

Surface Air Track Drill Scenario

Known: Equipment

- **Surface Limestone Mine**
- **33 Year Old Air Track Drill**
- **38 foot long holes using four 12 foot long drill steels**
- **No automatic drill steel changer**
- **Approximately 22 holes per shift**
- **15-20 minutes per hole (2 min includes tram & setup)**
- **Normal work-shift is 8 hours.**
- **Generally drilling on uneven or sloped surfaces**

Known:

1. Dose for 8-hour work shift is between 352% to 378%
2. Company has installed 3-engineering noise controls to the drill.
3. Operator ear sound levels:
 - 95.5 dBA while tramming
 - 109.4 dBA while drilling
4. Other sound levels:
 - 119.3 dBA in front of barrier
 - 108.5 dBA to 96.5 dBA away from controls at 3-foot increments
5. Drill operator is enrolled in a HCP
6. Dual Hearing Protection Being Worn

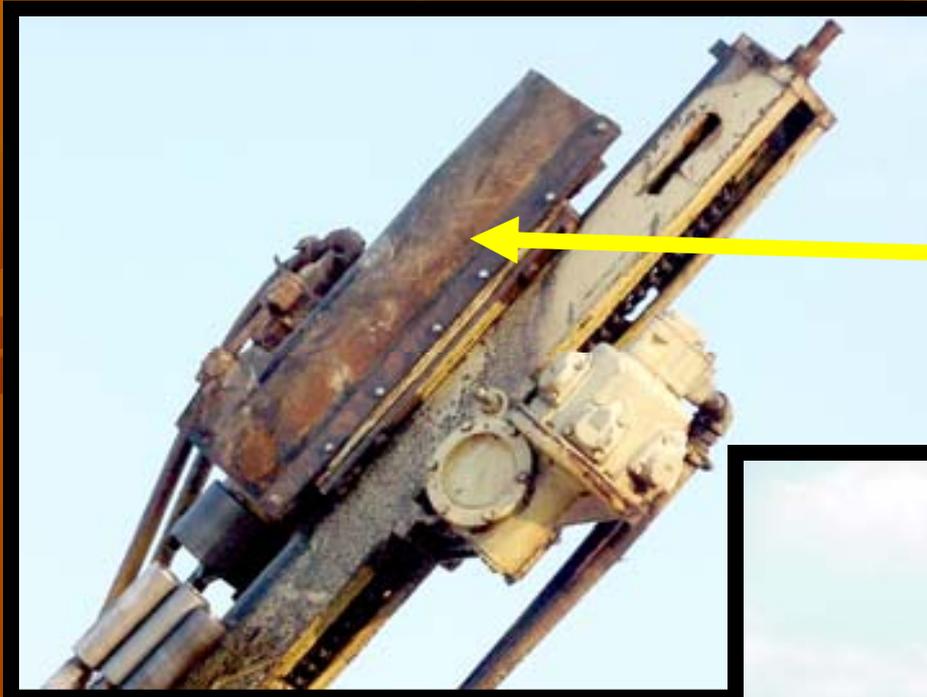
Known: Equipment



Known: Equipment-Current Noise controls

1. Hammer of drill is wrapped with $\frac{3}{8}$ -inch conveyor belting.
2. $\frac{3}{8}$ -inch conveyor belting barrier is installed between drill controls and drill hammer.
3. Two of the drill control air exhaust ports are rerouted to the rear of the drill via hose.

Known: Equipment-Current Noise controls



Drill Hammer Wrapped



Surface Drill Scenario
Salt Lake City, UT

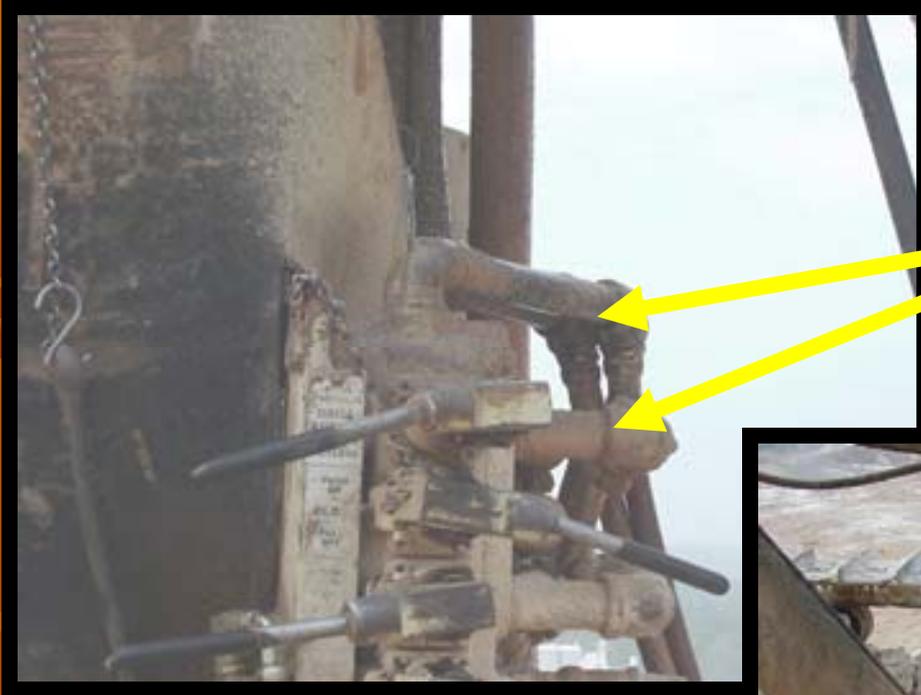
Known: Equipment-Current Noise controls



Barrier / Shield



Known: Equipment-Current Noise controls



Drill Control Exhaust Directed
To Rear Of Drill



High Wall Area

Air Compressor
~ 45 Feet Away

Air Hose



119.4 dBA In
Front Of Barrier

109.4 dBA
Behind Barrier

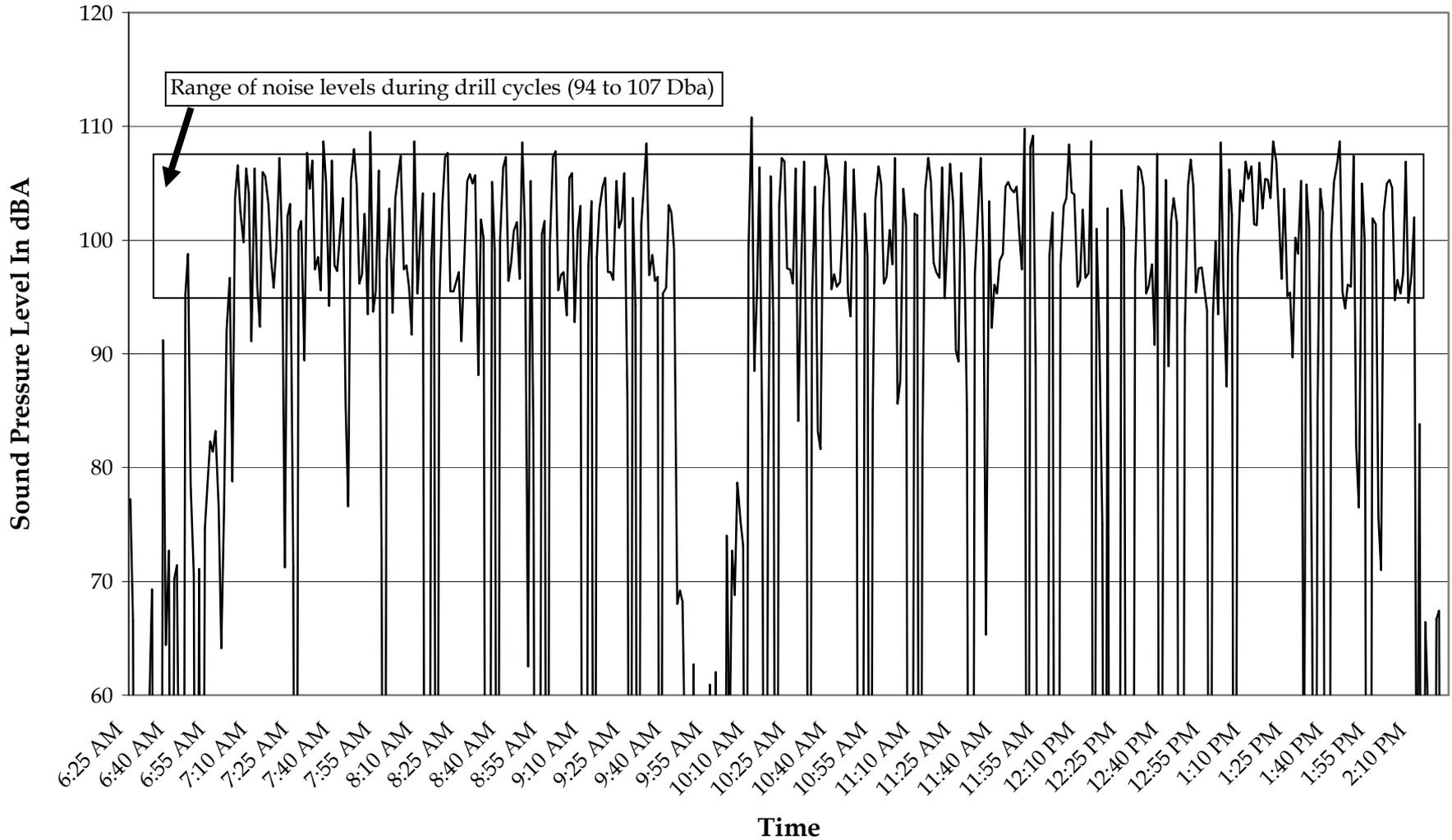
95.5 dBA 10' From
Rear Of Drill

Tram
Controls

Note: Generally a pickup truck
is located approximately 30-50 feet
from drill.

| | |
|-----|-----------|
| 3' | 108.5 dBA |
| 6' | 107.9 dBA |
| 9' | 106.2 dBA |
| 12' | 105.1 dBA |
| 15' | 102.6 dBA |
| 18' | 99.9 dBA |
| 21' | 97.9 dBA |
| 24' | 96.5 dBA |

Surface Air Track Drill Dosimeter Data



Range of noise levels during drill cycles (94 to 107 Dba)

Exposure Contributions

| <u>Task</u> | <u>Time(min)</u> | <u>Level(dBA)</u> | <u>Dose(%)</u> |
|--------------|------------------|-------------------|----------------|
| Tram/Set-up | 44 | ~ 93 | 14 |
| Lunch/Breaks | 30 | ~ 80 | 2 |
| Drilling | 406 | ~ 100.5 | 362 |

Drilling Solutions:

1. Is there another, quieter drill on the property that can do the job?
2. Replace the old drill with a new drill that is manufactured with an operator's enclosure?
3. Improve upon current noise controls ~ 3 dBA
97.5 dBA for 406 min. => 239 %
4. Use 3-sided portable enclosure for the operator ~ 10 dBA
90.6 dBA for 406 min. => 91.9 %

Enclose Hammer Inside Acoustically Treated Structure ~ 3.0 dBA



Cost < \$500

Properly Installed Air Muffler and Relocate Exhaust Away From Operator ~ 3.0



Cost < \$1000



Extending Barrier To Entire Drill Mast => 3.0

stationary panel



hinged door



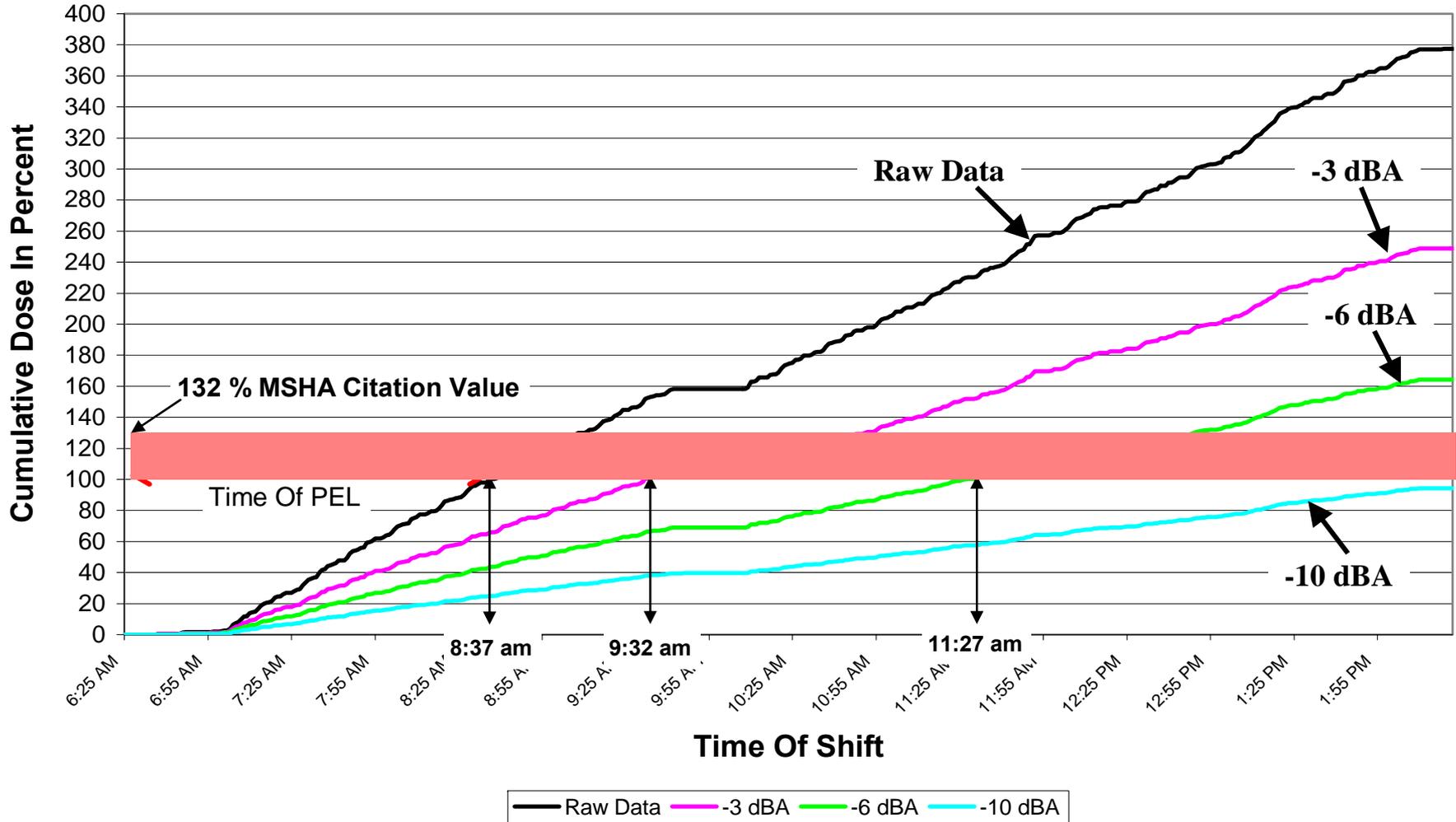
Cost < \$500

3-Sided Portable Enclosure => 10.0

Cost < \$1000



Surface Air Track Drill Operator With Projected Amounts Of Reduction



— Raw Data
 — -3 dBA
 — -6 dBA
 — -10 dBA

Projected Noise Exposure Results Based On dBA Reduction Amounts Using Engineering/Administrative Noise Controls

| <u>Drilling Reduced By; (For 406 Minutes)</u> | <u>Final Shift Dose%</u> |
|---|--------------------------|
| 100.5 - 1 = 99.5 dBA | 332 (-46%) |
| " - 2 = 98.5 dBA | 291 (-87%) |
| " - 3 = 97.5 dBA | 255 (-123%) |
| " - 4 = 96.5 dBA | 224 (-154%) |
| " - 5 = 95.5 dBA | 197 (-181%) |
| " - 10 = 90.5 dBA | 108 (-270%) |
| " - 12 = 88.5 dBA | 20 (-358%) |

Original Full-Shift Of 378 %

Alternative Solutions

Tamrock CHA-800 Drill







Tamrock CHA-800 Drill

| | |
|----------------------------------|-----------------|
| At operator Controls (Untreated) | 110.5 dBA |
| <u>Inside Homemade Cab</u> | <u>88.8 dBA</u> |
| Reduction | 21.7 dBA |

Cost of Homemade operator cab could be < \$1000

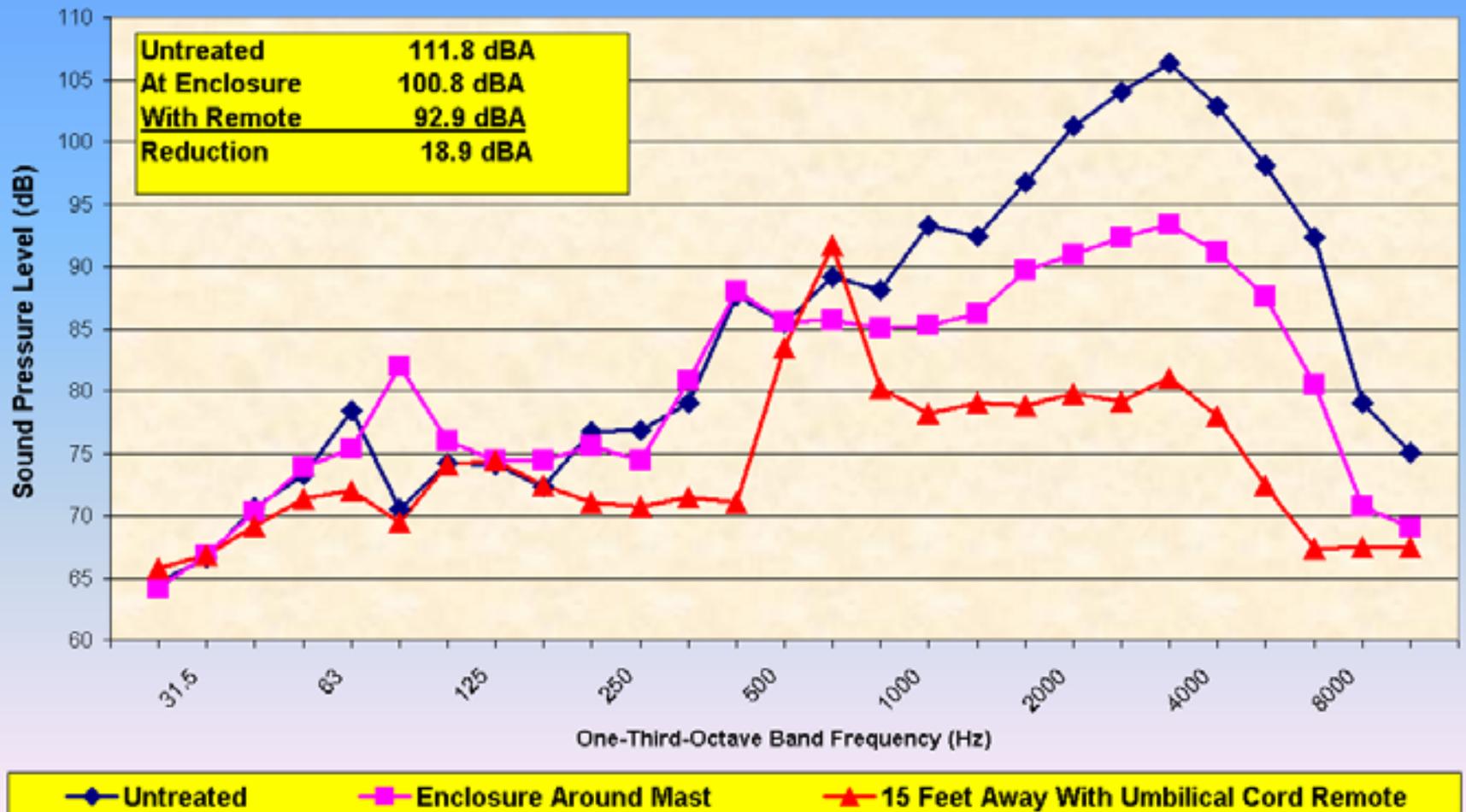
Tamrock Trimmer 100 Drill Enclosure Around Mast



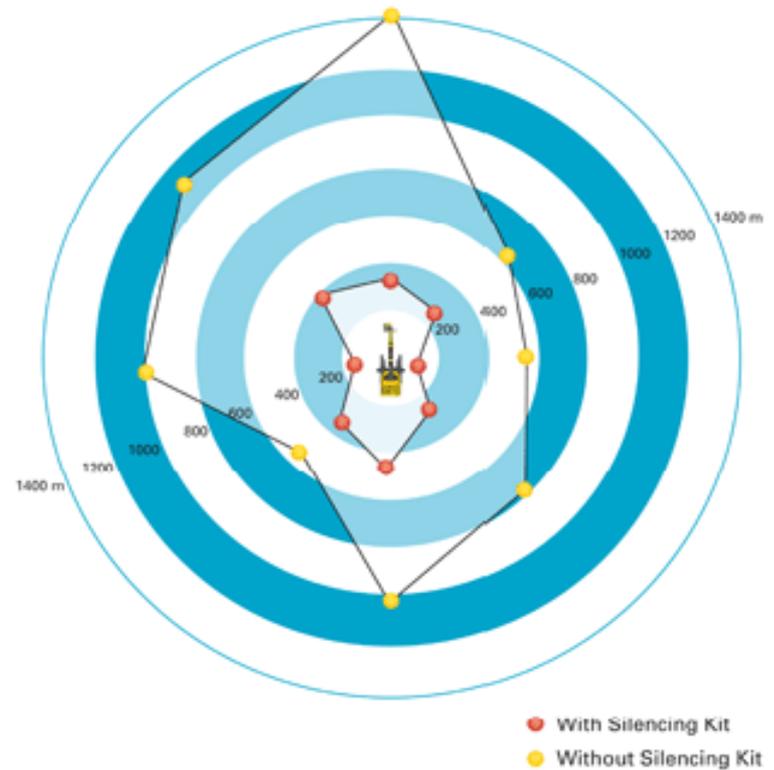
Operating Drill With Umbilical Cord Remote



Frequency Distribution of Sound Tamrock Trimmer 100 Drill



Atlas Copco Surface Drill Rig The Silenced ROC D7C



Surface Drill Scenario
Salt Lake City, UT

Atlas Copco Surface Drill Rig The Silenced ROC D7C



Atlas Copco Silenced ROC Brochure

Schhh...! Low noise crawler at work! Atlas Copco's first silenced surface drill rig is a sound investment

*Atlas Copco, the leading drill rig manufacturer, is set to launch the world's first ROC series surface drill rig with a substantially reduced noise level making it the quietest-running rig of its kind. The Silenced ROC, **which will be introduced in September 2005**, has a noise level of approximately 10 dB(A) below that of other rigs on the market, which enables it to be used in very restricted worksites in urban areas. Combined with lower fuel consumption and increased drilling capacity, the new Silenced ROC – designated as an option on ROC D7 C – represents a major step forward for the drillers' working environment and an ideal choice for small and medium-sized quarries and civil engineering work sites.*

Noise a key factor

In many countries, strict noise restrictions are imposed for drilling in urban

areas. This presents new opportunities for companies using Atlas Copco's new Silenced ROC. The rig's Silencing Kit reduces the noise level by more than 10 dB(A) which makes it possible to drill virtually anywhere.

- Atlas Copco has a clear strategy when it comes to environmental and safety issues, says Anders Hedqvist, D&D Manager Atlas Copco Surface Drilling Equipment. We are in the forefront of the development and the Silenced ROC plays an important role in this work. In the future, people who live near a quarry or construction site will have quieter surroundings.

Drilling noise is generated by vibration in the drill steel, feed system, boom and body of the rig. The advanced silencing system consists of many components which reduce the overall noise level, but the

most noticeable is the hood that covers the mast.

Operator Controls Relocated Inside of Cab



**Mine Safety and Health Administration
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