Shroff, Behram

From: Jon Winter (USA) [Jon.Winter@uranium1.com]
Sent: Friday, June 19, 2009 2:14 PM
To: Fliegel, Myron; Shroff, Behram
Subject: Moore Ranch Environmental Report RAI responses 1 of 2
Attachments: image001.jpg; ER RAI Cultural Historic Questions on Section 3.8 - 6.19.09.pdf; ER RAI Transportation Questions on Sections 3.2 & 4.2.2 - 6.19.09.pdf; Cover RAI responses 6.19.09.pdf

Myron, attached are the first set of responses to the Moore Ranch Environmental Report (ER) Request for Additional Information (RAI) dated 3.23.2009. This first set of responses will be emailed in two separate emails due to the size of the attached documents. This first email will contain responses (PDF format) to Questions on Sections 3.8 Cultural and Historic and Questions on Sections 3.2 Transportation. A PDF of the cover letter is also attached. The second email will contain responses to questions on Section 2.5 Alternatives and Section 3.7 Noise. The hard copy of the responses to the ER RAI's went out in today's mail.

Jon F. Winter
Manager Environmental & Regulatory Affairs, Wyoming

907 North Poplar Suite 260
Casper, WY 82601
Phone: 307-234-8235 ext. 331

uraniumone™
investing in our energy

I/77

uraniumone™
investing in our energy

June 19, 2009

Attn: Document Control Desk
Myron Fliegel, Senior Project Manager
Uranium Recovery Licensing Branch
Division of Waste Management
and Environmental Protection,
Office of Federal and State Materials
and Environmental Management Programs,
US Nuclear Regulatory Commission
Two White Flint North, MS T8F5
11545 Rockville Pike
Rockville, MD 20852

RE: ADDITIONAL INFORMATION REQUESTED FOR THE MOORE RANCH IN SITU URANIUM RECOVERY PROJECT LICENSE APPLICATION ENVIRONMENTAL REPORT, FIRST SET OF RESPONSES

Dear Mr. Fliegel:

By letter dated March 23, 2009, the U.S. Nuclear Regulatory Commission (NRC) staff provided a request for additional information (RAI) to complete review of the license application Environmental Report for the Moore Ranch In Situ Uranium Recovery Project. By this letter, Energy Metals Corporation dba Uranium One Americas (Uranium One) is submitting the first set of responses to RAI. The attached response addresses the following topical areas identified by NRC Staff:

- Responses to questions concerning the alternatives considered by EMC for the Moore Ranch Project;
- Responses to questions concerning transportation aspects;
- Responses to questions concerning existing noise and potential impacts; and
- Responses to questions concerning the cultural and historic resource aspects.

Energy Metals Corporation (US)
A Member of the Uranium One Inc. Group of Companies
tel +1 307-234-8235 • **fax** +1 307-237-8235
907 N. Poplar Street
Suite 260 • Casper
Wyoming • 82601
www.uranium1.com

uraniumone™
investing in our energy

Each response provides the RAI question prepared by NRC with any clarifications provided by Staff, the answer prepared by Uranium One, and the proposed changes to the License Application. Changes are presented in a track changes mode for ease of review by NRC Staff.

Uranium One intends to delay submittal of final revisions to the Environmental Report until the responses to all questions contained in this RAI have been completed. We expect to complete our responses to all RAI Questions by the end of June, 2009. Additionally, Uranium One is currently responding to open issues identified by NRC Uranium Recovery Staff in relation to the Technical Report. These responses will likely involve revisions to the Technical and Environmental Reports. We would propose to submit revisions to both reports once the open issues are resolved. We expect to submit response to these open issues by late July, 2009 although we understand that there may be some additional open issues identified in the near future. If this approach will in any way hinder the timely review by Staff of the submitted information, please inform us.

Please note that the response to RAI questions related to the cultural and historic resource aspects of the Moore Ranch project include several figures to be appended to Appendix B of the Environmental Report. The Class III Cultural Resource Inventory in Appendix B contains information that falls under the confidentiality requirement for archeological resources under the National Historic Preservation Act, Section 304 (16 U.S.C. 470w-3(a)). Accordingly, disclosure is specifically exempted by statute as specified in 10 CFR §2.390(a)(3). Therefore, Uranium One requests that all applicable portions of Appendix B remain "CONFIDENTIAL" for the purpose of Public Disclosure of this application. The new figures for Appendix B have been marked as follows:

> *Confidential Information Submitted under 10 CFR 2.390*
> *Disclosure is Limited Under the National Historic Preservation Act, Section 304 (16 U.S.C. 470w-3(a)).*

Energy Metals Corporation (US)
A Member of the Uranium One Inc. Group of Companies
tel +1 307-234-8235 • **fax** +1 307-237-8235
907 N. Poplar Street
Suite 260 • Casper
Wyoming • 82601
www.uranium1.com

uraniumone™
investing in our energy

If you should have any questions on these responses, please contact me by phone at (307) 234-8235 ext. 331 or by email at jon.winter@uranium1.com.

Sincerely,
Uranium One Americas

Jon Winter
Manager of Environmental and Regulatory Affairs

Enclosures: Responses to NRC Request For Additional Information

cc: Behram Shroff, NRC

Energy Metals Corporation (US)
A Member of the Uranium One Inc. Group of Companies
tel +1 307-234-8235 • **fax** +1 307-237-8235
907 N. Poplar Street
Suite 260 • Casper
Wyoming • 82601
www.uranium1.com

ALTERNATIVES

Question ER 2.5 No.1 Reasonable Alternatives – Alternate Plant Site

RAI Question:

Information on other sites that were evaluated prior to picking the site where the project is to be accomplished. Also include information on the footprint, such as alternative plant locations, routes for roads, and building locations.

Answer:

The Central Plant was initially proposed at a location which was situated approximately 700 feet to the west of the current proposed location, shown in Figure 1.2-4 of the Environmental Report. Since preparation of the Environmental Report, additional siting evaluations have been performed and a better location has been identified compared to the original proposed Central Plant site location. The current preferred Plant site is deemed the most suitable location primarily due to the existing topography and the minimal topographic changes required for the proposed layout of the plant infrastructure. Additional information on this evaluation and alternate site information including a new Figure 2.5-1 will be included in the revised Section 2.5 of this Environmental Report.

In addition, Section 4.12.2 of the Environmental Report will be revised to reflect updated radiological impacts due to relocation of the plant site. EMC has revised the dose impacts analysis using the MILDOS-Area code, resulting in an increase in the maximum annual dose at the site boundary from 0.8 mrem/year to 1.5 mrem/year. This change is reflected in Table 2.6-1 in response to RAI Question 2.5 Number 4.

Proposed Revisions to License Application

The following changes are proposed to the license application in response to this RAI question. Changes to the original text as submitted to NRC are noted in red-line/strikeout method.

2.5 REASONABLE ALTERNATIVES

2.5.2 Plant Location Alternatives

The site of the Moore Ranch Central Plant was initially planned at a location which was situated approximately 700 feet to the west of the current preferred location, shown in Figure 2.5-1. The current proposed plant site was deemed the more suitable location primarily due to existing topography, and the minimal topographic changes that would be required for the proposed layout to the plant infrastructure. The new proposed site location minimizes cut and fill, thereby minimizing the disturbance of natural ground. The revised site location, as with the alternate site location, is located to minimize environmental impacts in that it

will be in close proximity to the primary access road, it will avoid existing utilities, and its visibility from Highway 387 will be minimized.

Insert New Figure 2.5-1

Moore Ranch License/
Permit Boundary

State Highway 387

ORIGINAL (ALTERNATIVE)
PLANT SITE

PLANT ACCESS ROAD
1.77 Acres

CENTRAL PROCESSING
(PREFERRED) PLANT LOCATION
5.65 Acres

ISR Pipeline

SITE ACCESS ROAD

ACCESS ROAD

Wellfield 1
5 Header Houses
106 Patterns/200 Injectors
63 Monitor Wells
23.3 Acres

Wellfields 1 & 2
13 Header Houses
259 Patterns/440 Injectors
144 Monitor Wells
56.9 Acres

Wellfield 2
8 Header Houses
153 Patterns / 240 Injectors
81 Monitor Wells
33.6 Acres

N

750' 1500'
375' 0

VERIFY SCALE

SCALE 1":1500'

WELLFIELD PATTERN
DEVON ENERGY CBM ROAD
ISR Pipeline Design to Proposed Header Houses

TREC, Inc.
Engineering & Environmental Management
951 Werner Court
Suite 295
Casper, WY 82601
Phone (307)265-0096
Fax (307)265-2498
www.trecorp.com

uraniumone™
investing in our energy
907 N Poplar Street
Suite 260
Casper, WY 82601
tel +1 307-234-8235
fax +1 307-237-8235
www.uranium1.com

DRAWN BY: WB
CHECKED BY: JS
APPROVED BY:

MOORE RANCH
CPP
Site Road Plan

REV. #	DESCRIPTION	BY	DATE
0	INITIAL DRAFT	WB	05/19/09
1	UPDATE	KLW	06/17/09

Figure
2.5-1

Question 2.5.2 Number 2 Reasonable Alternatives – Liquid Effluent Disposal

RAI Question:

More physical details (size, location, operations) or other information (cost, logistics, technology, etc.) on the three liquid effluent disposal alternatives (overland application, evaporation ponds, and deep well injection).

Answer:

In 2008, Uranium One performed additional alternatives analysis for potential waste water treatment and disposal options. The results of this alternatives analysis were not available at the time the Moore Ranch NRC application was prepared and submitted. As a result of the initial screening analysis, a detailed analysis of deep well disposal, mechanical evaporation, chemical precipitation and reverse osmosis, and spray/solar evaporation was performed. In response to this RAI question, section 2.5.1.3 of the Environmental Report will be revised.

Proposed Revisions to License Application

The following changes are proposed to the license application in response to this RAI question. Changes to the original text as submitted to NRC are noted in red-line/strikeout method.

2.5.1.3 Waste Management

Liquid wastes generated from production and restoration activities are generally managed at ISR facilities by solar evaporation ponds, deep well injection, and/or land application. The use of deep waste disposal well(s) is considered by EMC to be the best alternative to dispose of these types of wastes. The Moore Ranch deep well(s) will isolate liquid wastes generated by the project from any underground source of drinking water (USDW). These wells must be authorized by the State of Wyoming under a Class I UIC Permit.

EMC has considered a wide range of liquid treatment/disposal methods for use at Moore Ranch. The alternatives analysis considered three primary waste streams from ISR operation:

Deleted: *and rejected using solar evaporation ponds and land application as a*

Deleted:

- *Plant eluant;*
- *Wellfield purge water; and*
- *RO reject produced during wellfield restoration.*

A "design basis influent" was developed for the three typical ISR wastewater streams to be managed as well as the projected water quality characterization for blending the waste streams. The alternatives analysis was completed stepwise with the development of a common evaluation basis, screening of potentially

applicable treatment technologies, development of candidate treatment trains, and technical and cost evaluation of the treatment trains. The initial screening of treatment technologies included evaluation of each technology for implementability, flexibility, maintainability, and relative capital and operating costs. The retained technologies were developed into treatment options and then the comparative evaluation of each option was conducted in parallel for each waste stream. Both capital and annual operating costs were developed for each option in order to calculate a net present value. The costs developed were comparative order-of-magnitude estimates intended for comparison purposes and were based on an ISR model case that could then be scaled to a particular operation. Costs that were common to all options such as regulatory reporting, project management, and administrative costs were not included.

Land application is feasible and has been historically used at some ISR facilities as a wastewater treatment/disposal method, generally in conjunction with deep well disposal and/or spray/solar evaporation. However, discharges through land application may be required to meet surface water quality standards. If land-applied water is not treated to stringent standards there is a potential for future environmental liability due to accumulation of contaminants in the soil or groundwater below the land application surface area. For this reason land application was not retained in the screening process for further consideration.

The following discussion provides a description of each treatment/disposal method considered and the relevant characteristics that led to the selection of deep well injection as the preferred alternative.

Deep well disposal

On any site where geologic and hydrogeologic conditions would allow, deep well injection is the current preferred method for wastewater disposal. Deep well injection is permitted primarily on the condition that potential sources of drinking water cannot be adversely impacted by the deep well operation, rather than by the quality and characteristics of the wastewater injected. Deep well "discharge standards" as incorporated into a permit are based on the mine operator's characterization of the waste stream. This method was considered potentially suitable for all ISR waste streams.

Mechanical Evaporation

Mechanical evaporation utilizing equipment that requires either gas or electric power was considered. Evaporation is energy-intensive, but produces the smallest possible volume of waste for disposal. Disposal costs per unit volume can be evaluated against the evaporator operations cost to determine the economic viability of evaporation as a post-treatment step. For this evaluation it is assumed that a volume reduction of approximately 95% is achieved. This method was considered potentially suitable for all ISR waste streams.

Chemical Precipitation and Reverse Osmosis

Chemical precipitation and reverse osmosis which can utilize the chemical precipitation step to either pretreat the wastewater for more efficient operation of the reverse osmosis system or use the chemical precipitation step to treat the brine was considered. Both a brine residual and a sludge are formed. This method was considered potentially suitable for all ISR waste streams.

Spray/solar evaporation

Spray/solar evaporation utilizing natural evaporation and enhancing the rate by spraying water to increase the surface area, which was assumed to provide a 95% volume reduction for this evaluation, was considered. While solar evaporation is technically feasible, the evaporation rate and length of the evaporation season must be considered in parallel with the flow rate of water to be treated. Pond size may become infeasibly large if the evaporation rate is low. If sprayers are used for evaporation enhancement, overspray due to high winds must be controlled. Additional issues with ponds include dust and dirt blown in, and the eventual need to remove salts and accumulated solids.

Table 2.5-1 provides a summary of the technical and cost evaluation of candidate water treatment and management options for a combination of the process wastewaters. For each of the alternatives considered, the table lists the advantages and disadvantages, the chemicals required, residues storage capacity, required offsite shipments, power requirements, labor requirements, environmental and safety considerations, capital cost, and 20-yr Net Present Value. For capital cost and 20-yr NPV, the deep disposal well alternative is considered the base case and the capital cost and 20-year NPV for the other alternatives are scaled from it.

As shown by Table 2.5-1, the NPV for the Deep Well Option and the Spray/Solar Evaporation Option were the most favorable (lowest estimated life cycle cost), with the Deep Well Option as the lowest overall cost. The Deep Well option presents additional environmental, safety and health benefits including the following:

- *Minimize worker exposure to concentrated brine streams that may contain uranium and byproduct material;*
- *Minimize the required footprint and therefore land disturbed by the system;*
- *Minimize the residual, either solid or liquid, stored onsite and also shipped offsite. There is no offsite transportation of residual required with a deep well; and*

- *Minimize the requirement for chemicals and other commodities.*

Based on this comparative evaluation the deep well water management option for ISR wastewater provides clear economic and environmental advantages.

All solid wastes will be properly managed. Non-contaminated solid waste will be disposed in an off site solid waste landfill permitted by the county in which it is located. Contaminated wastes will be shipped to a NRC or Agreement State licensed facility for disposal.

Insert New Table 2.5-1.

Deleted: *due to required treatment, monitoring and reclamation costs, and the potential environmental impacts from a surface discharge.*¶
¶

Deleted: -

Deleted: *approved*

Table 2.5-1
Treatment Alternatives Comparative Evaluation Matrix – 150 gpm ISL Wastewater

Evaluation Factor	Deep Well	Mechanical Evaporation	Chemical Precipitation/RO	Spray/Solar Evaporation
Advantages	Economical, no residuals so no onsite storage or offsite transport required, no concentrated chemicals required, minimal operating requirements, minimal space requirements, flexible with regard to water quality and disposal rate.	Produces very low volume brine for disposal or further processing by solidification or to dry salt for zero liquid discharge, produces treated water with essentially zero contaminants (distilled water), can be operated campaign style.	Broadly applicable to metals and common anion contaminants, chemical precipitation pretreatment allows operation of RO system to produce less brine, produces high quality treated water stream for reuse or discharge.	Primary treatment is simple system consisting of ponds, pumps, piping and nozzles. No complicated equipment, low capital cost. Commonly used for management of brine in arid climates. Can allow complete evaporation to dryness or remove low volume brine for solidification and offsite disposal.
Disadvantages	Site geology will dictate feasible disposal flow rate. Site hydrogeology (presence of potential drinking water aquifers) will dictate disposal well depth. Permitting process may be lengthy. Attention to water chemistry and need for antiscalent is required to minimize wellscreen scaling and fouling issues. Changes in water chemistry may require re-permitting. No recovery of treated water.	Long equipment lead, distillate is corrosive and would need conditioning for reuse or discharge, high capital and power cost, concentrates radionuclides into the evaporator brine by 20 times or more.	Produces both liquid and solids residues with higher volume liquid residues that other options. Highest labor. Requires bulk concentrated chemicals. Highest truck traffic of options evaluated for chemical deliveries and residuals transport.	Treatment rate dependent upon weather. "Overdesign" required to account for weather shutdowns. Potential for birds and other wildlife to drink and contact water. Treatment time affected by wind with high potential for overspray. Reduced efficiency and operating difficulty due to freezing in winter so large storage capacity required. Windborne dust and dirt reduce efficiency and increase maintenance (cleanouts). Large quantities of chemicals required for solidification and large quantities of solidified brine produced for offsite disposal.
Chemicals Required	None to minimal. Antiscalent may be required depending on water characteristics.	Minimal for evaporator and limited to antiscalent compounds and some cleaning products. Lime, soda ash, and polymer required for solidification.	Lime Concentrated acid Polymer, antiscalent and RO cleaning chemicals. Lime, soda ash and polymer for solidification.	Lime, soda ash, and polymer for solidification.
Residues Storage Capacity	Small feed tank – 10,000 gal storing regular strength wastewater	60,000 gal brine storage – approximately 5 days of storage for feed to solidification system. 100 yd^3 solidified brine (3-4 days)	200,000 gal brine storage – (4 days) 80 yd^3 sludge (20% solids by weight) from chemical precipitation storage 500 yd^3 solidified brine (3-4 days)	40,000,000 gal storage for low evaporation months 60,000 gal brine storage for low evaporation months 100 yd^e solidified brine (3-4 days)
Offsite Shipments	None	Approximately 10 trucks per week with solidified brine.	Approximately 43 trucks per week with solidified brine and dewaterered sludge.	Approximately 10 trucks per week with solidified brine.
Other Considerations	None	Brine is concentrated waste (20X feed), potentially characterized as hazardous or mixed waste	Brine is concentrated waste (6X feed) potentially characterized as hazardous or mixed waste	Brine is concentrated waste (20X feed) potentially characterized as hazardous or mixed waste
Power	710,000 kwh/yr	11,008,000 kwh/yr	2,912, 000 kwh/yr	8,822,000 kwh/yr
Labor	Minimal	3 – 4 FTE	6 FTE	3 – 4 FTE
Environmental /Safety	Safest and lowest environmental impact of options. Smallest carbon footprint with low operating power requirement and no truck traffic. No residuals stored onsite, no potential for wildlife exposure to holding ponds. No requirement for chemicals. No potential exposure to concentrated residues.	Large carbon footprint with over 10 times the power requirement of a deep well and 20 times the power requirement of the RO/precipitation option. Requires high operating temperatures and pressures. Low to moderate footprint primarily for brine storage tanks. Requires storage of brine as feed to solidification system and offsite transportation of solidified brine stream. High chemical requirements for solidification chemicals. High operating temperature and pressure.	Moderate carbon footprint with the lowest operating power requirement but the most truck traffic of any option evaluated. Handling of highest quantity of residues required including onsite storage and offsite disposal. Higher labor requirements with more potential for exposure to chemicals and residuals during sludge dewatering operations and residuals management.	Moderate carbon footprint with greater the power required of a deep well and some truck traffic for offsite brine disposal. Greatest risk to wildlife due to large volume ponds. Greatest potential for release of salts from overspray. Potential for exposure to labor from the sprays.
Capital cost estimate	Base Case	3.56 times base case	1.79 times base case	4.21 times base case
20 Year NPV	Base Case	17.6 times base case	68.9 times base case	17.9 times base case

Question 2.5 No. 3 Reasonable Alternatives - Alternative Lixiviants and Mining Methods

RAI Question:

Information on other lixiviants considered, as well as other technologies for underground uranium recovery.

Answer:

Section 2.5.1.1 of the Environmental Report provided a short discussion of alternate lixiviants that were considered by EMC during preparation of the License Application. Section 2.6.1 of the Environmental Report provided a discussion of mining alternatives that were considered but eliminated by EMC during preparation of the License Application. In response to this RAI question, sections 2.5.1.1 and 2.6.1 of the Environmental Report will be revised.

Proposed Revisions to License Application

The following changes are proposed to the license application in response to this RAI question. Changes to the original text as submitted to NRC are noted in red-line/strikeout method.

2.5.1.1 Lixiviant Chemistry

EMC proposes to use a sodium bicarbonate lixiviant that is an alkaline solution. Where the groundwater contains carbonate, an alkaline lixiviant will mobilize fewer hazardous elements from the ore body and will require less chemical addition than an acidic lixiviant. Also, test results at other projects indicate only limited success with acidic lixiviants, while the sodium bicarbonate has proven highly successful at commercial mining operations in the Powder River Basin to date. Alternate leach solutions include ammonium carbonate solutions and acidic leach solutions.

Acidic Leach Solutions

Acid-based lixiviants, such as sulfuric acid, have been used in the United States and are widely used internationally. Acid leach has historically produced a majority of the world's ISL production. Acid-based lixiviants generally achieve a higher degree of recovery (70 to 90%), better leaching kinetics, and a shorter leaching period. However, acid-based lixiviants dissolve heavy metals and other solids associated with uranium in the host rock and other chemical constituents that required additional remediation (International Atomic Energy Agency, 2001).

In the United States, acid-based lixiviants have been used only for small-scale research and development operations. At the Nine Mile test site in Wyoming, test patterns were developed using acid-based and carbonate-based lixiviants. The acid-based pattern

developed two significant problems. During uranium recovery operations, gypsum precipitated on well screens and within the aquifer, plugging wells and reducing the efficiency of wellfield circulation. Restoration efforts had limited success, apparently due to gradual dissolution of the precipitated gypsum following restoration, resulting in increased salinity and sulfate levels in the affected groundwater (Mudd, 2000).

Acid-based lixiviants were not found to be more cost effective than alkaline lixiviants, particularly in light of difficulties in achieving acceptable groundwater restoration results. The commercial use of alkaline lixiviants in the United States has been related to the need to restore affected groundwater and alkaline mine sites are recognized to be technically easier to restore. For this reason, a commercial ISR facility using an acid-based lixiviant has not been developed in the United States and EMC determined an acid-based lixiviant was not a suitable alternative for Moore Ranch.

Ammonia-based Lixiviants

Ammonia-based lixiviants have been used in the United States, including in Texas and Wyoming. The ammonia tended to adsorb onto clay minerals in the subsurface. The ammonia desorbs slowly from the clay during restoration, and therefore the aquifer requires that a much larger amount of groundwater be removed and processed during aquifer restoration (Mudd, 2000). In addition, concerns arose in the early 1980s over the potential post mining oxidation of ammonia in the groundwater to form nitrate and nitrite species. This potential difficulty in addition to the slow desorbtion of ammonia from clays resulted in a movement away from ammonia based lixiviants and an outright ban on their use in Texas. Due to this additional consumptive use of groundwater to meet groundwater restoration requirements, EMC determined that an ammonia-based lixiviant was not a suitable alternative for Moore Ranch.

Other Lixiviants

Other lixiviants which have been evaluated in laboratory scale and limited field tests include potassium based lixiviants, a range of oxidants including air, iodine, potassium permanganate, and a variety of trace additives such as clay stabilizing agents to increase the selective oxidation and mobilization of uranium minerals. To date, these alternatives have consistently proven to be far less economical than the planned oxygen – sodium bicarbonate system.

2.6.1 Mining Alternatives

Underground and open pit mining represent the two currently available alternatives to solution mining for the uranium deposits in the Moore Ranch project area. In the southern Powder River Basin uranium ore has been mined with open pits in the past. This activity occurred from 1970 to 1984 at the Exxon Highland facility and from the mid-1970s to 1986 at Union Pacific Resources Bear Creek site, both located south of the Moore Ranch site. A limited quantity of ore was also mined with underground mining at the Exxon Highland site, in addition to the open pit method. However, the underground

Deleted: Q

mine was uneconomical and plagued by poor ground conditions. Kerr McGee operated a test underground mine at the Bill Smith (now Smith Ranch) Project in the late 1970's with similar results. Subsequent work by Kerr McGee and its successor, Rio Algom Mining Corp. shifted to ISR methods. Likewise, Exxon recognized the inherent advantages of ISR and was in the process of amending the Highland NRC license for conversion of the project to an ISR operation when Highland was sold to Everest Minerals Corp. in 1983. Subsequently, Everest reconfigured the Highland Project into an ISR operation.

The Moore Ranch project was originally investigated by Conoco in the late 1970's as an open pit mine. Neither of these methods is economically viable for producing the Moore Ranch reserves at this time. The following sections discuss each mining alternative in relation to the Moore Ranch site.

2.6.1.1 Open Pit Mining

Open pit mining requires the removal of all material covering the orebody. This overburden must be removed and stockpiled to allow removal of the uranium-bearing ore. Once removed, the ore must be transported to a conventional uranium mill for further processing and uranium extraction.

Open pit mining of the relatively low grade Moore Ranch ore would require a capital investment that is not supported by the current uranium market. The nearest conventional mill with an operating license that could receive uranium ore for toll milling is the Denison Mines White Mesa Mill located in Blanding, Utah. The combination of capital costs to develop an open pit mine at Moore Ranch, the operating and maintenance costs to mine the ore, and the transportation costs to Blanding, Utah far exceed the current value of the ore as a feedstock for White Mesa. The nearest conventional uranium mill, Kennecott Uranium Corporation's Sweetwater Mill, located in the Great Divide Basin in Wyoming, is not licensed for operations. However, if the Sweetwater Uranium Mill was currently licensed for operation, similar economic factors would preclude mining the Moore Ranch deposit under current uranium market conditions.

Environmental factors must also be considered in addition to the economic factors for open pit mining. Open pit mining would produce large piles of waste rock that would permanently alter the topography of the Moore Ranch site. In addition, substantial dewatering of the pit on the order of several thousand gallons per minute would be required to depress the potentiometric surface. Large quantities of groundwater with naturally elevated radium-226 and uranium would be discharged requiring treatment and subsequent disposal of a radioactive solid waste.

2.6.1.2 Underground Mining

Underground mining of the Moore Ranch deposit would involve sinking mine shafts to the vicinity of the orebodies, horizontally driving crosscuts and drifts to the orebodies at

different levels, physically removing the ore and transporting the mined ore to the conventional uranium mill for further processing. The economic factors involved with this alternative are identical to those for ores mined from an open pit.

From an environmental perspective, open pit mining or underground mining and the associated milling process involve higher risks to employees, the public, and the environment. Radiological exposure to the personnel in these processes is increased not only from the mining process but also from milling and the resultant mill tailings. The milling process generates a significant amount of waste relative to the amount of ore processed. Extensive mill tailings ponds are needed for the disposal of these wastes. The environmental impacts associated with open pit and underground mining are generally recognized as being considerably greater than those associated with in-situ recovery mining.

In a comparison of the overall impacts of ISR mining of uranium compared with conventional mining, an NRC evaluation concluded that environmental and socioeconomic advantages of in situ recovery include the following:

1. *Significantly less surface area is disturbed than in surface mining, and the degree of disruption is much less. In addition, this disturbance is temporary in nature, being limited to the period of construction, operations, and decommissioning.*

2. *No mill tailings are produced and the volume of solid wastes is reduced significantly. The gross quantity of solid wastes produced by ISR methods is generally less than 1% of that produced by conventional milling methods (more than 948 kg (2090 lb) of tailings usually result from processing each metric ton (2200 lb) of ore).*

3. *Because no ore and overburden stockpiles or tailings pile(s) are created and the crushing and grinding ore-processing operations are not needed, the air exposure problems caused by windblown dusts from these sources, both on site and during transportation, are eliminated.*

4. *The tailings produced by conventional mills contain essentially all of the uranium daughter products including radium-226 that are originally present in the ore. By comparison, less than 5% of the radium in an ore body is brought to the surface when ISR methods are used. Consequently, operating personnel are not exposed to the radionuclides present in and emanating from the ore and tailings and the potential for radiation exposure is significantly less than that associated with conventional mining and milling.*

5. *By removing the solid wastes from the site to a licensed waste disposal site and otherwise restricting them from contaminating the surface and subsurface environment, the entire mine site can be returned to unrestricted use within a relatively short time.*

6. *Solution mining results in significantly less water consumption than conventional mining and milling.*

7. *The socioeconomic advantages of ISR include:*

    - *The ability to mine a lower grade ore,*
    - *A lower capital investment,*
    - *Less risk to the miner,*
    - *Shorter lead time before production begins, and*
    - *Lower manpower requirements.*

Additional References:

International Atomic Energy Agency. "Manual of Acid In Situ Leach Uranium Mining Technology."IAEA-TECDOC-1239. Vienna, Austria, August 2001.

Mudd, G.M. "Acid In Situ Leach Uranium Mining : 1 - USA and Australia." Tailings & Mine Waste 2000, Fort Collins, CO. January 2000.

Question ER 2.5 No.4 Reasonable Alternatives – Quantitative and Qualitative Support

RAI Question:

Quantitative and qualitative support for the assessments that are made in Table 2.6-1.

Answer:

The information presented in Table 2.6-1 Comparison of Predicted Environmental Impacts, is supported by the qualitative and quantitative analysis found in Section 4 (Environmental Impact) of this Environmental Report. Additional quantitative information for the Preferred Alternative category has been incorporated into Table 2.6-1 including data for Land Surface Impacts, Land Use Impacts, Geology and Soil Impacts, Groundwater Impacts, Noise Impacts, Radiological Health Impacts, and Waste Management Impacts. Also, the corresponding subsection numbers have been referenced for the Preferred Alternative information.

Proposed Revisions to License Application

The following changes are proposed to the license application in response to this RAI. Changes to the original text, as previously submitted to NRC, are noted in red-line/strikeout method.

Insert Revised Table 2.6-1

Table 2.6-1: Comparison of Predicted Environmental Impacts

Impacts of Operation	No-Action Alternative	Preferred Alternative	Process Alternatives	
			Alternate Lixiviant Chemistry	Alternate Waste Management
Land Surface Impacts	None	Minimal temporary impacts in wellfield areas: Wellfield 1 = approximately 23 acres under pattern; Wellfield 2 = approximately 34 acres under pattern; Significant surface and subsurface disturbance confined to a portion of the Central Plant site = approximately 6 acres (ER section 4.1).	Same as Preferred Alternative.	Same as Preferred Alternative. Potential additional impacts from land application of treated waste water and construction of evaporation pond alternatives.
Land Use Impacts	None	Loss of agricultural production (livestock grazing) in the impacted area (estimated 63 acres) for duration of project (ER Section 4.1).	Same as Preferred Alternative.	Same as Preferred Alternative plus additional land use impact from installation of evaporation ponds and/or land application areas.
Transportation Impacts	None	Minimal impact on current traffic levels (ER Section 4.2).	Same as Preferred Alternative.	Additional transportation impacts for mechanical or solar evaporation (10 trucks per week) and chemical precipitation/RO (43 trucks per week).
Geology and Soil Impacts	None	No geological impacts. Minimal temporary soil impacts in disturbance areas (estimated 63 acres) from wind and water erosion (ER Section 4.3).	Same as Preferred Alternative.	Same as Preferred Alternative. Potential additional impacts to soils from land application of treated waste water.
Surface Water Impacts	None	None (ER Section 4.4.1)	None	None

Deleted: Same as Preferred Alternative

Table 2.6-1: Comparison of Predicted Environmental Impacts

Impacts of Operation	No-Action Alternative	Preferred Alternative	Process Alternatives	
			Alternate Lixiviant Chemistry	Alternate Waste Management
Groundwater Impacts	None	Consumption of mining zone groundwater at an average rate of 105 GPM for control of mining solutions and restoration (ER Section 4.4.2)	Same as Preferred Alternative. Increased difficulty with groundwater restoration and stabilization resulting in increased water consumption for ammonia based lixiviants.	Same as Preferred Alternative.
Ecological Impacts	None	No substantive impairment of ecological stability or diminishing of biological diversity (ER Section 4.5).	Same as Preferred Alternative.	Same as Preferred Alternative.
Air Quality Impacts	None	Additional total dust emissions of 15.5 tons per year due to vehicle traffic on gravel roads (ER Section 4.6).	Same as Preferred Alternative.	Same as Preferred Alternative.
Noise Impacts	None	Barely perceptible increase over background noise levels in the area. (ER Section 4.7) Common equipment noise levels during the construction phase range from 70 to 101 dB at 50 feet distance. Using a 100 dB sound level at the Central Plant and a drop ratio of 6 dB per doubled distance, a maximum noise level of 80 dB at 4500 feet distance from the Central Plant. (See Technical Report Section 7.1.5).	Same as Preferred Alternative.	Same as Preferred Alternative.

Table 2.6-1: Comparison of Predicted Environmental Impacts

Impacts of Operation	No-Action Alternative	Preferred Alternative	Process Alternatives	
			Alternate Lixiviant Chemistry	Alternate Waste Management
Historic and Cultural Impacts	None	None	None	None
Visual/Scenic Impacts	None	Moderate impact; noticeable minor industrial component (ER Section 4.9).	Same as Preferred Alternative.	Same as Preferred Alternative plus additional visual and scenic impacts from installation of evaporation ponds and/or land application areas.
Socioeconomic Impacts	Loss of positive economic impact of $28.8M and 601 temporary and permanent jobs to Campbell County and the surrounding area	Annual direct economic impact of $28.8M and 601 temporary and permanent jobs to local area (ER Section 4.10)	Same as Preferred Alternative.	Same as Preferred Alternative.
Nonradiological Health Impacts	None	None	None	None
Radiological Health Impacts	None	Estimated maximum dose from radon gas released at Moore Ranch at the project boundary is 1.5 mrem/yr or 1.5% of the public dose limit (ER Section 4.12.2).	Same as Preferred Alternative.	Additional occupational exposure for handling concentrated brine byproduct material for disposal.

Deleted: Same as Preferred Alternative

Deleted: 0.8

Deleted: 0.8

Table 2.6-1: Comparison of Predicted Environmental Impacts

Impacts of Operation	No-Action Alternative	Preferred Alternative	Process Alternatives	
			Alternate Lixiviant Chemistry	Alternate Waste Management
Waste Management Impacts	None	Generation of additional liquid and solid waste for proper disposal; the maximum volume of liquid water stream for well disposal will be approximately 45 gpm during normal operations and approximately 100 gpm during restoration. The septic systems include an approximately 1000 gallon shop septic tank, and a 2000 gallon plant septic tank; uncontaminated solid waste generated will be approximately 2,000 cubic yards per year.	Same as Preferred Alternative. Mobilization of additional hazardous elements in lixiviant requiring disposal.	Generation of additional 11e.(2) byproduct material from mechanical evaporation, chemical precipitation/RO, and decommissioning evaporation ponds as shown in Table 2.5-1.
Mineral Resource Recovery Impacts	Loss of a valuable domestic energy resource. EMC estimated reserves are under development but the current estimated recoverable resource is 5.8 million pounds with a current spot market value of $522 million (based on $90/lb).	Recovery and use of a domestic energy resource.	Same as Preferred Alternative.	Same as Preferred Alternative.

Deleted:

TRANSPORTATION

Question ER 3.2 No.1 Transportation

RAI Question:

Provide a description including the surface (asphalt, gravel, or dirt) and condition (average, hazardous, etc.) which will allow for a complete evaluation of the impacts of ISR facility operation.

Answer:

Available state highway descriptions have been compiled and will be incorporated into revised section 3.2.1 Highways of this Environmental Report.

Proposed Revisions to License Application

The following changes are proposed to the license application in response to this RAI question. Changes to the original text as submitted to NRC are noted in red-line/strikeout method.

3.2.1 Highways

The primary transportation route to the proposed Moore Ranch license area from nearby communities is on State Highway 387, which connects the license area to regional population and economic centers along Interstate 25 to the west and State Highway 59 to the east. The City of Gillette is located approximately 50 miles northeast of the license area on State Highways 50 and 59. Interstate 25 connects to State Highway 387 via State Highway 192 from the Town of Kaycee and via State Highway 259 at the Town of Midwest. State Highway 50 connects with State Highway 387 approximately 4 miles east of the license area and State Highway 59 connects with State Highway 387 at the town of Wright. Annual Average Daily Traffic counts along the 13.06-mile segment of State Highway 387 between the Campbell/Johnson county line and the State Highway 387 junction is 1,110 vehicles (WYDOT 2005). Several private access roads extend south from State Highway 59 to access existing agricultural, as well as oil and gas facilities in the Permit Area. None of the existing roads in the license area provide access to residences or other public destinations. Figure 1.2-1 and 3.1-2 show the locations of highway access to the Moore Ranch Project site.

State Highways 59, 50 and 387 are bi-directional (two lane opposing travel), asphalt-paved highways in good to average condition. These highways also have passing lanes at appropriate locations. State Highway 59, 50 and 387 are all classified by the Wyoming Department of Transportation (WYDOT) as Rural Minor Arterial highways. The lanes on all three highways are twelve feet wide.

The total width of paved roadway ranges from 26 to 40 feet based on the varying paved shoulder widths and the presence of a periodic passing lane. Interstate 25 is a Federal Interstate Highway designed for high-volume, high-speed traffic. It is a four lane, divided highway with two lanes in each direction separated by a wide median. All state highways adjacent to the Project area are access controlled and are maintained year-round by WYDOT. Highway maintenance includes snow removal, debris removal and road repairs.

Additional references:

Wyoming Department of Transportation, May 26, 2009. S Larry, District 2, Sheridan, Wyoming.

Question ER 3.2 No.2 Transportation

RAI Question:

Please distinguish between the routes proposed during construction, regular operation, aquifer restoration, and decommissioning.

Answer:

Due to the limited number of primary highways serving the Moore Ranch Project Area, it is anticipated that the traffic routes used during all phases of the project, including construction, regular operation, aquifer restoration and decommissioning, will be the same. A discussion of the traffic impacts during the four phases of the project are found in the responses to questions for ER section 4.2.2. As requested, this route information will be included in the revised text in section 3.2.1, Highways.

Proposed Revisions to License Application

The following changes are proposed to the license application in response to this RAI question. Changes to the original text as submitted to NRC are noted in red-line/strikeout method.

The following paragraph is to be added to section 3.2.1 Highways:

> *During the construction, operation, restoration and decommissioning phases of the Project, immediate access to the Project location will be from State Highway 387, from either or both the east and the west. The workforce for each phase will be primarily from Gillette using State Highway 59 then westbound State Highway 387, and from Casper using Interstate Highway 25 then eastbound State Highway 387.*

Question 3.2 No. 3 Waste Shipment Transportation Impacts

RAI Question:

What will be the final destination of the radioactive waste, mixed waste, and nonradioactive waste? If this has not yet been decided, provide information on the most likely disposal sites and the proposed transportation routes to these sites.

Answer:

The preferred destination for radioactive waste produced from the Moore Ranch project is the Pathfinder Mines Shirley Basin site, which is licensed to receive 11(e).2 byproduct materials. The preferred destination for solid (nonradioactive) waste is the Midwest-Edgerton No. 2 disposal site located in Midwest, Wyoming. EMC does not expect to produce mixed waste as a result of the proposed processes at Moore Ranch. Hazardous waste impacts are discussed in Section 4.13.3.4 of the Environmental Report. As noted in that discussion, EMC believes that the facility will be defined as a Conditionally-Exempt Small Quantity Generator under the WDEQ Hazardous Waste Rules and Regulations and that hazardous waste generated on the project will be limited to used oil and universal hazardous wastes such as spent batteries. EMC plans to recycle the limited quantity of used oil generated on site through a properly licensed oil recycler. Universal wastes may be disposed with solid waste generated by the facility under WDEQ rules. Neither of these scenarios for disposal of hazardous wastes will result in additional traffic impacts.

Proposed Revisions to License Application

Since the question relates to impacts from the shipment of waste from the proposed project, revisions are proposed for Section 4.2.2 of the Environmental Report. The following additional information will be added to section 4.2.2.

Many of the questions posed by NRC related to Sections 3.2 and 4.2.2 in this RAI resulted in revisions to Section 4.2.2. For ease of review these proposed revisions are contained in a compiled revision included after ER Section 4.2.2 – Traffic Impacts, Question 2.

> *Transportation of dried yellowcake would be made in exclusive-use transport vehicles to a licensed conversion facility in Metropolis, Illinois for further processing. The proposed annual production rate for the Moore Ranch Project is 4 million pounds of yellowcake. Based on weight limits for legal transport, each shipment will contain approximately 40,000 pounds of yellowcake, resulting in a maximum total of 100 shipments of yellowcake per year, or an average of one shipment every 3.6 days. This level of traffic would not significantly affect the project-related traffic compared to the commuting traffic associated with the project workforce.*

Transportation of 11(e).2 byproduct material will be made in exclusive-use transport vehicles to a licensed disposal facility. Although a final disposal agreement is not in place at this time, the preferred alternative disposal site is the Pathfinder Mines Corp. (PMC) Shirley Basin facility due to proximity to the Moore Ranch site. The Shirley Basin facility is located approximately 132 highway miles from the Moore Ranch Project. The expected transport route to the PMC facility from Moore Ranch will be west on State Highway 387, south on Interstate 25, west on State Highway 220, and south on State Highway 487 to the PMC facility access road. The expected annual byproduct material production rate for the Moore Ranch Project is approximately 100 cubic yards as discussed in Section 4.13.3.2. Based on the use of covered roll-off containers with a nominal capacity of 20 cubic yards, EMC expects approximately five byproduct material shipments per year. This level of traffic would not significantly increase the project-related traffic compared to the estimated commuting and truck traffic associated with the project.

Transportation of nonradioactive solid waste will be made using a contract waste hauling company to a licensed disposal facility. The preferred alternative disposal site is the Midwest-Edgerton No. 2 disposal site located in Midwest, Wyoming due to proximity to the Moore Ranch site. The Midwest-Edgerton No. 2 facility is located approximately 24 highway miles from the Moore Ranch Project. The expected transport route to the Midwest-Edgerton No. 2 disposal facility will be west on State Highway 387 to Midwest. The expected annual nonradioactive solid waste production rate for the Moore Ranch Project is 2,000 cubic yards as discussed in Section 4.13.3.1. Typical contract waste haulage vehicles range in capacity from 20 to 40 cubic yards. Based on a conservative assumption of the use of haulage vehicles with a nominal capacity of 20 cubic yards, EMC expects 100 nonradioactive solid waste shipments per year, or an average of approximately 2 shipments per week.

Question ER 3.2 No.4 Traffic Impacts – Roads not subject to Decommissioning

RAI Question:

Please specify which new or upgraded roads will not be subject to decommissioning. This information is needed to determine future land use impacts.

Answer:

All wellfield roads will be removed at the time of project decommissioning. The newly constructed gravel road that leads to the Central Plant from the main access road (shown in Figure 4.2-2) will be left in place for future use. This information will be added to the land use impacts analysis contained in Section 4.1 of this Environmental Report.

Proposed Revisions to License Application

The following changes are proposed to the license application in response to this RAI question. Changes to the original text, as submitted to NRC, are noted in red-line/strikeout method.

4.1 LAND USE IMPACTS

As discussed in Section 3.1 of this Environmental Report (ER), rangeland is the primary land use within the Moore Ranch License Area and the surrounding 2.0-mile review area. Oil and gas production facilities and infrastructure are also located on rangeland throughout the review area. The review area also contains pastureland to the west. Based on a site reconnaissance conducted in May 2007 and a 2006 aerial photo, there are no occupied housing units in the License Area. Figure 3.1-1 depicts land use in the review area.

Construction of the Moore Ranch Central Plant and associated structures will encompass approximately 6 acres. The proposed Central Plant location, wellfields and access roads are shown in Figure 4.2-1. Operation of the Moore Ranch Project will ultimately encompass approximately 150 acres. Use of the land as rangeland will be excluded from this area during the life of the project. Oil and gas production facilities will not be affected. Considering the relatively small size of the area impacted by construction and operation, the exclusion of grazing from this area over the course of the Moore Ranch project will have an insignificant impact on local livestock production.

Deleted: 11

These impacts to land use are considered temporary and reversible by returning the land to its former grazing use through post-mining surface reclamation. All wellfield roads will be removed at the time of project decommissioning. The newly constructed gravel road that leads to the Central Plant from the main access road (shown in Figure 4.2-1) encompasses less than two acres in surface area and will be left in place for future use. Other than the land use impact of the Central Plant access road, there will be no long-term impacts or institutional controls following decommissioning of the site.

Deleted: T

Mitigation measures for the loss of agricultural production over the course of the project are discussed in Section 5.1.

Question ER 3.2 No. 5 Traffic Impacts – Traffic Increase

RAI Question:

There will be an impact to wildlife due to a potential increase in vehicle collisions; what is the anticipated increase in traffic? What will be the estimated increase in traffic from current activities at the site to traffic during construction and also during operation?

Additional clarification provided by NRC:

The issue is addressed in terms of a maximum percentage increase in average daily traffic for the project as a whole. Although impacts may not be "significant," we must still assess what impacts would exist under the proposed project. Please provide the anticipated increase in approximate number of vehicles associated with each phase of the project (i.e. construction, operation, aquifer restoration, and decommissioning). When quantifying these impacts, please differentiate between the different sizes and types of vehicles (e.g. passenger vehicles, delivery/operational equipment, yellowcake shipments, construction vehicles, etc).

Answer:

The maximum anticipated increase in vehicle traffic has been estimated and ~~the data is~~ tabulated for each phase of the project. Vehicle traffic as reported by the Wyoming Department of Transportation (WYDOT) has been broken down to "Truck" and "Auto" traffic, and is used as the basis for the traffic projections. Truck traffic includes trucks that haul heavy equipment (cranes, bulldozers, graders, track hoes, trenchers, front-end loaders) to the construction site, and also the facilities and equipment during the construction phase of the project. During the operational and restoration phases of the project, truck traffic is to include yellowcake shipments, radioactive byproduct waste and non-radioactive waste shipments, and regular operation deliveries. During the decommissioning phase, truck traffic will include hauling of equipment and facilities, and both radioactive and non-radioactive waste.

The average daily estimated increase in auto traffic is based on the workforce level, which varies depending upon the phase of the project. Auto traffic includes passenger vehicles, light duty trucks or other personal or work vehicles used to transport personnel to the project site. A conservative assumption of one employee per vehicle for each vehicle trip was used for the auto traffic projection. This traffic information will be included in the revision of section 4.2.2, Traffic Impacts of this ER.

Proposed Revisions to License Application

Since the question relates to impacts from increase traffic from the proposed project, revisions are proposed for Section 4.2.2 of the Environmental Report. Changes to the original ER text as submitted to NRC in response to this question are noted in red-line/strikeout method.

Many of the questions posed by NRC related to Sections 3.2 and 4.2.2 in this RAI resulted in revisions to Section 4.2.2. For ease of review these proposed revisions are contained in a compiled revision included after ER Section 4.2.2 – Traffic Impacts, Question 2.

4.2.2 Traffic Impacts

The most heavily used public road segment would be State Highway 387 between I-25 to the west and State Highway 59 to the east. Access to the License Area from Gillette would be from State Highway 59, and from Casper would be from I-25; traffic would converge on the License Area on State Highway 387 from the east and the west. Existing average daily traffic volumes for the local highways in the project area, State Highways 50, 59 and 387 are shown in Table 4.2-1 (WYDOT, 2009). The traffic information includes data from years 1997, 2006 and 2007. Additionally, for the year 2007, the table breaks down the truck traffic by percentage of the total traffic volume recorded. A map of the subject and regional roadways and communities is shown in Figure 4.2-1.

Deleted: *Construction traffic, the construction workforce, and the operations workforce*

Projected daily truck and auto traffic volume data for the three local State Highways during the construction, operation, restoration and decommissioning phases of the project is also presented in Table 4.2-1. The projected increases of vehicle traffic resulting from the project activities are calculated for each local highway segment being subjected to the total increase in traffic. This vehicle traffic increase calculation allows for the analysis of the maximum amount of traffic that could be expected for each local highway. Truck traffic includes trucks that haul heavy equipment (cranes, bulldozers, graders, track hoes, trenchers, front-end loaders, etc.) to the construction site, and haul the facilities and equipment during the construction phase of the project. During the operational and restoration phases of the project, truck traffic includes yellowcake shipments, radioactive by-product waste and non-radioactive waste shipments, and regular operation deliveries. During the decommissioning phase, truck traffic includes hauling of equipment and facilities, and both radioactive and non-radioactive waste. The average daily estimated increase in auto traffic is based on the workforce level, which varies depending upon the phase of the project. Auto traffic includes passenger vehicles, light duty trucks or other personal or work vehicles used to transport personnel to the project site. During the operational and restoration phases of the project there will be a peak workforce of 24 employees which equates to a maximum average of 48 auto trips per day using the assumption of one employee per vehicle per one-way vehicle trip.

Using these vehicle traffic projections and recent data supplied by WYDOT for the year 2007, the highest levels of project-related traffic would be from the truck traffic occurring during the construction phase of the project, when there could be an increase of 4.8 percent in daily truck traffic. The highest auto (non-truck) traffic increase related to the project may occur during the operational and

Deleted: *The existing traffic levels on the highway are low. T*

Deleted: *operations workforce, and assuming there would be an average of one employee per vehicle, per one-way vehicle trip,*

Deleted: *5.4*

restoration phases when a 2.5 percent average increase in daily auto trips could occur. The 4.8 percent increase in truck traffic and 2.5 percent increase in average daily auto traffic is well below the 25 percent threshold generally used for predicting significant effects to a transportation system, and the resulting potential for an impact on wildlife will be minimal.

Deleted: *along the highway*

Deleted: *is.*

Deleted: *5.4*

Deleted: *(10.8 percent for two trips per day)*

Equipment needed for construction and installation of the proposed facility would include heavy equipment (cranes, bulldozers, graders, track hoes, trenchers, and front-end loaders), and heavy- and light-duty trucks.

Additional references:

Wyoming Department of Transportation, May, 2009, Highway traffic survey data provided by the Mapping Division of the WYDOT Planning Department

Question 4.2.2 No. 1 Yellowcake Transportation Impacts

RAI Question:

An assessment of the increase in truck traffic transporting yellowcake.

Answer:

Section 4.2.2 has been revised to address the impacts from the increase in truck traffic due to shipments of yellowcake from the Moore Ranch project. The basis for this analysis is a production level of 4 million pounds of yellowcake per year. Section 4.2.3.2 of the Environmental Report addressed accidents involving yellowcake transport.

Proposed Revisions to License Application

The following changes are proposed to the license application in response to this RAI question. Changes to the original text as submitted to NRC are noted in red-line/strikeout method.

Many of the questions posed by NRC related to Sections 3.2 and 4.2.2 in this RAI resulted in revisions to Section 4.2.2. For ease of review these proposed revisions are contained in a compiled revision included after ER Section 4.2.2 – Traffic Impacts, Question 2.

4.2.2 Traffic Impacts

The most heavily used public road segment would be State Highway 387 between I-25 to the west and State Highway 59 to the east. Access to the License Area from Gillette would be from State Highway 59, and from Casper would be from I-25. Construction traffic, the construction workforce, and the operations workforce would converge on the License Area on State Highway 387 from the east and the west. The existing traffic levels on the highway are low. The highest levels of project-related traffic would be from the operations workforce, and assuming there would be an average of one employee per vehicle, per one-way vehicle trip, there could be an increase of 5.4 percent in daily traffic along the highway. This 5.4 percent (10.8 percent for two trips per day) increase is well below the 25 percent threshold generally used for predicting significant effects to a transportation system.

Transportation of dried yellowcake would be made in exclusive-use transport vehicles to a licensed conversion facility in Metropolis, Illinois for further processing. The proposed annual production rate for the Moore Ranch Project is 4 million pounds of yellowcake. Based on weight limits for legal transport, each shipment will contain approximately 40,000 pounds of yellowcake, resulting in a maximum total of 100 shipments of yellowcake per year, or an average of one

shipment every 3.6 days. This level of traffic would not significantly affect the project-related traffic compared to the commuting traffic associated with the project workforce.

Equipment needed for construction and installation of the proposed facility would include heavy equipment (cranes, bulldozers, graders, track hoes, trenchers, and front-end loaders), and heavy- and light-duty trucks.

Question ER 4.2.2 No.2 Traffic Impacts Road Maintenance

RAI Question:

Given the increase in traffic caused by the proposed ISR operation, the type of maintenance that is proposed for on-site roads.

Answer:

On-site road maintenance will include periodic grading of the primary access roads, snow plowing, applying water or other agent(s) for dust control, and regular inspections to ensure erosion control measures are adequate. This information will be added to the revised section 4.2.2 of this Environmental Report.

Proposed Revisions to License Application

The following changes are proposed to the license application in response to this RAI question. Changes to the original text as submitted to NRC are noted in red-line/strikeout method.

> *4.2.2 Traffic Impacts*
>
> *On-site road maintenance will include periodic grading of the primary access roads, snow plowing, applying water or other agent(s) for dust control, and regular inspections to ensure erosion control measures are adequate.*

Proposed Revisions to License Application

The following compiled changes are proposed to Section 4.2 of the Environmental Report as a result of the RAI questions previously discussed. Changes to the original text as submitted to NRC are noted in red-line/strikeout method.

4.2 TRANSPORTATION IMPACTS

4.2.1 Access Road Construction Impacts

State Highway 387 passes through the northern end of the proposed License Area. Delivery of construction materials will access the site on this highway. An existing gravel road accesses the general location selected for construction of the central plant. This existing road may require minor improvements and completion of a short spur road to accommodate access by trucks and heavy equipment during construction and operation. The environmental impacts of these minor improvements will be insignificant. Access road construction activities will primarily have minor air quality impacts, which are discussed in detail in Section 4.6.

4.2.2 Traffic Impacts

The most heavily used public road segment would be State Highway 387 between I-25 to the west and State Highway 59 to the east. Access to the License Area from Gillette would be from State Highway 59, and from Casper would be from I-25; traffic would converge on the License Area on State Highway 387 from the east and the west. Existing average daily traffic volumes for the local highways in the project area, State Highways 50, 59 and 387 are shown in Table 4.2-1 (WYDOT, 2009). The traffic information includes data from years 1997, 2006 and 2007. Additionally, for the year 2007, the table breaks down the truck traffic by percentage of the total traffic volume recorded. A map of the subject and regional roadways and communities is shown in Figure 4.2-1.

Deleted: . *Construction traffic, the construction workforce, and the operations workforce*

Projected daily truck and auto traffic volume data for the three local State Highways during the construction, operation, restoration and decommissioning phases of the project is also presented in Table 4.2-1. The projected increases of vehicle traffic resulting from the project activities are calculated for each local highway segment being subjected to the total increase in traffic. This vehicle traffic increase calculation allows for the analysis of the maximum amount of traffic that could be expected for each local highway. Truck traffic includes trucks that haul heavy equipment (cranes, bulldozers, graders, track hoes, trenchers, front-end loaders, etc.) to the construction site, and haul the facilities and equipment during the construction phase of the project. During the operational and restoration phases of the project, truck traffic includes yellowcake shipments, radioactive by-product waste and non-radioactive waste shipments, and regular operation deliveries. During the decommissioning phase, truck traffic includes hauling of equipment and facilities, and both radioactive and non-radioactive waste. The

average daily estimated increase in auto traffic is based on the workforce level, which varies depending upon the phase of the project. Auto traffic includes passenger vehicles, light duty trucks or other personal or work vehicles used to transport personnel to the project site. During the operational and restoration phases of the project there will be a peak workforce of 24 employees which equates to a maximum average of 48 auto trips per day using the assumption of one employee per vehicle per one-way vehicle trip.

Using these vehicle traffic projections and recent data supplied by WYDOT for the year 2007, the highest levels of project-related traffic would be from the truck traffic occurring during the construction phase of the project, when there could be an increase of 4.8 percent in daily truck traffic. The highest auto (non-truck) traffic increase related to the project may occur during the operational and restoration phases when a 2.5 percent average increase in daily auto trips could occur. The 4.8 percent increase in truck traffic and 2.5 percent increase in average daily auto traffic is well below the 25 percent threshold generally used for predicting significant effects to a transportation system, and the subsequent potential for an impact on wildlife will be minimal.

Deleted: *The existing traffic levels on the highway are low.*

Deleted: *T*

Deleted: *operations workforce, and conservatively assuming there would be an average of one employee per vehicle, per one-way vehicle trip,*

Deleted: *5.4*

Deleted: *along the highway*

Deleted: *is*

Deleted: *5.4*

Deleted: *(10.8 percent for two trips per day)*

Transportation of dried yellowcake would be made in exclusive-use transport vehicles to a licensed conversion facility in Metropolis, Illinois for further processing. The proposed annual production rate for the Moore Ranch Project is 4 million pounds of yellowcake. Based on weight limits for legal transport, each shipment will contain approximately 40,000 pounds of yellowcake, resulting in a total of 100 shipments of yellowcake per year, or an average of one shipment every 3.6 days. This level of traffic would not significantly affect the project-related traffic compared to the commuting traffic associated with the project workforce.

Transportation of 11(e).2 byproduct material will be made in exclusive-use transport vehicles to a licensed disposal facility. Although a final disposal agreement is not in place, the preferred alternative disposal site is the Pathfinder Mines Corp. (PMC) Shirley Basin facility due to proximity to the Moore Ranch site. The Shirley Basin facility is located approximately 132 highway miles from the Moore Ranch Project. The expected transport route to the PMC facility will be west on State Highway 387, south on Interstate 25, west on State Highway 220, and south on State Highway 487 to the PMC facility access road. The expected annual byproduct material production rate for the Moore Ranch Project is approximately 100 cubic yards. Based on the use of covered roll-off containers with a nominal capacity of 20 cubic yards, EMC expects five byproduct material shipments per year. This level of traffic would not significantly increase the project-related traffic compared to the estimated commuting and truck traffic associated with the project.

Transportation of nonradioactive solid waste will be made using a contract waste hauling company to a licensed disposal facility. The preferred alternative disposal site is the Midwest-Edgerton No. 2 disposal site located in Midwest, Wyoming due to proximity to the Moore Ranch site. The Midwest-Edgerton No. 2 facility is located approximately 24 highway miles from the Moore Ranch Project. The expected transport route to the Midwest-Edgerton No. 2 disposal facility will be west on State Highway 387 to Midwest.

The expected annual nonradioactive solid waste production rate for the Moore Ranch Project is 2,000 cubic yards. Typical contract waste haulage vehicles range in capacity from 20 to 40 cubic yards. Based on a conservative assumption of the use of haulage vehicles with a nominal capacity of 20 cubic yards, EMC expects 100 nonradioactive solid waste shipments per year, or an average of approximately 2 shipments per week. This level of traffic would not significantly increase the project-related traffic compared to the estimated commuting and truck traffic associated with the project.

Equipment needed for construction and installation of the proposed facility would include heavy equipment (cranes, bulldozers, graders, track hoes, trenchers, and front-end loaders), and heavy- and light-duty trucks.

On-site road maintenance will include periodic grading of the primary access roads, snow plowing, applying water or other agent(s) for dust control, and regular inspections to ensure erosion control measures are adequate.

All wellfield roads will be removed at the time of project decommissioning. The newly constructed gravel road that leads to the Central Plant from the main access road (shown in Figure 4.2-2) will be left in place for future use.

Insert Table 4.2-1, Figure 4.2-1, and Figure 4.2-2.

Additional references:

Wyoming Department of Transportation, May, 2009, Highway traffic survey data provided by the Mapping Division of the WYDOT Planning Department

Table 4.2-1 Local Highway Traffic Projections
Moore Ranch Uranium Project

HIGHWAY 50

			Mile Route Signs			1997		2006		2007*				Construction Phase				Operational Phase				Aquifer Restoration Phase				Decommissioning Phase			
														Projected Volume	Percent Increase	Projected Volume	Percent Increase	Projected Volume	Percent Increase	Projected Volume	Percent Increase	Projected Volume	Percent Increase	Projected Volume	Percent Increase	Projected Volume	Percent Increase	Projected Volume	Percent Increase
Route	Dir ^	Section Description	Begin^^ (Mile Marker)	Route	County	All Vehicles	Trucks	All Vehicles	Trucks	All Vehicles	Trucks	All Vehicles Minus Trucks	Truck Percentage	Trucks	Trucks	Auto Traffic	Auto Traffic	Trucks	Trucks	Auto Traffic	Auto Traffic	Trucks	Trucks	Auto Traffic	Auto Traffic	Trucks	Trucks	Auto Traffic	Auto Traffic
300	B	JCT I 90 (WEST GILLETTE INT)	1.533	WY 50	Campbell	6610	200	13500	720	14000	780	13220	5.6	800	2.5	13252	0.2	781	0.1	13268	0.1	781	0.1	13268	0.4	780	0.0	13230	0.1
300	B	GILLETTE CORP LIMITS	1.683	WY 50	Campbell	2400	200	6350	700	6950	760	6190	10.9	780	2.6	6222	0.5	761	0.1	6238	0.8	761	0.1	6238	0.8	760	0.0	6230	0.2
300	B	JCT LAKEWAY ROAD	3.04	WY 50	Campbell	1700	170	5950	660	6550	740	5810	11.3	760	2.6	5842	0.5	741	0.2	5858	0.8	741	0.2	5858	0.8	740	0.0	5820	0.2
300	B	GILLETTE CORP LIMITS	3.88	WY 50	Campbell	1700	170	5500	610	6100	690	5410	11.3	710	2.8	5442	0.6	691	0.2	5458	0.9	691	0.2	5458	0.9	690	0.0	5420	0.2
300	B	JCT 41 ROAD & FORCE ROAD	4.3	WY 50	Campbell	1500	230	5040	560	5640	640	5000	11.3	660	3.0	5032	0.6	641	0.2	5048	1.0	641	0.2	5048	1.0	640	0.0	5010	0.2
300	B	GILLETTE SOUTH CORP LIMITS	4.33	WY 50	Campbell	1500	230	3570	540	4160	620	3540	14.9	640	3.1	3572	0.9	621	0.2	3588	1.3	621	0.2	3588	1.3	620	0.0	3550	0.3
300	B	GILLETTE SOUTH URBAN LIMITS	6.05	WY 50	Campbell	1300	210	3130	520	3780	560	3220	14.8	580	3.4	3252	1.0	561	0.2	3268	1.5	561	0.2	3268	1.5	560	0.1	3230	0.3
300	B	JCT COUNTY ROAD 63 WEST	8.57	WY 50	Campbell	810	160	2060	500	2750	500	2250	18.2	520	3.8	2282	1.4	501	0.2	2298	2.1	501	0.2	2298	2.1	500	0.1	2260	0.4
300	B	HPMS SECTION CHANGE	24	WY 50	Campbell	810	160	1860	500	1910	500	1410	26.2	520	3.8	1442	2.2	501	0.2	1458	3.5	501	0.2	1458	3.5	500	0.1	1420	0.7
300	B	SAVAGETON	35.328	WY 50	Campbell	470	80	1450	370	1460	370	1090	25.3	390	5.1	1122	2.9	371	0.3	1138	4.2	371	0.3	1138	4.2	370	0.1	1100	0.9

HIGHWAY 59

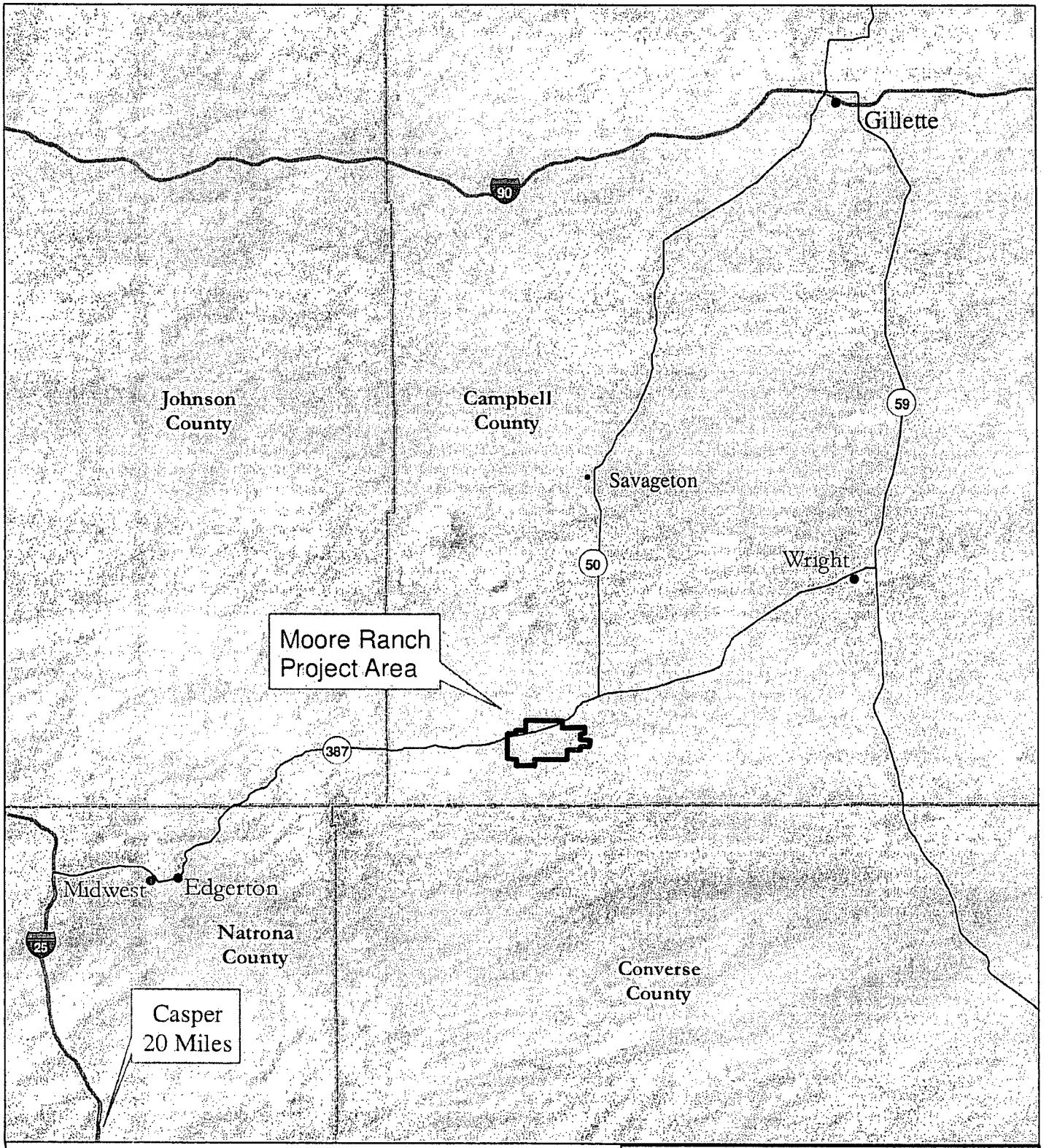
			Mile Route Signs			1997		2006		2007*				Construction Phase				Operational Phase				Aquifer Restoration Phase				Decommissioning Phase			
														Projected Volume	Percent Increase	Projected Volume	Percent Increase	Projected Volume	Percent Increase	Projected Volume	Percent Increase	Projected Volume	Percent Increase	Projected Volume	Percent Increase	Projected Volume	Percent Increase	Projected Volume	Percent Increase
Route	Dir ^	Section Description	Begin^^ (Mile Marker)	Route	County	All Vehicles	Trucks	All Vehicles	Trucks	All Vehicles	Trucks	All Vehicles Minus Trucks	Truck Percentage	Trucks	Trucks	Auto Traffic	Auto Traffic	Trucks	Trucks	Auto Traffic	Auto Traffic	Trucks	Trucks	Auto Traffic	Auto Traffic	Trucks	Trucks	Auto Traffic	Auto Traffic
43	B	CONVERSE - CAMPBELL COUNTY LINE	56.507	WY 59	Campbell	1200	260	1500	440	1650	340	1310	20.6	360	5.6	1342	2.4	341	0.3	1358	3.5	341	0.3	1358	3.5	340	0.1	1320	0.8
43	B	JCT COUNTY ROAD 30 EAST	67.49	WY 59	Campbell	1600	280	2330	450	2470	500	1970	20.2	520	3.8	2002	1.6	501	0.2	2018	2.4	501	0.2	2018	2.4	500	0.1	1980	0.5
43	B	JCT ROUTE 2300 (WY 450)	72.393	WY 59	Campbell	2270	380	3920	620	4560	930	3630	20.4	950	2.1	3662	0.9	931	0.1	3678	1.3	931	0.1	3678	1.3	930	0.0	3640	0.3
43	B	JCT ROUTE 42 (RENO JCT. WY 387)	75.064	WY 59	Campbell	2330	460	3930	750	4100	820	3280	20.0	840	2.4	3312	1.0	821	0.1	3328	1.4	821	0.1	3328	1.4	820	0.0	3290	0.3
43	B	JCT COUNTY ROAD 16 EAST TO LAWVER	81.4	WY 59	Campbell	2450	470	4750	760	4920	830	4090	16.9	850	2.4	4122	0.8	831	0.1	4138	1.2	831	0.1	4138	1.2	830	0.0	4100	0.2
43	B	JCT COUNTY ROAD 44 EAST	93.42	WY 59	Campbell	2800	480	4840	720	5010	790	4220	15.8	810	2.5	4252	0.8	791	0.1	4268	1.1	791	0.1	4268	1.1	790	0.0	4230	0.2
43	B	JCT COUNTY ROAD 12 EAST	102.37	WY 59	Campbell	3940	530	5810	660	6170	730	5440	11.8	750	2.7	5472	0.6	731	0.2	5488	0.9	731	0.2	5488	0.9	730	0.0	5450	0.2
43	B	JCT COUNTY ROAD SOUTHEAST	106.097	WY 59	Campbell	4440	720	6910	680	7260	750	6510	10.3	770	2.6	6542	0.5	751	0.1	6558	0.7	751	0.1	6558	0.7	750	0.0	6520	0.2
43	B	GILLETTE SOUTH URBAN LIMITS	106.86	WY 59	Campbell	4550	720	7700	690	8050	750	7300	9.3	770	2.6	7332	0.4	751	0.1	7348	0.7	751	0.1	7348	0.7	750	0.0	7310	0.1
43	B	JCT WHITETAIL STREET	106.95	WY 59	Campbell	5230	760	7880	690	8230	750	7480	9.1	770	2.6	7512	0.4	751	0.1	7528	0.6	751	0.1	7528	0.6	750	0.0	7490	0.1
43	B	JCT UNION CHAPEL ROAD	107.97	WY 59	Campbell	9600	780	15910	690	16260	750	15510	4.6	770	2.6	15542	0.2	751	0.1	15558	0.3	751	0.1	15558	0.3	750	0.0	15520	0.1
43	B	JCT SOUTHERN DRIVE	109.73	WY 59	Campbell	13700	820	15620	740	15970	760	15210	4.8	780	2.6	15242	0.2	761	0.1	15258	0.3	761	0.1	15258	0.3	760	0.0	15220	0.1
43	B	GILLETTE SOUTH CORP LIMITS	110.6	WY 59	Campbell	18120	820	20080	760	20440	780	19660	3.8	800	2.5	19692	0.2	781	0.1	19708	0.2	781	0.1	19708	0.2	780	0.0	19670	0.1
43	B	JCT LAKEWAY ROAD	111.44	WY 59	Campbell	23450	1020	32070	1000	32430	1020	31410	3.1	1040	1.9	31442	0.1	1021	0.1	31458	0.2	1021	0.1	31458	0.2	1020	0.0	31420	0.0
43	B	JCT I 90 (WY 59 INT)	112.16	WY 59	Campbell	17700	360	29170	710	29530	730	28800	2.5	750	2.7	28832	0.1	731	0.2	28848	0.2	731	0.2	28848	0.2	730	0.0	28810	0.0
43	B	RAMPS 703 & 704	112.24	WY 59	Campbell	17700	360	27170	460	27280	480	26800	1.8	500	4.0	26832	0.1	481	0.2	26848	0.2	481	0.2	26848	0.2	480	0.1	26810	0.0
43	B	HPMS SECTION CHANGE	112.78	WY 59	Campbell	17700	360	20290	460	20400	480	19920	2.4	500	4.0	19952	0.2	481	0.2	19968	0.2	481	0.2	19968	0.2	480	0.1	19930	0.1
43	B	JCT ROUTE 300 (WY 50)	114.855	WY 59	Campbell	12300	785	17800	1030	17910	1050	16860	5.9	1070	1.9	16892	0.2	1051	0.1	16908	0.3	1051	0.1	16908	0.3	1050	0.0	16870	0.1
43	B	GILLETTE NORTH CORP LIMITS	115.412	WY 59	Campbell	7450	485	9810	1150	9810	1170	8640	11.9	1190	1.7	8672	0.4	1171	0.1	8688	0.6	1171	0.1	8688	0.6	1170	0.0	8650	0.1
43	B	JCT HANNUM ROAD	117.863	WY 59	Campbell	4100	325	4250	490	4250	510	3740	12.0	530	3.8	3772	0.8	511	0.2	3788	1.3	511	0.2	3788	1.3	510	0.1	3750	0.3
43	B	JCT ROUTE 302 (US 14/16) & AIRPORT RD	118.65	WY 59	Campbell	620	110	1330	150	1160	280	880	24.1	300	6.7	912	3.5	281	0.4	928	5.2	281	0.4	928	5.2	280	0.1	890	1.1
43	B	JCT LITTLE POWDER RIVER	120.44	WY 59	Campbell	1020	110	1310	240	1350	270	1080	20.0	290	6.9	1112	2.9	271	0.4	1128	4.3	271	0.4	1128	4.3	270	0.1	1090	0.9
43	B	GILLETTE NORTH URBAN LIMITS	121.8	WY 59	Campbell	1020	110	1310	240	1350	270	1080	20.0	290	6.9	1112	2.9	271	0.4	1128	4.3	271	0.4	1128	4.3	270	0.1	1090	0.9
43	B	RAILROAD SEPARATION	122.62	WY 59	Campbell	610	110	900	140	1000	200	800	20.0	220	9.1	832	3.8	201	0.6	848	5.7	201	0.6	848	5.7	200	0.1	810	1.2
43	B	JCT COUNTY ROAD 26 EAST	135.6	WY 59	Campbell	440	70	550	90	540	100	440	18.5	120	16.7	472	6.8	101	1.1	488	9.8	101	1.1	488	9.8	100	0.3	450	2.2
43	B	WESTON	143.888	WY 59	Campbell	320	65	420	80	470	90	380	19.1	110	18.2	412	7.8	91	1.2	428	11.2	91	1.2	428	11.2	90	0.3	390	2.6
43	B	JCT COUNTY RD 33 WEST TO RECLUSE	155.388	WY 59	Campbell	300	55	380	70	480	90	390	18.8	110	18.2	422	7.6	91	1.2	438	11.0	91	1.2	438	11.0	90	0.3	400	2.5

HIGHWAY 387

			Mile Route Signs			1997		2006		2007*				Construction Phase				Operational Phase				Aquifer Restoration Phase				Decommissioning Phase			
														Projected Volume	Percent Increase	Projected Volume	Percent Increase	Projected Volume	Percent Increase	Projected Volume	Percent Increase	Projected Volume	Percent Increase	Projected Volume	Percent Increase	Projected Volume	Percent Increase	Projected Volume	Percent Increase
Route	Dir ^	Section Description	Begin^^ (Mile Marker)	Route	County	All Vehicles	Trucks	All Vehicles	Trucks	All Vehicles	Trucks	All Vehicles Minus Trucks	Truck Percentage	Trucks	Trucks	Auto Traffic	Auto Traffic	Trucks	Trucks	Auto Traffic	Auto Traffic	Trucks	Trucks	Auto Traffic	Auto Traffic	Trucks	Trucks	Auto Traffic	Auto Traffic
42	B	JOHNSON - CAMPBELL COUNTY LINE	118.726	WY 387	Campbell	1130	260	1600	430	1500	370	1130	24.7	390	5.1	1162	2.8	371	0.3	1178	4.1	371	0.3	1178	4.1	370	0.1	1140	0.9
42	B	JCT ROUTE 300 (WY 50 / PINETREE JCT)	131.793	WY 387	Campbell	740	190	970	280	890	220	670	24.7	240	8.3	702	4.6	221	0.5	718	6.7	221	0.5	718	6.7	220	0.1	680	1.5
42	B	JCT COUNTY ROADS NORTH & SOUTH	137.12	WY 387	Campbell	710	250	880	220	900	220	680	24.4	240	8.3	712	4.5	221	0.5	728	6.6	221	0.5	728	6.6	220	0.1	690	1.4
42	B	JCT LOCAL ROADS NORTH & SOUTH	149.24	WY 387	Campbell	1130	320	1900	410	2000	410	1590	20.5	430	4.7	1622	2.0	411	0.3	1638	2.9	411	0.3	1638	2.9	410	0.1	1600	0.6
42	B	WRIGHT	150.63	WY 387	Campbell	2140	380	3130	370	3390	480	2910	14.2	500	4.0	2942	1.1	481	0.2	2958	1.6	481	0.2	2958	1.6	480	0.1	2920	0.3
Averages:														593	4.8	6959	1.7	428	0.3	6975	2.5	574	0.3	6975	2.5	574	0.1	7471	0.6

^ Dir = Travel Direction for Traffic Volume (Increasing Mile Markers, IncDecreasing Mile Markers)
^^ Begin = Mile Marker Start of Section
All vehicle counts are estimated Average 24 Hour Traffic
* Year 2007 used as base for projected traffic volumes

Construction phase traffic: Assuming a construction workforce of 10 plus 6 welfield staff traveling one round trip per day to the site (32 auto traffic trips per day), and 10 truck round trips (20 trips) per day for equipment being hauled to the site
Operational phase traffic: Assuming a site workforce of 24 (48 auto traffic trips per day), and 1.12 average total truck trips per day (yellowcake shipments = 100 round trips per year or 200 truck trips/year = .548 trips/day; non radioactive waste shipments = 100 round trips/year or 200 truck trips/year = 0.548 trips/day; radioactive byproduct waste shipments = 5 round trips/year or 10 trips/year = 0.027trips/day).
Aquifer restoration phase traffic: Assuming a site workforce of 24 (48 auto traffic trips per day) and maximum of 1.12 truck trips per day (using production truck traffic data).
Decommissioning phase traffic: Assuming a site workforce of 5 (10 auto traffic trips per day) and 1 truck round trip per week (2 truck trips per wk = 0.285 trips/day) for equipment and waste shipments.



Legend

Moore Ranch License/Permit Boundary | County Boundary

N

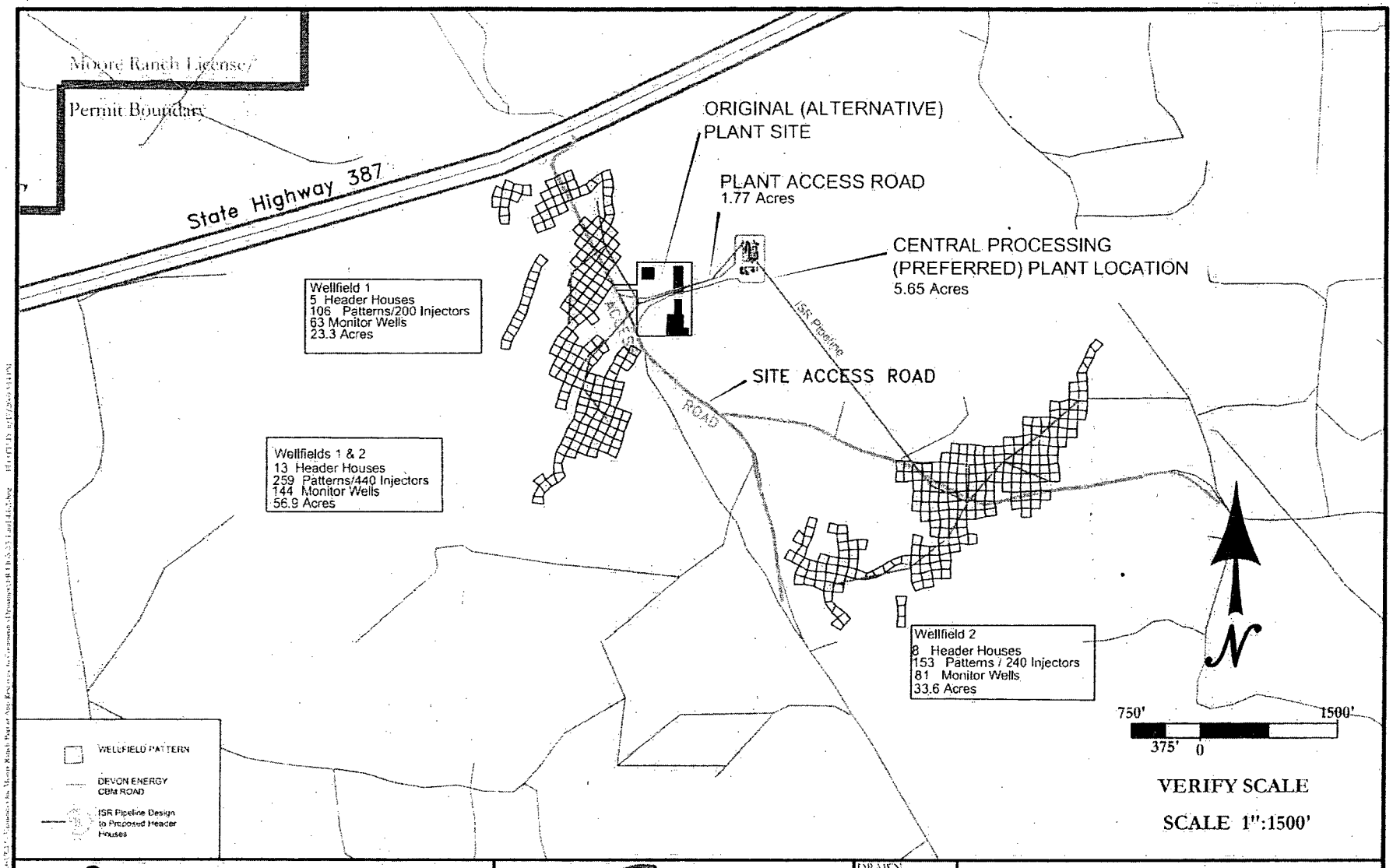
0 2.5 5 10 Miles

Source: Wyoming Geographic Information Science Center

Figure 4.2-1
MOORE RANCH URANIUM PROJECT
Local Highways

uraniumone
investing in our energy

TREC, Inc.



TREC, Inc.
Engineering & Environmental Management

951 Werner Court
Suite 395
Casper, WY 82601
Phone (307)265-0076
Fax (307)265-2498
www.trecorp.com

uraniumone™
investing in our energy

907 N Poplar Street
Suite 260
Casper, WY 82601

tel +1 307-234-8235
fax +1 307-237-8235
www.uraniumone.com

DRAWN BY: WB
CHECKED BY: JS
APPROVED BY:

MOORE RANCH
CPP
Site Road Plan

REV. #	DESCRIPTION	BY	DATE
0	INITIAL DRAFT	WB	05/19/09
1	UPDATE	KLW	06/17/09

Figure 4.2-2

NOISE

Question ER Section 3.7 – Noise

RAI Question:

The ER states existing ambient noise in vicinity of the Moore Ranch Project area is dominated by traffic noise from State Highway 387, surrounding oil and gas operations, and on-site coal bed methane operations. However, it does not provide existing ambient background sound levels. Additional information is required to adequately characterize the existing environment.

1) Please provide any sound level measurement data to determine background existing sound levels.
2) If no field measurements were taken please provide the methodology of how the ambient background sound levels were determined for comparing future noise impacts after the project commences.

Answer:

Uranium One did not perform any field measurements of noise at the Moore Ranch License Area for the preparation of this License Application.

Ambient background sound levels are based on analysis prepared for similar environmental review documents. Specifically, several environmental reviews prepared by the Bureau of Land Management provide information concerning ambient noise for the Powder River Basin.

Proposed Revisions to License Application

The following changes are proposed to the license application in response to this RAI question. Changes to the original text as submitted to NRC are noted in red-line/strikeout method.

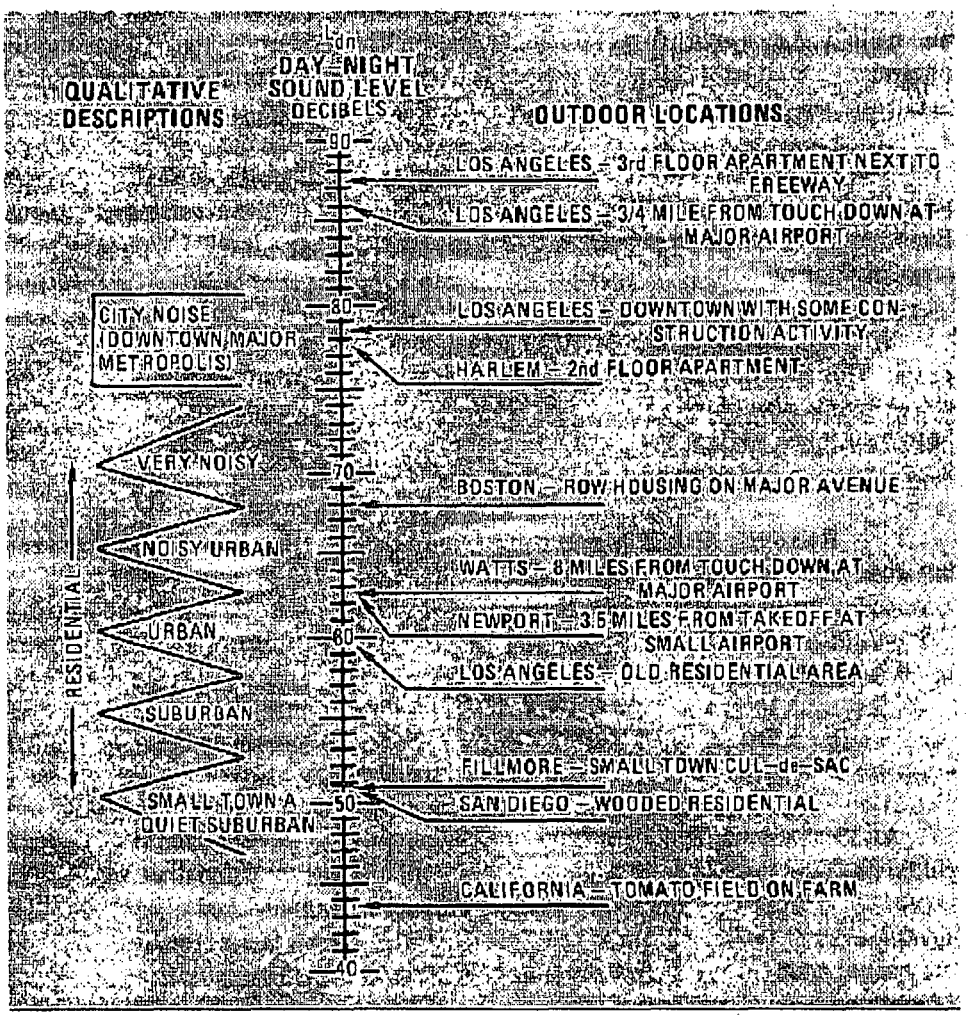
3.7 NOISE

Open rangeland is the primary land use within and in the surrounding 2.0-mile area. Other land uses include oil and gas and CBM production facilities, as well as pastureland located to the west of the Project area. The existing ambient noise in the vicinity of the Moore Ranch Project area is dominated by the traffic noise from State Highway 387, surrounding oil and gas operations, and on-site CBM operations.

Background noise surveys have not been conducted by EMC in the area. However, noise in rural areas away from industrial facilities and transportation

corridors is generally 30 to 40 dBA when the wind speeds are low. Background noise levels for the EPA category "farm in valley" are: daytime, 29 dBA; evening, 39 dBA; and nighttime, 32 dBA. Local conditions, such as topography and frequent high winds, can alter background noise conditions. The measured range of values of day-night sound levels outside dwelling units extends from 44 dB on a farm to 88.8 dB outside an apartment located adjacent to a freeway. Some examples of these data are summarized in Figure 3.7-1 (EPA 1974, EPA 1973).

Figure 3.7-1 Outdoor Day-Night Sound Level in dB at Various Locations



(EPA 1973)

Levels of noise close to industrial facilities and transportation corridors in the Powder River Basin are likely to be in the range of 50 to 70 dBA, depending on the proximity to these sources (BLM, 2003). The most significant ambient noise in the Moore Ranch License Area is from traffic on State Highway 387, which

transects the license area, and CBM operations that are located on site. In particular, two CBM compressor stations in the immediate vicinity use multiple engines to move natural gas from central gathering facilities and along high-pressure transmission pipelines. The location of these CBM compressor stations is shown on Figure 4.14-1. Noise from these existing compressor stations has been estimated to be 55 dBA at 600 feet from the compressor station (BLM 2000).

There are no occupied housing units in the vicinity of the proposed Moore Ranch Uranium Project. The nearest resident is approximately 4.3 miles to the east of the license area. As a result of the remote location of the Project and the low population density of the surrounding area, impact to noise or congestion above ambient background noise within the Project area or in the surrounding 2.0-mile area are not anticipated. Additionally, given the maximum increase in population due to migrant workers is insignificant, noise and congestion impacts are not anticipated in Campbell or other neighboring counties.

Additional References:

U.S. Bureau of Land Management. 2003 Final Environmental Impacts Statement and Proposed Plan Amendment for the Powder River Basin Oil and Gas Project. WY-070-02-065. Buffalo Field Office, Buffalo, Wyoming.

U.S. Bureau of Land Management. 2000. Wyodak Drainage Coal Bed Methane Environmental Assessment. EA # WY-070-01-034. Buffalo Field Office, Buffalo, Wyoming.

U.S. Environmental Protection Agency. 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. 550/9-74-004

U.S. Environmental Protection Agency. 1973. Impact Characterization of Noise Including Implications of Identifying and Achieving Levels of Cumulative Noise Exposure, EPA Report NTID 73.4.

Question ER 4.7 No.1 Noise Impacts

RAI Question:

Please provide existing daily or peak hour traffic volumes and truck percentages on any of the local roadways to be utilized by daily activities at the proposed facility.

Answer:

Average daily traffic volumes, including truck traffic percentages have been tabulated and are shown on Table 4.2-1 in Section 4.2 of this Environmental Report. A discussion of the noise impacts will be included in the revised Environmental Report section 4.7 Noise Impacts. A discussion of traffic impacts during the four phases of the project can be found in the revision to section 4.2 of the Environmental Report prepared in response to the RAI questions related to Transportation.

Question ER 4.7 No.2 Noise Impacts

RAI Question:

Please provide any future projections of traffic volumes and the percentage of trucks on these roadways.

Answer:

Projected daily truck and auto traffic volumes for the construction, operational, restoration and decommissioning phases of the project have been estimated based on recent traffic data and the maximum projected increase in vehicle traffic on the local highways will be minimal. This minimal increase in vehicle traffic volume will not significantly change the existing sound pressure (noise) levels at the site, adjacent to the site, or along the local state highways. The tabulated projected vehicle traffic results are shown on Table 4.2-1 in section 4.2 of this Environmental Report, and a discussion will be included in the revised Environmental Report section 4.7 Noise Impacts. A discussion of traffic impacts during the four phases of the project can be found in the revision to section 4.2 of the Environmental Report prepared in response to the RAI questions related to Transportation.

Proposed Revisions to License Application

The following changes are proposed to the license application in response to this RAI question. Changes to the original text as submitted to NRC are noted in red-line/strikeout method.

4.7 Noise Impacts

There are no occupied housing units in the vicinity of the proposed Moore Ranch Project. Open rangeland is the primary land use within and in the surrounding 2.0-mile area. Other land uses include oil and gas and coal bed methane production facilities, as well as pastureland located to the west of the project area. As a result of the remote location of the project and the low population density of the surrounding area, impact to noise or congestion within the project area or in the surrounding 2.0-mile area are not anticipated. Additionally, given the maximum increase in population due to migrant workers is insignificant, noise and congestion impacts are not anticipated in Campbell or other neighboring counties.

Average daily traffic volumes for the local highways in the project area, State Highways 50, 59 and 387 are shown in Table 4.2-1 (WYDOT, 2009). The traffic information includes data from years 1997, 2006 and 2007, and breaks down the truck traffic by percentage of the total traffic volume recorded in 2007. A map of the subject and regional roadways and communities is shown in Figure 4.2-1.

The most heavily used road segment will be State Highway 387 between I-25 to the west and State Highway 59 to the east. Access to the Project area from Gillette would be from State Highway 59, and from Casper would be I-25; traffic will converge on State Highway 387 from the east and the west.

Projected daily truck and auto traffic volume data for the three local State Highways is also presented in Table 4.2-1. The projections are based on expected vehicle traffic during the construction, operational, restoration and decommissioning phases of the project. Using these vehicle traffic projections and recent data supplied by WYDOT for the year 2007, it is estimated that on average, a maximum increase of 4.8 percent in truck traffic volume may occur during the construction phase of the project, if all three local State Highways were subject to the increased traffic. Given that the increases in truck traffic volume is based on maximum projections for all the local highways, the percentage increases in volume are minimal, and the minimal increases will not significantly change the existing sound pressure (noise) levels at locations on or adjacent to the project site.

Mitigation measures to control impacts from noise are discussed in section 5.7.

Additional references:
Wyoming Department of Transportation, May, 2009, Highway traffic survey data provided by the Mapping Division of the WYDOT Planning Department.

Question TR 7.1.5 - Noise Impacts of Construction

RAI Question:

Noise Impacts of Construction
The ER, again, states that there will be no noise or congestion impacts within a two-mile area. However, it does not provide any projections due to construction activities associated with the proposed project. Additional information is required to adequately assess the noise impact of the project.

1. Please provide projections of typical machinery to be used at the project and the reference sound levels associated with construction activities.
2. Please provide projected truck traffic associated with construction on the roadways leading to the proposed facility.

Answer:

Please note that although these questions refer to section 7.1.5 of the ER they actually pertain to section 7.1.5 of the TR (Noise Impacts of Construction). The proposed changes in response to this RAI are for section 7.1.5 of the Technical Report.

1. Various equipment types will be used during the Project construction phase. TR section 7.1.5 has been revised, as requested, to include sound level information for the typical equipment anticipated for use during Plant construction.
2. In response to this RAI question, a data table including projected construction truck traffic information will be added to the revised section 7.1.5 of this Technical Report.

Proposed Revisions to License Application

The following changes are proposed to the license application in response to this RAI question. Changes to the original text as submitted to NRC are noted in red-line/strikeout method.

> ***7.1.5*** *Noise Impacts of Construction*
>
> *There are no occupied housing units in the vicinity of the proposed Moore Ranch Project. Open rangeland is the primary land use within and in the surrounding 2.0-mile area. Other land uses include oil and gas and coal bed methane production facilities, as well as pastureland located to the west of the Project area. As a result of the remote location of the Project and the low population density of the surrounding area, impact to noise or congestion within the Project area or in the surrounding 2.0-mile area are not anticipated. Additionally, given the maximum increase in population due to migrant workers is insignificant, noise and congestion impacts are not anticipated in Campbell or other neighboring counties.*

Although noise impacts during construction will be minimal at the Project site and surrounding area, a compilation of the noise levels of equipment anticipated to be used during construction is provided below. Equipment required for construction and installation of the proposed facility will include heavy equipment (cranes, bulldozers, graders, track hoes, trenchers and front end loaders), and heavy- and light-duty trucks. For the purposes of this environmental evaluation, additional equipment that may be used during construction is listed below. Table 7.1-1 below is an inventory of potential construction equipment. Noise levels in this inventory are expressed in terms of L_{max} noise levels and are accompanied by a usage factor value. Specification 721.560 was originally developed by the Central Artery/Tunnel (CA/T) program in Massachusetts for use on the "Big Dig" project. This program was developed to be consistent with the intent of the city of Boston's Noise Code. The CA/T program has adopted and refined the most comprehensive and stringent construction noise control specification 721.560 of any public works project in the country. The specification contains both "relative" noise criteria limits at identified noise sensitive receptor locations, as well as "absolute" noise emission limits for any/all equipment used on the construction site (Thalheimer, 1999). Information from the CA/T program is used for reference only as the remote conditions and potential impacts of the Moore Ranch Project, located in a remote area of Wyoming, are far different than the urban impacts of the Big Dig Project in Boston.

Table 7.1-1 Noise Emission Reference Levels and Usage Factors				
Equipment Description	***Impact Device?***	***Acoustical Usage Factor (%)***	***Spec. 721.560 L_{max} @ 50 feet (dBA, slow)***	***Actual Measured L_{max} @ 50 feet (dBA, slow) (Samples Averaged)***
All Other Equipment > 5 HP	*No*	*50*	*85*	*N/A*
Auger Drill Rig	*No*	*20*	*85*	*84*
Backhoe	*No*	*40*	*80*	*78*
Bar Bender	*No*	*20*	*80*	*N/A*
Blasting	*Yes*	*N/A*	*94*	*N/A*
Boring Jack Power Unit	*No*	*50*	*80*	*83*
Chain Saw	*No*	*20*	*85*	*84*
Clam Shovel (dropping)	*Yes*	*20*	*93*	*87*
Compactor (ground)	*No*	*20*	*80*	*83*
Compressor (air)	*No*	*40*	*80*	*78*
Concrete Batch Plant	*No*	*15*	*83*	*N/A*
Concrete Mixer Truck	*No*	*40*	*85*	*79*
Concrete Pump Truck	*No*	*20*	*82*	*81*
Concrete Saw	*No*	*20*	*90*	*90*
Crane	*No*	*16*	*85*	*81*
Dozer	*No*	*40*	*85*	*82*
Drill Rig Truck	*No*	*20*	*84*	*79*
Drum Mixer	*No*	*50*	*80*	*80*
Dump Truck	*No*	*40*	*84*	*76*

Table 7.1-1 Noise Emission Reference Levels and Usage Factors				
Equipment Description	***Impact Device?***	***Acoustical Usage Factor (%)***	***Spec. 721.560 L_{max} @ 50 feet (dBA, slow)***	***Actual Measured L_{max} @ 50 feet (dBA, slow) (Samples Averaged)***
Excavator	*No*	*40*	*85*	*81*
Flat Bed Truck	*No*	*40*	*84*	*74*
Front End Loader	*No*	*40*	*80*	*79*
Generator	*No*	*50*	*82*	*81*
Generator (<25KVA, VMS Signs)	*No*	*50*	*70*	*73*
Gradall	*No*	*40*	*85*	*83*
Grader	*No*	*40*	*85*	*N/A*
Grapple (on backhoe)	*No*	*40*	*85*	*87*
Horizontal Boring Hydraulic Jack	*No*	*25*	*80*	*82*
Hydra Break Ram	*Yes*	*10*	*90*	*N/A*
Impact Pile Driver	*Yes*	*20*	*95*	*101*
Jackhammer	*Yes*	*20*	*85*	*89*
Man Lift	*No*	*20*	*85*	*75*
Mounted Impact Hammer (hoe ram)	*Yes*	*20*	*90*	*90*
Pavement Scarifier	*No*	*20*	*85*	*90*
Paver	*No*	*50*	*85*	*77*
Pickup Truck	*No*	*40*	*55*	*75*
Pneumatic Tools	*No*	*50*	*85*	*85*
Pumps	*No*	*50*	*77*	*81*
Refrigerator Unit	*No*	*100*	*82*	*73*

Table 7.1-1 Noise Emission Reference Levels and Usage Factors				
Equipment Description	***Impact Device?***	***Acoustical Usage Factor (%)***	***Spec. 721.560 L_{max} @ 50 feet (dBA, slow)***	***Actual Measured L_{max} @ 50 feet (dBA, slow) (Samples Averaged)***
Rivit Buster/Chipping Gun	*Yes*	*20*	*85*	*79*
Rock Drill	*No*	*20*	*85*	*81*
Roller	*No*	*20*	*85*	*80*
Sand Blasting (single nozzle)	*No*	*20*	*85*	*96*
Scraper	*No*	*40*	*85*	*84*
Sheers (on backhoe)	*No*	*40*	*85*	*96*
Soil Mix Drill Rig	*No*	*50*	*80*	*N/A*
Tractor	*No*	*40*	*84*	*N/A*
Ventilation Fan	*No*	*100*	*85*	*79*
Vibrating Hopper	*No*	*50*	*85*	*87*
Vibratory Concrete Mixer	*No*	*20*	*80*	*80*
Vibratory Pile Driver	*No*	*20*	*95*	*101*
Warning Horn	*No*	*5*	*85*	*83*
Welder/Torch	*No*	*40*	*73*	*74*

For each generic type of equipment listed in Table 7.1-1, the following information is provided:

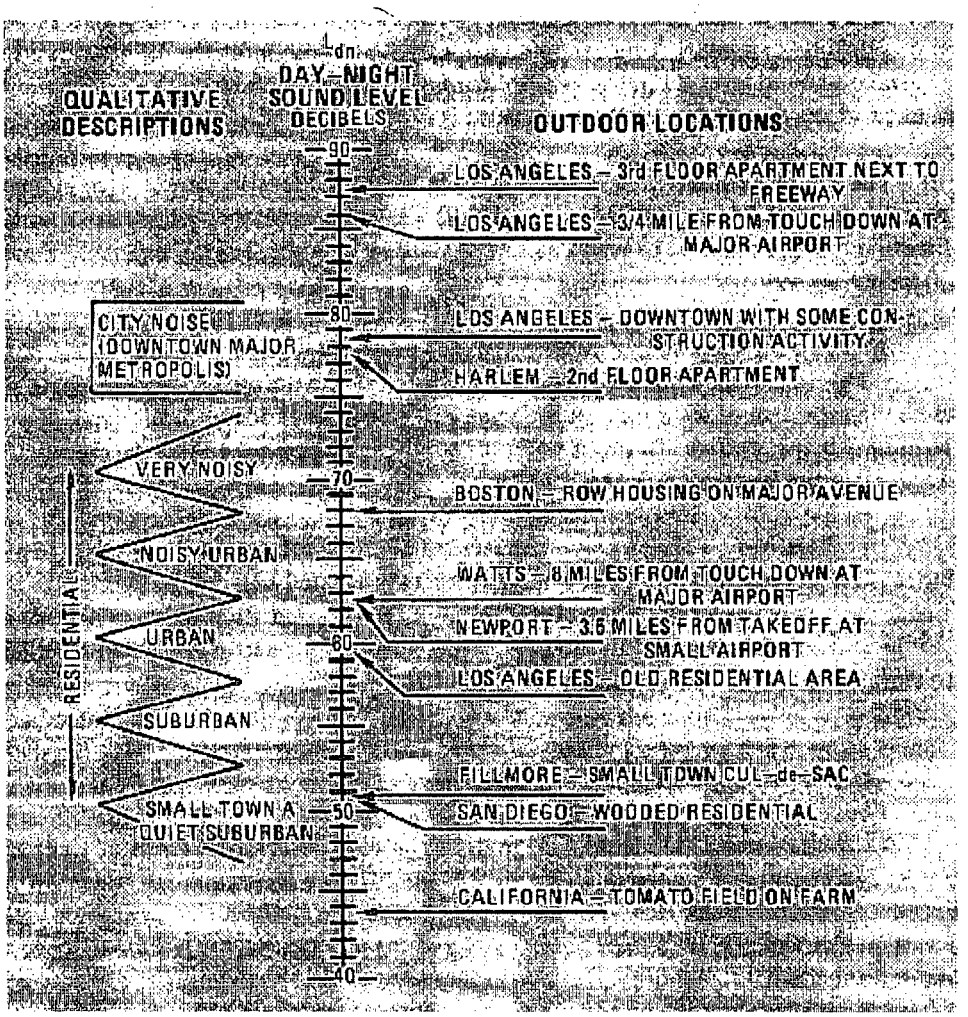
- *an indication as to whether or not the equipment is an impact device;*
- *the acoustical usage factor to assume for modeling purposes;*
- *the specification "Spec" limit for each piece of equipment expressed as an L_{max} level in dBA "slow" at a reference distance of 50 foot from the loudest side of the equipment;*
- *the measured "Actual" emission level at 50 feet for each piece of equipment based on hundreds of emission measurements performed on CA/T work sites.*

Background noise surveys have not been conducted in the Moore Ranch area. However, noise levels in rural areas away from industrial facilities and transportation corridors are generally in the range of 30 to 40 dBA when the wind speeds are low. Background noise levels for the EPA category "farm in valley" are: daytime, 29 dBA; evening, 39 dBA; and nighttime, 32 dBA. Local conditions, such as topography and frequent high winds, can alter background noise conditions. The measured range of values of day-night sound levels outside dwelling units extends from 44 dB on a farm to 88.8 dB outside an apartment located adjacent to a freeway. Some examples of these data are summarized in Figure 7.1-1. (EPA 1974, EPA 1973).

Although there is no site-specific noise data for the Moore Ranch Project, noise information is available from the Lost Creek ISR project in Wyoming, with a license application currently pending with the NRC. The Lost Creek ISR project is located in a fairly remote part of Wyoming, with areal topographic similarities to Moore Ranch and is comparable in project scale, making Lost Creek an appropriate analog. During construction, ISR projects create noise due to heavy equipment use and mine unit drilling. Drill rigs, heavy trucks, and equipment will generate noise that will be audible on-site above the 30 to 40 A-weighted decibels (dBA) of the background noise levels. At Lost Creek ISR the maximum measure of sound pressure (noise) during exploration activities was from a cement mixer and a generator running concurrently, which was 102 dBA, four feet from the source. During construction, occasional instantaneous levels could be somewhat higher. Field observations for the Lost Creek project indicated that drilling activities are inaudible to humans at distances greater that one mile, due to topographic interference and other factors (Lost Creek ISR, LLC. 2008).

Figure 7.1-2 shows the maximum noise levels anticipated at the Moore Ranch site during the construction phase of the project. Noise levels at the Project site boundary could be as high as 80dB at times during construction. However this construction activity sound level is less than or similar to vehicle traffic noise along HWY 387, and will not be a significant impact in the area.

Figure 7.1-1 Outdoor Day-Night Sound Level in dB at Various Locations



(EPA 1973)

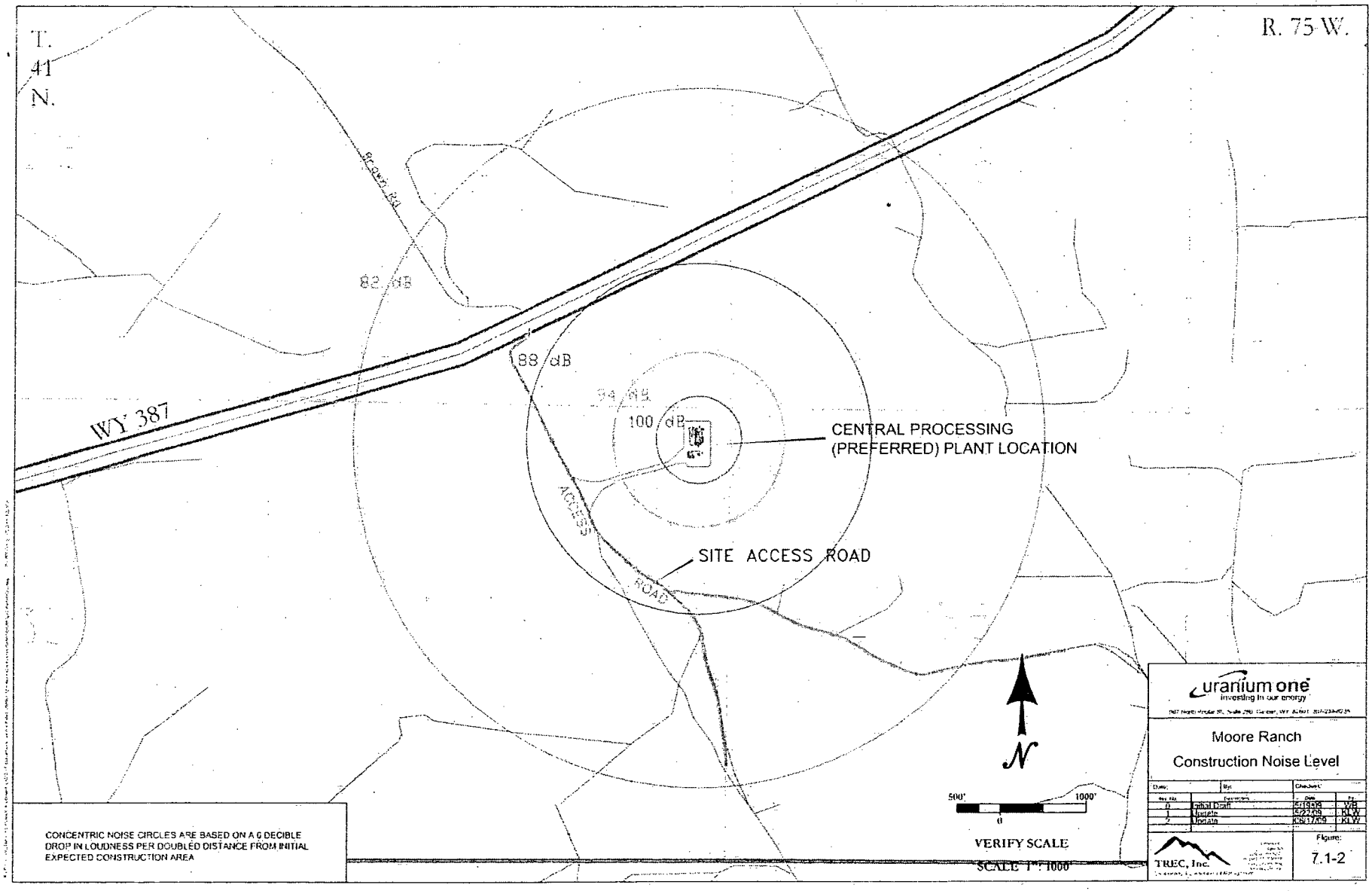

T. 41 N.
R. 75 W.
WY 387
82 dB
88 dB
94 dB
100 dB
CENTRAL PROCESSING (PREFERRED) PLANT LOCATION
SITE ACCESS ROAD
ACCESS ROAD
N
500'
0
1000'
VERIFY SCALE
SCALE 1" : 1000'
CONCENTRIC NOISE CIRCLES ARE BASED ON A 6 DECIBLE DROP IN LOUDNESS PER DOUBLED DISTANCE FROM INITIAL EXPECTED CONSTRUCTION AREA
uranium one
investing in our energy
Moore Ranch
Construction Noise Level
Rev. No. | Remarks | Date | By
0 | Initial Draft | 4/19/09 | WB
1 | Update | 4/22/09 | RLW
2 | Update | 6/11/09 | RLW
TREC, Inc.
Figure:
7.1-2

Table 7.1-2 Local Highway Traffic Projections
Moore Ranch Uranium Project

HIGHWAY 50

Route	Dir *	Section Description	Mile Route Signs: Begin** (Mile Marker)	Route	County	1997 All Vehicles	1997 Trucks	2006 All Vehicles	2006 Trucks	2007* All Vehicles	2007* Trucks	2007* All Vehicles Minus Trucks	2007* Truck Percentage	Construction Phase: Projected Volume Trucks	Construction Phase: Percent Increase Trucks	Construction Phase: Projected Volume Auto Traffic	Construction Phase: Percent Increase Auto Traffic	Operational Phase: Projected Volume Trucks	Operational Phase: Percent Increase Trucks	Operational Phase: Projected Volume Auto Traffic	Operational Phase: Percent Increase Auto Traffic	Aquifer Restoration Phase: Projected Volume Trucks	Aquifer Restoration Phase: Percent Increase Trucks	Aquifer Restoration Phase: Projected Volume Auto Traffic	Aquifer Restoration Phase: Percent Increase Auto Traffic	Decommissioning Phase: Projected Volume Trucks	Decommissioning Phase: Percent Increase Trucks	Decommissioning Phase: Projected Volume Auto Traffic	Decommissioning Phase: Percent Increase Auto Traffic
300	B	JCT I 90 (WEST GILLETTE INT)	1.533	WY 50	Campbell	6650	200	13500	720	14000	780	13220	5.6	800	2.5	13252	0.2	781	0.1	13268	0.4	781	0.1	13268	0.4	780	0.0	13230	0.1
300	B	GILLETTE CORP LIMITS	1.683	WY 50	Campbell	2400	200	6350	700	6950	760	6190	10.9	780	2.6	6222	0.5	761	0.1	6238	0.8	761	0.1	6238	0.8	760	0.0	6200	0.2
300	B	JCT LAKEWAY ROAD	3.04	WY 50	Campbell	1700	170	5950	660	6550	740	5810	11.3	760	2.6	5842	0.5	741	0.2	5858	0.8	741	0.2	5858	0.8	740	0.0	5820	0.2
300	B	GILLETTE CORP LIMITS	3.88	WY 50	Campbell	1700	170	5500	610	6100	690	5410	11.3	710	2.8	5442	0.6	691	0.2	5458	0.9	691	0.2	5458	0.9	690	0.0	5420	0.2
300	B	JCT 41 ROAD & FORCE ROAD	4.3	WY 50	Campbell	1500	230	5040	560	5640	640	5000	11.3	660	3.0	5032	0.6	641	0.2	5048	1.0	641	0.2	5048	1.0	640	0.0	5010	0.2
300	B	GILLETTE SOUTH CORP LIMITS	4.33	WY 50	Campbell	1500	230	3570	540	4160	620	3540	14.9	640	3.1	3572	0.9	621	0.2	3588	1.3	621	0.2	3588	1.3	620	0.0	3550	0.3
300	B	GILLETTE SOUTH URBAN LIMITS	6.05	WY 50	Campbell	1300	210	3130	520	3780	560	3220	14.8	580	3.4	3252	1.0	561	0.2	3268	1.5	561	0.2	3268	1.5	560	0.1	3230	0.3
300	B	JCT COUNTY ROAD 67 WEST	8.57	WY 50	Campbell	810	160	2060	500	2750	500	2250	18.2	520	3.8	2282	1.4	501	0.2	2298	2.1	501	0.2	2298	2.1	500	0.1	2260	0.4
300	B	HPMS SECTION CHANGE	24	WY 50	Campbell	810	160	1860	500	1910	500	1410	26.2	520	3.8	1442	2.2	501	0.2	1458	3.3	501	0.2	1458	3.3	500	0.1	1420	0.7
300	B	SAVAGETON	35.328	WY 50	Campbell	470	80	1450	370	1460	370	1090	25.3	390	5.1	1122	2.9	371	0.3	1138	4.2	371	0.3	1138	4.2	370	0.1	1100	0.9

HIGHWAY 59

Route	Dir *	Section Description	Mile Route Signs: Begin** (Mile Marker)	Route	County	1997 All Vehicles	1997 Trucks	2006 All Vehicles	2006 Trucks	2007* All Vehicles	2007* Trucks	2007* All Vehicles Minus Trucks	2007* Truck Percentage	Construction Phase: Projected Volume Trucks	Construction Phase: Percent Increase Trucks	Construction Phase: Projected Volume Auto Traffic	Construction Phase: Percent Increase Auto Traffic	Operational Phase: Projected Volume Trucks	Operational Phase: Percent Increase Trucks	Operational Phase: Projected Volume Auto Traffic	Operational Phase: Percent Increase Auto Traffic	Aquifer Restoration Phase: Projected Volume Trucks	Aquifer Restoration Phase: Percent Increase Trucks	Aquifer Restoration Phase: Projected Volume Auto Traffic	Aquifer Restoration Phase: Percent Increase Auto Traffic	Decommissioning Phase: Projected Volume Trucks	Decommissioning Phase: Percent Increase Trucks	Decommissioning Phase: Projected Volume Auto Traffic	Decommissioning Phase: Percent Increase Auto Traffic
43	B	CONVERSE - CAMPBELL COUNTY LINE	56.507	WY 59	Campbell	1200	260	1500	440	1650	340	1310	20.6	360	5.6	1342	2.4	341	0.3	1358	3.5	341	0.3	1358	3.5	340	0.1	1320	0.8
43	B	JCT COUNTY ROAD 30 EAST	67.49	WY 59	Campbell	1600	280	2330	450	2470	500	1970	20.2	520	3.8	2002	1.6	501	0.2	2018	2.4	501	0.2	2018	2.4	500	0.1	1980	0.5
43	B	JCT ROUTE 2300 (WY 450)	72.393	WY 59	Campbell	2270	380	3920	620	4560	930	3630	20.4	950	2.1	3662	0.9	931	0.1	3678	1.3	931	0.1	3678	1.3	930	0.0	3640	0.3
43	B	JCT ROUTE 42 (RENO JCT, WY 387)	75.064	WY 59	Campbell	2530	460	3930	750	4100	820	3280	20.0	840	2.4	3312	1.0	821	0.1	3328	1.4	821	0.1	3328	1.4	820	0.0	3290	0.3
43	B	JCT COUNTY ROAD 16 EAST TO LAWVER	81.4	WY 59	Campbell	2450	470	4750	760	4920	830	4090	16.9	850	2.4	4122	0.8	831	0.1	4138	1.2	831	0.1	4138	1.2	830	0.0	4100	0.2
43	B	JCT COUNTY ROAD 44 EAST	93.42	WY 59	Campbell	2800	480	4840	720	5010	790	4220	15.8	810	2.5	4252	0.8	791	0.1	4268	1.1	791	0.1	4268	1.1	790	0.0	4230	0.2
43	B	JCT COUNTY ROAD 12 EAST	102.37	WY 59	Campbell	3940	550	5830	660	6170	730	5440	11.8	750	2.7	5472	0.6	731	0.2	5488	0.9	731	0.2	5488	0.9	730	0.0	5450	0.2
43	B	JCT COUNTY ROAD SOUTHEAST	106.097	WY 59	Campbell	4440	720	6910	680	7260	750	6510	10.3	770	2.6	6542	0.5	751	0.1	6558	0.7	751	0.1	6558	0.7	750	0.0	6520	0.2
43	B	GILLETTE SOUTH URBAN LIMITS	106.86	WY 59	Campbell	4550	720	7700	690	8050	750	7300	9.3	770	2.6	7332	0.4	751	0.1	7348	0.7	751	0.1	7348	0.7	750	0.0	7310	0.1
43	B	JCT WHITETAIL STREET	106.95	WY 59	Campbell	5230	760	7880	690	8230	750	7480	9.1	770	2.6	7512	0.4	751	0.1	7528	0.6	751	0.1	7528	0.6	750	0.0	7490	0.1
43	B	JCT UNION CHAPEL ROAD	107.97	WY 59	Campbell	9600	780	15910	690	16260	750	15510	4.6	770	2.6	15542	0.2	751	0.1	15558	0.3	751	0.1	15558	0.3	750	0.0	15520	0.1
43	B	JCT SOUTHERN DRIVE	109.72	WY 59	Campbell	13700	820	15620	740	15970	760	15210	4.8	780	2.6	15242	0.2	761	0.1	15258	0.3	761	0.1	15258	0.3	760	0.0	15220	0.1
43	B	GILLETTE SOUTH CORP LIMITS	110.6	WY 59	Campbell	18120	820	20080	760	20440	780	19660	3.8	800	2.5	19692	0.2	781	0.1	19708	0.2	781	0.1	19708	0.2	780	0.0	19670	0.1
43	B	JCT LAKEWAY ROAD	111.44	WY 59	Campbell	23450	1020	32070	1000	32430	1020	31410	3.1	1040	1.9	31442	0.1	1021	0.1	31458	0.2	1021	0.1	31458	0.2	1020	0.0	31420	0.0
43	B	JCT I 90 (WY 59 INT)	112.16	WY 59	Campbell	17700	360	29170	710	29530	730	28800	2.5	750	2.7	28832	0.1	731	0.2	28848	0.2	731	0.2	28848	0.2	730	0.0	28810	0.0
43	B	RAMPS 703 & 704	112.24	WY 59	Campbell	17700	360	27170	460	27280	480	26800	1.8	500	4.0	26832	0.1	481	0.2	26848	0.2	481	0.2	26848	0.2	480	0.1	26810	0.0
43	B	HPMS SECTION CHANGE	112.78	WY 59	Campbell	17700	360	20290	460	20400	480	19920	2.4	500	4.0	19952	0.2	481	0.2	19968	0.2	481	0.2	19968	0.2	480	0.1	19930	0.1
43	B	JCT ROUTE 300 (WY 50)	114.855	WY 59	Campbell	12300	785	17800	1030	17910	1050	16860	5.9	1070	1.9	16892	0.2	1051	0.1	16908	0.3	1051	0.1	16908	0.3	1050	0.0	16870	0.1
43	B	GILLETTE NORTH CORP LIMITS	115.412	WY 59	Campbell	7450	485	9810	1150	9810	1170	8640	11.9	1190	1.7	8672	0.4	1171	0.1	8688	0.6	1171	0.1	8688	0.6	1170	0.0	8650	0.1
43	B	JCT HANNUM ROAD	117.653	WY 59	Campbell	4100	325	4250	490	4250	510	3740	12.0	530	3.8	3772	0.8	511	0.2	3788	1.3	511	0.2	3788	1.3	510	0.1	3750	0.3
43	B	JCT ROUTE 302 (US 14/16) & AIRPORT RD	118.85	WY 59	Campbell	620	110	1350	150	1160	280	880	24.1	300	6.7	912	3.5	281	0.4	928	5.2	281	0.4	928	5.2	280	0.1	890	1.1
43	B	JCT LITTLE POWDER RIVER	120.44	WY 59	Campbell	1020	110	1310	240	1350	270	1080	20.0	290	6.9	1112	2.9	271	0.4	1128	4.3	271	0.4	1128	4.3	270	0.1	1090	0.9
43	B	GILLETTE NORTH URBAN LIMITS	121.8	WY 59	Campbell	1020	110	1310	240	1350	270	1080	20.0	290	6.9	1112	2.9	271	0.4	1128	4.3	271	0.4	1128	4.3	270	0.1	1090	0.9
43	B	RAILROAD SEPARATION	122.62	WY 59	Campbell	610	110	900	140	1000	200	800	20.0	220	9.1	832	3.9	201	0.6	848	5.7	201	0.6	848	5.7	200	0.1	810	1.2
43	B	JCT COUNTY ROAD 26 EAST	135.6	WY 59	Campbell	440	70	550	90	540	100	440	18.5	120	16.7	472	6.8	101	1.1	488	9.8	101	1.1	488	9.8	100	0.3	450	2.2
43	B	WESTON	143.888	WY 59	Campbell	320	65	470	80	470	90	380	19.1	110	18.2	412	7.8	91	1.2	428	13.2	91	1.2	428	13.2	90	0.3	390	2.6
43	B	JCT COUNTY RD 33 WEST TO RECLUSE	155.388	WY 59	Campbell	300	55	380	70	480	90	390	18.8	110	18.2	422	7.6	91	1.2	438	11.0	91	1.2	438	11.0	90	0.3	400	2.5

HIGHWAY 387

Route	Dir *	Section Description	Mile Route Signs: Begin** (Mile Marker)	Route	County	1997 All Vehicles	1997 Trucks	2006 All Vehicles	2006 Trucks	2007* All Vehicles	2007* Trucks	2007* All Vehicles Minus Trucks	2007* Truck Percentage	Construction Phase: Projected Volume Trucks	Construction Phase: Percent Increase Trucks	Construction Phase: Projected Volume Auto Traffic	Construction Phase: Percent Increase Auto Traffic	Operational Phase: Projected Volume Trucks	Operational Phase: Percent Increase Trucks	Operational Phase: Projected Volume Auto Traffic	Operational Phase: Percent Increase Auto Traffic	Aquifer Restoration Phase: Projected Volume Trucks	Aquifer Restoration Phase: Percent Increase Trucks	Aquifer Restoration Phase: Projected Volume Auto Traffic	Aquifer Restoration Phase: Percent Increase Auto Traffic	Decommissioning Phase: Projected Volume Trucks	Decommissioning Phase: Percent Increase Trucks	Decommissioning Phase: Projected Volume Auto Traffic	Decommissioning Phase: Percent Increase Auto Traffic
42	B	JOHNSON - CAMPBELL COUNTY LINE	118.726	WY 387	Campbell	1130	260	1600	430	1500	370	1130	24.7	390	5.1	1162	2.8	371	0.3	1178	4.1	371	0.3	1178	4.1	370	0.1	1140	0.9
42	B	JCT ROUTE 300 (WY 50 / PINETREE JCT)	131.793	WY 387	Campbell	740	190	970	280	890	220	670	24.7	240	8.3	702	4.6	221	0.5	718	6.7	221	0.5	718	6.7	220	0.1	680	1.5
42	B	JCT COUNTY ROADS NORTH & SOUTH	137.12	WY 387	Campbell	710	250	880	220	900	220	680	24.4	240	8.3	712	4.5	221	0.5	728	6.6	221	0.5	728	6.6	220	0.1	690	1.4
42	B	JCT LOCAL ROADS NORTH & SOUTH	149.24	WY 387	Campbell	1130	320	1900	410	2000	410	1590	20.5	430	4.7	1622	2.0	411	0.3	1638	2.9	411	0.3	1638	2.9	410	0.1	1600	0.6
42	B	WRIGHT	150.63	WY 387	Campbell	2140	380	3130	370	3390	480	2910	14.2	500	4.0	2942	1.1	481	0.2	2958	1.6	481	0.2	2958	1.6	480	0.1	2920	0.3
Averages:														593	4.8	6959	1.7	428	0.3	6975	2.5	574	0.3	6975	2.5	574	0.1	7471	0.6

* Dir = Travel Direction for Traffic Volume (I=Increasing Mile Markers, B=Decreasing Mile Markers)
** Begin = Mile Marker Start of Section
All vehicle counts are estimated Average 24 Hour Traffic
* Year 2007 used as base for projected traffic volumes

Construction phase traffic: Assuming a construction workforce of 10 plus 6 wellfield staff traveling one round trip per day to the site (32 auto traffic trips per day), and 10 truck round trips (20 trips) per day for equipment being hauled to the site.
Operational phase traffic: Assuming a site workforce of 24 (48 auto traffic trips per day), and 1.12 average total truck trips per day (yellowcake shipments = 100 round trips per year or 200 truck trips/year = .548 trips/day; non radioactive waste shipments = 100 round trips/year or 200 truck trips/year = 0.548 trips/day; radioactive byproduct waste shipments = 5 round trips/year or 10 trips/year = 0.027trips/day).
Aquifer restoration phase traffic: Assuming a site workforce of 24 (48 auto traffic trips per day) and maximum of 1.12 truck trips per day (using production truck traffic data).
Decommissioning phase traffic: Assuming a site workforce of 5 (10 auto traffic trips per day) and 1 truck round trip per week (2 truck trips per week= 0.285 trips/day) for equipment and waste shipments.

Truck traffic is common on State Highways 387, 59 and 50 as a result of the construction and operational activities of the oil and gas, coal and CBM industries. Average daily traffic volumes for the local highways in the project area, State Highways 50, 59 and 387, are shown in Table 7.1-2 (WYDOT, 2009). The traffic information includes data from years 1997, 2006 and 2007; additionally, projected daily truck and auto traffic volume data for the three local State Highways are also presented.

During the construction phase of the project, truck traffic will consist of a maximum of ten deliveries per day, resulting in an estimated maximum increase in truck traffic of 4.8%. The projected truck traffic increase is based on the conservative scenario of all three local State Highways being subjected to the increased traffic. Travelling from the construction site, trucks will only pass occupied residences once they reach WYO 387, which is a well-traveled road as shown in Table 7.1-2. Therefore the increase in truck traffic caused by the project is not expected to be noticeable, and the noise impact will be very minor given the location.

Additional References

http://www.fhwa.dot.gov/environment/noise/handbook/09.htm

Lost Creek ISR, LLC. 2008. Lost Creek Project, South-Central Wyoming, Environmental Report, Application for US NRC Source Material License Rev1, pg 4-47.

Thalheimer, Erich., 1999, Construction Noise Control Program and Mitigation Strategy at the Central Artery/Tunnel Project, Noise Control Engineering Journal Volume 48,

U.S. Environmental Protection Agency. 1974. Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. 550/9-74-004

U.S. Environmental Protection Agency. 1973. Impact Characterization of Noise Including Implications of Identifying and Achieving Levels of Cumulative Noise Exposure, EPA Report NTID 73.4.

Wyoming Department of Transportation, May, 2009, Highway traffic survey data provided by the Mapping Division of the WYDOT Planning Department.

CULTURAL AND HISTORIC

Question 3.8 Number 1

RAI Question:

Information on missing pages from page 21 to the end of Appendix B; it appears that the section continues beyond page 21. If this section of Appendix B does not contain descriptions of the previously reported sites, please provide these descriptions as well.

Answer:

EMC has provided NRC with a revised Appendix B to include the missing page.

Proposed Revisions to License Application:

A revised Appendix B was provided to NRC in March 2009.

Question 3.8 Number 2

RAI Question:

Confirmation in the form of field maps, field notes, or identification of report sections, that a cultural resources assessment was completed for the access roads proposed for use during construction and for the permanent routes that will be used to access the facilities.

Answer:

Two additional maps have been generated to supplement the original Figure 1 of the Frontier Archeology Class III survey report. The maps (east half and west half of the Moore Ranch Project area) confirm that all of the License boundary area where development activities are planned were covered by the Frontier Archaeology survey (2007) or previous surveys of the area. All development activities (including access roads both permanent and during construction) will be located with in Sections 34 and 35, T42N and R75W. The revised maps depict that all of Sections 34 and 35 have been covered by a Class III inventory. Over a span of 25 years, seven different archaeological contractors and the Office of the Wyoming State Archaeologist have conducted inventories, during seven different years, throughout the project area. The attached table lists inventories completed, the company the inventory was performed for, the consultant or agency that performed the inventory, the year the inventory was completed, and the Section, Township and Range in which the inventory was located.

Proposed Revisions to License Application:

Two additional Figures depicting the east half and west half of the Moore Ranch Project area are provided to supplement the information contained in Appendix B of the Environmental Report. Please note that these figures are confidential information submitted under 10 CFR 2.390.

Question 3.8 Number 3

RAI Question:

A map that shows all previously surveyed land blocks and the locations of all sites and isolated finds. The survey maps presented in Appendix B on pages 6 and 7 are not adequate, as they only display those areas surveyed in the 2007 study.

Answer:

Two additional maps have been generated to supplement the original Figure 1 of the Frontier Archeology Class III survey report. The maps (east half and west half of the Moore Ranch Project area) confirm that all of the License boundary area where development activities are planned were covered by the Frontier Archaeology survey (2007) or previous surveys of the area.

Proposed Revisions to License Application:

Two additional Figures depicting the east half and west half of the Moore Ranch Project area are provided to supplement the information contained in Appendix B of the Environmental Report. Please note that these figures are confidential information submitted under 10 CFR 2.390.

Section 3.8 Number 4

RAI Question:

Complete descriptions of all structures present within the boundaries of Site 48CA146. Also, the results of any visual assessment completed for these buildings (if present) relative to the facilities proposed for the project

Answer:

Site 48CA146 fell outside the inventory area and EMC did not ask Frontier to revisit the site when it conducted its fieldwork. As such the site was treated in the Background Research section of the report and only to the degree required by the Standards for Class III reports. The Standards do not require that previously recorded sites be described at this level of detail.

The site was evaluated as non-eligible by the Buffalo Field Office of the Bureau of Land Management on August 2, 2007. The Wyoming SHPO concurred with this evaluation on August 16, 2007. No visual assessment of the site was conducted because the site has been evaluated as non-significant and therefore cannot be adversely affected by actions associated with the development of the mine. Because the site cannot be adversely affected by this action there is no need to describe the structures present at this site at the level of detail as requested by the reviewer.

Proposed Revisions to License Application

No changes to Environmental Report are required as a result of this question.

Section 3.8 Number 5

RAI Question:

Complete descriptions of all structures within the boundaries of Site 48CA3400. Also, the results of any visual assessment completed for these buildings (if present) relative to the facilities proposed for the project

Answer:

Site 48CA3400 fell outside the inventory area and EMC did not ask Frontier to revisit the site when it conducted its fieldwork. As such the site was treated in the Background Research section of the report and only to the degree required by the Standards for Class III reports. The Standards to not require that previously recorded sites be described at this level of detail.

The site was evaluated as non-eligible by the Buffalo Field Office of the Bureau of Land Management on August 2, 2007. The Wyoming SHPO concurred with this evaluation on August 16, 2007. No visual assessment of the site was conducted because the site has been evaluated as non-significant and therefore cannot be adversely affected by actions associated with the development of the mine. Because the site cannot be adversely affected by this action there is no need to describe the structures present at this site at the level of detail as requested by the reviewer.

Proposed Revisions to License Application

No changes to Environmental Report are required as a result of this question.

Section 3.8 Number 6

RAI Question:

Complete descriptions of all structures within the boundaries of Site 48CA6173. Also, the results of any visual assessments completed for these buildings (if present), relative to the facilities proposed for the project

Answer:

Site 48CA6173 fell outside the inventory area and EMC did not ask Frontier to revisit the site when it conducted its fieldwork. As such, the site was treated in the Background Research section of the report and only to the degree required by the Standards for Class III reports. The Standards to not require that previously recorded sites be described at this level of detail.

The site was evaluated as non-eligible by the Buffalo Field Office of the Bureau of Land Management on August 2, 2007. The Wyoming SHPO concurred with this evaluation on August 16, 2007. No visual assessment of the site was conducted because the site has been evaluated as non-significant and therefore cannot be adversely affected by actions associated with the development of the mine. Because the site cannot be adversely affected by this action there is no need to describe the structures present at this site at the level of detail as requested by the reviewer.

Proposed Revisions to License Application

No changes to Environmental Report are required as a result of this question.

Section 3.8 Number 7

RAI Question:

A discussion of why 60 acres located in Sections 26 and 27, T42N, R75W were omitted in the archaeological survey report. Information is needed for this tract of land

Answer:

The sixty acres was not inventoried because these six, 10 acre blocks and their associated infrastructure corridors were inventoried in 1999 by Arcadis in connection with Devon Energy's Pine Tree Iberlin wells Coal Bed Methane POD. The Arcadis inventory is considered valid by the Buffalo Field Office of the Bureau of Land Management, (the federal agency responsible for managing non-Forest Service split estate lands in the Powder River Basin) so it wasn't necessary to re-inventory these areas.

Proposed Revisions to License Application

No changes to Environmental Report are required as a result of this question.

Section 3.8 Number 8

RAI Question:

How the archaeological and historical resources were identified within and near the proposed license area, and subsequently marked and protected

Answer:

Properties were identified by walking systematic transects spaced no more than 30 meters apart. As required by the standard permit conditions, a property's datum is marked using a large nail, bridge spike or metal stake with an attached metal tag inscribed with the date, temporary site number and recorder's initials. The datum is to be covered with a white PVC pipe to prevent animal damage to the tag and increase the visibility of the datum.

Only one site, 48CA965, falls within the current area of potential affect. Apparently, neither the Bureau of Land Management nor the Wyoming State Office of Historic reviewed the report so there was no concurrence by these parties with the recorder's (Wyoming Office of the State Archaeologist) evaluation of the site's ineligibility for listing on the National Register of Historic Places (NRHP). EMC is asking that the Nuclear Regulatory Commission request a review of the Class III report by the Wyoming State Office of Historic Preservation so that a final determination of the site's significance can be made. This will allow all of the interested parties to determine whether or not site 48CA965 will be adversely affected by this undertaking.

Neither of the two sites (48CA6694 and 48CA6696) that Frontier thought might be eligible for listing on the NRHP is in the area of potential effect as currently proposed by EMC. As a result, neither Frontier nor EMC has made any effort to protect these properties. Frontier recommended additional testing to make a final determination of the status of these sites with regard the NRHP and it would seem premature to protect these properties until testing has been conducted and a final determination of their eligibility has been made by the Wyoming State Office of Historic Preservation.

Proposed Revisions to License Application

3.8.1 Historic, Archeological, and Cultural Resources

Beginning in September of 2006 through July 20, 2007, Mr. James A Brunette, dba Frontier Archaeology, conducted a Class III Cultural Resource Inventory of the Moore Ranch Project License area including record searches from the Wyoming State Historic Preservation Office (WSHPO) and field surveys of areas that have not been previously inventoried. Standard pedestrian transects were used to conduct the Class III inventory.

Subsurface tests were not conducted in association with this project. Fieldwork conditions were favorable, with no snow cover, sunny to partly cloudy skies, temperatures ranging from the 40's to the upper 90's, and variable winds. Field notes and other data are on file at the Frontier Archaeology office at 3630 West 46th Street, Casper, Wyoming.

Properties were identified by walking systematic transects spaced no more than 30 meters apart. As required by the standard permit conditions, a property's datum is marked using a large nail, bridge spike or metal stake with an attached metal tag inscribed with the date, temporary site number and recorder's initials. The datum is to be covered with a white PVC pipe to prevent animal damage to the tag and increase the visibility of the datum.

The Class II Cultural Resource Inventory investigations found seven sites, 48CA6691-48CA6697, and 25 Isolate Resources/Artifacts, including artifacts from the Paleo-Indian, Middle Archaic, Late Archaic and Historic periods. Two sites, 48CA6694 and 48CA6696, are considered eligible for nomination to the National Register of Historic Places (NRHP). All sites and artifacts are described in detail in the Class III Inventory Report in Appendix B. Six previously recorded sites were also revisited during this investigation. None of the previously recorded sites have been affected by CBM development or exploratory drilling activities associated with uranium development. Only two sites, 48CA965 and 48CA966, which are listed as not eligible for nomination to the NRHP, are at or near any current development areas (near the monitor well ring). One site, 48CA965, falls close to the current area of potential affect. Apparently, neither the Bureau of Land Management nor the Wyoming State Office of Historic reviewed the report so there was no concurrence by these parties with the recorder's (Wyoming Office of the State Archaeologist) evaluation of the site's ineligibility for listing on the National Register of Historic Places (NRHP). EMC is asking that the Nuclear Regulatory Commission request a review of the Class III report by the Wyoming State Office of Historic Preservation so that a final determination of the site's significance can be made. This will allow all of the interested parties to determine whether or not site 48CA965 will be adversely affected by this undertaking. No sites are located within planned wellfield areas (see report in Appendix B).

None of the sites eligible for nomination are located within areas currently planned for in situ development, and in fact, are located well over a mile away from any planned development. If exploration and development plans are subsequently expanded near those areas, then all associated ground-disturbing activities will avoid impacting sites 48CA6694 and 48CA6696. If avoidance is not feasible, then a testing/data recovery plan will need to be implemented and completed prior to commencement of any ground disturbing activities to mitigate the adverse affects to the eligible sites.

As concluded in the Class III Cultural Resource Inventory Report in Appendix B, the currently proposed Moore Ranch Project will not affect any known significant cultural resources and additional archaeological work is not considered necessary.

The Class III Cultural Resource Inventory in Appendix B contains information that falls under the confidentiality requirement for archeological resources under the National Historic Preservation Act, Section 304 (16 U.S.C. 470w-3(a)). The report, including Wyoming Cultural Resource Forms, has also been submitted to WSHPO for concurrence and the WDEQ-LQD under a separate cover from Frontier Archaeology. The Wyoming Cultural Resource Forms are not included in Appendix B since these forms were not provided to the client due to disclosure restrictions in the NHPA Section 304. Accordingly, disclosure is specifically exempted by statute as specified in 10 CFR §2.390(a)(3). Therefore, EMC requests that all applicable portions of Appendix B remain "CONFIDENTIAL" for the purpose of Public Disclosure of this application. Each page of the protected cultural resource information has been marked as follows:

Confidential Information Submitted under 10 CFR 2.390

The cover page for Appendix B has been marked with a more detailed statement, as follows:

Confidential Information Submitted under 10 CFR 2.390
Disclosure is Limited Under the National Historic Preservation Act, Section 304 (16 U.S.C. 470w-3(a)).