DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION

Permit Application Analysis
AP-12198

July 21, 2011

NAME OF FIRM:	Strata Energy, Inc.
NAME OF FACILITY:	Ross ISR Project
FACILITY LOCATION:	Uranium Mining Area Sections7, 17, 18, and 19 of T53N, R67W and Sections 12, 13, and 24 of T53N, R68W Crook County, Wyoming Processing Plant Location NE1/4SE1/4 Section 18 of T53N, R67W Crook County, Wyoming
TYPE OF OPERATION:	In-situ Recovery Uranium Mine and Processing
RESPONSIBLE OFFICIAL:	Anthony J. Simpson, Chief Operating Officer
MAILING ADDRESS:	P.O. Box 2318 Gillette, WY 82717
TELEPHONE NUMBER:	(307) 686-4066
REVIEWING ENGINEER:	Andrew Keyfauver, NSR Permit Engineer

1.0 PURPOSE OF APPLICATION

Strata Energy, Incorporated submitted an application to construct the Ross ISR Project, which will utilize the in-situ recovery method to extract uranium and produce up to a maximum of three (3) million pounds per year of yellowcake (U_3O_8).

Attached in Appendix A is a map showing the location and extent of the proposed in-situ uranium recovery area. This map is also contained in the permit application as Figure A-3.1.

2.0 PROCESS DESCRIPTION

Well field

The Ross ISR process begins when the groundwater is pumped from the extraction/production wells and through the uranium extraction plant. After the groundwater is circulated through the plant, oxygen is added to the water. Additional chemicals that may be added prior to injection include carbon dioxide to adjust pH and provide a carbonate source, sodium bicarbonate to provide a carbonate source, and chlorine

to eliminate bacteria. This "fortified" water is injected into the ore through injection wells. As the water passes through the porous sandstone, it oxidizes and solubilizes the uranium. This water is pulled to the extraction wells and pumped to the surface plant for uranium removal. The cycle is repeated until the uranium in the sandstone is depleted.

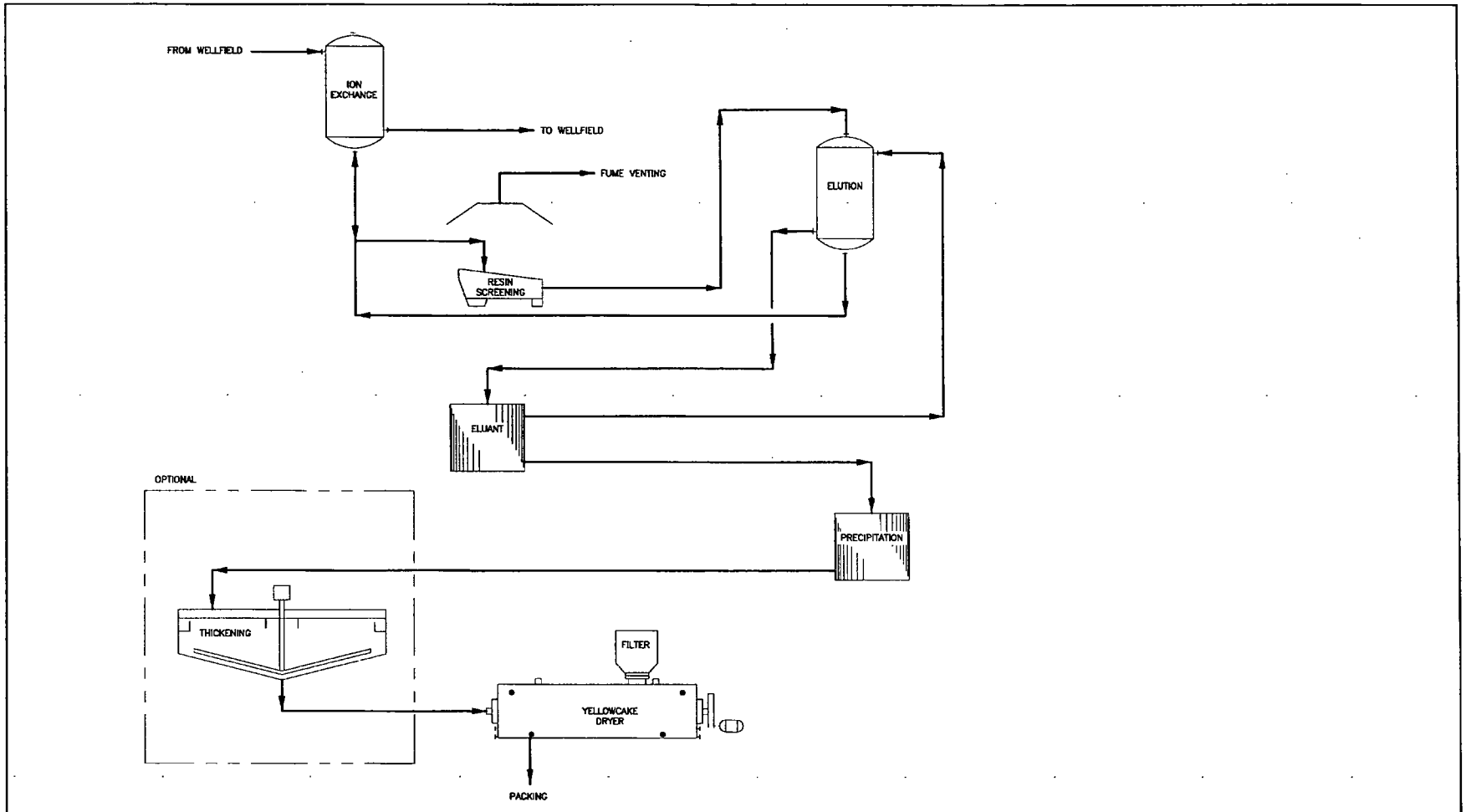
Processing Plant

The processing plant uses pressurized down flow ion exchange columns to remove uranyl dicarbonate or uranyl tricarbonate from the groundwater. Once the resin becomes loaded, the column(s) is isolated from the process flow and the resin is transferred via piping to a separate vessel for elution. In the elution circuit, the loaded resin will be passed over vibrating screens to remove entrained sand particles and other fines. The resin will then be moved into down-flow elution vessels for uranium recovery and regeneration. In the elution vessel the resin is contacted with a salt and sodium carbonate solution to remove the uranium. The resin is then transferred back to an ion exchange column for reuse. The uranium rich solution is then sent to a tank for batch precipitation. To initiate the precipitation cycle, hydrochloric or sulfuric acid is added to the solution. Caustic soda or ammonia is added to the solution to regulate pH and hydrogen peroxide is added to effect precipitation of uranyl peroxide. A yellowcake thickener system (optional as proposed) is utilized to remove impurities in the precipitate. The underflow from the first yellowcake thickener is fed to a re-dissolve tank, where solids are contacted with sulfuric acid. The uranium precipitate slurry is then re-precipitated in a series of tanks. This slurry is then pumped from the last precipitation tank to a second yellowcake thickener, where most of the solution is separated from the uranium oxide solids. After precipitation/thickening the yellowcake is washed in a filter press to remove excess chlorides and other soluble contaminates. The filter cake is then slurred with clean water and transferred to the yellowcake vacuum dryer. After drying the yellowcake is packaged into 55-gallon drums for storage before transport to a conversion facility. Figure 2-1 is a simplified block flow diagram of the Ross ISR Processing Plant. This figure is also contained in the application as Figure A-3.5.

3.0 ESTIMATED EMISSIONS

Emissions sources from the Ross ISR Project consist of fugitive dust from vehicular traffic, acid tank loading, tank loading of salt and soda ash, emergency generator (400 hp), along with the dryer heater and space heater. Estimated emissions from the facility are shown in Table 3-1, and the methodology for emission estimation is described in Section 3.1 of this analysis.

Figure 2-1: Process Flow Diagram



DRAWING NO.	REFERENCE DRAWING TITLE	NO	REVISIONS	BY	APP	DATE
		J	ISSUED FOR FINAL COMMENTS	OC	RH	13/07/11
		I	ISSUED FOR REVIEW	OC	RH	11/07/11

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STRATA ENERGY

LYNTEK INCORPORATED

ROSS ISR PROJECT
PLANT DESIGN
AIR QUALITY PERMIT
APPLICATION FIGURE A-3.5

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SCALE: (D) NTS

Table 3-1: Ross ISR Project Estimated Potential to Emit (tpy)						
Source	NO_x	CO	PM_{10}	SO_2	VOC	HCl/H_2SO_4
400 hp Emergency Generator [1]	0.7	0.6	<0.1	<0.1	<0.1	--
Vacuum Dryer Heater	0.4	0.2	<0.1	<0.1	<0.1	--
Space Heater [2]	0.2	0.1	<0.1	<0.1	<0.1	--
HCl Acid Tank	--	--	--	--	--	<0.1
H_2SO_4 Acid Tank	--	--	--	--	--	<0.1
Other Storage Tanks	--	--	--	--	0.6	--
Salt/Sodium Carbonate and Bicarbonate Tanks (dry)	--	--	<0.1	--	--	--
Fugitives (vehicle traffic)	--	--	82.0 [3]	--	--	--
Facility Total	**1.3**	**0.9**	**82.0**	**<0.1**	**0.6**	**<0.1**

[1] Based on 500 hours of operation per calendar year.
[2] Based on 4360 hours of operation per calendar year.
[3] Based on onsite fugitives of 14.3 tpy of PM_{10} and offsite (haul road) fugitive emissions of 67.7 tpy during normal (routine) operation.
Note: Strata Energy, Inc. provided emissions during the construction phase of the facility; however, these emissions are considered secondary emissions and are not counted toward the potential to emit as defined under the WAQSR.

3.1 Emission Estimation Methodology

3.1.1 Emergency Generator

The proposed diesel fired backup generator engine is proposed to be EPA Tier 3 certified. Emissions for the generator engine are shown in the following tables.

Table 3-2: Generator Emission Factors (g/hp-hr)					
Source	NO_x	CO	PM	SO_2 [1]	VOC
400 hp Tier 3 engine	3.0	2.6	0.15	0.166	0.142

[1] There are no emission factors for SO_2 under the EPA Tier 1-3 Nonroad Diesel Engine Emission Standards, the factor was determined from AP-42 Table 3.3-1–*Emission Factors for Uncontrolled Gasoline and Diesel Industrial Engines.*

Table 3-3: Generator Emissions										
Source	NO_x		CO		PM		SO_2		VOC	
	lb/hr	tpy [1]	lb/hr	tpy [1]	lb/hr	tpy [1]	lb/hr	tpy [1]	lb/hr	tpy [1]
400 hp Tier 3 Engine	2.6	0.7	2.3	0.6	0.1	<0.1	0.1	<0.1	0.1	<0.1

[1] Based on 500 hours of operation per year.

3.1.2 Heaters

Emissions from the vacuum dryer heater and space heater were estimated using EPA document, AP-42, Compilation of Emission Factors. Emission factors and emissions for the heaters are shown in Tables 3-4 and 3-5.

Source	Table 3-4: Heater Emission Factors (lb/MMBtu)						
	Size (MMBtu/hr)	Operating Hours	NO_x	CO	$PM_{10}/PM_{2.5}$	SO_2	VOC
Vacuum Dryer Heater	1.0	8,760	0.092	0.039	0.007	0.0005	0.005
Space Heater	1.2	4,380	0.092	0.039	0.007	0.0005	0.005

Source	Table 3-5: Heater Emissions									
	NO_x		CO		PM		SO_2		VOC	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Vacuum Dryer Heater	0.1	0.4	<0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
Space Heater [1]	0.1	0.2	<0.1	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

[1] Ton per year emissions based on 4380 hours of operation per calendar year.

3.1.3 Storage Tanks

Emissions from the storage tanks were estimated utilizing EPA Tanks 4.09. This program utilizes the size of tank, type of tank construction, and contents of the tank to estimate the standing/working/breathing losses from a tank. Emissions from these sources are shown in Table 3-1.

3.1.4 Salt, Sodium Carbonate, and Bicarbonate Handling (dry product)

Particulate emissions from the handling of sodium carbonate and sodium bicarbonate were based on bin vent filters with an outlet grain loading of 0.01 gr/acfm and flow rates of 180 acfm. Emissions from these sources are shown in Table 3-1.

3.1.5 Fugitive Emissions (vehicle traffic)

Strata Energy, Inc. estimated fugitive emissions from vehicular traffic using EPA document, AP-42, Compilation of Emission Factors. Strata Energy, Inc. assumed the following control thresholds on those portions of the haul road or within the facility which are controlled as follows: thirty percent (30%) control efficiency for the use of water, a sixty percent (60%) control efficiency for the use of magnesium chloride, and seventy-five (75%) control efficiency for the use of recycled asphalt. Fugitive emissions are shown in Table 3-1.

4.0 CHAPTER 6, SECTION 4 – PREVENTION OF SIGNIFICANT DETERIORATION (PSD)

A major stationary source under Chapter 6, Section 4 of the Wyoming Air Quality Standards & Regulations (WAQSR) is a named facility which emits, or has the potential to emit, one hundred (100) tons per year or more of any air pollutant or any stationary source which emits or has the potential to emit two hundred and fifty (250) tons per year or more of any pollutant for which standards are established. The Ross ISR Project is not a named source under Chapter 6, Section 4; therefore, the 250 tpy threshold is applicable to this facility. The facility does not emit 250 tpy or more of any regulated NSR pollutant; therefore, the facility is not a major stationary source as defined under Chapter 6, Section 4 of the WAQSR, and the proposed permitting action is not subject to PSD review.

5.0 CHAPTER 6, SECTION 3 – MAJOR SOURCE APPLICABILITY (TITLE V)

The Division determines major source applicability based on point sources and includes fugitive emissions from sources which are subject to new source performance standards which were in effect as of August 7, 1980. Fugitive emissions from vehicle traffic are not subject to any new source performance standard at this facility; therefore, they were not counted toward applicability.

Table 5-1: Major Source Applicability					
	NO_x	CO	PM_{10}	SO_2	VOC
Point Source Emissions	1.3	0.9	<0.1	<0.1	0.6
Totals	**1.3**	**0.9**	**<0.1**	**<0.1**	**0.6**

Since criteria pollutants at the Ross ISR Project are less than 100 tons per year, and HAP emissions are less than 10 tpy of any individual HAP or 25 tpy of any combination of HAPs the Ross ISR project is not a "major source" as defined in Chapter 6, Section 3 of the WAQSR. Therefore, Strata Energy, Inc. shall obtain an operating permit for the Ross ISR Project in accordance with Chapter 6, Section 2 of the WAQSR.

6.0 CHAPTER 6, SECTION 2 – BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

Per the requirements of Chapter 6, Section 2 of the WAQSR, all facilities must demonstrate the use of BACT. Therefore, Strata Energy, Inc. conducted a BACT analysis for the control of pollutants emitted from the facility in accordance with state requirements.

6.1 Emergency Generator

The Division considers compliance with the new source performance standard (40 CFR part 60, subpart IIII) for the emergency generator engine limited to 500 hours of operation per year as being representative of BACT for this unit.

6.2 Heaters

The Division considers good combustion with no additional controls for the proposed 1.0 MMBtu/hr vacuum dryer heater and 1.2 MMBtu/hr space heater to be representative of BACT for these gaseous fuel fired heater.

6.3 Acid Tanks

Strata Energy, Inc. has proposed to incorporate an acid fume abatement system into the acid storage and unloading system at the Ross ISR Project. The system will consist of a simple scrubber that will control acid vapors from the storage tank that is generated during off loading of acid. The system will also be part of the closed loop acid unloading system that will capture any vapors remaining in the lines after the tank truck has off loaded. The Division considers the acid fume abatement system for the acid storage tanks as representing BACT for the Ross ISR Project.

6.4 Salt, Sodium Carbonate, and Sodium Bicarbonate Handling

Sodium carbonate, sodium bicarbonate, and salt will be pneumatically conveyed from haul trucks into storage tanks. These tanks will be equipped with bin vent dust collectors with manufacturer estimates of 0.01 gr/acfm, and have flow rates of approximately 180 acfm during loading operations. The Division will consider the use of bin vents as being representative of BACT for control of particulate emissions from the loading of the sodium carbonate, sodium bicarbonate, and salt storage tanks at the Ross ISR Project.

6.5 Fugitive Emissions (vehicle traffic)

Strata Energy, Inc. has proposed to conduct the following mitigation measures to minimize fugitive emissions from vehicle traffic:

- Minimize disturbed areas by minimizing access road widths, utilizing existing county and oilfield roads where possible, and implementing a one way in/one way out policy.
- Implementing dust control Best Management Practices such as magnesium chloride on primary access roads and portions of county roads near the project or affronting residential properties.
- Implementing dust abatement Best Management Practices such as wetting disturbed areas and primary, secondary and tertiary roads as needed.
- Implementing speed limits on access roads within the proposed project area.
- Increased speed limit signage and enforcement of speed limits on county roads for Strata employees and contractors.

Specifically, Strata Energy, Inc. has proposed to apply magnesium chloride to the following road sections once per year, or more frequently if needed (a map depicting these roads is shown in Exhibit 1 in the application):

- 1.1 miles of primary access and central processing plant area roads
- 0.6 miles of the more frequently traveled wellfield access roads
- 8.4 miles of county roads that fall within or adjacent to the permit area, including D road and the New Haven Road.

In addition, Strata Energy, Inc. also has a Memorandum of Understanding (MOU) with Crook County. Under this MOU, Strata Energy, Inc. has agreed to supply dust control over 1/4 mile stretches on county roads that front residential properties and are used to access the Ross ISR Project. Strata Energy, Inc. provided copy of this MOU in the application as Appendix C.

The Division considers the fugitive dust control strategy proposed by Strata Energy, Inc. to represent BACT for minimizing particulate emissions from vehicle traffic and wind erosion for the Ross ISR project.

6.6 Radon (Radionuclides)

Strata Energy, Inc. has proposed the use of a closed-loop uranium recovery process with a downflow IX system to prevent the release of radon emissions. Minimal radon emissions are anticipated during filter changes, resin transfers, and required maintenance activities. The Division considers the use of a closed loop uranium processing system for in-situ uranium recovery to prevent the release of radon emissions as being representative of BACT for this operation.

7.0 NEW SOURCE PERFORMANCE STANDARDS (NSPS)

There are currently no NSPS standards for in-situ uranium recovery operations.

Subpart IIII of 40 CFR part 60 is applicable to stationary compression ignition (CI) internal combustion engines (ICE) that commence construction after July 11, 2005, where CI ICE are manufactured after April 1, 2006 (are not fire pump engines), or manufactured after July 1, 2006 (fire pump engines). The proposed emergency diesel fired engine associated with the Ross ISR Project will be subject to 40 CFR part 60, subpart IIII.

The diesel storage tank is not subject to 40 CFR part 60, subpart Kb as the storage tank is less than 75 m^3 (≈472 bbls or 19,813 gallons) in size.

8.0 NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (NESHAPs)

EPA's current promulgated NESHAP rules under 40 CFR part 63, subpart ZZZZ apply to major sources of HAP emissions, as well as area sources of HAP emissions. Since the Ross ISR Project has the potential to emit less than 10 tpy of any individual HAP, or 25 tpy of any combination of HAPs, the facility is considered an area source of HAPs. The emergency generator engine at the Ross ISR Project will be subject to the applicable requirements for area sources under 40 CFR part 63, subpart ZZZZ.

9.0 AMBIENT AIR QUALITY

9.1 Radiological Effects

Radon is a naturally occurring, radioactive gas that is formed from the radioactive decay of uranium. The applicant estimated the dose of radiation that would accumulate from exposure to the proposed operations at the Ross ISR Project (dose commitment) using the MILDOS-AREA computer code. This code is used by the Nuclear Regulatory Commission to perform routine radiological impact and compliance evaluations for various uranium recovery operations. Only airborne releases of radioactive materials can be considered with MILDOS-AREA, which is appropriate for the Ross ISR Project because the only potential source of radioactivity from the closed-loop system would be airborne radon gas. The closed-loop system is designed to prevent the release of radon emissions.

The MILDOS-AREA code was used to calculate release rates and the dose commitments associated with Rn-222 (radon) and Rn-222 decay products (radon daughters). Details of the applicant's MILDOS-AREA modeling can be found in the permit application for the project. Table 9-1 summarizes the total amount of Rn-222 emissions that were estimated using MILDOS-AREA for production and restoration activities for the Ross ISR Project.

Table 9-1
Ross ISR Project
Estimated Annual Dose to Members of the Public

Modeled Location	Maximum TEDE (mrem/yr)		
	Construction Phase (3-5 years)	Operation Phase (4-8 years)	Aquifer Restoration Phase (1-2 years)
Wood Residence	0.000045	0.470	0.468
Strong Residence	0.000053	0.735	0.731
Wesley Residence	0.000070	0.779	0.775
Burch Residence	0.000013	0.090	0.089
Oshoto Field Office	0.000048	0.542	0.540
Rancher #1	0.000002	0.017	0.018
Rancher #2	0.000001	0.011	0.011
Rancher #3	0.000001	0.020	0.020
Rancher #4	0.000001	0.041	0.041
Rancher #5	0.000001	0.010	0.010
Oilfield Worker #1	0.000005	0.049	0.049
Oilfield Worker #2	0.000001	0.020	0.020
Courier	0.000001	0.049	0.049
Vendor	0.000004	0.548	0.542

Note: TEDE = Total Effective Dose Equivalent

According to 10 CFR 20.1301(a)(1), an individual member of the public should not be exposed to a total radiation dose above background of more than 100 mrem/yr (millirem/year). The maximum predicted total dose at the 14 modeled locations was less than 1.0 mrem/yr. All of the predicted dose values were well below the total dose allowed by 10 CFR 20.

10.0 PROPOSED PERMIT CONDITIONS

The Division of Air Quality proposes to issue an air quality permit to Strata Energy, Inc. for the construction of the Ross ISR Project with the following conditions:

1. That authorized representatives of the Division of Air Quality be given permission to enter and inspect any property, premise or place on or at which an air pollution source is located or is being constructed or installed for the purpose of investigating actual or potential sources of air pollution and for determining compliance or non-compliance with any rules, standards, permits or orders.

2. That all substantive commitments and descriptions set forth in the application for this permit, unless superseded by a specific condition of this permit, are incorporated herein by this reference and are enforceable as conditions of this permit.

3. That a permit to operate in accordance with Chapter 6, Section 2(a)(iii) of the WAQSR is required after a 120-day start-up period in order to operate this facility.

4. That all notifications, reports and correspondences associated with this permit shall be submitted to the Stationary Source Compliance Program Manager, Air Quality Division, 122 West 25th Street, Cheyenne, WY 82002 and a copy shall be submitted to the District Engineer, Air Quality Division, 2100 West 5th Street, Sheridan, WY 82801.

5. That written notification of the anticipated date of initial start-up, in accordance with Chapter 6, Section 2(i) of the WAQSR, is required not more than 60 days or less than 30 days prior to such date. Notification of the actual date of startup is required within 15 days after startup.

6. That the date of commencement of construction shall be reported to the Administrator within 30 days of commencement. In accordance with Chapter 6, Section 2(h) of the WAQSR, approval to construct or modify shall become invalid if construction is not commenced within 24 months after receipt of such approval or if construction is discontinued for a period of 24 months or more. The Administrator may extend the period based on satisfactory justification of the requested extension.

7. Strata Energy, Inc. shall notify the Division of the engine type installed for the emergency generator within fifteen (15) days of installation. Such notification shall be submitted on a complete Engine Installation/Removal form. The form can be downloaded from the Air Quality website http://deq.state.wy.us/aqd or obtained from the Air Quality Division.

8 The emergency generator engine shall be limited to 500 hours of operation per year. Strata Energy, Inc. shall install and maintain a non-resettable hour meter on the engine to demonstrate compliance with the hours limit in this condition. A record of hours of operation for the generator shall be maintained for a period of at least five (5) years and shall be made available to the Division upon request.

9. That for the emergency generator engine, installed under condition 7, Strata Energy, Inc. shall operate and maintain the engine, air pollution control equipment, and monitoring equipment according to good air pollution control practices at all times, including startup, shutdown, and malfunction. Records of any maintenance or corrective actions shall be kept and maintained and shall be made available to the Division upon request.

10. Strata Energy, Inc. shall maintain documentation that the emergency generator engine is Tier 3 certified.

11. Strata Energy, Inc. shall comply with the applicable requirements of 40 CFR part 60, subpart IIII for the emergency generator engine.

12. Strata Energy, Inc. shall comply with the applicable requirements of 40 CFR part 63, subpart ZZZZ for the emergency generator engine.

13. That acid emissions (HCl/H_2SO_4) from loading the acid storage tanks shall be controlled with an acid fume abatement system.

14. That the acid fume abatement system shall be maintained such that it remains a viable means of controlling acid emissions. A log of the maintenance activities and visual inspections, including addition of caustic (if necessary), shall be kept and made available to the Division upon request.

15. Radon emission control equipment, all vent lines, connections, fittings, valves, relief valves, hatches or any other appurtenance employed to contain and collect vapors, shall be maintained and operated during any time the facility is operating such that the radon emissions are controlled at all times, except for filter changes, resin transfer operations, and required maintenance activities. Records shall be maintained noting dates and durations of times during such operation when any control system or device or the associated containment and collection equipment is not functioning to control radon emissions as required by this permit.

16. That Strata Energy, Inc. shall treat the roads associated with the Ross ISR Project with water and/or chemical dust suppressants to control fugitive dust emissions, as depicted in Exhibit 1 – Fugitive Dust Control Map contained within the permit application, on a schedule such that treatment remains a viable fugitive dust control measure.

    i. Strata Energy, Inc. shall apply magnesium chloride to the following road sections once per year:

    • 1.1 miles of primary access and central processing plant area roads
    • 0.6 miles of the more frequently traveled wellfield access roads
    • 8.4 miles of county roads that fall within or adjacent to the permit area, including D road and the New Haven Road.

    These roads are depicted in Exhibit 1 of the permit application. The chemical dust suppressant shall be maintained continuously to the extent that it remains a viable control measure, which may require additional applications.

17. That Strata Energy, Inc. shall be limited to three (3) million pounds of yellowcake (U_3O_8) per year. Records of yellowcake production shall be kept and maintained and shall be made available to the Division upon request.

18. That all records as required by this permit shall be maintained for a period of at least five years from the date such records are generated and the records shall be made available to the Division upon request.

Appendix A
Ross ISR Project Area

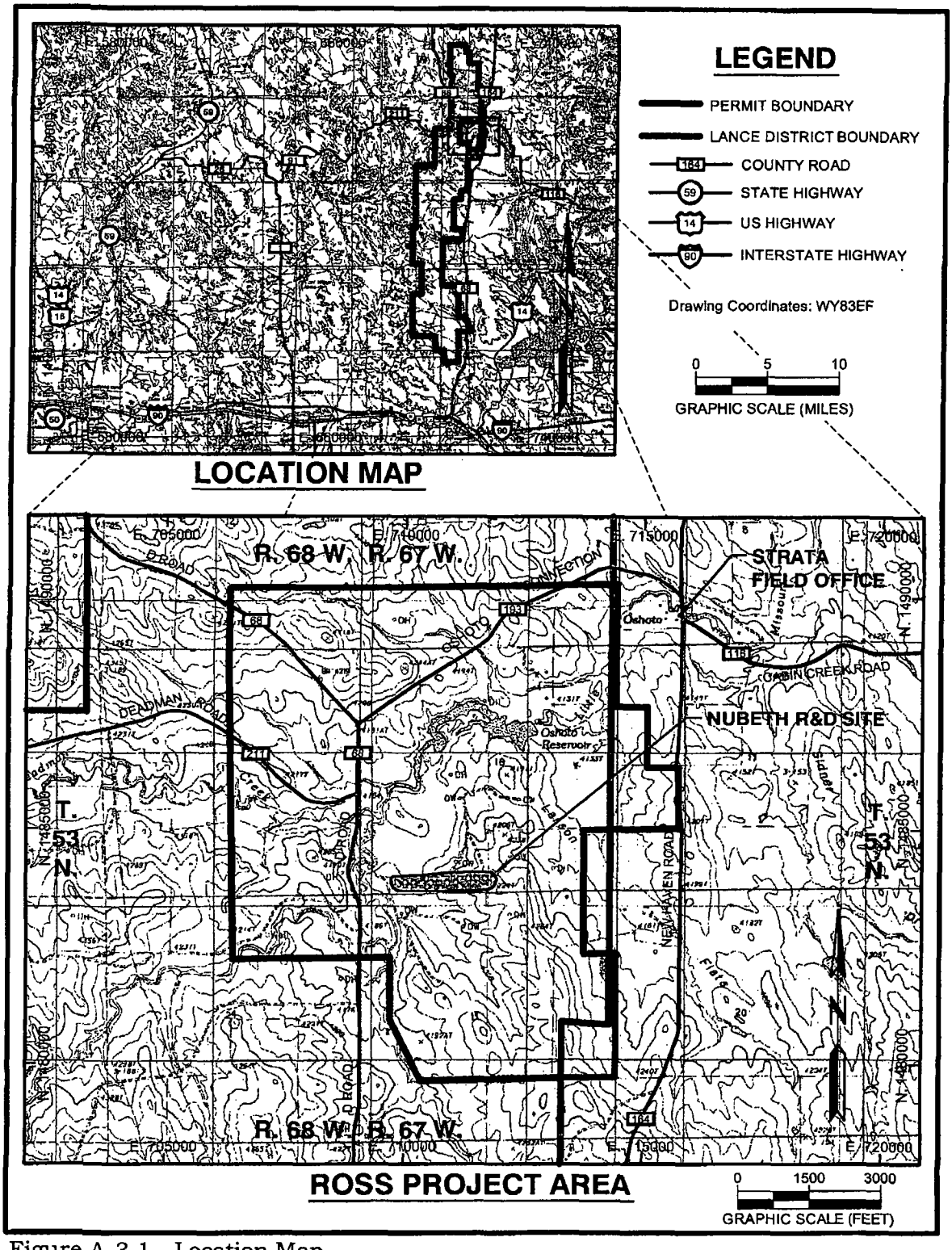

Figure A-3.1. Location Map.

(1) 9470 mi^2 (LITTLE RIVER BASIN)
9550 mi^2 USGS

(2) TABLE 2.7-1 DIFFERENCE BETWEEN MEAN ANNUAL DISCHARGE AND MEAN ANNUAL FLOW

(3) TABLE 2.7-5 Row 1, Col 1, LIST LMR @ CONFLUENCE W/ DEADMAN CREEK (J3)
BUT J3 IS @ CONFLUENCE W/ DRAW 5

(4) Addendum 3.1-A FIG 2 - Contour line is mislabeled

(5) FIGURE 2.7-3 Boundary between Sub basins B11 + B6

6 HEC-HMS
- BASIN Properties
- Stage Volume for Oshoto
- Elevation of Oshoto Res during 100-year Flood

7 Irrigation