

Our ref: 12585800-COR-0001

Overview

BC Hydro is applying for an environmental permit to operate an electric generation facility with six diesel generators near Bella Bella, B.C.

The facility has operated in the same location for many years with 5 generators. The addition of a 6th generator triggered the need for a permit. The site operates on an as-needed basis, providing back-up power in the event of an outage at the primary source. The site typically operates for 4 to 6 weeks in the spring and for possible periodic short-term periods in the winter.

Location

The Bella Bella Generating Station is located approximately 2 km east of Bella Bella at the north end of Denny Island in Shearwater, B.C.

To meet the regional power needs and support growth in the area, BC Hydro has initiated a project:

M179 – Addition of a Diesel-Fired Mobile Generating Unit

An additional diesel-fired generator (M179) will be added to the five (5) existing generators (BELG1, BELG2, BELG3, M177, M178) already located at the generating station. This new generator increases the station's power capacity from 4.9 megawatts (MW) to 6.5 MW. Any diesel generating station bigger than 5 MW needs an Air Discharge permit.

Air Quality Impacts from the Generating Station

As part of the Air Permit application process, an air quality assessment was completed. This was required for all air emissions sources burning diesel at the site. We need to understand the expected impact on the air quality in the surrounding area.

Burning diesel can release different chemicals into the air. When fuels are burned at high temperatures, nitrogen and oxygen in the air make a mixture of chemicals called oxides of nitrogen (also called NO_x). Some of that NO_x will be nitrogen dioxide (also called NO₂), which might be released as NO₂ or it might become NO₂ in the air through reactions. Nitrogen dioxide has effects on both human health and the environment. It can cause breathing issues like allergic reactions, asthma and respiratory infections. B.C. has regulatory limits for one hour (113 µg/m³) and full year exposure to NO₂ (32 µg/m³).

Burning diesel can also make smoke, which contains small particles called PM_{2.5}. B.C. has regulatory limits for 24-hour periods (25 µg/m³) and full-year exposures (8 µg/m³) for PM_{2.5}.

GHD used a dispersion model to predict the highest air quality impacts. Dispersion models are computer programs used to estimate pollutant concentrations in the air around a plant. The model uses information about the equipment, emissions, stack height, and weather.

The model showed that the largest air quality effects were associated with NO₂ and with PM_{2.5}. Although different scenarios were modelled, here we talk about two cases:

- The worst case, where all six generators run at 100% load for five months a year; and
- The typical case, where all six generators run at their average rate over the last five years.

Operation of the diesel generators is predicted to cause exceedances of both NO₂ and PM_{2.5} limits when all of the generators are running. This is true whether the generators are running at full power or at typical levels

(about 57% of maximum). The maximum values are predicted to occur at the fenceline for NO₂ or approximately 300 m to the southwest of the site for PM_{2.5}.

To help understand if nearby communities or homes will be impacted, the model identified nine nearby locations where people are expected to be. These locations were Heiltsuk hospital, Heiltsuk college, Bella Bella community school, Bella Bella School District Board Office, Shearwater fishing lodge and information centre, Denny Island aquatic centre, Spindrift Point cabins and the Denny Island community. The model shows that impacts for NO₂ are expected for all sensitive receptors in the worst case. In typical cases there are impacts predicted for the Shearwater fishing lodge and Denny Island locations. These are shown in Table 1.

Table 1 Predicted Concentrations of NO₂ and PM_{2.5} at populated areas in the model domain, including background

Pollutant	Scenario	Period	BC Limit	Heiltsuk Hospital	Heiltsuk College	Bella Bella Community School	Bella Bella School Board Office	Shearwater fishing lodge and info centre	Denny Island Aquatic Centre	Denny Island Cabin	Spindrift Point Cabins	Denny Island Community
			(µg/m ³)	(µg/m ³)	(µg/m ³)	(µg/m ³)	(µg/m ³)	(µg/m ³)	(µg/m ³)	(µg/m ³)	(µg/m ³)	(µg/m ³)
NO ₂ (OLM)	Worst Case	1-hour	113	143.3	135	147.8	143.2	352.8	564.5	432.5	199.2	479.5
	Typical Case	1-hour	113	50.9	52.6	53.3	51.7	205.3	364.3	229.6	97.9	358.4
	Worst Case	Annual	32	5.4	5.4	5.4	5.4	15.7	16.5	35	12.6	47
	Typical Case	Annual	32	5.1	5.1	5.1	5.1	8.8	8.0	10.6	6.8	14.3
PM _{2.5}	Worst Case	24-hour	25	14.1	14.1	14.1	14.1	16.5	26.4	20	15.6	25
	Typical Case	24-hour	25	13.8	13.8	13.8	13.8	15.1	17.1	15.3	14.3	17.9

Note:

Worst case is all six generators running at 100% load for five months of the year
 Typical case is all six generators running at average loads over the last five years

Conclusions:

The air quality assessment associated with the project indicates:

- BC Hydro recognizes there will be air quality impacts due to operation of the facility, however, priority is given to supply reliable electricity to the community.
- Air quality impacts are expected when the diesel-fired generators are running, even when they run below maximum output.
- The most significant impacts are close to the site or along the fenceline.
- When the generators operate at maximum output, impacts are expected at all populated areas examined. When generators operate at typical output, impacts are expected at the Shearwater fishing lodge and info centre and within Denny Island.
- The frequency of these impacts is expected to be low as the station is operated on an as-needed basis, ready to start up quickly if the grid needs extra power, or if an outage occurs at the primary source (hydroelectric power producer located in Ocean Falls) (for example, maintenance outage).