

1    **3.6           HEALTH AND SAFETY**

2    This section describes potential health and safety hazards in the study area that may result from  
3    construction, operations, and decommissioning of the Project. Risks to health and safety associated with  
4    a wind energy facility may include fire or risk of explosion, electrical hazards, inadvertent release of  
5    hazardous materials, mechanical hazards, ice throw from WTGs, falls from WTGs, and risks from hunting  
6    activity. The potential exposure to such risks by the public, construction workers, Project employees  
7    during operations, Weyerhaeuser employees in the Project vicinity, and recreationists near the study area  
8    are evaluated. Potential mitigation measures are also identified. Existing conditions that relate to noise  
9    risks are discussed in Section 3.7, Noise.

10   **3.6.1        Study Methodology**

11   Impacts were identified by reviewing the proposed placement of the Project within the study area in  
12   proximity to existing facilities, residential areas, and roads that will be used to access the site for  
13   construction, operations, and decommissioning the Project. The study area is defined as the Project Area  
14   as described in Section 2, Proposed Action and Alternatives. The primary sources of information reviewed  
15   for this section include published documents and federal, state and local regulations regarding the  
16   potential health and safety risks related to a wind energy facility.

17   **3.6.2        Regulatory Framework**

18   Multiple state and federal regulations apply to public and occupational health and safety hazards that  
19   may be present in the study area. Occupational hazard regulations are administered through the federal  
20   Occupational Safety and Health Act (OSHA) standards (29 CFR 1910). The Department of Labor and  
21   Industries Division of Occupational Safety and Health administers the Washington Industrial Safety and  
22   Health Act (WISHA) (49.17 RCW). In addition, the Department of Labor and Industries would also conduct  
23   the permitting and inspection of the electrical improvements in unincorporated Lewis and Thurston  
24   counties. WISHA develops and enforces rules that protect workers from hazardous job conditions. WISHA  
25   regulates an array of occupational hazards in Chapter 296 WAC (Safety Standards for Construction Work)  
26   such as safety standards for construction work (Chapter 296-155 WAC), general safety and health  
27   standards (Chapter 296-24 WAC), and general occupational health standards (Chapter 296-62 WAC).

28   Thurston and Lewis counties do not have code requirements pertaining to public health and safety that  
29   are specifically oriented towards wind energy generation facilities. However, both counties have required  
30   building setbacks to ensure the Project is located at safe distances from public uses. Chapter 17.145.020  
31   LCC setback requirements for construction of a commercial project are based on distance (in feet) from  
32   the property line. A ten-foot setback is required from the front and side of a structure. No setback is  
33   required from the rear of the structure (unless abutting a residential zone). TCC setback requirements are  
34   determined by zoning type. The study area in Thurston County is zoned as Natural Resources Long-Term  
35   Forestry. For commercial buildings, a 10-foot setback is required from front yard property lines, and 5 feet  
36   from the side and rear yard (TCC 20.07.030).

37   Building codes are developed and enforced to protect individuals from safety risks such as structural  
38   failures, fire hazards caused by electrical systems, and electrical shock. The O&M Facility located in  
39   Thurston County is the only building that will be developed as part of the Project and will be constructed  
40   in accordance with Title 14, Buildings and Construction, of the TCC. The O&M facility would also include  
41   other buildings and uses including vehicle and maintenance material storage.

1 Fire and Explosion

2 Fire protection and worker safety are regulated by WISHA in Chapter 296-155-260 WAC (Fire Protection  
3 during Construction), and fire protection (Chapter 296-24 WAC) in the General Safety and Health  
4 Standards section (WAC 296-24-585). OSHA regulations which apply to fire safety are included under Title  
5 29 CFR, Part 1910 Subpart E (Exit Routes, Emergency Action plans, and Fire prevention plans), Part 1910  
6 Subpart L (Fire Protection), and Part 1926.24 (Fire Protection and Prevention).

7 DNR implements a series of regulations to protect forest lands from fire hazard (WAC 332-24). Prevention  
8 and response to forest fires is regulated by DNR through two closure systems to reduce wildfire risk on  
9 12.7 million acres of private and state forestland protected by the agency. The first is a four-level industrial  
10 regulation system (Industrial Fire Precaution Levels [IFPL]), which helps prevent wildfires by regulating  
11 work on or adjacent to forest lands (WAC 332-24-301). The four levels require cessation of certain  
12 activities depending on the fire hazard (DNR 2015):

- 13 • Level I: Closed Fire Season – fire equipment and firewatch service is required.
- 14 • Level II: Partial Hootowl – limits certain activities to between the hours of 8 p.m. and 1 p.m.
- 15 • Level III: Partial Shutdown – prohibits some activities altogether and limits other activities  
16 between the hours of 8 p.m. and 1 p.m.
- 17 • Level IV: General Shutdown – All operations prohibited.

18 Waivers to the cessation of activities can be requested from DNR provided that “fire safe” practices are  
19 implemented. Such practices can include but may not be limited to: wetting down or removal of slash fuel  
20 in the immediate operating area; night operations; ceasing activities when the relative humidity is less  
21 than 35 percent or during windy conditions; and increasing fire detection and suppression measures

22 DNR also administers Public Use Restrictions, which limit activities on forest land during periods of high  
23 fire danger, including: summer fire rules which restrict or prohibit activities such as cigarette smoking, use  
24 of fireworks and use of non-industrial chain saws; burn bans; closed entry areas; and forest land closures  
25 (DNR 2015). Finally, DNR regulations also address requirements for burn permits (WAC 332-24 201  
26 through -261) and spark emitting equipment (WAC 332-24-405) among others.

27 Explosives use for blasting may be necessary for construction of the Project. Both Thurston and Lewis  
28 counties have code requirements for explosives use pertaining to mining that will apply to the Project.  
29 Thurston and Lewis counties require notification to properties located a certain distance from lands  
30 conducting blasting activities (LCC 17.30.370 and TCC 18.04.055). All blasting activities must comply with  
31 the Blasting Guidance Office of Surface Mining U.S. Department of Interior, Blasting Guidance Manual  
32 (1987). Safety standards related to the use of explosives are also regulated by the Washington State  
33 Explosives Act, Chapter 296-52 WAC (Safety Standards for Possession, Handling and use of Explosives).

34 Electrical Hazards

35 The Washington Department of Labor and Industries leads the permitting and inspection of all electrical  
36 work in the unincorporated areas of Thurston County and Lewis County. Current electrical laws and rules  
37 include RCW 19.28 (Electricians and Electrical Installations) and Chapter 296-46B WAC (Electrical Safety  
38 Standards, Administration, and Installation). Additionally, general federal OSHA standards for  
39 occupational electrical safety are published in Title 29 CFR, Part 1910.269 (Electric Power Generation,

1 Transmission and Distribution), Part 1910.302 through 1910.308 (Design Safety Standards for Electrical  
2 Systems) and 1910.331 through 1910.335 (Electrical Safety – Related Work Practices Standards). OSHA’s  
3 electrical standards are based on two National Fire Protection Association (NFPA) Standards: NFPA 70,  
4 National Electric Code and NFPA 70E, Standard for Electrical Safety in the Workplace. NFPA is a national  
5 broad-based association focusing on fire protection and safety.

6 Hazardous Materials

7 Hazardous materials are those listed in the EPA Consolidated List of Chemicals Subject to Reporting under  
8 Title III of the Superfund Amendments and Reauthorization Act of 1986. Hazardous materials are  
9 regulated by the Hazardous Waste Management Act (70.105 RCW), and Chapter 173-303 WAC  
10 (Dangerous Waste Regulations), which includes the Department of Ecology’s management of hazardous  
11 materials. Hazardous materials are regulated by Thurston County’s Article V (Solid Waste Handling) and  
12 Article VI (Nonpoint Source Pollution). Thurston County Article V1-3.11 defines hazardous materials as  
13 acutely toxic, ignitable, corrosive, reactive, persistent, carcinogenic, or leach hazardous constituents, as  
14 described in Chapter 173-303 WAC. Lewis County defines hazardous wastes per 70.105 RCW and requires  
15 storage and treatment of hazardous wastes per the Department of Ecology’s Dangerous Waste  
16 Regulations, Chapter 173-303 WAC.

17 During Project operation, maintaining turbine blades may involve activities such as buffing and  
18 resurfacing, which may expose employees to harmful gases, vapors, and dusts. OSHA regulations which  
19 apply to ventilation requirements and the proper use of respiratory protection equipment are provided  
20 under Title 29 CFR, Section 1910.94 (Ventilation) and Section 1910.34 (Respiratory Protection).

21 Worker Falls from Towers

22 Construction and maintenance workers will be required to work at extreme heights on WTGs. OSHA has  
23 developed occupational safety standards related to falls in the general workplace (29 CFR 1910) and for  
24 construction activities (29 CFR 1926). WISHA regulates fall protection for construction activities in 296-  
25 155 Part C-1 WAC (Fall Protection Requirements for Construction) and fall protection from structures such  
26 as elevated work platforms in 296-869 WAC. In addition, OSHA regulations under Title 29 CFR, Section  
27 1910 Subpart D-Walking-Working Surfaces (1910.21 through 1910.30) apply to the design of fixed ladders  
28 which will be installed within the WTG’s, including requirements for fall arrest systems such as cages,  
29 wells, and landing platforms.

30 Machinery Hazards

31 Cranes, derricks, and hoists are often used to move the large, heavy loads during wind turbine installation  
32 and maintenance. OSHA safety standards that apply to the operation of cranes, derricks, and hoists are  
33 included in Title 29 CFR, Part 1910.179 through 1910.181. In addition, general requirements for machine  
34 guarding of all rotating parts and points of operation on machines (including parts of WTGs) are regulated  
35 by OSHA under Title 29 CFR 1910, Subpart O - Machinery and Machine Guarding.

36 Confined Spaces

37 A confined space is defined in OSHA regulations (29 CFR 1910.146) as an area that has adequate size and  
38 configuration for employee entry, has limited means of access or egress, and is not designed for  
39 continuous employee occupancy. The configuration of all nacelles will classify them as confined spaces,  
40 and some hazards may be severe enough to classify a nacelle as a permit-required confined space (PRCS).

1 A PRCS is defined in OSHA regulations (29 CFR 1910.146) as a confined space that presents or has the  
2 potential for hazards related to atmospheric conditions (toxic, flammable, asphyxiating), engulfment,  
3 configuration, or any other recognized serious hazard. PRCSs are regulated by OSHA under Title 29 CFR  
4 Part 1910.146). Under these regulations, if workers are expected to enter a PRCS, the employer must  
5 develop a written permit-required confined space program and make it available to workers. The program  
6 must detail the steps to be taken to make the space safe for entry.

### 7 **3.6.3 Affected Environment**

8 The study area is located in a rural, lightly populated area that is characterized primarily by commercial  
9 forestry use with a mix of recently harvested areas and timber stands of varying ages. The closest public  
10 road to the study area is Skookumchuck Road SE, approximately 3.45 miles north of the northern most  
11 WTG location. The closest residence is approximately 3.2 miles from the Project Area where WTGs and  
12 the Project substation will be located, and the closest residences to the O&M Facility are located  
13 approximately 0.25 mile to the southeast and to the south.

#### 14 **3.6.3.1 Rural, Commercial and Industrial Hazards**

15 Limited health and safety hazards currently exist in the study area. Primary safety risks include electrical,  
16 mechanical, and release of hazardous materials associated with living, working, and traveling in a rural  
17 area. Existing occupational hazards are mainly associated with commercial forestry activities, consisting  
18 of fire and explosion due to equipment leaks and spills of fuels and chemicals typically used for such  
19 activities. Occupational hazards also occur in relationship to commercial forestry activities including but  
20 not limited to, slips trips and falls, use of tree harvesting equipment, and exposure to falling trees. Other  
21 existing occupational hazards include operation and maintenance of the Tono substation and existing  
22 transmission line infrastructure located adjacent to the proposed gen-tie lines in the northwest corner of  
23 the study area.

#### 24 **3.6.3.2 Fire Hazards**

25 Wildfires are also a concern as this area is hot and dry during the summer. Wildfire season generally runs  
26 from April 15 through October 15 in the state of Washington, depending on snow pack and drought  
27 conditions. DNR is the state's largest on-call fire department. Its IFPL are activated during the fire season  
28 and are used as an activity closure system to reduce wildfire risk (DNR 2017a). Rarely, when extreme fire  
29 weather conditions exist, DNR may issue an order restricting access to all people and activities on private  
30 and public lands. Thurston and Lewis counties have a moderate fire danger rating and burn risk (DNR  
31 2017b). According to DNR's online fire statistic records that date back to 2008, no natural and human  
32 caused fires have occurred within the study area (DNR 2017c). Between 2008 and present, a total of 35  
33 wildfires have occurred in Thurston and Lewis counties. The closest fire occurred in Thurston County  
34 approximately 0.25 mile north of the gen-tie line micro-siting corridor in 2013. Multiple other fires have  
35 been reported near the study area over the past decade.

36 Weyerhaeuser, as an owner and operator of commercial forestry lands, has established general yet robust  
37 "fire safe" practices in accordance with state fire protection laws and IFPL rules established by DNR.  
38 Equipment onsite includes fire suppression trucks, along with appropriate hand tools and firefighting  
39 equipment as recommended or required by DNR's IFPL rules and regulations and Weyerhaeuser's fire  
40 plan.

1 With respect to recreational permit holders, Weyerhaeuser designates access points for entry to areas  
2 open for recreational use (see Section 3.8.3.3); areas where active logging, road construction, or other  
3 commercial operations or forest management are underway are strictly off-limits. Vehicles entering the  
4 farm must carry shovels, fire extinguisher and an axe or Pulaski (Weyerhaeuser 2017). Additional  
5 information about fire protection may be found in Chapter 3.12.

6 **3.6.3.3 Hazardous Materials**

7 Hazards related to releases of toxic or hazardous materials are currently limited in the study area. No  
8 agricultural, commercial, or industrial facilities are in the study area that may use explosive materials or  
9 pressurized flammable gases. Due to the rural nature of the existing land use, there are few sources of  
10 toxic or hazardous materials that could accidentally be released into the environment. The exception to  
11 this will be an accidental spill of diesel fuel related to vehicle use.

12 A survey of existing contaminated sites near the study area was conducted using the Department of  
13 Ecology's online system (Ecology 2017). No existing contaminated sites of concern were identified in the  
14 study area. The closest contaminated site is the BP Olympic Pipe Line Company Olympia Station, located  
15 in Rainier, Washington approximately 2.5 miles northwest of the study area. Site investigations have  
16 confirmed the presence of contaminated soil and groundwater, including non-halogenated solvents,  
17 pesticides, and petroleum products (Ecology 2017). The Tono substation in the study area has suspected  
18 petroleum contamination in soils and is awaiting cleanup (Ecology 2017). Occupational hazards may be  
19 associated with the cleanup of these sites. The public, recreationists, and Weyerhaeuser workers in the  
20 vicinity of the study area do not have access to these areas.

21 Within the study area, the BP Olympic refined petroleum products pipeline and the Williams Northwest  
22 natural gas pipeline are constructed underground, located parallel to the BPA transmission line through  
23 both Thurston and Lewis counties (WUTC 2017). The gen-tie line alignment will result in an overhead  
24 crossing of both pipelines. Neither pipeline is located near the proposed WTG sites.

25 **3.6.4 Impacts of the Proposed Action**

26 **3.6.4.1 Construction**

27 Public and occupational health and safety risks associated with the Project include potential fire and  
28 explosions, electrical hazards, hunting activity, worker falls from WTGs, and an inadvertent hazardous  
29 materials release during construction of the Project.

30 Fire and Explosion

31 Risk of fire and explosion may occur during construction of the WTGs as a result of both human activities  
32 and natural events. Fires could start from environmental sources such as wildland fires and lightning  
33 strikes, from an electrical fire or explosion resulting from construction equipment failure, or from the use  
34 of combustible materials during construction. The risk of unintentional fire or explosion from human  
35 activities can occur when electrical generating equipment; electric cables; and combustibles such as fuels,  
36 hydraulic fluids, lubricants, plastics, textiles, insulation, and metal are exposed to heated equipment. The  
37 highest expected fire risks are grass fires during the hot, dry summer season. Construction workers, the  
38 public, recreationists, and Weyerhaeuser workers in the vicinity of the study area could be at risk from  
39 fire and explosion hazards depending on the source and how far it spreads.

1 Use of explosives (blasting) may be required for construction of the Project. If bedrock is encountered at  
2 WTG locations, rock anchors will be used to secure the base of the foundations. Blasting will be necessary  
3 for installation of the rock anchors. Workers may be exposed to occupational hazards associated with  
4 blasting. Due to the rural setting of the study area, the public is not likely to be exposed to blasting hazards.

#### 5 Electrical Hazards

6 Electrical hazards present during construction of the Project may include both human-caused activities  
7 and natural events resulting in electrocution from arc flashes, electric shock, falls due to shock, thermal  
8 burn hazards, and lightning strikes. These hazards can occur inside the turbines or near the overhead gen-  
9 tie line. The risk of electric shock from human activities can be caused by accidents, human error, or  
10 tampering of equipment by unauthorized persons. Electric shock leads to electrocution and is dependent  
11 on the amount of current, or amperes (amps), a person is exposed to. Currents at 0.01 amps can produce  
12 painful to severe shocks, while currents between 0.1 to 0.2 amps are deemed to be lethal.

13 WTGs will be vulnerable to lightning strikes due to their height and location on elevated ridges. However,  
14 lightning strikes are considered rare because the study area is not a high lightning-prone area (NOAA  
15 2017). Lightning strikes could affect construction workers within the study area, recreationists, and  
16 Weyerhaeuser employees near the study area.

#### 17 Hazardous Materials

18 Construction of the Project requires the use of some hazardous materials. Types of hazardous materials  
19 that may be present include fuels and lubricant oils from construction vehicles and equipment. Diesel fuel  
20 is the primary potentially hazardous substance that will be used in any significant quantity during  
21 construction for operating equipment and vehicles. Fuel storage will occur at a pre-selected laydown  
22 location on the ridge where WTGs will be constructed. A leak or spill of these materials may create a risk  
23 to environmental or worker health depending on the volume released and the spill containment measures  
24 implemented at the storage or equipment fueling location. Exposure to these hazardous materials will be  
25 temporary in nature and will be limited to Project construction sites located within the study area  
26 boundary. A release of hazardous materials in the study area is mainly considered an occupational hazard,  
27 but Weyerhaeuser employees or permit-holding recreationists authorized to use motorized vehicles near  
28 construction sites could also accidentally release small quantities of hazardous materials such as fuels in  
29 the study area.

#### 30 Worker Falls from Towers

31 During construction of the Project, workers will be exposed to falling hazards when erecting the WTGs.  
32 WTG height ranges from 262 to 344 feet. The public, Weyerhaeuser employees, and recreationists will  
33 not be exposed to these hazards.

#### 34 Machinery Hazards

35 Cranes, derricks, and hoists are often used to move the large, heavy loads during WTG installation.  
36 Hazards associated with the operation of this equipment include the potential for a crane boom, load line,  
37 or load to accidentally come in contact with nearby power lines. Other crane hazards are present in the  
38 form of workers being struck by the load, caught inside the swing radius, or failing to  
39 assemble/disassemble the crane properly. In addition, the moving parts associated with the turbine (such  
40 as gears and blades), if not guarded properly, have the potential to cause severe injuries, such as crushed

1 fingers or hands, amputations, burns, or blindness. Workers must make sure that the rotating parts and  
2 points of operation of machines are properly guarded prior to using them.

### 3 Confined Spaces

4 The configuration of all nacelles will classify them as confined spaces, and some hazards may be severe  
5 enough to classify a nacelle as a PRCS. During construction of the Project, workers performing construction  
6 activities within the nacelles may be exposed to confined space hazards such as atmospheric conditions  
7 (toxic, flammable, asphyxiating), engulfment, or configuration.

### 8 Recreation Activity

9 Recreationists may gain access to the study area via a Weyerhaeuser Recreational Permit (see Section  
10 3.8.3.3). A permit grants a permittee the right to recreate on Weyerhaeuser property between August 1<sup>st</sup>  
11 and July 23<sup>rd</sup> every year (Weyerhaeuser 2017). Types of permit access include motorized vehicles and non-  
12 motorized methods. Recreation activities permitted include hunting, camping, collecting fire wood,  
13 berries, and mushrooms. Permits come with a key to unlock the recreation access point gates. Possible  
14 hazards to construction workers, Weyerhaeuser employees, or other recreationists as a result of hunting  
15 activity in the vicinity of the study area could occur.

### 16 **3.6.4.2 Operation**

17 Public health and safety risks associated with the Project during operations includes potential for fire and  
18 explosion, electrical hazards, hazardous materials release, mechanical hazards, ice throw, hunting activity,  
19 and worker falls from WTGs.

### 20 Fire and Explosion

21 The same environmental and human-caused sources of fire and explosion described for construction  
22 activities could occur during operation of the Project. These include wildland fires, lightning strikes,  
23 electrical explosions caused from construction equipment failure, and the use of combustible materials  
24 such as lubricants. Other risks of fire and explosion may be caused by improper energizing and de-  
25 energizing of equipment, faulty wiring, exposure of a heat source to combustibles, mechanical friction,  
26 and lightning strikes to equipment.

27 Faulty electrical wiring or electrical short circuits may cause fires in the nacelle during WTG maintenance  
28 and operations. Mechanical friction from multiple moving parts within the WTG such as gears, shafts, and  
29 rotors may cause a spark that could ignite combustible items stored within the WTG. Hazards associated  
30 with WTG fires will be limited to maintenance workers during operation of the Project unless the fire  
31 spreads beyond the study area.

32 Another cause of fires can occur from lightning strikes, directly to Project equipment, or strikes elsewhere  
33 that then cause fires that damage Project equipment. Project workers, the public, recreationists, and  
34 Weyerhaeuser workers in the vicinity of the study area could be at risk to lightning strikes. WTGs will be  
35 vulnerable to lightning strikes due to their height and location on elevated ridges. However, lightning  
36 strikes are considered rare because the study area is not a high lightning-prone area (NOAA 2017).  
37 Lightning strikes could affect construction workers within the study area, recreationists, and  
38 Weyerhaeuser employees near the study area.

1 Electrical Hazards

2 During operations, electrical hazards associated with the Project may include electrocution, arc flashes,  
3 thermal burns, lightning, and exposure to electric and magnetic fields (EMFs). These hazards can occur  
4 inside the turbine itself or at nearby overhead power lines.

5 Exposure to EMFs are common to areas where electrical power is used and in the presence of lightning.  
6 EMFs are generated by all types of electrical devices, appliances, utility transmission lines, distribution  
7 lines, and substations. Electric fields are produced by the difference in electrical potential (voltage); and  
8 the movement of charges (current). This movement of charges produces magnetic fields. EMFs are  
9 invisible and are also referred to as radiation. EMFs fall into two categories, non-ionizing and ionizing.  
10 Non-ionizing is considered low to mid-frequency radiation which is observed to be harmless. Sources of  
11 non-ionizing radiation include, but are not limited to, home appliances, computers, wireless networks,  
12 and power lines. Ionizing radiation sources are considered mid to high-frequency and pose health risks  
13 such as cellular and DNA impairments. Sources of ionizing radiation include ultraviolet waves, X-rays on  
14 varying hertz levels, and some gamma rays.

15 Potential sources of EMFs from the Project includes the gen-tie line, grid connection power lines, turbine  
16 generators, transformers, and underground network cables. The gen-tie line will be a 115-kV transmission  
17 line from the Project substation to PSE's electrical system at the Tono substation. The gen-tie line will be  
18 on average 61 feet above ground. EMFs produced from transmission lines depend on several factors,  
19 including the number of currents carried by the line, the arrangement of those currents, and the height  
20 above ground. 115-kV transmission lines generate low levels of EMFs which diminish further from the line  
21 (WHO 2007). Grid connection lines are similar to other power lines and generate low levels of EMFs,  
22 comparable to other household appliances (National Collaborating Centre for Environmental Health  
23 2013). Turbine generators are located inside the WTG's central housing, which is 60 to 100 meters above  
24 the ground and results in minimal EMFs at ground level (Environ Health 2014). Transformers carry the  
25 entire electrical output of the wind farm and generate the highest amount of EMFs. However, EMF levels  
26 diminish within 8 to 10 meters from the transformer (Environ Health 2014). In general, the strength of a  
27 magnetic field decreases with increasing distance. The underground network cables that connect the  
28 WTGs generate almost no EMFs at the ground surface because of the close placement of phase  
29 conductors and screening of the cables (Sustainable Energy Australia 2004). According to the National  
30 Institute of Environmental Health Sciences (NIEHS), scientific evidence suggests that any health risk due  
31 to exposure from EMFs are weak (NIEHS 2017). The study area is located in a rural, lightly populated area  
32 with limited access to the WTGs and gen-tie areas. Therefore, due to the remoteness of the study area,  
33 the Project will not pose significant EMF hazards to local populations, Project workers, recreationists, or  
34 Weyerhaeuser workers in the vicinity of the study area.

35 Hazardous Materials

36 Project operations generate very small quantities of hazardous materials from WTG maintenance. Waste  
37 will include used filters, spent grease, and materials to clean WTGs. These waste fluids will be generated  
38 in small quantities because they need to be changed infrequently, and the changing of these fluids is not  
39 performed all at once, but on an individual WTG -by- WTG basis. An estimated 100 pounds of waste per  
40 WTG per year is expected for the service cycle (including used filters, spent grease, and materials to clean  
41 turbines) (Carroll 2018). Another 50 pounds per WTG per year is estimated for small component failure.  
42 Occasionally, major components may need to be replaced. These major components are usually recycled.

1 Gear box and hydraulic station oil changes need to take place every 7 to 10 years or once during the WTG's  
2 life. Each WTG contains approximately 80 gallons of gear oil and 25 to 35 gallons of hydraulic oil.

3 Minor oil spills from WTG components can be expected as part of the WTG life cycle. The potential for a  
4 large-scale accidental spill from a WTG malfunction is low because the quantities of fluid contained are  
5 small, and their storage is compartmentalized within each WTG. In addition, any accidental release is  
6 controlled. WTGs will have an automated shutoff if oil levels become low (typically 5 gallons or less).

7 Hazardous materials, including wastes, will be stored for short periods of time during Project operations  
8 at the O&M Facility. Gear oil and hydraulic oil stored in 55-gallon drums will be kept in a designated  
9 containment area. Usually no more than 200 gallons will be stored onsite at any time.

10 Mineral oil used to fill substation transformers acts as a coolant and is a potential source of hazardous  
11 material that could accidentally be spilled during Project operations. The substation transformers will  
12 have a specifically designed containment system to ensure that any accidental fluid leak does not result  
13 in discharge to the environment. The potential for an accidental spill from malfunction or breach of the  
14 transformers is low.

15 Hazardous materials spills from equipment will be minor and addressed as appropriate at the time of the  
16 spill. Exposure to workers will be limited to within the study area. Exposure to hazardous materials by  
17 local populations, Project workers, recreationists or Weyerhaeuser workers near the study area will be  
18 minimal.

19 During Project operation, maintaining turbine blades may involve activities such as buffing and  
20 resurfacing, which may expose employees to harmful gases, vapors, and dusts. However, employees will  
21 be trained in the proper use of respiratory personal protective equipment, which will protect employees  
22 from direct exposure to harmful inhalants and reduce the risk to a low level.

23 Mechanical Hazards

24 Mechanical failure during operations could occur from collapse or cracking of the WTG tower or WTG  
25 blades but is extremely rare. Causes of WTG structural failure can be a result of internal component  
26 failure, manufacturing or human error, or extreme weather conditions such as lightning strikes or ice  
27 accumulation. Lack of maintenance inspections can result in operational malfunction and WTG  
28 substandard performance and ultimately WTG failure or shutdown. Examples of structural and WTG  
29 maintenance issues include rotor overspeed and generator and gearbox failure.

30 WTG structural failure is not expected to have a significant impact on the public. Recreationists or  
31 Weyerhaeuser workers near the study area could be exposed to WTG structural failure hazards. However,  
32 WTGs are located in a rural, lightly populated area. In addition, the WTGs will be built within the applicable  
33 property line setbacks, to minimize the risk of injury in the event of WTG failure. Signs and gates will be  
34 posted to prevent trespassing. Access to the WTGs will be restricted for public use. Therefore, private  
35 access roads, the remoteness of the site, and access restriction will ensure adequate and reasonable  
36 protection to the public from structural failures that may be associated with the Project.

37 *Blade Throw/Failure*

38 Blade throw or blade failure occurs when a WTG blade or metal fragment from a structurally unsound  
39 blade is shed during rotation. Documented cases of blade throw or failure reported an average distance

1 of 150 meters (493 feet) for an entire blade and 500 meters (1,640 feet) for blade fragments (Garrad  
2 Hassan Canada, Inc. 2007). Though a rare occurrence, blade failure has been identified to be the result of  
3 improper blade installations, cold stress causing component deformation, or improper design loads. Due  
4 to the Project's remote location, blade throw or failure is unlikely to cause any additional risk to the public.  
5 Public access to the Project Area will not be permitted. However, blade throw will remain an occupational  
6 hazard to workers at the facility, recreationists with permitted access to Weyerhaeuser's recreational  
7 lands, and Weyerhaeuser workers in the vicinity of the study area.

#### 8 Ice Throw

9 Due to the location of the WTGs at higher elevations in a region which can experience freezing  
10 temperatures in winter, ice and snow may form and build up on the WTG blades and towers. Build up may  
11 occur when blades are in rotation or shut down. Sudden stop and releases of the blades that contain ice  
12 and snow can create a potential falling hazard or ice throws directly beneath the WTG, and in some rare  
13 cases, the distance can exceed twice the total height of the WTG (Massachusetts Department of  
14 Environmental Protection 2012). The distance that a piece of ice can travel from the WTG is a function of  
15 the wind speed, operating conditions, the shape of the ice, and the presence of any obstructions in the  
16 ice flight path. Accumulation of snow and ice may cause additional vibration due to tower imbalance  
17 resulting in structural failure. During operation, the WTGs will be monitored remotely and tracked for any  
18 excess vibrations that may affect the structure and balance of the tower. WTG operations may cease  
19 during extreme icing conditions. Ice throw remains an occupational hazard onsite and could be a risk to  
20 recreationists and Weyerhaeuser employees in the vicinity of the study area. However, recreational  
21 access to Weyerhaeuser lands is usually focused on the hunting season, which does not occur during the  
22 winter.

#### 23 Worker Falls from Towers

24 Workers performing maintenance activities during operations may experience falls from WTG towers.  
25 Additionally, workers may experience climbing fatigue when climbing the fixed ladder systems within the  
26 WTGs up to the nacelle. WTG height ranges from 262 to 344 feet. Maintenance is conducted from a  
27 manned basket lowered from a nacelle-mounted winch. The public, Weyerhaeuser employees, and  
28 recreationists will not be exposed to these hazards.

#### 29 Machinery Hazards

30 Cranes, derricks, and hoists are often used to move the large, heavy loads during WTG maintenance.  
31 Hazards associated with the operation of this equipment include the potential for a crane boom, load line,  
32 or load to accidentally come in contact with nearby power lines. Other crane hazards are present in the  
33 form of workers being struck by the load, caught inside the swing radius, or failing to  
34 assemble/disassemble the crane properly. In addition, the moving parts associated with the turbine (such  
35 as gears and blades), if not guarded properly, have the potential to cause severe injuries, such as crushed  
36 fingers or hands, amputations, burns, or blindness. Workers must make sure that the rotating parts and  
37 points of operation of machines are properly guarded prior to using them.

#### 38 Confined Spaces

39 The configuration of all nacelles will classify them as confined spaces, and some hazards may be severe  
40 enough to classify a nacelle as a PRCS. During operation of the Project, workers performing maintenance

1 activities within the nacelles may be exposed to confined space hazards such as atmospheric conditions  
2 (toxic, flammable, asphyxiating), engulfment, or configuration.

### 3 Recreation Activity

4 Possible hazards to Project maintenance workers or damage to equipment during operations as a result  
5 of hunting activity in the vicinity of the study area could occur. Vice versa, persons recreating under permit  
6 may be exposed to Project related maintenance vehicles on roads, and maintenance activities if they are  
7 in areas adjacent to where such maintenance occurs.

### 8 **3.6.4.3 Decommissioning**

9 Decommissioning activities will result in the same public and occupational health and safety risks  
10 associated with Project construction, including potential fire and explosions, electrical hazards, hunting  
11 activity, worker falls from WTGs, and an inadvertent hazardous materials release.

### 12 **3.6.5 Impacts of the No Action Alternative**

13 Under the No Action Alternative, the Project would not be constructed. The No Action Alternative would  
14 maintain the current condition of the study area. Timber harvest and related activities would continue on  
15 Weyerhaeuser lands within the study area. Other environmental effects and hazards associated with  
16 timber harvest and associated activities, such as the risk of fire due to lightning strikes or non-Project  
17 related human activities would continue to exist but potentially have a lower risk level in comparison to  
18 the Project. The risk of hazardous materials release to the environment would remain at its current level,  
19 related primarily to vehicle fuel spills associated with commercial forestry activities and agricultural  
20 chemical use on agricultural, commercial, or residential lands.

### 21 **3.6.6 Mitigation Measures**

22 The Project will comply with all applicable local, state, and federal safety, health ordinances, regulations,  
23 and standards, as well as any required plans and BMPs. The following mitigation measures will be  
24 implemented to reduce impacts to public health and safety resulting from construction, operations, and  
25 decommissioning the Project. The Applicant will develop a Project Health and Safety Plan (HSP) prior to  
26 construction for all phases of the Project. The HSP will be implemented to manage and control safety risks,  
27 as well as guide responses in the case of emergency situations at the Project. Access to emergency medical  
28 and fire services is important to mitigate any impacts from potential health and safety issues. See Section  
29 3.12, Public Services and Utilities for more details on emergency medical and fire services available.

### 30 **3.6.6.1 Construction and Decommissioning**

31 A number of design standards have been developed for WTGs which address occupational health and  
32 safety elements. These include standards of the American Society of Mechanical Engineers, the American  
33 National Standards Institute, the American Society of Testing and Materials, the NFPA, the American Gear  
34 Manufacturer's Association, and the Institute of Electrical and Electronics Engineers. The Project will be  
35 designed in accordance with applicable standards, some of which directly or indirectly address  
36 occupational health and safety concerns. The O&M Facility and the buildings located at the Project  
37 substation will be designed and constructed in accordance with local building and fire codes (Title 14,  
38 Buildings and Construction, of the TCC and Title 15, Buildings and Construction, of the LCC, respectively).

1 This section provides mitigation measures for public and occupational health and safety risks associated  
2 with potential fire and explosions, electrical hazards, hunting activity and an inadvertent hazardous  
3 materials release during construction and decommissioning the Project. Additional mitigation measures  
4 addressing emergency response are discussed in Section 3.12.6.1.

5 Fire and Explosion

6 The Project falls outside of fire districts in Thurston County but a portion of the study area falls within the  
7 Thurston 911 Communications dispatch area of the Southeast Thurston Regional Fire Authority (Thurston  
8 County Regional Planning Council 2017). This information will be submitted to Lewis and Thurston  
9 counties prior to issuance of building permits as part of the Project’s Emergency Response Plan (ERP). A  
10 draft of the ERP is attached as Appendix 3.6-1 and will be finalized prior to the start of construction with  
11 consultation with local service providers. This plan will outline potential fire and explosion risks during  
12 construction, operation, and decommissioning of the Project, will identify the assignments of key  
13 personnel in the event of a fire and provide an evacuation plan for workers on the wind turbines.  
14 Development and implementation of this plan will minimize the potential for significant impacts that  
15 Project construction, operations, and decommissioning will have on public safety. See Section 3.12, Public  
16 Services and Utilities for more details on fire protection services available in Thurston and Lewis counties  
17 as applicable to the Project.

18 The Applicant will provide all police, fire districts, and emergency medical personnel with emergency  
19 response details for the Project including detailed maps of access roads surrounding the Project site, and  
20 keys to the master lock systems to enable emergency personnel with access to the site.

21 Fire and emergency procedures as part of the Project’s Weyerhaeuser lease will be implemented. Table  
22 3.6-1 summarizes these emergency procedure provisions. These procedures include that the Applicant  
23 conducts fire safety training for all construction employees and contractors. All construction equipment  
24 (e.g., cutting torches and cutting tools) will use spark arresters and require construction shut-downs when  
25 extreme fire danger conditions persist. Fire suppressant equipment will be maintained within the Project  
26 Area, and the Applicant will provide additional water supply for firefighting locations beyond the  
27 contracted fire districts. WTGs will be designed and maintained to protect against fire danger. All  
28 operations will follow the appropriate IFPL designated by DNR.

1 **Table 3.6-1. Weyerhaeuser Lease Emergency Procedure Provisions**

<p><b>SAFETY REQUIREMENTS</b></p>	<ul style="list-style-type: none"> <li>• The Applicant will coordinate entry of vehicles into the Project Area with Weyerhaeuser's travel standards (e.g. use of CB radios, use of escorts, etc.) whenever Weyerhaeuser's logging operations are underway along the designated travel routes.</li> <li>• The designated speed limit for all vehicles operating on private Project access roads will not exceed 25 mph.</li> <li>• During construction and operation the Applicant will provide travel coordination for all construction and operational vehicles including, but not limited to, installation of directional signs, road designation, radio communication, escorts, and flaggers as needed to coordinate with Weyerhaeuser's timberland operations.</li> <li>• Applicant's employees, contractors, sub-contractors, and visitors will comply with all of Weyerhaeuser's and RES safety rules including, but not limited to, wearing safety helmets, vests, CB communications, etc.</li> <li>• No firearms are allowed on Project site at any time.</li> <li>• Comply with all safety laws and regulations.</li> <li>• Safety belts will be worn while driving at the Project site and while operating equipment. Safety belts will be worn by all employees, contractors, subcontractors, business visitors, and vendors.</li> </ul>
<p><b>SECURITY/GATES</b></p>	<ul style="list-style-type: none"> <li>• Applicant will prepare a security plan for the Project site during construction and prior to beginning operations. Contact information for emergency responders will be included in the plan and emergency providers will be provided keys for secured entry locations to the Project site.</li> <li>• All Wind Turbine access doors and other facilities shall be locked or have available locks and gates to be used as necessary to secure equipment and facilities.</li> </ul>
<p><b>FIRE/EMERGENCY PROCEDURES.</b></p>	<ul style="list-style-type: none"> <li>• The Applicant has developed an Emergency Response Plan (ERP) that includes Fire Prevention for the construction phase of the Project. The Applicant will update this plan to address the operations phase prior to the beginning of Project operation. The Applicant will coordinate with local emergency responders during the development of the construction and operations ERPs.</li> <li>• The Applicant will conduct construction activities and Project operations in compliance with the State fire protection laws and general "fire safe" practices established by Weyerhaeuser. The Applicant, and its contractors, subcontractors, vendors, and visitors will be subject to restrictions under the appropriate Industrial Fire Precaution Levels established by the Washington Department of Natural Resources (DNR).</li> <li>• The ERP will include, but not be limited to, Applicant's fire prevention measures, employee training, equipment, fire response plans, and emergency communication and evacuation procedures. The plans will</li> </ul>

	<p>identify the Applicant's operation restrictions under all Industrial Fire Precaution Levels for both construction and operations periods for the Project Improvements.</p> <ul style="list-style-type: none"><li>• The Applicant will maintain fire suppression equipment on site including but not limited to: fire suppression trucks, equipped to meet DNR Industrial/Forest Lands rules and regulations, appropriate hand tools and firefighting equipment as recommended or required by the DNR's IFPL rules and regulations and Weyerhaeuser's fire plan.</li><li>• In consultation with Weyerhaeuser and local emergency responders the Applicant will select and provide an emergency helicopter evacuation site at or near the Project site for responding to Project-related emergencies.</li><li>• All Wind Turbines will be designed and maintained to protect against fire danger from lightning strikes, power surges, and equipment malfunctions including but not limited to adequate grounding, earth termination systems, shielding measures, fire extinguishers and automated fire suppression equipment for all Project Improvements.</li><li>• All equipment will be equipped with adequate mufflers and spark arrestors and will be parked only in designated areas. During commercial operations all equipment and vehicle parking areas will be maintained to reduce the danger of fire from such risks as combustible materials, sparks, etc. and Applicant will implement Best Management Practices for appropriate Fire Precaution Levels.</li><li>• All operations will follow the appropriate Industrial Fire Precaution Levels designated by DNR. Applicant will institute Best Management Practices for all Industrial Fire Precaution Levels.</li><li>• Smoking will not be allowed on the Lease Area, access roads, or within any of Applicant's operations on or adjacent to the Property.</li><li>• Open fires of any kind are prohibited on the Property during the fire season as declared by DNR.</li><li>• All of Applicant's operational crews will be trained in forest fire prevention and suppression.</li><li>• All of Applicant's operational crews, vendors, suppliers, and visitors will stay on designated travel routes and parking shall occur only in designated areas.</li><li>• During the construction of the Project, all equipment operators will be limited to designated areas, all clearing and grubbing operations will be in accordance with DNR fire codes and Industrial Fire Precaution Level regulations. If so ordered by DNR, all such activities will be curtailed to comply with DNR directives under Industrial Fire Precaution Level IV conditions. Applicant will have the right to seek a waiver from DNR for continued Wind Turbine operations after the Commercial Operations Date, provided Applicant can demonstrate to Weyerhaeuser's satisfaction that such commercial operations do not create increased fire ignition risk.</li></ul>
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	<ul style="list-style-type: none"><li>• Any welding, cutting, or similar activities will take place only in appropriate designated areas in accordance with DNR rules and regulations for the IFPL establish by DNR.</li></ul>
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2 For blasting activities, a geotechnical specialist will help locate bedrock and determine the appropriate  
3 foundation design for each WTG location. The contractor will prepare and enforce safety training and  
4 protocols prior to commencing work that will address prevention methods for rock or blast debris fly,  
5 controlled access to the blasting site during loading and blasting, resident and construction worker blast  
6 notification methods, and blasting materials storage. Blasting activities will be conducted by professionally  
7 trained and certified explosive experts and will employ industry-standard techniques. Blasting hazards  
8 will be managed onsite; therefore, the public, recreationists, and Weyerhaeuser employees near the study  
9 area will not be exposed.

10 Electrical Hazards

11 To prevent electrocution by a human-caused accident or error during construction and decommissioning  
12 of the Project, all electrical components and infrastructure will be installed by qualified professionals in  
13 accordance with applicable standards and regulations. Additional safety precautions include vegetation  
14 clearing to avoid contact with collection and interconnection lines, restrict road and site access, and map  
15 and mark location of buried collection system lines. Safety training will be provided to all construction  
16 workers. Required safety equipment will include approved safety gear, clothing, and grounding  
17 equipment. To prevent electrocution as a result of unauthorized activities, construction site access will be  
18 restricted by gated and locked private access roads, substation yards, and access to the WTGs will be well  
19 secured.

20 Hazardous Materials

21 Implementation of appropriate spill prevention and control measures will ensure that the risk of an  
22 accidental release of hazardous materials remains low throughout construction and decommissioning of  
23 the Project. The Applicant will develop and implement an SPCC Plan in accordance with applicable local,  
24 state, and federal requirements prior to commencing construction. The plan will include provisions for  
25 monitoring petroleum leaks from vehicles and construction equipment and protocols for spill reporting  
26 and proper cleaning, storage, and disposal of potential spills. Some examples of standard SPCC provisions  
27 for the handling of hazardous material include:

- 28 • Oil product storage areas will be established at the site lay-down yards. Aboveground storage  
29 tanks will be positioned in such a way that the aboveground storage tank is protected from impact  
30 or rupture using berms or barriers. Gravity fed tanks will not be used.
- 31 • Store and maintain equipment in a designated area, as appropriate.
- 32 • Use secondary containment (drip pan) to catch spills when removing or changing fluids.
- 33 • Use proper equipment (pumps, funnels) to transfer fluids.
- 34 • Keep spill response materials readily available and properly stocked.
- 35 • Transfer used/waste oils to designated recycling containers.
- 36 • Equipment inspections for leaks and spills.

- 1 • Immediate shut down and repair, if needed.
- 2 • Preventative maintenance for equipment.
- 3 • Low-level indicators and alarms on hydraulic equipment.
- 4 • Prompt correction of visible discharges.
- 5 • Prompt removal, clean-up, and disposal of oil in secondary containment, according to state or
- 6 federal requirements.
- 7 • Initial “awareness” training will be used to train all personnel during site orientation. Employees
- 8 who handle oil products, conduct equipment maintenance, or operate construction vehicles or
- 9 equipment at the site will receive additional training.

#### 10 Worker Falls from WTGs

11 Construction workers are required to work at extreme heights when installing WTGs. The Applicant will  
12 develop a detailed fall protection plan for the site to control fall hazards from WTGs during construction.  
13 The plan will outline appropriate safety protection equipment including anchorage structures, body  
14 supports (harnesses), rescue devices such as baskets, and crew composition including persons trained in  
15 rescues at height. Rescue baskets will be stored at the O&M Facility for the purposes of removing injured  
16 employees from WTGs in emergency situations. Provisions for special training for emergency medical  
17 services personnel in the use of rescue baskets will be provided by the Applicant. Detailed maps showing  
18 all access roads to the Project and keys to locked access gates will be provided to fire districts.

#### 19 Machinery Hazards

20 The use of cranes, derricks, and hoists during WTG installation will be performed in accordance with  
21 applicable OSHA regulations (29 CFR 1910.179- 1910.181) for safe use and maintenance of the equipment  
22 and appropriate training of employees. This equipment will be inspected before use and operated  
23 according to the manufacturer's instructions. The proper clearance distance from power lines will be  
24 maintained at all times so the crane boom, load line, or load itself does not contact nearby power lines.  
25 In addition, all rotating parts and points of operation for construction equipment or other machinery  
26 associated with the turbine (such as gears and blades), will be properly guarded prior to using them in  
27 accordance with OSHA regulations for machine guarding (29 CFR 1910 Subpart O).

#### 28 Confined Spaces

29 WTG nacelles are considered confined spaces, and some hazards may be severe enough to classify them  
30 as PRCS, as well. In accordance with OSHA safety regulations for PRCS use and access, if workers are  
31 expected to enter a PRCS, the employer will develop a written PRCS program and make it available to  
32 workers. The program will detail the steps to be taken to make the space safe for entry.

#### 33 Recreation Activity

34 Construction site access will be restricted by gated and locked private access roads, substation yards, and  
35 access to the WTGs will be well secured from the general public. The Applicant will develop and implement  
36 a construction site access plan in coordination with Weyerhaeuser to prevent injury to Project  
37 construction workers as a result of recreation activities such as hunting, and vice versa, to prevent injury

1 to permit holders as a result of Project construction activities. The plan will identify areas that are  
2 temporarily closed to recreation activity due to construction of the Project.

### 3 **3.6.6.2 Operations**

4 Mitigation measures described above for construction and decommissioning the Project also apply to the  
5 operations of the Project. Additional mitigation measures proposed are described below. The Project will  
6 comply with all applicable setback requirements, as adequate setbacks are an important factor in  
7 minimizing safety concerns for potential ice throw, WTG tower collapse, blade throw, and EMFs.  
8 Additional mitigation measures addressing emergency response are discussed in Section 3.12.6.2.

#### 9 Fire and Explosion

10 During operations, fires can be caused by mechanical failure in WTG nacelles. Based on industry review  
11 by Caithness Windfarm Information Forum, between 2005 and 2012, there was on average a maximum  
12 of 11.7 fires per year; note that this is out of the 225,000 wind turbines installed globally at the time of  
13 the review, meaning that you could expect there to be one fire a year for every 19,230 turbines operating  
14 worldwide, on average (GWEC 2018). WTGs have built-in fire protection features that monitor nacelle  
15 temperatures. The WTG control system will monitor nacelle temperatures and automatically shut the  
16 WTG down and send an alarm to the control room if temperatures are exceeded. In addition to the  
17 monitoring system, a fire suppression system in the nacelle will be incorporated into each WTG and each  
18 WTG will be equipped with a fire extinguisher. In addition, WTGs will be equipped with quick escape  
19 descent devices for workers to escape in the event of a fire or other emergency.

20 In addition, fire breaks will be a design feature. Each road will be considered a site fire break, and each  
21 WTG location will have an area of up to approximately 125 feet by 150 feet to allow for assembly. This  
22 area will be rolled flat with most of significant vegetation removed to aid in protection against fire  
23 dangers. All construction and operations staff will be trained in fire prevention awareness, and trained  
24 personnel will be able to handle minor fire suppression tasks. The Applicant will provide any special  
25 training to fire district personnel and DNR for fires related to WTGs. The Applicant will develop and  
26 implement an ERP, which will outline potential fire and explosion risks during construction, operation, and  
27 decommissioning of the Project, will identify the assignments of key personnel in the event of a fire and  
28 provide an evacuation plan for workers on the wind turbines. A draft of the ERP is attached as Appendix  
29 3.6-1 and will be finalized prior to the start of construction with consultation with local service providers.

30 Comprehensive lightning and surge protection measures are required to reduce damage and resulting  
31 repairs (Dehn and Sohne 2015). WTGs and the substation will be equipped with lightning protection  
32 systems. Each WTG has lightning protection measures incorporated to reduce the potential for lightning-  
33 related fires. To reduce damage caused by lightning strikes, each WTG, including rotor blades, will be  
34 connected to a grounding grid surrounding the WTG foundation. In the event of a lightning strike, the  
35 grounding grid will facilitate the flow of lightning energy safely to the ground and will not affect the WTG  
36 or the surroundings.

37 Implementing practices from the NFPA of Recommended Practice for Fire Protection for Electric  
38 Generating Plants and High Voltage Direct Current Converter Stations will be put to practice to reduce the  
39 risk of WTG fires and explosions from natural phenomenon, human, electrical, and mechanical errors. The  
40 HSP will incorporate fire safety planning to ensure that fire safety planning is incorporated into the design,  
41 construction, and operation of all facilities. Industry standard clearance distances will be maintained

1 between vegetation and electrified Project elements which may cause fire, for example gen-tie line  
2 conductors and substation components.

### 3 Electrical Hazards

4 WTGs will be equipped with a lightning protection system in order to minimize damages on mechanical  
5 components, electrical systems, and control systems. This standard lightning protection provides a high  
6 protection level and continue to be improved upon as technology changes.

7 In addition to mitigation measures for electrical shock hazards discussed for construction and  
8 decommissioning, site access will be restricted to the public by gated and locked private access roads,  
9 substation yards, and access to the WTGs will be well secured.

10 The World Health Organization's International EMF Project was launched to provide scientifically sound  
11 and objective answers to public concerns about possible hazards of low level EMFs. Despite extensive  
12 research, to date there is no evidence to conclude that exposure to low level electromagnetic fields is  
13 harmful to human health. However, research is ongoing – if EMFs do have an effect on cancer, then any  
14 increase in risk will be extremely small. The results to date contain many inconsistencies, but no large  
15 increases in risk have been found for any cancer in children or adults (WHO 2017). Therefore, no other  
16 mitigation measures are proposed.

### 17 Hazardous Materials

18 The Applicant will develop and implement an Operations SPCC Plan in accordance with local, state, and  
19 federal requirements. The SPCC will be renewed every five years. Any hazardous waste material generated  
20 by Project operation will be disposed of in a manner specified by local and state regulations or by the  
21 manufacturer. The Applicant will submit a complete list of hazardous materials stored at the O&M Facility.  
22 Any drums used for storing gear and hydraulic oil will be sealed by a certified waste contractor. Measures  
23 incorporated into the design of the O&M Facility will ensure that the risk of accidental spill or release of  
24 hazardous materials at the O&M Facility will be low and will not be a risk to health and safety or the  
25 environment. Any spilled or released hazardous materials will be contained inside a secondary container  
26 and not released to the environment per TCC Article VI. The Project operator will be required to notify the  
27 Department of Ecology immediately of any spills of hazardous substances to help ensure an appropriate  
28 and immediate response. Employees will be trained in the proper use of respiratory personal protective  
29 equipment, including proper storage and maintenance, to be implemented during maintenance activities  
30 that could generate harmful gases, vapors, or dusts.

### 31 Mechanical Hazards

32 WTGs will meet international design and manufacturing safety standards and will be certified by a  
33 professional engineer. Quality control inspections will be conducted according to industry standard  
34 practices to ensure proper functioning of all WTGs. The WTGs will include several inherent safety features  
35 that reduce the possibility of health and safety risks, such as rotor and overspeed controls. WTGs will be  
36 shut down at the manufacturer's recommended maximum wind speeds to avoid structural damage. A  
37 communication and control system for monitoring and controlling the WTGs will use fiber-optic  
38 communication lines that run parallel to the power collection system cables. Each WTG will be equipped  
39 with a rotor control and braking system, which will respond automatically to the set controller conditions  
40 for cut-out speeds and could be operated by the control center in the O&M Facility.

1 In general, operations personnel working on the WTGs will work in pairs. In the unlikely event that an  
2 injury occurs while working in the nacelle, all staff and local emergency medical services personnel will be  
3 trained in lowering injured individuals from the nacelle using a specially-designed rescue basket. The  
4 rescue basket will be kept onsite at the O&M Facility and will be available for use by local emergency  
5 medical services personnel.

6 Signs and gates will be posted to prevent trespassing. Access to the WTGs will be through restricted access  
7 roads and will not be open for public use.

8 Ice Throw

9 Potential impacts to the public associated with the risk from ice throw will be minimized through  
10 adherence to setback requirements. WTGs will be built within the applicable property line setbacks,  
11 regulated by Lewis County to minimize the risk of injury in the event of ice throw. Potential impacts to  
12 operations personnel will be minimized by training staff to recognize icing conditions and implement  
13 specific safety protocols should work near WTGs occur while these conditions exist. While ice remains on  
14 the WTG structures, access to turbines by site personnel will be restricted based on manufacturer's  
15 recommendations. WTGs will be equipped to remotely switch off when site personnel detect ice  
16 accumulation.

17 Signs and gates will be posted to prevent trespassing by the public recreating in the area. Site access will  
18 be restricted by gated and locked private access roads, and access to the WTGs will be well secured.

19 Worker Falls from Towers

20 Maintenance workers will be required to work at extreme heights on WTG towers. The Applicant will  
21 develop a detailed fall protection plan to control fall hazards from WTG towers. The plan will outline  
22 appropriate safety protection equipment including anchorage structures, body supports (harnesses),  
23 rescue devices such as baskets, baskets, and crew composition including persons trained in rescues at  
24 height. In addition, fixed ladder systems within the WTGs that provide access to the nacelle will be  
25 equipped with fall arrest systems such as cages, wells, and landing platforms as required by OSHA  
26 regulations (29 CFR 1910.21 through 1910.30). Rescue baskets will be stored at the O&M Facility for the  
27 purposes of removing injured employees from WTG towers in emergency situations. The Applicant will  
28 require tower inspections to take place on a regular basis to ensure tower structural integrity and worker  
29 safety. Provisions for special training for emergency medical services personnel in the use of rescue  
30 baskets will be provided by the Applicant. Detailed maps showing all access roads to the Project and keys  
31 to locked access gates will be provided to fire districts.

32 Machinery Hazards

33 The use of cranes, derricks, and hoists during WTG maintenance activities will be performed in accordance  
34 with applicable OSHA regulations (29 CFR 1910.179- 1910.181) for safe use and maintenance of the  
35 equipment and appropriate training of employees. This equipment will be inspected before use and  
36 operated according to the manufacturer's instructions. The proper clearance distance from power lines  
37 will be maintained at all times so the crane boom, load line, or load itself does not contact nearby power  
38 lines. In addition, all rotating parts and points of operation for construction equipment of other machinery  
39 associated with the turbine (such as gears and blades), will be properly guarded prior to using them in  
40 accordance with OSHA regulations for machine guarding (29 CFR 1910 Subpart O).

1 Confined Spaces

2 WTG nacelles are considered confined spaces, and some hazards may be severe enough to classify them  
3 as PRCS as well. In accordance with OSHA safety regulations for PRCS use and access, if workers are  
4 expected to enter a PRCS, the employer will develop a written PRCS program and make it available to  
5 workers. The program will detail the steps to be taken to make the space safe for entry.

6 Recreation Activity

7 Site access will be restricted by gated and locked private access roads, substation yards, and access inside  
8 the WTGs will be well secured from the public. Following construction, access to recreational uses will be  
9 reopened to Weyerhaeuser recreational permit holders. Weyerhaeuser will continue to implement its  
10 requirements for safe access and recreation practices on its lands (Weyerhaeuser 2017), modified as  
11 needed to address Project operation and safety. The Applicant will develop and implement an operations  
12 site access plan in coordination with Weyerhaeuser to inform recreation permit holders and  
13 Weyerhaeuser staff of potential Project hazards, safety measures that permit holder and staff must  
14 respect, and activities which are prohibited near Project facilities.

15 **3.6.7 Connected Action**

16 Construction of the interconnection will involve delivery and installation of a step-up transformer in the  
17 Tono substation yard, and conductoring to interconnect the gen-tie line to the step-up transformer, and  
18 the transformer to the remainder of the substation. Transformer installation activities will be conducted  
19 in accordance with applicable worker health and safety requirements as required by WISHA/OSHA (see  
20 Section 3.6.2 above). The transformer and associated conductors will be maintained and operated in  
21 accordance with industry standards to prevent spills, fires, and explosions. The substation yard is fully  
22 fenced, thereby excluding the public from both construction and operation activities to avoid their  
23 exposure to construction site and electrical hazards.

24 **3.6.8 Unavoidable Adverse Impacts**

25 Both during construction and operation hazardous conditions may occur at the site as a result of  
26 occupational hazards, onsite activities that could result in a spill of hazardous materials, and inherent site  
27 conditions (e.g., wildfires). The Applicant will implement SPCC plans for construction and operation phases  
28 of the Project. The Applicant will implement required employee safety procedures and emergency  
29 response plans in coordination with local emergency responders during both construction and operation.  
30 The Applicant will design and operate the Project to minimize the risk of fires. Finally, the Applicant will  
31 develop construction and operation site access policies so that recreational permit holders and  
32 Weyerhaeuser employees are able to access the site safely. With these mitigation measures in place  
33 impacts to health and safety will be reduced to non-significance.

34 **3.6.9 References**

35 Dehn + Sohne. 2015. White Paper – Lightning and surge protection for wind turbines. Publication  
36 WP016/E/0515.

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38 a Human Health Concern? 2017; 13: 9. Available online:  
39 <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3943383/>

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