Docket No. 7156
Exhibit UPC-Cross- PG4
Admitted: ____________

STATE OF VERMONT
ENVIRONMENTAL COURT

APPEALS OF CURTIS, ET AL.	} } }	Docket No. 203-11-03

PREFILED DIRECT TESTIMONY OF PETER H. GULDBERG

from the source or sources of interest."[1] In simple terms, it is the existing sound level in an area before a project is built. The L_{90} metric, while sometimes misnamed the background level, is more accurately described as a minimum sound level since it represents the sound present during the quietest 10% of the time and has been traditionally used in community noise studies to represent the quietest interval during some time of day or night. The L_{90} level does not properly characterize an area because it ignores the 90% of the sounds in the existing environment that are loudest. For example, in an urban area such as Newport where St. Mary's Church is located, existing sound levels are dominated by motor vehicle traffic and these frequent but intermittent sounds are thrown out in the calculation of the L_{90} metric.

U.S. EPA states that "background noise may be considered as the equivalent sound level [L_{eq}] that existed before the introduction of the new noise."[2] The background (existing) sound levels at homes near the Newport Project site were properly reported as energy-average equivalent L_{eq} sound levels (see page 4 of the Report). The L_{eq} metric is the most widely used measure in community noise studies because it accounts for both the magnitude and duration of varying sounds present in developed

[1] Acoustical Society of America, American National Standard, ANSI S12.18-1994, p.3.

[2] EPA, "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety," Report No. 550/9-74-004, 1974, page A-6.

A18. We calculated the maximum sound level from the equipment shelter for six different residential properties located closest to the Church, using the closest residential property line, as required under the Newport Ordinance, and also using the closest upper story window location. If the Church building shielded a residence from the shelter, we accounted for the sound barrier effect using Fresnel diffraction calculations, which are standard in acoustic engineering. The calculations were made for normal operations and emergency operations.

Q19. What were the results of the acoustic modeling that you performed for the equipment shelter?

A19. The results are shown on pages 5 and 6 of the Report. To summarize, the results showed that maximum sound levels from the equipment shelter on the closest residences ranged from 5 to 36 decibels dBA during normal operations and from 30 to 48 dBA during emergency operations.

Q20. Is it your opinion that these numbers are conservative?

A20. Yes, the acoustic modeling is conservative and overstates actual sound levels because: 1) it assumed continuous maximum operation of equipment and did not account for the fact that the HVAC unit will cycle on and off, and 2) it ignored sound attenuation due to air absorption and ground cover.

Regarding the second point, as sound travels it is diminished as a result of absorption by its surroundings. We did not reduce the numbers to account for this absorption.

SOUND LEVEL CRITERIA

There are no state noise regulations with numerical decibel limits. The City of Newport does have a Bylaw that regulates sound. The Bylaw sets a not-to-exceed limit of 70 dBA for all districts uses, as measured at any individual property line location.

EXISTING SOUND LEVELS

Measurements of existing sound levels were made on Monday, September 8, day and night, at two locations: (1) the NW corner of the Curtis property line closest to the church, and (2) the west property line of the Therrien residence on Raymond Avenue. All measurements were made using a Type 1 sound analyzer (CEL Model 593), calibrated and equipped with a windscreen. Weather conditions were ideal for accurate sound measurement: skies were clear and winds were light (0-5 mph). Measurements were made at three times:

(1) Afternoon from 12:55 - 2:37 p.m.,
(2) Early evening from 5:11 - 6:47 p.m., and
(3) Nighttime from 11:00 p.m. to 12:42 a.m.

Average afternoon sound levels (L_{eq}) ranged from 54 to 56 dBA and dominant sounds were traffic on local streets, a dog barking on the Couto property, children playing at a nearby school and natural sounds. Early evening average sound levels ranged from 48 to 49 dBA, representing the same dominant sounds. Late at night the average sound levels were 38 to 40 dBA and represent primarily distant highway traffic.

ANALYSIS RESULTS

During normal operations, the equipment sound sources are limited to the wall mounted HVAC units used to cool and heat the equipment shelter. The HVAC units cycle on an off in order to maintain an acceptable temperature within the enclosure. During power outages, an emergency generator runs to provide electric power to ensure continuous operations. When neither the HVAC equipment nor the generator are operating, there will be no audible noise emitted from the onsite equipment. The emergency generator is equipped with a silencer. The exhaust silencer proposed for this site is rated as a critical grade silencer, which is among the highest rated silencers commercially available for this generator set. Measurements made by TEI at a similar Verizon telecommunications facility in Brandon, Vermont and Pittsfield, Massachusetts were used to estimate equipment sound generation source data.

Acoustic modeling of the Verizon facility was performed using the standard formula for hemispherical wave spreading of acoustic energy with distance. The predicted sound levels are conservative since attenuation due to atmospheric and ground absorption were ignored. Calculations were completed at the residential property line locations as required under the Newport Ordinance. Predictions were also completed for the closest residential structures at an upper story mid-window location. Where applicable, building shielding as a result of the church building breaking the line of sight between the equipment and receptor was added using the Maekawa Method. The results of the modeling analysis, including the distance in linear feet between the base shelter and receptor, are provided in Table 2. The results are shown in two categories, normal operation and emergency operation.