

CS-4000 Unit #5990 Full Noise Survey
21 April 1997
Morenci Mine Site, Morenci, Arizona

Site Description

This full noise survey was conducted between 0820 and 1313 on 21 April 1997 at the Phelps Dodge, Morenci Mine. This active copper mine is located near the northeastern Arizona town of Morenci. It is a high desert area with rocky soil and scrub brush. The altitude is approximately 5,000 feet above sea level. The site was in the mountainous terrain outside of the town and outside of the active mine pit. The drill rig was on a pad area with a steep up-slope on the right (Figure 1). There were some additional noise sources such as heavy equipment and a highway within 100 yards of the site that could have contributed to noise levels in the survey. There were several vehicles (running occasionally) positioned around the drill site.

Environmental Conditions

During the entire survey, winds were moderate from the southwest at speeds from 5 to 10 miles per hour. Temperatures started in the mid 70^os F and rose to the high 80^os F during the course of the survey with low humidity. The background noise level taken with the SLM before drilling operations was less than 75.0 dBA.

Site Equipment

The drill surveyed was unit 5990 based out of Chandler, Arizona. The main engine of the drill rig is a deck mounted, six cylinder, 653 Detroit diesel. Associated equipment included with the rig is an FMC W1122BCD hydraulic powered water pump, which runs off of power supplied by the drill rig engine. The rig is mounted on a 1984 F-2275 Freightliner carrier. Ancillary equipment included a Ford F-700 water truck and a Ford F-150 driller's pick-up truck.

Technical Approach

Layne Christensen Safety Coordinator, Jim Wright, conducted this survey. During the survey, the drill crew wore the noise dosimeters for approximately five hours while performing routine drilling operations. For this time, there were no shut downs or work stoppages. The helper made two water runs totaling approximately one hour during the survey. The helper drove the F-700 water truck to a location, filled the tank and returned to the rig. This survey would constitute an "average" time frame of drilling on a CS 4000 core drill rig.

Audio Dosimetry Results

Dosimetry of personnel on this CS-4000 drill rig showed exposure averages above the OSHA/ MSHA action levels of 85 dBA TWA₈ and the 50% dose. The tables on the following pages outline specific dosimetry results.

Instantaneous Sound Level Measurement Results

Instantaneous SLM results for the CS-4000 drill rig at Morenci showed noise levels above 85 dBA up to twenty-five feet (25') away from the rig during drilling operations. These levels were dependent upon the direction of the rig. The front showed the lowest levels beginning at ~ 88 dBA. The noise levels at the left and right sides of the drill produced levels of ~ 106 dBA due to the close proximity of the engine.

Conclusion

The dosimetry data, 85 dBA line and instantaneous SLM readings taken during this survey are within other historical surveys conducted.

Equipment List	
Instrument	Serial Number
DuPont Mk3 Personal Dosimeter in SLM mode	027257
DuPont AC-1 Acoustical Calibrator	01149
DuPont Mk1 Personal Dosimeter	14902
DuPont Mk1 Personal Dosimeter	14904

Calibration Records						
Serial Number	Pre-Cal			Post-Cal		
	94dBA	114dBA	124dBA	94dBA	114dBA	124dBA
027257	94.0	114.0	124.1	94.1	114.0	124.1
14902	94.1	114.2	124.1	94.1	114.1	124.2
14904	94.1	114.1	124.0	94.0	114.1	124.1

Noise Dosimeter Survey Results						
	Survey Dose %	anticipated Dose ₈ %	survey dBA _{avg}	anticipated ¹ TWA ₈	dBA _{max}	Time (hrs:min)
14902 – driller	51.5	83.0	88.6	85.2	117.1	4:53
14904 - helper	49.9	80.0	87.7	85.0	112.8	4:53

¹ based on survey dose% in equation $TWA_8 = 16.61 \log_{10} (D\%/100) + 90$

Instantaneous SLM Readings				
Distance from Rig in feet	SLM Readings in dBA from Position			
	Front	Rear	Left	Right
0	87.8	96.3	106.2	103.8
5	85.7	92.9	96.5	96.0
10	81.3	90.0	91.7	91.3
15	80.0	86.7	88.9	89.4
20	78.5	85.1	86.8	87.0
25	-	81.6	85.0	85.1
30	-	78.5	82.2	82.2
35	-	-	78.0	78.9

Misc. Instantaneous SLM Readings	
Operator's Station	96 dBA

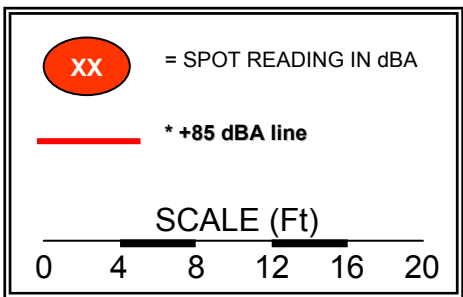
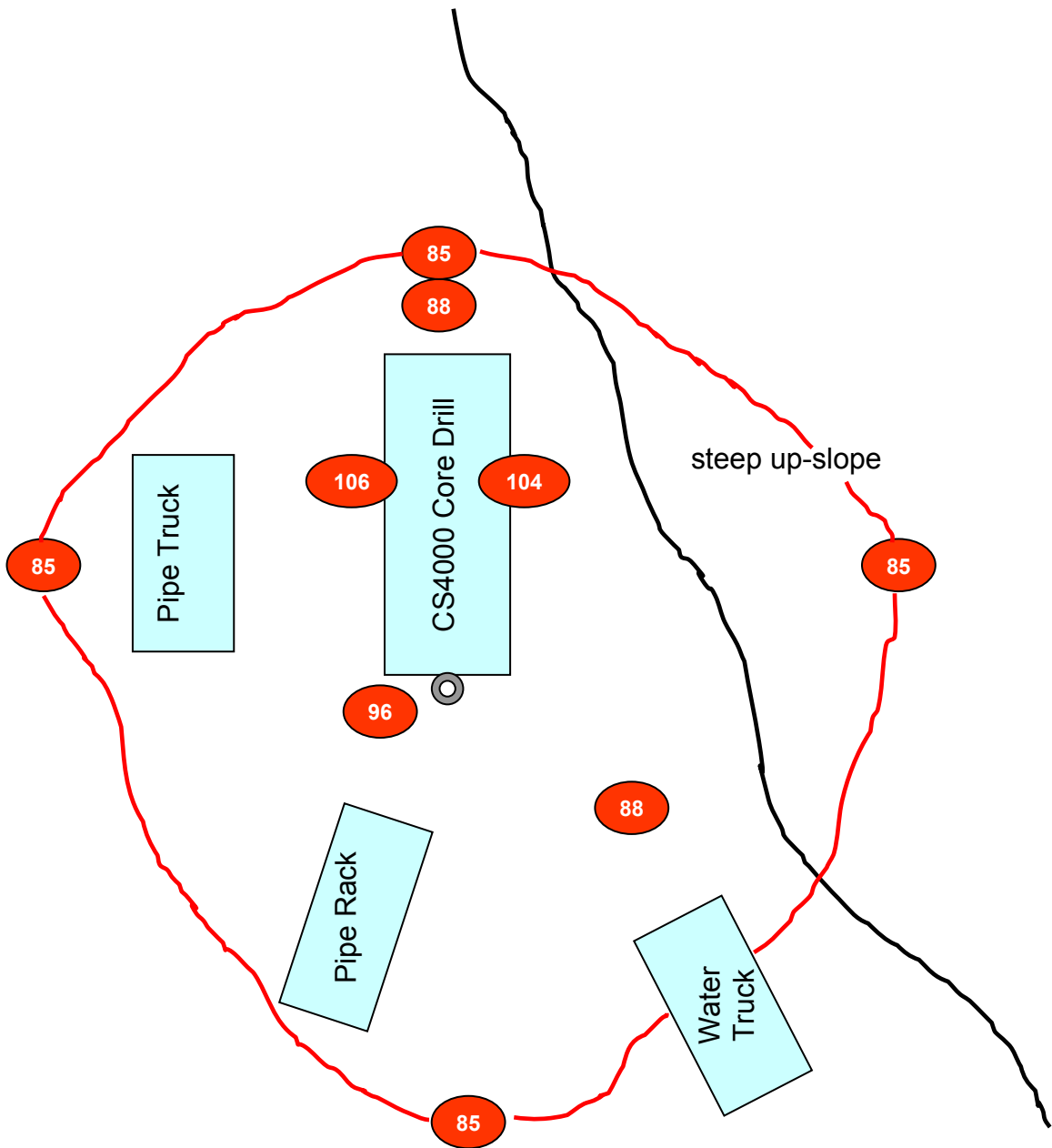


Figure 1 Morenci Mine CS4000
 #5990
 21 April 1997