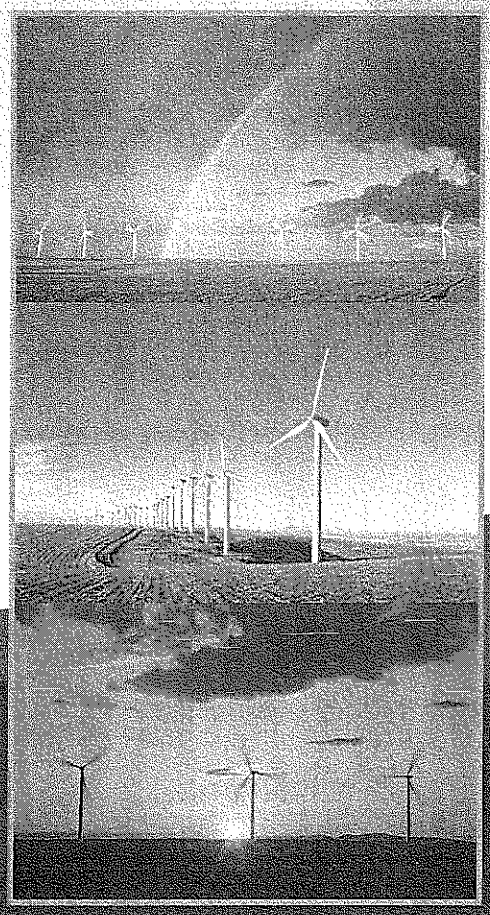
Site Certificate Application for the

Biglow Canyon Wind Farm

Sherman County, Oregon



Submitted to the
Oregon Energy Facility Siting Council

Orion Energy LLC

ORION ENERGY LLC

CH2MHILL

WEST, Inc.

October 2005

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EXHIBIT A

APPLICANT INFORMATION

OAR 345-021-0010(1)(a)

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ATTACHMENTS

A.1 NAME AND ADDRESS OF APPLICANT AND CONTACT PERSON

OAR 345-021-0010(1)(a)(A) *The name and address of the applicant including all co-owners of the proposed facility, the name, mailing address and telephone number of the contact person for the application, and if there is a contact person other than the applicant, the name, title, mailing address and telephone number of that person;*

Response:

The Applicant filing this Site Certificate Application is Orion Sherman County Wind Farm LLC (Applicant), a wholly owned subsidiary of Orion Energy LLC (Orion).

Orion is privately held, and its sole business is the development, financing, construction, and operation of large-scale wind power facilities.

The address of the Applicant is:

Orion Sherman County Wind Farm LLC
1611 Telegraph Avenue, Suite 1515
Oakland, CA 94612
Tel: (510) 267-8988
Fax: (510) 267-0325

The contact person for this application is:

Carlos V. Pineda
Orion Energy LLC
1611 Telegraph Avenue, Suite 1515
Oakland, CA 94612
Tel: (510) 267-8989, 0320
Fax: (510) 267-0325

Contact persons other than the Applicant are:

Mike Pappalardo
CH2M HILL
2300 NW Walnut Boulevard
Corvallis, OR 97330-3538
Tel: (541) 768-3724
Fax: (541) 752-0276

Peter Mostow
Stoel Rives LLP
900 SW Fifth Ave., Suite 2600
Portland, OR 97204-1268
Tel: (503) 294-9338
Fax: (503) 220-2480

A.2 PARTICIPANT INFORMATION

OAR 345-021-0010(1)(a)(B) *The contact name, address and telephone number of all participating persons, other than individuals, including but not limited to any parent corporation of the applicant, persons upon whom the applicant will rely for third-party permits or approvals related to the facility, and, if known, other persons upon whom the applicant will rely in meeting any facility standard adopted by the Council.*

Response:

The only participating person at this time is the parent entity of the Applicant, Orion Energy LLC. The contact name, address, and telephone number for Orion are:

James J. Eisen
Orion Energy LLC
1611 Telegraph Avenue, Suite 1515
Oakland, CA 94612
Tel: (510) 267-0320
Fax: (510) 267-0325

A.3 CORPORATE INFORMATION

OAR 345-021-0010(1)(a)(C) *If the applicant is a corporation, it shall give: (i) The full name, official designation, mailing address, and telephone number of the officer responsible for submitting the application; (ii) The date and place of its incorporation; (iii) A copy of its articles of incorporation and its authorization for submitting the application; and (iv) In the case of a corporation not incorporated in Oregon, the name and address of the resident attorney-in-fact in this state and proof of registration to do business in Oregon.*

(i) The full name, official designation, mailing address and telephone number of the officer responsible for submitting the application;

Response:

The full name, title, mailing address, and telephone number of the officer responsible for submitting this application are:

James J. Eisen
Vice President
Orion Energy LLC
1611 Telegraph Avenue, Suite 1515
Oakland, CA 94612
Tel: (510) 267-0320
Fax: (510) 267-0325

(ii) The date and place of its incorporation;

Response: The Applicant was formed on February 26, 2004, as a limited liability company under the laws of the state of Delaware.

(iii) A copy of its articles of incorporation and its authorization for submitting the application; and

Response: The Applicant's certificate of formation and authorization for submitting this application are included as Attachment A-1 and Attachment A-2 to this exhibit, respectively.

(iv) In the case of a corporation not incorporated in Oregon, the name and address of the resident attorney-in-fact in this state and proof of registration to do business in Oregon.

Response:

The resident attorney-in-fact for this application is:

Peter Mostow
Stoel Rives LLP
900 SW Fifth Ave., Suite 2600
Portland, OR 97204-1268
Tel: (503) 294-9338
Fax: (503) 220-2480

Proof of registration for the Applicant to do business in Oregon is included as Attachment A-3 to this exhibit.

A.4 PARENT COMPANY INFORMATION

OAR 345-021-0010(1)(a)(D) *If the applicant is a wholly owned subsidiary of a company, corporation, or other business entity, in addition to the information required by paragraph (C), it shall give the full name and business address of each of the applicant's full or partial owners.*

Response:

The full name and address of Orion, the Applicant's parent entity, is:

Orion Energy LLC
1611 Telegraph Avenue
Suite 1515
Oakland, CA 94612
Tel: (510) 267-8988
Fax: (510) 267-0325

A.5 MISCELLANEOUS INFORMATION

OAR 345-021-0010(1)(a)(E) *If the applicant is an association of citizens, a joint venture or a partnership, it shall give: (i) the full name, official designation, mailing address and telephone number of the person responsible for submitting the application; (ii) the name, business address and telephone number of each person participating in the association, joint venture or partnership and the percentage interest held by each; (iii) proof of registration to do business in Oregon; (iv) a copy of its articles of association, joint venture agreement or partnership agreement and a list of*

its members and their cities of residence; and (v) if there are no articles of association, joint venture agreement or partnership agreement, the applicant shall state that fact over the signature of each member.

Response: Not applicable.

OAR 345-021-0010(1)(a)(F) *If the applicant is a public or governmental entity, it shall give: (i) the full name, official designation, mailing address and telephone number of the person responsible for submitting the application; and (ii) written authorization from the entity's governing body to submit an application.*

Response: Not applicable.

OAR 345-021-0010(1)(a)(G) *If the applicant is an individual, the individual shall give his or her mailing address and telephone number.*

Response: Not applicable.

ATTACHMENT A-1

Certificate of Formation and Certificate of Amendment

Delaware

The First State

I, HARRIET SMITH WINDSOR, SECRETARY OF STATE OF THE STATE OF DELAWARE, DO HEREBY CERTIFY THE ATTACHED IS A TRUE AND CORRECT COPY OF THE CERTIFICATE OF FORMATION OF "ORION SHERMAN COUNTY WIND FARM LLC", FILED IN THIS OFFICE ON THE TWENTY-SIXTH DAY OF FEBRUARY, A.D. 2004, AT 11:52 O'CLOCK A.M.

Harriet Smith Windsor

Harriet Smith Windsor, Secretary of State

3769725 8100

040140258

AUTHENTICATION: 2956493

DATE: 02-27-04

PDX/052780019.PDF

State of Delaware
Secretary of State
Division of Corporations
Delivered 12:12 PM 02/26/2004
FILED 11:52 AM 02/26/2004
SRV 040140258 - 3769725 FILE

CERTIFICATE OF FORMATION
OF
LIMITED LIABILITY COMPANY

FIRST. The name of the limited liability company is ORION SHERMAN COUNTY WIND FARM LLC.

SECOND. The address of its registered office in the State of Delaware is 2711 Centerville Road, Suite 400, Wilmington, Delaware 19808. The name of its Registered Agent at such address is Corporation Service Company.

IN WITNESS WHEREOF, the undersigned have executed this Certificate of Formation of ORION SHERMAN COUNTY WIND FARM LLC this 26th day of February, 2004.

BY: Mary Ann Brzoska
Mary Ann Brzoska
Authorized Person

ATTACHMENT A-2

Unanimous Consent Authorizing Orion Energy LLC to Submit Application

ORION SHERMAN COUNTY WIND FARM LLC

WRITTEN CONSENT OF MANAGER

The undersigned Orion Energy L.L.C., a California limited liability company, being the manager (the "Manager") of Orion Sherman County Wind Farm LLC, a Delaware limited liability company (the "Company"), does hereby adopt, by written consent, the following resolution:

NOW, THEREFORE, BE IT RESOLVED, that each of the officers of the Company listed below (the "Officers") is hereby authorized to prepare, complete, sign, file and submit one or more Notices of Intent and/or Applications for Site Certificate in the name or on behalf of the Company with the Oregon Department of Energy or other governmental authority(ies), on any form approved by the Oregon Department of Energy or other governmental authority(ies), for the development, design, finance, construction, implementation, installation, operation, and/or maintenance of one or more wind energy projects in the State of Oregon, at such locations as any of the Officers may deem appropriate.

Michael Haas	President
Reid M. Buckley	Vice President
James J. Eisen	Vice President

IN WITNESS WHEREOF, the undersigned Manager has adopted this consent resolution effective as of July 20, 2005.

Manager:

ORION ENERGY L.L.C.

By _____
JAMES J. EISEN, VICE PRESIDENT

ATTACHMENT A-3

Proof of Registration to do Business in Oregon

Phone: (503) 986-2200
Fax: (503) 378-4381

Application for Authority to Transact—Foreign Limited Liability Company

Secretary of State
Corporation Division
255 Capitol St. NE, Suite 151
Salem, OR 97310-1327
FilingInOregon.com

REGISTRY NUMBER: _____

In accordance with Oregon Revised Statute 192.410-192.490, the information on this application is public record. We must release this information to all parties upon request and it will be posted on our website. For office use only

Please Type or Print Legibly in Black Ink. Attach Additional Sheet if Necessary

1) NAME Orion Sherman County Wind Farm LLC

NOTE: (Must contain the words "Limited Liability Company" or the abbreviations "LLC" or "L.L.C.") Must be identical to the name on the Certificate of Existence. See #3.

2) STATE OR COUNTRY OF ORGANIZATION
Delaware

Date of Organization: _____

3) CERTIFICATE OF EXISTENCE
☑ An original certificate of existence, current within 60 days of delivery to this Division, authenticated by the official having custody of the organization, is attached.

4) DURATION (Please check one.)
☐ Latest date upon which the Limited Liability Company is to dissolve is _____

☑ Duration shall be perpetual.

5) THIS FOREIGN LIMITED LIABILITY COMPANY SATISFIES THE REQUIREMENTS OF ORS 63.714(3).

6) NAME OF OREGON REGISTERED AGENT
CSC

7) ADDRESS OF OREGON REGISTERED AGENT (Must be an OREGON Street Address, which is identical to the registered agent's business office.)
285 Liberty St. Suite 370
Salem, Oregon 97301

8) ADDRESS OF PRINCIPAL OFFICE OF THE BUSINESS
1611 Telegraph Ave. Ste. 1515
Oakland, CA 94612

9) ADDRESS WHERE THE DIVISION MAY MAIL NOTICES
C/O Orion Energy LLC
1611 Telegraph Ave. Ste 1515
Oakland, CA 94612

10) IF THIS LIMITED LIABILITY COMPANY IS NOT MEMBER MANAGED, CHECK ONE BOX BELOW.
☐ This limited liability company is managed by a single manager.
☐ This limited liability company is managed by multiple manager(s).

11) EXECUTION (At least one member or manager must sign.)

Signature	Printed Name	Title
[signature]	James J. Eison	Vice President of Member

12) CONTACT NAME (To resolve questions with this filing.)
Laurie Mazer

DAYTIME PHONE NUMBER (Include area code.)
510-267 8988

FEES

Regular Processing Fee $50 · Confirmation Copy (Optional) $5
Processing Fees are nonrefundable.
Please make check payable to "Corporation Division."
NOTE:
Fees may be paid with VISA or MasterCard. The card number and expiration date should be submitted on a separate sheet for your protection.

157 (Rev. 1/04)

EXHIBIT B

GENERAL INFORMATION ABOUT THE PROPOSED FACILITY

OAR 345-021-0010(1)(b)

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TABLES

FIGURES *(located after text)*

B.1 DESCRIPTION OF THE PROPOSED FACILITY

OAR 345-021-0010(1)(b) *Information about the proposed facility, construction schedule, and temporary disturbances of the site, including:*

OAR 345-021-0010(1)(b)(A) *A description of the proposed energy facility, including as applicable:*

(i) Major components, structures, and systems, including a description of the size, type, and configuration of equipment used to generate electricity and useful thermal energy;

Response:

B.1.1 Facility Overview

The proposed Biglow Canyon Wind Farm Facility (Facility) will be located on private land in an unincorporated area of Sherman County. It will consist of up to 225 wind turbines with an aggregate nominal nameplate generating capacity of up to 450 megawatts (MW) of electricity. The Facility will be powered by wind, a clean, renewable resource. No carbon, sulfur, nitrogen, or mercury air emissions will be produced as a result of this Facility. In addition, the Facility will not consume water resources in the generation of electricity, nor will it produce waste heat or significant quantities of solid waste.

Orion began development of the Facility in 2001, and anticipates construction to begin in early 2007. Orion has signed long-term land agreements with landowners representing thousands of acres of land in Sherman County. A list of the owners of record of property within or adjacent to the proposed Facility site is contained in Exhibit F.

The Facility will be interconnected with the Bonneville Power Administration's (BPA) transmission system under one of two alternatives. One alternative involves interconnection at a new substation located in the southern section of the Facility site and construction of an overhead transmission line approximately 3 miles long. The other alternative involves interconnection at a new substation located near the center of the Facility site and construction of an overhead transmission line approximately 7 miles long.

B.1.2 Power Generation Equipment and Systems

The Facility is expected to consist primarily of the following facilities:

- Wind turbines that have an aggregate nominal nameplate generating capacity of up to 450 MW. The turbines will consist of one of the following:
  - Up to approximately 225 wind turbines, each with a nameplate capacity of approximately 1.5 MW (this Energy Facility layout is called the Minimum Turbine Layout)

- Up to approximately 150 wind turbines, each with a nameplate capacity of approximately 3.0 MW (this Energy Facility layout is called the Maximum Turbine Layout)
- Between 150 and 225 turbines, each with a nameplate capacity of approximately 1.5 MW to 3.0 MW
- An Energy Facility layout consisting of a combination of the foregoing

Wind turbines will be sited within corridors; their precise locations within each corridor will be determined by Orion Sherman County Wind Farm LLC (Applicant), based on the wind turbine model selected and the various siting criteria.

- Approximately 43 miles of newly constructed access roads and turnaround areas.
- Up to 10 permanent meteorological towers.
- A site control and data acquisition system.
- A 34.5-kilovolt (kV) power collection system linking each turbine to the next and to the Facility substation. The power collection system will be largely underground, but might be overhead in some locations.
- A Facility substation located in one of two locations. One location is in the southern section of the Facility site and would include a new 3-mile, high-voltage transmission line. The other substation location is in the center section of the Facility site and would include a new 7-mile, high-voltage transmission line.
- An operations and maintenance (O&M) facility, including shop facilities, a control room, a maintenance yard, a kitchen, an office, a washroom, and other facilities typical of this type of facility.

The following sections provide detailed information about Facility components, including the wind turbines, the O&M facility, communications equipment, access roads and laydown areas, and the electrical system.

B.1.3 Wind Turbines

A wind turbine features a nacelle mounted on a tower. The nacelle houses the generator and gearbox, and supports the rotor and blades at the hub. The turbine tower supports and provides access to the nacelle. Figure B-1 shows a typical configuration for a wind turbine and tower. The turbines are connected by power collection systems linked to an electric substation.

The generator installed in each wind turbine will have a nameplate rating from approximately 1.5 MW to approximately 3.0 MW. The Applicant is not affiliated with any wind turbine manufacturer and has not selected the wind turbine model or models that will be installed in the Facility. Table B-1 provides information about two

representative wind turbine options: the 1.5-MW General Electric (GE) wind turbine and the 3.0-MW GE wind turbine.[1]

Table B-1 Characteristics of Potential Turbines for the Biglow Canyon Wind Farm

	GE 1.5-MW Turbine or Comparable Model	GE 3.0-MW Turbine or Comparable Model
Tower Type	Tubular	Tubular
Tower Height (meters)	up to 80	up to approx. 85
Rotor Diameter (meters)	up to 82.5	up to approx. 100

Wind turbines will be sited within corridors approximately 500 feet wide (such corridors are called *turbine corridors*). The preliminary locations of the turbine corridors are illustrated in Figure C-2 (in Exhibit C). The number of turbines in each corridor, the spacing between turbines, and their precise locations within the corridor will be determined prior to construction by the Applicant, based on the wind turbine models selected and various siting criteria, such as terrain and noise.

Because the Applicant seeks Council approval to select from a range of defined options with respect to turbine vendor and size, number of turbines, and their locations within turbine corridors, the studies and analyses provided in this Site Certificate Application (SCA) are based on a worst case approach tailored for each resource protected by a Council standard. For example, for the scenic and aesthetic evaluation, both the Maximum Turbine Layout and the Minimum Turbine Layout were analyzed and the layout having the maximum impact is described in detail in the appropriate exhibit of this SCA. Similarly, for wetlands, fish and wildlife habitat, and threatened and endangered species, all areas within the proposed turbine corridors have been surveyed and the impact calculations for these resources, presented in Exhibits J, P, and Q, respectively, reflect the maximum potential impacts from among the various turbine sizes and layouts.

B.1.4 Meteorological Towers and SCADA

Up to 10 meteorological towers will be placed throughout the Facility site. The meteorological towers will collect wind resource data. These towers will be up to approximately 85 meters (279 feet) tall.

In addition, a supervisory control and data acquisition (SCADA) system will be installed at the Facility site. The SCADA system will assist with the remote operation of the wind turbines, collect operating data from each wind turbine, and archive wind and performance data from various sources. The SCADA system will be linked (via fiber optic cables or other means of communication) to a central computer in the O&M facility.

[1] These GE turbine models are presented for reference purposes only. The Applicant will select the final turbine model, manufacturer, and nameplate capacity based on various technical, financial, and siting factors.

B.1.5 Electrical System

The Facility's electrical system will consist of: (1) a power collection system, which will collect energy generated by each wind turbine, increase voltage through a pad-mounted transformer, and deliver it via electric cables to (2) the Facility substation, where transformers will further increase the voltage of energy delivered by the power collection system, and (3) a high-voltage transmission line that will deliver power from the Facility substation to BPA.

B.1.6 Collection System

Each wind turbine will generate power at approximately 690 volts (voltage could vary, depending on the turbine model ultimately selected for the Facility). A transformer next to each tower will increase the voltage to 34.5 kV. From the transformer, power will be transmitted via electric cables. Some of the cables will be buried, approximately 3 or more feet below the ground surface, in a trench up to 3 feet wide. In areas where collector cables from several strings of turbines follow the same alignment (for example, near the Facility substation), multiple sets of cables could be installed within a single trench where practicable. There will be approximately 700,000 feet of underground electric cables. These cables will generally be alongside, above, or below fiber optic cables interconnecting the SCADA system.

In some locations, the collector lines might be constructed above ground, on pole or tower structures. Aboveground structures allow the collector cables to span terrain such as canyons, native grasslands, wetlands, and intermittent streams, thus reducing environmental impacts, or to span cultivated areas, thus reducing impacts to farming. Overhead structures will generally be about 23 to 28 feet tall.

B.1.7 Substation and Interconnection to BPA

There are two transmission alternatives for connecting the Facility to the BPA high-voltage transmission system.

B.1.7.1 Transmission Alternative 1

Interconnect with the BPA system[2] by constructing a new substation in the southern section of the Facility site, and possibly construct an overhead high-voltage transmission line approximately 3 miles long (see Figure C-2 in Exhibit C).[3]

Under this alternative, an overhead high-voltage transmission line approximately 3 miles long might be constructed from a new Facility substation, located in the southern

[2] A new BPA transmission line is being developed to connect the proposed Klondike III wind energy facility of PPM Energy, Inc. (the Klondike III Facility) and the Biglow Canyon Facility, among other customers, to the BPA transmission system. PPM submitted a Site Certificate Application for the Klondike III Facility to the Oregon Department of Energy on May 13, 2005. BPA held scoping meetings for the new BPA line on March 1 and April 27, 2005, in connection with the preparation of an Environmental Impact Study. On September 7, 2005, BPA released a Plan of Service, effectively initiating the more active development and permitting period for the new BPA line.

[3] It is possible the 3-mile transmission line would not be required because BPA might allow interconnection directly at the Facility substation. However, this determination has not yet been made and the Applicant therefore seeks to permit both the substation and the transmission line.

section of the Facility site, to a location at or near the existing Klondike Schoolhouse substation. The substation site would be a graveled, fenced area of up to 6 acres, with transformer and switching equipment and a parking area. Transformers would be non-polychlorinated biphenyl (PCB) oil-filled types.

B.1.7.2 Transmission Alternative 2

Interconnect with BPA system by constructing a new substation near the center of the Facility site, and possibly construct an overhead high-voltage transmission line approximately 7 miles long (see Figure C-2 in Exhibit C).[4]

Under this alternative, an overhead high-voltage transmission line approximately 7 miles long might be constructed from a new Facility substation, located near the center of the Facility site, to an electric transformer or switching facility to be installed at BPA's John Day Substation or Switchyard for delivery of electricity to BPA's high-voltage transmission system. The Facility substation site would be a graveled, fenced area of up to 6 acres, with transformer and switching equipment and a parking area. Transformers would be non-PCB oil-filled types.

B.1.8 O&M Facility

The permanent O&M facility will have approximately 5,000 square feet of enclosed space, including office and workshop areas, control room, kitchen, bathroom, shower, utility sink, and other facilities typical of this type of facility. Water for the bathroom and kitchen will be acquired from an onsite well constructed by a licensed contractor according to local and state requirements. Water use is not expected to exceed 1,000 gallons per day. Domestic wastewater generated at the O&M facility will drain into an onsite septic system. A graveled parking area for employees, visitors, and equipment will be located in the vicinity of the building.

There are three alternative locations for the O&M facility: (1) adjacent to the Facility substation under Transmission Alternative 1, (2) adjacent to the Facility substation under Transmission Alternative 2, and (3) located in or in place of the existing house located at 97327 Emigrant Lane, Wasco.

B.1.9 Laydown Areas and Access Roads

Construction of the Facility will require improving and widening some existing roads and constructing new roads to provide access for construction vehicles. Use of the new roads will continue during operation of the Facility. The Facility will also require laydown areas during construction for the delivery of wind turbines and other parts, facilities, and equipment.

[4] It is possible the 7-mile transmission line would not be required because BPA might allow interconnection directly at the Facility substation. However this determination has not yet been made and the Applicant therefore seeks to permit both the substation and the transmission line.

B.1.9.1 Laydown Areas

There will be up to six principal, temporary laydown areas for the staging of construction equipment, wind turbines and their components, towers, and other parts, facilities, and equipment. Each laydown area will be up to 5 acres and will be covered with gravel. The gravel will be removed and the area restored after construction has been completed. In addition to the principal laydown areas, temporary laydown areas will be located at each wind turbine location, and an additional laydown area will be located at each string. It is anticipated that each turbine laydown area will temporarily disturb approximately 4,000 square feet.

A diagram showing a typical turbine pad, an access road, and a temporary turbine laydown area is presented in Figure C-3 (Exhibit C). The laydown area for the turbine blades is also shown in Figure C-3. However, placement of blades in the laydown area is expected to result in little to no soil disturbance.

B.1.9.2 Existing Roads

Existing roads in the Facility area are typically 16 to 20 feet wide. Improvements for construction vehicles generally will involve providing an all-weather surface. In addition, some existing roads will be widened up to approximately 35 feet for construction, and up to approximately 16 to 18 feet wide for operation, including an additional 5 to 6 feet of shoulders.

B.1.9.3 New Roads

In areas where there are no roads near proposed wind turbine strings, new access roads will be constructed. Permanent turnaround areas will be situated at the end of each turbine string. Approximately 40 miles of new access roads and turnaround areas will be constructed. In general, these roads will be up to approximately 35 feet wide during construction, and up to approximately 16 to 18 feet wide for operation, including an additional 5 to 6 feet of shoulders.

B.1.9.4 Temporary Access

In addition to the permanent access roads, temporary access roads or areas, each up to 35 feet wide, might be required for construction of some facilities.

B.2 SITE PLAN

(ii) A site plan and general arrangement of buildings, equipment, and structures;

Response: A site plan is included in Exhibit C, Figure C-2.

B.3 FUEL AND CHEMICAL STORAGE FACILITIES

(iii) Fuel and chemical storage facilities, including structures and systems for spill containment;

Response: No extremely hazardous materials (as defined by 40 Code of Federal Regulations 335) are anticipated to be produced, used, stored, transported, or disposed of in connection with the operation or maintenance of this Facility. Lubricants, oils, greases, antifreeze, cleaners, degreasers, and hydraulic fluids used in the operation and maintenance of the Facility will be stored in the O&M building, in approved containers above ground. Similarly, lubricants, oils, greases, antifreeze, cleaners, degreasers, or hydraulic fluids being held for delivery to a certified recycling transporter will be temporarily stored in the O&M building in approved containers that will be located above ground. Production, use, storage, transport, and disposal of any hazardous materials associated with the proposed Facility will be in strict accordance with federal, state, and local government regulations and guidelines.

B.4 FIRE PREVENTION

(iv) Equipment and systems for fire prevention and control;

Response: The wind turbines in the Facility will be equipped with built-in fire prevention measures that allow the turbines to shut down automatically before mechanical problems create excess heat or sparks. The use of underground power collector cables substantially reduces the risk of fire from short circuits caused by wildlife or lightning. Most of the Facility's new access roads are oriented perpendicular to the prevailing winds and thus serve as effective fire breaks. As described previously, there will be a temporary laydown area around each turbine site that will remain cleared of vegetation throughout the construction process. After construction has been completed, there will be no welding, cutting, grinding, or other flame- or spark-producing operations near the turbines. Therefore, the Applicant will revegetate this cleared area with agricultural crops or native grasses, as appropriate. Native grasses in this area are generally quite short.

All onsite employees for both construction and operations will receive annual fire prevention and response training by a professional fire safety training firm. The volunteer fire departments from the City of Rufus and the City of Wasco will be asked to participate in this training. Employees will be prohibited from smoking outside of company vehicles during dry summer months.

Each company vehicle onsite will contain a fire extinguisher, water spray can, shovel, Emergency Response procedures book, and a two-way radio for immediate communications with the O&M facility. The O&M facility staff will coordinate fire response efforts. Water-carrying trailers (water buffaloes) will be present at appropriate locations around the Facility to be determined in consultation with the local fire departments. A water buffalo will be brought to any job site where there is a substantial risk of fire. Each water buffalo will have a capacity of 500 gallons and be equipped with a pump and hoses. The pumps will be 5-horsepower (hp) engine-driven units with a pumping rate of 60 gallons per minute. One-inch hoses will be stored with each water buffalo. Finally, the water buffaloes can be towed by a number of vehicles, including service trucks and pickup trucks; such vehicles will be present in sufficient numbers at all times during construction and operation of the Facility. All local fire departments will have maps of and gate keys to the Facility site.

B.5 WASTE MANAGEMENT AND DISPOSAL

(v) Structures, systems, and equipment for waste management and disposal, including, to the extent known, the amount of wastewater the applicant anticipates and the applicant's plans for disposal of wastewater and storm water. If the applicant has submitted any permit applications to the Office, as described in OAR 345-021-0000(4), that contain this information, the applicant may copy relevant sections of those documents into this exhibit or include in this exhibit cross-references to the relevant sections of those documents;

Response: The following subsections describe waste and storm water management during the construction and operations phases of the Facility.

B.5.1 Construction

A variety of non-hazardous, inert construction wastes will be generated during construction. The major solid waste types will be concrete waste from turbine pad construction, wood waste from wood forms used for concrete pad construction, and scrap steel from turbine tower construction. Some additional wastes could include erosion control materials, such as straw bales and silt fencing, and packaging materials for turbine parts and electrical equipment.

Wastewater might be generated during construction from wash-down of concrete trucks after concrete loads have been emptied. Trucks will be washed down only at an off-site concrete batch plant. Portable toilets will be provided for onsite sewage handling during construction and will be pumped and cleaned regularly by the construction contractor. No other wastewater will be generated during construction.

Generation of wastes from construction will be minimized through detailed estimating of materials needs and through efficient construction practices. Any wastes generated during construction will be recycled as much as is feasible. Steel scrap will be collected and transported to a recycling facility. Wood waste will be recycled to the greatest extent feasible. Concrete waste will be used as fill onsite or at another site (as described in Exhibit G) or, if no reuse option is available, removed to a local landfill. Packaging wastes (such as paper and cardboard) will be segregated and recycled as is feasible. Any non-recyclable wastes will be collected and transported to a local landfill.

Stormwater during construction will be managed in compliance with a Facility Stormwater General Permit 1200-C, issued by the Oregon Department of Environmental Quality, and the associated Erosion Control Plan. In general, the construction of roads, turbine foundations, and other facilities will be regulated by an erosion control plan that will require best management practices to minimize possible impacts to soils from erosion or other factors.

Erosion control measures that will be followed during Facility construction could include the following:

- Maintaining vegetative buffer strips between the areas impacted by construction activities and any receiving waters

- Installing sediment fence/straw bale barriers at locations shown on the plans
- Placing straw mulching and discing at locations adjacent to disturbed areas
- Planting designated seed mixes at impacted areas adjacent to the disturbed areas
- Creating some construction equipment staging areas during the road work
- Placing sediment fences as necessary along the downslope side of disturbed areas to minimize erosion

B.5.2 Operations

Very little solid waste will be generated from Facility operations. The main waste generated during operations will be at the O&M building. Some minor and potentially hazardous wastes will be generated—oily rags or similar wastes related to turbine lubrication and other maintenance, as described in Exhibit G. The only other source of solid waste will be incidental waste from repair and/or replacement of electrical or turbine equipment. Any solid waste generated during operations will be disposed of in the same manner as solid waste generated during construction.

No industrial wastewater will be generated during operations. Blade wash water will probably not be required regularly for Energy Facility operation, although occasional blade washing might be conducted by a contractor.

Because of the very small amount of impervious surface associated with the Facility, as well as the climate at the Facility site, no significant quantities of stormwater will be generated during Facility operation and no operational stormwater management measures are proposed. Wind energy facilities are not subject to the requirement to obtain an operational stormwater permit, 1200-Z.

B.6 SOURCE OF FUELS, FUEL CYCLES, ELECTRICAL LOADS, ENERGY FLOW, AND EXCESS HEAT DISPOSAL

(vi) For thermal power plants and electric generating facilities producing energy from wind, solar or geothermal energy:

(I) A discussion of the source, quantity, availability, and energy content of all fuels (Btu, higher heating value) or the wind, solar or geothermal resource used to generate electricity or useful thermal energy. For the purpose of this subparagraph, "source" means the coal field, natural gas pipeline, petroleum distribution terminal or other direct source;

Response: Figure B-2 shows the frequency and direction of winds in the Facility area.

(II) Fuel cycle and usage including the maximum hourly fuel use at the net electrical power output at average annual conditions for a base load gas plant and the maximum hourly fuel use at nominal electric generating capacity for a non-base

load power plant or a base load gas plant with power augmentation technologies, as applicable;

Response: Because the Energy Facility will use renewable energy, it will not have a "fuel cycle."

(III) The gross capacity as estimated at the generator output terminals for each generating unit. For a base load gas plant, gross capacity is based on the average annual ambient conditions for temperature, barometric pressure and relative humidity. For a non-base load plant, gross capacity is based on the average temperature, barometric pressure and relative humidity at the site during the times of year when the facility is intended to operate. For a baseload gas plant with power augmentation, gross capacity in that mode is based on the average temperature, barometric pressure and relative humidity at the site during the times of year when the facility is intended to operate with power augmentation.

Response: Because the Energy Facility will use renewable energy and will not consume fossil fuels it is not considered a "base-load" or "non-base load" plant.

(IV) A table showing a reasonable estimate of all on-site electrical loads and losses greater than 50 kilowatts, including losses from on-site transformers, plus a factor for incidental loads, that are required for the normal operation of the plant when the plant is at its designed full power operation.

Response: Table B-2 provides estimates of onsite electrical loads and losses greater than 50 kW.

Table B-2 Onsite Electrical Loads and Losses

Description	Load (kW)
Utility Interconnect Power Transformers (Two (169/225/281 MVA))	
No Load Losses	300-350 kW
Load Losses	4,000-4,500 kW
Auxiliary Losses	Less than 10 kW

(V) Process flow, including power cycle and steam cycle diagrams to describe the energy flows within the system;

Response: Wind energy will be converted to electricity by the turbines in this Energy Facility. Depending on the wind turbine model selected for this Facility by the Applicant, the wind turbines will probably operate at wind speeds in the range of approximately 6 to 67 miles per hour (mph) and the turbine blades will turn at a speed of approximately 5 to 22 revolutions per minute (rpm).

Depending on the wind turbine model selected for this Facility by the Applicant, the proposed turbines are likely to employ an active yaw control (designed to

steer the turbine toward the wind), active blade pitch control (designed to regulate wind rotor speed), and a generator/power electronic converter system (designed to produce nominal 60-Hertz electric power). The rotors will probably spin in a clockwise direction under normal operating conditions when viewed from an upwind location. At speeds exceeding the maximum wind speed for which the turbine is designed to operate, the rotor will stop turning.

Each wind turbine will generate power at approximately 690 volts (voltage might vary depending on the turbine model ultimately selected for the Facility). A transformer next to each tower will increase the voltage to 34.5 kV. From there, power will be transmitted via electric cables. Power will be collected at the Facility substation where it will be converted to a higher voltage for transmission to the regional BPA transmission network.

(VI) Equipment and systems for disposal of waste heat;

Response: Different turbine models use different means of disposing of waste heat. The GE 1.5- and 3.0-MW wind turbines use air-cooled oil lubricating systems to lubricate and cool the gears and generator of the turbines.

(VII) The maximum number of hours per year and energy content (BTU per year, higher heating value) of alternate fuel use;

Response: No alternate fuel will be used.

(VIII) The nominal electric generating capacity;

Response: The Energy Facility will consist of up to 225 wind turbines with an aggregate nominal nameplate generating capacity of up to 450 MW of electricity.

(IX) The fuel chargeable to power heat rate;

Response: Because the Energy Facility will be a renewable energy facility, there is no relevant "fuel chargeable to power heat rate."

B.7 TRANSMISSION LINE LOAD CAPACITY AND TYPE OF CURRENT

(vii) For transmission lines, the rated voltage, load carrying capacity, and type of current;

Response: As discussed previously, there are two transmission alternatives for connecting the Facility to the BPA high-voltage transmission system: a transmission line approximately 3 miles long and a transmission line approximately 7 miles long. Both of these lines will be 230-kV to 500-kV lines, with a load-carrying capacity of up to 450 MW of alternating current.

B.8 PIPELINE OPERATING PRESSURE AND CAPACITY

(viii) For pipelines, the operating pressure and delivery capacity in thousand cubic feet per day;

Response: This section is not applicable as the Facility will not include a pipeline.

B.9 UNDERGROUND GAS STORAGE

(ix) For surface facilities related to underground gas storage, estimated daily injection and withdrawal rates, horsepower compression required to operate at design injection or withdrawal rates, operating pressure range and fuel type of compressors; and

Response: This section is not applicable because the Facility will not include underground gas storage facilities.

B.10 LIQUEFIED NATURAL GAS STORAGE

(x) For facilities to store liquefied natural gas, the volume, maximum pressure, liquefication and gasification capacity in thousand cubic feet per hour.

Response: This section is not applicable because the Facility will not include liquefied natural gas storage facilities.

B.11 DESCRIPTION OF RELATED OR SUPPORTING FACILITIES

OAR 345-021-0010(1)(b)(B) *A description of major components, structures, and systems of each related or supporting facility;*

Response: Major components, structures, and systems of related or supporting facilities include public roads used for site access. Access to the Facility will be provided by primary and secondary transporter routes. These routes will be used to bring in equipment, materials, and personnel from outside of the study area to the Facility site and will include state and county roadways. See Exhibit U for a discussion of public routes and transportation planning.

B.12 DIMENSIONS OF MAJOR STRUCTURES AND FEATURES

OAR 345-021-0010(1)(b)(C) *The approximate dimensions of major facility structures and visible features.*

Response: The primary visible Facility structures will be the wind turbines. Table B-1 provides dimensions for two wind turbine options: the 1.5-MW GE wind turbine and the 3.0-MW GE wind turbine.

Other visible features of the Facility include the following:

- Up to 10 meteorological towers, each up to 85 meters (279 feet) tall.
- Sections of the power collection system that might be located above ground. Pole structures used to carry aboveground power collection lines will generally be about 23 to 28 feet tall.
- An overhead transmission line approximately 3 or 7 miles long, depending on the alternative selected. Structures used to carry the overhead transmission line will be approximately 60 to 90 feet tall, depending on terrain.

- A one- or two-story O&M building, approximately 5,000 square feet in area.

B.13 CORRIDOR EVALUATION AND SELECTION

OAR 345-021-0010(1)(b)(D) *If the proposed energy facility is a pipeline or a transmission line or has, as a related or supporting facility, a transmission line or pipeline, that, by itself, is an energy facility under the definition in ORS 469.300, a corridor selection assessment explaining how the applicant selected the corridor(s) for analysis in the application. In the assessment, the applicant shall evaluate the corridor adjustments the Office has described in the project order, if any. The applicant may select any corridor for analysis in the application and may select more than one corridor. However, if the applicant selects a new corridor, then the applicant must explain why the applicant did not present the new corridor for comment at an informational meeting under OAR 345-015-0130. In the assessment, the applicant shall discuss the reasons for selecting the corridor(s), based upon evaluation of the following factors:*

(i) Least disturbance to streams, rivers and wetlands during construction;

(ii) Least percentage of the total length of the pipeline or transmission line that would be located within areas of Habitat Category 1, as described by the Oregon Department of Fish and Wildlife;

(iii) Greatest percentage of the total length of the pipeline or transmission line that would be located within or adjacent to public roads, as defined in ORS 368.001, and existing pipeline or transmission line rights-of-way;

(iv) Least percentage of the total length of the pipeline or transmission line that would be located within lands that require zone changes, variances or exceptions;

(v) Least percentage of the total length of the pipeline or transmission line that would be located in a protected area as described in OAR 345-022-0040;

(vi) Least disturbance to areas where historical, cultural or archaeological resources are likely to exist;

(vii) Greatest percentage of the total length of the pipeline or transmission line that would be located to avoid seismic, geological and soils hazards; and

(viii) Least percentage of the total length of the pipeline or transmission line that would be located within lands zoned for exclusive farm use;

Response: The proposed Facility is not a pipeline or a transmission line and does not have, as a related or supporting facility, a transmission line or pipeline that, by itself, is an energy facility under the definition in ORS 469.300.

B.14 PIPELINE AND TRANSMISSION LINE

OAR 345-021-0010(1)(b)(E) *For the corridor(s) the applicant selects under paragraph (D) and for any related or supporting facility that is a pipeline or transmission line, regardless of size:*

B.14.1 Length of Pipeline or Transmission Line

(i) The length of the pipeline or transmission line;

Response:

As discussed previously, there are two transmission line alternatives for connecting the Facility to the BPA high-voltage transmission system: a transmission line approximately 3 miles long and a transmission line approximately 7 miles long.

B.14.2 Right-of-Way Width

(ii) The proposed right-of-way width of the pipeline or transmission line, including to what extent new right-of-way will be required or existing right-of-way will be widened;

Response:

New rights-of-way up to approximately 150 feet wide (up to approximately 250 feet wide during construction) will be required along the proposed path of the high-voltage transmission line for the Facility.

B.14.3 Public Right-of-Way

(iii) If the proposed corridor follows or includes public right-of-way, a description of where the facility would be located within the public right-of-way, to the extent known. If the applicant might choose to locate all or part of the facility adjacent to but not within the public right-of-way, describe the reasons the applicant would use to justify locating the facility outside the public right-of-way. The application must include a set of clear and objective criteria and a description of the type of evidence that would support locating the facility outside the public right-of-way, based on those criteria;

Response:

The proposed corridor for the high-voltage transmission line will not be located within a public right-of-way. The Applicant has chosen to utilize a right-of-way adjacent to but not within the public right-of-way in some locations to avoid the possibility that the transmission line might have to be relocated if the existing public right-of-way were widened or modified at a later date.

B.14.4 Pipeline Diameter and Location

(iv) The diameter and location, above or below ground, of each pipeline; and

Response: Not applicable.

B.14.5 Transmission Line Structures and Dimensions

(v) A description of the transmission line structures and their dimensions;

Response: The high-voltage transmission line will be supported on structures that could be designed to carry multiple circuits. The Applicant has not selected the type of structures to be used. The type of structure selected might be poles, H-Frame structures, trusses, or lattice towers. A typical H-Frame structure consists of two poles, a crossarm near the top, and an X-Brace under the crossarm. Three insulators typically are attached to the crossarm to support the three conductors—one on each end of the crossarm and one in the middle, with 20-foot spacing. To maintain a minimum 30-foot conductor ground clearance, the structures typically are approximately 60 to 90 feet above grade, depending on terrain. The poles typically are direct-embedded in the soil 8 to 12 feet deep, and are 18 to 24 inches in diameter at the ground line. Average span lengths typically vary from 600 to 800 feet, with longer spans of up to 1,500 feet, as necessary, to cross ravines.

B.15 CONSTRUCTION SCHEDULE

OAR 345-021-0010(1)(b)(F) *A construction schedule including the date by which the applicant proposes to begin construction and the date by which the applicant proposes to complete construction. Construction is identified in OAR 345-001-0010. The applicant shall describe in this exhibit all work on the site that the applicant intends to begin before the Council issues a site certificate. The applicant shall include an estimate of the cost of that work. For the purposes of this exhibit, "work on the site" means any work within a site or corridor, other than surveying, exploration or other activities to define or characterize the site or corridor, that the applicant anticipates or has performed as of the time of submitting the application;*

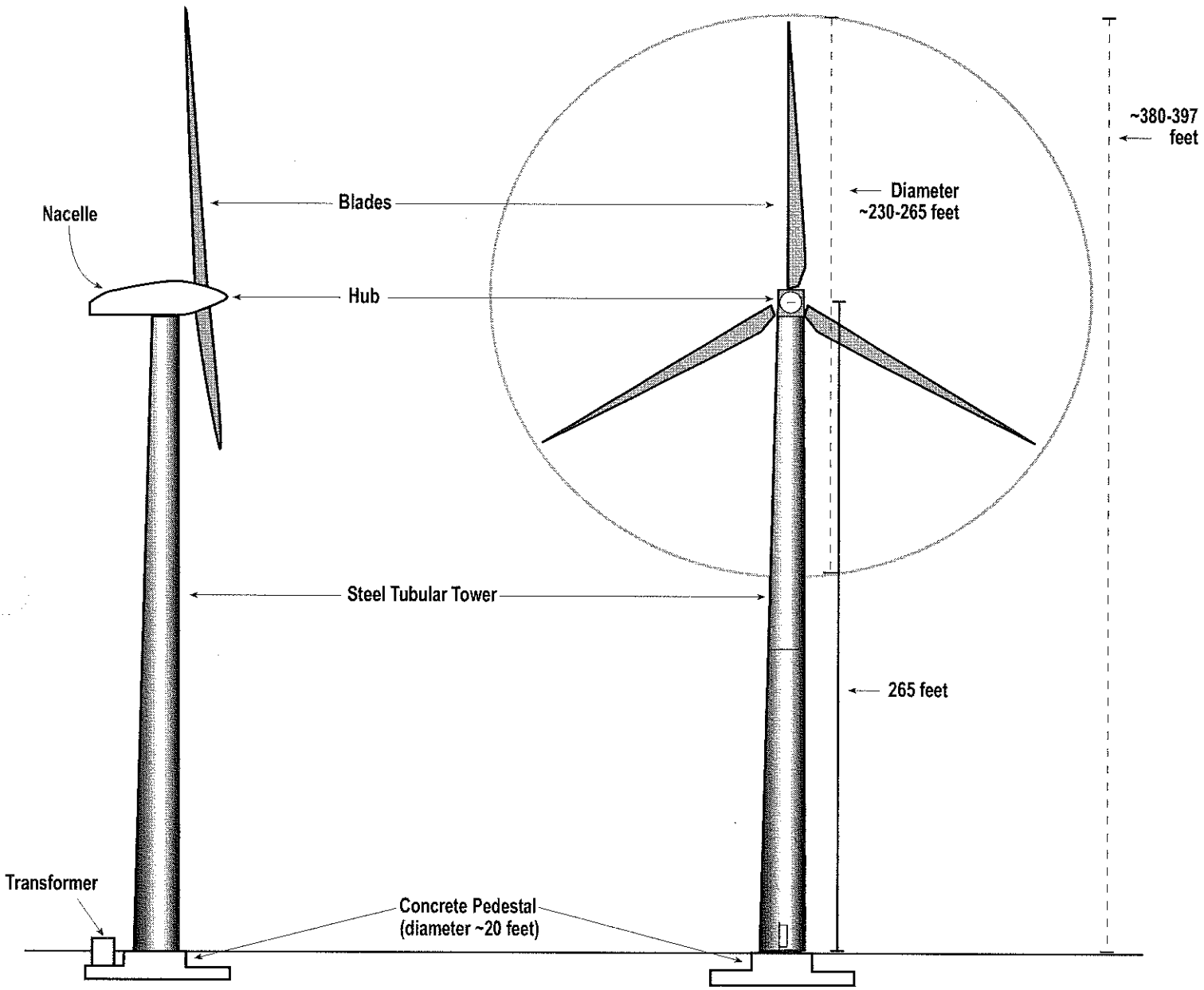
Response: The Applicant proposes to begin construction of the Facility by the end of the first quarter of 2007 and to complete construction of at least part of the Facility by the end of the fourth quarter of 2007. As the Facility might be built in phases, the Applicant proposes that: (1) construction of the first phase of the Facility should begin within 2 years of issuance of the site certificate, and (2) construction on the last phase should begin within 5 years of issuance of the site certificate. The Applicant does not expect to perform any construction before the Council issues a site certificate.

B.16 MAP OF DISTURBANCE AREAS

OAR 345-021-0010(1)(b)(G) *A map showing all areas that may be temporarily disturbed by any activity related to the design, construction, and operation of the proposed facility.*

Response: See Figure B-3. Temporarily disturbed areas, such as laydown areas and collector system trenches, will total up to 381 acres.

Figures



ORION ENERGY LLC

FIGURE B-1

Typical 1.5-MW Wind Turbine and Tower

BIGLOW CANYON WIND FARM

DIRECTION	PERCENT OF ANNUAL TURBINE ENERGY
0	0.01%
10	0.00%
20	0.05%
30	0.13%
40	0.18%
50	0.18%
60	0.18%
70	0.21%
80	0.85%
90	1.33%
100	1.83%
110	1.77%
120	0.49%
130	0.10%
140	0.03%
150	0.01%
160	0.01%
170	0.01%
180	0.00%
190	0.05%
200	0.11%
210	0.18%
220	0.27%
230	0.44%
240	1.83%
250	12.22%
260	41.64%
270	27.34%
280	6.82%
290	1.56%
300	0.13%
310	0.02%
320	0.00%
330	0.00%
340	0.00%
350	0.01%
Grand Total	**100%**

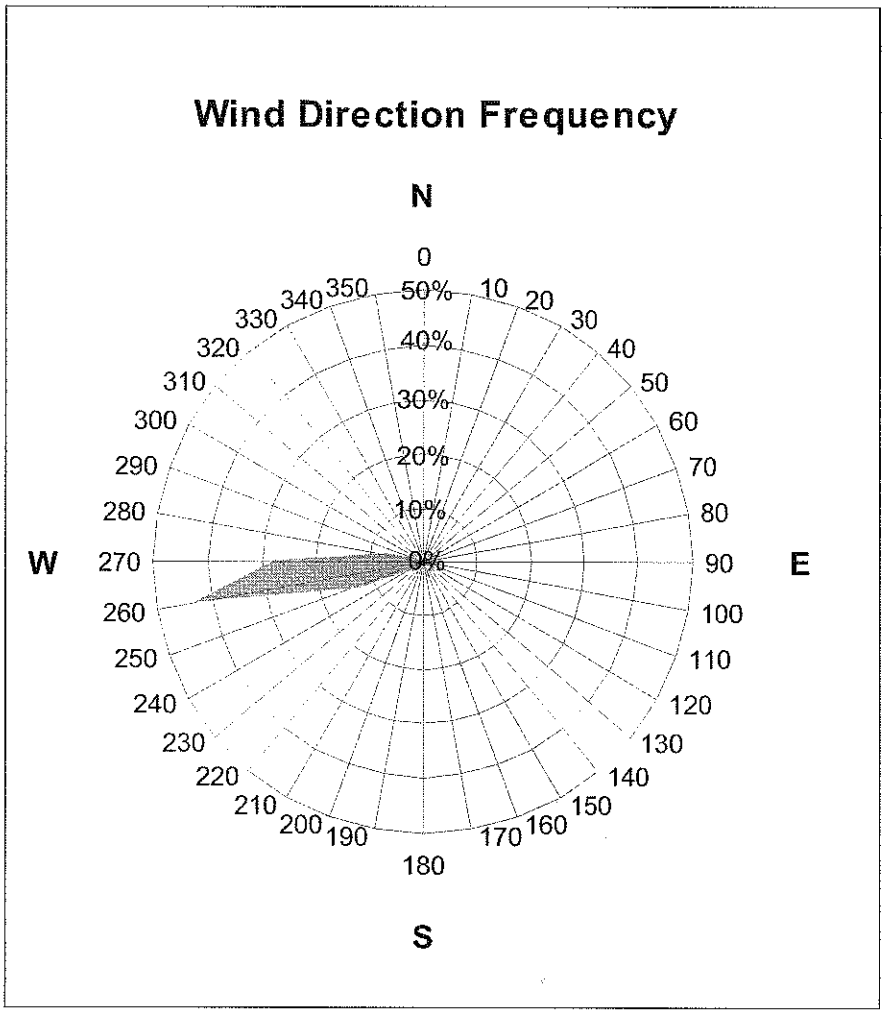


FIGURE B-2
Frequency and Direction of Wind in the Facility Area
BIGLOW CANYON WIND FARM

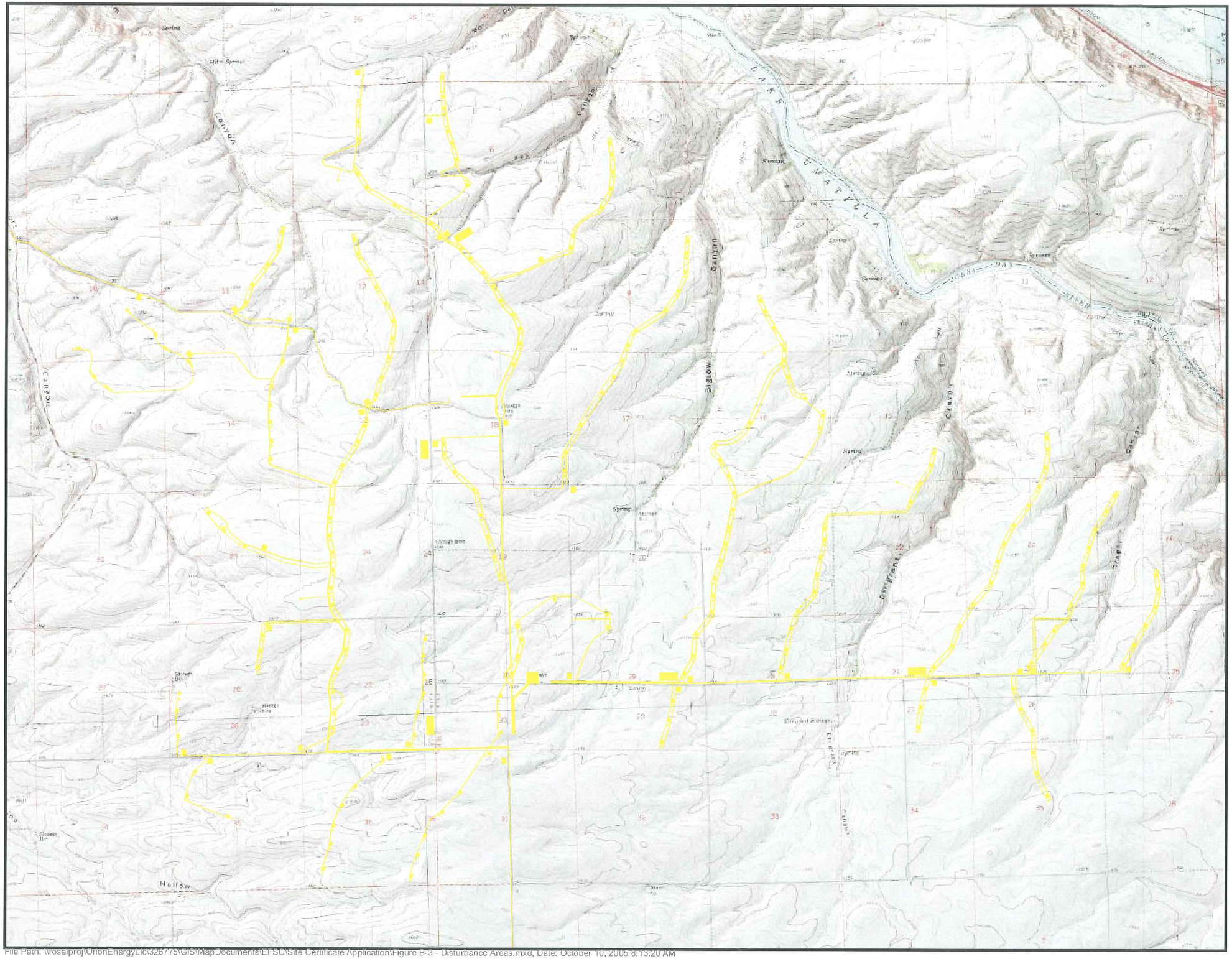


Figure B-3
Disturbance Areas
Biglow Canyon Wind Farm

ORION ENERGY LLC

Legend

Temporary Disturbance Area (~381 acres)

*Note: Figure B-3 shows the maximum amount of disturbed area anticipated for the Facility for the layout alternatives described in Exhibit B.

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Miles

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EXHIBIT C

PROPOSED LOCATION AND MAPS

OAR 345-021-0010(1)(c)

TABLE OF CONTENTS

C.1 INTRODUCTION

OAR 345-021-0010(1)(c) *Information about the location of the proposed facility, including:*

C.2 MAPS

OAR 345-021-0010(1)(c)(A) *A map or maps, including a 7.5-minute quadrangle map, showing the proposed locations of the energy facility site, and all related or supporting facility sites, in relation to major roads, water bodies, cities and towns, important landmarks and topographic features.*

Response: A map showing the location of the proposed Biglow Canyon Wind Farm Facility (Facility) site boundary plotted on a 7.5-minute quadrangle map is included as Figure C-1.

C.3 LOCATION OF FACILITY COMPONENTS

OAR 345-021-0010(1)(c)(B) *A description of the location of the proposed energy facility site and the proposed site of each related or supporting facility, including the approximate land area of each. If a proposed pipeline or transmission line is to follow an existing road, pipeline, or transmission line, the applicant shall state to which side of the existing road, pipeline, or transmission line the proposed facility will run, to the extent it is known.*

Response: Figure C-2 shows the location of the proposed Facility site boundary and the location of each related and supporting facility. See below for further information.

Location and Land Area of the Energy Facility

The Facility area is located approximately 2.5 miles northeast of Wasco, Oregon, in Sherman County. Specifically, the site is north of Dehler Lane, east of US 97, south of Helm Lane, and west of the John Day River. The Biglow Canyon Wind Farm Facility (the Facility) will be built within approximately 25,000 acres of land in Township 2 North, Range 17 and 18 East of the Willamette Meridian.

Turbines

Wind turbines will be sited within corridors 500 feet wide (such corridors are called "turbine corridors"). The preliminary locations of the turbine corridors are illustrated in Figure C-2. The number of turbines in each corridor, the spacing between turbines, and their precise locations within the corridor will be determined prior to construction by Orion Sherman County Wind Farm LLC (Applicant), based on the wind turbine model selected and various siting criteria, such as terrain and noise.

Meteorological Towers

Up to 10 meteorological towers will be placed throughout the Facility area. Figure C-2 shows the approximate location of the meteorological towers.

Collection System

A transformer next to each tower will increase the voltage from the wind turbine to 34.5 kilovolts (kV). From there, power will be transmitted via 34.5-kV electric cables. Some of the cables will be buried, approximately 3 or more feet below the ground surface, in a trench up to 3 feet wide. In areas where collector cables from several strings of turbines follow the same alignment (for example, near the Facility substation), multiple sets of cables will be installed within each trench where practicable. There will be approximately 700,000 feet of underground electric cables alongside, above, or below fiber optic cables interconnecting the supervisory control and data acquisition (SCADA) system (see Figure C-2).

In some locations, the 34.5-kV collector lines might be constructed aboveground, on pole or tower structures (see Figure C-2). Aboveground structures allow the collector cables to "span" terrain such as canyons, native grasslands, wetlands, and intermittent streams.

Substation and Interconnection to Bonneville Power Administration

There are two transmission alternatives for connecting the Facility to the Bonneville Power Administration (BPA) high-voltage transmission system.

Alternative 1

Interconnect with the BPA system[1] by constructing a new substation in the southern section of the Facility site, and possibly construct an overhead transmission line approximately 3 miles long (see Figure C-2). Under this alternative, an overhead transmission line approximately 3 miles long might be constructed from a new Facility substation located in the southern section of the Facility site to a location at or near the existing Klondike Schoolhouse substation.[2]

Alternative 2

Interconnect with the BPA system by constructing a new substation near the center of the Facility site, and possibly construct an overhead transmission line approximately 7 miles long (see Figure C-2). Under this alternative, an overhead transmission line approximately 7 miles long might be constructed from a new Facility substation located near the center of the Facility site to an electric transformer or switching facility to be installed at BPA's John Day Substation or Switchyard for delivery of electricity to BPA's high-voltage transmission system.[3]

---

[1] A new BPA transmission line is being developed to connect the proposed Klondike III wind energy facility of PPM Energy, Inc. (the Klondike III Facility) and the Biglow Canyon Facility, among other customers, to the BPA transmission system. PPM submitted a Site Certificate Application for the Klondike III Facility to the Oregon Department of Energy on May 13, 2005. BPA held scoping meetings for the new BPA line on March 1 and April 27, 2005, in connection with the preparation of an Environmental Impact Study. On September 7, 2005, BPA released a "Plan of Service," effectively initiating the more active development and permitting period for the new BPA line.

[2] It is possible the 3-mile transmission line would not be required because BPA might allow interconnection directly at the Facility substation. However, this determination has not yet been made and the Applicant therefore seeks to permit both the substation and the transmission line.

[3] It is possible the 7-mile transmission line would not be required because BPA might allow interconnection directly at the Facility substation. However, this determination has not yet been made and the Applicant therefore seeks to permit both the substation and the transmission line.

O&M Facility

There are three alternatives for an O&M facility (see Figure C-2): (1) adjacent to substation alternative 1, (2) adjacent to substation alternative 2, and, (3) located in place of the existing home on Emigrant Lane (this house would be demolished during construction).

Laydown Areas

There will be up to six principal, temporary laydown areas for the staging of equipment, Energy Facility turbines and their components, towers, and other facilities (see Figure C-3). Each laydown area will be up to 5 acres and will be covered with gravel. In addition to the principal laydown areas, temporary laydown areas will be located at each turbine and permanent turnaround areas will be situated at the end of each turbine string.

Existing Roads

Improvements to existing roads in the Facility area will be required. The location of existing roads requiring improvements is depicted on Figure C-2.

New Roads

In areas where there are no roads near proposed wind turbine strings, new access roads will be constructed. Approximately 40 miles of new access roads and turnaround areas will be constructed (see Figure C-1).

Land Area of Biglow Canyon Wind Farm Related or Supporting Facilities

The approximate land area of the related or supporting facilities is estimated in Table C-1.

Table C-1 Estimated and Approximate Area of the Energy Facility and all Related or Supporting Facilities[1]

Facilities	Units of Measurement	Approx. Unit Area	Approx. No. of Units	Approx. Total Area in Acres
Permanent Facilities				
Turbine Pads/Towers	Square feet per tower	2,786	225	14.39
Substation/Alternative Substation	Acres	6	1	6
Meteorological towers	Square feet	900	9	0.19
O&M Facility (building)	Square feet	5,000	1	0.11
O&M Facility Site	Acres	5	1	5
Access roads, new	Square feet disturbed area per linear foot of road	28	213,795	137.43
Access roads, improved	Square feet disturbed area per linear foot of road	18	3,617	1.49
Turnaround Areas	Square feet	7,854	29	5.23
Total Permanent Facilities				**169.84**

Table C-1 Estimated and Approximate Area of the Energy Facility and all Related or Supporting Facilities[1]

Facilities	Units of Measurement	Approx. Unit Area	Approx. No. of Units	Approx. Total Area in Acres
Temporary Facilities				
Access roads, construction	Square feet disturbed area per linear foot of road	7	217,412	34.94
Access road to Meteorological Tower	Square feet disturbed area per linear foot of road	8	7,335	1.35
Meteorological Tower[2]	Square feet	5,000	9	1.03
Laydown areas at each string	Acres per area	1	30	30
Laydown areas at each tower site	Square feet per laydown area	18,500	225	95.56
Additional laydown areas	Acres per area	5	6	30
Temporary access for overhead line construction[3]	Square feet disturbed area per linear foot of road	12	36,960	10.18
Underground collector cable disturbed area	Square feet of disturbed area per linear foot of trench	20[4]	7,748,256	177.88
Total Temporary Facilities				**380.93**

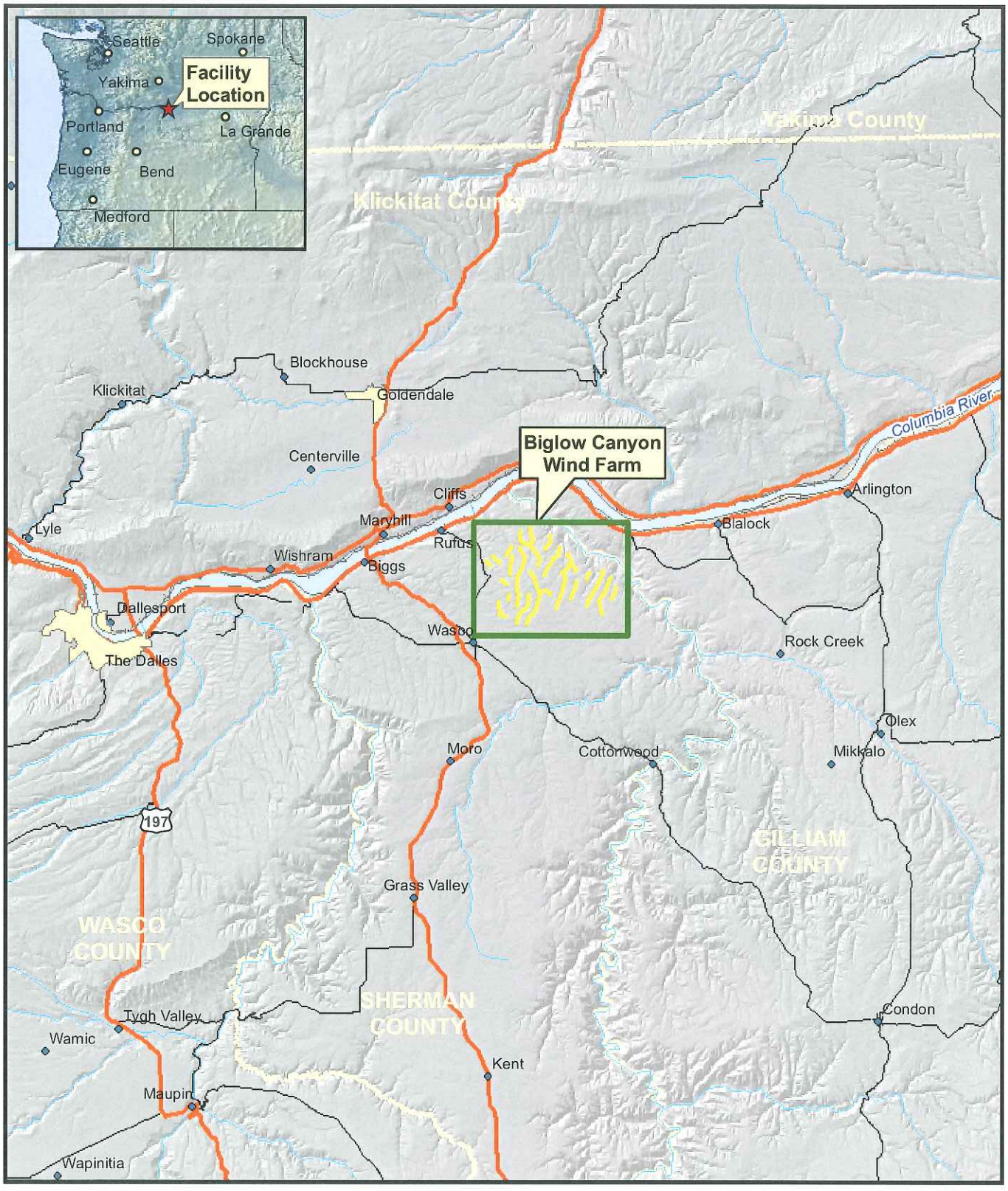
[1] Overhead collection line poles and associated laydown areas total less than 5 acres.

[2] Meteorological tower impact does not include estimated guy wire area; the footprint of the base is approximately 30 feet by 30 feet.

[3] Either approximately 3 or approximately 7 miles long.

[4] Disturbance from underground electric collection system is based on 20 square feet per lineal foot of trench for first circuit, plus 12 square feet per lineal foot of trench for each additional paralleling circuit.

Figures



Legend

- Highway
- Major Road
- Lakes and Rivers
- Proposed Turbine Corridors
- City Limits

N

0 5 10 15

Miles

ORION ENERGY LLC

Figure C-1

Vicinity Site Map

Biglow Canyon Wind Farm

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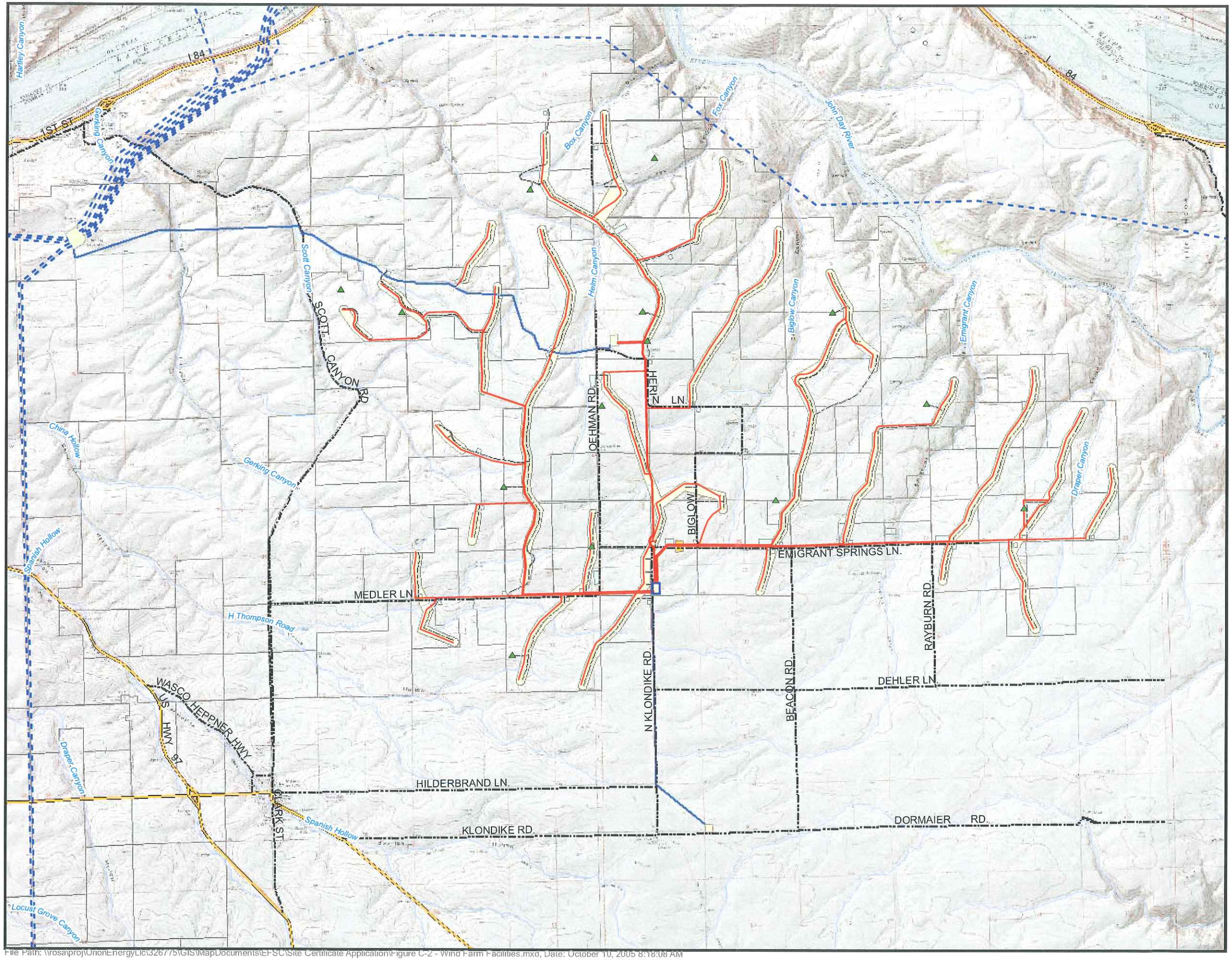

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Figure C-2
Wind Farm Facilities
Biglow Canyon Wind Farm

ORION ENERGY LLC

Legend

- Proposed Met Tower
- Proposed Turbine Corridors
- Proposed Facility Access Roads
- Existing Dirt Roads
- Existing Paved Roads
- Proposed 34.5-kV Underground Collector System
- Existing Transmission Line
- Proposed Transmission Line
- Proposed Staging Areas
- Existing Substation
- Proposed Substation / Proposed O&M Facility
- Proposed O&M Facility
- Streams

* Power Lines may be constructed to 500-kV

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0 0.5 1 1.5 2
Miles

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Source:
Map created using the following USGS, 7.5-Minute Quad Maps: Klondike (1971), Quinton (1976), Rufus (1971), and Wasco (1987)

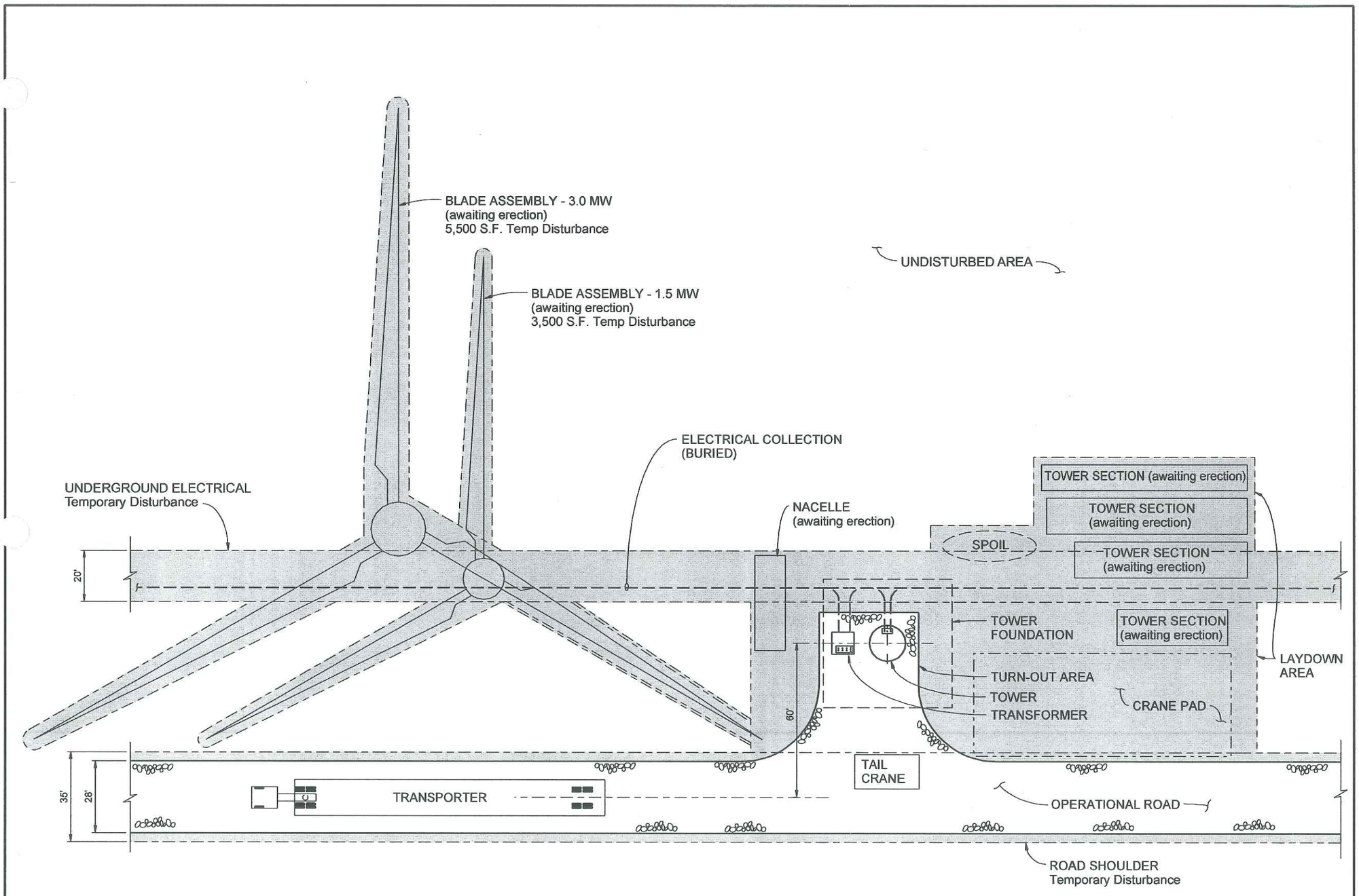

Figure C-3

Typical Turbine Laydown Area

Biglow Canyon Wind Farm

Sherman County, Oregon

ORION ENERGY LLC

Legend

- Temporary Disturbance
- Operational Disturbance

Notes:

1. With the Exception of the Operational Road and Turnout Area, All Other Areas are Subject to Temporary Disturbance.
2. Minor Modifications Could be Made to the Dimensions of the Final Layout Depending on Site Conditions, Turbine Type Selected and Revisions to Project Layout Specifications Requested by the Project Construction Contractor.

Estimated Temporary Disturbance Per Turbine Site		
	1.5 MW	3.0 MW
Laydown Area:	15,000 s.f.	17,000 s.f.
Blade Assembly:	3,500 s.f.	5,500 s.f.
Total:	18,500 s.f.	22,500 s.f.

0 20 40 60

Scale In Feet

CH2MHILL

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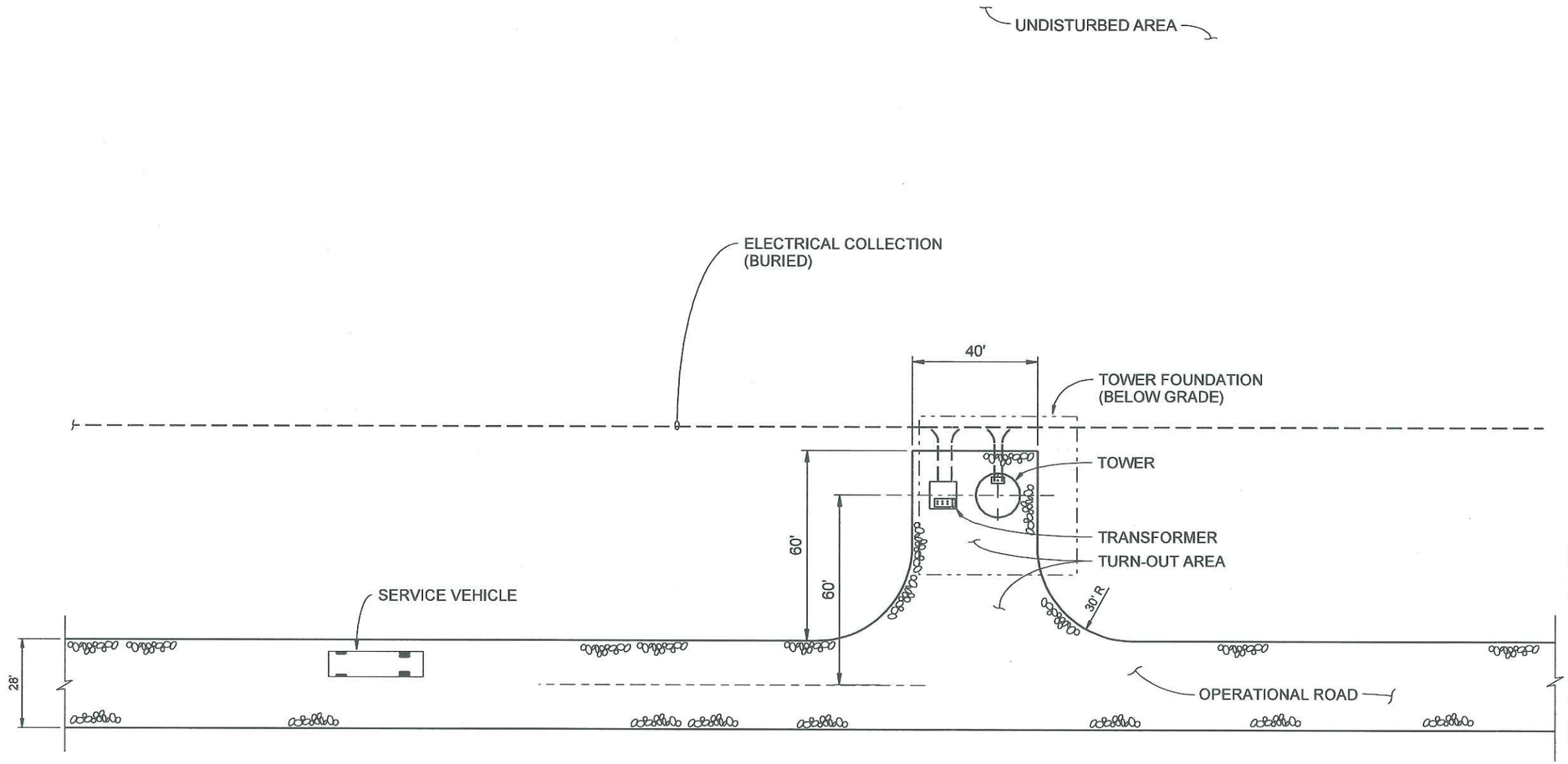
Figure C-4

Typical Turbine, Final grading

Biglow Canyon Wind Farm

Sherman County, Oregon

ORION ENERGY LLC



Legend

Operational Disturbance

Note:
Minor Modifications Could be Made to the Dimensions of the Final Layout Depending on Site Conditions, Turbine Type Selected and Revisions to Project Layout Specifications Requested by the Project Construction Contractor.

Estimated Permanent Disturbance Per Turbine Site		
	1.5 MW	3.0 MW
Turnout Area:	2,786 s.f.	2,786 s.f.

0 20 40 60

Scale In Feet

CH2MHILL

figure5_326775.dgn 05-OCT-2005 08:55:16

EXHIBIT D

ORGANIZATIONAL, MANAGERIAL, AND TECHNICAL EXPERTISE

OAR 345-021-0010(1)(d)[1]

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[1]Please refer to Exhibits A and E for information to support a finding of compliance with subsections (3) and (4) of OAR 345-022-0010 (third-party permits).

D.1 INTRODUCTION

OAR 345-021-0010(1)(d) *Information about the organizational expertise of the applicant to construct and operate the proposed facility, providing evidence to support a finding by the Council as required by OAR 345-022-0010, including:*

Response: Orion Energy LLC (Orion), as parent of Orion Sherman County Wind Farm LLC (Applicant), will provide the organizational, managerial, and technical expertise to construct and operate the proposed Biglow Canyon Wind Farm facility (Facility). Orion's wind resource team has led efforts to identify suitable locations for, permit and develop more than 1,100 megawatts (MW) of installed wind energy projects worldwide. Orion will directly provide its expertise to the Applicant.

D.2 APPLICANT'S PREVIOUS EXPERIENCE

OAR 345-021-0010(1)(d)(A) *The applicant's previous experience, if any, in constructing and operating similar facilities;*

Response: Orion is privately-held, and its sole business is the development, financing, construction, and operation of large-scale wind plants. Orion was formed in 1998 to help meet the growing worldwide demand for low-cost, nonpolluting renewable energy. Orion is based in Oakland, California, and also operates in the United Kingdom through its sister company, RDC Developments Ltd.

Principals of Orion have a proven track record of developing wind energy projects in the U.S. and internationally, with more than 1,100 MW of projects developed, financed, and constructed in the U.S., Europe, Latin America, and Asia. In the U.S., Orion has financed and completed the development of seven wind energy projects totaling over 500 megawatts of capacity in the last six years. Six of these projects are currently operating.

Operating projects developed by Orion are identified in Table D-1.

Table D-1 Wind Power Generation Facilities

Project Name	Commercial Operation Date	Location	Size	Turbine Type	Power Purchaser	Project Owner/ Operator
Camp Grove Wind Farm	2006 (under development)	Marshall and Stark Counties, IL	Approx. 140MW (subject to change)	TBD	TBD	TBD
Uinta County Wind Farm	December 2003	Uinta County, WY	144 MW	Vestas V80	PPM Energy	FPL Energy
Green Mountain Wind Farm at Brazos	December 2003	Scurry County, TX	160 MW	Mitsubishi 1.0 MW	TXU Electric, Green Mountain Energy	Shell Renewables
Waymart Wind Farm	October 2003	Wayne County, PA	65 MW	GE Wind 1.5 MW	Exelon	FPL Energy
Indian Mesa Wind Farm	June 2001	Pecos County, TX	83 MW (initial phase)	Vestas V47	Lower Colorado River Authority, TXU Electric	Initially National Power, sold to FPL Energy

Table D-1 Wind Power Generation Facilities

Project Name	Commercial Operation Date	Location	Size	Turbine Type	Power Purchaser	Project Owner/ Operator
Green Mountain Wind Farm	May 2000	Somerset County, PA	10 MW	Nordex N60	Green Mountain Energy	Initially National Power, sold to FPL Energy
Delaware Mountain Wind Farm	June 1999	Culberson County, TX	30 MW (initial phase)	Enron Wind Corp. Z-48	Lower Colorado River Authority, Reliant Energy	Initially National Power, sold to FPL Energy

For more information on Orion's success in developing commercially operational wind energy projects, please see www.orion-energy.com.

D.3 QUALIFICATION OF APPLICANT'S PERSONNEL

OAR 345-021-0010(l)(d)(B) *The qualifications of the applicant's personnel who will be responsible for constructing and operating the facility, to the extent that the identities of such personnel are known when the application is submitted;*

Response: **Michael Haas** is President of Orion. Mr. Haas was involved in the wind industry and held executive positions at Kenetech Corporation before founding Orion. While at Kenetech, he led the development, finance, implementation, and construction of projects totaling 350 MW of installed capacity and directed more than 1,000 MW of contracted projects through various stages of development worldwide. He also served as General Manager of the "56-100" Wind Turbine Division, responsible for the engineering, manufacturing, operations and maintenance of over 500 MW of wind turbines. Prior to his tenure at Kenetech, Mr. Haas worked for the McDonnell-Douglas Corporation. Mr. Haas received a Bachelor's degree in Mechanical and Aerospace Engineering from the University of Missouri-Rolla, and a Master's degree in Aeronautical and Astronautical Engineering from Stanford University.

Reid Buckley is Vice President of Orion and oversees all North American development activities, including the Biglow Canyon Wind Farm Facility (the Facility). Mr. Buckley has been employed in the wind industry since 1992, holding senior development and finance positions at Tomen Power Corporation and Kenetech Windpower Inc. before joining Orion. At Tomen and Kenetech, he was responsible for development, finance, and implementation of wind energy projects throughout the western United States and managed the purchase and sale of numerous wind power assets. Prior to working in the energy industry, Mr. Buckley was a management consultant at Bain & Company. Mr. Buckley received both a Bachelor's degree in Engineering Mechanics and a Master's degree in Public and Private Management from Yale University.

Jim Eisen is Vice President of Orion. Mr. Eisen has been involved in energy and project development since 1986. He has overseen the legal, financial, and development efforts for more than 1,000 MW of installed wind energy capacity. Before joining Orion, he was

Vice President and General Counsel for Kenetech Corporation and Vice President and Assistant General Counsel for Catellus Development Corporation. Prior to entering the energy field, Mr. Eisen practiced general corporate law with the law firms of Heller Ehrman, and Curtis, Mallet-Prevost, Colt & Mosle. Mr. Eisen received a Bachelor's degree from the Massachusetts Institute of Technology and a law degree from New York University's School of Law.

Carlos Pineda manages Orion project development activities, including land acquisition, permitting, and origination, at a number of sites in the midwest and western states. Prior to joining Orion, Carlos spent 5 years at The AES Corporation where he managed financial analysis for a clean coal project and led development on a regional liquefied natural gas and power project. Prior to his employment at AES, Carlos worked in multilateral and commercial banking and in the environmental sector. Carlos holds a Bachelor's degree in Human Biology and an honors degree in Latin American Studies from Stanford University. Carlos also received a joint MBA in Finance and Master's in Environmental Management from Yale University.

Al Germain is Orion's Director of Wind Resource Assessment and has 25 years of experience in the wind industry. Mr. Germain is responsible for managing all of Orion's site identification, wind resource assessment, data acquisition and analysis, site optimization, and energy forecasting activities. He has led site identification, wind resource monitoring, and energy yield analysis efforts for more than 1,500 MW of installed wind energy capacity in the U.S., Latin America, Europe, and Asia. Mr. Germain received a Bachelor's degree in Agricultural Engineering from the University of Wisconsin, and a Master's degree in Mechanical Engineering and Atmospheric Science from Oregon State University.

Kathryn Arbeit is responsible for Orion's project development activities in the northwestern U.S. She has been a project development manager with Orion for 4 years, engaged in all aspects of new project development. Before joining Orion, she was Senior Project Consultant at Nexant Inc., where she managed the design and development of energy efficiency and renewable energy programs for a variety of utility clients. Kathryn graduated from Stanford University in 1998 with a B.S. in Earth Systems.

Maria Wong is responsible for Orion's digital mapping, wind resource assessment, and wind resource database management. Maria has been with Orion for 1 year, and previously worked as a Geotechnical Engineer for Fugro (Hong Kong) Limited. She received a Bachelor's degree in Civil Engineering from the University of California at Davis.

D.4 QUALIFICATIONS OF KNOWN CONTRACTORS

OAR 345-021-0010(1)(d)(C) *The qualifications of any architect, engineer, major component vendor, or prime contractor upon whom the applicant will rely in constructing and operating the facility, to the extent that the identities of such persons are known when the application is submitted;*

Response: Orion has not yet selected its prime contractors or turbine suppliers for the Facility. Orion will work with experienced professionals in the engineering and construction and wind turbine manufacturing industries to complete the Facility.

Orion intends to conduct a competitive bid to award the contract for engineering services and Facility construction. The Request for Proposal (RFP) would be released following the granting of the Site Certificate. Likewise, Orion will consider competitive offers for the supply of the Facility's wind turbine generators (WTGs). Final decisions on both engineering procurement contractors and the sourcing of WTGs will be made based on competitive criteria such as the price, proven experience in constructing wind energy projects, financial capability, managerial resources, and environmental track record, among other factors.

D.5 APPLICANT'S PAST PERFORMANCE

OAR 345-021-0010(1)(d)(D) *The past performance of the applicant, including but not limited to the number and severity of any regulatory citations in constructing or operating a facility, type of equipment, or process similar to the proposed facility;*

Response: Orion has not had any regulatory citations in the construction or operation of any facility, equipment, or process.

D.6 APPLICANT WITH NO PREVIOUS EXPERIENCE

OAR 345-021-0010(1)(d)(E) *If the applicant has no previous experience in constructing or operating similar facilities and has not identified a prime contractor for construction or operation of the proposed facility, other evidence that the applicant can successfully construct and operate the proposed facility. The applicant may include, as evidence, a warranty that it will, through contracts, secure the necessary expertise; and*

Response: Not applicable.

D.7 ISO CERTIFIED PROGRAM

OAR 345-021-0010(1)(d)(F) *If the applicant has an ISO 9000 or ISO 14000 certified program and proposes to design, construct and operate the facility according to that program, a description of the program;*

Response: Orion does not have an ISO 9000 or 14000 certified program.

D.8 MITIGATION

OAR 345-021-0010(1)(d)(G) *If the applicant relies on mitigation to demonstrate compliance with any standards of Division 22 or 24 of this chapter, evidence that the applicant can successfully complete such proposed mitigation, including past experience with other projects and the qualifications and experience of personnel upon whom the applicant will rely, to the extent that the identities of such persons are known at the date of submittal.*

Response: Facility impacts to wildlife habitat, scenic or other resources may require mitigation. The Applicant's parent company, Orion Energy, LLC, has experience in completing mitigation for many of its wind energy projects.

The types of mitigation upon which the Applicant will rely to demonstrate compliance with Council standards are standard in the wind industry and a number of qualified contractors exist who successfully can perform this work. For most of Orion's project developments, Orion has agreed to use "best management practices" to control erosion and storm water during construction and to do post-construction site restoration of disturbed areas; to comply with industry standards for overhead power lines to reduce avian electrocution; and to meet regulatory standards for project removal and site restoration when the facility is decommissioned. For many wind projects, Orion has adjusted turbine siting or power line siting to reduce or avoid wildlife or aesthetic impacts.

Orion's principals have completed over 1,100 megawatts of wind energy projects in the United States, Canada, Latin America, Europe and Asia, many of which required wildlife mitigation. These principals and/or Orion have been involved in wildlife mitigation efforts, including the following:

- Set aside funds for the purchase of conservation land and agreed to limitations on the number of trees cut for the Waymart Wind Farm project in Wayne County, Pennsylvania.

- Completed pre-construction wildlife surveys for the Uinta County Wind Farm project in southwestern Wyoming to minimize impacts to raptor and grassland bird nests.

- Modified turbine siting, conducted post-construction avian monitoring, and implemented other wildlife mitigation for the Foot Creek Rim project in Wyoming.

- Funded duck marsh habitat and other wildlife mitigation for the Solano County project in California

If necessary, Orion will contract with qualified environmental firms with significant experience in mitigation planning and implementation to carry out any required mitigation projects. Orion's wildlife consultant for this Facility, Western EcoSystems Technology, Inc., has experience in successfully designing and completing wildlife mitigation on many wind energy projects, including facilities in the Pacific Northwest.

EXHIBIT E

PERMITS NEEDED FOR CONSTRUCTION AND OPERATION

OAR 345-021-0010(1)(e)

TABLE OF CONTENTS

E.1 INTRODUCTION

OAR 345-021-0010(1)(e) *Information about permits needed for construction and operation of the facility, including:*

Response: See sections below.

E.2 IDENTIFICATION OF NECESSARY PERMITS

OAR 345-021-0010(1)(e)(A) *Identification of all federal, state and local government permits needed before construction and operation of the proposed facility, legal citation of the statute, rule or ordinance governing each permit, and the name, address and telephone number of the agency or office responsible for each permit.*

Response:

E.2.1 Federal Permits

This section lists federal permits.

Permit: **Record of Decision (ROD)/NEPA Compliance**
(*This will be led by BPA*)

Agency: Kimberly St. Hilaire
Bonneville Power Administration
905 NE 11th Avenue
Portland, OR 97208
(503) 230-5361

Authority: 42 USCA 4332; 40 CFR pt 1500

Permit: **Clean Water Act, Section 404**

Agency: Karla Ellis
U.S. Army Corps of Engineers, Portland District
333 SW First Avenue
Portland, OR 97204
(503) 808-4380

Authority: 33 USCA 1344; 33 CFR parts 320, 323, 325-28, and 330

Permit: **Notice of Proposed Construction or Alteration** (Form 7460.1)

Agency: Federal Aviation Administration
Don Larsen
Northwest Mountain Regional Office
Air Traffic Division, ANM-520
1601 Lind Avenue, SW
Renton, WA 98055-4056
(425) 227-2520

Authority: 14 CFR Part 77

E.2.2 State Permits: Not Federally Delegated

The Energy Facility Siting Council (EFSC) determines compliance with Oregon statutes and rules for state agencies. This section lists authorizations that will be required under state law.

Permit: **Energy Facility Site Certificate**

Agency: Oregon Office of Energy, Energy Facility Siting Council
625 Marion Street NE, Suite 1
Salem, OR 97301-3742
(503) 378-4040

Authority: Oregon Revised Statute (ORS) 469.300 *et seq.*
Oregon Administrative Rule (OAR) Chapter 345
Divisions 1, 21-24

Permit: **Removal/Fill Permit**

Agency: Oregon Department of State Lands
775 Summer Street NE, Suite 100
Salem, OR 97031-1279
(503) 378-3805

Authority: ORS 196; OAR Chapter 141, Division 85

Permit: **Onsite Sewage Disposal**

Agency: Oregon Department of Environmental Quality
Eastern Division
2146 NE 4th
Bend, OR 97701
(541) 388-6146

Wasco-Sherman Public Health Department
419 E 7th Street
The Dalles, OR 97058
(541) 506-2600

Authority: ORS 454 and 468B; OAR Chapter 340, Divisions 71 and 73

Permit: **Water Right Permit or Water Use Authorization**

Agency: Oregon Water Resources Department
Water Rights Section
158 12th Street NE
Salem, OR 97310
(503) 378-8466

Authority: ORS 537; OAR 690 Divisions 310, 340, 410 and 502

Permit: **Oversize Load Movement Permit/Load Registration**

Agency: Oregon Department of Transportation
Motor Carriers Transportation Division
550 Capitol Street NE
Salem, OR 97301
(503) 378-1289

Authority: ORS 818.030; OAR Chapter 734 Division 82

Permit: **Archaeological Permit**

Agency: Oregon Parks and Recreation Department, SHPO
725 Summer Street NE, Suite C
Salem, OR 97301
(503) 986-0674

Authority: ORS 97, 358, and 390; OAR Chapter 736, Division 51

E.2.3 State Permits: Federally Delegated

EFSC does not determine compliance with statutes and rules if the federal government has delegated the decision on compliance to a state agency other than EFSC. This section lists state permits issued by state agencies under federally delegated programs.

Permit: **Construction Stormwater General and NPDES Permit 1200-C**

Agency: Oregon Department of Environmental Quality
Eastern Division
2146 NE 4th
Bend, OR 97701
(541) 388-6146

Authority: Clean Water Act, Section 402; 40 CFR § 122
ORS 468.065; 468B.030; ORS 468B.050; OAR 345 Division 45

Permit: **Water Quality Certification**

Agency: Oregon Department of Environmental Quality
811 SW 6th Avenue
Portland, OR 97204
(503) 229-5279

Authority: 33 USCA 1341, Section 401
OAR Chapter 340, Division 48

E.2.4 Local Permits

This section lists local permits:

Permit: **Conditional Use Permit**

Agency: Sherman County Planning Department and Planning Commission
110 Main St., Unit 2
Moro, OR 97039
(541) 565-3601

Authority: SCZO, Section 3.1.3.17—Commercial Utility Facilities

Permit: **Building Permit**

Agency: Sherman County Planning Department and Planning Commission
110 Main St., Unit 2
Moro, OR 97039
(541) 565-3601

Authority: ORS 454 and 468B; OAR Chapter 340, Divisions 71 and 73

E.3 DESCRIPTION OF NECESSARY PERMITS

OAR 345-021-0010(1)(e)(B) *A description of each permit and the reasons the permit is needed for construction or operation of the facility.*

Response:

E.3.1 Federal Permits

Record of Decision (ROD)/NEPA Compliance
42 USCA 4332; 40 CFR pt 1500

Interconnection to BPA's transmission system will be subject to review under the NEPA. The NEPA review (in this case an Environmental Impact Statement) will include review

under the Endangered Species Act, the National Historic Preservation Act, and related cultural resources protection statutes. This will be led by BPA.

Clean Water Act, Section 404
33 USCA 1344; 33 CFR parts 320, 323, 325-28, and 330

This permit is triggered if there are impacts to waters of the United States (Clean Water Act), including wetlands, by construction of the proposed Facility. The self-executing Nationwide Permit from the Corps applies to the utility line and activities associated with the Facility[1] (see Exhibit J). However, because the Corps' nationwide permit is self-executing, no further permission or permitting action from the Corps is required to carry out the utility or associated Facility activities.

Notice of Proposed Construction or Alteration (Form 7460.1)
14 CFR Part 77

The Facility turbine towers will be over 200 feet high and therefore will trigger review by the Federal Aviation Administration (the FAA) pursuant to 14 CFR part 77. Upon review of tower latitude, longitude, and height, the FAA issues a determinative notice if the Facility will interfere with flight paths or will require further conditions of the site certificate, such as minimum lighting requirements. However, no permit is issued by the FAA.

E.3.2 State Permits: Not Federally Delegated

Energy Facility Site Certificate
Oregon Revised Statute (ORS) 469.300 *et seq.*
Oregon Administrative Rule (OAR) Chapter 345
Divisions 1, 21-24

An Energy Facility Site Certificate is required before construction or operation.

Removal/Fill Permit
ORS 196; OAR Chapter 141, Division 85

A Removal/Fill Permit is required if there are impacts to waters of the United States (Clean Water Act), including wetlands, by construction of the proposed Facility. A Removal/Fill Permit will be required because removal and fill will be greater than the required threshold to obtain a permit (50 cubic yards).

Water Right Permit or Water Use Authorization
ORS 537; OAR 690 Divisions 310, 340, 410 and 502

[1] Nationwide Permit #12 covers construction, maintenance, and repair of utility lines and associated facilities in waters of the United States, provided the discharge from the Facility does not cause the loss of more than one-half of an acre of waters of the United States and the length of fill does not exceed 50 linear feet.

This permit is required for commercial uses of greater than 5,000 gallons per day from groundwater wells. The Facility will require withdrawal and use of water from the O&M Facility well; however, the well will produce less than 5,000 gallons per day.

Onsite Sewage Disposal
ORS 454 and 468B; OAR Chapter 340, Divisions 71 and 73

The new O&M facility will require an onsite sewage permit from the Wasco-Sherman Public Health Department. The process for siting a septic system requires a soil evaluation permit and a construction installation permit.

The O&M facility does not require a water pollution control facility (WPCF) permit from the Oregon Department of Environmental Quality (DEQ) because it does not have a flow of greater than 2,500 gallons per day, it will not handle sewage with a greater strength than residential wastewater, and it does not use a technology identified by DEQ as warranting regulation [OAR 340-071-0130 (15)].

Oversize Load Movement Permit/Load Registration
ORS 818.030; OAR Chapter 734 Division 82

This permit is required for hauling oversize or heavy loads on state highways.

E.3.3 State Permits: Federally Delegated

Construction Stormwater General and NPDES Permit 1200-C
Clean Water Act, Section 402; 40 CFR § 122
ORS 468.065; 468B.030; ORS 468B.050; OAR 345 Division 45

This permit is intended to meet the need for NPDES permits for storm water discharges associated with construction activity. It is required for construction projects that disturb more than 1 acre of ground.

Water Quality Certification
33 USCA 1341, Section 401; OAR Chapter 340, Division 48

Certification is required if a federal license or permit (i.e., Dredge/Fill Permit) is required to build the Facility. As discussed previously, the Applicant will conduct activities required for the construction, maintenance, and repair of utility lines that are covered by a Corps' self-executing Nationwide Permit. Most of the Nationwide Permits have pre-certification for water quality under section 401 of the Clean Water Act.

E.3.4 Local Permits

This section lists local permits:

Conditional Use Permit
SCZO, Section 3.1.3.17; Commercial Utility Facilities

This permit is applicable to all Facility components located in a land use with a conditional use designated for utility facilities. Commercial utility facilities are a conditional use permitted in the County's F-1 Zone. The applicable conditional use criteria are found in relevant provisions of SCZO Article 5. Approval of this Facility will be sought through the Council.

Building Permit
ORS 454 and 468B; OAR Chapter 340, Divisions 71 and 73

This permit is applicable to all Facility structures. This permit is submitted to Sherman County, but issued through Wasco County. A building permit is required for the facilities. This permit is submitted to Sherman County, but issued through Wasco County.

E.4 NON-FEDERALLY DELEGATED PERMIT APPLICATION

OAR 345-021-0010(1)(e)(C) *For state or local government permits or approvals for which the Council must determine compliance with applicable standards, evidence to support findings by the Council that construction and operation of the proposed facility will comply with all statutes, rules and standards applicable to the permit. The applicant may show this evidence:*

(i) In Exhibit J for permits related to wetlands;

Response: See Exhibit J. A state Removal/Fill Permit will be required to construct the Facility. The Applicant expects to submit this permit application to the Oregon Department of Energy and Oregon Department of State Lands in October 2005, and will incorporate the permit into this SCA at that time.

(ii) In Exhibit O for permits related to water rights.

Response: See Exhibit O. Commercial and industrial water uses of less than 5,000 gallons per day from a groundwater well are exempt from having to obtain a permit. Accordingly, no permit application will be submitted.

E.5 FEDERALLY DELEGATED PERMIT APPLICATION

OAR 345-021-0010(1)(e)(D) *For federally delegated permit applications, evidence that the responsible agency has received a permit application and the estimated date when the responsible agency will complete its review and issue a permit decision.*

Response: A 1200-C permit application will be submitted to ODE and DEQ in October 2005, and incorporated at that time into this SCA.

E.6 THIRD-PARTY PERMITS

OAR 345-021-0010(1)(e)(E) *If the applicant will not itself obtain a state or local government permit or approval for which the Council would ordinarily determine compliance but instead relies on a permit issued to a third party, identification of any such third-party permit and for each:*

(i) Evidence that the applicant has, or has a reasonable likelihood of entering into, a contract or other agreement with the third party for access to the resource or service to be secured by that permit;

Response: It is not anticipated that any third-party permits will be required to construct the Facility. Adequate quarries exist in the area to provide the needed materials for construction. However, if new or expanded quarry facilities are deemed to be necessary by the contractor, the contractor will be responsible for acquiring state or local permits.

(ii) Evidence that the third party has, or has a reasonable likelihood of obtaining, the necessary permit; and

Response: Not applicable.

(iii) An assessment of the impact of the proposed facility on any permits that a third party has obtained and on which the applicant relies to comply with any applicable Council standard.

Response: Not applicable.

E.7 FEDERALLY DELEGATED PERMIT ISSUED TO A THIRD PARTY

OAR 345-021-0010(1)(e)(F) *If the applicant relies on a federally delegated permit issued to a third party, identification of any such third-party permit for each:*

(i) Evidence that the applicant has, or has a reasonable likelihood of entering into, a contract or other agreement with the third party for access to the resource or service to be secured by that permit;

Response: No federally delegated permits will be needed by a third party in order to construct the Facility.

(ii) Evidence that the responsible agency has received a permit application; and

Response: Not applicable.

(iii) The estimated date when the responsible agency will complete its review and issue a permit decision.

Response: Not applicable.

E.8 MONITORING PROGRAM

OAR 345-021-0010(1)(e)(G) *The applicant's proposed monitoring program, if any, for compliance with permit conditions.*

Response: Monitoring requirements, if any, will be determined by the Council and by the federal agencies responsible for issuing permits or approvals for the Facility. The Applicant's proposed monitoring program for compliance with permit conditions is

described within this application, e.g., requirements for erosion control monitoring and reporting.

EXHIBIT F

PROPERTY OWNERSHIP

OAR 345-021-0010(1)(f)

TABLE OF CONTENTS

F.1 INTRODUCTION

OAR 345-021-0010(1)(f) *A list of the names and mailing addresses of all owners of record, as shown on the most recent property tax assessment roll, of property located within or adjacent to the corridor(s) the applicant has selected for analysis as described in subsection (b) and property located within or adjacent to the site of the proposed facility. The applicant shall submit an updated list of property owners as requested by the Office of Energy before the Office issues notice of any public hearing on the application for a site certificate as described in OAR 345-015-0220. In addition to incorporating the list in the application for a site certificate, the applicant shall submit the list to the Office in electronic format suitable to the Office for the production of mailing labels. Property adjacent to the proposed site of the facility or corridor means property that is:*

OAR 345-021-0010(1)(f)(A) *Within 100 feet of the site or corridor, where the site or corridor is within an urban growth boundary;*

OAR 345-021-0010(1)(f)(B) *Within 250 feet of the site or corridor, where the site or corridor is outside an urban growth boundary and not within a farm or forest zone;*

OAR 345-021-0010(1)(f)(C) *Within 500 feet of the site or corridor, where the site or corridor is within a farm or forest zone.*

Response: Table F-1 lists the names and mailing addresses of all owners of record, as shown on the most recent Sherman County property tax assessment roll, of property located within 500 feet of the turbine corridors or Biglow Canyon Wind Farm facilities such as roads, high-voltage lines, collection lines, or substations. The list has been submitted to the Office of Energy in an electronic format suitable for the production of mailing labels.

F.2 SUMMARY

Table F-1. Property Ownership Within 500 Feet of Facility Site

Landowner Names	Addresses	
Patrick and Lori Beers	P.O. Box 202	Rufus, OR 97050
John and Nancy Fields	75960 Hwy 97	Wasco, OR 97065
The Estate of I. Nerine Fields	75960 Hwy 97	Wasco, OR 97065
Norman and Marilyn Fridley	P.O. Box 46	Wasco, OR 97065
Barbara Ann Fridley	435 #4 Road	Goldendale, WA 98620
Donna Jean Smith Gatter	5213 NE 114th St.	Vancouver, WA 98686-4527
Delta Johnson Trust	c/o Delta Johnson, 3325 Columbia River Drive, #8	The Dalles, OR 97058
Thomas S and Helen K Macnab	c/o Kevin and Kathryn McCullough, P.O. Box 194	Wasco, OR 97065
James, Kevin and Kathryn McCullough	P.O. Box 194	Wasco, OR 97065
Mrs. Charles Macnab	405 E. Scenic Drive	The Dalles, OR. 97058
Gary and Mary Macnab	P.O. Box 251	Wasco, OR 97065

Table F-1. Property Ownership Within 500 Feet of Facility Site

Landowner Names	Addresses	
Patrick Macnab	P.O. Box 271	Wasco, OR 97065
Peter Macnab	608 Yates	Wasco, OR 97065
Macnab Inc.	P.O. Box 251	Wasco, OR 97065
Junietta Macnab, Trustee	745 E 18th	The Dalles, OR. 97058
Doug Medler	P.O. Box 1287	The Dalles, OR. 97058
Barbara Lee Svenson	110 SE 7th St	Clatskanie, OR. 97016
The Estate of Thilda Rettig	c/o Lois Moffett, 23223 131st Ave SE	Snohomish, WA 98296-5420
Robert and Alda Scharf, Trustees	Scharf Shadeland Farms, 7695 Tucker Rd.	Amity, OR 97101
Reine Thomas	6351 NE Brighton St, Orenco Station	Hillsboro, OR 97124
Dewey Thomas	P.O. Box 153	Wasco, OR 97065
Ronald K. and Melva D. Thomas	P.O. Box 7	Wasco, OR 97065
Dewey Thomas, Trustee	P.O. Box 153	Wasco, OR 97065
James Weir Memorial Trust	c/o Trena Gray, P.O. Box 325	Wasco, OR 97065
Vera Jean Campbell Trust	c/o U.S. Bank, Farm, Ranch & Timber Asset Management, P.O. Box 3588, PD-WA-T7TR	Spokane, WA 99220
Thomson and Constance Martin	P.O. Box 128	Rufus, OR 97050
Donald Coats	P.O. Box 45	Wasco, OR 97065
Dora O. Wright	c/o Donald Coats, P.O. Box 718	Rufus, OR 97050
Chester C. Coats	c/o J Thomas Coats, 113 "B" E 2nd St	The Dalles, OR 97058
Reid Ranch LLC	200 W. 9th Street	The Dalles, OR 97058
Bureau of Land Management	3015 NE 3rd Street	Prineville, OR 97754
George L. Jr. and Marlene O. Fox	1313 N. Williams	Kennewick, WA 99336
Liberty Medrick Trust	c/o Leslie Suskie, Trustee, 7510 Ridge Drive	Gladstone, OR 97027
Frank Zaniker	901 Richmond Street	The Dalles, OR 97058
Charles L. and Barbara J. Gray	P.O. Box 387	Wasco, OR 97065
Brett L. and Trena Gray	P.O. Box 325	Wasco, OR 97065
Gordon McKee	130 16500 SE 1st	Vancouver, WA 98684
Mac Five Farm LLC	3440 Vaughn St.	Portland, OR 97210
Richard E. Jones	1600-236 N. Rhododendron Drive	Florence, OR 97439
David and James Magaw	C/o Rachel Baars, 2461 Wildwood Road	Curtis, OR 97844
James E. and Dean W. Medler	c/o Louis Tatum Rev. Trust, Louann E. Jones, P.O. Box 426	Irrigon, OR 97844
Grant and Nancy Simpson	P.O. Box 370	Moro, OR 97039
William and Douglas Martin	P.O. Box 201	Rufus, OR 97050

Table F-1. Property Ownership Within 500 Feet of Facility Site

Landowner Names	Addresses	
Betty Rathburn	P.O. Box 193	Wasco, OR 97065
John Hilderbrand	96247 Hilderbrand Lane	Wasco, OR 97065
Tom McCoy	93340 Hwy 206	Wasco, OR 97065
Beverly Gunderson	c/o Eddie Gunderson Jr., 810 Hep-Spray Highway	Heppner, OR 97036
Riverview Community Bank	c/o Dale M., Waid, and Paula K Conner, P.O. Box 15	Rufus, OR 97050
Stevens Family Farms	c/o Herbert A. Stevens, P.O. Box 257	Husum, WA 98623
Robert C. Jones Jr.	c/o Mary Alice Jones, Trustee, 1928 South Century Lane	Spokane, WA 99037
Karen Falk	6056 Eight Mile Road	The Dalles, OR 97058
Stephen McMillin	11046 SW Riggs Road	Powell Butte, OR 87753
Eugene McMillin	622 Cedar Street	Leavenworth, WA 98826
Rosanna Hulse, Trustee	P.O. Box 427	Dufur, OR 87021
Joseph, Patricia, and John Lobbato, Co-Trustees	9870 SW Kent Court	Tigard, OR 97224
Estate of Marguerite Kaseberg	c/o Patricia Skiles, 504 Veterans Drive	The Dalles, OR 97058
John and Elaine Macnab	18450 Oakdale Road	Dalles, OR 97338
Dean W. Medler	2067 Hwy 52	Payette, ID 83661
James E. Medler	c/o Kelly Medler, 1064 SW Gaines	Portland, OR 97239
Jean Ellis	4012 NE 157th Court	Vancouver, WA 98682

EXHIBIT G

MATERIALS ANALYSIS

OAR 345-021-0010(1)(g)

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G.1 INTRODUCTION

Exhibit G provides evidence required by OAR 345-021-0010(1)(g). The following evidence provides an inventory of industrial materials of substantial quantity flowing into and out of the proposed Biglow Canyon Wind Farm Facility (Facility) and a description of Orion Sherman County Wind Farm LLC (Applicant) plans to manage hazardous substances and non-hazardous waste materials during construction and operation.

The Exhibit is organized in accordance with the application requirements contained in OAR 345-021-0010(1)(g).

OAR 345-021-0010(1)(g) *A materials analysis, including:*

G.2 INVENTORY OF INDUSTRIAL MATERIALS

OAR 345-021-0010(1)(g)(A) *An inventory of substantial quantities of industrial materials flowing into and out of the proposed facility during construction and operation;*

Response:

G.2.1 Construction

Table G-1 provides an inventory of industrial materials that will be used on the Facility in substantial quantities during Facility construction and operations. As shown in Table G-1, the primary construction materials are rock, water, concrete, steel, fiberglass, and assorted electrical equipment.

The type of turbine selected for the Energy Facility will affect the quantity of materials used at the Facility. The material inventories provided in this Exhibit provide the maximum assumed quantity of materials required to install either the minimum layout of 225 turbines rated at 1.5 megawatts (MW) each, or the maximum layout of 150 turbines rated at 3.0 MW each.

Construction of new and improved roads, temporary staging areas, and a Facility substation will require an estimated 321,000 cubic yards of rock or gravel, which contractors will bring onto the Facility site from offsite quarry sources. A breakdown of rock/gravel quantities includes:

- Approximately 263,000 cubic yards of rock/gravel will be used for construction of 43 miles of access roads, 29 turnarounds, and improvement of 0.7 mile of existing access roads.
- Approximately 48,000 cubic yards of rock/gravel might also be used for construction of a total of six 5-acre temporary staging areas and thirty 1-acre staging areas.
- Approximately 10,000 cubic yards of rock/gravel will be used for construction of a 6-acre Facility substation.

Table G-1 Inventory of Materials to be Used During Construction and Operation

Materials	Quantity/Units	Ultimate Disposition
CONSTRUCTION		
Rock/gravel for road improvement and construction	263,000 cubic yards	Will remain onsite as roadbed
Rock/gravel for temporary staging areas	48,000 cubic yards	Will be completely or partially removed after construction
Rock/gravel for substation	10,000 cubic yards	Will remain onsite at substation location
Water for dust control, road compaction, and concrete mixing	12 million gallons	Absorption/evaporation, or incorporated into concrete
Concrete for turbine pads	62,000 cubic yards	Incorporated into turbine pads
Steel for turbine towers[1]	33,800 tons	Incorporated into turbine towers
Nacelles (steel for generator, hub, and gearbox)[1]	18,100 tons	Mounted on turbine towers
Fiberglass for turbine blades[1]	4,500 tons	Incorporated into turbine blades
Electrical transformers	225	Mounted on concrete pad adjacent to turbine tower
Underground electrical cable	266 miles of conductor (88.6 miles per phase multiplied by three phases)	Buried underground
Overhead high-voltage transmission line	7 miles, approx. 70 wood-pole structures 21 miles of aluminum/ steel conductor (wire)	Will remain along selected route from the Energy Facility to point of connection with the BPA system
OPERATIONS AND MAINTENANCE		
Oils (turbine lubricant for maintenance)	1,100 gallons/year	Stored at operations and maintenance facility; added to turbine as needed
Oils (turbine lubricant used during operation)	19,575 gallons[2]	Stored in turbines. Gearbox: 80 gallons replaced every 3 years. Yaw Drives: 5 gallons replaced every 2 years. Pitch Drives: 2 gallons replaced 2 years after Commercial Operation Date, then every 4 years.
Ethylene Glycol (antifreeze)	675 gallons/year	Stored at operations and maintenance facility; added to turbine as needed
Simple Green (general cleaner)	675 gallons/year	Stored at operations and maintenance facility
WD40 for general lubrication	1,125 gallons/year	Stored at operations and maintenance facility
Round-up and 2,4-D for weed control	168 gallons/year	Stored at operations and maintenance facility

Notes:

[1] Material quantities for turbine towers, nacelles, and blades estimated from *Technical Documentation, Wind Turbine Generator Systems, Transport Descriptions*, GE Energy, 2005.

[2] Assumes 225 1.5-MW turbines.

The quantity of rock/gravel used for temporary staging areas is dependent on the time of year the construction occurs and the weather conditions. A portion of the rock/gravel used for temporary staging areas might be reclaimed from the site during restoration of those areas.

Total construction water use is estimated to be about 12 million gallons, with roughly half for dust control and the other half for other construction activities. Actual daily water use will vary, depending on the timing of construction and the weather (e.g., the need for dust control will be far greater in dry, windy summer conditions than at other times of year). Water will be applied by tanker trucks to roads and construction areas during the construction process for road compaction and to reduce dust from trucks and other construction activities. Water will also be combined with up to 62,000 cubic yards of concrete to construct a maximum of 225 concrete turbine pads and transformer pads (one each for each proposed turbine). See Exhibit O for a more detailed discussion of the water and its source.

Approximately 225 tons of steel will be required for each 3.0-MW turbine tower, assuming 150 turbine towers, resulting in a total of up to approximately 33,800 tons of steel required for the maximum turbine layout. Mounted on top of each turbine tower is a nacelle—the unit that houses the turbine itself, the rotor, blades, hub, and gearbox. An estimated maximum of 18,100 tons of steel will be required for construction of the nacelles, including the generator, hub, and gearbox, for the maximum 3.0-MW turbine layout. Approximately 4,500 tons of fiberglass will be used in the rotor blades. The minimum layout of 225 turbines rated at 1.5 MW each will require an equal or lesser quantity of steel and fiberglass.

An electrical transformer will be adjacent to each turbine tower. Transformers will contain non-polychlorinated biphenyl (non-PCB) mineral oil and will be sealed. Underground electrical cable will be used to connect the turbines.

A total of 468,000 feet (88.6 miles) of underground electrical collector lines will be installed at the site, with 3-phase conductors resulting in 1,402,000 feet (266 miles) of conductor. In some locations, the collector lines might be constructed above ground, on pole or tower structures. Aboveground structures allow the collector cables to "span" terrain such as canyons, native grasslands, wetlands, and intermittent streams, thus reducing environmental impacts, or to span cultivated areas, thus reducing impacts to farming. The overhead structures will generally be about 23 to 28 feet tall. In addition to the collector system, a high-voltage overhead transmission line will be constructed from the Facility substation at the Facility to the point of connection with the Bonneville Power Administration (BPA) system. The longer transmission line alternative will be approximately 7 miles long, depending on the selected point of connection to the BPA system. The transmission line will consist of up to 70 wood-pole structures and up to 21 miles of aluminum or steel conductors.

Finally, a number of smaller, ancillary structures will be constructed to support the primary operations at the Energy Facility. These structures include an operations and maintenance (O&M) facility of approximately 5,000 square feet, and up to 10 meteorological towers (up to approximately 85 meters [279 feet] tall). The quantity of materials from these structures is small in comparison to the materials required for construction of the primary structures at the Energy Facility, and thus have not been included in Table G-1.

As indicated in Table G-1, the materials used for construction will remain onsite, with the exception of water, which will be lost through absorption and evaporation. Materials used for temporary facilities, which will be removed after construction, have not been included in the materials estimate. Handling of construction wastes is discussed in Sections G.3 and G.4.

G.2.2 Operations

No substantial quantities of industrial materials will be brought onto or removed from the Energy Facility during operations. The only materials that will be brought onto the site will be those related to maintenance or replacement of Energy Facility components (e.g., nacelle or turbine components, electrical equipment). The only materials that will be removed from the Energy Facility will be those parts or facilities replaced during maintenance activities. Those materials removed or replaced will not constitute a significant amount.

G.3 MANAGEMENT OF HAZARDOUS SUBSTANCES

OAR 345-021-0010(1)(g)(B) *The applicant's plans to manage hazardous substances during construction and operation, including measures to prevent and contain spills; and*

Response: Hazardous materials that will be used on the Energy Facility include lubricating oils, cleaners, and herbicides, as shown in Table G-1. These materials will be used primarily during operations but potentially during construction as well. These hazardous materials will be stored in accordance with applicable regulations.

Hazardous materials will be used in a manner that is protective of human health and the environment and will comply with all applicable local, state, and federal environmental laws and regulations. Accidental releases of hazardous materials (e.g., vehicle fuel during construction or lubricating oil for turbines) will be prevented or minimized through the proper containment of these substances during use and transportation on the Energy Facility. Oily waste, rags, or dirty or hazardous solid waste will be collected in sealable drums and removed for recycling or disposal by a licensed contractor.

The types, amounts, and use of lubricants and cleaners at a wind facility make accidental releases of any significant quantities very unlikely. In the unlikely event of an accidental hazardous materials release, the spill or release will be cleaned up and the contaminated soil or other materials disposed of and treated according to applicable regulations. See Exhibit CC for a listing of applicable regulations. Spill kits containing items such as absorbent pads will be located on equipment and in the onsite temporary storage facilities to respond to accidental spills. Employees handling hazardous materials will be instructed in the proper handling and storage of these materials, as well as where spill kits are located.

G.4 MANAGEMENT OF NON-HAZARDOUS WASTE MATERIALS

OAR 345-021-0010(1)(g)(C) *The applicant's plans to manage non-hazardous waste materials during construction and operation.*

Response: Solid waste materials will be generated during construction from concrete and steel work. Wood (from concrete forms) and steel scraps (from turbine towers) will be separated and recycled to the extent feasible. Concrete and excavation waste will be used as fill onsite or will be removed from the Energy Facility for fill use elsewhere.

Disposal of materials as fill onsite will be conducted in accordance with OAR 340-093-0080 and other applicable regulations. OAR 340-093-0080 provides a variance or permit exemption for disposal of inert wastes. The inert waste must be demonstrated to be substantially the same as "clean fill." OAR 340-093-0080(2) defines clean fill as material consisting of soil, rock, concrete, brick, building block, tile, or asphalt paving that does not contain contaminants that could adversely impact waters of the state or the United States. To meet the clean fill definition, the inert construction debris will be separated from other debris that is not inert. The only clean fill that might be disposed of onsite will be waste concrete generated during construction. The construction contractor might (with the agreement of the landowner) bury waste concrete (excess cement mix from a construction site; batches of concrete that do not meet specifications) onsite. In such cases, the material will be placed in an excavated hole, covered with at least 3 feet of topsoil, and regraded to match existing contours.

Packing materials, paper, and refuse will be separated, accumulated in dumpsters, and periodically removed for recycling or disposal by a licensed waste hauler. Portable toilets will be provided for onsite sewage handling during construction and will be pumped and cleaned regularly by the construction contractor.

G.5 CONCLUSION

The foregoing evidence satisfies the Council's information requirements for materials analysis by providing an inventory of substantial quantities of industrial materials that will be used and by providing the Applicant's general plans for managing hazardous substances and non-hazardous waste materials. The evidence also demonstrates that the materials to be used at the Energy Facility will be managed in a manner that precludes any significant risk to public health and safety.

EXHIBIT H

GEOLOGIC AND SOIL STABILITY

OAR 345-021-0010(1)(h)

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TABLES

FIGURES *(located after text)*

H.1 INTRODUCTION

Exhibit H provides evidence to support a finding by the Council as required by **OAR 345-022-0020**, which states:

"(1) Except for facilities described in sections (2) and (3), to issue a site certificate, the Council must find that:

"(a) The applicant, through appropriate site-specific study, has adequately characterized the site as to seismic zone and expected ground motion and ground failure, taking into account amplification, during the maximum credible and maximum probable seismic events; and

"(b) The applicant can design, engineer, and construct the facility to avoid dangers to human safety presented by seismic hazards affecting the site that are expected to result from all maximum probable seismic events. As used in this rule 'seismic hazard' includes ground shaking, landslide, liquefaction, lateral spreading, tsunami inundation, fault displacement, and subsidence;

"(c) The applicant, through appropriate site-specific study, has adequately characterized the potential geological and soils hazards of the site and its vicinity that could, in the absence of a seismic event, adversely affect, or be aggravated by, the construction and operation of the proposed facility; and

"(d) The applicant can design, engineer, and construct the facility to avoid dangers to human safety presented by the hazards identified in subsection (c)[.]"

"(2) The Council may issue a site certificate for a facility that would produce power from wind, solar, or geothermal energy without making the findings described in section (1). However, the Council may apply the requirements of section (1) to impose conditions on a site certificate issued for such a facility[.]"

"(3) The Council may issue a site certificate for a special criteria facility under OAR 345-015-0310 without making the findings described in section (1). However, the Council may apply the requirements of section (1) to impose conditions on a site certificate issued for such a facility[.]"

Response: The evidence provided in the following sections demonstrates that this standard has been met because Orion Sherman County Wind Farm LLC (Applicant's) site-specific characterization of seismic, geologic, and soils hazards in the Biglow Canyon Wind Farm Facility (Facility) area indicates a low potential for risk, and the Facility will be designed and constructed to standards that adequately protect the Facility and the public from seismic, geologic, and soils hazards. The Exhibit is organized in accordance with the application requirements contained in OAR 345-021-0010(1)(h).

H.2 GEOLOGICAL AND TOPOGRAPHIC FEATURES

"Information from reasonably available sources regarding the geological and soil stability of the site and vicinity, providing evidence to support findings by the Council as required by OAR 345-022-0020, including:

"(A) A description of the geological features and topography of the site and vicinity[.]"

Response: The Biglow Canyon Wind Farm is located in the north-central part of Sherman County, in north-central Oregon. The Facility site is just south of the Columbia River, in an area situated between the John Day River to the east and US Highway 97 to the west. The topography and geology for the site and vicinity are summarized here. Figure H-1 shows the general geology of the area.

- *Topography:* Sherman County encompasses a total of 531,840 acres (831 square miles) in north-central Oregon and is approximately 20 miles wide and 42 miles long. The Columbia River forms the northern border of the county; the east and west boundaries are marked by the steep, deep canyons of the John Day River on the east and the Deschutes River on the west. The rugged canyons of Buck Hollow, a tributary of the Deschutes, mark the southwest border. The landscape of the county is defined by rolling hills and steep narrow canyons. Elevation ranges from 185 feet above sea level along the Columbia River to 3,600 feet on the highlands in the south. Nearly 58 percent of the county's land is tilled and soft white winter wheat is the major crop. Sherman County is the only county in Oregon without natural forestation (Oregon State University Extension Service, Sherman County, 2005)[1]. The local topography of the Facility area is characterized by gently rolling hills consisting primarily of wheat fields and other cultivated crops.

- *Geologic Features:* Sherman County is located entirely within the Deschutes-Columbia Plateau (a.k.a. Columbia Plateau) physiographic province. The Deschutes-Columbia Plateau is predominantly a volcanic province covering approximately 63,000 square miles in Oregon, Washington, and Idaho (Orr and Orr[2]). Volcanic rocks mapped as Columbia River Basalt Group (CRBG) underlie nearly the entire province. These rocks are middle Miocene in age (around 6 to 17 million years old) and consist principally of basalt that erupted from vents in central and northeast Oregon, southeast Washington, and Idaho, and flowed westward to the Pacific Ocean (Beeson et al., 1989).

  The Deschutes-Columbia Plateau is divided into three informal geographic subprovinces: the Yakima Fold Belt and the Blue Mountain and Palouse subprovinces (Meyer and Price, 1979). The Facility site is located in the Yakima Fold Belt subprovince, an area that is characterized by long, narrow anticlines (upward-arching folds in layered rocks), with intervening narrow to broad synclines (downward-arching folds) that extend in an easterly to southeasterly direction from the western margin of the plateau to its center.

  From a regional perspective, most major faults in the subprovince are thrust or reverse faults that strike generally parallel to the anticlinal fold axis. These faults are probably contemporaneous with the folding northwest- to north-trending shear zones and minor folds that commonly transect the major folds (Bauer and Hanson, 2000). The Facility site lies between the Columbia Hills Anticline to the north

[1] http://extension.oregonstate.edu/sherman/countynews/countyfacts.php

[2] http://www.wou.edu/las/physci/taylor/gs407rivers/orr_orr2.PDF

(Newcomb, 1966) and the Gordon Ridge Anticline and Grass Valley Syncline to the south (Bela, 1982).

During the end of the last ice age (approximately 12, 500 yrs ago), huge floods swept down the Columbia Gorge when giant ice dams repeatedly formed and failed in western Montana. The flood waters are thought to have reached a maximum elevation of 1,100 feet above mean sea level (amsl) in the Facility area. Where side canyons or tributaries enter the Columbia, the flood waters flowed back into them. Wherever side canyons crested a natural drainage divide below elevation 1,100 feet, natural "spillways" were formed and deeply scoured out. In the Facility area, Draper, Emigrant, Biglow, Fox, Box, Helm, Scott, Gehrking, and China Hollow canyons were all back flooded. Other major spillways near the Facility area include Phillipi, Blalock, Jones, and Alkalai canyons, to the east.

The flood waters carried huge icebergs that grounded as the waters subsided. These icebergs often carried very large boulders and other glacial debris, which they dropped when they grounded below the maximum flood level, elevation 1,100 feet.

- *Soils:* Soils in the Facility area generally consist of silty and sandy loams that formed from loess, a late Pleistocene soil. The silt loess that covers much of the uplands of the study area is largely derived from wind erosion of the surrounding alluvial and lacustrine deposits. These loess deposits consist of eolian silt and fine sand ranging from 0 to more than 40 feet thick, but they are typically less than 10 feet thick (Macdonald et al., 1999). Field reconnaissance of the Facility site, along with data provided in the Natural Resource Conservation Service Soil Survey for the Facility site, indicates the Facility area is generally covered by 4 to 6 feet of loess.

A review of aerial photography and field reconnaissance of the Facility site in August 2005 did not reveal evidence of slope instability, faulting, or ground rupture at the Biglow Canyon Wind Farm site.

H.3 SITE-SPECIFIC GEOLOGIC AND GEOTECHNICAL WORK

"(B) A description of site specific geological and geotechnical work performed or planned to be performed before construction. The applicant shall include:

"(i) A proposed schedule for geotechnical work[.]"

Response: A detailed site-specific geotechnical investigation of the Facility site will be conducted before construction activities begin. The investigation will assess subsurface soil and geologic conditions and provide information that will be used for the design of turbine foundations and foundations of other significant facility structures (i.e., O&M building, Energy Facility substation). The investigation will also provide data for the installation of underground collector cables and overhead lines.

H.3.1 Nature and Extent of Work

"(ii) A description of the nature and extent of the work with a discussion of the methods used to assess the expected ground response, including amplification, at the site[.]"

Response: Work performed at the Facility site will consist of geological and geotechnical exploration and engineering services to support the development of site-civil and foundation and design for the Facility. The geological and geotechnical exploration work conducted at the Biglow Canyon Wind Farm Facility could include the following services:

- Drilling to determine the subsurface profile at turbine locations and to collect soil and rock samples for classification and laboratory testing; the drilling could include in situ testing (such as pressuremeter, standard penetration tests) to estimate soil properties
- Excavating approximately six 3- to 4-foot-deep test pits along 34.5-kV collection circuits (home runs) to collect samples for soil thermal resistivity testing
- Performing seismic refraction and/or downhole seismic geophysical techniques at turbine locations to estimate the subsurface profile and estimate the dynamic properties of the soil and rock
- Conducting in situ Wenner soil electrical resistivity testing at turbine locations and at the interconnection substation
- Coordinating and conducting laboratory testing of soil and rock samples (including strength testing, index testing, soil corrosion testing, and thermal resistivity testing)
- Reviewing laboratory test results and perform engineering evaluation
- Preparing a geotechnical data report to summarize data and provide engineering recommendations for design

The geological and geotechnical exploration work will be conducted in advance of engineering design and site construction activities. The exploration and reporting will be completed by registered professional engineers and engineering geologists. Licensed surveyors will complete mapping and surveying using CADD and GPS surveying capabilities. The work described can be performed in any season, but is best performed without frost in the soil. Final design work for the turbine foundations will be completed by the construction contractor.

Methods used to assess the expected ground response, including amplification at the site, are presented in part (F) of this Exhibit (Section H.7, Seismic Hazard Assessment).

H.3.2 Professional Literature

"(iii) A list of the professional literature relied on in characterizing the site[.]"

Response:

Beeson, M.H., T.L. Tolan, and J.L. Anderson. 1989. *The Columbia River Basalt Group in western Oregon; geologic structures and other factors that controlled flow emplacement patterns.* In: Reidel, S.P., and P.R. Hooper, eds. *Volcanism and Tectonism in the Columbia River Flood-Basalt Province.* Geological Society of America Special Paper 239.

Bauer, H.H., and A.J. Hansen, Jr. 2000. *Hydrology of the Columbia Plateau Regional Aquifer System, Washington, Oregon, and Idaho.* U.S. Geological Survey Water Resources Investigations Report 96-4106. Tacoma, Washington.

Bela, J.L. 1982. *Geologic and Neotectonic Evaluation of North-central Oregon: The Dalles 1° by 2° Quadrangle.* Oregon Department of Geology and Mineral Resources Geologic Map Series GMS-27, Portland, Oregon.

Building Seismic Safety Council. 2003. *2003 Edition NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other Structures, Part 1 – Provisions.* Federal Emergency Management Agency report FEMA 450. Washington, D.C.

Geomatrix Consultants. 1995. *Seismic Design Mapping, State of Oregon.* Prepared for Oregon Department of Transportation. Facility No. 2442.

Geomatrix Consultants. 1996. *Probabilistic Seismic Hazard Analysis, DOE Hanford Site, Washington.* Prepared for Westinghouse Hanford Company. Facility No. 2169. WHC-SD-W23A-TI-OO2, Rev. 1A. February.

International Code Council. 2003. International Building Code: Building Officials and Code Administrators International, Inc., International Conference of Building Officials, Southern Building Code Congress International.

Kramer, Steven L. 1996. *Geotechnical Earthquake Engineering.* Upper Saddle River, New Jersey: Prentice-Hall, Inc.

Macdonald, Gerald D., James M. Lamkin, and Roger H. Borine. 1999. *Soil Survey of Sherman County Oregon.* Natural Resource Conservation Service, U.S. Department of Agriculture.

Madin, Ian P. 1994. *Earthquake Database for Oregon 1833 – 10/25/93.* Open File Report 0-94-4, Oregon Department of Geology and Mineral Industries.

Meyer, C.W., and S.M. Price. 1979. *Geologic Studies of the Columbia Plateau, A Status Report.* Rockwell International, Rockwell Hanford Operations RHO-BWI-ST-4.

Uniform Building Code. 1997. *International Conference of Building Officials*, Vol. 2. Whittier, California.

USGS (U.S. Geological Survey). 2005a. Earthquake Hazards Program, National Seismic Hazard Mapping Project Web Page. URL: http://eqhazmaps.usgs.gov/. Golden, Colorado. Accessed August 3, 2005.

USGS (U.S. Geological Survey). 2005b. Earthquake Hazards Program, Earthquake Search Web Page. URL: http://neic.usgs.gov/neis/epic/epic_circ.html. Golden, Colorado. Accessed August 3, 2005.

U.S. Geological Survey. 1989. *Volcanism and Tectonism in the Columbia River Flood-Basalt Province*, USGS Special Paper 239, ISBN 0-8137-2239-X.

Walker, G.W., and N.S. MacLeod. 1991. Geologic Map of Oregon: U. S. Geological Survey, scale 1:500,000, 2 sheets.

H.3.3 Responsible Personnel

"(iv) The names of the personnel responsible for the work and a description of their relevant experience[.]"

Response: The personnel responsible for the preparation of work contained in this exhibit are listed and described here.

Josh Butler, P.E. Josh Butler is a geotechnical engineer with 8 years experience in the design and management of geotechnical projects, including leadership of complex exploration programs. Mr. Butler has been involved with multiple wind power projects in the northwest and in Europe, including the Stateline Wind Power project. His experience comprises field investigations, laboratory testing programs, geotechnical analyses, site civil design, including grading and drainage plans, design of roadway embankments, design of shallow and deep foundations, and preparation of drawings and specifications. Mr. Butler has M.S. and B.S. degrees in civil/geotechnical engineering from Utah State University and is a registered professional engineer in Idaho.

Nason McCullough, Ph.D. Nason McCullough is a geotechnical engineer with 7 years experience conducting field explorations, seismic hazard studies, and geotechnical engineering analysis and design of shallow and deep foundations, embankment dams, and slopes for both static and seismic design. Dr. McCullough has been involved with the Stateline Wind Power project. He has Ph.D., M.S., and B.S. degrees in civil engineering from Oregon State University, with emphasis in geotechnical engineering.

Mike Pappalardo, R.G. Mike Pappalardo is a geologist with more than 16 years of experience conducting geologic investigations, hydrogeology exploration, project management, and environmental planning. He has participated in several wind power projects in the northwest, including the Stateline Wind Power and Wild Horse Wind Power projects. Mr. Pappalardo has a B.S. degree in geology from the University of Oregon and is a registered geologist in Oregon and Washington.

Vince Rybel, P.E. Vince Rybel is a geotechnical engineer with more than 33 years of geotechnical and general civil engineering experience, including project and construction

management. He has extensive experience with geotechnical site reports, as well as the development of foundation design and construction recommendations. Mr. Rybel worked extensively for several years on the Stateline Wind Power project near Walla Walla, Washington. He has M.S. (geotechnical) and B.S. degrees in civil engineering from the University of Illinois and is an active registered professional engineer in Oregon, Washington, Kentucky, and Ohio. He has inactive status in Indiana, Nevada, the territory of Guam and Alaska.

H.4 TRANSMISSION LINES

"(C) For all transmission lines, a description of locations along the proposed route where the applicant proposes to perform site specific geotechnical work, including but not limited to railroad crossings, major road crossings, river crossings, dead ends, corners, and portions of the proposed route where geological reconnaissance and other site-specific studies provide evidence of existing landslides or marginally stable slopes that could be made unstable by the planned construction."

Response:

Geological and geotechnical exploration work will be conducted in advance of engineering design and site construction activities along transmission lines (and other components) constructed for the Facility. Registered professional engineers and engineering geologists will conduct field reconnaissance to determine site specific locations for further geological and geotechnical exploration activities. These locations will include major road crossings, river crossings, dead ends, corners, and portions of the proposed route where reconnaissance and other site-specific studies provide evidence of existing landslides or marginally stable slopes that could be made unstable by the planned construction. As noted above in Section H.3.1, these activities could include drilling, test pits, geophysical analysis, laboratory testing of soil and rock samples and preparation of a Geotechnical Data Report that will summarize data and provide engineering recommendations for design along transmission line routes.

H.5 PIPELINES

"(D) For all pipelines that would carry explosive, flammable, or hazardous materials, a description of locations along the proposed route where the applicant proposes to perform site specific geotechnical work, including but not limited to railroad crossings, major road crossings, river crossings, and portions of the proposed alignment where geologic reconnaissance and other site specific studies provide evidence of existing landslides or marginally stable slopes that could be made unstable by the planned construction[.]"

Response: There will be no pipelines or related or supporting facilities that would carry explosive, flammable, or hazardous materials, as defined on ORS 469.300, proposed by the Biglow Canyon Wind Farm Facility within Oregon.

H.6 SOIL STABILITY MAP

"(E) A map showing the location of the existing and significant potential geological and soil stability hazards and problems, if any, on the site and in its vicinity that could adversely affect, or be aggravated by, the construction and operation of the proposed facility[.]"

Response: No significant potential geological or soil stability hazards were identified at the Facility site. Most of the slopes in this region consist of basalt with a thin veneer of loess, which are not generally susceptible to slope stability failures at this angle. In addition, turbines and other Energy Facilities components will be set back sufficiently from slopes to protect against highly unlikely instabilities.

H.7 SEISMIC HAZARD ASSESSMENT

"(F) An assessment of the seismic hazards. For the purposes of this assessment, the maximum probable earthquake (MPE) is the maximum earthquake that could occur under the known tectonic framework with a 10 percent chance of being exceeded in a 50-year period. If seismic sources are not mapped sufficiently to identify the ground motions above, the applicant shall provide a probabilistic seismic hazard analysis to identify the peak ground accelerations expected at the site for a 500-year recurrence interval and a 5,000-year recurrence interval. In the assessment, the applicant shall include:"

"(i) Identification of the Oregon Building Code Seismic Zone designation for the site[.]"

Response: With adoption of the 2003 International Building Code (IBC; International Code Council, 2003), Oregon no longer identifies a seismic zone designation. Previous to the adoption of the 2003 IBC, the area was designated as Oregon Building Code Seismic Zone 2B, a relatively low hazard zone (particularly compared with Alaska and California), which is associated with a seismic zone factor of 0.2 (UBC, 1997). The seismic design parameters for the 2003 IBC are an S_s factor of 0.45 and an S_1 factor of 0.15.

H.7.1 Earthquake Sources

"(ii) Identification and characterization of all earthquake sources capable of generating median peak ground accelerations greater than 0.05g on rock at the site. For each earthquake source, the applicant shall assess the magnitude and minimum epicentral distance of the maximum credible earthquake (MCE) and the MPE[.]"

Response: The seismic hazard in the Biglow Canyon Wind Farm Facility area results from three seismic sources: Cascadia Subduction Zone interplate events, Cascadia Subduction Zone intraslab events, and crustal events (Geomatrix, 1995, 1996).

Two of the potential seismic sources, interplate and intraslab events, are related to the subduction of the Juan De Fuca plate beneath the North American plate. Interplate events occur because of movement at the interface of these two tectonic plates. Intraslab events originate within the subducting tectonic plate, away from its edges, when built-up stresses within the subducting plate are released. These source mechanisms are referred to as the Cascadia Subduction Zone (CSZ) source mechanism. The CSZ is located near the

coastlines of Oregon, Washington, and British Columbia. The two source mechanisms associated with the CSZ are currently thought to be capable of producing maximum earthquakes with moment magnitudes of approximately 9.0 and 7.5, respectively (Geomatrix, 1995; USGS, 2005a,b).

Earthquakes caused by movements along crustal faults, generally in the upper 10 to 15 miles, result in the third source mechanism. In the vicinity of the Biglow Canyon Wind Farm Facility, earthquakes occur within the crust of the North America tectonic plate when built-up stresses near the surface are released through fault rupture. There are several crustal faults in the vicinity of the Facility, including several northwest-striking faults that have been mapped by various authors near The Dalles and Arlington-Shutler Buttes Faults (Personius et al., 2003). However, none of these fault zones have been identified in the Facility area itself and these faults are generally considered to be inactive or to have a low probability of activity.[3]

The peak ground acceleration (PGA) at the site resulting from a seismic event on one of these source mechanisms was estimated using information developed by the USGS in its National Seismic Hazard Mapping Facility (USGS, 2005a,b). This information includes estimated PGA at a theoretical soft rock/stiff soil interface for different probabilities of exceedance. The USGS database also provides deaggregation information throughout the United States. The deaggregation information provides estimates of the mean earthquake moment magnitude and mean epicentral distance associated with given probability of exceedance at a given location.

The maximum probable earthquake (MPE) is considered to be an earthquake that has a probability of exceedance of approximately 10 percent in 50 years (an approximate 500-year recurrence interval). The U.S. Geological Survey (USGS) deaggregation information indicates that the MPE mean moment magnitude is magnitude 6.25 at a mean distance of 40 miles, with an associated PGA at the soft rock/stiff soil interface of 0.087g (USGS, 2005a,b).

The maximum considered earthquake (MCE) is considered to be an earthquake that has a probability of exceedance of approximately 10 percent in 50 years (an approximate 2,500-year recurrence interval). The USGS estimates that a mean MCE moment magnitude of 6.1 at a distance of 16 miles will produce a PGA of 0.19g. Figures H-2 and H-3 show the deaggregation data for the MPE and MCE events.

H.7.2 Recorded Earthquakes

"(iii) A description of any recorded earthquakes within 50 miles of the site and of recorded earthquakes greater than 50 miles from the site that caused ground shaking at the site more intense than the Modified Mercalli III intensity. The applicant shall include the date of

[3] Geomatrix Consultants, Inc. (1990) inferred that most faults near The Dalles were not active. No evidence of Quaternary displacement has been documented along the Arlington-Shutler Butte fault. The U.S. Army Corps of Engineers (1983) used regional structural relationships to suggest that youngest movement on the fault occurred more than 1 Ma, but airphoto analysis by S.K. Pezzopane (1993) and pers. comm. (1993) in Geomatrix Consultants Inc. (1995), and Geomatrix Consultants, Inc. (1995) suggest that the Arlington-Shutler Butte fault has "good geomorphic expression" of faulting and may have been active in the middle or late Quaternary (<700-780 ka). The fault also is mapped as active in the middle or late Quaternary (<780 ka) by Weldon et al. (2002).

occurrence and a description of the earthquake that includes its magnitude and highest intensity and its epicenter location or region of highest intensity[.]"

Response: Table H-1 provides the date of occurrence, epicenter, depth, reported magnitude, intensity, and distance (unless otherwise noted) of earthquakes within 50 miles of the Facility site. Table H-2 lists recorded earthquakes greater than 50 miles from the site that caused ground shaking at the site more intense than Modified Mercalli (MM) III shaking intensity or greater at the Facility site. For reference, an intensity of MM III is associated with shaking that *is* "noticeable indoors, but may not be recognized as an earthquake." An intensity of MM VII is "noticed by people driving cars, everyone runs outdoors, and slight to moderate damage is caused to well-built, ordinary buildings." The largest recorded earthquake to shake the Facility area was the magnitude 7.1 earthquake in Olympia, Washington in 1949, which caused a shaking intensity of MM VIII at its epicenter (Table H-2). Other significant historical earthquakes could have resulted in ground shaking more intense than MM III in the Facility area. However, data on the actual intensity of these earthquakes were not recorded, are not readily available, or occurred prior to the historical record. *All the earthquakes within recorded history that have occurred within 50 miles of the project site have a magnitude less than 5.0.*

Information in Table H-1 was developed by means of information screened from earthquake databases given by the Oregon Department of Geology and Mineral Industries (Madin, 1994; Niewendorp and Neuhaus, 2003) and the USGS Earthquake Hazards Program (USGS, 2005a,b).

Table H-1. Recorded Earthquakes within 50 Miles[1] of the Biglow Canyon Wind Farm[2]

Year	Month	Day	Approximate Geographic Location or		Magnitude[3]	Depth (mi)	Intensity[4]	Distance (mi)
			Latitude	Longitude				
1866	11	24	The Dalles		3.7	..	IV	29
1866	12	1	The Dalles		3.0	..	III	29
1892	2	29	The Dalles		3.7	..	IV	29
1920	11	28	45.70	121.50	3.7	..	IV	44
1975	7	1	45.63	120	3.5	5	..	26
1976	4	12	45.22	120.77	4.8	15	VI	21
1976	4	17	45.08	120.8	4.2	15	.F	28
1981	6	14	45.95	120.49	3.1	14	..	38
1985	2	10	45.86	119.64	3.7	5	IVF	49
1987	9	8	45.18	120.08	3.1	1	..	21
1988	9	29	45.85	120.26	3.5	13	..	32
1989	3	27	45.82	120.26	3.1	12	..	30
1993	12	16	45.2	120.09	3	6	..	21
1993	12	18	45.25	120.11	3.1	0	..	24
1995	8	29	46.21	119.91	3.1	15	..	60
1997	3	22	45.19	120.07	3.9	1	..	22
1997	3	23	45.2	120.07	3.4	1	..	21

Table H-1. Recorded Earthquakes within 50 Miles[1] of the Biglow Canyon Wind Farm[2]

Year	Month	Day	Approximate Geographic Location or		Magnitude[3]	Depth (mi)	Intensity[4]	Distance (mi)
			Latitude	Longitude				
1997	4	17	45.19	120.08	3.2	1	..	21
1997	10	13	46.1	120.36	3.3	17	..	49
1998	2	3	45.81	120.2	3.1	16	..	30
1999	8	31	45.19	120.09	3.2	3	..	21
2000	1	30	45.2	120.12	4.1	0	.F	19
2000	1	30	45.19	120.1	3.4	8	.F	21
2000	2	1	45.19	120.11	3.6	0	..	20
2000	8	17	45.31	120.04	3.2	15	..	19

1 The approximate center of the Facility site is located at latitude 45° 39' 49" N, longitude 120° 35' 42" W.

2 Source: Beaulieu, 1977; Madin, 1994; Niewendorp and Neuhaus, 2003; and USGS Earthquake Hazards Program, Earthquake Search (see http://neic.usgs.gov/neis/epic/epic_circ.html). Databases accessed for the Earthquake Search includes Significant U.S. Earthquakes 1568 to 1989 and USGS/NEIC (PDE) 1973 - Present.

3 Magnitude values are calculated by the USGS. Magnitude values are Local Magnitudes(ML) and Coda Duration Magnitude (MD). LM magnitude is generally referred to as the true "Richter magnitude". The values are computed for distances less than 600 km with depths less than 70 km. MD estimates are derived from the duration or coda length of earthquake vibrations. Duration or coda length magnitude scales are normally adjusted to agree with ML (see http://neic.usgs.gov/neis/epic/code_magnitude.html).

4 Modified Mercalli intensity scale. Dashed line equals no data for that event. F indicates that the event was felt in the area.

Table H-2. Significant Historical Earthquakes Greater than 50 miles[1] from the Biglow Canyon Wind Farm[2]

Year	Month	Day	Approximate Geographic Location or		Magnitude[3]	Intensity[4]
			Latitude	Longitude		
1700	1	26	Offshore, Cascadia Subduction Zone		9.0	NA
1872	12	15	47.90	120.30	7.0	IXF
1877	10	12	45.75	122.50	NA	VIIF
1893	3	7	45.90	119.30	4.7	VI
1921	9	14	Walla Walla, WA		5.0	VI
1936	7	15	45.97	118.21	5.8	VII
1949	4	13	47.17	122.62	7.1	VIIIF
1951	1	7	McNary, OR		4.3	V
1959	8	18	44 50	111.01	6.3	VIII
1962	11	6	45.64	122.59	5.2	VIIF
1965	4	29	47.40	122.30	6.7	VIIIF
1974	12	13	45.26	121.6	4.1	IVF
1992	8	7	45.86	119.59	3.9	VF
1993	3	25	45.03	122.61	5.7	VIIC
2001	2	28	47.15	122.73	6.8	VIII
2002	6	29	45.33	121.69	4.5	IVF
2002	6	29	45.34	121.68	3.8	IIIF

1 The approximate center of the Facility site is located at latitude 45° 39' 49" N, longitude 120° 35' 42" W.

2 Source: Beaulieu, 1977; Madin, 1994; Niewendorp and Neuhaus, 2003; and USGS Earthquake Hazards Program, Earthquake Search (see http://neic.usgs.gov/neis/epic/epic_circ.html). Databases accessed for the Earthquake Search includes

Table H-2. Significant Historical Earthquakes Greater than 50 miles[1] from the Biglow Canyon Wind Farm[2]

Year	Month	Day	Approximate Geographic Location or		Magnitude[3]	Intensity[4]
			Latitude	Longitude		

Significant U.S. Earthquakes 1568 to 1989 and USGS/NEIC (PDE) 1973 - Present.

3 Magnitude values are calculated by the USGS. Magnitude values are Local Magnitudes(ML) and Coda Duration Magnitude (MD). LM magnitude is generally referred to as the true "Richter magnitude". The values are computed for distances less than 600 km with depths less than 70 km. MD estimates are derived from the duration or coda length of earthquake vibrations. Duration or coda length magnitude scales are normally adjusted to agree with ML (see http://neic.usgs.gov/neis/epic/code_magnitude.html).

4 Modified Mercalli intensity scale. Dashed line equals no data for that event. F indicates that the event was felt in the area.

H.7.3 Median Ground Response Spectrum

"(iv) Assessment of the median ground response spectrum from the MCE and the MPE and identification of the spectral accelerations greater than the design spectrum provided in the Oregon Building Code. The applicant shall include a description of the probable behavior of the subsurface materials and amplification by subsurface materials and any topographic or subsurface conditions that could result in expected ground motions greater than those characteristic of the Oregon Building Code Seismic Zone identified above[.]"

Response: As previously noted, Oregon has adopted the 2003 IBC. Therefore, the following analysis is based on IBC criteria. The 2003 IBC develops a design spectrum by using two-thirds of the Maximum Considered Earthquake (MCE) ground motion. The MCE earthquake combines probabilistic earthquakes with a 2 percent probability of exceedance in 50 years (recurrence interval of about 2,500 years), with modifications for deterministic ground motions, where necessary (Leyendecker et al., 2000).

The design response spectra for the site based on the USGS probabilistic seismic hazard study (USGS, 2005a,b) and the 2003 IBC are shown in Figure H-4. The estimated site amplification is based on the Building Seismic Safety Council (2003) provisions. The site class is estimated to be S_B based on shear wave velocities measured in similar materials (Barr Engineering Company, 2004). A site class S_B results in a site amplification of 1.0, therefore the ground surface PGA and spectral acceleration are anticipated to be the same as the bedrock (soft rock/stiff soil) interface ground motions determined from the USGS (2005a,b).

The response spectra indicate that a design per the MPE event (500 year) is well within the IBC 2003 design code spectra.

H.7.4 Seismic Hazards Expected to Result from Seismic Events

"(v) An assessment of seismic hazards expected to result from reasonably probable seismic events. As used in this rule 'seismic hazard' includes ground shaking, landslide, lateral spreading, liquefaction, tsunami inundation, fault displacement, and subsidence[.]"

Response: A review of site geology and available literature suggests that the risk of ground rupture related to fault displacement in the Facility vicinity is low. There are no

mapped faults on the Facility site and earliest movement along nearby faults (The Dalles and Arlington-Shutler Buttes Faults) has been estimated to have occurred 700,000 to 1.6 million years ago (Personius et al., 2003). The topography of the Facility area is characterized by gently rolling hills, bedrock is believed to be generally shallow (less than 10 feet in most locations), and the groundwater table is deep. Therefore, the potential for ground rupture, earthquake-induced landslides and slope instability, lateral spreading, liquefaction, and settlement or subsidence at the site are low.

Tsunami inundation is also not a seismic hazard at this inland site. The Facility is not located near any large water bodies and is over 1,000 feet above the Columbia River.

Because the potential for seismic induced hazards are low at the Facility site, mitigation measures to address these hazards in the siting, design, and construction of the Facility are not necessary. The design of the turbine tower can readily accommodate the level of seismic energy described in part F.IV (subsection H.7.3, Median Ground Response Spectrum.

H.8 NONSEISMIC GEOLOGIC HAZARDS

"(G) An assessment of soil-related hazards such as landslides, flooding, and erosion which could, in the absence of a seismic event, adversely affect or be aggravated by the construction or operation of the facility[.]"

Response: The basalt rock present over most of the Facility area is generally competent rock, free of existing landslides. No landslides were observed during the site reconnaissance.

The Facility will temporarily disturb 381 acres during construction and the Facility's permanent footprint will be approximately 170 acres. The potential for erosion related to construction activities is moderate. Soil erosion potential within the Facility study area is typically moderate to high, with the presence of existing vegetation. Because of steady, high wind speed, areas of vegetation removal are likely to expose soils to accelerated water and wind erosion until they are stabilized. The action also will alter the landscape with minor cuts and fills for roadways and leveling for turbine foundations. These alterations will result in some minimal impact to existing topography and surface drainage that could potentially cause erosion of area soils. Best management practices will be implemented by the construction contractor through the Facility's National Pollutant Discharge Elimination System (NPDES) 1200-C Stormwater Construction Permit to mitigate the potential for erosion.

The elevation of the Facility site in Oregon is well above the flood elevations for the area, resulting in no flood-related hazards to human safety or to the Facility operations in Oregon.

H.9 SEISMIC HAZARD MITIGATION

"(H) An explanation of how the applicant will design, engineer, and construct the facility to avoid dangers to human safety from the seismic hazards identified in paragraph (F). The

applicant shall include proposed design and engineering features, applicable construction codes, and any monitoring for seismic hazards[.]"

Response: The Oregon Building Code (OBC) uses the IBC 2003 Edition, with current amendments by the State of Oregon and local agencies. Pertinent design codes as they relate to geology, seismicity, and near-surface soils are contained within IBC chapter 16, sections 1614 and 1615, Earthquake Loads and Site Ground Motion, respectively, with slight modifications by the current amendments of the State of Oregon and by local agencies. All facilities for the Biglow Canyon Wind Farm Facility must be designed to or exceed these minimum standards.

The building code will provide adequate protection to human safety for the Facility. The IBC design spectra exceed the USGS site-specific spectra, having a 500-year return period. The Facility will comprise improved roadways, wind turbine towers, and underground collector cables. There will be no continually manned facilities other than the Facility's office (operations and maintenance building), and in general, the area is used for agriculture or cattle grazing and is sparsely populated. Therefore, because this is a wind power generation facility in a thinly populated area, and not a more critical structure, such as a petroleum pipeline or an earth dam, the risks to human safety related to seismic hazards, for example, a tower collapse or a landslide, are minimal.

Current engineering standards (i.e., IBC) will be used in the design of the Facility. These standards require that under the design earthquake, the factors of safety, or resistance factors used in design, exceed certain values. For example, in the case of slope design, a factor of safety of at least 1.1 is normally required during the evaluation of seismic stability. This factor of safety is introduced to account for uncertainties in the design process and to ensure that performance is acceptable. Similar conservatism is introduced during the design of structures and pipelines through the use of load and resistance factors. As in the case of slope stability, these factors are introduced to ensure acceptable performance during the design seismic event. By introducing these levels of conservatism into the design methods being applied, other requirements such as setback distances are also defined. In the event that factors of safety for slope stability are not met, common practice is to estimate amounts of soil displacement. If this displacement is predicted to cause permanent structural damage or risk to occupants, remedial measures are required to mitigate the risk. For slope stability the remedial measures could include use of ground improvement methods, including retaining structures, to limit the movement to acceptable levels. These standards are appropriate protection measures for human safety, given the relatively low level of risk for the Biglow Canyon Wind Farm Facility.

H.10 NONSEISMIC HAZARD MITIGATION

"(I) An explanation of how the applicant will design, engineer, and construct the facility to adequately avoid dangers to human safety presented by the hazards identified in paragraph (G)[.]"

Response: Because the construction of roads and turbine foundations will be engineered, and will be subject to an erosion control plan and an NPDES 1200-C construction permit

(see Attachments E-1 and E-2 of Exhibit E), it is likely that the Facility will be constructed with more protections against erosion than existing farm roads and pastures in the Facility area. Work on the access roads will include grading and regraveling of existing roads and construction of new roads. Surface water drainage provisions, including gravel-lined drainage ditches and culverts, also will be included for short- and long-term surface water control.

Erosion control measures to be installed during work on the access roads could include:

- Maintenance of vegetative buffer strips between the areas impacted by construction activities and any receiving waters
- Installation of sediment fence/straw bale barriers at locations shown on the plans
- Straw mulching and discing at locations adjacent to the road that have suffered impacts
- Provision of temporary sediment traps downstream of intermittent stream crossings
- Provision of sediment type mats downstream of perennial stream crossings
- Planting of designated seed mixes at affected areas adjacent to the road

Some construction equipment staging areas will be created during the road work. A sediment fence will be installed along the downslope side of these staging areas, as appropriate.

All areas affected by the construction will be seeded when there is adequate soil moisture. They will be reseeded in the spring if a healthy cover crop does not grow. The sediment fence and check dams will remain in place until the affected areas are well vegetated and the risk of erosion has been eliminated. The Applicant will remove the sediment fence at that time.

Whenever feasible, roadways will be constructed such that surface drainage continues to natural drainage patterns, with minimal diversions through ditches and culverts. Surface water will be diverted from turbine facilities into natural drainage paths via drainage ditches. Regular maintenance of drainage facilities will ensure continued proper operation.

Biglow Canyon Wind Farm facilities will be located to avoid potential landslide hazards, and new slopes will be designed with an adequate safety factor against sliding. All structures will be constructed with sufficient setback from slopes to mitigate against landslide induction related to their construction.

H.11 CONCLUSION

The risk of seismic hazards to human safety at the proposed site is small. The probability of a large-scale seismic event centered at or near the Facility is also small. The facilities will all be unoccupied (except for times of temporary maintenance) and will be located in sparsely populated areas. As a result, the probability of a large seismic event occurring

while the facility is occupied is much lower than that for a normal building or similar facility. This very low probability results in minimal risk to human safety.

The basalt rock in the area is not generally prone to large-scale landslides, as evidenced by the lack of these types of features in the area. Small active faults could potentially occur in the general Facility area; however, no such fault has been identified and the activity of nearby faults identified outside the Facility boundary is generally very low. The characteristics of the Facility will ensure that the risk to the structure associated with movement along one of these faults is low, unless the structure is directly above an unknown fault. Even then, the risk to life and safety will be very low because the structures will be unoccupied most of the time. Failure of one of the turbines from fault movement also would result in minimal environmental damage because these structures do not contain or transport major volumes of fluids or other materials that could contaminate an area. Because of the absence of groundwater in the surficial soil layers in most areas, liquefaction, and its associated effects, such as lateral spreading, are not considered seismic hazards for the site.

The risks posed by non-seismic geologic hazards are small. The Facility area can be generally characterized as loess-covered, basalt uplands. The basalt rock is typically highly competent and not subject to landslides, resulting in little risk to human safety. Erosion hazard related to soil and wind action will probably be improved with the implementation of an engineered erosion control plan and will pose little to no threat to human safety.

Given the relatively small risks these hazards pose to human safety, standard methods of practice, including use of the current IBC, will be adequate for the design and construction of the Biglow Canyon Wind Farm.

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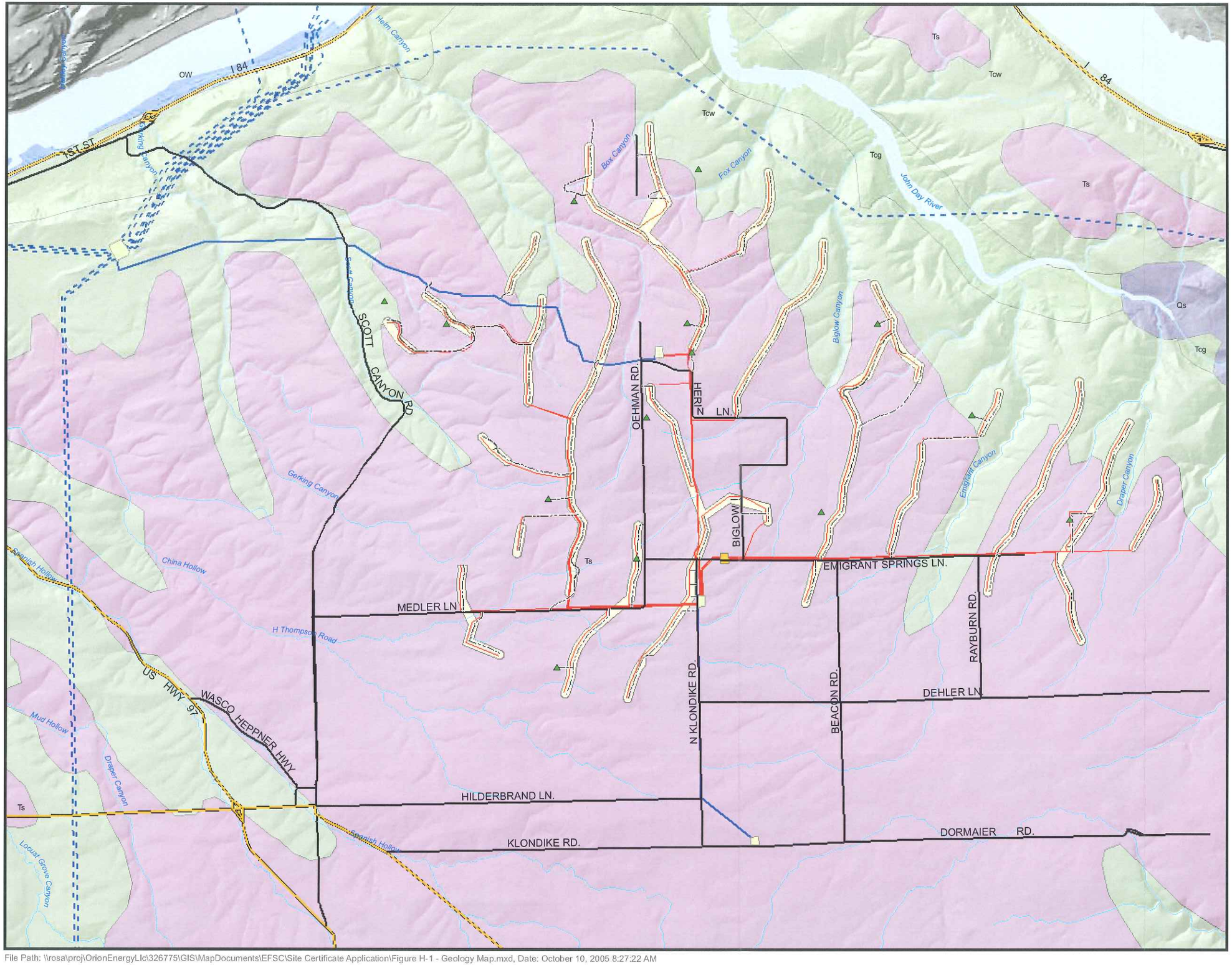
Figures

Figure H-1
Geology Map
Biglow Canyon Wind Farm

ORION ENERGY LLC



Legend

- Proposed Met Tower
- Proposed Facility Access Roads
- Existing Dirt Roads
- Existing Roads
- Existing Highways
- Proposed 34.5-kV Underground Collector System
- Proposed Transmission Line
- Existing Transmission Line
- Proposed Turbine Corridors
- Existing Substation
- Proposed Substation / Proposed O&M Facility
- Proposed O&M Facility
- Rivers and Lakes
- (Qs) Lacustrine and fluvial sedimentary rocks
- (Tc) Columbia River Basalt Group and related flows
- (Tcg) Grande Ronde Basalt, Columbia River Basalt Group
- (Tcw) Wanapum Basalt, Columbia River Basalt Group
- (Ts) Tuffaceous sedimentary rocks and tuff
- (OW) Waterbody

N
W E
S

0 0.5 1 1.5 2
Miles

CH2MHILL

Source: Walker, G.W., and MacLeod, N.S., 1991, Geologic map of Oregon: U. S. Geological Survey

File Path: \\rosa\proj\OrionEnergyLlc\326775\GIS\MapDocuments\EFSC\Site Certificate Application\Figure H-1 - Geology Map.mxd, Date: October 10, 2005 8:27:22 AM

Figure H-2. Probabilistic Seismic Hazard Deaggregation of the 500-Year Return Period Earthquake for the Biglow Canyon Wind Farm Site (USGS, 2002)

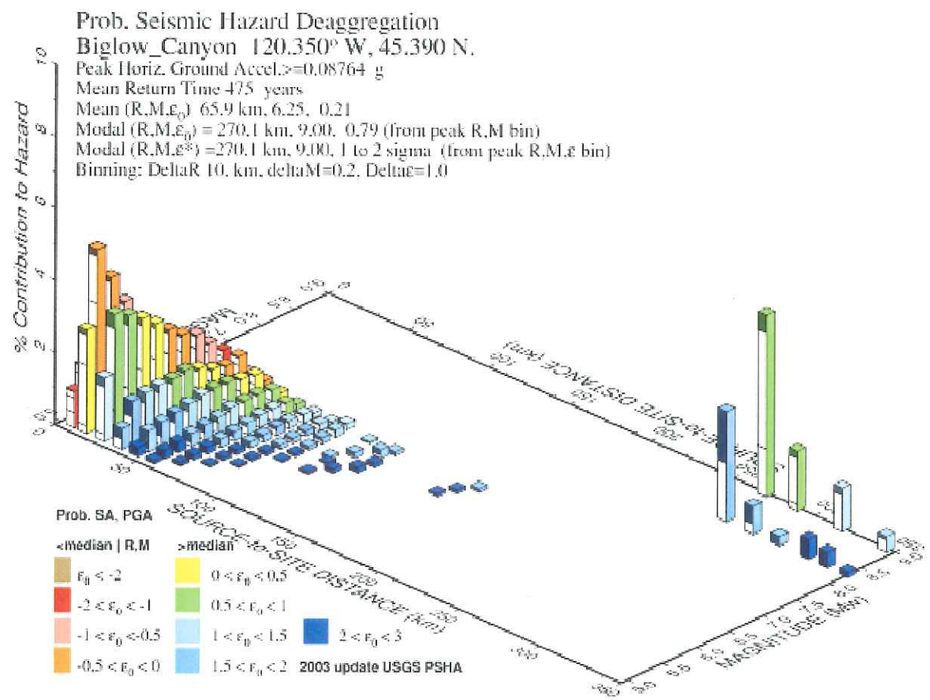


Figure H-3. Probabilistic Seismic Hazard Deaggregation of the 2500-Year Return Period Earthquake for the Biglow Canyon Wind Farm Site (USGS, 2002)

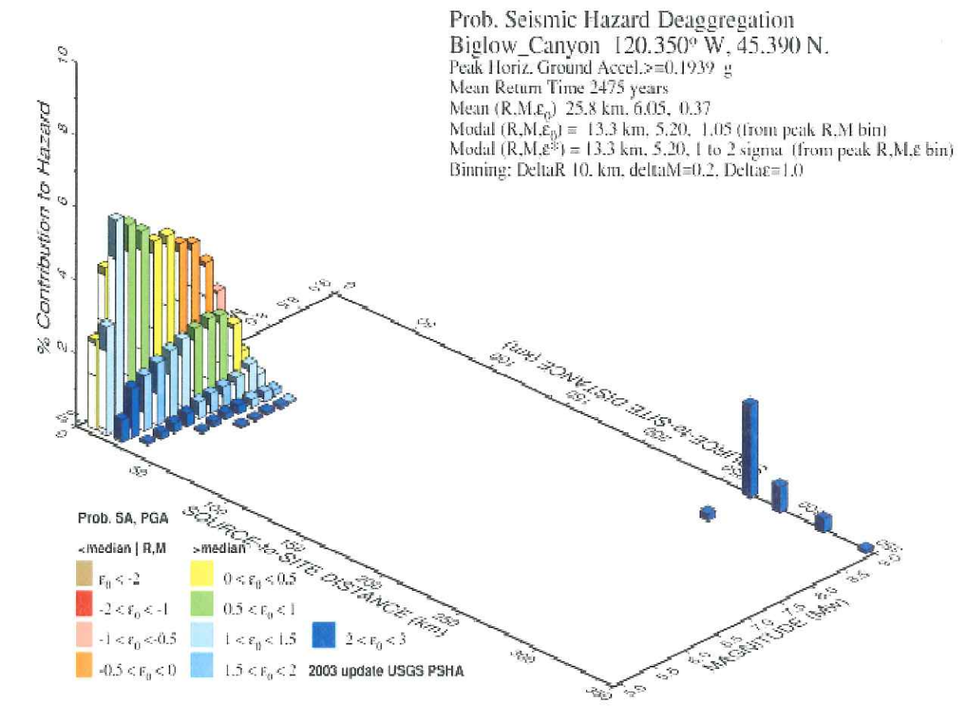


Figure H-4. Response Spectra for the Biglow Canyon Wind Farm Site