

WESTERN GRAY WHALE ADVISORY PANEL

3rd Meeting

Agenda Item: 7

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ENGLISH

MONITORING AND MANAGEMENT OF CONTINUOUS NOISE

Measurement of Sound Levels from Industrial Activities

During PA-B Topsides Installation in 2007

Submitted by SEIC

MEASUREMENT OF SOUND LEVELS FROM INDUSTRIAL ACTIVITIES DURING PA-B TOPSIDES INSTALLATION IN 2007

1. BACKGROUND

This document is intended as an early-stage briefing note on the 2007 acoustic monitoring in Piltun, to be made available to the Western Gray Whale Advisory Panel in advance of the WGWAP-3 meeting of 10-13 November 2007 in Lausanne, Switzerland. The information contained herein, while not as detailed or extensive as the full post-season acoustic monitoring reports that are prepared over a longer time frame, should provide the Panel with a clear picture of the sound levels that were measured at various stations and their correlation with the salient phases of construction activities. In 2007 most of the Sakhalin Energy Investment Company (SEIC) construction activities were concentrated at the PA-B platform site and consisted of the float-over and installation of the platform topsides plus ancillary tasks such as the placement of a floating accommodation module (flotel) adjacent to the platform for the workers involved in the topsides commissioning. The present document focuses on documenting sound levels over the phase of most intensive construction activity and several days before and after it, covering the period from 23 June to 14 July 2007 inclusive.

2. METHODS

Acoustic Measurement Equipment and Locations

In 2007, as in previous construction seasons, Sakhalin Energy implemented a real-time acoustic monitoring program using autonomous underwater acoustic recorders with radio-telemetry channels (T-AUAR) and analog sonobuoys (ASB). Combinations of the two types of devices were installed on the seafloor at different periods of the season along the seaward boundary of the feeding area approximately at the 20 m isobath line. The T-AUAR and ASB units were equipped with radio telemetry transmitters to broadcast full-waveform analog acoustic signals in the frequency range of 10-5000 Hz to an onshore station at Piltun Lighthouse, where the noise levels were monitored and assessed in real time 24 hours a day. The T-AUAR units also performed near-continuous recording of broadband acoustic data in the frequency range 1-15000 Hz to internal hard disk (there is a 20 minute gap every 4 hours when the acoustic data recorded on a flash memory buffer are copied to the hard drive of the computer). Up to four sites were simultaneously monitored during the industrial activities; their locations relative to the offshore platforms and shore monitoring station are shown in Figure 1.

Because of operational and maintenance requirements the four monitoring sites were outfitted with different measurement units at various times, not always on a continuous basis. For the

purpose of post-season analysis of sound levels, internally recorded data from T-AUAR units would always be used preferentially to telemetered data since the latter are prone to radio noise and generally over-estimate acoustic levels during quieter periods. For some sites and times, however, only radio transmitted data were available and were used in the analysis. Over the period encompassed in this briefing note, the four monitoring sites provided data as follows:

- Odoptu PA-B: Radio data from 23 June to 3 July
Radio and disk based data from 10 July to 14 July
- PA-B-20: Radio data from 23 June to 3 July
Radio and disk based data from 3 July to 14 July
- Piltun: Radio data from 23 June to 3 July
Radio and disk based data from 3 July to 14 July
- Molikpaq: Radio data from 23 June to 30 June
Radio data from 10 July to 14 July.

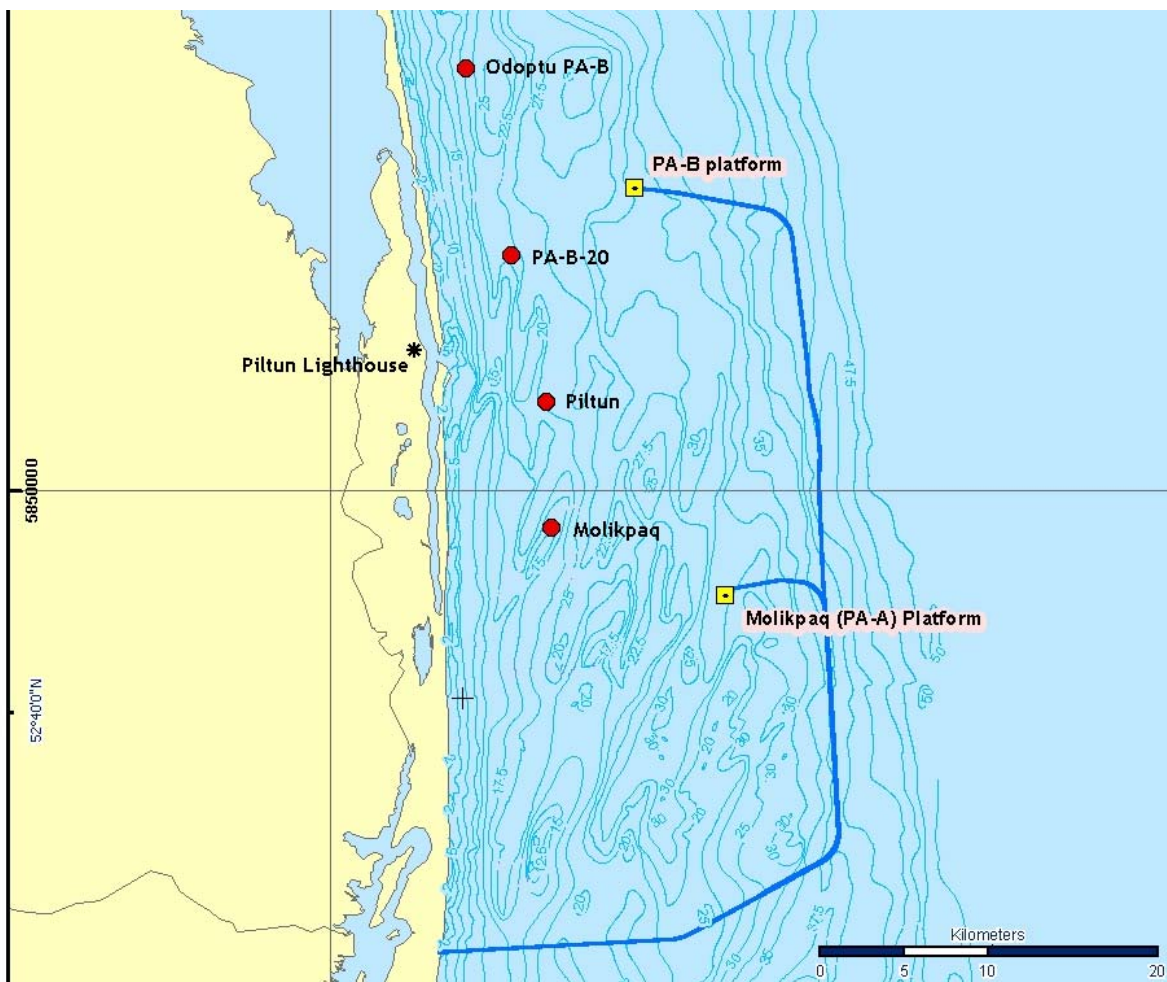


Figure 1. Location of sound monitoring sites for the 2007 construction season.

Calculation of Noise Levels

Hourly mean values were computed post-season from one-minute broadband sound levels (over the pass-band 10Hz to 5kHz for both telemetred and disk-based data) provided by a Russian scientific team from the Pacific Oceanological Institute, Vladivostok, who operated and maintained the acoustic monitoring system. In performing the analysis care was taken to exclude gap periods in the internal T-AUAR data due to disk transfer activity, as well as any intervals where the measurements at any given station were dominated by noise from very nearby vessels unrelated to the construction activities, which almost without exception would have been scientific ships involved in the western gray whale research activities. The criterion for discarding any of the abnormal hourly levels in the presentation of the results was that the presence of a vessel near the respective station had to be confirmed and documented in the field logs kept by the real-time monitoring team (based either on observation or on communications with the vessels involved). There were also sporadic instances where the levels at a station, particularly the Piltun and Molikpaq measurement sites, could be elevated for up to a few hours by unusually strong tidal or sea current activity that induced self noise in the unit. Again, only where such events were documented as self noise by the monitoring team based on spectral content and/or aural assessment were the corresponding data points discarded in the results presented here.

3. RESULTS

The hourly mean levels for all available data periods at the four monitoring stations were plotted on a common time scale for ease of comparative assessment and are presented in Figure 2. The sound level traces are overlaid over time bands identifying the major construction phases taking place at or near the PA-B platform site, allowing a visual correlation of noise level and industrial activity. One point to be heeded in comparing relative levels at the various stations in the early part of the time series (pre 3 July) – where all data are telemetry based – is that during periods of low acoustic activity the signal from each station would be dominated by radio noise, which created a minimum effective level or “pedestal” between 105 and 110 dB re μPa^2 . These values would be unrepresentative of the actual acoustic levels measured at the hydrophones.

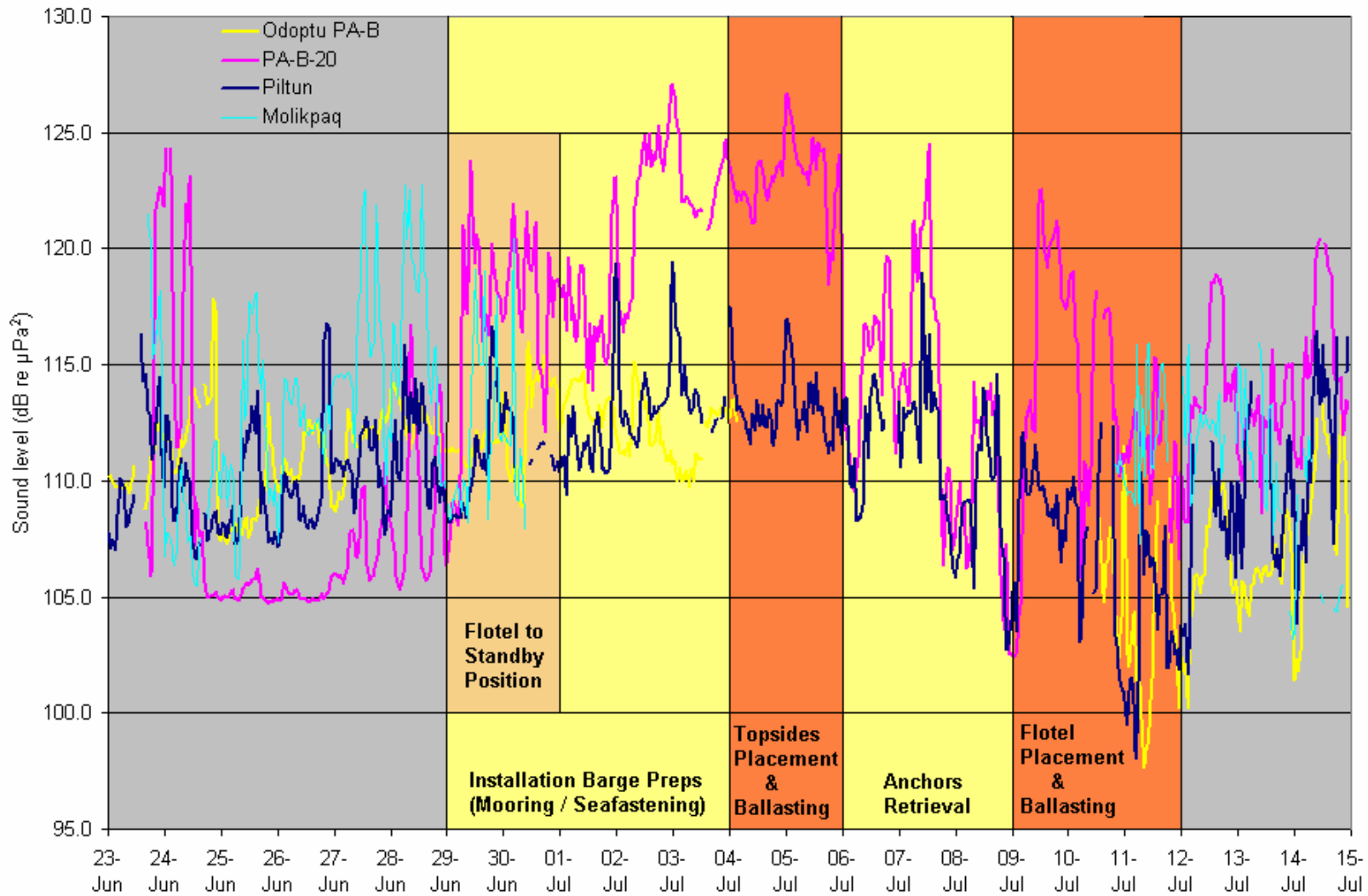


Figure 2. Hourly mean sound levels at the four monitoring stations overlaid on the salient phases of construction activity.