Hydro Québec

Technical Report

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To Ministère de l'environnement (MELCCFP)

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Subject **New Puvirnituq generating station – Noise monitoring program during operation phase**

1. Introduction

The community of Puvirnituq will start being supplied by a new hydroelectric generating station around 2026. The proposed generating station will be located outside the village and its expansion zone, i.e., 1.5 kilometres west of residences and 2.5 kilometres from the airport.

The draft-design study showed that noise emissions from the new thermal generating station would be compliant with the noise level criteria established for the village's built and inhabited areas, specifically 45 dBA LAr for 1 hour during the day and 40 dBA LAr for 1 hour at night. To ensure compliance with these criteria, a noise monitoring program will be implemented when the new generating station is commissioned, the content of which is presented below.

2. Methodology

The methodology suggested for monitoring noise is made up of three components:

- Noise surveys conducted with class 1 sound level meters in inhabited areas located near the thermal generating station's noise sources.
- Sound propagation modeling carried out based on the noise surveys to validate compliance over a larger area.
- Identification of noise mitigation measures, if necessary, in the event of non-compliance.

In the village, noise surveys will be conducted at inhabited sites at the village entrance, specifically at points P1 and P2 in Figure 1 below.

Figure 1: Location of measuring points in the village

The envelope of the generating sets is the source of the noise emissions, and the noise is transmitted to the outside through the walls of the generating station and through ventilation openings; this is the noise emitted by fuel combustion exhaust, the ventilation of cooling air intake and exhaust and, lastly, the radiators.

Noise surveys will be conducted near these noise emission sources. Based on these surveys, we will then model the noise propagation using the SoundPlan® software. Outdoor noise propagation will be calculated using the ISO 9613 method, which allows us to calculate the attenuation of sound as it propagates in order to forecast the noise level at a given distance from the emission source. The method takes into account geometric divergence, atmospheric absorption, the effect of hard or porous soil, reflection from surfaces, the screening effect and topography. It predicts the noise level under meteorological conditions that are favorable to the propagation of sound from its emission sources to its receivers. Only continuous noise is considered.

Thanks to the propagation modeling, validated by the sound surveys, the compliance of noise emissions will be confirmed at all receiving points in the village.

In the event of non-compliance, the propagation model will be used to identify the dominant noise sources, and mitigation measures will be considered. These measures may include (though are not limited to) adding absorbent material along the inner walls of the engine bays or adding mufflers on air intake and output openings.

The noise monitoring will be conducted by a qualified professional (e.g., acoustics engineer) and will comply with the methodology of instruction note 98-01.

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