

**EXHIBIT G**

**MATERIALS ANALYSIS**

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

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## G.1 INTRODUCTION

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

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 Golden Hills Wind Farm and a description of how the Applicant plans to manage hazardous substances and non-hazardous waste materials during construction and operation.

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

## 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: The inventory of materials expected at the facility is shown in Table G-1.

### **Construction-related materials**

The primary materials used will be gravel for road construction and as aggregate in concrete, water for dust control and road compacting and for mixing concrete. Steel will be the primary material for the turbines and nacelles.

The Project will require up to approximately 270,000 cubic yards of gravel for road and turbine pad construction. Gravel will be acquired from a local gravel source in Sherman and/or Wasco County, which is described in Exhibit K. Approximately 26 million gallons of water, described in more detail in Exhibit O, will be used for concrete mixing, dust control and road compaction. Concrete will be used to construct up to 267 turbine foundations and transformer pads. The type of turbine selected for the Project will largely determine the gross tonnage of steel brought to the project site. The largest amount of steel that would be brought to the site is 69,100 tons. This amount would be the result of using 267 turbines weighing approximately 259 tons each.

Each turbine has a single nacelle, which is made from a variety of materials. This unit houses the generator, gearbox, and auxiliary equipment. Transformers adjacent to each turbine base will contain nonpolychlorinated biphenyl (non-PCB) mineral oil. The oil will be sealed within the transformer. Approximately 200 miles of underground electrical cable will be used to connect the turbines to the substations.

### **Operation-related materials**

No substantial quantities of industrial materials will be used or stored on-site during operation of the Project. Replacement parts will be periodically brought to the Project to replace worn equipment, but old equipment will be removed and will not add to the amount of industrial materials at the Project. Other materials such as lubricants,

weed-control chemicals, and general cleaners will be stored in the O & M building and as shown in Table G-1 would not constitute a significant amount of materials.

### **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: The Applicant will manage all hazardous material in accordance with applicable EPA and OSHA regulations and by its own internal hazardous material program and guidelines that will be followed both during construction and operation. In accordance with the program, all hazardous materials that are on site will be catalogued, the material safety data sheets (MSDS) for the materials will be available, employees will receive training on the handling of hazardous material, and guidelines for the proper storage, transport, and disposal of hazardous materials will be posted.

To prevent the spilling of hazardous materials, the Applicant has a rigorous program to ensure that all components of operating equipment, transport systems, and site facilities will maintain structural integrity.

All hazardous material will be stored inside where it is not exposed to the elements. In addition, the Applicant or its designated contractor will maintain hazardous material containment and cleanup kits on site at all times to contain all other potential hazardous material spills.

### **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 will be generated during construction. Wood from concrete forms and steel scraps will be separated and recycled wherever practical. Concrete and excavated soil will be used as fill at the project site or transported off-site for use elsewhere.

Disposal of materials as on-site fill 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, or "clean fill" as described in OAR 340-093-0080(2). 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 has the potential to be disposed of on-site will be waste concrete generated during construction. The construction contractor, with landowner approval, may bury the waste (e.g. excess concrete from a construction site, batches of concrete that do not meet specifications) on site. If this were to occur, the contractor would excavate a hole, cover the waste concrete with a minimum of three feet of soil, and regrade the area to match existing contours.

Other materials would be separated from fill and disposed of or recycled. Materials such as packing materials, paper, and other refuse will be collected as needed by a local waste

hauler. Portable toilets will be provided for on-site sewage handling during construction and will be maintained by the local toilet contractor.

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

<b>Material</b>	<b>Quantity/Units</b>	<b>Ultimate Disposition</b>
<b><i>CONSTRUCTION</i></b>		
Rock/gravel for road construction	225,000 cubic yards	Will remain onsite roadbed
Rock/gravel for concrete	45,000 cubic yards	Will remain onsite in foundations
Water for dust control and road compaction	22.5 million gallons	Absorption/evaporation
Water for concrete mixing	2.6 million gallons	Incorporated into concrete
Concrete for up to 267 turbine pads	109,200 cubic yards	Incorporated into turbine pads
Steel for up to 267 turbines	69,100 tons	Incorporated into turbine towers
Nacelles (include generator, rotor, blades, hub, and gearbox)	Up to 267 units	Mounted on turbine towers
Electrical GSU transformers	Up to 267 units	Mounted on concrete pad adjacent to turbine tower
34.5 kV Electrical cable	Up to 200 miles	Buried underground, except 3.5 miles of above ground collection system
Main Step up transformer, switchgear, breakers	Up to 3 of each	Incorporated into the substations
Transmission poles/structures	Up to 159 poles/structures	Incorporated into the transmission line
<b><i>OPERATIONS and MAINTENANCE</i></b>		
Mineral oils (turbine lubricant and transformer coolant)	3 gallons/turbine	Stored in O&M; added to turbine as needed
Synthetic oils (turbine lubricant, gear oil)	20 gallons/turbine	Stored in O&M; added to turbine as needed
Simple Green (general cleaner)	3 gallons/turbine	Stored in O&M
WD-40; grease (general lubricant)	5 gallons/turbine	Stored in O&M
Ethylene Glycol (anti-freeze)	3 gallons/turbine	Stored in O&M
Round-up and 2,4-D (weed control)	0	subcontract out for weed control
Hydraulic Fluid	3 gallons/turbine	Stored in O&M; added to turbine as needed
Batteries (pitch drive motor backup power)	3 replacement batteries	Stored in O&M
Paints/solvents	1 gallon/turbine (for painting/cleaning of turbine)	Stored in O&M