

**COMPARISON OF COAL MINE OCCUPATIONAL EXPOSURES  
COLLECTED AT TWO THRESHOLD SOUND LEVELS**

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## **PURPOSE OF STUDY**

**TO DETERMINE THE DISTRIBUTION OF OCCUPATIONAL NOISE EXPOSURES OF MINERS IN ORDER TO ESTIMATE THE NUMBER OF MINERS THAT COULD EXCEED THE PERMISSIBLE EXPOSURE LIMIT (PEL), ACTION LEVEL (AL), OR DUAL HEARING PROTECTION LEVEL (DHPL) OF THE PROPOSED MSHA NOISE REGULATIONS. THIS INFORMATION IS USEFUL TO ESTIMATE THE NUMBER OF CASES OF NONCOMPLIANCE, AND TO ESTIMATE THE NUMBER OF MINERS THAT WOULD BE COVERED BY A HEARING CONSERVATION PROGRAM.**

**PERMISSIBLE EXPOSURE LEVEL (PEL) = 90 dBA twa-8 (100%)**

**ACTION LEVEL (AL) = 85 dBA twa-8 (50%)**

**DUAL HEARING PROTECTION LEVEL (DHPL) = 105 dBA twa-8 (800%)**

## DATA COLLECTION

- **4,247 FULL SHIFT MSHA INSPECTOR NOISE SURVEYS**
- **COLLECTED WITH NOISE DOSIMETERS**
- **5-dB EXCHANGE RATE, 90-dB CRITERION LEVEL, A-WEIGHTING, SLOW RESPONSE**
- **DUAL (90/80 dB) THRESHOLD MEASUREMENTS**
- **MICROPHONE AT MSHA POSITION**
- **10% DOSE INTERVALS**

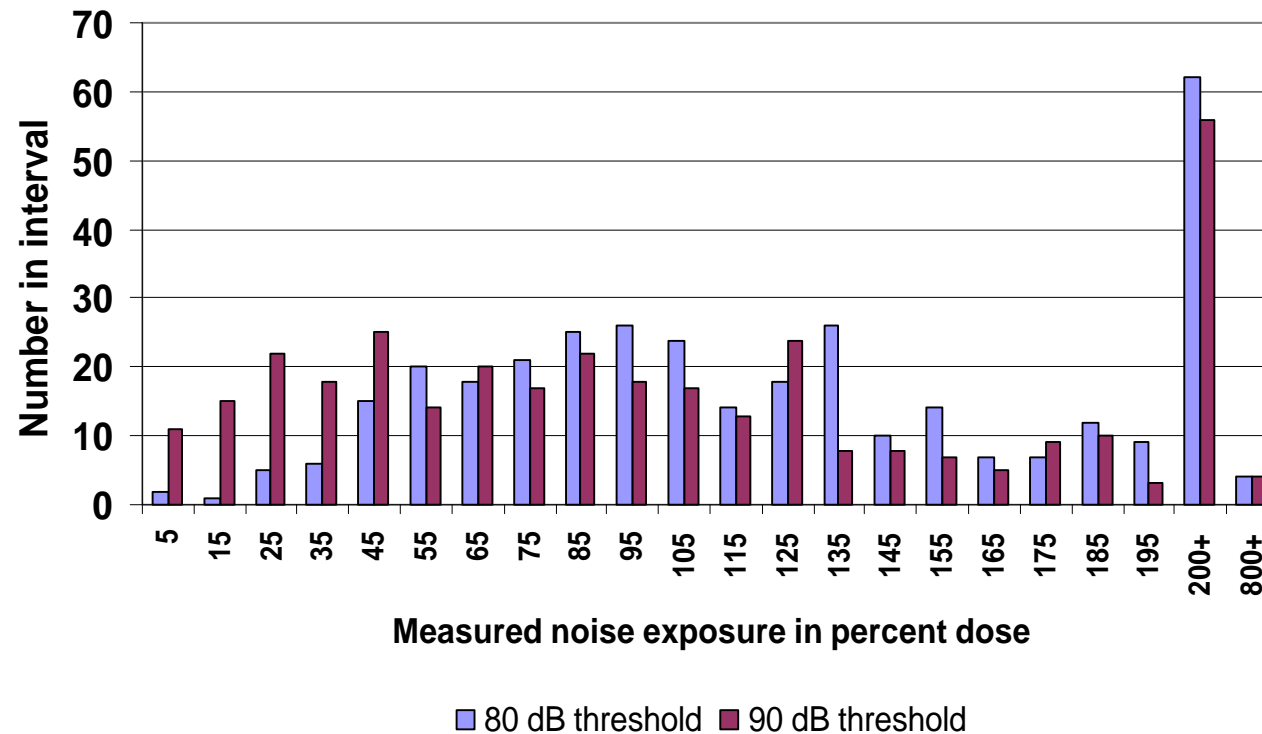




## BULLDOZERS (#368)

	80 dB THRESHOLD	90 dB THRESHOLD
N	342	
>AL	91.5%	73.4%
>PEL	59.4%	46.9%

### NOISE EXPOSURE OF BULLDOZER OPERATORS

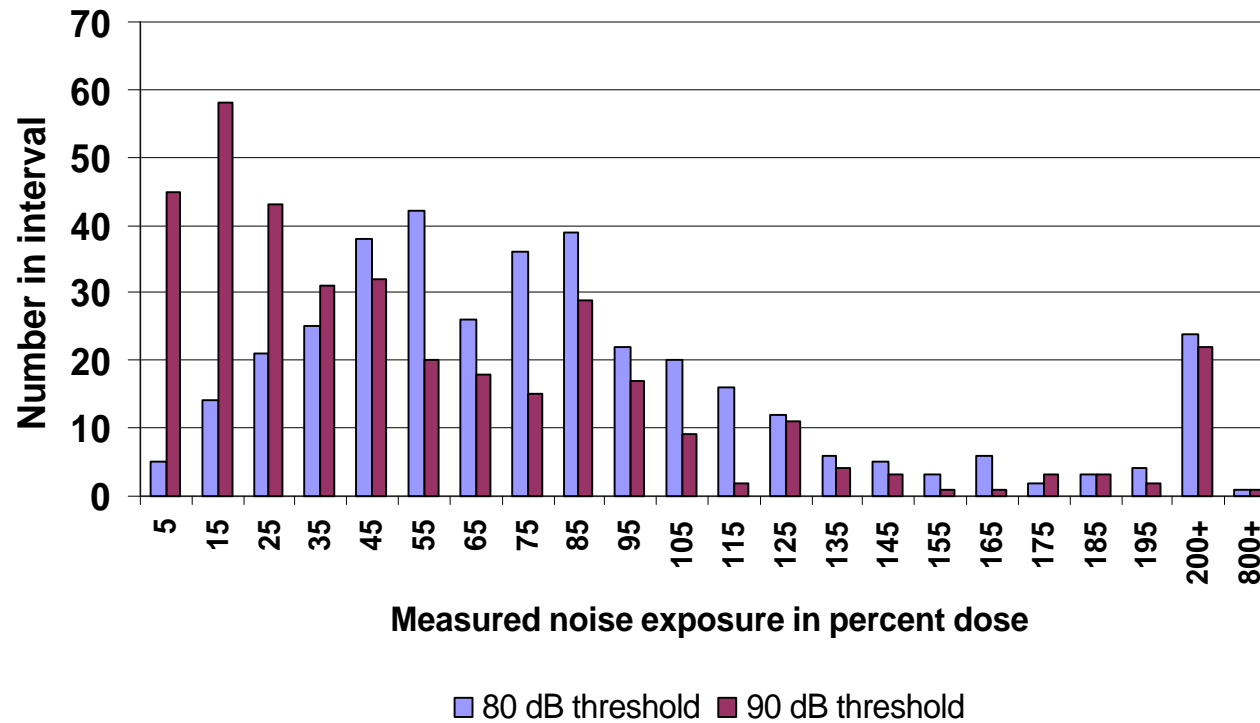




## FRONT-END LOADERS (#382)

	80 dB THRESHOLD	90 dB THRESHOLD
N	369	
>AL	72.1%	43.4%
>PEL	27.4%	16.5%

### NOISE EXPOSURE OF FRONT-END LOADER OPERATORS

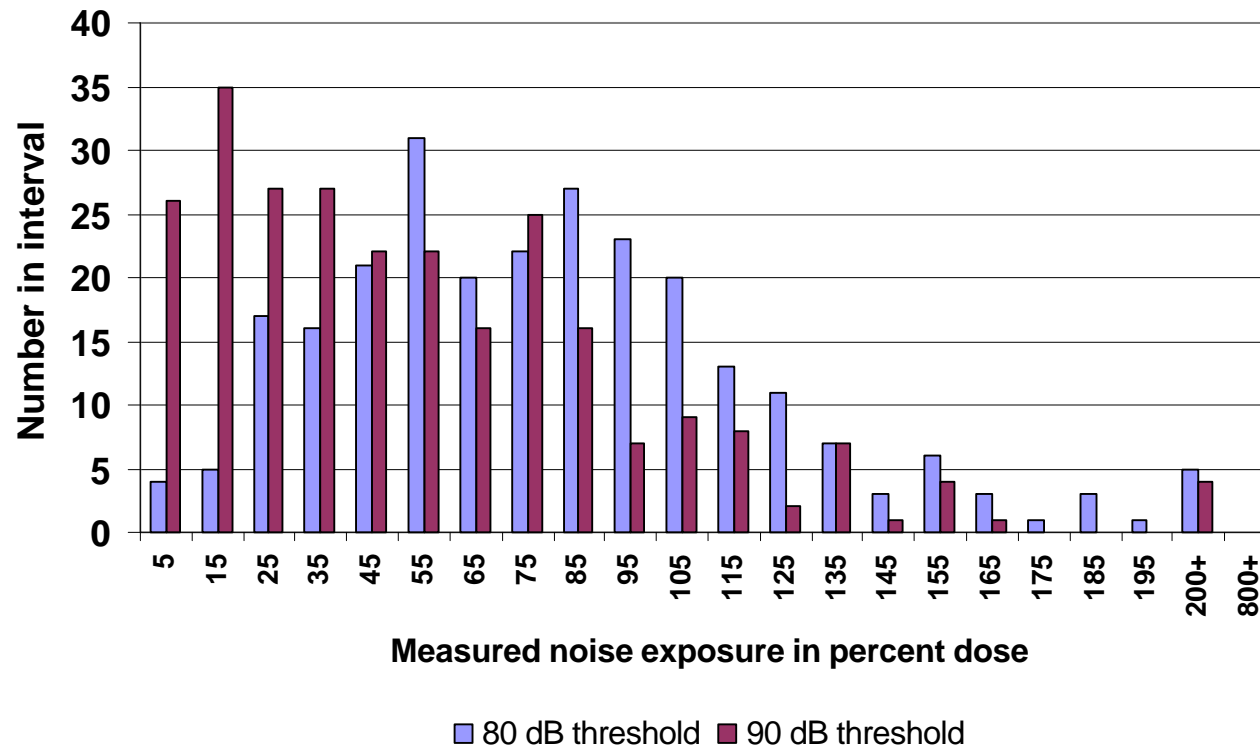




## HAULAGE TRUCK (#376 & #386)

	80 dB THRESHOLD	90 dB THRESHOLD
N	259	
>AL	75.7%	47.1%
>PEL	28.2%	12.7%

### NOISE EXPOSURE OF TRUCK OPERATORS

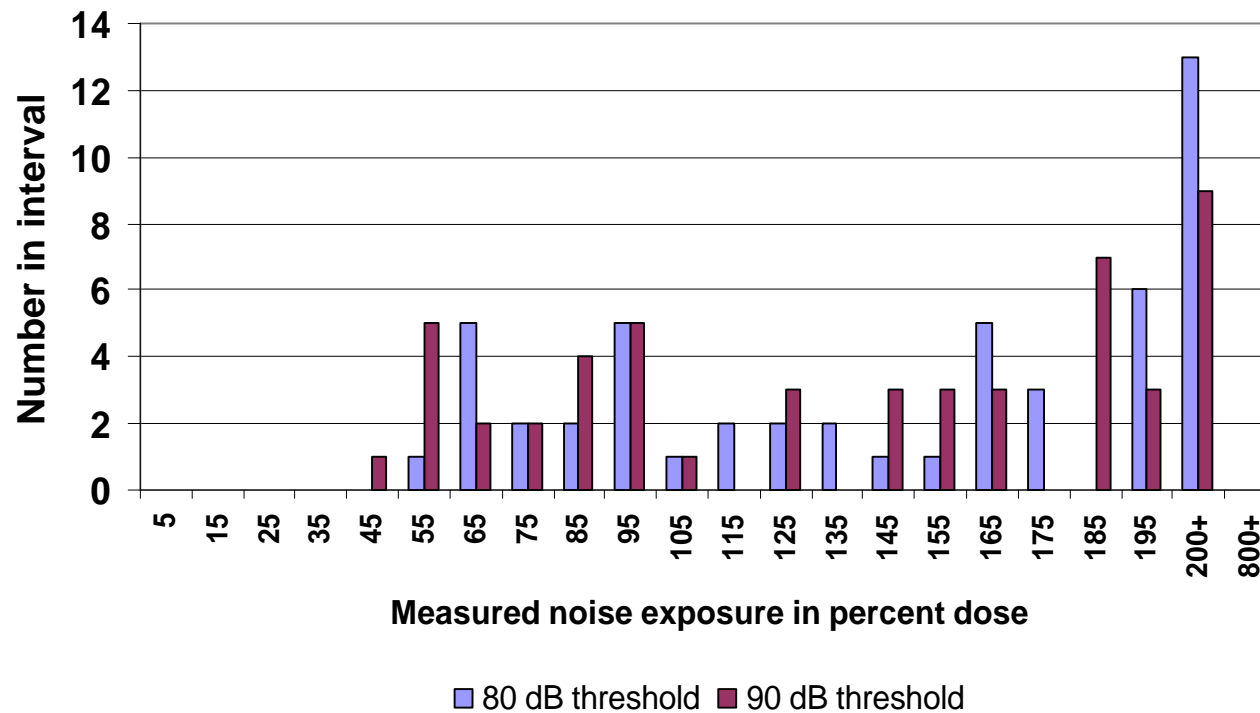




## LONGWALL (#064 & #044)

	80 dB THRESHOLD	90 dB THRESHOLD
N	51	
>AL	100%	98.0%
>PEL	70.6%	62.8%

### NOISE EXPOSURE OF LONGWALL OPERATORS

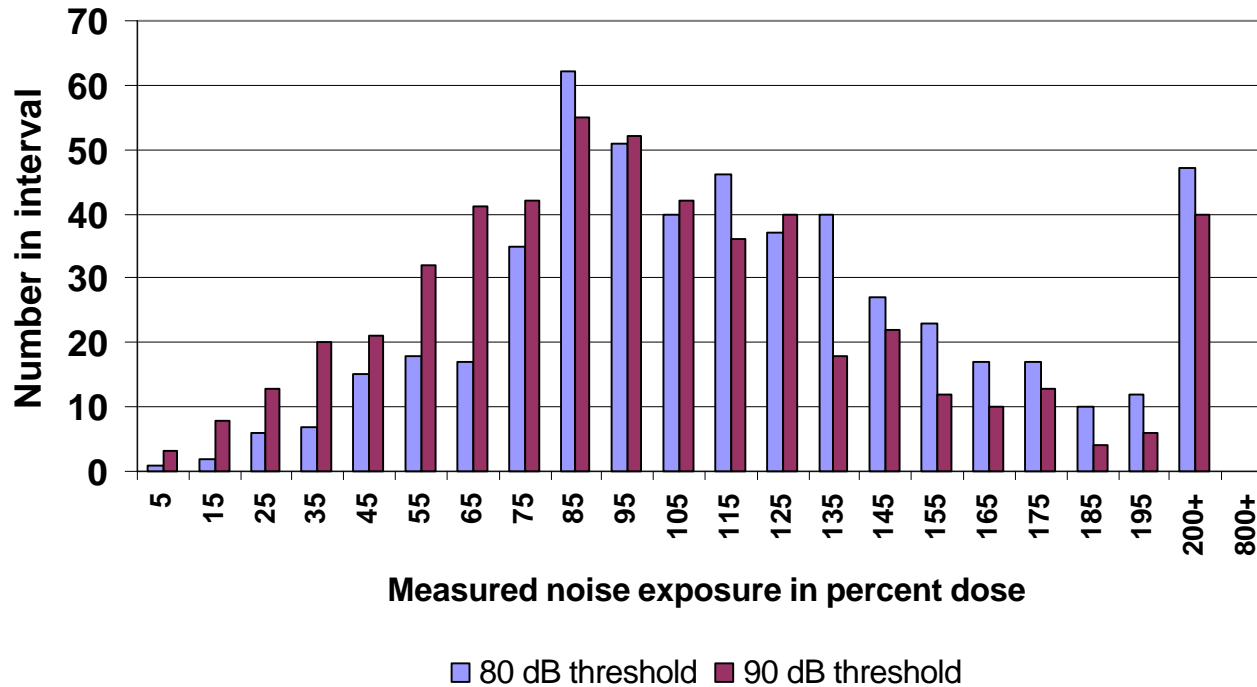




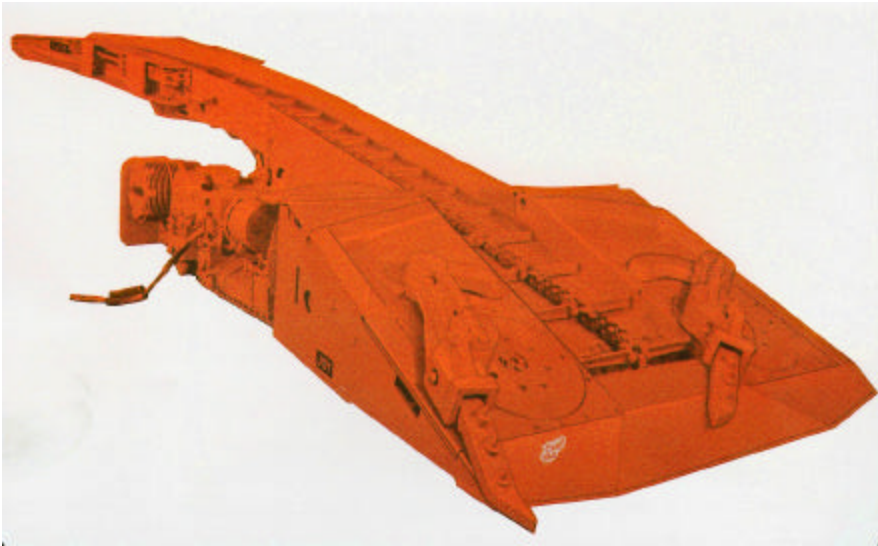
## CONTINUOUS MINER (#035 & #036)

	80 dB THRESHOLD	90 dB THRESHOLD
N	530	
>AL	94.2%	87.7%
>PEL	59.6%	45.9%

### NOISE EXPOSURE OF CONTINUOUS MINER OPERATORS





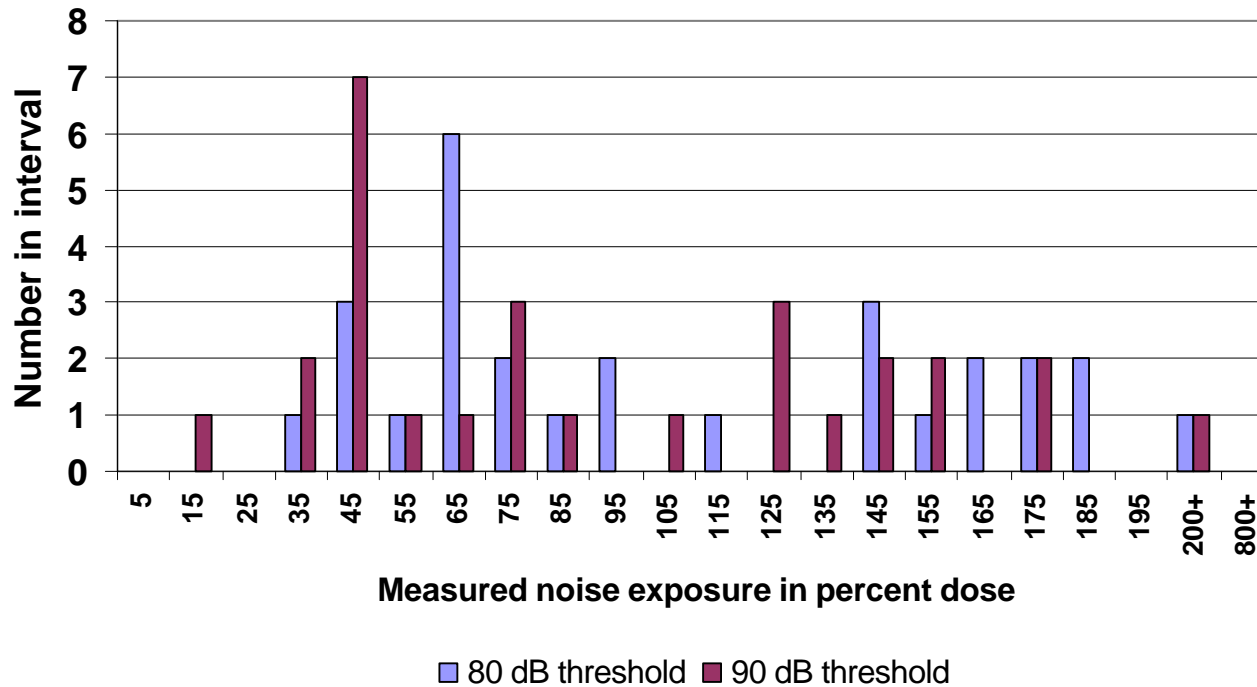


## UNDERGROUND LOADING MACHINE

(#042 & #043)

	80 dB THRESHOLD	90 dB THRESHOLD
N	28	
>AL	85.7%	64.3%
>PEL	42.9%	42.9%

### NOISE EXPOSURE OF LOADING MACHINE OPERATORS

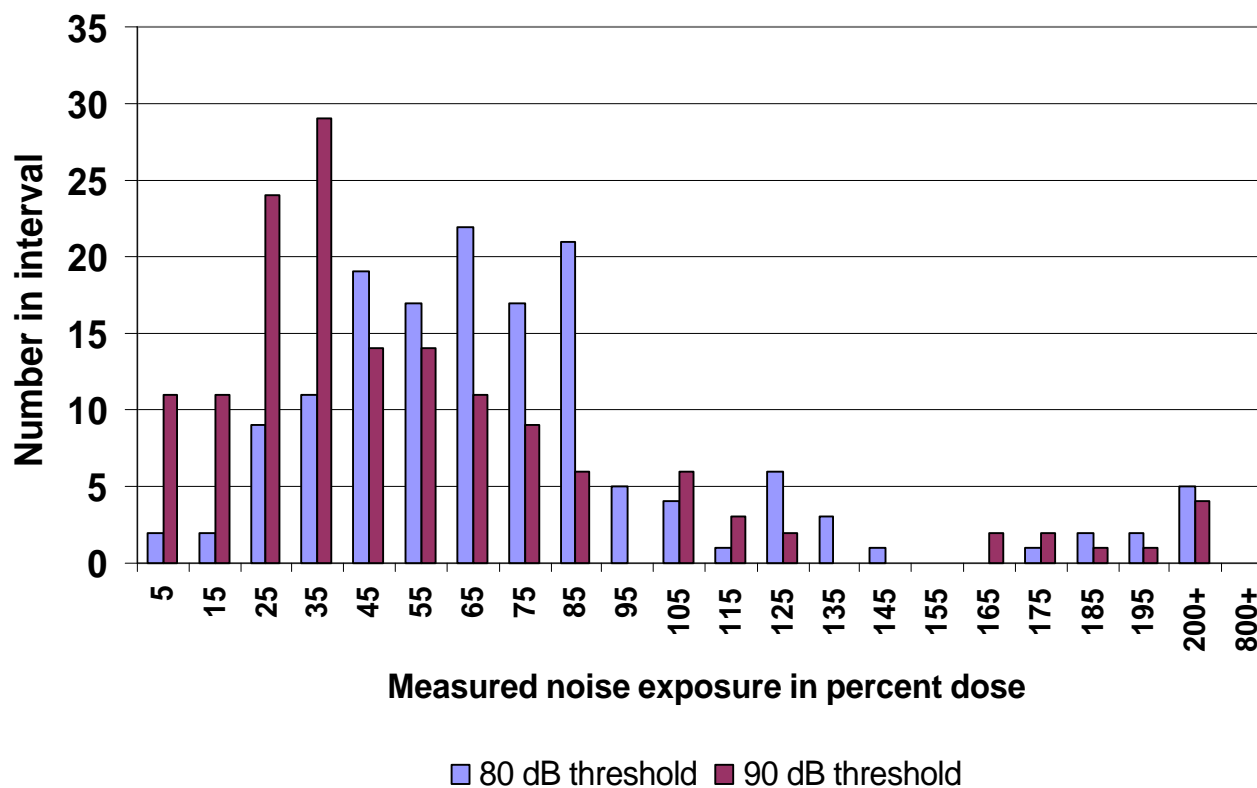




## UNDERGROUND SCOOP (#054)

	80 dB THRESHOLD	90 dB THRESHOLD
N	150	
>AL	71.3%	40.7%
>PEL	16.7%	14.0%

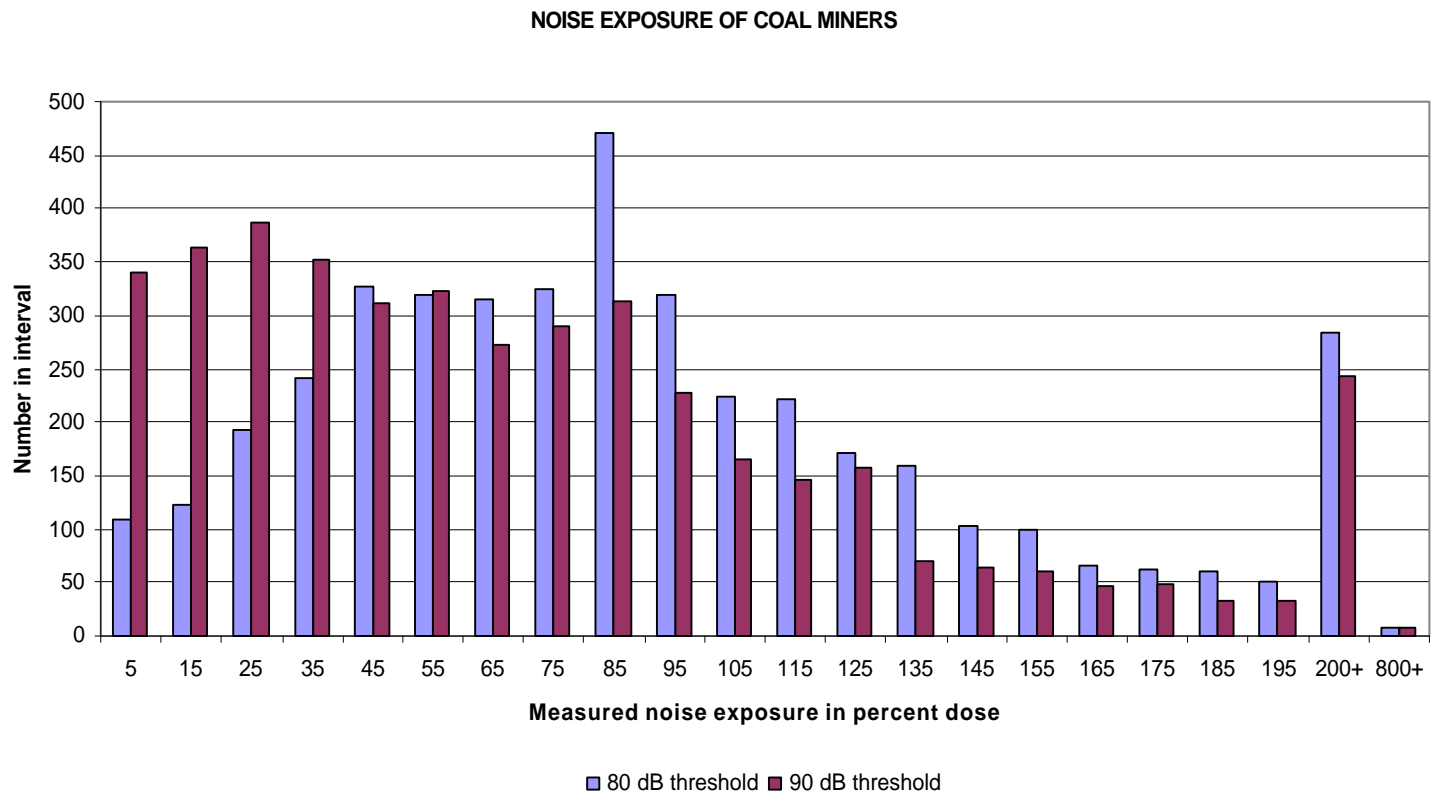
### NOISE EXPOSURE OF SCOOP OPERATORS



# DATA DISTRIBUTION FOR THE ENTIRE DATA BASE

	80 dB THRESHOLD	90 dB THRESHOLD
NO. OF SAMPLES	4247	
%>AL (85 dBA)	76.6%	58.7%
%>PEL (90 dBA)	35.4%	25.2%

Note: These results are consistent with those reported by MSHA in the preamble to its proposed rule.



## **DISCUSSION**

- **WITH RESPECT TO THE PERMISSIBLE EXPOSURE LIMIT OF 100% DOSE:**
  - **35.4% OF SAMPLES EXCEED THE PEL @ 80 dB THRESHOLD**
  - **25.2% OF SAMPLES EXCEED THE PEL @ 90 dB THRESHOLD**
- **WITH RESPECT TO THE ACTION LEVEL OF 50% DOSE:**
  - **76.6% OF SAMPLES EXCEEDED THE AL @ 80 dB THRESHOLD**
  - **58.7% OF SAMPLES EXCEEDED THE AL @ 90 dB THRESHOLD**
- **WITH RESPECT TO THE DUAL HEARING PROTECTION LEVEL, FEW SAMPLES EXCEED THE 800% DOSE LIMIT WHERE DUAL HEARING PROTECTION IS REQUIRED.**

## **CONCLUSIONS**

- **LOWERING THE THRESHOLD INCREASES THE NUMBER OF MINERS THAT WOULD BE IN NONCOMPLIANCE WITH THE NOISE STANDARD.**
- **LOWERING THE THRESHOLD INCREASES THE NUMBER OF MINERS INCLUDED IN A HEARING CONSERVATION PROGRAM.**
- **THERE IS A WIDE VARIATION WITHIN AND AMONG MINING OCCUPATIONS IN TERMS OF NOISE EXPOSURE, REGARDLESS OF THRESHOLD.**