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To: Stefan Galvez, California Department of Transportation
From: Keith Pommerenck
CC: Ivy Edmonds-Hess, Parsons Brinckerhoff
Courtney Cacace, Garcia and Associates
Date: November 5, 2009
Re: San Francisco-Oakland Bay Bridge East Span Seismic Safety Project, Self-Anchored Suspension Span
Subject: T1 Temporary Access Trestle Installation – Hydroacoustic Measurements For November 4, 2009

The California Department of Transportation (Department) is in the process of replacing the existing East Span of the San Francisco-Oakland Bay Bridge (SFOBB) with a new bridge immediately to the north. To facilitate the construction of the Self-Anchored Suspension Span portion of the new East Span, twenty 36-inch diameter steel pipe piles will be installed to support a temporary access trestle (see Figure 1). Hydroacoustic data was collected during impact pile driving of three piles with the bubble curtain in operation, on November 4, 2009. The piles were identified from Figure 1 as piles number 6, 5 and 4.

Underwater sound measurements were collected at three locations 10 meters (33 feet), 28 to 30 meters (92 to 98 feet), and 103 to 107 meters (338-351 feet) from the piles, at a depth of 2-3 meters (7-10 feet). The driving was completed using the Delmag 30-32 diesel impact hammer.

On November 4, 2009 the impact driving for Pile 6 began at 0847 hours and ended at 0852 hours. There were approximately 184 pile strikes in this time period. The peak criteria of 206 dB re: 1µPa at 10 meters (33 feet) from the pile was exceeded. The accumulated SEL criteria of 187 dB re 1µPa-sec² at 30 meters (98 feet) from the pile was exceeded during the driving.

For Pile 5, driving began at 0917 hours and ended at 0922 hours. There were approximately 128 pile strikes in this time period. The peak criteria of 206 dB re: 1µPa at 10 meters (33 feet) from the pile was not exceeded. The accumulated SEL criteria of 187 dB re 1µPa-sec² at 28 meters (92 feet) from the pile was exceeded during the driving.

For Pile 4, driving began at 0957 hours and ended at 1001 hours. There were approximately 108 pile strikes in this time period. The peak criteria of 206 dB re: 1µPa at 10 meters (33 feet) from the pile was not exceeded. The accumulated SEL criteria of 187 dB re 1µPa-sec² at 28 meters (92 feet) from the pile was exceeded during the driving.

The daily accumulated SEL at 10 meters (33 feet) from all three piles was approximately 203 dB re 1µPa-sec². The daily accumulated SEL at 28 meters (92 feet) from all three piles was approximately 199 dB re 1µPa-sec². The accumulated SEL was not measured at the location 103 to 107 meters (338-351 feet) from the pile. The accumulated SEL for this monitoring location will be calculated in the future. The measurement results including accumulated SEL are summarized Table 1 and Table 2 below.

Table 1: Summary of Measured Sound Levels for November 4, 2009

Pile	Time	Location	Peak		SEL	
			dB re: 1µPa		dB re: 1µ-sec ²	
			Mean	Range	Single Strike	Cumulative
6	0847 - 0852	10 meters	203	195 - 207	175	201
		30 meters	200	192 - 204	171	196
		107 meters	191	190 - 192	ND	ND
5	0917 - 0922	10 meters	203	196 - 206	175	198
		28 meters	200	192 - 204	171	195
		103 meters	187	185 - 188	ND	ND
4	0957-1001	10 meters	201	196 - 204	170	194
		28 meters	198	190 - 200	169	193
		105 meters	182	181 - 183	ND	ND

ND – SEL was not measured in the field, but will be calculated at a later date

Table 2: Summary of RMS Measured Sound Levels for November 4, 2009

Pile	Time	Location	RMS	
			dB re: 1µPa	
			Mean	Range
6	0847 - 0852	30 meters	186	178 - 189
		103 meters	175	174 - 176
5	0917 - 0922	28 meters	187	172 - 191
		107 meters	173	172 - 174
4	0957 - 1001	28 meters	186	177 - 188
		105 meters	170	169 - 171

Figure 1

