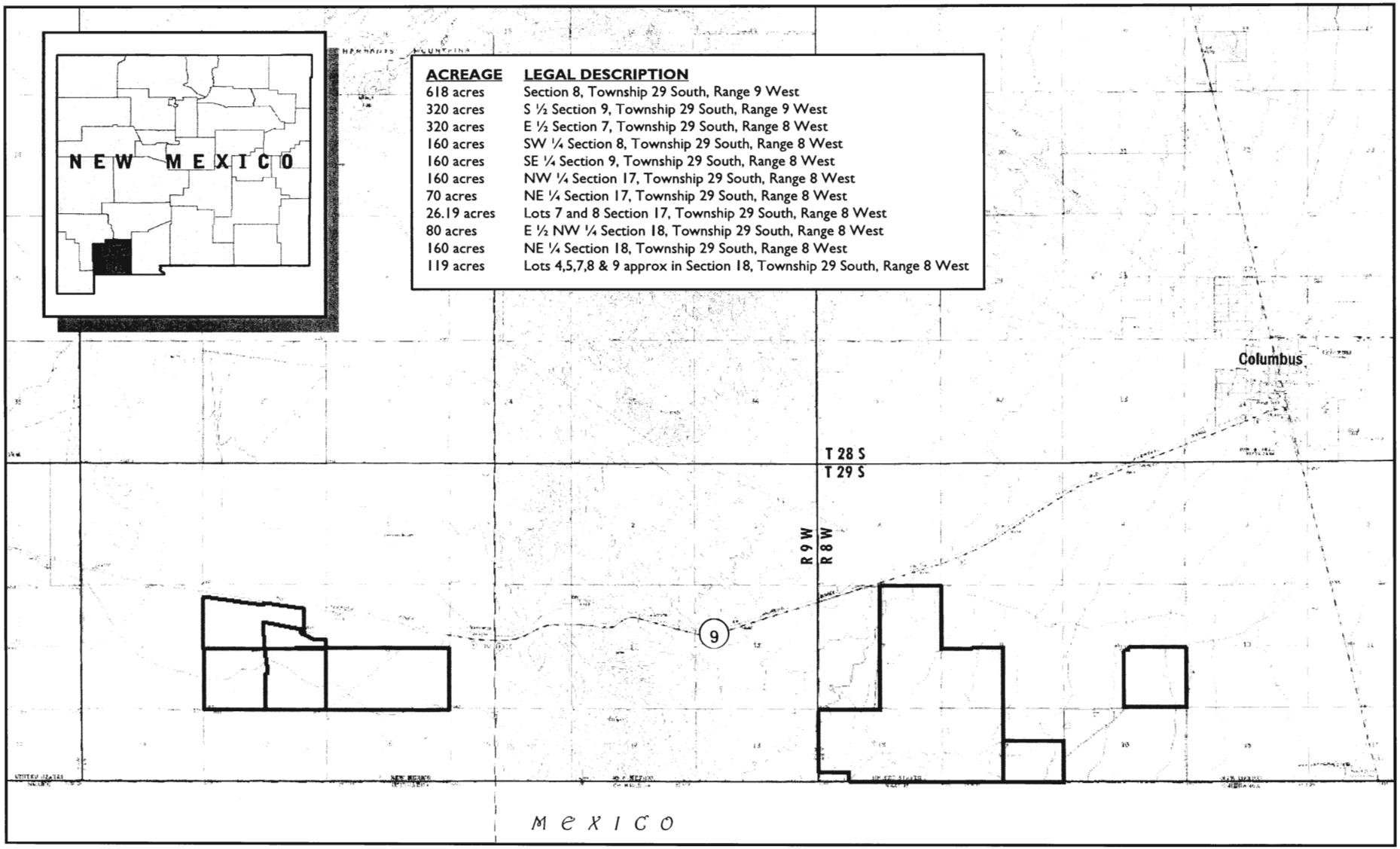
Generalized Project Description
Proposed Integrated Algal Biorefinery
Sapphire Energy Company
Luna County, New Mexico
March 2009
(Updated July 2010)

Sapphire Energy Company (Sapphire) is proposing to conduct a field-scale project in Luna County, New Mexico to further evaluate the feasibility of its proprietary process to generate fuel from algae. The algae used in the proposed project are not new intergeneric organisms within the meaning of the federal Coordinated Framework for Regulation of Biotechnology, 51 Fed. Reg. 23302 – 23309 (June 26, 1986) or any of the implementing regulations under the Framework and, thus, the project is not subject to review by the Animal and Health Inspection Service (APHIS) Biotechnology Regulatory Service under the Plant Protection Act. The field-scale project, referred to by the company as IABR (integrated algal biorefinery), would apply a pilot-proven process to an approximate 400-acre development near Columbus, New Mexico. **Figure 1** shows the locations of the land parcels that will be used to host the development. The primary facilities associated with the project will be located on the western parcel shown on **Figure 1;** the eastern land parcel will be used either for facility development or accessed for groundwater with the extracted water routed to the facility in the western parcel. Details of the layout of facilities associated with the project are being finalized.

The IABR facility would include two primary components; (I) a series of earthen cells (ponds), covering approximately 300 acres, that would be filled to a shallow depth (less than one foot) with water derived from on-site wells; and, (2) a small processing facility (approximately 100 acres of ancillary facilities including roads) wherein the harvested algae would be processed. The ponded water would serve as the host for growing algae in which carbon dioxide would be added to the ponds through a diffuser system. The primary inputs of the IABR are water, carbon dioxide, and natural sunlight that would promote growth of the algae inoculated in the ponds.

When ready, the algae would be harvested and processed at a small on-site facility that would generally separate the water from the algae and create pellets of the product that would be trucked to an existing, permitted offsite facility for oil extraction. At the existing off-site facility, the Company would use a wet extrusion process to generate what it refers to as "green crude," a product that would ultimately be shipped via truck to an existing oil refinery for further processing into a refined fuel. It is anticipated that approximately 100 barrels of green crude would be generated daily using this process, or approximately 30,000 barrels per year. Concurrent with the production of green crude is the production of solid post-extracted residual biomass which will either be digested anaerobically to biogas to provide thermal energy required during processing or used as animal feed.

The primary waste products from the process at the proposed IABR site would be wastewater. The water would be recycled into the cells hosting the algae farm. Water to start the operation as well as provide make-up water would be obtained from existing on-site wells. The expected water demand for the IABR project is approximately 3,500 acre feet per year. Approximately 15,000 to 30,000 tons of carbon dioxide would be used annually as an additive to the process to promote algal growth. The peak power demand to support the IABR project would be less than 2 megawatts, which would be accessed through existing infrastructure at the proposed project site.



Proposed IABR Sites
Luna County, New Mexico
FIGURE 1

March 10, 2009

Energy, Minerals, Forestry and Resources Conservation Division
State Forester
P.O. Box 1948
Santa Fe, New Mexico 87504

Dear Sir/Madam:

RE: Proposed Sapphire Energy Company Integrated Algal Biorefinery Project, Luna County, New Mexico

Sapphire Energy Company is in the process of making a request for financial assistance to USDA-Rural Development. It is necessary that Rural Development determine compliance with the requirements of the environmental assessment process on any project financed by the agency.

Attached is a location map and a description of the proposed project for which financial assistance has been requested. We would appreciate your advice as to whether the project would affect any regulations under your jurisdiction as well as provide us other information concerning the project site that you may have available. We would like this information back as soon as possible and no later than April 10, 2009.

Thank you for your attention to this matter.

Sincerely,

Brian Goodall, Ph.D.
Vice President of Downstream Technology

Attachments

Conversation Record

Project name: Sapphire Bio-Algal Fuel Farm
Date: July 22, 2009
Contact: Butch Blazer
Phone: 505-476-3200
By: Jim Stapleton, AMEC Geomatrix
Subject: Threatened or Endangered Flora or Fauna

The department received letter and if there is no conflict and no endangered or threatened flora or fauna , then they don't need to be involved in the loop and usually will not respond to the letter. They will only respond if there is a known problem.

March 10, 2009

National Park Service
Regional Director
P.O. Box 728
Santa Fe, New Mexico 87504

Dear Sir/Madam:

RE: Proposed Sapphire Energy Company Integrated Algal Biorefinery Project, Luna County, New Mexico

Sapphire Energy Company is in the process of making a request for financial assistance to USDA-Rural Development. It is necessary that Rural Development determine compliance with the requirements of the environmental assessment process on any project financed by the agency.

Attached is a location map and a description of the proposed project for which financial assistance has been requested. We would appreciate your advice as to whether the project would affect any regulations under your jurisdiction as well as provide us other information concerning the project site that you may have available. We would like this information back as soon as possible and no later than April 10, 2009.

Thank you for your attention to this matter.

Sincerely,

Brian Goodall, Ph.D.
Vice President of Downstream Technology

Attachments

March 10, 2009

New Mexico Department of Game and Fish
Director
P.O. Box 25112
Santa Fe, New Mexico 87504

Dear Sir/Madam:

RE: Proposed Sapphire Energy Company Integrated Algal Biorefinery Project, Luna County, New Mexico

Sapphire Energy Company is in the process of making a request for financial assistance to USDA-Rural Development. It is necessary that Rural Development determine compliance with the requirements of the environmental assessment process on any project financed by the agency.

Attached is a location map and a description of the proposed project for which financial assistance has been requested. We would appreciate your advice as to whether the project would affect any regulations under your jurisdiction as well as provide us other information concerning the project site that you may have available. We would like this information back as soon as possible and no later than April 10, 2009.

Thank you for your attention to this matter.

Sincerely,

Brian Goodall, Ph.D.
Vice President of Downstream Technology

Attachments

Conversation Record

Project name: Sapphire Bio-Algal Fuel Farm
Date: June 5, 2009
Contact: Eliza Gilbert
Agency: New Mexico Game and Fish
Phone: 505.476.8130
By: Tom Tangen, AMEC Geomatrix
Subject: NM Process for T & E Permitting

Ms. Gilbert does not know how the Federal process for T&E consultation works. It does not occur in conjunction with the NMDGF process. The State of NM process is not similar to the Federal process. The State of NM does not have authority to allow a direct take of T&E species.

In the case we encounter T&E species at the site, we have some options that can be pursued: 1. try to enhance off site species habitat 2. Get permission to move the species in question, such as possibly move burrowing owls.

In terms of consultation requirements: The NMDGF doe not have a formal process for consultation. Unless there is a Federal nexus. In that case, the US Dept of F&G will require us to consult with them (USDFW) and with the NMDGF. NMDGF will require a site eco survey and a description of the Project (POO). There is no need for a meeting, but the State biologist may ask for one depending on the project. The State biologist will usually ask for and take 30 days to respond to a notification about the project. If there are no fauna T&E species detected at the site, there is usually no need to consult, but if there are some T&E species, consultation is Strongly Recommended.

To reiterate,State of NM and Feds usually do separate consultations if required. There is no formalized MOA or other agreement in place to control interactions between State and Feds. NMDGF is trying to re-introduce Aplomado Falcons into Luna, Hidalgo, Grant and Sierra counties. Person at the state with good Aplomado Falcon knowledge and knowledge of the reintroduction methods is Hira Walker 505 476 8109. Ms. Gilbert also suggested I try to reach Ms. Terra Manasco with the Conservation Services Division if I have more questions. P.O. 25112, Santa Fe, 87507

Project name:	**Sapphire Bio-Algal Fuel Farm**
Date:	**07/24/09**
Contact:	**Mike Hine or Wally Murphy**
Agency:	**US Fish & Wildlife Service**
Phone:	**505-248-6911**
By:	**Jim Stapleton, AMEC Geomatrix**

Called US Fish and Wildlife Service and left a message that we are going to send a report documenting a June 2009 Flora and fauna survey. Have another survey planned for later in the summer.

March 10, 2009

New Mexico Environment Department
Air Quality Bureau
P.O. Box 26110
Santa Fe, New Mexico 26110

Dear Sir/Madam:

RE: Proposed Sapphire Energy Company Integrated Algal Biorefinery Project, Luna County, New Mexico

Sapphire Energy Company is in the process of making a request for financial assistance to USDA-Rural Development. It is necessary that Rural Development determine compliance with the requirements of the environmental assessment process on any project financed by the agency.

Attached is a location map and a description of the proposed project for which financial assistance has been requested. We would appreciate your advice as to whether the project would affect any regulations under your jurisdiction as well as provide us other information concerning the project site that you may have available. We would like this information back as soon as possible and no later than April 10, 2009.

Thank you for your attention to this matter.

Sincerely,

Brian Goodall, Ph.D.
Vice President of Downstream Technology

Attachments

Conversation Record

Project name: Sapphire Bio-Algal Fuel Farm
Date: July 22, 2009
Contact: Ted Schooley
Agency: NM Environment Department – Air quality
Phone: 505-827-2855
By: Jim Stapleton, AMEC Geomatrix
Subject: Called ted on 7/22, left a voicemail. Told him that we were still working on the permitting. I also tried calling him on 7/23 – He has not returned my call.

March 10, 2009

New Mexico Environment Department
Water and Waste Management Division
P.O. Box 26110
Santa Fe, New Mexico 26110

Dear Sir/Madam:

RE: Proposed Sapphire Energy Company Integrated Algal Biorefinery Project, Luna County, New Mexico

Sapphire Energy Company is in the process of making a request for financial assistance to USDA-Rural Development. It is necessary that Rural Development determine compliance with the requirements of the environmental assessment process on any project financed by the agency.

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Thank you for your attention to this matter.

Sincerely,

Brian Goodall, Ph.D.
Vice President of Downstream Technology

Attachments

Meeting Conversation Record

Project name: Sapphire Bio-Algal Fuel Farm
Date: April 16, 2009
Agency Attendance: George Schuman
AMEC Geomatrix Attendance: Tom Tangen, Myles Grotbo
Subject: Discussion of Agency Requirements for Groundwater Permit

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Discussion centered on how to demonstrate to the NMED that Sapphire can demonstrate no effect on groundwater.

GS – NMED would like to review any data from a pilot test to demonstrate the liner capatility
Stated there is some obligation to do a pilot test
Applicant will have to come up with testwork to support a discharge plan

MG - asked about how aquifers are defined in NM

GS - an aquifer in NM has to produce enough water to sustain a yield
Went on to state that a perched groundwater zone, if large enough, could be considered receiving water and if > 10,000 mg/l TDS would not be considered "protectable" water under NM law.
Stated that Sapphire could possibly demonstrate whether the perched zones were actually aquifers under the NM definition IF the drillers logs were detailed enough. Probably not likely however.

MG / TT – asked how NMED will review a discharge plan and associated design for a pond liner

GS - NMED would have an engineer review the design in detail, but more important, they would do a review on the BASIS for the design.
NMED will also require a monitoring plan
NMED will require submittal of a liner design, not just criteria
NMED would establish a point of compliance near the site, (probably no less than 20 – 50 feet from a potential source
Discussed monitoring well screening criteria. Screened no more than 15 feet below the level of the phreatic surface and 5 feet of screen above the top of the water table.

MG/TT- asked about Septic tank permits

GS - Stated that there are two permits available in NM <2,000 gallons per day (gpd) and >2000 gpd, review requirements in NMAC 20.7.3. Need criteria on size of facility.

MG/TT - asked about timing of obtaining a permit from NMED.

GS - Stated that a field test producing credible data may take as much as 4 – 6 months.
After receipt of NOI and field test data, and design, NMED would need a minimum of 4-6 months to review a permit application. Best possible scenario with NO public interest.

GS - Stated that apparently the Las Cruces R&D facility is discharging without a permit.

March 10, 2009

New Mexico State Highway and Transportation Department
District Engineer, NMSHTP
2912 E. Pine Street
Deming, New Mexico 88030

Dear Sir/Madam:

RE: Proposed Sapphire Energy Company Integrated Algal Biorefinery Project, Luna County, New Mexico

Sapphire Energy Company is in the process of making a request for financial assistance to USDA-Rural Development. It is necessary that Rural Development determine compliance with the requirements of the environmental assessment process on any project financed by the agency.

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Thank you for your attention to this matter.

Sincerely,

Brian Goodall, Ph.D.
Vice President of Downstream Technology

Attachments

March 10, 2009

Office of the State Engineer
State Engineer
Bataan Memorial Building, Room 101
P.O. Box 25102
Santa Fe, New Mexico 87504-5102

Dear Sir/Madam:

RE: Proposed Sapphire Energy Company Integrated Algal Biorefinery Project, Luna County, New Mexico

Sapphire Energy Company is in the process of making a request for financial assistance to USDA-Rural Development. It is necessary that Rural Development determine compliance with the requirements of the environmental assessment process on any project financed by the agency.

Attached is a location map and a description of the proposed project for which financial assistance has been requested. We would appreciate your advice as to whether the project would affect any regulations under your jurisdiction as well as provide us other information concerning the project site that you may have available. We would like this information back as soon as possible and no later than April 10, 2009.

Thank you for your attention to this matter.

Sincerely,

Brian Goodall, Ph.D.
Vice President of Downstream Technology

Attachments

CONFERENCE CALL MEETING NOTES
August 19, 2009
11:00 am MST

ATTENDEES:

- **US DEPARTMENT OF AGRICULTURE**
  - Korah Abraham
  - Juliet Bochicchio
  - George Scott

- **Office of the State Engineer (OSE) – New Mexico**
  - John D'Antonio
  - John Romero
  - Jim Seizmore

- **Sapphire Energy, Inc.**
  - Jaime Moreno
  - Bryn Davis
  - Nick Hofmeister

- **AMEC Geomatrix, Inc.**
  - Myles Grotbo
  - Terry Grotbo
  - Cam Stringer

Mr. John D'Antonio (the State Engineer for New Mexico) briefly described the jurisdiction of his office related to water rights in New Mexico. Mr. D'Antonio identified to the call participants the awareness his agency has of the IABR project and the level of involvement the OSE has had to date in discussing water rights associated with the Cooper Property, the amount of consumptive use that would be allowed under New Mexico water law.

Mr. D'Antonio indicated that the leasing of water rights to make up the difference between water rights appurtenant to the IABR property and the water requirements of the IABR was a good strategy because it would provide water rights that are already proven, easing the process transferring water to the IABR facility. He affirmed that his office will work with Sapphire through the process of water rights consumptive use allocation and leasing.

March 10, 2009

State Historic Preservation Officer
Attn: Katherine Slick
Bataan Memorial Building
407 Galisteo Street, Suite 236
Santa Fe, New Mexico 87501

Dear Ms. Slick:

RE: Proposed Sapphire Energy Company Integrated Algal Biorefinery Project, Luna County, New Mexico

Sapphire Energy Company is in the process of making a request for financial assistance to USDA-Rural Development. It is necessary that Rural Development determine compliance with the requirements of the environmental assessment process on any project financed by the agency.

Attached is a location map and a description of the proposed project for which financial assistance has been requested. We would appreciate your advice as to whether the project would affect any regulations under your jurisdiction as well as provide us other information concerning the project site that you may have available. We would like this information back as soon as possible and no later than April 10, 2009.

Thank you for your attention to this matter.

Sincerely,

Brian Goodall, Ph.D.
Vice President of Downstream Technology

Attachments

Sapphire Energy

3115 Merryfield Row, Lab 130
San Diego, California 92121
858-530-3656 ph | 888.501.8353 fax

March 10, 2009

NMCRIS

DRE 499

State Historic Preservation Officer
Attn: Katherine Slick
Bataan Memorial Building
407 Galisteo Street, Suite 236
Santa Fe, New Mexico 87501

Dear Ms. Slick:

RE: Proposed Sapphire Energy Company Integrated Algal Biorefinery Project, Luna County, New Mexico

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Thank you for your attention to this matter.

Sincerely,

Brian Goodall, Ph.D.
Vice President of Downstream Technology

Attachments;
IABR_Site.pdf
Generalized Project Description 09March09.pdf

COMMENTS

Michelle Ensey
for NM State Historic Preservation Officer

If financial assistance is obtained from Rural Development or federal land is involved Consultation with this office will be required under Section 106 of the National Historic Preservation Act. If state land is involved, consultation will be required under state law.

USDA Rural Development

United States Department of Agriculture
Rural Development
State of New Mexico

MME

August 13, 2009

SUBJECT: Sapphire Energy Company Integrated Algal Bio-Refinery Facility Project - Determination of No Effect

087483

TO: Ms. Michelle Ensey
State of New Mexico
Department of Cultural Affairs
Historic Preservation Division
Bataan Memorial Bldg (2nd floor)
407 Galisteo Street
Santa Fe, NM 87501

Dear Ms. Ensey:

Rural Development (RD) is proposing to provide Federal Financial Assistance to Sapphire Energy for the construction of an Integrated Algal Bio-Refinery Facility southwest of the community of Columbus in Luna County, New Mexico. In late July the environmental consultant, AMEC Geomatrix, Inc. had forwarded a cultural resource survey prepared by Lone Mountain Archeological Services, Inc. to your office for your review. Project Area 1, as described in the report, is the Area of Potential Effect for the proposed undertaking.

RD requests concurrence with a "Determination of No Effect" from your office for the project.

If you have any questions on the above proposal, please feel free to contact me at (505) 471-4960.

George Scott, P.E.
Rural Development Engineer

No Historic Properties Affected. 8/31/09

michelle Ensey
for NM State Historic Preservation Officer

Concur that the proposed project will have no effect as long as project is constructed in Area 1. If there is any change in plans and Area 2 will be used, then consultation with this office will be required.

6200 Jefferson NE • Suite 255 • Albuquerque, NM 87109
505-761-4950 • Fax - 505-761-4976 • TDD - 505-761-4938

Committed to the future of rural communities

Green, Lynne

From: Grotbo, Terry
Sent: Friday, August 14, 2009 3:53 PM
To: Green, Lynne
Subject: FW: Cultural Resources Survey - Sapphire Energy

Terry Grotbo
Geologist
amec Geomatrix Inc.
1824 North Last Chance Gulch
Helena, MT 59601
406-442-0860
terry.grotbo@amec.com

From: Grotbo, Myles
Sent: Thursday, August 13, 2009 4:21 PM
To: Grotbo, Terry
Subject: FW: Cultural Resources Survey - Sapphire Energy

FYI...

Myles Grotbo
406-442-0860

From: Ensey, Michelle, DCA [mailto:michelle.ensey@state.nm.us]
Sent: Thursday, August 13, 2009 4:16 PM
To: Tangen, Tom
Cc: jaime.moreno@sapphireenergy.com; george.scott@nm.usda.gov; Grotbo, Myles
Subject: RE: Cultural Resources Survey - Sapphire Energy

Tom,

I apologize for not getting back to you sooner, but I have reviewed the report and just spoke with George Scott. George will send me a letter requesting concurrence with a determination of No Historic Properties Affected. I agree with the archaeologist that the site, LA 162362 within project area 1 is not eligible. If this is the preferred project area, then we will be able to concur with the no effect determination when the letter arrives from Rural Development. In the meantime, I will need the Laboratory of Anthropology (LA) site records for all seven archaeological sites that were recorded during the survey of both Area 1 and Area 2. The archaeological consultant should have provided these forms to you. Please send them to me in the mail as soon as possible.

Please call or email me if you have any questions.

Michelle M. Ensey
Archaeologist
Department of Cultural Affairs
Historic Preservation Division
Bataan Memorial Building
407 Galisteo Street, Suite 236

May 30, 2009

Ms. Lori Allen
Realty Specialist, Lands and Minerals
Las Cruces District Office
Bureau of Land Management
1800 Marquess Street
Las Cruces, New Mexico 88005

Re: Access to BLM – Managed Land Near Columbus, New Mexico

Dear Ms. Allen

This letter is notification to BLM that biologists with Amec Geomatrix will be accessing privately held, State managed, and Federally managed land near Columbus, New Mexico for the purpose of conducting an ecological survey during the week of June 1 through 5. The survey is associated with potential development of an algae growth and processing facility and will focus on studies of migratory birds, other fauna and flora, and presence / absence of jurisdictional wetlands and non-wetland waters of the US.

The biologists will be accessing land in the area of Sections 7, 8, 9, 16, 17, and 18 in T29S, R8W; and Sections 7, 8, 9, 10, 11, 12, 13, 14,15, 16, 17, and 18 in T29S, R9W. If you have any questions regarding this activity, please contact me at the numbers or email address below.

Sincerely yours,
AMEC Geomatrix, Inc.

Tom Tangen
Senior Engineer
Direct Tel.: 505 821 0221
Cell Phone: 505 301 2081
E-mail: tom.tangen@mec.com

forward via email.

AMEC Geomatrix, Inc.
7007 Wyoming Blvd. NE, Suite F1
Albuquerque, NM
USA 87109-3983
Tel (505) 821-0221
www.amecgeomatrixinc.com

AMEC Geomatrix

Green, Lynne

From: Grotbo, Terry
Sent: Friday, August 14, 2009 3:52 PM
To: Green, Lynne
Subject: FW: transmittal
Attachments: transmittal - site forms- Dept of Cultural Affairs - M. Ensey.pdf

Terry Grotbo
Geologist
amec Geomatrix Inc.
1824 North Last Chance Gulch
Helena, MT 59601
406-442-0860
terry.grotbo@amec.com

From: Tangen, Tom
Sent: Friday, August 14, 2009 10:14 AM
To: george.scott@nm.usda.gov
Cc: Jaime Moreno; Grotbo, Terry; Grotbo, Myles
Subject: transmittal

Mr. Scott,
I am attaching a copy of the transmittal that accompanied the site forms requested by Ms. Michelle Ensey of the Dept of Cultural Affairs. The forms were fedexed priority overnight on August 14.

Regards to all,

Tom

Tom Tangen
Senior Engineer
Amec - Geomatrix
7007 Wyoming Blvd. NE, Suite F-1
Albuquerque, NM 87109
Office 505-821-0221
Cell 505-301-2081
tom.tangen@amec.com

Santa Fe, NM 87501
voice: (505) 827-4064
fax: (505) 827-6338
michelle.ensey@state.nm.us
www.nmhistoricpreservation.org

From: Tangen, Tom [mailto:Tom.Tangen@amec.com]
Sent: Wednesday, July 29, 2009 7:21 AM
To: Ensey, Michelle, DCA
Cc: jaime.moreno@sapphireenergy.com; george.scott@nm.usda.gov; Grotbo, Myles
Subject: Cultural Resources Survey - Sapphire Energy

Good Morning Ms. Ensey,
You were contacted several days ago by Ms. Ann Swanberg-Mee with USDA Rural Development regarding an integrated algal biorefinery project being proposed for development in Luna County, NM by Sapphire Energy. Ms. Swanberg-Mee informed me of your conversation and asked that I forward the attached cultural resources survey completed for the project earlier this year. The attached cover letter describes the project and discusses project contacts.

I will follow this electronic submittal with hard copies of the survey and the attached letter. Please let me know how many hard copies you will require. If you have any questions about this submittal or other issues, please contact me at the email address or phone numbers below.

Regards,
Tom Tangen

Tom Tangen
Senior Engineer
Amec - Geomatrix
7007 Wyoming Blvd. NE, Suite F-1
Albuquerque, NM 87109
Office 505-821-0221
Cell 505-301-2081
tom.tangen@amec.com

USDA Rural Development

United States Department of Agriculture
Rural Development
State of New Mexico

July 30, 2009

SUBJECT: Integrated Algal Bio-Refinery Facility (IABR), Luna County - Determination of No Effect

TO: Fort Sill Apache Tribe
Jeff Houser,Chairman
Rt. 2, Box 121
Apache, OK 73006

Dear Mr. Houser,

Rural Development (RD) is proposing to provide Federal Financial Assistance to the Sapphire Energy Company. The project consists of construction of an Integrated Algal Bio-Refinery Facility (IABR) in Luna County, New Mexico (Figure 1 and Figure 2). The purpose of the project is to construct and operate a demonstration-scale facility in the United States (US) that produces jet and diesel fuel, derived from renewable algae sources.

A generalized layout of key components associated with the proposed IABR facility, including approximately 300 acres of ponds, is illustrated in Figure 1. Existing wells on the property will be used to supply the water necessary to fill and maintain the ponds. Please consider the green shaded area in Figure 2 to be the Area of Potential Effect (APE). The APE as depicted will include all access routes and staging areas.

Enclosed with this letter is a copy of the *Cultural Resource Survey for the Mimbres Due Diligence Project, Luna County, New Mexico, NMCRIS Number 113215*a project description and maps of the area and proposed improvements.

RD has made a determination of "no effect" for this undertaking. Should we not receive a response from your office within 30 days from the date of receipt of this letter, we will assume that this project will not have an adverse effect on any archeological or historic concerns and will proceed with the project. If you have any questions on the above proposal, please feel free to contact me at (505) 471-4960.

Sincerely,

George Scott, P.E.
Rural Development Engineer

6200 Jefferson NE • Suite 255 • Albuquerque, NM 87109
505-761-4950 • Fax - 505-761-4976 • TDD - 505-761-4938

Committed to the future of rural communities

USDA Rural Development

United States Department of Agriculture
Rural Development
State of New Mexico

July 30, 2009

SUBJECT: Integrated Algal Bio-Refinery Facility (IABR), Luna County - Determination of No Effect

TO: Hopi Tribe
Benjamin Nuvamsa, Chairman
P.O. Box 123
Kykotsmovi, AZ 86039

Dear Mr. Nuvamsa,

Rural Development (RD) is proposing to provide Federal Financial Assistance to the Sapphire Energy Company. The project consists of construction of an Integrated Algal Bio-Refinery Facility (IABR) in Luna County, New Mexico (Figure 1 and Figure 2). The purpose of the project is to construct and operate a demonstration-scale facility in the United States (US) that produces jet and diesel fuel, derived from renewable algae sources.

A generalized layout of key components associated with the proposed IABR facility, including approximately 300 acres of ponds, is illustrated in Figure 2. Existing wells on the property will be used to supply the water necessary to fill and maintain the ponds. Please consider the green shaded area in Figure 2 to be the Area of Potential Effect (APE). The APE as depicted will include all access routes and staging areas.

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Rural Development Engineer

6200 Jefferson NE • Suite 255 • Albuquerque, NM 87109
505-761-4950 • Fax - 505-761-4976 • TDD - 505-761-4938

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RECEIVED
AUG 20 2009
BY: CPO/KS

8/24/09

RECEIVED
AUG 20 2009
BY:

USDA Rural Development

United States Department of Agriculture
Rural Development
State of New Mexico

July 30, 2009

SUBJECT: Integrated Algal Bio-Refinery Facility (IABR), Luna County
Determination of No Effect

TO: Hopi Tribe
Benjamin Nuvamsa, Chairman
P.O. Box 123
Kykotsmovi, AZ 86039

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A generalized layout of key components associated with the proposed IABR facility, including approximately 300 acres of ponds, is illustrated in Figure 2. Existing wells on the property will be used to supply the water necessary to fill and maintain the ponds. Please consider the green shaded area in Figure 2 to be the Area of Potential Effect (APE). The APE as depicted will include all access routes and staging areas.

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Sincerely,

George Scott, P.E.
Rural Development Engineer

for Margaret Kewanwisiwma
8-21-09

6200 Jefferson NE • Suite 255 • Albuquerque, NM 87109
505-761-4950 • Fax - 505-761-4976 • TDD - 505-761-4938

Committed to the future of rural communities

USDA Rural Development

United States Department of Agriculture
Rural Development
State of New Mexico

July 30, 2009

SUBJECT: Integrated Algal Bio-Refinery Facility (IABR), Luna County - Determination of No Effect

TO: White Mountain Apache Tribe
Ronnie Lupe, Chairman
P.O. Box 700
Whiteriver, AZ 85941

Dear Mr. Lupe,

Rural Development (RD) is proposing to provide Federal Financial Assistance to the Sapphire Energy Company. The project consists of construction of an Integrated Algal Bio-Refinery Facility (IABR) in Luna County, New Mexico (Figure 1 and Figure 2). The purpose of the project is to construct and operate a demonstration-scale facility in the United States (US) that produces jet and diesel fuel, derived from renewable algae sources.

A generalized layout of key components associated with the proposed IABR facility, including approximately 300 acres of ponds, is illustrated in Figure 2. Existing wells on the property will be used to supply the water necessary to fill and maintain the ponds. Please consider the green shaded area in Figure 2 to be the Area of Potential Effect (APE). The APE as depicted will include all access routes and staging areas.

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Sincerely,

George Scott, P.E.
Rural Development Engineer

6200 Jefferson NE • Suite 255 • Albuquerque, NM 87109
505-761-4950 • Fax - 505-761-4976 • TDD - 505-761-4938

Committed to the future of rural communities

USDA Rural Development

United States Department of Agriculture
Rural Development
State of New Mexico

July 30, 2009

SUBJECT: Integrated Algal Bio-Refinery Facility (IABR), Luna County - Determination of No Effect

TO: Mescalero Apache Tribe
President Carleton Naiche-Palmer
P.O. Box 227
Mescalero, NM 88340

Dear Mr. Naiche-Palmer,

Rural Development (RD) is proposing to provide Federal Financial Assistance to the Sapphire Energy Company. The project consists of construction of an Integrated Algal Bio-Refinery Facility (IABR) in Luna County, New Mexico (Figure 1 and Figure 2). The purpose of the project is to construct and operate a demonstration-scale facility in the United States (US) that produces jet and diesel fuel, derived from renewable algae sources.

A generalized layout of key components associated with the proposed IABR facility, including approximately 300 acres of ponds, is illustrated in Figure 2. Existing wells on the property will be used to supply the water necessary to fill and maintain the ponds. Please consider the green shaded area in Figure 2 to be the Area of Potential Effect (APE). The APE as depicted will include all access routes and staging areas.

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Sincerely,

George Scott, P.E.
Rural Development Engineer

6200 Jefferson NE • Suite 255 • Albuquerque, NM 87109
505-761-4950 • Fax - 505-761-4976 • TDD - 505-761-4938

Committed to the future of rural communities

USDA Rural Development

United States Department of Agriculture
Rural Development
State of New Mexico

July 30, 2009

SUBJECT: Integrated Algal Bio-Refinery Facility (IABR), Luna County - Determination of No Effect

TO: Ysleta del Sur Pueblo
Frank Paiz, Governor
P.O. Box 17579 – Ysleta Station
El Paso, TX 79917

Dear Mr. Paiz,

Rural Development (RD) is proposing to provide Federal Financial Assistance to the Sapphire Energy Company. The project consists of construction of an Integrated Algal Bio-Refinery Facility (IABR) in Luna County, New Mexico (Figure 1 and Figure 2). The purpose of the project is to construct and operate a demonstration-scale facility in the United States (US) that produces jet and diesel fuel, derived from renewable algae sources.

A generalized layout of key components associated with the proposed IABR facility, including approximately 300 acres of ponds, is illustrated in Figure 2. Existing wells on the property will be used to supply the water necessary to fill and maintain the ponds. Please consider the green shaded area in Figure 2 to be the Area of Potential Effect (APE). The APE as depicted will include all access routes and staging areas.

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Sincerely,

George Scott, P.E.
Rural Development Engineer

6200 Jefferson NE • Suite 255 • Albuquerque, NM 87109
505-761-4950 • Fax - 505-761-4976 • TDD - 505-761-4938

Committed to the future of rural communities

March 10, 2009

Lela Kaskalla, Governor
Pueblo of Nambe
Route 1, Box 117-BB
Santa Fe, New Mexico 87501

Dear Lela:

RE: Proposed Sapphire Energy Company Integrated Algal Biorefinery Project, Luna County, New Mexico

Sapphire Energy Company is in the process of making a request for financial assistance to USDA-Rural Development. It is necessary that Rural Development determine compliance with the requirements of the environmental assessment process on any project financed by the agency.

Attached is a location map and a description of the proposed project for which financial assistance has been requested. We would appreciate your advice as to whether the project would affect any regulations under your jurisdiction as well as provide us other information concerning the project site that you may have available. We would like this information back as soon as possible and no later than April 10, 2009.

Thank you for your attention to this matter.

Sincerely,

Brian Goodall, Ph.D.
Vice President of Downstream Technology

Attachments

March 10, 2009

Donald Eriacho, Governor
Pueblo of Zuni
P.O. Box 339
Zuni, New Mexico 87327

Dear Mr. Eriacho:

RE: Proposed Sapphire Energy Company Integrated Algal Biorefinery Project, Luna County, New Mexico

Sapphire Energy Company is in the process of making a request for financial assistance to USDA-Rural Development. It is necessary that Rural Development determine compliance with the requirements of the environmental assessment process on any project financed by the agency.

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Thank you for your attention to this matter.

Sincerely,

Brian Goodall, Ph.D.
Vice President of Downstream Technology

Attachments

March 10, 2009

U.S. Army Corps of Engineers
Attn: Construction Operations Division
Regulatory Branch
4101 Jefferson Plaza, NE
Albuquerque, New Mexico 87109-3435

Dear Sir/Madam:

RE: Proposed Sapphire Energy Company Integrated Algal Biorefinery Project, Luna County, New Mexico

Sapphire Energy Company is in the process of making a request for financial assistance to USDA-Rural Development. It is necessary that Rural Development determine compliance with the requirements of the environmental assessment process on any project financed by the agency.

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Thank you for your attention to this matter.

Sincerely,

Brian Goodall, Ph.D.
Vice President of Downstream Technology

Attachments

Conversation Record

Project name:	Sapphire Bio-Algal Fuel Farm
Date:	6-24-09
Contact:	Lesley McWhirter, U.S. Army Corps of Engineers, Albuquerque District
By:	Shelly Adams, AMEC Earth & Environmental, Inc.
Subject:	Jurisdictional Determinations in New Mexico

After describing the wetland north of the highway, the ephemeral washes, and their overland surface discharge across the Mexico border, Lesley McWhirter "highly recommended" coordinating with the Corps. She said there were two options – either obtaining an approved jurisdictional determination (JD) or submitting a Preliminary JD Form for our project. She said even though initially it seems that there is no "significant nexus" and that the wetland may be an isolated water she recommends coordination due to the difficulties involved with the recent Rapanos and SWANNC rulings, and crossing the Mexico border. (Ephemeral washes without a significant nexus to a navigable water of the U.S. and isolated wetlands are not jurisdictional to the Corps).

Lesley discussed the two options. The benefit of a Preliminary JD is that it is a quicker process, but the drawback is that you are accepting that everything is jurisdictional (even if they would have been determined non-jurisdictional otherwise) and will be held to all Section 404 permit requirements (Nationwide Permit, Preconstruction Notification, Individual Permit, etc). Obtaining an approved JD (based on conducting delineations), on the other hand, is a slower process, but there is a possibility of receiving a non-jurisdictional status and the proponent would not need a permit from the Corps.

The JD package would be submitted to the EPA (by the Corps) for concurrence on the "significant nexus" determination, which takes approximately one month to one and a half months. The "isolated waters" determination goes through a separate process and is determined by the Corps and EPA. This process takes about 3 months for approval.

She recommended calling out the wetland on the JD package even if we're not impacting it and to state that we are avoiding it if that is the case. She said that Rick Gatewood, out of the El Paso Field Office, would actually be the Project Manager, but recommended coordinating with Kelly Allen initially and for any questions we may have. (Rick is new to his position). Kelly Allen is apparently updating a JD checklist with the recent Rapanos rulings included. Lesley said she would contact Kelly and ask her to send us the JD checklist as soon as possible.

Leferink, Richard

From: McWhirter, Lesley A SPA [Lesley.A.McWhirter@usace.army.mil]
Sent: Wednesday, June 24, 2009 1:57 PM
To: Adams, Shelly
Cc: Allen, Kelly E SPA
Subject: JD in southern NM

Shelly,

Regarding your inquiry on information required for an approved JD, I am asking our regulatory PM, Kelly Allen, to send you our JD checklist. This should help you put together the information we will need to do an approved JD. Since the proposed project is located on the NM/Mexico border, your JD request submittal should be sent to Rick Gatewood in our El Paso field office (see mailing address on our website).

If you have any questions, please feel free to call me at the number below, or Kelly at 505-342-3216.

Lesley McWhirter
NM/TX Branch Chief, Regulatory Division
Albuquerque District, U.S. Army Corps of Engineers
4101 Jefferson Plaza NE
Albuquerque, NM 87109

Office: 505-342-3678
Fax: 505-342-3498

Information about the Regulatory Program is available at http://www.spa.usace.army.mil/reg/

Leferink, Richard

From: Allen, Kelly E SPA [Kelly.E.Allen@usace.army.mil]
Sent: Thursday, June 25, 2009 2:22 PM
To: Adams, Shelly
Subject: USACE JD checklist
Attachments: NAl_JD_general.doc

Shelly,
Attached is our JD checklist. I incorporated data collection required for Approved (Rapanos) JDs. In the case of Preliminary JDs less data collection is required. If you have any questions please let me know. Thanks.

<<NAl_JD_general.doc>>

Kelly E. Allen
Project Manager
Regulatory Division, Albuquerque District
U.S. Army Corps of Engineers
4101 Jefferson Plaza NE
Albuquerque, NM 87109
Office: 505-342-3216
Fax: 505-342-3498

Information about the Regulatory Program is available at http://www.spa.usace.army.mil/reg/

Conversation Record

Project name:	Sapphire Bio-Algal Fuel Farm
Date:	7/22/2009
Contact:	Kelly Allen, U.S. Army Corps of Engineers, Albuquerque
By:	Jim Stapleton, AMEC Geomatrix
Subject:	Jurisdictional Determinations in New Mexico

I spoke to Kelly on 7/22 about the jurisdictional determination. She informed me that their El Paso office would be handling it. The gentleman is Richard Gatewood 505-554-7943. (915) 568-6985

Leferink, Richard

From: Allen, Kelly E SPA [Kelly.E.Allen@usace.army.mil]
Sent: Thursday, June 25, 2009 1:06 PM
To: Adams, Shelly
Subject: FW: JD in southern NM

Shelly,
I'm currently updating the checklist with Rapanos guidance so I'll send it to you shortly. Thanks.

Kelly E. Allen
505-342-3216 office

-----Original Message-----
From: McWhirter, Lesley A SPA
Sent: Wednesday, June 24, 2009 1:57 PM
To: shelly.adams@amec.com
Cc: Allen, Kelly E SPA
Subject: JD in southern NM

Shelly,

Regarding your inquiry on information required for an approved JD, I am asking our regulatory PM, Kelly Allen, to send you our JD checklist. This should help you put together the information we will need to do an approved JD. Since the proposed project is located on the NM/Mexico border, your JD request submittal should be sent to Rick Gatewood in our El Paso field office (see mailing address on our website).

If you have any questions, please feel free to call me at the number below, or Kelly at 505-342-3216.

Lesley McWhirter
NM/TX Branch Chief, Regulatory Division
Albuquerque District, U.S. Army Corps of Engineers
4101 Jefferson Plaza NE
Albuquerque, NM 87109

Office: 505-342-3678
Fax: 505-342-3498

Information about the Regulatory Program is available at
http://www.spa.usace.army.mil/reg/

March 10, 2009

U.S. Environmental Protection Agency
Director
1445 Ross Avenue
Suite 1200
Dallas, Texas 75202-2733

Dear Sir/Madam:

RE: Proposed Sapphire Energy Company Integrated Algal Biorefinery Project, Luna County, New Mexico

Sapphire Energy Company is in the process of making a request for financial assistance to USDA-Rural Development. It is necessary that Rural Development determine compliance with the requirements of the environmental assessment process on any project financed by the agency.

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Thank you for your attention to this matter.

Sincerely,

Brian Goodall, Ph.D.
Vice President of Downstream Technology

Attachments

May 30, 2009

Ms. Lori Allen
Realty Specialist, Lands and Minerals
Las Cruces District Office
Bureau of Land Management
1800 Marquess Street
Las Cruces, New Mexico 88005

Re: Access to BLM – Managed Land Near Columbus, New Mexico

Dear Ms. Allen

This letter is notification to BLM that biologists with Amec Geomatrix will be accessing privately held, State managed, and Federally managed land near Columbus, New Mexico for the purpose of conducting an ecological survey during the week of June 1 through 5. The survey is associated with potential development of an algae growth and processing facility and will focus on studies of migratory birds, other fauna and flora, and presence / absence of jurisdictional wetlands and non-wetland waters of the US.

The biologists will be accessing land in the area of Sections 7, 8, 9, 16, 17, and 18 in T29S, R8W; and Sections 7, 8, 9, 10, 11, 12, 13, 14,15, 16, 17, and 18 in T29S, R9W. If you have any questions regarding this activity, please contact me at the numbers or email address below.

Sincerely yours,
AMEC Geomatrix, Inc.

Tom Tangen
Senior Engineer
Direct Tel.: 505 821 0221
Cell Phone: 505 301 2081
E-mail: tom.tangen@mec.com

forward via email.

AMEC Geomatrix, Inc.
7007 Wyoming Blvd. NE, Suite F1
Albuquerque, NM
USA 87109-3983
Tel (505) 821-0221
www.amecgeomatrixinc.com

AMEC Geomatrix

March 10, 2009

Natural Resource Conservation Service
District Conservationist
Deming Service Center
405 E Florida Street
Deming, New Mexico 88030-5235

Dear Sir/Madam:

RE: Proposed Sapphire Energy Company Integrated Algal Biorefinery Project, Luna County, New Mexico

Sapphire Energy Company is in the process of making a request for financial assistance to USDA-Rural Development. It is necessary that Rural Development determine compliance with the requirements of the environmental assessment process on any project financed by the agency.

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Thank you for your attention to this matter.

Sincerely,

Brian Goodall, Ph.D.
Vice President of Downstream Technology

Attachments

-----Original Message-----
From: Garcia, Luis - Deming, NM [mailto:Luis.Garcia@nm.usda.gov]
Sent: Thursday, July 23, 2009 5:57 PM
To: Stapleton, Jim
Subject: FW: AB Cooper farm

-----Original Message-----
From: Garcia, Luis - Deming, NM
Sent: Thursday, July 23, 2009 4:51 PM
To: 'jim.stapleton@amce.com'
Subject: AB Cooper farm

Mr. Stapleton,

Attached is the letter with associated maps.

luis

United States Department of Agriculture

NRCS

Natural Resources Conservation Service
405 East Florida
Deming, NM 88030
Phone: (575) 546-9692 **Fax:** (575) 546-0038
Web site: www.nm.nrcs.usda.gov

Mr. Stapleton

I have attached some scanned documents. This land you referred to Sect 9- T 29s R 8w has two farms associated with it. Both Farms are documented in Farm Service Agency (FSA) as Farm number 540 and Tract 248. Our prime and unique farm land map shows this land to have both Prime Farmland and Additional Farmland. Please see attached scanned maps.

If you have additional question feel free to give us a call.

Sincerely,

Luis B. Garcia, DC
Deming Field Office
USDA NRCS

MEMORANDUM

DATE: JULY 24, 2009

TO: CHRIS CERQUONE, SENIOR SCIENTIST

FROM: WILHELM WELZENBACH, PROJECT SCIENTIST

RE: CORRESPONDENCE WITH NRCS

To support the USDA BioRefinery Assistance Loan Guarantee application for the Sapphire Energy Project outside Columbus, New Mexico, I obtained the following information and direction from regulatory agencies through personal communication regarding Highly Erodible Lands (HEL) and Farmland of Statewide Importance.

3/23/2009 - Ken Scheffe, State Soil Scientist – Natural Resources Conservation Service (NRCS)

- Mr. Scheffe stated that all areas in Luna County are HEL, due to the windy dry climate.

3/23/2009 - Luis Garcia, Deming Field Office – NRCS District Conservationist

- Mr. Garcia stated that we should obtain the Conservation Plan for the property from the Farm Service Agency (FSA), and that plan will include the field number and site-specific HEL determination.
- Regarding whether the property is a Sodbust, Mr. Garcia stated that any areas with at least 5 years of cropping history prior to 1985 are not considered Sodbust. This means that the project area is not a Sodbust, because the site was reportedly cropped for a long period prior to 1979.

3/23/2009 - Paul Offet, Deming Field Office - FSA

- Provided the current Conservation Plan for the fields on the site, through the land owner's real estate agent. The Conservation Plan, including HEL determination and wetlands sections, was attached with the loan guarantee application. (Further discussion of the Conservation Plan and HEL determination are on Page 2.)

2/9/2009 – Clarence Chavez, Soil Data Quality Specialist – Bureau of Land Management (BLM)

- Mr. Chavez discussed which areas in the Mimbres Basin would be likely to have collapsible soils, and therefore be difficult areas to construct ponds. Mr. Chavez also described the extent of salt-affected soils in Luna County.

Based on the landscape of the IABR site, which has low-angle slopes of less than 2%, and is not downhill from significant arroyos, the conditions that would lead to collapsible soils are not present at the site. Significant gravel fractions were observed in soil during the field survey, and near-surface soils were very dense, which is not indicative of collapsible soil. The field survey was provided in the loan guarantee application.

The IABR site is not considered to be exceptional farmland worthy of land management restrictions. Specifically, the NRCS Web Soil Survey database (found at http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx) does not include the site as an area shown to be "prime farmland, farmland of statewide importance, farmland of local importance, or unique farmland".

Following receipt of comments by USDA on the initial loan guarantee application, the following additional information was obtained in personal communication with FSA and NRCS:

7/24/2009 - Mackie Erwin, Executive Director, Deming Field Office - FSA

- It would be a good practice for new owners to come in to the field office and register themselves with FSA, so they could be tracked by USDA in regards to their practices, and be recognized by USDA. The new owners may want to obtain a new Conservation Plan from NRCS that can be executed by FSA.

7/24/2009 - Santiago Misquez, Deming Field Office - NRCS

- Conservation Plans automatically transfer with the land to the new owner.
- The HEL determination also stays with the land, and does not change, because it is based on the characteristics of the land.
- If new land uses are put in place, then assignment of HEL may no longer apply (such as if annual cropping is no longer performed), because conditions that would lead to high risk of erosion are no longer in place. It would be a good practice for the new owners to come in to the field office and create a new Conservation Plan to reflect their use of the land.

Based on the above two conversations, Sapphire Energy should register with the Deming Field Office of FSA/NRCS as the new owner, and either have NRCS create a new Conservation Plan applicable to the proposed future land use (IABR and surroundings), or obtain from NRCS documentation that the proposed future land use would not need a Conservation Plan because it is neither CRP nor annual tilling and cropping.

U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

RT I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request 8/14/09
Name Of Project SAPPHIRE ENERGY	Federal Agency Involved USDA
Proposed Land Use INTEGRATED ALGA BIO-REFINERY FACILITY	County And State LUNA NEW MEXICO
PART II *(To be completed by NRCS)*	Date Request Received By NRCS

Does the site contain prime, unique, statewide or local important farmland? *(If no, the FPPA does not apply -- do not complete additional parts of this form).*	Yes ☐	No ☐	Acres Irrigated	Average Farm Size
Major Crop(s)	Farmable Land In Govt. Jurisdiction Acres: %		Amount Of Farmland As Defined in FPPA Acres: %	
Name Of Land Evaluation System Used	Name Of Local Site Assessment System		Date Land Evaluation Returned By NRCS	

PART III *(To be completed by Federal Agency)*	Alternative Site Rating Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	400.0			
B. Total Acres To Be Converted Indirectly	442.4			
C. Total Acres In Site	842.4	0.0	0.0	0.0
PART IV *(To be completed by NRCS)* Land Evaluation Information				
A. Total Acres Prime And Unique Farmland				
B. Total Acres Statewide And Local Important Farmland				
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted				
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value				
PART V *(To be completed by NRCS)* Land Evaluation Criterion Relative Value Of Farmland To Be Converted *(Scale of 0 to 100 Points)*	0	0	0	0

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(These criteria are explained in 7 CFR 658.5(b)*	Maximum Points				
1. Area In Nonurban Use	15	15			
2. Perimeter In Nonurban Use	10	10			
3. Percent Of Site Being Farmed	20	0			
4. Protection Provided By State And Local Government	20	0			
5. Distance From Urban Builtup Area	15	15			
6. Distance To Urban Support Services	15	10			
7. Size Of Present Farm Unit Compared To Average	10	10			
8. Creation Of Nonfarmable Farmland	10	0			
9. Availability Of Farm Support Services	5	5			
10. On-Farm Investments	20	0			
11. Effects Of Conversion On Farm Support Services	10	0			
12. Compatibility With Existing Agricultural Use	10	0			
TOTAL SITE ASSESSMENT POINTS	160	65	0	0	0
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland *(From Part V)*	100	0	0	0	0
Total Site Assessment *(From Part VI above or a local site assessment)*	160	65	0	0	0
TOTAL POINTS *(Total of above 2 lines)*	260	65	0	0	0

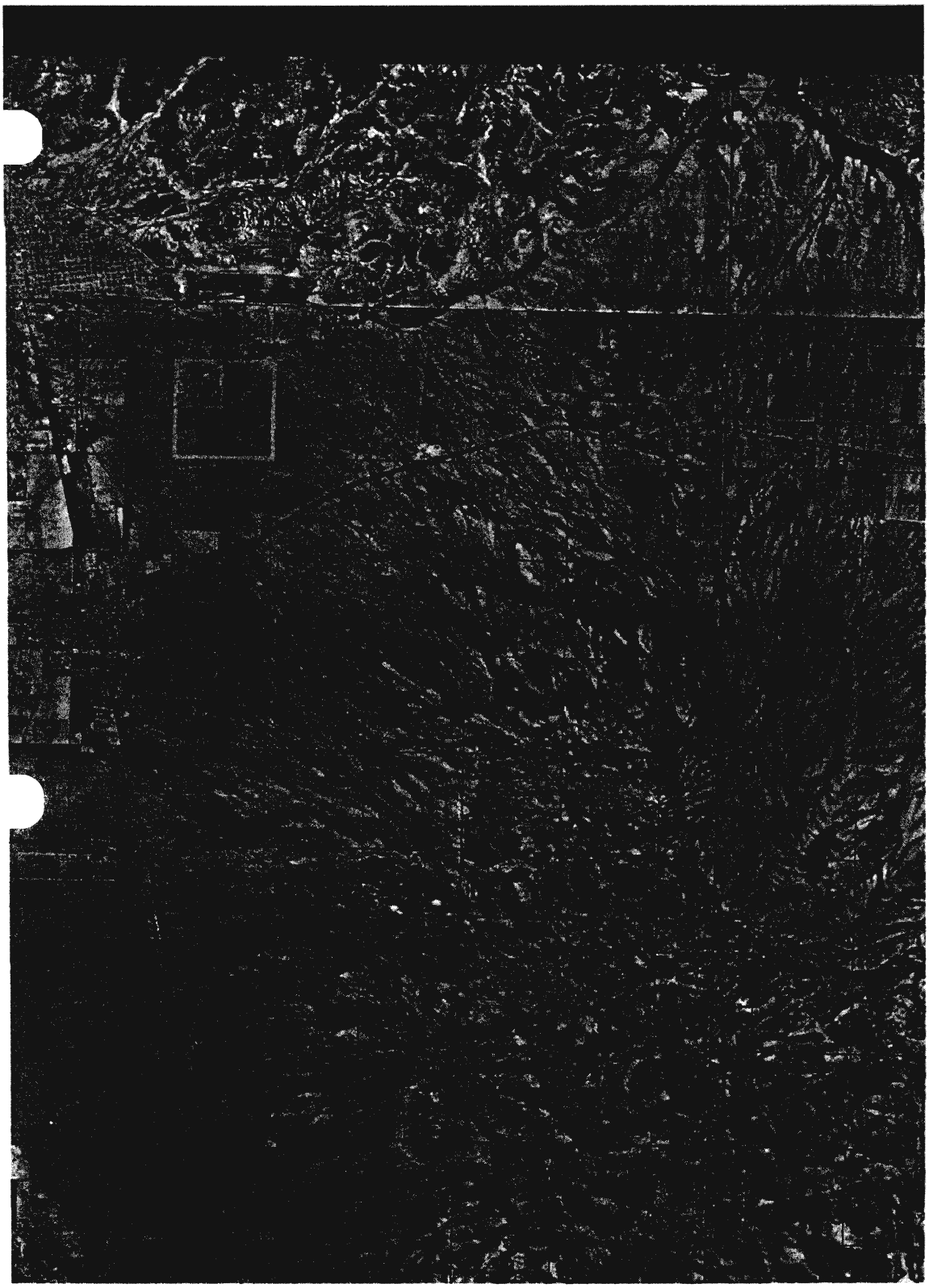
Site Selected:	Date Of Selection	Was A Local Site Assessment Used? Yes ☐ No ☐

Reason For Selection:

(See Instructions on reverse side)

Form AD-1006 (10-83)

This form was electronically produced by National Production Services Staff



Green, Lynne

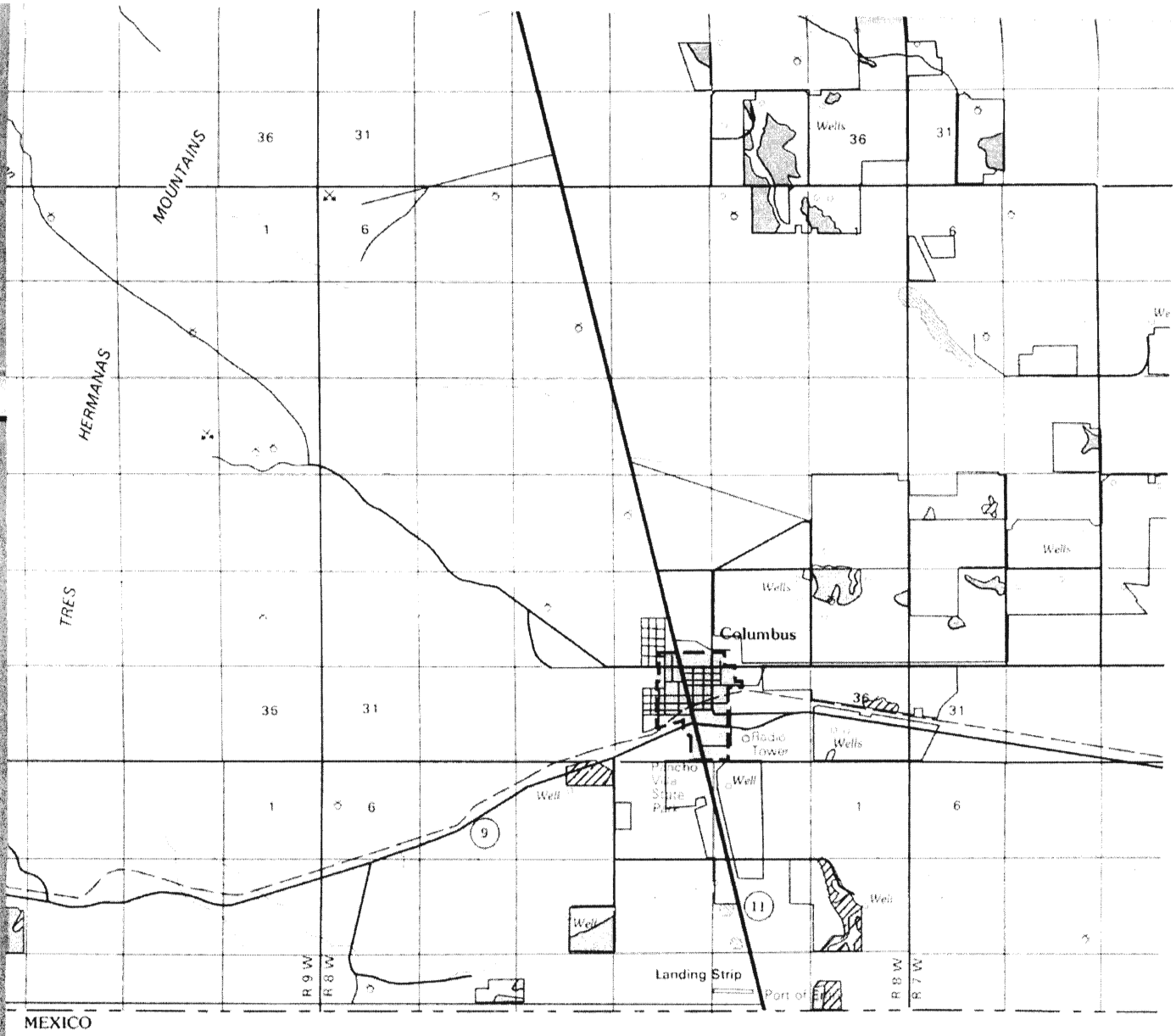
From: Grotbo, Terry
Sent: Friday, August 14, 2009 4:19 PM
To: Green, Lynne
Subject: FW: Form 1006
Attachments: AD1006sapphire.pdf; Appendix A Section VI.doc

Terry Grotbo
Geologist
amec Geomatrix Inc.
1824 North Last Chance Gulch
Helena, MT 59601
406-442-0860
terry.grotbo@amec.com

From: Stapleton, Jim
Sent: Friday, August 14, 2009 2:25 PM
To: Grotbo, Terry
Subject: Form 1006

Terry
Here is form 1006 and an attached info sheet. We are trying to get a location and acreage outline map together and plan to send the whole package to Jamie in the next 30 min.

Jim Stapleton
Project Scientist
Amec - Geomatrix
7007 Wyoming Blvd. NE, Suite F-1
Albuquerque, NM 87109
Office 505-821-0221
jim.stapleton@amec.com



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25000 30000 35000 40000 45000 FEET

6 7 8 9 10 KILOMETERS

79

EPARTMENT OF AGRICULTURE
)IL CONSERVATION SERVICE

LEGEND

Prime farmland
Total acres 38,257

Unique farmland, other than prime
Total acres— none reported

Additional farmland of statewide importance
Total acres 22,804

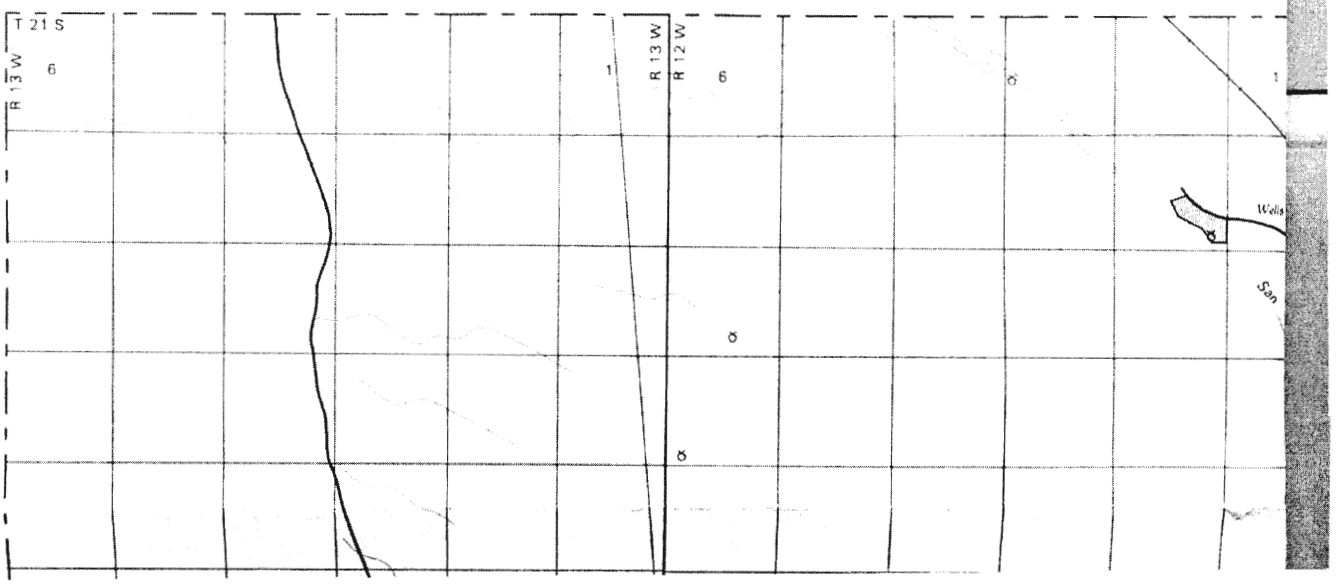
Additional farmland of local importance
Total acres—none reported

Other farmland
Total acres 2,734

Other land

Water areas

Approximate limits of urban growth



U.S. Department of Agriculture

FARMLAND CONVERSION IMPACT RATING

PART I *(To be completed by Federal Agency)*	Date Of Land Evaluation Request 8/14/09
Name Of Project SAPPHIRE ENERGY	Federal Agency Involved USDA
Proposed Land Use INTEGRATED ALGA BIO-REFINERY FACILITY	County And State LUNA NEW MEXICO
PART II *(To be completed by NRCS)*	Date Request Received By NRCS

Does the site contain prime, unique, statewide or local important farmland? *(If no, the FPPA does not apply -- do not complete additional parts of this form).* Yes [redacted] No X KB		Acres Irrigated 0	Average Farm Size
Major Crop(s)	Farmable Land In Govt. Jurisdiction Acres: %	Amount Of Farmland As Defined In FPPA Acres: %	
Name Of Land Evaluation System Used N/A	Name Of Local Site Assessment System N/A	Date Land Evaluation Returned By NRCS	

PART III *(To be completed by Federal Agency)*	Alternative Site Rating			
	Site A	Site B	Site C	Site D
A. Total Acres To Be Converted Directly	400.0			
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A. Total Acres Prime And Unique Farmland	0			
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C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted				
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value				
PART V *(To be completed by NRCS)* Land Evaluation Criterion Relative Value Of Farmland To Be Converted *(Scale of 0 to 100 Points)*	0	0	0	0

PART VI *(To be completed by Federal Agency)* Site Assessment Criteria *(These criteria are explained in 7 CFR 658.5(b)*	Maximum Points				
1. Area In Nonurban Use	15	15			
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PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland *(From Part V)*	100	0	0	0	0
Total Site Assessment *(From Part VI above or a local site assessment)*	160	65	0	0	0
TOTAL POINTS *(Total of above 2 lines)*	260	65	0	0	0

Site Selected:	Date Of Selection	Was A Local Site Assessment Used? Yes ☐ No ☐

Reason For Selection:

Contains no prime, unique, statewide or locally designated cropland. 8/31/09

KENNETH F. SCHEFFE, State Soil Scientist

(See Instructions on reverse side)

Form AD-1006 (10-83)

This form was electronically produced by National Production Services Staff

Part VI Site Assessment Criteria

1. Area In Non-urban Use – 100% of the land is in non-urban use within 1.0 mile from where the project is intended. The nearest urban center is 2 miles away. Maximum Total Points 15, Points earned 15.

2. Perimeter In Non-urban Use – 100% of the land perimeter borders non-urban use. The nearest urban center is 2 miles away. Maximum Total Points 10, Points earned 10.

3. Percentage of Site Being Farmed – 0% of the land is being farmed. The last time the land was farmed was 1978. Maximum Total Points 20, Points earned 0.

4. Protection Provided By State And Local Governments – 0% of the site is subject to state or unit of local government policies or programs to protect farmland or covered by private programs to protect farmland. Maximum Total Points 20, Points earned 0.

5. Distance to Urban Built-up Area – The site is 2 miles or more from an urban built-up area. Maximum Total Points 15, Points earned 15.

6. Distance to Urban Support Services – Some services such as electricity, fire and police protection and schools are more than 1 mile but less than 3 miles from the site. Maximum Total Points 15, points earned 10.

7. Size of Present Farm Unit Compared to Average – The farm unit is as large as the average size farm unit in the area. Maximum Total Points 10, Points earned 10.

8. Creation of Non-Farmable Farmland – The land currently is not farmed but upon closure of the facility the land will be returned to its pre-development conditions. Maximum Total Points 10, Points earned 0.

9. Availability of Farm Support Services – The site will not have an adverse affect on the available farm support services. Currently those services are not being used because no farming has been done since 1978. Maximum Total Points 5, Points earned 5.

10. On-Farm Investments – There are no structures on the site or irrigation systems that are operational. Maximum Total Points 20, Points Earned 0.

11. Effects Of Conversion On Farm Support Services – The site would actually require many support services and possibly create demand some new services. Maximum Total Points 10, points Earned 0.

12. Compatibility With Existing Agricultural Use – The site is currently not being farmed. The site use would be compatible with the surrounding area and would not have any long-term environmental effect. Maximum Total Points 10, Points earned 0.

March 10, 2009

U.S. Fish & Wildlife Service
Field Supervisor
2105 Osuna Rd NE
Albuquerque, New Mexico 87504

Dear Sir/Madam:

RE: Proposed Sapphire Energy Company Integrated Algal Biorefinery Project, Luna County, New Mexico

Sapphire Energy Company is in the process of making a request for financial assistance to USDA-Rural Development. It is necessary that Rural Development determine compliance with the requirements of the environmental assessment process on any project financed by the agency.

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Thank you for your attention to this matter.

Sincerely,

Brian Goodall, Ph.D.
Vice President of Downstream Technology

Attachments

5.5

Sapphire Energy

3115 Merryfield Row, Lab 130
San Diego, California 92121
858-530-3656 ph | 888.501.8353 fax

RECEIVED
MAR 16 2009
USFWS-NMESFO

March 10, 2009

U.S. Fish & Wildlife Service
Field Supervisor
2105 Osuna Rd NE
Albuquerque, New Mexico 87504

Dear Sir/Madam:

RE: Proposed Sapphire Energy Company Integrated Algal Biorefinery Project, Luna County, New Mexico

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Brian Goodall, Ph.D.
Vice President of Downstream Technology

Attachments;
IABR_Site.pdf
Generalized Project Description 09March09.pdf

Conversation Record

Project name:	Sapphire Bio-Algal Fuel Farm
Date:	May 5, 2009
Contact:	Eric Hine, USFWS, Consultation/Federal Nexus Specialist
Phone:	505-761-4735
By:	Shelly Adams, AMEC Earth & Environmental, Inc.
Subject:	Federal Nexus and USFWS Process

Eric Hine concurred that the northern aplomado falcon (NAP) was a non-essential experimental in the project area. NAPs have been sighted in the project vicinity, are historically known to occur in the area, and have a nest between Deming and the project area. USFWS consults regularly with the U.S. Border Patrol regarding NAPs. USFWS is actively reintroducing populations of NAP. Experimental non-essential means that a federal agency cannot jeopardize the continued existence of NAPs. He recommended talking to Pat Zenone, the lead for the NAP.

It is up to the federal lead agency to decide whether to prepare a Biological Assessment (BA), or whether to prepare a hybrid NEPA Environmental Assessment (EA)/BA, in which the determination of effects would be included within. You can embed the Section 7 consultation in the Environmental Assessment.

The species list Sapphire Energy received (directing to the USFWS website list) is adequate and we do not need request another unless a lot of time goes by before the BA is prepared.

Pendiomelum pentaphyllym is hard to assess habitat, difficult to survey, and emerges Aprilish or after monsoons in August. It probably didn't flower this year, not enough snow melt, no window this year. There is currently a petition to list (October 2008) and the 90 day finding is under review. They will probably perform a status review next year. Should survey for this species in case it gets listed.

Regarding the Migratory Bird Treaty Act (MBTA), in SE New Mexico, birds are known to get encrusted from groundwater pumping to surface because the water is salty. He recommended performing surveys outside of breeding season in addition to breeding season surveys (April through August). He encouraged us to clear prior to the breeding season to discourage nesting. He also recommended having a biomonitor on site during bulldozing and clearing activities to ensure birds were not nesting or being harmed. He said that as far as surveys go, he was concerned with presence rather than density.

Conversation Record

Project name:	Sapphire Bio-Algal Fuel Farm
Date:	May 6, 2009
Contact:	Patricia Zenone, USFWS, Northern Aplomado Falcon Lead
Phone:	505-761-4718
By:	Shelly Adams, AMEC Earth & Environmental, Inc.
Subject:	Northern Aplomado Falcons in project area

Patricia Zenone discussed habitat for the northern aplomado falcon (NAP), which includes yuccas and trees over 6 feet tall with big abandoned raptor or corvid nests. NAPs don't build their own nest. She said even if we don't have habitat in the project footprint, we'll need to identify the action area (area outside the project boundaries exposed to noise and other disturbances), determine if there is suitable habitat in the action area, and perform surveys within suitable habitat to determine if NAPs occur in the action area. She recommended avoiding removal of any large yuccas or mesquites.

There is a survey protocol, and the surveyor must be certified. She said that I would probably be qualified and to go ahead and submit my application to Albuquerque USFWS for approval. She said she would email me the survey protocol.

Mitigation measures that she recommended include ensuring the facility lighting is faced downward, reducing human disturbance, and building wildlife ramps so the birds don't drown, since the NAP could be attracted to the constructed ponds. The ponds could have a negative effect on NAPs depending on the size of the pond and depth, and the water quality.

She said that she would be happy to work with us further and recommended sending photos or making a field visit with her. I told her that I was concerned about discussing the project in too much detail before we had identified the lead federal agency, since it would be the lead federal agency initiating Section 7 Consultation. I told her that I would likely wait to discuss the project further with her until after the lead federal agency was identified. She agreed.

Leferink, Richard

From: Patricia_Zenone@fws.gov

Sent: Thursday, May 07, 2009 6:01 PM

To: Adams, Shelly

Subject: 2003 "Interim Survey Methodology for the Northern Aplomado Falcon (Falco femoralis septentrionalis) in Desert Grasslands"

Attachments: aplomado falcon interim survey protocol 2003.pdf

Hi Shelly,

As we discussed, attached is a copy of the 2003 "Interim Survey Methodology for the Northern Aplomado Falcon (*Falco femoralis septentrionalis*) in Desert Grasslands." This document is also sent to biologists when they receive a Scientific and Recovery Endangered Species Permit from the U.S. Fish and Wildlife Service to survey for aplomado falcons in New Mexico, Texas, or Arizona. Such a permit is required to survey for aplomado falcons in these States. If you are interested in applying for one, please contact Vanessa Martinez at (505) 248-6665 for more information and review our permits website at <http://www.fws.gov/endangered/permits/index.html>.

My co-worker wasn't in the office today for me to ask about the other aplomado falcon document we discussed, but I expect to see her tomorrow. Please let me know if you have any questions about the attached survey protocol or this message. Regards, Patricia (505-761-4718).

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Mexico Ecological Services Field Office
2105 Osuna NE
Albuquerque, New Mexico 87113
Phone: (505) 346-2525 Fax: (505) 346-2542

APR - 1 2009

Thank you for your recent request for information on threatened or endangered species or important wildlife habitats that may occur in your project area. The New Mexico Ecological Services Field Office has posted lists of the endangered, threatened, proposed, candidate and species of concern occurring in all New Mexico Counties on the Internet. Please refer to the following web page for species information in the county where your project occurs: http://www.fws.gov/southwest/es/NewMexico/SBC_intro.cfm. If you do not have access to the Internet or have difficulty obtaining a list, please contact our office and we will mail or fax you a list as soon as possible.

After opening the web page, find New Mexico Listed and Sensitive Species Lists on the main page and click on the county of interest. Your project area may not necessarily include all or any of these species. This information should assist you in determining which species may or may not occur within your project area.

Under the Endangered Species Act of 1973, as amended (Act), it is the responsibility of the Federal action agency or its designated representative to determine if a proposed action "may affect" endangered, threatened, or proposed species, or designated critical habitat, and if so, to consult with us further. Similarly, it is their responsibility to determine if a proposed action has no effect to endangered, threatened, or proposed species, or designated critical habitat. On December 16, 2008, we published a final rule concerning clarifications to section 7 consultations under the Act (73 FR 76272). One of the clarifications is that section 7 consultation is not required in those instances when the direct and indirect effects of an action pose no effect to listed species or critical habitat. As a result, we do not provide concurrence with project proponent's "no effect" determinations.

If your action area has suitable habitat for any of these species, we recommend that species-specific surveys be conducted during the flowering season for plants and at the appropriate time for wildlife to evaluate any possible project-related impacts. Please keep in mind that the scope of federally listed species compliance also includes any interrelated or interdependent project activities (e.g., equipment staging areas, offsite borrow material areas, or utility relocations) and any indirect or cumulative effects.

Candidates and species of concern have no legal protection under the Act and are included on the web site for planning purposes only. We monitor the status of these species. If significant declines are detected, these species could potentially be listed as endangered or threatened. Therefore, actions that may contribute to their decline should be avoided. We recommend that candidates and species of concern be included in your surveys.

Also on the web site, we have included additional wildlife-related information that should be considered if your project is a specific type. These include communication towers, power line safety for raptors, road and highway improvements and/or construction, spring developments and livestock watering facilities, wastewater facilities, and trenching operations.

Under Executive Orders 11988 and 11990, Federal agencies are required to minimize the destruction, loss, or degradation of wetlands and floodplains, and preserve and enhance their natural and beneficial values. We recommend you contact the U.S. Army Corps of Engineers for permitting requirements under section 404 of the Clean Water Act if your proposed action could impact floodplains or wetlands. These habitats should be conserved through avoidance, or mitigated to ensure no net loss of wetlands function and value.

The Migratory Bird Treaty Act (MBTA) prohibits the taking of migratory birds, nests, and eggs, except as permitted by the U.S. Fish and Wildlife Service. To minimize the likelihood of adverse impacts to all birds protected under the MBTA, we recommend construction activities occur outside the general migratory bird nesting season of March through August, or that areas proposed for construction during the nesting season be surveyed, and when occupied, avoided until nesting is complete.

We suggest you contact the New Mexico Department of Game and Fish, and the New Mexico Energy, Minerals, and Natural Resources Department, Forestry Division for information regarding fish, wildlife, and plants of State concern.

Thank you for your concern for endangered and threatened species and New Mexico's wildlife habitats. We appreciate your efforts to identify and avoid impacts to listed and sensitive species in your project area.

Sincerely,

Wally Murphy
Field Supervisor

United States Department of Agriculture
Rural Development
State of New Mexico

August 17, 2009

SUBJECT: Proposed Sapphire Bio-Algal Fuel Farm
Determination of No Effect

TO: Susan MacMullin, Field Supervisor
U.S. Department of Interior - Fish and Wildlife Service
New Mexico Ecological Services Field Office
2105 Osuna, NE
Albuquerque, NM 87113-1001

Dear Ms. MacMullen:

Rural Development (RD) is proposing to provide Federal Financial Assistance to Sapphire Energy for the construction of an integrated algal biorefinery in Luna County, NM. Please find enclosed a draft Biological Field Survey Report prepared by Amec Geomatrix, Inc. for the project area.

After review of the report, RD has made a determination that the proposed undertaking will not adversely affect wildlife resources for the area. The report does recommend action items concerning wildlife resources for Sapphire Energy's consideration.

Should we not receive a response from your office within 30 days from the date of receipt of this letter, we will assume that this project will not have an adverse effect on any wildlife resources and will proceed.

If you have any questions on the above proposal, please feel free to contact me at (505) 471-4960.

George Scott, P.E.
Rural Development Engineer

cc: Lisa Kirkpatrick, Chief
New Mexico Department of Game and Fish
Conservation Services Division
P.O. Box 25112
Santa Fe, NM 87504

enclosures

NEW MEXICO
ENVIRONMENT DEPARTMENT

Office of the Secretary

BILL RICHARDSON
Governor

Harold Runnels Building
1190 Saint Francis Drive (87505)
PO Box 26110, Santa Fe, NM 87502
Phone (505) 827-2855 Fax (505) 827-2836
www.nmenv.state.nm.us

RON CURRY
Secretary
Jon Goldstein
Deputy Secretary

September 11, 2009

Anthony Ashby
Loan Specialist USDA
Rural Development
1400 Independence Ave, SW
Room 6858-S Mail STOP 3225
Washington, DC 20250

RE: Letter from USDA Rural Development Regarding Sapphire Energy Integrated Algal Biorefinery (IABR), Luna County (NMED File No. 3037ER)

Dear Mr. Ashby:

Your letter regarding the above named project was received in the New Mexico Environment Department (NMED) and was sent to various Bureaus for review and comment. Comments were provided by the Surface Water Quality Bureau, Ground Water Quality Bureau and are as follows.

Ground Water Quality Bureau
GWQB staff reviewed the above-referenced document as requested, focusing specifically on the potential effect to ground water quality in the area of the proposed project.

The letter notes that Sapphire Energy is considering the construction of an integrated algal biorefinery in Luna County that would involve the construction and use of shallow, lined impoundments. The discharge of water into these ponds containing constituents at concentrations exceeding Water Quality Control Commission ground water standards will require a ground water Discharge Permit. Ground water Discharge Permits are issued by the NMED Ground Water Quality Bureau pursuant to the Water Quality Control Commission Regulations, 20.6.2 NMAC. Sapphire Energy is encouraged to continue communication with the Ground Water Quality Bureau regarding permitting requirements for the proposed project.

Further, construction of the integrated algal biorefinery will likely involve the use of heavy equipment, thereby leading to the possibility of contaminant releases (e.g., fuel, hydraulic fluid, etc.) associated with equipment malfunctions. The GWQB advises all parties involved in the project to be aware of discharge notification requirements contained in 20.6.2.1203 NMAC.

Compliance with the notification and response requirements will ensure the protection of ground water quality in the vicinity of the project.

Surface Water Quality Bureau
The U.S. Environmental Protection Agency (USEPA) requires National Pollutant Discharge Elimination System (NPDES) permit coverage for storm water discharges from construction projects (common plans of development) that will result in the disturbance (or re-disturbance) of one or more acres (as of June 30, 2008), including expansions, of total land area. If this project exceeds one acre, it requires appropriate NPDES permit coverage prior to beginning construction.

Among other things, this permit requires that a Storm Water Pollution Prevention Plan (SWPPP) be prepared for the site and that appropriate Best Management Practices (BMPs) be installed and maintained both during and after construction to prevent, to the extent practicable, pollutants (primarily sediment, oil & grease and construction materials from construction sites) in storm water runoff from entering waters of the U.S. This permit also requires that permanent stabilization measures (revegetation, paving, etc.), and permanent storm water management measures (storm water detention/retention structures, velocity dissipation devices, etc.) be implemented post construction to minimize, in the long term, pollutants in storm water runoff from entering these waters.

You should also be aware that EPA requires that all "operators" (see **Federal Register/Vol. 63, No. 128/Monday, July 6, 1998** pg 36509) obtain NPDES permit coverage for construction projects. Generally, this means that at least two parties will require permit coverage. The owner/developer of this construction project who has operational control over project specifications (probably the Sapphire Energy, Inc. in this case), the general contractor who has day-to-day operational control of those activities at the site, which are necessary to ensure compliance with the storm water pollution plan and other permit conditions, and possibly other "operators" will require appropriate NPDES permit coverage for this project.

I apologize for the delay in responding to you and hope this information is helpful.

Sincerely,

Julie Roybal For:
Georgia Cleverley
NMED File #3037

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Mexico Ecological Services Field Office
2105 Osuna NE
Albuquerque, New Mexico 87113
Phone: (505) 346-2525 Fax: (505) 346-2542

Recvd 9/28/09

September 24, 2009

Cons. #22420-2009-FA-0151

Mr. George Scott, P.E.
Rural Development Engineer
6200 Jefferson NE, Suite 255
Albuquerque, New Mexico 87109

Dear Mr. Scott:

Thank you for the opportunity to comment on the proposed Sapphire Energy project. The USDA Rural Development is proposing to provide Federal Financial Assistance to Sapphire Energy for the construction of an integrated algal bio-refinery in Luna County. The U.S. Fish and Wildlife Service (Service) has the viewed the draft Biological Field Survey Report prepared by Amec Geomatrix, Inc. The Service found the referenced report very informative in its analysis. If implemented, the recommendations described in the report for each of the wildlife and vegetative surveys would minimize the impacts from the proposed project. The Service recommends that the biological report recommendations be implemented for the proposed project.

Your cover letter indicated that if there was no response from us within 30 days, you would assume that the referenced project would not have an adverse effect on any wildlife resources and would proceed. We cannot make the impact determination for you; however, we do have the following comments that will help you determine the effects of the proposed project. There are two Federal laws that may affect your determination of potential impacts as a result of the proposed project. These laws are the Endangered Species Act (Act), as amended, and the National Environmental Policy Act (NEPA), they are often times confused because they have similar language and terms. Both laws require the action proponent to make the determination on the affects of their proposed actions.

Under the Act, as amended, it is the responsibility of the Federal action agency or its designated representative to determine if a proposed action "may affect" endangered, threatened, or proposed species, or designated critical habitat, and if so, to consult with the Service further. The action agency documents the "no effect" determinations as part of normal environmental review procedures. No consultation is necessary for determinations of "no effect" under the Act, as amended. Similarly, it is the responsibility of the action agency or project proponent, not the Service, to make "no effect" determinations.

The Biological Field Report indicated that the northern aplomado falcon (falcon) (*Falco femoralis septentrionalis*) habitat may be present on the periphery of and/or immediately adjacent to the property of the action area. We recommend that USDA Rural Development consult with the Service through section 7 of the Act for the falcon. If you have any questions about the falcon please contact Dr. Patricia Zenone at (505)-761-4718 or <patricia_zenone@fws.gov>.

The NEPA requires Federal agencies to integrate environmental values into their decision making processes by considering the environmental impacts (positive and negative) of their major proposed actions and reasonable alternatives to those actions.

Under NEPA, an Environmental Assessment (EA) provides evidence/analysis for determining whether the action will cause significant impacts (*i.e.,* if yes, an Environmental Impact Statement is required). When it is determined that there will be no significant impacts as a result of the proposed action, an EA fulfills the agency's compliance with NEPA. If it is determined that there will be significant (positive and/or negative) impacts, an EA facilitates preparation of an Environmental Impact Statement. Environmental Assessments do not need to be circulated for public review.

A Finding of No Significant Impact (FONSI) is a decision document supporting a determination that an action will not result in significant impacts. A FONSI is prepared after the EA is completed and a determination of no significant impacts has been made. A FONSI must be either circulated to the affected public, or made available for review for 30 days prior to making a decision when the action usually requires an Environmental Impact Statement or is without precedent. The FONSI is often included in the EA, but may be a separate document that includes a summary of the EA.

The Biological Field Report indicated that burrowing owls (*Athene* cunicularia) have been observed on the proposed action property. The Migratory Bird Treaty Act (MBTA) prohibits the taking of migratory birds, nests, and eggs, except as permitted. To minimize the likelihood of adverse impacts to all birds protected under the MBTA, we recommend construction activities occur outside the general migratory bird nesting season of March through August, or that areas proposed for construction during the nesting season be surveyed, and if necessary, avoided until nesting is complete. To minimize adverse impacts to birds protected under the Migratory Bird Treaty Act, tree stands or other adequately vegetated areas should be surveyed for the presence of nesting birds during the general migratory bird nesting season of April through August. Disturbance to nesting areas should be avoided until nesting is completed.

Thank you for your concern for endangered species and New Mexico's wildlife habitats. In future communications regarding this project please refer to 22420-2009-FA-0151. If you have any questions, please contact Santiago Gonzales of my staff at the letterhead address or at (505) 761-4720 or 4708.

Sincerely,

Cynthia G Abeyta

for Wally Murphy
Field Supervisor

cc:
Director, New Mexico Department of Game and Fish, Santa Fe, New Mexico
Director, New Mexico Energy, Minerals, and Natural Resources Department, Forestry Division, Santa Fe, New Mexico

STATE OF NEW MEXICO
DEPARTMENT OF GAME & FISH

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September 21st, 2009

Rec'd 9/24/09

George Scott, P.E.
Rural Development Engineer
United States Department of Agriculture
6200 Jefferson NE, Suite 255
Albuquerque, NM 87109

Re: Proposed Sapphire Bio-Algal Fuel Farm; NMGF No. 12962

Dear Mr. Scott,

In response to your letter dated August 17th, regarding the above referenced project, the Department of Game and Fish (Department) does not anticipate significant impacts to wildlife or sensitive habitats. For your information, we have enclosed a list of sensitive, threatened and endangered species that occur in Luna County.

For more information on listed and other species of concern, contact the following sources:

1. BISON-M Species Accounts, Searches, and County lists: http://www.bison-m.org
2. Habitat Handbook Project Guidelines: http://wildlife.state.nm.us/conservation/habitat_handbook/index.htm
3. For custom, site-specific database searches on plants and wildlife, go to http://nhnm.unm.edu, then go to Data, then to Free On-Line Data, and follow the directions
4. New Mexico State Forestry Division (505-476-3334) or http://nmrareplants.unm.edu/index.html for state-listed plants
5. For the most current listing of federally listed species **always** check the U.S. Fish and Wildlife Service at (505-346-2525) or http://www.fws.gov/southwest/es/NewMexico/SBC.cfm.

Thank you for the opportunity to review and comment on your project. If you have any questions, please contact
Patrick Mathis, Southwest Area Habitat Specialist at (575) 532-2108 or patrick.mathis@state.nm.us.

Sincerely,

Terra Manasco
Assistant Chief, Conservation Services Division
Technical Guidance Section

TLM/pm

xc: Wally Murphy, Ecological Services Field Supervisor, USFWS
Luis Rios, SW Area Operations Chief, NMDGF

NEW MEXICO WILDLIFE OF CONCERN
COUNTY LUNA

For complete up-dated information on federal-listed species, including plants, see the US Fish & Wildlife Service NM Ecological Services Field Office website at http://www.fws.gov/ifw2es/NewMexico/SBC.cfm. For information on state-listed plants, contact

Common Name	Scientific Name	NMGF	US FWS	critical habitat
Great Plains Narrowmouth Toad	Gastrophryne olivacea	E		
Chiricahua Leopard Frog	Rana chiricahuensis	s	T	
Reticulate Gila Monster	Heloderma suspectum suspectum	E		
Brown Pelican	Pelecanus occidentalis	E		
Neotropic Cormorant	Phalacrocorax brasilianus	T		
Bald Eagle	Haliaeetus leucocephalus	T	T	
Common Black-Hawk	Buteogallus anthracinus	T	SOC	
Aplomado Falcon	Falco femoralis	E	Exp	
Peregrine Falcon	Falco peregrinus	T	SOC	
Mountain Plover	Charadrius montanus	s	SOC	
Common Ground-Dove	Columbina passerina	E		
Yellow-billed Cuckoo	Coccyzus americanus	s	C	
Mexican Spotted Owl	Strix occidentalis lucida	s	T	Y
Burrowing Owl	Athene cunicularia		SOC	
Violet-crowned Hummingbird	Amazilia violiceps	T		
Lucifer Hummingbird	Calothorax lucifer	T		
Southwestern Willow Flycatcher	Empidonax traillii extimus	E	E	Y
Loggerhead Shrike	Lanius ludovicianus	s		
Bell's Vireo	Vireo bellii	T	SOC	
Gray Vireo	Vireo vicinior	T		
Botteri's Sparrow	Aimophila botterii	s		
Baird's Sparrow	Ammodramus bairdii	T	SOC	
Varied Bunting	Passerina versicolor	T		
Long-legged Myotis Bat	Myotis volans interior	s		
Fringed Myotis Bat	Myotis thysanodes thysanodes	s		
Western Red Bat	Lasiurus blossevillii	s	SOC	
Pale Townsend's Big-eared Bat	Corynorhinus townsendii pallescens	s	SOC	
Desert Pocket Gopher	Geomys arenarius	s	SOC	
Ringtail	Bassariscus astutus	s		
Western Spotted Skunk	Spilogale gracilis	s		
Hooded Skunk	Mephitis macroura milleri	s		
Cook's Peak Woodlandsnail	Ashmunella macromphala	T	SOC	
Fairy Shrimp	Streptocephalus moorei	s		

USDA Rural Development

OCT 05 2009

United States Department of Agriculture
Rural Development

U.S. Fish and Wildlife Service
New Mexico Ecological Services Field Office
2105 Osuna NE
Albuquerque, New Mexico 87113

Attention: Wally Murphy

Re: Cons. #22420-2009-FA-0151
Sapphire Energy Project, Luna County, NM
Northern Aplomado Falcon Habitat –
"may effect/not likely to effect" Letter of Concurrence Request

Dear Mr. Murphy,

The U.S. Department of Agriculture Rural Development (USDA-RD) requests a letter of concurrence from the USFWS with respect to our determination of "may effect/not likely to effect" for the northern aplomado falcon (*Falco femoralis septentrionalis*) (falcon) for the Sapphire Energy Project in Luna County, NM. This request is in response to USFWS's letter dated September 24, 2009, which recommended that USDA-RD consult with the Service through Section 7 of the ESA for the falcon. This request is also in response to personal communication with Santiago Gonzales of USFWS in which he recommended USDA-RD make a "may effect/not likely to effect" letter of concurrence request to USFWS for the falcon, based on a review of the project.

Project Description

The project proposes to construct and operate an Integrated Algal Bio-Refinery Facility (IABR) to produce oil from algae, for ultimate refinery to transportation fuel, southwest of Columbus, New Mexico. The IABR facility proposes to construct ponds and process equipment on approximately 400 acres of land. Ponds will be constructed on about 300 acres to grow algae and another 100 acres will be used to house the process equipment required to dry algae and purify algal oil and an evaporation pond. Process equipment will be installed at the IABR facility, including an anaerobic digester, membrane filter system, disc centrifuge, boiler, hexane distiller, several process and holding tanks and other related equipment. The project proposes the conversion of approximately 400 acres of degraded upland habitat to ponds and support facilities for the IABR facility. Construction may be scheduled to begin as early as the Fall of 2009, with operations commencing as early as Spring 2010, and will run for approximately 3 years. The proposed site is privately owned land consisting of disturbed land from farming activities. Adjacent state and federally managed public land supports native plant communities and wildlife habitats typical of the Chihuahuan Desert.

NEPA Process

USDA-RD prepared an Environmental Assessment (EA) on the project which included analysis of impacts to bird and wildlife on the site and affected area. A Finding of No Significant Impact (FONSI), including a Section 7 Endangered Species Act determination, was signed on September 21, 2009 (Attachment 1). Pubic notice of the FONSI was published on September 24, 25 and 28, 2009.

Survey Results

As part of the EA process, a Biological and Wetland Field Survey Report for the proposed IABR Project site dated August, 2009, reported no falcons but the presence of potential suitable nests for the falcon identified on the property (but outside of the construction envelope) and on the periphery of the project site, based on surveys completed in June, 2009 (Attachment 2). USDA-RD made a finding of no adverse effect to wildlife resources for the project and surrounding area based on this August 2009 report and a sent a letter to USFWS dated August 17, 2009, which summarized our finding of no effect. USFWS's September 24, 2009 letter requesting informal Section 7 consultation was received by USDA-RD on October 1, 2009. A second Biological and Wetland Field Survey Report was completed on the proposed IABR Project site in September 2009, which included results of a second falcon survey completed in September, 2009 (Attachment 3). This survey reported identical results for the falcon (no presence of falcons but the presence of potential suitable nests).

As outlined in the biological reports, three suitable Aplomado falcon nests (raptor and/or corvid nests) (two are located on one yucca) occur immediately north of the highway in the northwestern-most portion of the Property between the old railroad grade and Highway 9 (Attachments 2 and 3, Figure 1). The other nest is located in the northeastern-most portion of the east half of the Cooper Property/project area, adjacent to the eastern property fence line. Removal of yuccas and associated nests (potentially suitable falcon nests) will be avoided due to their location on the periphery of the property, outside of the construction envelope. Although there would be no direct disturbance to these habitats from the proposed project, indirect effects from nearby human activities (noise and visual disturbance) could displace species sensitive to human presence and project activities. Additional potentially suitable nesting habitat on adjacent public land could be indirectly affected by increased levels of human activity in the project area.

As indicated above, two of the nests are located immediately adjacent to the highway where substantial vehicular activity associated with Border Patrol movements and other human activity occurs. The amount of noise and vibration associated with current activity reduces the potential for falcons to use these nest sites.

Mitigation Measures

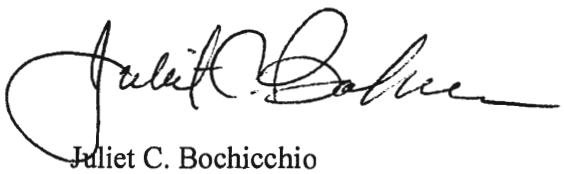
Mitigative measures applicable to the falcon as listed in the FONSI (Attachment 1) which will be employed for this project include the following: The USFWS recommends that in order to minimize the likelihood of adverse impacts to all birds protected under the Migratory Bird Treaty Act (MBTA), construction activities should occur outside the general migratory bird nesting season of March through August, or that areas proposed for construction during nesting season be surveyed, and when occupied, avoided until nesting is completed.

In addition to the mitigation measures as stated in the FONSI, there are several mitigative measures which are proposed to be employed at the project site during construction, which are geared toward ensuring minimal impact to wildlife species. Noise-related impacts will be controlled by limiting equipment delivery trips and management of work hours to reduce impacts on neighbors. The use of "jake brakes" by trucks will be prohibited to lower noise levels. In addition, noise reduction mufflers for trucks hauling equipment to the site could be employed, if necessary.

Based on the survey results and proposed mitigation measures, USDA-RD concludes there is minimal habitat for the falcon on the project site and periphery, and the project is not likely to affect the falcon. For these reasons, we request concurrence from USFWS on this determination. All action on this proposal will be stopped until USDA-RD receives a letter of concurrence on this determination from USFWS.

Please feel free to contact me directly if I can provide further information on this request for letter of concurrence at juliet.bochicchio@wdc.usda.gov or at (202) 205-8242.

Sincerely,



Juliet C. Bochicchio
Environmental Protection Specialist

Attachments: 1- FONSI
2- Biological and Wetland Field Survey Report dated August 2009
3- Biological and Wetland Field Survey Report dated September 2009

DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
El Paso Regulatory Office
P.O. Box 6096
Fort Bliss, Texas 79906-0236
915-772-2784
FAX 915-843-2106

October 7, 2009

REPLY TO
ATTENTION OF:

Regulatory Division
New Mexico/Texas Branch

SUBJECT: Action Number SPA-2009-00257-ELP, Sapphire Energy Company, Integrated Algal Biorefinery Project, Luna County, New Mexico

Jaime Moreno, P. E.
Vice President
Sapphire Energy, Inc.
27101 Puerta Real
Ste 280
Mission Viejo, CA 92691

Dear Mr. Moreno:

The U.S. Army Corps of Engineers (Corps) is in receipt of your letter dated October 7, 2009 concerning a proposal by Sapphire Energy Inc. to construct and operate an Integrated Algal Biorefinery (IABR) located southwest of Columbus, in Sections 8 and 9, Township 29 south, Range 8 and 9 west, in Luna county, New Mexico. The activity involves the construction of a number of shallow ponds with liners, to be used to grow algae for refining to fuel. We have assigned Action No. SPA-2009-00257-ELP to this activity. To avoid delay, please include this number in all future correspondence concerning this project.

We have reviewed this project in accordance with Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act of 1899 (RHA). Under Section 404, the Corps regulates the discharge of dredged and fill material into waters of the United States, including wetlands. The Corps responsibility under Section 10 is to regulate any work in, or affecting, navigable waters of the United States. Based on your description of the proposed work, other information available to us, and current regulations and policy, we have determined that this project will not involve any of the

This is only a preliminary JD, and is not sufficient.
* Please note, USDA determined that an "official Jurisdictional determination letter" is required to ensure no waters of U.S impact.

above activities, because the wetlands on site will be avoided by the project. Therefore, it will not require Department of the Army authorization under the above laws. However, it is incumbent upon you to remain informed of any changes in the Corps Regulatory Program regulations and policy as they relate to your project.

The Corps based this decision on a preliminary jurisdictional determination (JD) that there may be waters of the United States on the project site. Preliminary JDs are advisory in nature and may not be appealed. An approved JD is an official Corps determination that "waters of the U.S." and/or "navigable waters of the U.S." are either present or absent on a particular site. An approved JD precisely identifies the limits of those waters on the project site determined to be jurisdictional under the CWA or RHA. If you wish, you may request that the USACE reevaluate this case and issue an approved JD. If you request an approved JD, you may not begin work until the approved JD, which may require coordination with the Environmental Protection Agency, is completed. Please contact me if you wish to request an approved JD for this case.

If you have any questions concerning our regulatory program, please contact me at 915-772-2784 or by e-mail at richard.h.gatewood@usace.army.mil. At your convenience, please complete a Customer Service Survey on-line available at http://per2.nwp.usace.army.mil/survey.html.

Sincerely,

Richard Gatewood
Regulatory Manager

Copies furnished:

Terry Grotbo
AMEC Geomatrix, Inc.
1824 North Last Chance Gulch
Helena, Montana 59601

New Mexico/Texas Branch

United States Department of the Interior

FISH AND WILDLIFE SERVICE
New Mexico Ecological Services Field Office
2105 Osuna NE
Albuquerque, New Mexico 87113
Phone: (505) 346-2525 Fax: (505) 346-2542

October 14, 2009

Cons. # 22420-2009-FA-0151

Mr. George Scott, P.E.
Rural Development Engineer
6200 Jefferson NE, Suite 255
Albuquerque, New Mexico 87109

Dear Mr. Scott:

Thank you for your request for concurrence on the Sapphire Energy Project, Luna County. The USDA Rural Development is proposing to provide Federal Financial Assistance to Sapphire Energy for the construction of an integrated algal bio-refinery in Luna County, New Mexico. The U.S. Fish and Wildlife Service (Service) has reviewed the draft Biological Field Survey report, finding of no significant impact (FONSI), and other relevant document provided by USDA Rural Development. You have determined that the proposed project is not likely to affect the northern aplomado falcon (falcon) (*Falco femoralis septentrionalis*) because the proposed project area contains minimal falcon habitat.

The northern aplomado falcon was listed as an endangered species on February 25, 1986 (51 FR 6686). On July 26, 2006 (71 FR 42298), the reintroduced northern aplomado falcon population in New Mexico and Arizona was designated "nonessential experimental," a classification that reduces land management requirements for northern aplomado falcons in these two States. When nonessential experimental populations are located outside a National Wildlife Refuge or in a unit of the National Park System, the Service treats the population as proposed for listing and only two provisions of the ESA apply: section 7(a)1 and section 7(a)4. Section 7(a)1 requires Federal agencies to use their authorities to further the conservation of listed species. Section 7(a)4 requires Federal agencies to confer (rather than consult) with the Service on actions that are likely to jeopardize the continued existence of a proposed species. The results of a conference are advisory in nature and do not restrict agencies from carrying out, funding, or authorizing activities.

Because the falcon is designated as nonessential experimental population the determination is "not likely to jeopardize" the of the northern aplomado falcon (*Falco femoralis septentrionalis*). We are providing you with a conference report for this species in accordance with the Endangered Species Act.

Conference Report: Based on information provided by you and other information available to the Service, we believe that Sapphire Energy Project is "not likely to jeopardize" the nonessential experimental population of the falcon because: (1) minimal habitat is found within the proposed project area; (2)) the project proponent has committed to conduct future surveys for falcons and their nesting habitat; (2) the project proponent would attempt to avoid potential falcon nest sites; and (3) the proposed project area contains minimal falcon habitat.

We appreciate your commitment to conduct surveys for this subspecies and its nesting habitat. As additional information, presence/absence surveys for falcons must be conducted by biologists permitted by the Service for this subspecies. If your surveys locate a falcon or nest, please contact us for further coordination so we may provide technical assistance on a protection or nest management plan. This concludes the conference report for the nonessential experimental population of the northern aplomado falcon. If you have any questions about the falcon or this conference report, please contact Santiago Gonzales at (505) 761-4720.

Thank you for the opportunity to comment. In future communication regarding this project, please refer to Consultation #22420-2009-FA-0151. If you have any questions, concerning this consultation please contact Santiago Gonzales of my staff at the letterhead address or at (505) 761-4720.

Sincerely,

Santiago Gonzales
Acting Field Supervisor

cc:
Director, New Mexico Department of Game and Fish, Santa Fe, New Mexico
Director, New Mexico Energy, Minerals, and Natural Resources Department, Forestry Division, Santa Fe, New Mexico
Ms. Julie Boochicchio, USDA Rural Development, 1400 Independence Ave. S.W., Washington DC 20250-0700

COPY FOR YOUR INFORMATION

Notification of the Finding of No Significant Impact (FONSI)
For Sapphire Energy, Inc.
Integrated Algal Biorefinery (IABR) Facility
In Columbus,New Mexico

The US Department of Agriculture, Rural Development, Rural Business and Cooperative Service received a request from Sapphire Energy, Inc. for a loan guarantee in the amount of $60 Million under the USDA Rural Business and Cooperative Service Section 9003, Biorefinery Assistance Program. The Lender is Square 1 Bank. The proposed loan guarantee request is for construction of a 3-year pilot-scale integrated algal biorefinery (IABR) facility to be located on 400-acres southwest of Columbus, New Mexico. The facility would include the construction of a number of shallow engineered ponds and related infrastructure.

As required by the National Environmental Policy Act and agency regulations, the USDA Rural Development has assessed the potential environmental effects of the proposal. Upon consideration of the applicant's proposal, comments from federal and state environmental regulatory and natural resource agencies, the agency has determined that the proposal will not have a significant adverse effect on the quality of human environment. Therefore, Rural Development will not prepare an Environmental Impact Statement for this project.

For copies of the Environmental Assessment or for further information, please contact: Mr. Anthony Ashby, Loan Specialist, USDA, Rural Development, 1400 Independence Avenue SW, Room 6858-S, Washington DC, 20250 (202) 720-0661. Any person interested in commenting on the proposal should submit their comments to the Agency contact at the address identified above. Comments must be received by Rural Development within 15 days following the date of publication. Rural Development will make no further decisions regarding this proposed action during this fifteen-day period.

The project area is located in Sections 8 and 9, T29S, R8 and 9 West, approximately 7 miles west of Columbus, New Mexico, approximately one-half mile north of the US/Mexico border.

NATIONAL PARK SERVICE

The National Park Service reviewed this project, and determined that no parks will be affected; therefore, we have no comments.

Signed: Julie Sheep Date: 10/13/09

DEPARTMENT OF THE ARMY
ALBUQUERQUE DISTRICT, CORPS OF ENGINEERS
El Paso Regulatory Office
P.O. Box 6096
Fort Bliss, Texas 79906-0236
915-772-2784
FAX 915-843-2106

January 21, 2010

REPLY TO
ATTENTION OF:

Regulatory Division
New Mexico/Texas Branch

SUBJECT: Action No. SPA-2009-00257-ELP, Sapphire Energy Company, Integrated Algal Biorefinery Project, Luna County, New Mexico

Jaime Moreno P. E.
Sapphire Energy, Inc.
27101 Puerta Real
Ste 280
Mission Viejo, CA 92691

Dear Mr. Moreno:

The U.S. Army Corps of Engineers (Corps) is in receipt of your letter dated December 17, 2009 concerning a proposal by Sapphire Energy Inc. to construct and operate an Integrated Algal Biorefinery located southwest of Columbus, in Sections 8 and 9, Township 29 south, Range 8 and 9 west, in Luna county, New Mexico. The activity involves the construction of a number of shallow ponds with liners to be used to grow algae for refining to fuel. We have assigned Action No. SPA-2009-00257-ELP to this activity. To avoid delay, please include this number in all future correspondence concerning this project.

We have reviewed this project in accordance with Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act of 1899 (RHA). Under Section 404, the Corps regulates the discharge of dredged and fill material into waters of the United States, including wetlands. The Corps responsibility under Section 10 is to regulate any work in, or affecting, navigable waters of the United States. Based on your description of the proposed work, other information available to us, and current regulations and policy, we have determined that this project will not involve any of the above activities. Therefore, it will not require Department of the Army authorization

under the above laws. However, it is incumbent upon you to remain informed of any changes in the Corps Regulatory Program regulations and policy as they relate to your project.

The Corps based this decision on an approved jurisdictional determination (JD) that there are no waters of the United States on the project site. The basis for this approved JD is: that the project site contains intrastate waters with no nexus to interstate or foreign commerce. The JD form is available at http://www.spa.usace.army.mil/reg/Jurisdictional_Determinations/jurisdictional_determinations.asp. This approved JD is valid for a period of no more than five years from the date of this letter unless new information warrants revision of the delineation before the expiration date.

You may accept or appeal this approved JD or provide new information in accordance with the Notification of Administration Appeal Options and Process and Request For Appeal (NAAOP-RFA). This form is available at http://www.spa.usace.army.mil/reg/Administrative%20Appeals/appeals_process.asp. If you elect to appeal this approved JD, you must complete Section II (Request For Appeal or Objections to an Initial Proffered Permit) of the form and return it to the Army Engineer Division, South Pacific, CESPD-PDS-O, Attn: Tom Cavanaugh, Administrative Appeal Review Officer, 1455 Market Street, Room 1760, San Francisco, CA 94103-1399 within 60 days of the date of this notice. Failure to notify the Corps within 60 days of the date of this notice means that you accept the approved JD in its entirety and waive all rights to appeal the approved JD.

If you have any questions concerning our regulatory program, please contact me at 915-772-2784 or by e-mail at richard.h.gatewood@usace.army.mil. At your convenience, please complete a Customer Service Survey on-line available at http://per2.nwp.usace.army.mil/survey.html.

Sincerely,

Richard Gatewood
Regulatory Manager

Enclosure(s):

Copies furnished via electronic format:

Myles Grotbo
AMEC Geomatrix, Inc.
1824 North Last Chance Gulch
Helena, Montana 59601

David Menzie: david.menzie@state.nm.us

New Mexico/Texas Branch

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): January 21, 2010

B. DISTRICT OFFICE, FILE NAME, AND NUMBER: CESPA-RD-ELP; SPA-2009-257-ELP; Saphire Energy Integrated Algal Biorefinery

C. PROJECT LOCATION AND BACKGROUND INFORMATION:

State:New Mexico County/parish/borough: Luna City:
Center coordinates of site (lat/long in degree decimal format): Lat. 31.78823° **N**, Long. -107.71387° **W**.
Universal Transverse Mercator:
Name of nearest waterbody: Rio Casas Grandes in Mexico
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: None; the nearest TNW is the Rio Grande, which is located in a separate watershed, approximately 80 miles from the project area.
Name of watershed or Hydrologic Unit Code (HUC): 13030201 Mimbres between Playas Lake and Mimbres sub units.
☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☐ Office (Desk) Determination. Date:
☒ Field Determination. Date(s): September 15, 2009

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** *"navigable waters of the U.S."* within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]

☐ Waters subject to the ebb and flow of the tide.
☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.
Explain: .

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are no** "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. **Waters of the U.S.**
   a. **Indicate presence of waters of U.S. in review area (check all that apply):** [1]
      ☐ TNWs, including territorial seas
      ☐ Wetlands adjacent to TNWs
      ☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
      ☐ Non-RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
      ☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
      ☐ Impoundments of jurisdictional waters
      ☐ Isolated (interstate or intrastate) waters, including isolated wetlands

   b. **Identify (estimate) size of waters of the U.S. in the review area:**
      Non-wetland waters: linear feet: width (ft) and/or acres.
      Wetlands: acres.

   c. **Limits (boundaries) of jurisdiction** based on: **Pick List**
      Elevation of established OHWM (if known): .

2. **Non-regulated waters/wetlands (check if applicable):**[3]

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

☒ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional. Explain: **Based on a review of the Wetland Determination Data Forms-Arid West Region (Appendix E of the attached delineation report, titled Jurisdictional Determination Application, Proposed Integrated Algal Biorefinery, dated December 2009) two wetlands were identified as vegetative swales within the review area which were characterized by wetland vegetation and seasonal inundation, but no hydric soil. Based on a USGS Orthophoto dated 2005 (Figure D-2 of delineation report), a topograhic map dated 1999 (Figure D-3 ot delineation report), a NRCS Soil Survey Map dated 2008 (Figure D-4 of delineation report), site photos dated 2009 (Appendix C of the delineation report, and the review of the information provided in the delineation report, there are no tributaries within the review area. Erosional features (ephemeral drainages) begin and end without connecting with other drainages or erosional features. The ephemeral drainages are not continuous with or confluent with other drainage features, wetlands, TNWs, or other waters of the US.**.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW
Identify TNW: .

Summarize rationale supporting determination: .

2. Wetland adjacent to TNW
Summarize rationale supporting conclusion that wetland is "adjacent": .

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY)**:**

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. **Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.**

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) General Area Conditions:
Watershed size: **Pick List**
Drainage area: **Pick List**
Average annual rainfall: inches
Average annual snowfall: inches

(ii) Physical Characteristics:
(a) Relationship with TNW:
☐ Tributary flows directly into TNW.
☐ Tributary flows through **Pick List** tributaries before entering TNW.

Project waters are **Pick List** river miles from TNW.
Project waters are **Pick List** river miles from RPW.
Project waters are **Pick List** aerial (straight) miles from TNW.
Project waters are **Pick List** aerial (straight) miles from RPW.
Project waters cross or serve as state boundaries. Explain: .

Identify flow route to TNW[5]: .
Tributary stream order, if known: .

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.
[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

(b) General Tributary Characteristics (check all that apply):

Tributary is: ☐ Natural
☐ Artificial (man-made). Explain: .
☐ Manipulated (man-altered). Explain: .

Tributary properties with respect to top of bank (estimate):
Average width: feet
Average depth: feet
Average side slopes: **Pick List.**

Primary tributary substrate composition (check all that apply):

☐ Silts	☐ Sands	☐ Concrete
☐ Cobbles	☐ Gravel	☐ Muck
☐ Bedrock	☐ Vegetation. Type/% cover:	
☐ Other. Explain: .		

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: .
Presence of run/riffle/pool complexes. Explain: .
Tributary geometry: **Pick List**
Tributary gradient (approximate average slope): %

(c) Flow:
Tributary provides for: **Pick List**
Estimate average number of flow events in review area/year: **Pick List**
Describe flow regime: .
Other information on duration and volume: .

Surface flow is: **Pick List.** Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .
☐ Dye (or other) test performed: .

Tributary has (check all that apply):
☐ Bed and banks
☐ OHWM[6] (check all indicators that apply):

☐ clear, natural line impressed on the bank	☐ the presence of litter and debris
☐ changes in the character of soil	☐ destruction of terrestrial vegetation
☐ shelving	☐ the presence of wrack line
☐ vegetation matted down, bent, or absent	☐ sediment sorting
☐ leaf litter disturbed or washed away	☐ scour
☐ sediment deposition	☐ multiple observed or predicted flow events
☐ water staining	☐ abrupt change in plant community
☐ other (list):	

☐ Discontinuous OHWM.[7] Explain: .

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):

☐ High Tide Line indicated by:	☐ Mean High Water Mark indicated by:
☐ oil or scum line along shore objects	☐ survey to available datum;
☐ fine shell or debris deposits (foreshore)	☐ physical markings;
☐ physical markings/characteristics	☐ vegetation lines/changes in vegetation types.
☐ tidal gauges	
☐ other (list):	

(iii) Chemical Characteristics:
Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: .
Identify specific pollutants, if known: .

[6]A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7]Ibid.

(iv) Biological Characteristics. Channel supports (check all that apply):

- ☐ Riparian corridor. Characteristics (type, average width): .
- ☐ Wetland fringe. Characteristics: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:

(a) General Wetland Characteristics:

Properties:

Wetland size: acres

Wetland type. Explain: .

Wetland quality. Explain: .

Project wetlands cross or serve as state boundaries. Explain: .

(b) General Flow Relationship with Non-TNW:

Flow is: **Pick List**. Explain: .

Surface flow is**: Pick List**

Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .

- ☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:

- ☐ Directly abutting
- ☐ Not directly abutting
  - ☐ Discrete wetland hydrologic connection. Explain: .
  - ☐ Ecological connection. Explain: .
  - ☐ Separated by berm/barrier. Explain: .

(d) Proximity (Relationship) to TNW

Project wetlands are **Pick List** river miles from TNW.

Project waters are **Pick List** aerial (straight) miles from TNW.

Flow is from: **Pick List.**

Estimate approximate location of wetland as within the **Pick List** floodplain.

(ii) Chemical Characteristics:

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: .

Identify specific pollutants, if known: .

(iii) Biological Characteristics. Wetland supports (check all that apply):

- ☐ Riparian buffer. Characteristics (type, average width): .
- ☐ Vegetation type/percent cover. Explain: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

3. Characteristics of all wetlands adjacent to the tributary (if any)

All wetland(s) being considered in the cumulative analysis: **Pick List**

Approximately ( ) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)

Summarize overall biological, chemical and physical functions being performed: .

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: .

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☐ TNWs: linear feet width (ft), Or, acres.
   - ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: .
   - ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: .

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional waters within the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
☐ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.[9]**
As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
☐ Demonstrate that impoundment was created from "waters of the U.S.," or
☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]
☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
☐ which are or could be used for industrial purposes by industries in interstate commerce.
☐ Interstate isolated waters. Explain: .
☐ Other factors. Explain: .

Identify water body and summarize rationale supporting determination: .

---

[8] See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.*

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .
☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):
☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☒ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: .
☐ Other: (explain, if not covered above): .

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: "Delineation of Waters of the US Report Loop 375 at I-10, El Paso County Texas", TXDOT project number, CSJs: 2121-04-065 and 2121-04-082 prepared for the TXDOT El Paso District, submission of September 2009, field date of August 12, 2009, report prepared by David Alexander and Dave Severison of Blanton Associates.
☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
☒ Office concurs with data sheets/delineation report.
☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps: .
☐ Corps navigable waters' study: .
☐ U.S. Geological Survey Hydrologic Atlas: .
☐ USGS NHD data.
☐ USGS 8 and 12 digit HUC maps.
☒ U.S. Geological Survey map(s). Cite scale & quad name: 7.5 min topo 1:24,000 Luna County,NMX 1991 - 1999.
☒ USDA Natural Resources Conservation Service Soil Survey. Citation:Soil Survey of Luna Co USDA Dec 2008.
☒ National wetlands inventory map(s). Cite name:USFWS National Wetland Inventory, Luna County New Mexico.
☐ State/Local wetland inventory map(s): .
☒ FEMA/FIRM maps:FEMA map panel .
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☒ Aerial (Name & Date):2005 Color IR,Luna County Quad, Orthophoto.
or ☒ Other (Name & Date): Eight photos taken along the drainage.
☐ Previous determination(s). File no. and date of response letter: .
☐ Applicable/supporting case law: .
☐ Applicable/supporting scientific literature: .
☐ Other information (please specify):
.

B. ADDITIONAL COMMENTS TO SUPPORT JD: Results of the on-the-ground and remote surveys indicated that erosional drainage features and wetlands in the review area do not have a nexus with traditional navigable waters or interstate waters. They are seasonal drainage features that become indistinguishable as flows concentrated by the railroad embankment spread over the flat uplands on the nearly level topography of formerly irrigated crop land. Traditional navigable waters of the United States are not present in the watershed receiving drainage from the review area. None of the drainage features or wetlands in the review area connect to drainage features that flow into Mexico.

ATTACHMENT F-2

Summary of Soil Resources Information for the Proposed IABR Facility Luna County, New Mexico

April 2009

Assessment Methods

Based upon the Natural Resources Conservation Service (NRCS) soil survey of Luna County, New Mexico, a site-specific investigation was conducted to document the nature of the soils at the proposed IABR site. Between March 5 and 7, 2009, soil observations were made and sampling was conducted at 10 locations. At the time of the soil investigation, the location of the IABR facility was not known and soils on all land controlled by Sapphire were investigated. This consisted of property that has been termed the "eastern" and "western" parcels in this report. Since that time, the "western" parcels have been selected for the new IABR facility.

Soil was excavated at five locations within the western parcel, and five locations within the eastern parcels (**Figure 1**). A test pit was excavated at each location to a depth of 12 inches. A hand-augured borehole was then advanced from 12 inches to 36 inches below surface within the excavation, except if refusal was encountered at less than 36 inches. At each location, soil observations were recorded, photographs were taken, and soil samples were collected. At least three soil samples were collected from each location, corresponding with depths of 0-12, 12-24, and 24-36 inches, unless specific horizon changes or shallow refusal indicated other sampling intervals were appropriate. Soil samples were submitted to A&L Plains Agricultural Laboratories, Inc. (A&L) for chemical analysis.

Findings

The western parcel of the Sapphire property (site of the proposed IABR) contains two NRCS soil map units (**Figure 1**). These map units are Stellar silty clay loam (SU), which comprises the vast majority of the western portion, and a smaller area of the relatively coarse-grained Nickel-Tres Hermanas complex (NT).

The eastern parcels contain six NRCS soil map units (**Figure 1**). Most of the eastern parcel is mapped by NRCS either as the Nickel-Tres Hermanas complex (NT), or as Mohave sandy clay loam (MU). The bottom of a narrow drainage that runs through the eastern parcel is mapped as Mimbres and Verhalen soils (MR), a unit that is described by NRCS as being primarily silty clay loam. Three other map units are depicted by NRCS as isolated areas within the eastern parcel. These map units are Akela very gravelly loam (AG), the Pintura-Berino (PB) complex which includes eroded fine sand to loamy sand, and Stellar silty clay loam (SU).

Soil observations made during this study are included in **Appendix A** and photographs at each location are presented in **Appendix B**. The A&L laboratory report is presented in **Appendix C**. NRCS reports regarding soils of the Sapphire property are included in **Appendix D**. United States Department of Agriculture (USDA) Highly Erodible Land (HEL) determinations for the property are included in **Appendix E**.

1.1 Field Observations - Western Parcel (Site of Proposed IABR)

Field investigation of the western parcel conducted during this study included sampling of four locations across the SU map unit (Sites B1, B2, B4, and B5, **Figure 1**) and one location in the smaller NT map unit (Site B6, **Figure 1**).

The SU map unit was found to be relatively coarse-grained when compared to the NRCS description. Sandy silt was the primary texture class observed in the SU locations, with significant gravel layers at locations B1 and B2 near the western end of the western parcel. Potential soil changes within the SU map unit were indicated by areas dominated by thistle vegetation, in contrast to the majority of the SU map unit that was covered with bentgrass, cheatgrass, and minor amounts of yucca (**Figure 1**). No significant topographic changes were observed within the SU map unit. The observed soil conditions in the smaller NT map unit were generally consistent with the NRCS description of that unit as a gravelly loam.

1.2 Field Observations - Eastern Parcels

Field investigation of the eastern parcels conducted during this study was designed to sample all six of the NRCS map units, except the Akela very gravelly loam (AG). AG is mapped only in a small area along the Mexican border, and is the most coarse-grained map unit on the property, therefore it was not anticipated that ponds associated with the proposed project would be constructed in the AG area.

On the eastern parcels, differences in soil materials were observed between each of the five sampled locations (B8, B9, B10, B12, and B13, **Figure 1**), as would be expected based on the NRCS soil survey showing each location in a separate soil map unit.

1.3 Laboratory Results

The soil samples were analyzed by A&L for Sodium Adsorption Ratio (SAR), Electrical Conductivity (EC), and pH. SAR is used to evaluate the potential for sodium-related dispersion of clays, which may result in decreased permeability of clay-containing soils. EC is used to evaluate salt accumulation, and pH is used to determine if soils are acidic or alkaline. Values obtained for these parameters were within acceptable limits for agricultural use of the property, and had the following characteristics.

The SAR was moderate to low at most locations, with the exception of relatively-high SAR in all samples from location B2, in the deepest sample from location B5, and in the surface soil sample from location B10. The highest SAR value was 13.44 at location B10, which is approaching levels where sodium-related clay dispersion would be prevalent.

EC values ranged from 0.1 to 2.7 millimhos per centimeter (mmhos/cm). These EC values indicate that the soils of the property are not saline. Values for pH ranged from 7.8 to 8.8, which indicates that moderately to strongly alkaline soils are present at all sampled locations, however none of the samples were extremely alkaline.

1.4 Summary of Soil Resources Findings

Site-specific investigation of the western parcel (location of proposed IABR) indicated that soils were generally more coarse-grained than the silty clay loam designation given to most of the western parcel by the NRCS soil survey for Luna County.

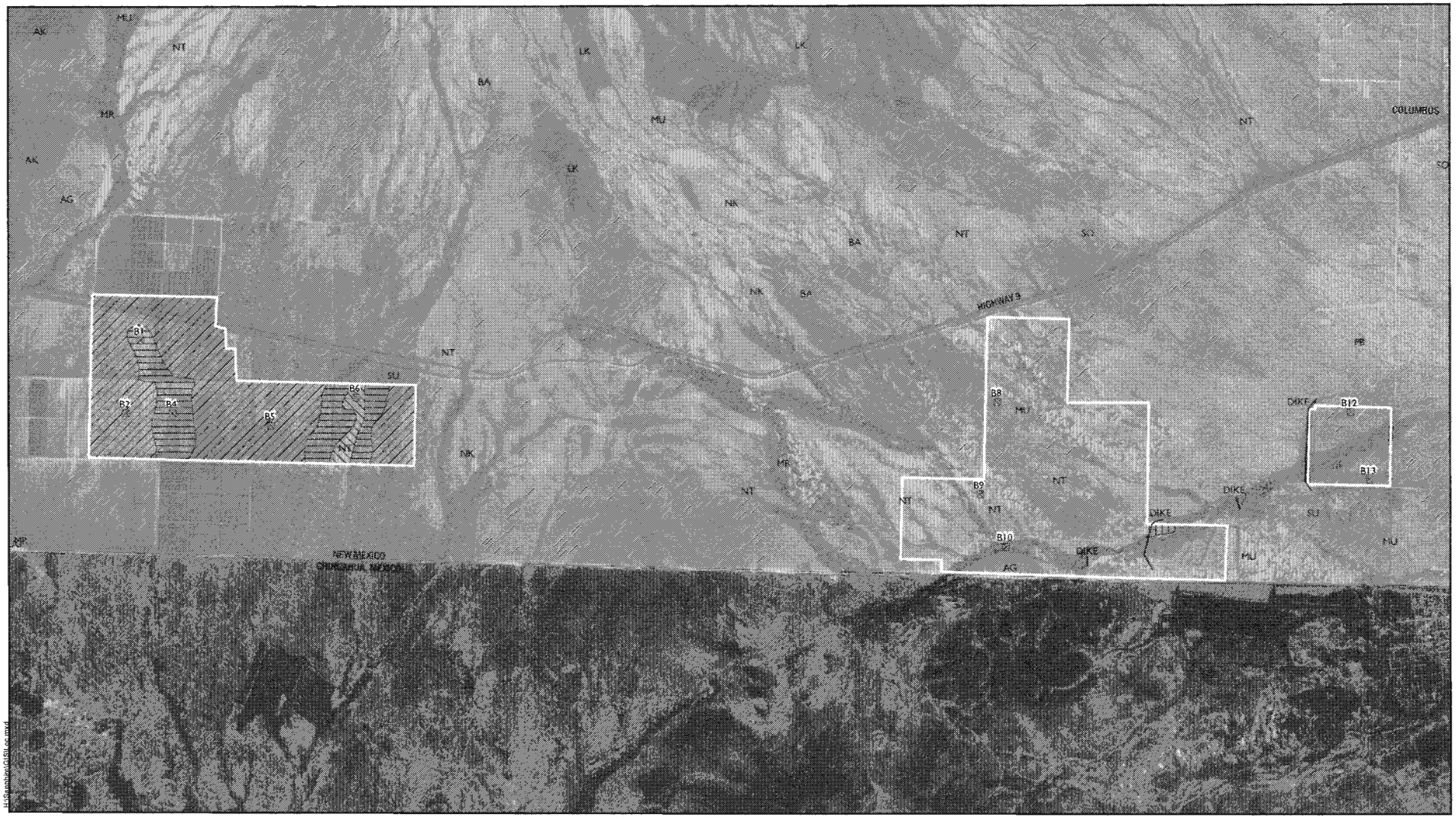
In the eastern parcels, greater diversity of soil conditions was observed, which is consistent with the greater number of map units present in the NRCS soil survey for the area. The following general characteristics were observed at the five locations excavated in the eastern parcels:

- Site B8 – gravelly materials, with increasing clay near the bottom of the excavation.
- Site B9 – silty material to the bottom of the excavation, with no gravel below 8 inches.
- Site B10 – silty, slightly moist in some subsurface layers. Gravel was only observed near the bottom of the excavation.
- Site B12 – very dense gravelly silt.
- Site B13 – very gravelly material.

The gravel encountered at each location in the eastern parcels was angular or subangular, except at locations B12 and B13, where subrounded gravel was encountered. Subsurface accumulation of carbonates was observed at many locations on the property, which is in accordance with the alkaline pH of all soil samples from the property. Dikes were observed within the eastern portion of the property, including one dike in the south-central area shown on **Figure 1**, dikes around the eastern-most quarter section of the property that includes locations B12 and B13, and dikes within the small area south of what is indicated on **Figure 1** as an elevated non-alluvium. These dikes generally were observed to cause the width of the mapped alluvial unit (MR) to be wider than shown on the NRCS soil survey. All observed locations had significant amounts of sand and/or gravel in upper 24 inches of soil, except location B10 excavated at the bottom of a drainage on the eastern portion of the property.

United States Department of Agriculture (USDA) Highly Erodible Land (HEL) determinations for the property indicates that soil at the proposed IABR site is highly erodible (**Appendix E**). According to USDA, the current soil conservation plan based on agricultural use will need to be revised to accommodate the algal ponds prior to construction of the IABR facility.

FIGURE 1



Source: New Mexico, RGIS

Soil Samples

Cover Type
- Bentgrass, Cheatgrass, and Minor Yucca
- Cheatgrass
- Thistle
- Elevated (Not Alluvium)

Soil Type
- AG - Akela very gravelly loam
- AK - Akela very gravelly loam
- BA - Berino and Mohave soils
- HT - Hondale-Mimbres complex
- LK - Lehmans extremely rocky loam
- MR - Mimbres and Verhalen soils
- MU - Mohave sandy clay loam
- NK - Nickel very gravelly sandy loam
- NT - Nickel-Tres Hermanos complex
- PB - Pintura-Berino complex
- SO - Sonoita gravelly sandy loam
- SU - Stellar silty clay loam
- UG - Upton gravelly sandy loam

N

Feet

0 3,000

AMEC Geomatrix

NOTE:
Locations B3, B7, and B11 were not investigated, and are not shown on this figure

Soil Map
Columbus, New Mexico
FIGURE 1

APPENDIX A

Soil Sampling Field Forms

Soil Survey		Soil Pedon Description Data Sheet [pg 1]	
Date:	3/5/09	**Site ID*:**	B1
Time:	17:20	**Boring / Pit / Other:**	Boring
Slope:	1%	**Northing**	
Aspect:	S	**Easting:**	
Parent Material/Origin:		**Photo [Y/N - Name]:**	9, 10, 11 (probably)
Drainage [depth to water table]:		**Observers/Party:**	W. Welzenbach
Topography / Landform:		**Site Sampled** [Y/N]:	**No. Samples:** 6

Taxonomic Description**

Epipedon:	Anthropic/Mollic
Control Texture:	
Classification [USDA]:	
Series :	Stellar
Biota (Plants & Animals):	Grasses and forbs < 1 ft tall, with clads of 5-9 pentagons
Land Use:	Former farmland

NOTES [specifically note recent weather, evidence of degradation, surface coarse fragments, etc.]

Dry surface with 25% coarse fragments (angular gravel)
Roots and small tubule tracts present
Soil dry to total borehole depth.

* Site ID comprised of unique alpha-numeric designator.

Soil Survey — Soil Pedon Description Data Sheet [pg 2]

HORIZON DESCRIPTIONS — SITEID: B1

	Horizon [x below number if sampled]	Depth [cm]	Bound.	Color: Matrix	Color: Mottles [with % abund.]	Texture [& % Clay]	Clay Films [Y / N]	Structure [grade, size, class, strength]	C.F.% by Vol [note size, % ironstone or concretions]	HCl pH 1:1	General Comment
1	Ap	0-8		5YR6/3	(white grave 2.5%)	Sandy silt 10% clay	N	soft, loose	25% white limestone gravel, some angular	3	
2	B	8-17	sharp (boundary)	Pres 5YR6/5	(white grave 2.5%)	silt, grave (Ca) 5% clay	N	v. dense	75% lime stone and other angular gravel, 2 in max. dim.	3	
3	B	17-20				gravelly si. 5% clay	N	dense	15% angular gravel 3/4 in. max. dim.	3	
4	B	20-30		10YR5/4		si. H (Mg) 5% clay	N	stiff	<5%	4	
5	BK	30-36		10YR6/4	white (5% gravel)	si. H (Ca) 5% Clay	N	med. stiff	<5%	3	
6		-									
7		-									
8		-									
9		-									
10		-									

Samples
0-18 in (1)
12-24 in (2)
24-36 in (3)

Soil Survey		Soil Pedon Description Data Sheet [pg 1]	
Date:	3/5/09	**Site ID*:**	B2
Time:	15:37	**Boring / Pit / Other:**	Boring
Slope:	1%	**Northing**	
Aspect:	South	**Easting:**	
Parent Material/Origin:		**Photo** [Y / N - Name]:	6, 7, 8 (profile, N, S)
Drainage [depth to water table]:	NA	**Observers/Party:**	W. Wolzenmacher
Topography / Landform:		**Site Sampled** [Y / N]:	**No. Samples:**

Taxonomic Description**

Epipedon:	Mollic Xanthropolis
Control Texture:	
Classification [USDA]:	
Series :	Stelter
Biota (Plants & Animals):	Grasses and forbs (mostly non-native), anthills and gopher mounds in vicinity*
Land Use:	former farm field.

NOTES [specifically note recent weather, evidence of degradation, surface coarse fragments, etc.]

Dry loose surface with ~40% coverage with smaller gravel.

Plow lines present in nearby veg. patterns, some evidence of anthills nearby in vicinity.

* vegetation all less than 1 ft. tall (no heterogeneity)

Soil dry to total borehole depth.

Soil Survey — **Soil Pedon Description Data Sheet [pg 2]**

HORIZON DESCRIPTIONS — **SITEID:** B2

	Horizon [x below number if sampled]	Depth [cm] (in)	Bound.	Color: Matrix	Color: Mottles [with % abund.]	Texture [& % Clay]	Clay Films [Y / N]	Structure [grade, size, class, strength]	C.F.% by Vol [note size, % ironstone or concretions]	HCl rxn pH	General Comment
1	A_p	0 - 3		5YR 6/5		sandy silt 15% clay	N	Loose soft	10% angular gravel up to 0.5 in. max. dim.	3	Very loose structure, grass roots, gravel
2	B	3 - 20		5YR 5/6		silty sand 5% clay	N	med dense	15% angular gravel up to 1.5 in max. dim.	3	Carbonates [illegible] roots to 5in
3	B_k	20 - 34		5YR 8/1		silt (ML) 5% clay	N	v. stiff	15% angular gravel up to ½ in max. dia.	4	Partially cemented
4	C	34 - 36		5YR 8/1		silty gravel (GM) 0% clay	N	v. dense	55% angular limestone gravel up to 2 in max. dim.	4	Additional coarse fragments in Bk-like matrix
5		-									
6		-									
7		-									
8		-									
9		-									
10		-									

Samples:
0-3 in Ap
3-12 in B
12-24 C
24-28 C, B
24-36 C

0 = none
1 = [illegible]

Soil Survey		Soil Pedon Description Data Sheet [pg 1]	
Date:	3/6/09	**Site ID*:**	B4
Time:	9:30	**Boring / Pit / Other:**	boring
Slope:	2%	**Northing**	
Aspect:	S-SE	**Easting:**	
Parent Material/Origin:		**Photo** (Y / N - Name]:	
Drainage [depth to water table]:		**Observers/Party:**	W. Welzenbach
Topography / Landform:		**Site Sampled** [Y / N]:	**No. Samples:**

Taxonomic Description**

Epipedon:	Mollic / Anthropic
Control Texture:	
Classification [USDA]:	
Series [Ghanaian]:	Stellar ?
Biota (Plants & Animals):	Pentaclethra clusters (3-4 tall)
Land Use:	Fallow - farmed

NOTES [specifically note recent weather, evidence of degradation, surface coarse fragments, etc.]

Drainage from NW-SE of ditch at N. end of gravel road. Runs down middle of drainage area (many grass lines). Gravel layer at surface in drainage area. Some small gravel on surface (flat angular gravel up to 3/4" max dimension). Soil dry to total depth.

* Site ID comprised of unique alpha-numeric designator.

** Profiles will be classified based on field observations. USDA classification to be completed following field effort.

Soil Survey — **Soil Pedon Description Data Sheet [pg 2]**

HORIZON DESCRIPTIONS — **SITEID:** BH

	Horizon [x below number if sampled]	Depth [cm] (in.)	Bound.	Color: Matrix	Color: Mottles [with % abund.]	Texture [& % Clay]	Clay Films [Y / N]	Structure [grade, size, class, strength]	C.F.% by Vol [note size, % ironstone or concretions]	HCl - pH rxn	General Comment
1	O_i	0 - 0.25		5YR 5/4	—	SiH (ML) 10% clay	N	Loose, soft	5% flat angular gravel	3	Decomposing grass prevalent
2	A_1	0.25 - 3		5YR 5/4	—	sandy silt (ML) 15% clay	Y	mod. stiff	5% flat angular gravel, ½ in. max. diam	3	prevalent roots and root channels
3	B	3 - 21		10YR 5/2	—	sandy silt (ML) 10% clay	N	mod. stiff	5% black angular gravel	3	
4	B_k	21 - 36		10YR 6/4	white, 10%	sandy silt 15% clay	N	v. stiff, partially cemented	15% white angular concretions	4	Deeper Bk than 4 locations
5		-						fine (4 in.)	modules		
6		-									
7		-									
8		-									
9		-									
10		-									

Samples:

0 - 1 in

1 - 21 in

21 - 36

Soil Survey		Soil Pedon Description Data Sheet [pg 1]	
Date:	3/6/09	**Site ID*:**	B5
Time:	11:25	**Boring / Pit / Other:**	Boring
Slope:	1%	**Northing**	
Aspect:	S	**Easting:**	
Parent Material/Origin:		**Photo** (Y / N - Name]:	
Drainage [depth to water table]:		**Observers/Party:**	G. Weltzenbach
Topography / Landform:		**Site Sampled** [Y / N]:	**No. Samples:**

Taxonomic Description**

Epipedon:	Mollic / Anthropic
Control Texture:	
Classification [USDA]:	
Mapped **Series** [Ghanaian]:	Stetter
Biota (Plants & Animals):	thistle, small burrows present at surface (2in. channels to bottom)
Land Use:	former farmland

NOTES [specifically note recent weather, evidence of degradation, surface coarse fragments, etc.]

Large thistle area (almost ½ section width). Angular gravel up to 3 in. max dia. at surface. Some charcoal pieces within thistle (ex. biological provided organic carbon source), soil dry to total depth explored.

* Site ID comprised of unique alpha-numeric designator.

** Profiles will be classified based on field observations. USDA classification to be completed following field effort.

Soil Survey — **Soil Pedon Description Data Sheet [pg 2]**

HORIZON DESCRIPTIONS — **SITEID:** B5

	Horizon [x below number if sampled]	Depth -[cm]- (in)	Bound.	Color: Matrix	Color: Mottles [with % abund.]	Texture [& % Clay]	Clay Films [Y / N]	Structure [grade, size, class, strength]	C.F.% by Vol [note size, % ironstone or concretions]	HCl pH	General Comment
1	Oi	0 - 0.75		5YR 5/4		Si H(mS) 10% clay	N	loose soft.	15% angular gravel up to 3/4 in max dia	6	Chert grass is most of the organic matter.
2	Ap	0.75 - 5		5YR 5/4		sandy si [illegible] 15% clay	Y	mod. sl. cr	5% angular gravel [illegible]	6	prevalent roots (5YR 5/4 dominant in 24 samples)
3	B	5 - 14		5YR 5/6		sandy si 5% clay	N	V. St. cr	20% angular gravel [illegible]	6	[illegible] roots
4	Bw	14 - 20		5YR 5/6	white and black (15%)	[illegible]	N	V. St. cr	10% angular gravel up to 1/2 in	6	
5	B	20 - 27		5YR 6/4		clayey si/cl 20% clay	N	V. Stiff	None	6	
6	Bk	27 - 36		10YR 7/4	white (15%)	Si H(mS) 5% clay	N	M. St. ff to Soft	None	4	
7		-									
8		-									
9		-									
10		-									

Samples:
0-12 in
12-24 in
(5YR 5/4 dominant in 24 samples)
27-36 in *

* to explain Bk only

Soil Survey		Soil Pedon Description Data Sheet [pg 1]	
Date:	3/6/09	**Site ID*:**	B6
Time:	13:00	**Boring / Pit / Other:**	boring
Slope:	0 - 1%	**Northing**	
Aspect:	S	**Easting:**	
Parent Material/Origin:		**Photo** (Y) N - Name]:	
Drainage [depth to water table]:		**Observers/Party:**	W. Welzenbach
Topography / Landform:		**Site Sampled** [(Y) N]:	**No. Samples:**

Taxonomic Description**

Epipedon:	Mollic / Anthropic
Control Texture:	
Classification [USDA]:	
Mapped **Series** [Ghanaian]:	Nickel / Tres Hermanos
Biota (Plants & Animals):	Cheatgrass and spurge (every 50m) yucca
Land Use:	former farmland

NOTES [specifically note recent weather, evidence of degradation, surface coarse fragments, etc.]

Gopher mound (2 ft tall) located 20m NE of site and 20m E-SE of site. Angular gravel up to 2.5 in max. dim present at surface. Soil dry to total depth.

* Site ID comprised of unique alpha-numeric designator.

** Profiles will be classified based on field observations. USDA classification to be completed following field effort.

Soil Survey — **Soil Pedon Description Data Sheet [pg 2]**

HORIZON DESCRIPTIONS — **SITEID:** B6

	Horizon [x below number if sampled]	Depth [cm] (in)	Bound.	Color: Matrix	Color: Mottles [with % abund.]	Texture [& % Clay]	Clay Films [Y / N]	Structure [grade, size, class, strength]	C.F.% by Vol [note size, % ironstone or concretions]	~~pH~~ HCl Eff	General Comment
1	Oi	O - 0.5		10YR 5/6		fine s.lt (10% clay)	N	loose, soft	very surface has 40% angular gravel	2	pine needles, leaves
2	Ap	0.5 - 3		5YR 5/6		sandy s.lt (med) (~15% clay)	N	loose, soft	<5%	3	abundant roots
3	E	3 - 20		5YR 5/6		sandy s.lt (15% clay)	N	V. soft	20% strike angular gravel, ½ in. max. dim	3	abundant roots to 10 in.
4	Bt	20 - 26		5YR 5/6		sandy s.lt (25% clay)	Y	mod. stiff	<5% white angular gravel	3	after cohesion the above and below horizons
5	Bk	26 - 36		5YR 5/4 and lighter values	some distinct (40%)	gravelly s.lt (10% clay)	N	V. stiff	35% white angular gravel up to 2 in. max. dim	4	
6		-									
7		-									
8		-									
9		-									
10		-									

Samples:
0-12 in C
12-24 in C
26-36 in C
all to capture only Bk

Soil Survey | **Soil Pedon Description Data Sheet [pg 1]**

Date:	3/6/09	**Site ID*:**	B8
Time:	16:25	**Boring / Pit / Other:**	boring
Slope:	1%	**Northing**	
Aspect:	SW	**Easting:**	
Parent Material/Origin:		**Photo** (Y / N - Name]:	
Drainage [depth to water table]:		**Observers/Party:**	D Weltenbach
Topography / Landform:		**Site Sampled** [Y / N]:	**No. Samples:**

Taxonomic Description**

Epipedon:	
Control Texture:	
Classification [USDA]:	
mapped **Series** [Ghanaian]:	MU

Biota (Plants & Animals):	Cheatgrass with intermittent mesquite
Land Use:	Former farmland (and pasture?)

NOTES [specifically note recent weather, evidence of degradation, surface coarse fragments, etc.]

Edge of mesquite to mixed mesquite-cheatgrass is approx. 100m N of site. Surface is 70% subangular coarse fragments from ½ to 4" max dimension.

* Site ID comprised of unique alpha-numeric designator.

** Profiles will be classified based on field observations. USDA classification to be completed following field effort.

Soil Survey — **Soil Pedon Description Data Sheet [pg 2]**

HORIZON DESCRIPTIONS — **SITEID:** 08

	Horizon [x below number if sampled]	Depth ~~[cm]~~ (in)	Bound.	Color: Matrix	Color: Mottles [with % abund.]	Texture [& % Clay]	Clay Films [Y / N]	Structure [grade, size, class, strength]	C.F.% by Vol [note size, % ironstone or concretions]	~~pH~~ HCl rxn	General Comment
1	O	0 - 0.75		10YR 7/4		Sandy s.l. (wV) 5% clay	N	loose, soft	(surface only)	Ø	
2	A	0.75 - 6		5YR 4/4		Silty gravel (GmL) 10% clay	Y	weak, massive, v. dense	60% angular gravel up to 0.75 in. max. dim.	Ø	potentially collapsible?
3	A	6 - 15		5YR 4/4		Sandy s.l. 10% clay	Y	med. stiff	10% small gravel and coarse sand (<1 in. max. dim.)	1	slightly moist
4	Bk	15 - 19		5YR 4/6	white, weakly cemented	Sandy s.l. 15% clay	N	v. stiff	50% white calcareous concretions	4	slightly moist
5		-									Refusal at 19 in. on large rock
6		-									
7		-									
8		-									
9		-									
10		-									

Samples
0-12 in. (3)
12-15 in (1)
15-19 in. (1)
Sum vol. 4 oz

Soil Survey		Soil Pedon Description Data Sheet [pg 1]	
Date:	3/7/09	**Site ID*:**	B9
Time:	9:30	**Boring / Pit / Other:**	Boring
Slope:	2-3%	**Northing**	
Aspect:	S-SW	**Easting:**	
Parent Material/Origin:		**Photo** [Y / N - Name]:	
Drainage [depth to water table]:		**Observers/Party:**	W. Wolfenbarger
Topography / Landform:	Shoulder	**Site Sampled** [Y / N]:	**No. Samples:**

Taxonomic Description**

Epipedon:	Mollic
Control Texture:	
Classification [USDA]:	
Mapped **Series** [Ghanaian]:	Nickel - TCS Hermanas

Biota (Plants & Animals):	Sparse cheatgrass w/ intermittent mesquite (see pic 58)
Land Use:	Former rangeland (?) or water developed

NOTES [specifically note recent weather, evidence of degradation, surface coarse fragments, etc.]

Surface is 40% subangular gravel up to 1 in max dim. Small (2in dia) animal burrow is located 15ft S. of site, and then ghost vicinity. Site at cheatgrass / sparse cheatgrass edge (see pic 54)

* Site ID comprised of unique alpha-numeric designator.

Soil Survey — **Soil Pedon Description Data Sheet [pg 2]**

HORIZON DESCRIPTIONS — **SITEID:** ba

	Horizon [x below number if sampled]	Depth [cm]	Bound.	Color: Matrix	Color: Mottles [with % abund.]	Texture [& % Clay]	Clay Films [Y / N]	Structure [grade, size, class, strength]	C.F.% by Vol [note size, % ironstone or concretions]	pH (HCl reqn)	General Comment
1	A_1	0-2		10YR 3/4		Sandy s.l. 15% clay	N	loose soft	none [illegible] surface	4	abundant grass roots present [illegible]
2	A	2-8		10YR 4/4		sandy s.l. 10% clay	N	v. sl. stiff	25% angular gravel to [illegible]	4	prevalent roots [illegible]
3	B_t	8-20		10YR 5/2		sandy s.l. 25% clay	Y	wpd sl. stiff to v. sl. stiff	none	4	[illegible] prevalent roots [illegible]
4	Bk	20-25		10YR 8/4		si l (m) 15% clay	Y	sl. stiff → soft	none / Carbonate nodules up to 1 in. dia.	4	dry
5		-									
6		-									
7		-									
8		-									
9		-									
10		-									

Samples:
0-2in (1)
12-24in (2)
24-36in (3)

Soil Survey		Soil Pedon Description Data Sheet [pg 1]	
Date:	3/6/09 | 3/7/09	**Site ID*:**	B10
Time:	17:40 | 7:00	**Boring / Pit / Other:**	Borro
Slope:	< 1%	**Northing**	
Aspect:	E-SE	**Easting:**	
Parent Material/Origin:	Alluvium	**Photo** [Y / N - Name]:	
Drainage [depth to water table]:		**Observers/Party:**	W. Walzenbach
Topography / Landform:		**Site Sampled** [Y / N]:	**No. Samples:**

Taxonomic Description**

Epipedon:	
Control Texture:	
Classification [USDA]:	
Series [Ghanaian]:	

Biota (Plants & Animals):	tall thistle with dead/dormant shrubs spaced 30m apart
Land Use:	Drainage way (unused). Near powerline right-of-way.

NOTES [specifically note recent weather, evidence of degradation, surface coarse fragments, etc.]

Approx. 2% angular gravel up to 2in max dia. at surface (ie. much less surface gravel than upland sites).

* Site ID comprised of unique alpha-numeric designator.

** Profiles will be classified based on field observations. USDA classification to be completed following field effort.

Soil Survey — **Soil Pedon Description Data Sheet [pg 2]**

HORIZON DESCRIPTIONS — **SITEID:** B10

	Horizon [x below number if sampled]	Depth (cm)	Bound.	Color: Matrix	Color: Mottles [with % abund.]	Texture [& % Clay]	Clay Films [Y / N]	Structure [grade, size, class, strength]	C.F.% by Vol [note size, % ironstone or concretions]	HCl reaction pH	General Comment
1	A_i	0 - 2.5		5YR 7/2	—	sandy silt ~0% clay	N	loose, soft	none below surface	2	
2	A	2.5 - 8		10YR 6/4		silt (ML) <5% clay	N	weak angular friable	none	Ø	prevalent grass and [illegible] root dry slightly moist.
3	B	8 - 16		10YR 4/4		Sandy silt 10% clay	Y	weak, angular, friable	none	Ø	fine roots present
4	B_k	16 - 36		10YR 4/4		Sandy silt 15% clay	Y	weak, angular, friable	5% angular gravel up to ¼ in. max dia.	3	~5% carbonate nodules at 18 in.
5		-									increasing sand and carbonates w/ depth
6		-									
7		-									
8		-									
9		-									
10		-									

Samples:
0 - 12 in (1) (3)
12 - 24 in.

Soil Survey		Soil Pedon Description Data Sheet [pg 1]	
Date:	7/7/09	**Site ID*:**	B12
Time:	11:10	**Boring / Pit / Other:**	Boring
Slope:	<1%	**Northing**	
Aspect:	SE	**Easting:**	
Parent Material/Origin:		**Photo** [Y / N - Name]:	
Drainage [depth to water table]:		**Observers/Party:**	W. Wolpenhorst
Topography / Landform:		**Site Sampled** [Y / N]:	Y **No. Samples:**

Taxonomic Description**

Epipedon:	
Control Texture:	
Classification [USDA]:	
Maybe **Series** [Ghanaian]:	B

Biota (Plants & Animals):	weeds (thistle)
Land Use:	Former farmland, surrounded by dikes, previously irrigated

NOTES [specifically note recent weather, evidence of degradation, surface coarse fragments, etc.]

Surface is approx. 50% vesiculated Volcanic gravel up to 1.5 in. max. dia. covers 40-60% of surface.

* Site ID comprised of unique alpha-numeric designator.

** Profiles will be classified based on field observations. USDA classification to be completed following field effort.

Soil Survey — **Soil Pedon Description Data Sheet [pg 2]**

HORIZON DESCRIPTIONS — **SITEID:** BD

	Horizon [x below number if sampled]	Depth [cm]	Bound.	Color: Matrix	Color: Mottles [with % abund.]	Texture [& % Clay]	Clay Films [Y / N]	Structure [grade, size, class, strength]	C.F.% by Vol [note size, % ironstone or concretions]	HCl rxn pH	General Comment
1	A_p	0-2		5 YR 7/4		Sandy <5% clay	N	Loose, Soft	below surface: 5% angular gravel	Ø	dry
2	B_t	2-14		5YR 5/4		gravelly sandy 15% clay	Y	V. dense	30% subrounded gravelly	Ø	fine roots present
3	B	14-24		10 YR 7/4		gravelly sandy <5% clay	N	m. dense	10% subrounded white gravel up to 2cm	2	No roots dry
4	Bk	24-29		5YR 5/4		gravelly sandy 5% clay	N	m. dense	white nodules	4	
5		-									
6		-									
7		-									
8		-									
9		-									
10		-									

Soil Survey		Soil Pedon Description Data Sheet [pg 1]	
Date:	3/7/09	**Site ID*:**	B13
Time:	12:40	**Boring / Pit / Other:**	boring
Slope:	< 1%	**Northing**	
Aspect:	E (on flat)	**Easting:**	
Parent Material/Origin:		**Photo** (Y) N - Name]:	
Drainage [depth to water table]:		**Observers/Party:**	W. Welzenbach
Topography / Landform:		**Site Sampled** [Y / N]:	Y **No. Samples:**

Taxonomic Description**

Epipedon:	Anthropic
Control Texture:	
Classification [USDA]:	
Mapped **Series** [Ghanaian]:	SU (Stellar)

Biota (Plants & Animals):	Thistles, bare surface, and dormant shrubs (see pic. 70)
Land Use:	Former farmland

NOTES [specifically note recent weather, evidence of degradation, surface coarse fragments, etc.]

Area surrounded by dikes with known former irrigation
Subrounded volcanic gravel up to 2.5in. max. dim. present on
50% of soil surface.

* Site ID comprised of unique alpha-numeric designator.

** Profiles will be classified based on field observations. USDA classification to be completed following field effort.

Soil Survey — **Soil Pedon Description Data Sheet [pg 2]**

HORIZON DESCRIPTIONS — **SITEID:** B13

	Horizon [x below number if sampled]	Depth [cm]	Bound.	Color: Matrix	Color: Mottles [with % abund.]	Texture [& % Clay]	Clay Films [Y / N]	Structure [grade, size, class, strength]	C.F.% by Vol [note size, % ironstone or concretions]	pH (HCl, mn)	General Comment
1	O	0 - 0.25		10YR 7/4		gravelly silt <5% clay	N	loose soft	50% subrounded gravel	Ø	
2	Ap	0.25 - 5		5YR 7/4		sandy silt 5% clay	N	loose soft	15% angular gravel up to 2 in.	Ø	
3	B	5 - 12		10YR 4/4		gravelly silt 15% clay	Y	v. stiff platy	25% subrounded gravel up to 1 in.	Ø	prevalent roots and root channels
4	b	12 - 24		10YR 6/4		sandy silt 5% clay	N	v. stiff	10% subrounded gravel & caliche up to 3 in.	2	
5	C	24 - 31		5YR 6/4		sandy gravel <5% clay	N	v. dense	70% angular gravel up to 6 in.	Ø	
6	C	31 - 36		10R 7/2		silty sand <5% clay	N	med. dense	25% subangular gravel up to 1.5 in.	2	
7		-									
8		-									
9		-									
10		-									

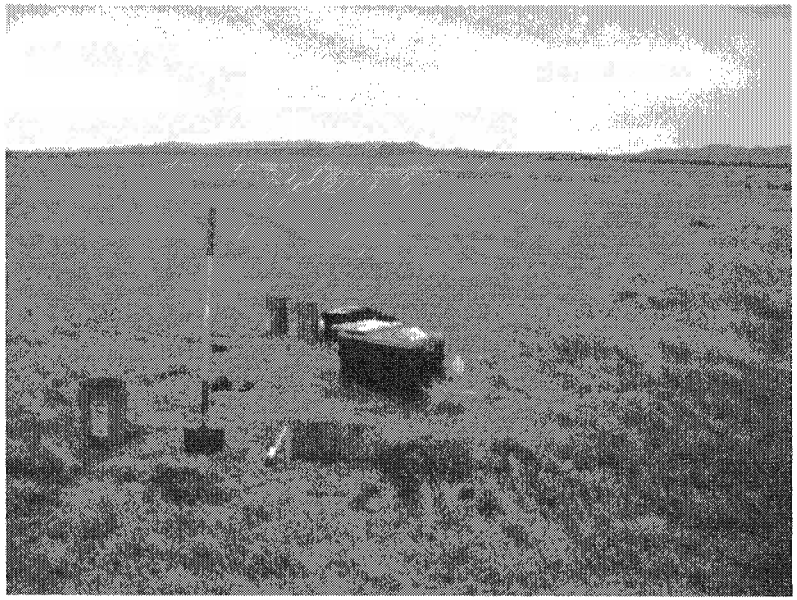
samples:
0 - 12 in (3)
12 - 24 in (1)
24 - 31 in (1)
31 - 36 in (1)

APPENDIX B

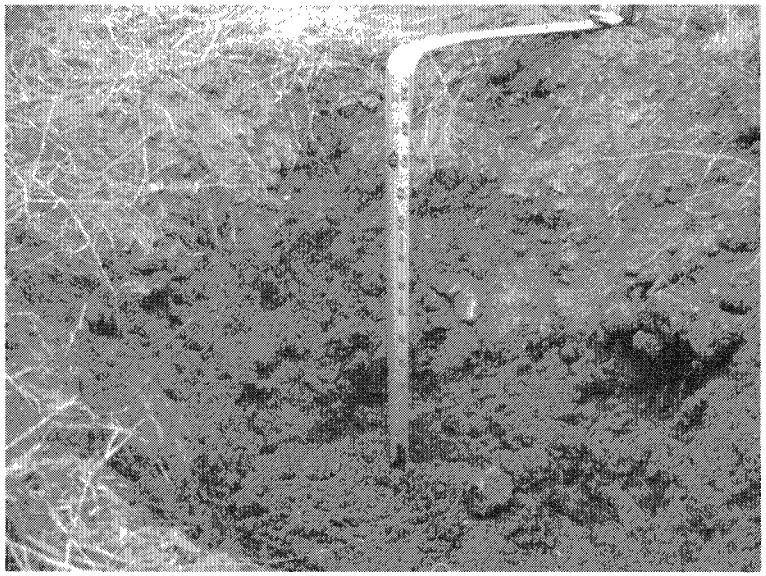
Soil Sampling Photographs

Soils Photo 1: B1 profile.

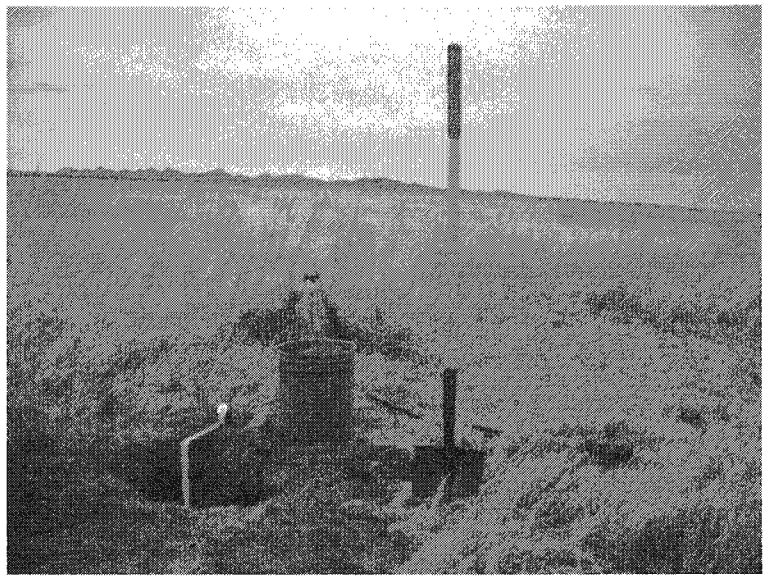
Soils Photo 2: B1 location facing north.



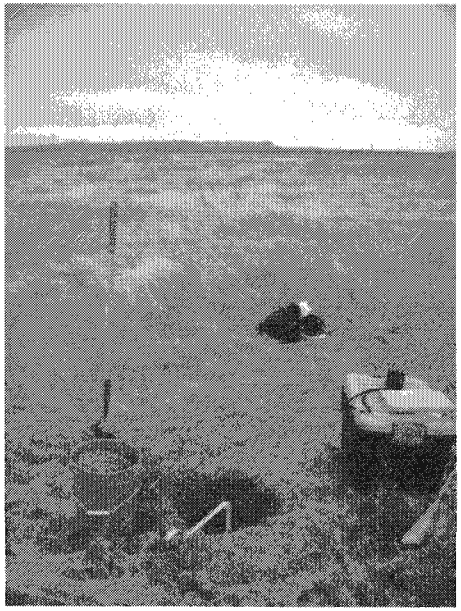
Soils Photo 3: B1 location facing south.



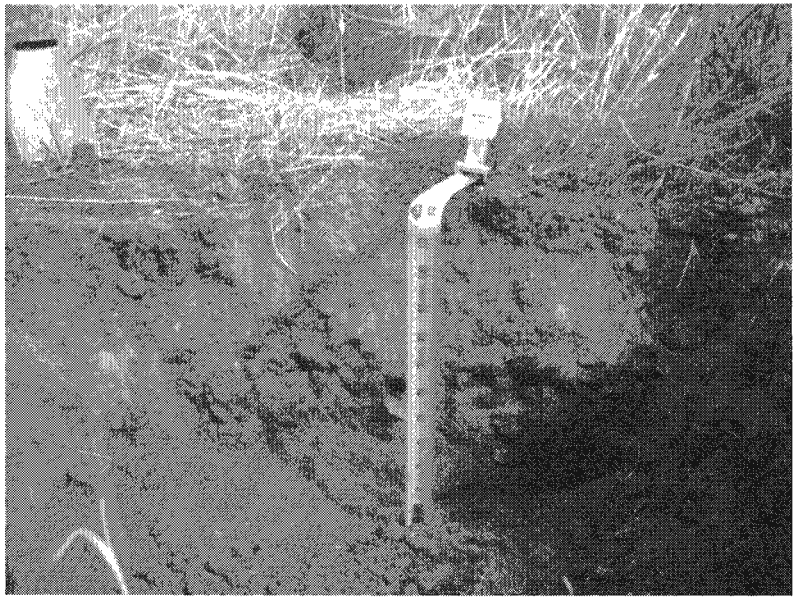
Soils Photo 4: B2 profile.



Soils Photo 5: B2 location facing northwest.



Soils Photo 6: B2 location facing south.

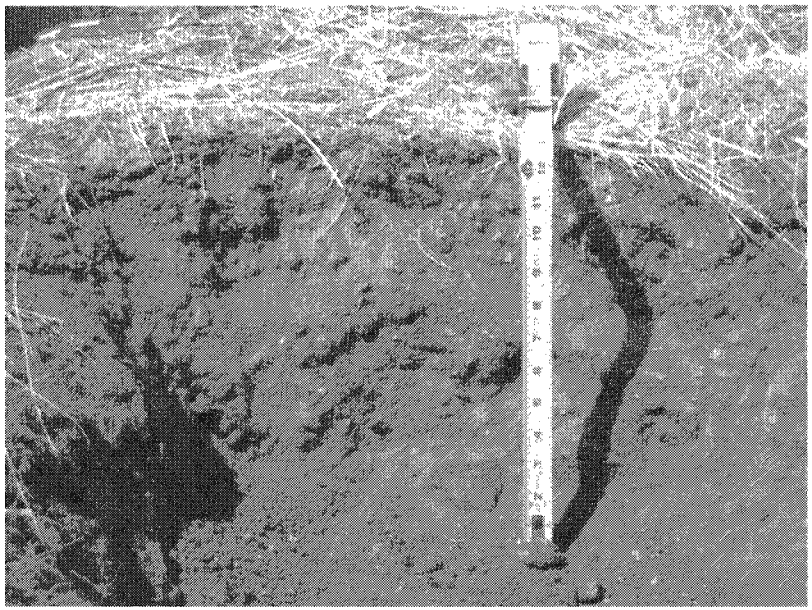


Soils Photo 7: B4 profile.

Soils Photo 8: B4 location facing northwest.

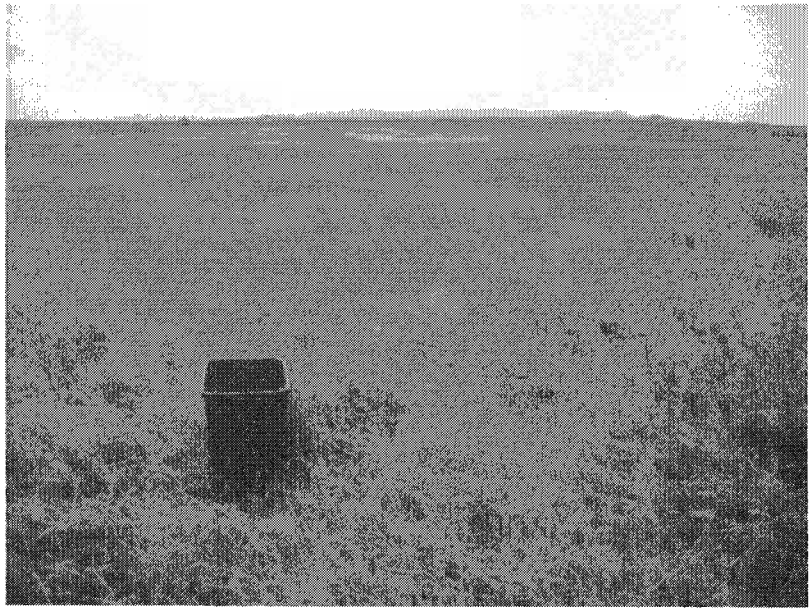
Soils Photo 9: B4 location facing south.

Soils Photo 10: B4 location facing east. Notice vegetation change from cheatgrass to darker thistle.

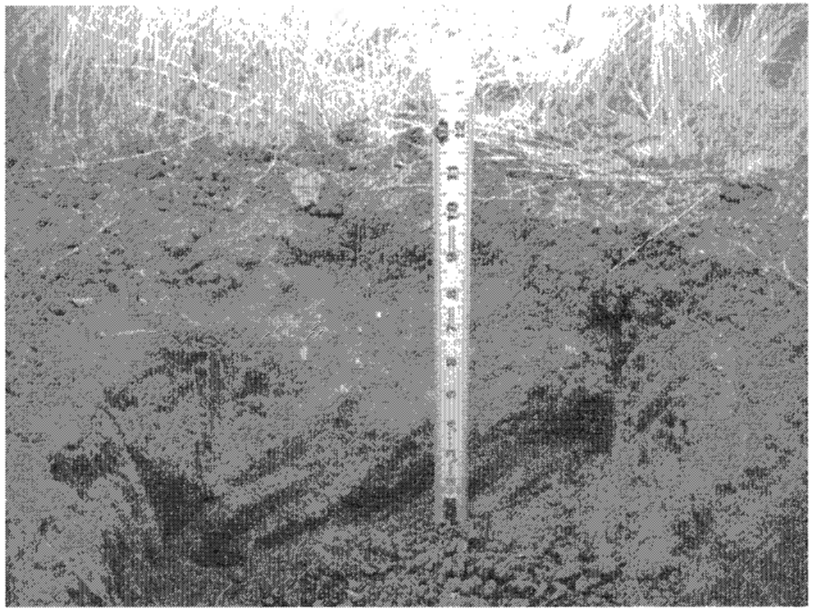


Soils Photo 11: B5 profile.

Soils Photo 12: B5 location facing north.



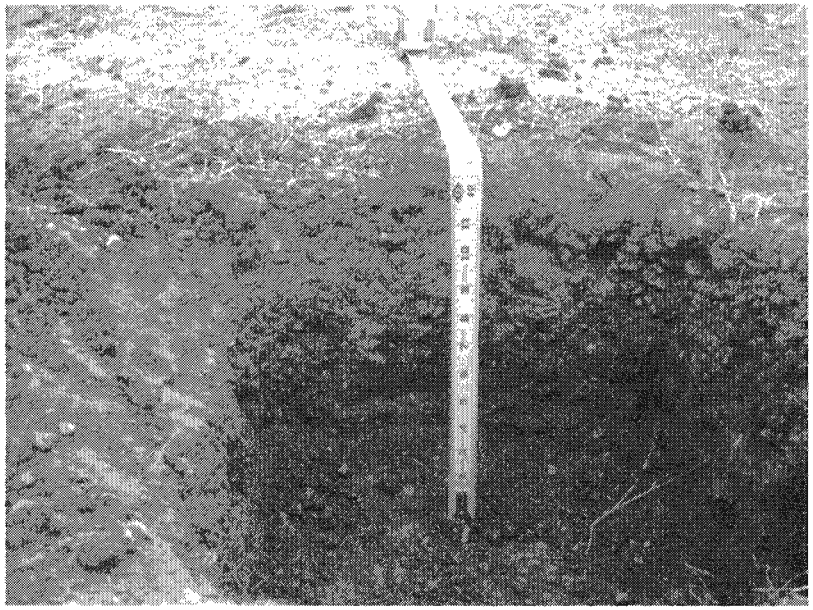
Soils Photo 13: B5 location facing south.



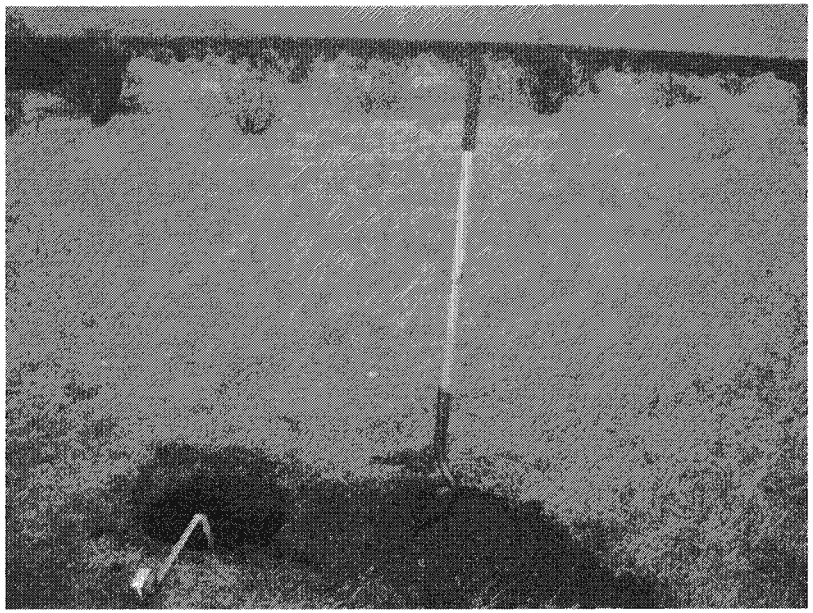
Soils Photo 14: B6 profile.

Soils Photo 15: B6 location facing north.

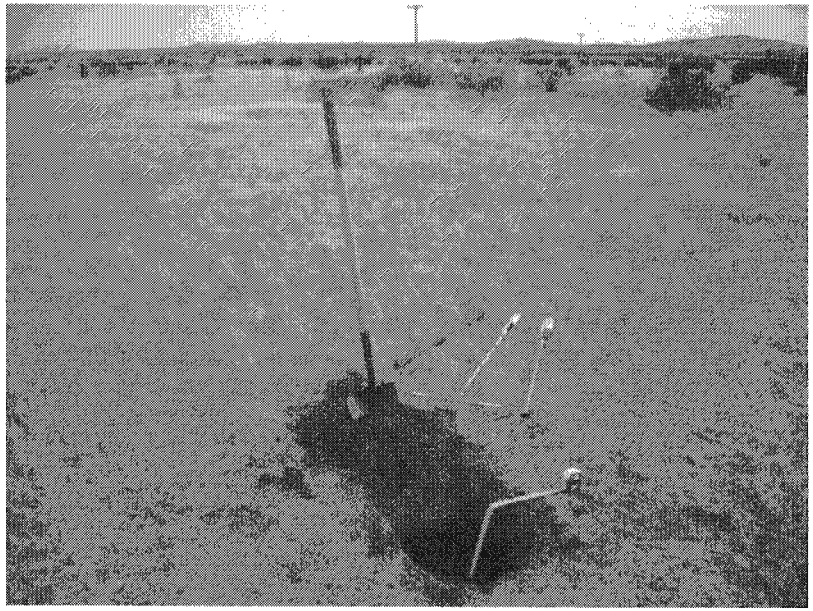
Soils Photo 16: B6 location facing south.



Soils Photo 17: B8 profile.

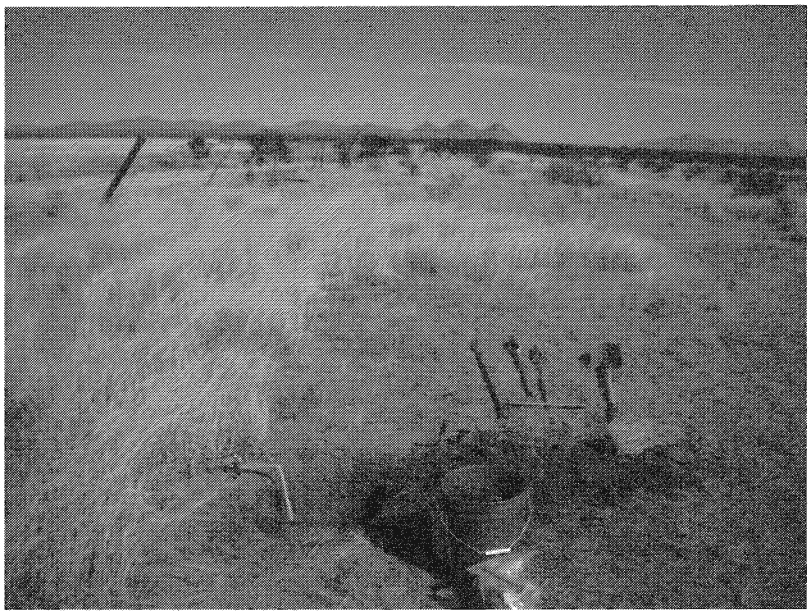


Soils Photo 18: B8 location facing north-northeast.

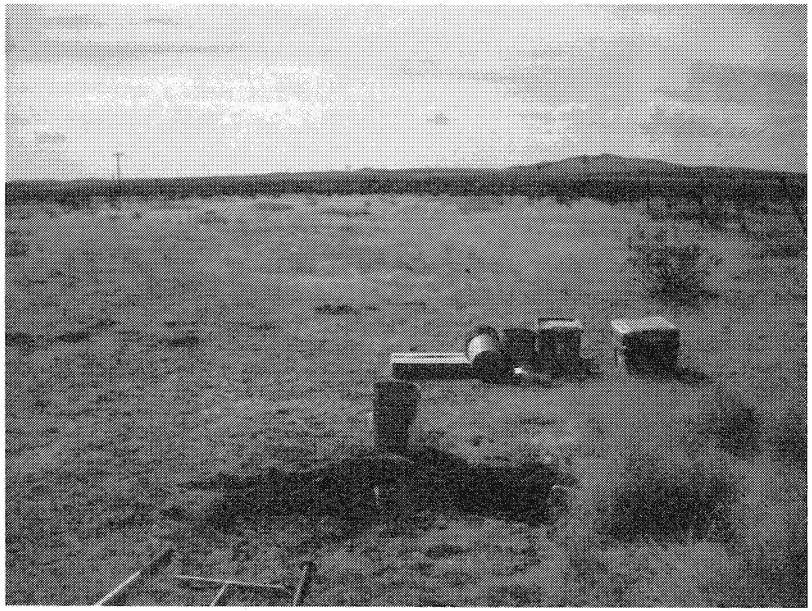


Soils Photo 19: B8 location facing south.

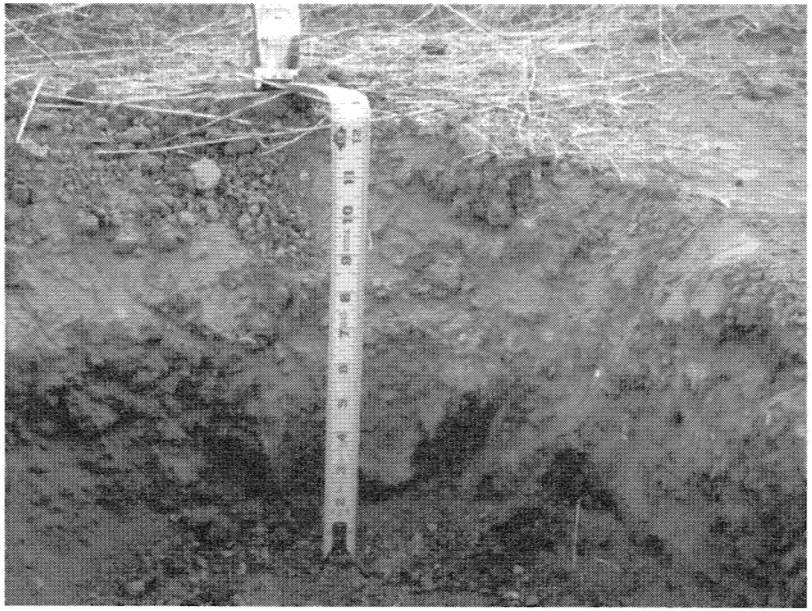
Soils Photo 20: B9 profile.



Soils Photo 21: B9 location facing north.



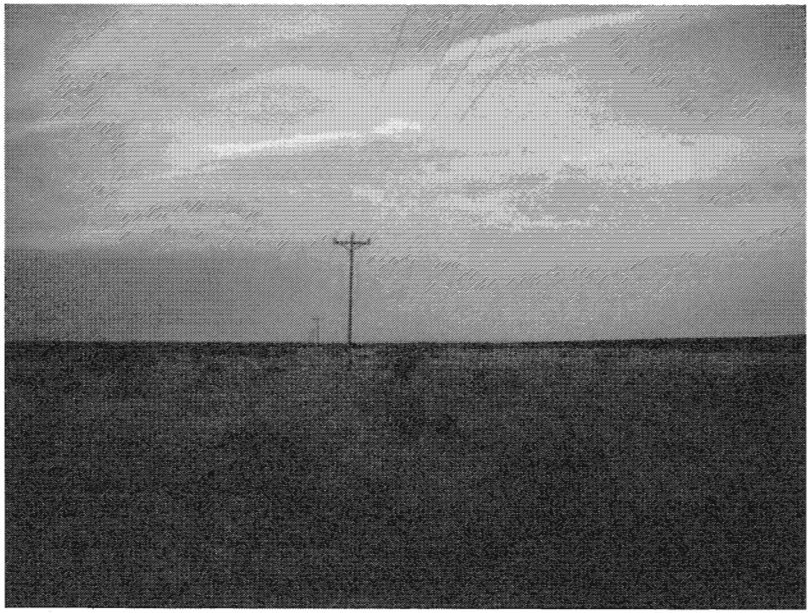
Soils Photo 22: B9 location facing south.



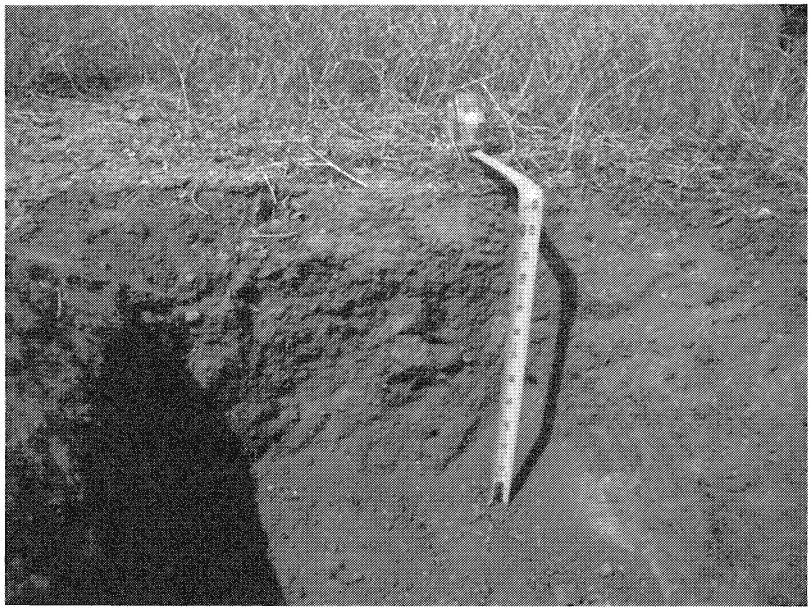
Soils Photo 23: B10 profile.

Soils Photo 24: B10 location facing north.

Soils Photo 25: B10 location facing south.

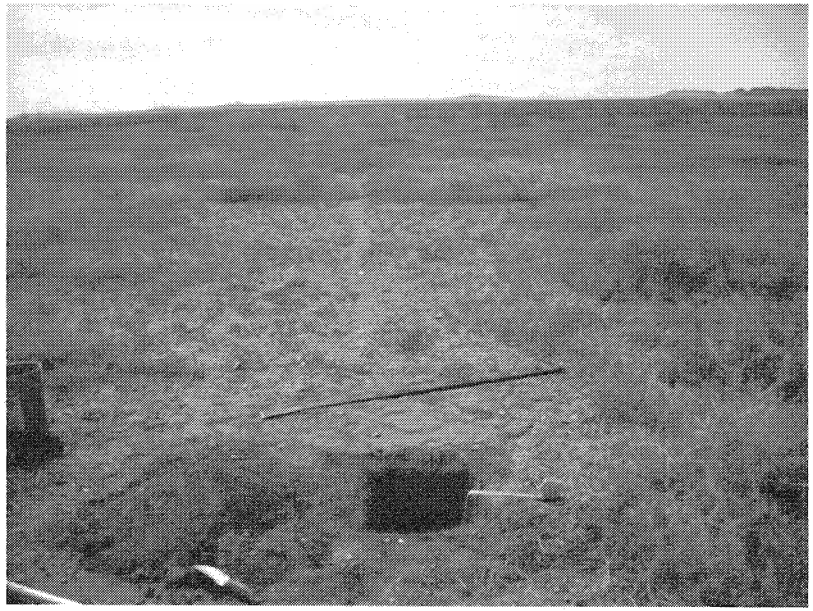


Soils Photo 26: B10 location facing east down drainageway.

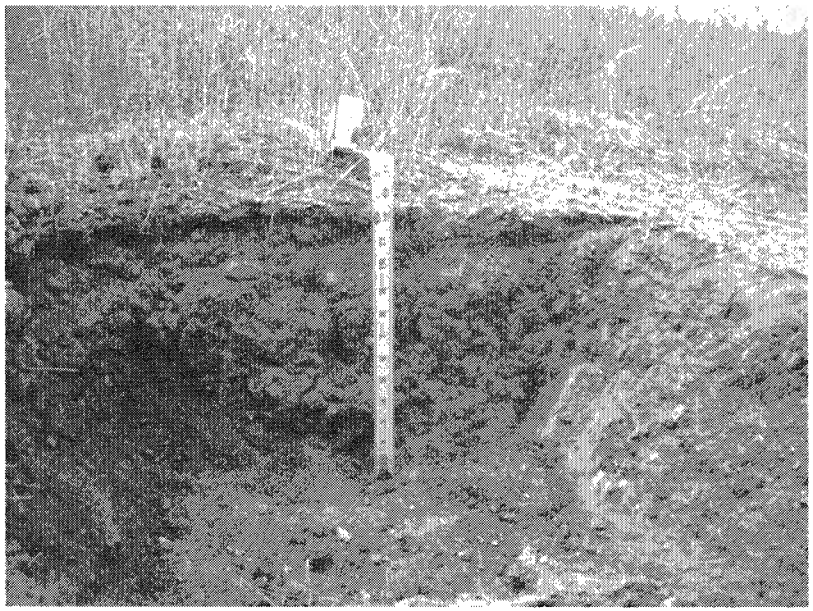


Soils Photo 27: B12 profile.

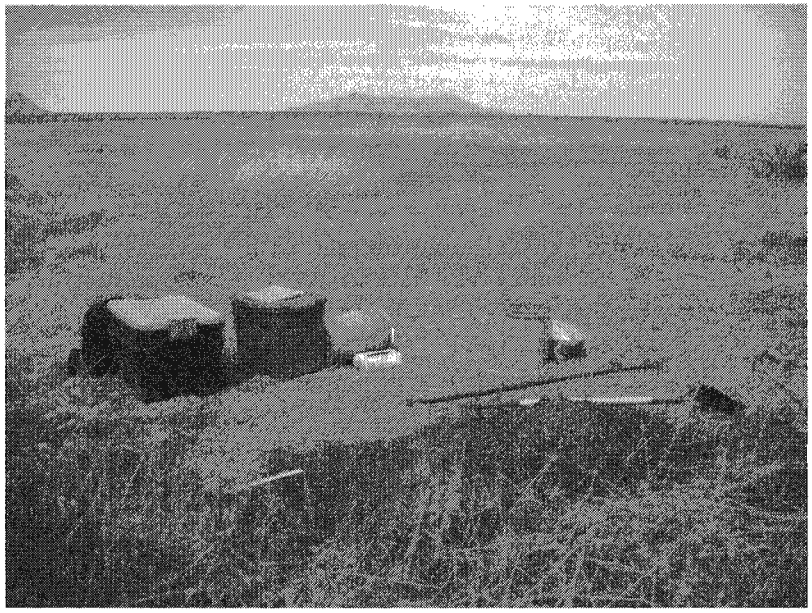
Soils Photo 28: B12 location facing north.



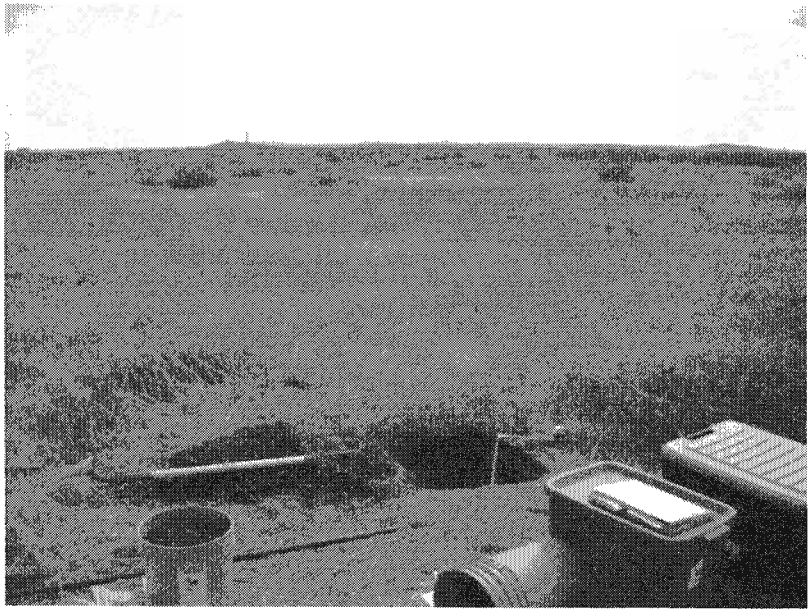
Soils Photo 29: B12 location facing south.



Soils Photo 30: B13 profile.



Soils Photo 31: B13 location facing north.



Soils Photo 32: B13 location facing south.

APPENDIX C

Laboratory Report

A & L PLAINS AGRICULTURAL LABORATORIES, INC.
302 34th St. • P.O. Box 1590 • Lubbock, TX 79408 • (806) 763-4278
FAX (806) 763-2762 • www.al-labs-plains.com

09-086-01a

REPORT NUMBER

Date: March 26, 2009
Page 1

Amec GeoMatrix
7007 Wyoming Blvd. NE
Suite F-1
Albuquerque, NM 87109

Submitted by:
Tom Tangen
Jason Olivar

Project: Sapphire
Project No: 14821

S A R by Saturated Paste Extract

Lab No.	Sample ID	Sample Depth	Matrix	SAR	Sodium ppm	Calcium ppm	Magnesium ppm	E.C. mmhos/cm	pH
93292	B1	0-12	Soil	**3.64**	56	12	3	**0.3**	**8.3**
93293	B1	12-24	Soil	**8.89**	252	31	18	**1.1**	**8.3**
93294	B1	24-36	Soil	**6.76**	100	10	4	**0.5**	**8.1**
93295	B2	0-12	Soil	**10.40**	313	55	8	**1.4**	**8.0**
93296	B2	12-24	Soil	**9.25**	203	27	6	**0.9**	**8.1**
93297	B2	24-36	Soil	**10.13**	240	31	7	**1.0**	**8.1**
93298	B4	0-12	Soil	**3.84**	54	9	4	**0.3**	**8.5**
93299	B4	12-21	Soil	**5.77**	93	12	4	**0.4**	**8.5**
93300	B4	21-36	Soil	**7.08**	133	17	6	**0.6**	**8.2**
93301	B5	0-12	Soil	**2.87**	63	22	8	**0.4**	**8.3**
93302	B5	12-24	Soil	**3.67**	48	7	3	**0.2**	**8.8**
93303	B5	24-36	Soil	**10.48**	263	28	12	**1.1**	**8.5**
93304	B6	0-12	Soil	**1.85**	30	15	3	**0.2**	**8.2**
93305	B6	12-24	Soil	**2.91**	61	21	7	**0.3**	**8.5**
93306	B6	24-36	Soil	**4.24**	63	11	4	**0.7**	**8.4**
93307	B8	0-12	Soil	**5.44**	146	31	14	**0.2**	**8.1**
93308	B8	12-15	Soil	**0.95**	19	20	5	**0.2**	**8.0**
93309	B8	15-19	Soil	**0.93**	19	20	6	**0.3**	**8.0**

A & L PLAINS AGRICULTURAL LABORATORIES, INC.

302 34th St. • P.O. Box 1590 • Lubbock, TX 79408 • (806) 763-4278
FAX (806) 763-2762 • www.al-labs-plains.com

09-086-01a

REPORT NUMBER

Date: March 26, 2009

Amec GeoMatrix
7007 Wyoming Blvd. NE
Suite F-1
Albuquerque, NM 87109

Submitted by:
Tom Tangen

Project: Sapphire
Project No: 14821

S A R by Saturated Paste Extract

Lab No.	Sample ID	Sample Depth	Matrix	SAR	Sodium ppm	Calcium ppm	Magnesium ppm	E.C. mmhos/cm	pH
93310	B9	0-12	Soil	**0.96**	28	44	13	**0.2**	**8.3**
93311	B9	12-24	Soil	**2.02**	31	12	3	**0.4**	**8.0**
93312	B9	24-36	Soil	**4.66**	66	10	3	**2.7**	**7.9**
93313	B10	0-12	Soil	**13.44**	622	105	34	**0.3**	**8.1**
93314	B10	12-24	Soil	**1.05**	25	33	5	**0.7**	**7.8**
93315	B10	24-36	Soil	**0.64**	28	109	20	**0.8**	**8.0**
93316	B12	0-12	Soil	**1.45**	58	88	19	**0.1**	**8.0**
93317	B12	12-24	Soil	**2.62**	31	7	2	**0.3**	**8.4**
93318	B12	24-36	Soil	**3.76**	49	7	3	**0.2**	**8.5**
93319	B13	0-12	Soil	**5.41**	104	15	8	**0.3**	**8.4**
93320	B13	12-24	Soil	**5.81**	107	15	7	**0.4**	**8.7**
93321	B13	24-31	Soil	**6.23**	102	12	5	**0.5**	**8.4**
93322	B13	31-36	Soil	**6.40**	108	12	5	**0.5**	**8.4**
						QC			
				%Accuracy	96.7	99.6	99.4		
				%Deviation	3.29	0.45	0.60		
				%Precision	93.6	97.1	99.4		

Respectfully submitted,

by
A&L Plains Ag Labs, Inc.

CHAIN-OF-CUSTODY RECORD

Wilhelm.welzenbach@amec.com

FRE 1523

PROJECT NAME: Sapphire			DATE: 3-19-09 PAGE OF
PROJECT NUMBER: 14821	LABORATORY NAME: Amec GeoMatrix	CLIENT INFORMATION	REPORTING REQUIREMENTS
RESULTS TO: tom.tangen@amec.com	LABORATORY ADDRESS: 7007 Wyoming Blvd, NE, Suite F-1		
TURNAROUND TIME: 3 to 5 Days	Albuquerque, NM 87109		
SAMPLE SHIPMENT METHOD: Fed-X	LABORATORY CONTACT: Tom Tangen		GEOTRACKER REQUIRED: YES (NO)
	LABORATORY PHONE NUMBER: 505-301-2081 (cell)		SITE SPECIFIC GLOBAL ID NO:

SAMPLERS (SIGNATURE):

ANALYSES

DATE	TIME	SAMPLE NUMBER	Electrical Conductivity (Saturated Paste)	pH (Saturated Paste)	SAR (Saturated Paste)	CONTAINER TYPE AND SIZE	Soil (S), Water (W), Vapor (V), or Other (O)	Filtered	Preservative Type	Cooler	MS/MSD	No. of Containers	ADDITIONAL COMMENTS
3-5-09	17:20	B1,0-12in	X	X	X	1 Gallon Plastic Bags	S					1	
		B1,12-24in	X	X	X							1	
	↓	B1,24-36in	X	X	X							1	
	15:37	B2,0-12in	X	X	X	No sample						1	
		B2,0-12in	X	X	X	No sample						1	
		B2,12-24in	X	X	X							1	
		B2,24-28in	X	X	X							1	
↓	↓	B2,24-36in	X	X	X							1	
3-6-09	9:30	B4,0-12in	X	X	X							1	
		B4,12-21in	X	X	X							1	
	↓	B4,21-36in	X	X	X							1	
	11:25	B5,0-12in	X	X	X							1	
		B5,12-24in	X	X	X							1	
↓	↓	B5,24-36in	X	X	X							1	
			[redacted]									[redacted]	

RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	DATE	TIME
SIGNATURE:	3/19/09		SIGNATURE:	3/19/09	3:34
PRINTED NAME: Jason Olivar			PRINTED NAME: Scott Clemons		
COMPANY: Amec			COMPANY: ATC TRANS.		
SIGNATURE:			SIGNATURE:		
PRINTED NAME:			PRINTED NAME:		
COMPANY:			COMPANY:		
SIGNATURE:			SIGNATURE:		
PRINTED NAME:			PRINTED NAME:		
COMPANY:			COMPANY:		

TOTAL NUMBER OF CONTAINERS:

SAMPLING COMMENTS:

1281 East Alluvial Ave., Suite 101
Fresno, California 93720-2659
Tel 559.264.2535 Fax 559.264.7431

amec

FRE 1523

CHAIN-OF-CUSTODY RECORD

PROJECT NAME: Sapphire
DATE: 3-19-09
PAGE: OF

PROJECT NUMBER: 14821
REPORTS TO: Tom.Jangen@amec.com
TURNAROUND TIME: 3 to 5 Days
SAMPLE SHIPMENT METHOD: Fed-X

LABORATORY NAME: Amec Geomatrix
LABORATORY ADDRESS: 7207 Wyoming Blvd., NE, Suite F-1 Albuquerque, NM 87109
LABORATORY CONTACT: Tom Jangen
LABORATORY PHONE NUMBER: 505-301-2091 (cell)

CLIENT INFORMATION

REPORTING REQUIREMENTS

GEOTRACKER REQUIRED: YES

SITE SPECIFIC DISCHARGE:

SAMPLERS (SIGNATURE):

ANALYSES

DATE	TIME	SAMPLE NUMBER	Electrical Conductivity (Saturated Paste)	pH (Saturated Paste)	SAR (Saturated Paste)	CONTAINER TYPE AND SIZE	Soil (S), Water (W), Vapor (V), or Other (O)	Filtered	Preservative Type	# OF CONTAINERS	ADDITIONAL COMMENTS
3-6-09	13:00	B6, 0-12 in	X	X	X	1 Gallon Plastic Bags	S				
		B6, 12-24 in	X	X	X						
		B6, 24-36 in	X	X	X						
	16:25	B8, 0-12 in	X	X	X						
		B8, 12-15 in	X	X	X						
		B8, 15-19 in	X	X	X						
3-7-09	9:30	B9, 0-12 in	X	X	X						
		B9, 12-24 in	X	X	X						
		B9, 24-36 in	X	X	X						
3-6-09	17:40	B10, 0-12 in	X	X	X						
3-7-09	7:00	B10, 12-24 in	X	X	X						
		B10, 24-36 in	X	X	X						
	11:10	B12, 0-12 in	X	X	X						
		B12, 12-24 in	X	X	X						
		B12, 24-36 in	X	X	X						

RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	DATE	TIME
SIGNATURE:	3/19/09		SIGNATURE:	3-20-09	
PRINTED NAME: Jason Olivas			PRINTED NAME: Scott Cleveland		
COMPANY: Amec			COMPANY: A+L Pzl/MC		
SIGNATURE			SIGNATURE		
PRINTED NAME:			PRINTED NAME:		
COMPANY:			COMPANY:		
SIGNATURE			SIGNATURE		
PRINTED NAME:			PRINTED NAME		
COMPANY:			COMPANY:		

TOTAL NUMBER OF CONTAINERS: 5

SAMPLING COMMENTS

1281 East Alluvial Ave., Suite 101
Fresno, California 93720-2659
Tel 559.264.2535 Fax 559 264.7431

amec

FRE 1523

CHAIN-OF-CUSTODY RECORD

PROJECT NAME: Sapphire
DATE: 3-19-09
PAGE: OF

PROJECT NUMBER: 14821
REPORTS TO: Tom.Tangen@amec.com
TURNAROUND TIME: 3 to 5 Days
SAMPLE SHIPMENT METHOD: Fed-X

LABORATORY NAME: Amec GeoMatrix
LABORATORY ADDRESS: 7007 Wyoming Blvd, NE Suite F-1, Albuquerque, NM 87109
LABORATORY CONTACT: Tom Tangen
LABORATORY PHONE NUMBER: 505-301-2081 (cell)

CLIENT INFORMATION

REPORTING REQUIREMENTS

GEOTRACKER REQUIRED: YES

SITE SPECIFIC GLOBAL ID NO.:

SAMPLERS (SIGNATURE):

DATE	TIME	SAMPLE NUMBER	Electrical Conductivity (Saturated Paste)	pH (Saturated Paste)	SAR (Saturated Paste)	CONTAINER TYPE AND SIZE	Sp (S, Water (W) Vapor (V) or Other (O)	Filtered	Preservative Type	Comments	HOLD	ADDITIONAL COMMENTS
3-7-09	12:40	B13, 0-12 in	X	X	X	1 Gallon Plastic Bags	S					
		B13, 12-24 in	X	X	X							
		B13, 24-31 in	X	X	X							
↓	↓	B13, 31-36 in	X	X	X							

RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	DATE	TIME
SIGNATURE:	3/19/09		SIGNATURE:	3-19-09	
PRINTED NAME: Jason Oliver			PRINTED NAME: Scott Coleman		
COMPANY: Amec			COMPANY: H&L PLATING		
SIGNATURE			SIGNATURE		
PRINTED NAME			PRINTED NAME:		
COMPANY			COMPANY:		
SIGNATURE			SIGNATURE		
PRINTED NAME			PRINTED NAME		
COMPANY			COMPANY:		

TOTAL NUMBER OF CONTAINERS

SAMPLING COMMENTS

1281 East Alluvial Ave., Suite 101
Fresno, California 93720-2659
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amec