SECTION 4

HEARING CONSERVATION

PROGRAM
Section 4 Action Items

Hearing Conservation

1. Determine worker noise exposure and then record. (Records must be made available to MSHA inspectors.) Use one of the following methods:
   a. MSHA Data: Obtain from Inspector or get earlier MSHA data from MSHA home page (www.msha.gov) – see “Data Retrieval System”.
   b. Equipment manufacturer’s data.
   c. Data from similar equipment, but be ready to explain why you think the equipment is similar (and therefore, the data are valid.)
   d. Use an SLM or Dosimeter to do your own measurements.
   e. Call Dave Carlson at 906/487-2453 or email dcarlson@mtu.edu for Assistance.

2. Determine which workers’ exposures exceed the Action Level/Permissible Exposure Limit, and who needs to be enrolled in your Hearing Conservation Program. If none exceed the Action Level, you are Done. Simply file your results so you have them when MSHA shows up.

3. If a worker’s 8 hr time-weighted-average level exceeds 85 dBA, follow the summary of actions you may take on the following page. Send notification letter to overexposed worker.

4. If you need to enroll workers in a hearing conservation program, complete the Generic Hearing Conservation Program form in this manual and follow the steps in the program (including training, audiometric testing, hearing protection, installation of feasible engineering and administrative controls, notifications, and recordkeeping).
Section 4

Hearing Conservation Program

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Part 62 Compliance – How to Comply in a Cost-Effective Way

The minimum requirement to comply with the Part 62 Noise standard is that the mine operator monitor (not necessarily measure) worker exposure to mine noise. Some common-sense suggestions that may minimize operator compliance cost follow:

- Unless the mine operator already has noise measurement data or data from other sources such as equipment manufacturer data or data from similar equipment measured elsewhere, the operator must determine employee exposure. We suggest the operator purchase a low cost ($30 to $40) slow-response sound level meter which measures noise on the A scale between 80 and 140 dBA. Use this instrument to measure the decibel level from all noise sources people are exposed to on the mine site. Determine which, if any, noise sources emit noise at levels above 85 dBA. If there are none, simply keep the measurement data on file to show it to the MSHA inspector when he/she requests it. You’ve fulfilled your requirements.

- However, if sources above 85 dBA are found, you may still need to do nothing more. You should, however, either try to make changes that reduce these sources to levels below 85 dBA, or restrict employees from working regularly or for extended times in these areas using posted warnings and other means. Remember that every 5 dBA increase in noise level above the limit cuts the allowable exposure time in half. Thus a very short exposure to very loud noise can cause a worker, who is otherwise working in a quiet environment, to be overexposed.

- If the MSHA inspector makes measurements and finds that the 8-hour average noise exposure for any miner exceeds 85 dBA, the mine will probably be cited, unless the miner has been enrolled in a hearing conservation program (HCP -- requirements follow in this section). The citation will probably amount to $60 for each violation, unless the miner’s 8-hour average exposure exceeds 90 dBA and the miner is not wearing hearing protection, which may make the violation S&S, where the fine could greatly increase.

- When the operator finds sources of noise in excess of 90 dBA and there is a chance that the 8-hour average exposure of any miner exceeds 90 dBA, the operator should require that the potentially overexposed miner wear hearing protection and also meet the other requirements for those exposed over 85 dBA. The mine operator must also implement feasible engineering controls or control overexposure by restricting access to the work area (posting the area or reducing hours of work in the area etc.).

- Remember that the inspector won’t cite you for noise levels on the minesite, regardless of how high they are. Legal limits are based, not on the noise level, but on the 8-hour average noise level to which the miner is exposed. If workshifts are longer than 8 hours the limits are reduced (for example, 16 hours at 90 dBA is equal to 8 hours at 95 dBA. If you determine that the 8-hour average exposure is 85 dBA and the miner works 16 hours at this noise level, your estimate of his exposure should be increased to 90dBA – or, put in different words, the time a miner can be exposed is cut in half for each 5 dBA increase in the noise level).
If a miner is thought to be exposed to noise in excess of 105 dBA, this miners should be required to wear double hearing protection (plugs and muffs) and all 90 dBA overexposure legal requirements must also be met. An exposure to 105 dBA for 1 hour is equal to an exposure of 90 dBA for 8 hours (Legal Limits: 90 dBA = 8 hours, 95 = 4 hours, 100 dBA = 2 hours, 105 dBA = 1 hour etc.). Any additional time the miner is exposed to noise in excess of 90 dBA is over the legal limit. No miner can ever be exposed to noise levels in excess of 115 dBA, regardless of the amount or type of hearing protection worn.

Hearing Conservation – Questions and Answers to Inform You of What is Required

1) MSHA requires that mine operators monitor worker exposure to noise. T__, F__.
   True -- Monitoring is not the same as measuring. The mine operator has various options including: a) actual measurements, b) using data from similar equipment, c) using data MSHA has taken, d) using equipment manufacturer data.

2) What is required when the 8-hour time-weighted average exposure for a worker is greater than 85 dBA? When the 85 dBA “Action Level” is exceeded, the miner must be enrolled into a hearing conservation program and offered hearing protection. The miner must wear this hearing protection if the baseline (first) audiometric testing will not be done within 6 months of enrollment or if an annual audiogram indicates that the miner has incurred a Standard Threshold Shift (10 dB shift) in a miner’s hearing as determined by averaging the results measured at 2000, 3000 and 4000 hertz. The use of hearing protection does not eliminate the need to take the other required actions.

3) What is required when the 8-hour time-weighted average exposure for a worker is greater than 90 dBA? In addition to the requirements for exceeding 85 dBA, when the 90 dBA permissible exposure limit (PEL) is exceeded, the operator must require that the hearing protection be worn and must also implement feasible engineering or administrative controls. The use of hearing protection does not eliminate the need to take the other required actions.

4) What is required when the 8-hour time-weighted average exposure for a worker is greater than 105 dBA? In addition to the requirements for exceeding 90 dBA, the operator must require that dual hearing protection (plugs and muffs) be worn. The use of dual hearing protection does not eliminate the need to take the other required actions.

5) What is the maximum sound level a miner can be exposed to? If a 30-second test indicates the miner is exposed to more than 115 dBA, the exposure level is out of compliance – the miner must never be exposed to this level of noise with or without hearing protection.

6) Which of the following are correct? Noise-induced hearing loss a) can be prevented by reducing the time exposed to noise that is too loud (over 85 dBA), b) is reversible, c)
can be prevented by wearing adequate hearing protection. **a and c are correct.**

7) What is the permissible exposure limit (PEL) for noise? **The PEL for noise is a 100% dose equal to a noise level of 90 dBA for 8 hours, 95 dBA for 4 hours, 100 dBA for 2 hours, 105 dBA for 1 hour etc.**

8) If the 8-hour time-weighted-average noise exposure level (TWA) for a miner is over 90 and increases by 5 dBA, the time the miner can legally work in the noisier area decreases by how much? **By 50% or 1/2.**

9) If the length of the miner’s workshift doubles, the time-weighted-average noise level above 90 dBA to which the miner can be exposed is decreased by ____ dBA. **By 5 dBA.**

10) Does MSHA regulate: a) mine noise or b) miner exposure to mine noise? **MSHA does not regulate mine noise. The law requires that every mine either have data that shows that the 8-hour time-weighted-average exposure of every miner is below 85 dBA, or that the appropriate action be taken.**

11) Pick the correct items -- A miner who is put into a hearing conservation program must a) be monitored b) be offered hearing protection, c) be offered audiometric testing, d) receive hearing conservation training. **All are correct.**

12) Pick the incorrect items -- An audiometric test: a) provides a record over a number of sound frequencies of how loud noise must be for you to hear it, b) corrects your hearing problems, c) lets you and the mine operator know how fast you are losing your hearing, d) helps the operator determine if your hearing loss is work related, e) provides the operator with information needed to assess the effectiveness of controls, f) is automatically sent to MSHA. **b and f are incorrect. Data are reported to MSHA by the mine operator, only when an annual audiogram reveals a 25 dB shift in a miner’s hearing as determined by averaging the results measured at 2000, 3000 and 4000 hertz.**

13) What is a standard threshold shift. **A standard threshold shift occurs when an annual audiogram reveals a 10 dB shift in a miner’s hearing as determined by averaging the results measured at 2000, 3000 and 4000 hertz.**

14) When is hearing protection of importance to protect a miner’s hearing? **Whenever the miner is exposed to loud noise (greater than 85 dBA), both on and off the job.**

15) Which of the following are advantages of ear muffs? a) glasses do not affect them, b) better to use in hot environment, c) less infections, d) easier to use, e) less costly, f) easier to carry and store. **c and d are correct.**
16) Which of the following are advantages of ear plugs? a) Glasses do not affect them, b) better to use in hot environment, c) less infections, d) easy to use, e) less costly, f) easier to carry and store. \textit{a, b, e, and f are correct.}

17) Does MSHA require a certain noise reduction rating for ear plugs? \textit{No -- MSHA doesn't rely on the listed ratings, but requires that the products used by miners be commercial rated products.}

18) What care is required for hearing protectors? \textit{Reusable plastic plugs should be cleaned with soap and water, dried and stored in a clean, dry place. Replace them if they show signs of wear. For muffs, inspect the inner lining and replace them when there is evidence of wear, tears or cracks.}

19) How are ear plugs correctly installed? \textit{Follow the manufacturer’s instructions.}

\textit{For disposable foam plugs these usually include:}
\begin{itemize}
  \item a. Wash and dry hands before inserting.
  \item b. Use thumb and forefinger to roll into a small crease-free cylinder.
  \item c. With the opposite hand, pull the upper back of the ear outward and upward.
  \item d. Insert the plug and hold at least 10 seconds, giving it time to expand making a tight seal.
  \item e. Don’t worry about pushing the plug in too deep – it’s too short to hurt you.
\end{itemize}

\textit{Reusable plastic plugs are simply inserted by using the opposite hand to pull the upper back of the ear outward and upward and inserting the plug.}

\textit{If you have a correct seal with plugs or muffs, your voice will sound louder and hollow. Try covering your ears completely with your hands to see what plugs or muffs should do.}

20) How often does the operator need to determine your exposure to noise? \textit{Initially and then only when a change is made that may affect your noise exposure level. If noise exposure has not changed, further monitoring may not be necessary.}

21) How often does the operator need to provide hearing conservation training to people that are enrolled in an HCP? \textit{Within 30 days after enrollment in an HCP and once per year by the end of the same month it was done the previous year.}

22) Must a miner who is in an HCP be informed of noise measurement results? \textit{Yes – the miner must be informed in writing within 15 days of the measurements.}

23) Must a miner be informed of audiometric testing results and interpretation? \textit{Yes – the miner must be informed in writing within 10 working days of the mine receiving the results.}
24) What records must the operator have for MSHA? *Records of annual HCP training for enrolled employees, records of audiometric testing and records of employee notification of audiometric testing results and of exposure determination results (including if the action, PEL or dual-hearing protection level was exceeded) and the corrective action the operator is taking.*
Hearing Conservation Program Quiz

1. CFR30 Part 62 requires that noise samplers be placed on all mine employees once per year. True ___, False ___
2. The permissible exposure limit (PEL) for noise is 90 dBA. True ___, False ___
3. The action level for noise is 85 dBA. True ___, False ___
4. If a noise source produces noise in excess of 85 dBA, the mine needs a hearing conservation program. True ___, False ___
5. All miners are required to wear hearing protection. True ___, False ___
6. CFR30 Part 62 is concerned only with how much noise miners are exposed to – not how much noise is produced by mine equipment. True ___, False ___
7. Noise measurements to determine if the PEL is exceeded only average noise exposures greater than or equal to 90 dBA and consider all exposure to noise less than 90 dBA to be zero. True ___, False ___
8. Noise measurements to determine if the action level is exceeded only average noise exposures greater than or equal to 80 dBA and consider all exposure to noise less than 80 dBA to be zero. True ___, False ___
9. A mine may not need to sample for noise at all if it has good data from other sources about the amount of noise people operating the mine equipment are exposed to. True ___, False ___
10. A mine needs written documents showing the noise miners are exposed to. True ___, False ___
11. Audiometric testing, as required when a miner is enrolled in a Hearing Conservation Program, determines how much hearing loss a miner has suffered since the previous test. True ___, False ___
12. Audiometric testing, as required when a miner is enrolled in a Hearing Conservation Program, must be performed annually. True ___, False ___
13. Hearing Conservation Program training must be done annually. True ___, False ___
14. Michigan Technological University includes Hearing Conservation Program training in each year’s annual refresher training. True ___, False ___

Ans. FTFTFTFTFTFTFTFTFTFTFTFTFT
NOISE MEASUREMENT PROCEDURES

for use by

Michigan Mine Safety & Health Training Program Personnel

by

Dave Carlson and Phil Eggerding

May 21, 2002
NOISE MEASUREMENT PROCEDURES

for use by

Michigan Mine Safety & Health Training Program Personnel

NOTE – Immediately upon arriving at the mine site, the technician must receive site-specific hazard-awareness training from the mine contact person.

BACKGROUND

This writeup presents procedures and guidelines for conducting noise surveys, evaluating results, reporting to the mine operator, developing written hearing conservation programs, and determining who should be placed in a hearing conservation program (HCP).

Consultation with Mine Contact Person

At least one week prior to sampling, the mine contact person should be contacted by phone to discuss the following:

- Mine must provide our technician with site-specific hazard-awareness training,
- Mine must inform the miners sampled of scope of work – (read paragraph – Appendix 1),
- Mine must provide miners or representatives with the opportunity to observe monitoring – paying the miners for observation is not required by law (as also explained in paragraph to miners – Appendix 1),
- What we will provide up front:
  - Assessment of whether or not the measurements are needed (alternative monitoring methods),
  - Estimate of the extent of required measurements,
  - Assessment of the number of miners who need to be monitored,
  - Noise Sampling Agreement (costs, clarification of bad-data issues, etc. as in Appendix 2),
  - Copy of paragraph explaining scope of work to miners to be sampled.

PROCEDURES FOR NOISE MEASUREMENTS

Noise Survey Equipment

All noise surveys will be conducted using personal noise dosimeters. The technician will need to wear appropriate PPE. At a minimum, this should include:

Hard Hat
Safety Glasses
Ear Muffs or Plugs
Appropriate shoes which cover and protect feet – Discuss mine requirements
Snug fitting shirt & trousers (no shorts), etc.
No jewelry where there is danger of catching on things

The technician’s equipment should include the following:

<table>
<thead>
<tr>
<th>Item</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Noise Dosimeters</td>
<td>6</td>
</tr>
<tr>
<td>Personal Dosimeter Manual</td>
<td>1</td>
</tr>
<tr>
<td>Wind Screens</td>
<td>7</td>
</tr>
<tr>
<td>Rubber Bands for Wind Screens</td>
<td>As Needed</td>
</tr>
<tr>
<td>Sound Level Meters (may use a 7\textsuperscript{th} dosimeter)</td>
<td>1</td>
</tr>
<tr>
<td>Calibrators</td>
<td>1</td>
</tr>
<tr>
<td>Calibrator Adapter</td>
<td>1</td>
</tr>
<tr>
<td>9-volt alkaline batteries</td>
<td>10</td>
</tr>
<tr>
<td>Copies of procedures and forms</td>
<td>As Needed</td>
</tr>
<tr>
<td>Pencils &amp; clipboards</td>
<td>As Needed</td>
</tr>
<tr>
<td>Fine Point Phillips and regular head screw drivers</td>
<td>1 each</td>
</tr>
<tr>
<td>Additional copies of data forms</td>
<td>As Needed</td>
</tr>
</tbody>
</table>

Settings and procedures for the Quest Micro-15 personal noise dosimeter are presented in Appendix 3. All personal dosimeters must be set to the parameters listed under “Code” in Appendix 3. Do not alter dip switch settings. If code “EE3#” does not show up when the CODE key is pressed, look in the Micro-15 Noise Dosimeter manual pages 19 through 22 to determine and correct dip switch settings (# is the number of the instrument between 1 and 7).

Personal noise dosimeters and acoustical calibrators are required to be calibrated annually. A calibration schedule for all dosimeters and calibrators has been established. This schedule must be strictly adhered to – for this reason all Micro-15s and Calibrators/Adapters on loan must be sent back to the Program office by September 15 so this calibration can be performed.

Protocol for Noise Measurements

The technician will conduct one full workshift (normally 8 hours) of sampling for each 1 to 5 persons sampled. The forms the technician will need are contained in Appendix 4 (Tables 1-3). The technician may need additional copies of these forms.

1. Pre-inspection Procedures –

**Always start the day with a fresh 9-volt alkaline battery in each dosimeter.** Procedural instructions for checking the calibration of the instruments are contained in Appendix 3. A field calibration check of each dosimeter will be conducted and the reading recorded in Table 2 of Appendix 4. If the dosimeter does not operate within +/- 1.0 dB, the dosimeter will be calibrated as in Appendix 3. If the unit cannot be calibrated or doesn’t seem to hold calibration, send it back for repair.
2. **Placing the Dosimeter on the Miner**

- The dosimeter microphone should be located at the top of the shoulder midway between the neck and end of the shoulder, with the microphone diaphragm pointing in a vertical upward direction.

- The microphone should be located on the shoulder that is normally between the principal noise source and the miner's ear.

- To the extent practicable, the dosimeter instrument body and microphone cable must be positioned underneath exterior clothing to minimize potential safety problems and damage to the instrument. Clothing must not cover the microphone itself.

- A wind screen must be used on the dosimeter at all times to protect the microphone from water and dust and to prevent adverse effects of air velocity exceeding 20 miles per hour (1760 ft/min) in the survey location.

3. **Sampling Time**

   The miner must wear the dosimeter for the entire “normal” work shift. A normal work shift would not include occasional overtime work.

4. **Monitoring the Sampling Process**

   The technician must observe the miner being surveyed on a frequent basis and take notes. At least 4 times during the shift, the technician will be checking the dose level for each of the miners wearing dosimeters and recording the data in Table 2 of Appendix 4. The data should provide information about events since the previous dose check including:
   - The miner’s activities,
   - Mining activity levels (normal mining period, high production period, etc.),
   - Whether or not working conditions and activities are typical (based on discussion with miners),
   - Potential noise source(s) in the areas the miner worked,
   - Noise controls,

   SLM readings will also be taken near various noise sources – see Appendix 4, Table 3.

5. **Sampling for Exposure to Extremely High Noise Levels**

   a. A separate dosimeter in the sound level meter (SLM) mode or a SLM will be used to check a miner’s noise exposure to very high noise levels (instantaneous readings approaching 115 dBA).
b. The SLM microphone must be held at arm’s length within 1 or 2 feet of the miner’s ear in a normal work area, with the microphone pointed upward. At frequencies above 1,000 Hz, a significant deviation from reference noise readings can occur when the windscreen is left on the microphone. When using the dosimeter in the SLM mode, remove the windscreen from the microphone before noise measurements are made, and replace it after use. A windscreen must remain on the sound level meter at all other times to protect the microphone from water and dust and to prevent adverse effects of air velocity exceeding 20 miles per hour (1760 ft/min) in the survey location.

c. Readings of at least 30 seconds duration should be taken from areas where instantaneous readings are approaching 115 dBA to obtain a 30-second average measurement. Record the readings in Appendix 4, Table 3.

d. Note -- Technicians should not take noise measurements with sound level meters on moving equipment, such as shuttle cars and bulldozers, unless safe seating arrangements are provided.

Post Inspection Procedures

1. Perform a field calibration check of each dosimeter unit after each shift of use. If the unit does not operate within a tolerance range of +/- 1.0 dB with the post-shift calibration check, this must be recorded and discussed with Dave Carlson and with the the mine contact person.

2. Clean up the instruments, and dispose of the batteries properly.

3. Complete the report in Appendix 4 and present it to the operator.

4. Meet with the Mine Operator, assist in decisions about who to enroll in an HCP.

5. Assist mine operator in developing a written HCP.

6. Conduct HCP training if arrangements have been made.
APPENDIX 1

Paragraph to be Read to Miners Prior to Sampling

A technician from Michigan Technological University will be on our site on (day and date) to conduct noise exposure measurements. The measurements, required by the law, are being paid for by this company and are for our company’s use to determine whether improvements are needed to protect your hearing. The technician will be placing battery-powered noise samplers on up to 5 people. To get results that are meaningful, you should not deviate from your normal work routine, except to answer questions the technician may ask. The samplers should remain on the same person at all times throughout the entire work shift, including breaks, lunch etc. The technician will remain in the work area throughout the shift to collect information about your activities to be used later to explain the readings. If possible, let the technician know when you are leaving your normal work area, where you will be, what you will be doing, and when you will return. Please do not tamper with the samplers. If you notice any problems, please inform the technician immediately. Within a few days after the measurements, you will be informed of the results and how they affect you. The law requires that employee representatives be allowed to observe the sampling process, but does not require that they be paid for this activity.
APPENDIX 2

Noise Sampling Agreement Between Michigan Technological University (MTU) and ___________________________(the Company)

MTU will conduct sampling at _____________________________________________ to determine if persons specified by the Company are overexposed to noise based on certain specified noise limits.

The Company will either provide site-specific hazard awareness training for the technician prior to sampling or will accompany the technician throughout the day(s) while sampling is taking place.

The MTU technician will:

1. Place noise samplers on up to five persons and these persons will wear the samplers for the entire normal workshift. The full-shift noise exposure values measured will be compared to the specified limits -- 50 % Action Level limit and the 100 % and 800 % PEL limits.

2. Attempt to obtain sound level meter (SLM) readings on persons who may be exposed to noise levels that approach or exceed the 115 dBA maximum 30-second average limit.

3. Attempt to obtain other data, as time allows, to assist the Company in determining the source(s) of high readings including:
   a. Recording SLM readings near various noise sources and
   b. Taking notes about activities and locations of the persons wearing noise samplers and recording accumulated doses at intervals throughout the day.

MTU will prepare and submit a written report to the Company containing the data collected. MTU will also assist the Company in deciding who to enroll in a hearing conservation program (HCP) and in preparing a written HCP. MTU will train persons who are enrolled in the HCP, if arrangements can be made to do so while the technician is still on site.

Costs -- The Company agrees to pay for this service at the rates below including, but not limited to:

1. Technician time charged at the rate of $45 per hour for sampling, reporting and assisting the Company and $35 per hour for travel. It is roughly estimated that the technician will work about 9 hours for each 8-hour day of sampling and about 8 hours for preparing the report, assisting the Company in deciding who to enroll, preparing the written HCP, and training the persons. However, MTU cannot be held to these estimated times if specific conditions at the Company demand more time.
2. **Travel costs** charged at a rate $0.365 per mile from and to the technician’s home, meals while away from home (using Government-Approved Domestic per Diem rates by location as on the Internet at [http://www.policyworks.gov/org/main/mt/homepage/mtt/perdiem/perd02d.xls](http://www.policyworks.gov/org/main/mt/homepage/mtt/perdiem/perd02d.xls)), and any tolls, parking and motel charges.

3. **Supplies** including, but not limited to, one 9-volt alkaline battery for each instrument per day and any wind screens that are lost during sampling.

**Disclaimers** – Because, overall, the costs to Michigan Tech (which include the cost of purchasing the equipment and labor, materials and service fees to maintain and calibrate the equipment) are expected to exceed the costs charged to the Company, any failed measurements, which may need repeating, will be at the Company’s expense. MTU is unable to control the fact that operating conditions and the activities of the Company’s employees may vary considerably from day to day, and, therefore, MTU is unable to guarantee that the results will be the same or near those obtained by others.

I agree to the above conditions:

_________________________ ___________  
**Company Person’s Signature** **Date**

_________________________ ___________  
**MTU Person’s Signature** **Date**
APPENDIX 3

Operating Instructions for the Quest Micro-15 Dosimeter

Turning MICRO-15 On
Press **ON/OFF** key. The MICRO-15 should display “18:8:8.8” for 3 seconds and then display “----”. If this sequence does not occur, check battery.

Changing Battery
Loosen two screws on back of unit and change battery. Use a 9-volt alkaline battery.

Calibration
Insert microphone in a 58-839 calibrator adaptor and place adaptor in calibrator. Turn on calibrator and press **SOUND LEVEL** on the MICRO-15. The display should read between 109.8 and 110.2 dB. If necessary adjust **CAL** screw while pressing **SOUND LEVEL** to bring reading within these limits.

Pause and Run
When the MICRO-15 is turned on, or it is reset, or the battery is changed, or the **PAUSE** key is pressed, the unit is automatically in the **PAUSE** mode. In the **PAUSE** mode, only the **SOUND LEVEL** and **PAUSE TIME** functions are active. All other functions may be read but no new data is being accumulated. Press **RUN** to start or to continue accumulating data.

Reading Data
Pressing any key except **ON/OFF** and **PRINT** will cause data to be displayed. The key must be held down for 1 second before it is read. If the key is held down the data will be updated each second. When the key is released the last displayed data will remain on the display. If some data cannot be calculated (as an example, **L-AVG** cannot be calculated if the MICRO-15 has never been in the **RUN** mode), then “----” will be displayed.

Displayed Data

**SOUND LEVEL**  The current sound level in decibels.

**PEAK LEVEL**  The highest Peak level since the unit started accumulating data.

**SLOW MAX**  The maximum level with a **SLOW** time constant.

**HTL L-AVG**  The average sound level with a high threshold level (**HTL**). For OSHA, the **HTL** is set at 90 dB.

**HTL DOSE**  The accumulated noise dose expressed as a percent of the allowable Dose for all noise above **HTL**.
HTL TWA  The time-weighted average sound level measured in decibels. It is that sound level which, if maintained for 8 hours, would produce the same noise dose as the measured dose.

LTL L-AVG  The average sound level with a low threshold level (LTL). For OSHA/MSHA, the LTL is set at 80 dB.

LTL DOSE  The noise dose above the LTL.

LTL TWA  The LTL time weighted average sound level.

3 dB LEQ  The integrated average sound level with a 3 dB exchange rate and no threshold.

3 dB DOSE  The noise dose with a 3 dB exchange rate and no threshold expressed in percent of the allowable dose.

3 dB SEL  The sound exposure level expressed in decibels of the total integrated noise averaged over one second. It is used to measure the sound energy of an event such as a passing airplane.

OL TIME  The time the noise level has been above the overload level. If the overload level has not been exceeded for a total of 1 second the OL TIME will read “: 0”.

PAUSE TIME  The time the unit has been in the PAUSE mode.

RUN TIME  The time the unit has been in the RUN mode and accumulating data.

CODE  An encoded number, which identifies the internal switch settings. As an example, if the display is “EE3#”, the unit is set as follows (correct settings for MSHA use):

- 90 dB for 8-hour criterion level.
- 5 dB exchange rate.
- 90 dB HTL.
- 80 dB LTL.
- 115 dB overload level.
- “A” weighted frequency response.
- 50-146 dB range.
- # is a number from 0 to 7 used to identify the dosimeter.

ON/OFF Mode

To put the MICRO-15 into the off mode, hold the ON/OFF key down for five seconds until the display reads “18:8:8.8”. When the key is release, the display will be blank.
The off mode is not a mode in which the circuits are completely deactivated. It is a very low power mode in which no new data is accumulated but all accumulated data is retained.

To turn the unit back on to accumulate data, press the ON/OFF key.

The unit is completely off only when the battery is removed.

**Reset Mode**

To reset the unit and erase all accumulated data, hold down both the ON/OFF and PAUSE keys for five seconds. When the unit is reset, the display will show “----” or “: 0”.

The five-second feature is intended to prevent the loss of accumulated data through accidental resetting.

**Print**

Press the PAUSE key. Connect a Printer to the PRINT jack and press the PRINT Key.

While the Printer is printing, the keys are inactive. To stop printing, press the ON/OFF key for 1 second.
Appendix 4

Generic Report To Mine Operator

Developed by

Michigan Technological University
Results from

Noise Measurement Survey

at

Company

Conducted by:

Technician Name

Michigan Technological University

Houghton, MI 49931

Date

Questions Should be Directed Either to Technician or To:

David H. Carlson
Manager, Mine Safety & Health Training Program
Geological and Mining Engineering and Sciences Dept.
Michigan Technological University
Houghton, MI 49931
Phone – 906/487-2453
email – dcarlson@mtu.edu

Technician's Signature  Date
INTRODUCTION

On date(s), noise sampling was performed at mine name. The employees and occupations sampled were selected in conservations between Michigan Tech and company personnel. Dosimeters were placed on number mine employees to obtain full workshift noise exposure readings. In addition, instantaneous sound level meter (SLM) readings were taken at various mine locations.

While the readings accurately represent operating conditions and worker activities at the time the measurements were made, translating the results into employee exposure over time is only accurate to the extent that worker activities and mine conditions during sampling were typical of normal conditions at the mine. Conversations with mine employees indicate that the miner activities and conditions during sampling:

☐ were not typical for the persons sampled.
☐ were typical for the persons sampled.
☐ were not typical for the following persons and/or measurements:

<table>
<thead>
<tr>
<th>Person’s or measurement locations</th>
<th>Type of Measurement</th>
<th>Time of Day</th>
<th>Differences from Normal Working Conditions</th>
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RESULTS

The results for each of the employees sampled are summarized in Table 1.

Action Level Overexposures

Action level noise dose values are listed in Column 5. Employees with action level full-shift noise doses exceeding 50 % must be notified in writing and enrolled in a hearing conservation program (HCP). Since mine operating conditions and employee activities during sampling may not represent the worst case, it may be prudent for the mine operator to enroll all employees whose noise dose approaches 50 % -- for example, the operator should consider enrolling all miners whose action level noise doses exceed 30 or 40 %.

If any employees must be enrolled, the technician will assist the operator in preparing a written HCP. A written HCP, while not required by law, helps ensure that the various MSHA-required HCP elements are adhered to on time. Elements of a written HCP are given in the MSHA standard, 30CFR Part 62, and include the following (see the 30CFR Part 62 standard for additional details on requirements):

- **62.110 – Noise Exposure Assessment** --establish a system of monitoring that evaluates each miner's noise exposure sufficiently to determine continuing compliance,

- **62.160 – Hearing Protectors** – allow the miner to choose a hearing protector from at least two muff types and two plug types at no cost to the employee, and in the event dual hearing protectors are required, to choose one of each type (proper fit/use conditions also apply),

- **62.170 thru 62.175 – Audiometric Testing** – provide within 6 months of enrolling, audiometric testing which results in a valid baseline audiogram, or offer and provide the testing within 12 months where the operator uses mobile test vans to do the testing,

- **62.180 – Training** -- within 30 days of a miner's enrollment into a hearing conservation program and annually, provide the miner with training – topics specified in standard,

- **62.190 – Records** – Maintain various records required by the standard.
If the operator approves, the technician will conduct the initial HCP training during the sampling visit. About ½ to 1 hour is needed for this training, and to hold down the cost, this training would normally be conducted after meeting with the operator on the afternoon of the day after sampling is completed (the technician would normally use the morning to prepare this report). Annual HCP training is also required for enrolled employees, and Michigan Tech automatically includes this training in its Part 46 and Part 48 annual refresher mine safety training. To schedule annual refresher training, contact Dave Carlson (see cover page for contact information).

In addition to adhering to all elements of the HCP, the mine operator must file evidence that overexposed employees were notified, such as a copy of a notification letter sent to them (technician will provide the operator with sample copies). Other employees performing the same jobs on different days or different shifts should also be notified (of potential overexposure) and enrolled.

Action level noise dose data in column 5 of Table 1 indicate that number employees must be enrolled and that it may be prudent to enroll number employees whose dose approaches the action level. As mentioned above, the operator may also need to enroll other employees who perform similar duties. The operator may enroll all employees.

While the law allows employees to refuse enrollment, the operator should document this in writing with the employee’s signature. The operator also has the option to make enrollment a condition of employment. The primary costs to the mine are the cost of annual audiometric testing, annual training and providing hearing protection as well as lost production during the time these activities take place.

**Permissible Exposure Limit Overexposure**

When the Permissible Exposure Limit (PEL) noise dose exceeds 100%, the conditions for Action Level Overexposure must be met and, in addition, the mine operator must:

- Ensure that overexposed miners wear hearing protection, and
- Use all feasible engineering and administrative controls to reduce the PEL noise dose exposure below 100%.
Engineering controls reduce noise levels and administrative controls limit the time miners are exposed, such as by switching employees into and out of certain noisy jobs during a single workday to reduce the full-shift Pel dose to a percentage below the 100% legal limit.

The data in Table 1, column 6, indicate that number employees are over 100% and must wear hearing protection.

**Double Hearing Protection Limit Overexposure**

When the PEL noise dose exceeds 800% (an 8-hour time-weighted average of 105 dBA) the mine operator must meet all the conditions for PEL overexposure and, in addition, the overexposed miner(s) must wear dual hearing protection (both plugs and muffs). The data in Table 1, Column 6, indicate that number employees exceed the 800% PEL dose.

**Periodic Dose Checks and Notes About Miner Activities**

Throughout the day while sampling, the technician approached the miner being sampled, checked the accumulated action level and (or) PEL dose values and recorded them. The miner was asked about his activities and locations since the previous check, and these, in addition to the technician’s observations, were recorded in the notes. The measurements were translated into dose/hour and dose/8-hour values and are presented alongside notes on the miner’s activities in Table 2. These data can help determine which locations/activities contribute the most to the miner’s noise dose.

**SLM Measurements**

Maximum Exposure Level -- No miner’s noise exposure level may exceed 115 dBA at any time. When a miner is observed to be working in the vicinity of noisy equipment with levels approaching 115 dBA, the 115 dBA limit is tested by holding a SLM near the miner’s ear closest to the noise source for 30 seconds. The 30-second average readings, if required, are listed in Table 3. If the 115 dBA limit is exceeded, the mine must immediately correct the condition.
Number miners were found to be exposed to noise levels in excess of this 115 dBA maximum level.

**SLM Readings Near Various Noise Sources** -- Readings were also taken near various noise sources throughout the mine. An attempt was made to take the readings at the nearest location to the source where a person might be located. These data are also listed in Table 3. The combination of the “periodic dose checks and notes” and the “SLM Measurements at Various Sources” provide information, which the operator can use to identify and correct overexposure situations.

**CONCLUSION**

The technician will meet with the operator to prepare a written HCP if employee enrollment is required. If arrangements have been made to do so, the technician will also do HCP training for employees who are enrolled and for any others the operator wants to train. Michigan Technological University will invoice the mine operator within 2 months of completing the study. Questions may be directed to the technician or to Dave Carlson (906/487-2453 or email dcarlson@mtu.edu).

Questions on noise control should be directed to MSHA’s Industrial Hygienists for this district – Bill Pomroy or George Schorr in the Duluth, Minnesota District office (phone -- 218/720-5448). Internet addresses for draft copies of MSHA’s new Noise Control Manuals are for “Surface Mining Equipment” ([http://www.msha.gov/1999noise/Surface/noisesurface.htm](http://www.msha.gov/1999noise/Surface/noisesurface.htm)) and for “Prep and Processing” ([http://www.msha.gov/1999noise/prepplants/prepplants.htm](http://www.msha.gov/1999noise/prepplants/prepplants.htm)). The manuals contain information on how to control noise on mining and processing equipment as well as where to purchase the various components.
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<th>Column 1</th>
<th>Column 2</th>
<th>Column 3</th>
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<th>Column 6</th>
<th>Column 7</th>
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</thead>
<tbody>
<tr>
<td>Employee Name</td>
<td>Employee Number</td>
<td>Occupation Work Activity and Equipment Used</td>
<td>Date Sampled (if employee is enrolled in HCP w/o sampling indicate by a dash in space)</td>
<td>Action Level Noise Dose (full shift, 80 dBA threshold)</td>
<td>Permissible Exposure Level Noise Dose (full shift, 90 dBA threshold)</td>
<td>Date Employee Notified Of Full Shift Noise Dose (required if AL noise dose at or above 50%)</td>
<td>Date Employee Enrolled In Hearing Conservation Program (required if AL noise dose at or above 50%)</td>
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Table 1-- Employee Noise Exposure Record
**Table 2 – Doses and Notes Throughout the Day and Calculated Values**

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**Data on Instruments Used**

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<th>Pre Cal (110 dB)</th>
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**Dosimeter No.** | **Person Monitored** | **Chk No.** | **Time of Day (24 Hr Clock)** | **Dose Reading, %** | **Hours Between Chks** | **Dose Between Chks** | **Dose per Hour** | **Dose per 8-Hour** | **Operation/Activities Between Checks – Equipment, Noise Sources/Controls, Miner Location(s), etc.**

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### Table 3. SLM Readings at Various Noise Sources

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<th>Time of Day</th>
<th>Type of Measurement</th>
<th>Measurement Location</th>
<th>Person Exposed (if any)</th>
<th>Reading</th>
<th>Notes – Equipment, Noise Sources/Controls, Other Observations</th>
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Appendix 5

Generic Hearing Conservation Program

Developed by

Michigan Technological University

Dave Carlson & Phil Eggerding
Instructions for filling out Generic Company Hearing Conservation Program Policy

Page 1: General company information.
It is not necessary to fill out this page if this HCP Policy will be included as a subpart in a larger Company Policy Manual.

Page 2: 62.110 – Noise Exposure Assessment
Noise Exposure Assessment – Place a check mark by those noise assessment methods that will be used at your company.

Page 3: 62.160 – Hearing Protectors
Check off and fill in the information on the various types of hearing protectors that will be used at your mine.

Page 4: 62.170 thru 62.175 – Audiometric Testing
Check off whether your mine requires audiometric testing or not. Check off method your company will use to do audiometric testing.

Hearing Conservation Program Check-List
This checklist is provided to aid you in assuring full compliance with the standard.

Forms
The following forms are available for use in your HCP. In the standard, MSHA does not specify the types of forms to be used. Some of these example forms would be better suited to large companies – others, to small companies.
Most of these forms may be downloaded from our web site at: www.mine-safety.mtu.edu.

1. Hearing Conservation Program Training Record – Used to record the HCP Training for single individuals.
2. Hearing Conservation Program Training Class Roster – can be used as a record of HCP training for a large group.
3. Record Of Baseline Audiometric Testing – Lists those employees who have been baseline tested.
4. Record of Annual Audiometric Testing – Lists the annual audiometric tests done on company employees.
5. Hearing Conservation Program Employee Enrollment Record (Comprehensive) – A form that can be used to track all HCP aspects of employees enrolled in HCP.
6. Employee Noise Exposure Record – A form used to track Noise exposure of a large number of employees.

30 CFR Part 62 Hearing Conservation Program
GENERAL COMPANY INFORMATION

MSHA ID Number: ______________
Company Name: _______________________________________________________
Company Address: _____________________________________________________
City, State & Zip Code: ________________________________________________
Mine Name: ____________________________________________________________________________

Person responsible for health and safety training at the mine (Name and Position)

Responsible Person: ______________________________________________________
Position/Title: _________________________________________________________
Phone Number: _________________________________________________________
E-mail (optional): _______________________________________________________

The attached Hearing Conservation Program complies with the following subparts of CFR 30:
62.110 – Noise Exposure Assessment
62.160 – Hearing Protectors
62.170 thru 62.175 – Audiometric Testing
62.180 – Training
62.190 – Records
**62.110 – Noise Exposure Assessment**

*Noise Exposure Assessment*

At least one of the following method(s) will be used to assess employee exposure to noise (All that apply are checked):


___ 3. Mine Safety & Health Administration (MSHA) compliance sampling data. (Copies of all such data will be included in records kept for this Hearing Conservation Program.)

___ 4. Equipment manufacturer's noise specifications. (Copies of all such data will be included in records kept for this Hearing Conservation Program.)

___ 5. Data from similar equipment.

*Observation of Monitoring*

This mine will provide the miners and their representatives with an opportunity to observe noise exposure monitoring and will give them prior notice of the date and time monitoring will take place.

*Miner Notification of Exposure*

This mine will notify a miner in writing within 15 days when his or her noise exposure equals or exceeds the action level, permissible exposure level or dual hearing protection level (provided this mine has not notified the miner of a similar exposure within the prior 12 months.) A record of notification will be kept at the mine for at least 6 months after the overexposure situation is corrected.
62.160 – Hearing Protectors

Hearing Protectors

The following two Hearing Protection Devices will be routinely offered (at no cost) to employees requiring such devices at this company. **The law requires two types of muffs and two types of plugs be offered.**

Hearing protection Device #1
Type:
- ___ In-Ear (Ear Plug)     ___ Over-the-Ear (Ear Muff)     ___ Ear Canal Cap
- ___ Other (Describe:)___________________________________________________
Manufacturer: _________________________________________________________
Ordering Information: ___________________________________________________

Hearing Protection Device #2
Type:
- ___ In-Ear (Ear Plug)     ___ Over-the-Ear (Ear Muff)     ___ Ear Canal Cap
- ___ Other (Describe:)___________________________________________________
Manufacturer: _________________________________________________________
Ordering Information: ___________________________________________________

Hearing Protection Device #3
Type:
- ___ In-Ear (Ear Plug)     ___ Over-the-Ear (Ear Muff)     ___ Ear Canal Cap
- ___ Other (Describe:)___________________________________________________
Manufacturer: _________________________________________________________
Ordering Information: ___________________________________________________

Hearing Protection Device #4
Type:
- ___ In-Ear (Ear Plug)     ___ Over-the-Ear (Ear Muff)     ___ Ear Canal Cap
- ___ Other (Describe:)___________________________________________________
Manufacturer: _________________________________________________________
Ordering Information: ___________________________________________________

In the event that the employee has a medical condition that prevents the use of the original choices offered the following additional choices will be made available.

Hearing Protection Device – Alternate #1
Type:
- ___ In-Ear (Ear Plug)     ___ Over-the-Ear (Ear Muff)     ___ Ear Canal Cap
- ___ Other (Describe:)___________________________________________________
Manufacturer: _________________________________________________________
Ordering Information: ___________________________________________________

Hearing Protection Device – Alternate #2
Other devices recommended by the physician who determined that the original choices were not suitable.

Hearing Protector Training

Training will be done on provided hearing protectors within 30 days of enrollment in the Hearing Conservation Program and thereafter, during annual refresher training.
62.170 thru 62.175 – Audiometric Testing

Audiometric testing will be offered to employees whose noise exposure is at or above the Action Level. The choice checked below reflects this mine’s policy on requiring audiometric testing.

___ This mine requires baseline audiometric testing as a condition of employment.
___ This mine does not require a baseline audiometric test as a condition of employment.

Baseline audiometric testing will be provided within 6 months of enrollment in the Hearing Conservation Program (12 months if mobile lab is used.) The choice checked below reflects this mine’s policy on audiometric testing.

___ Audiometric testing will be performed by our mine operation. The following is the name of the qualified Audiometric testing person:
__________________________________________________________________

___ The following Audiometric Testing Service will be used for testing of our employees.
Name of Audiometric Testing Service: __________________________________
Address: ____________________________________________________________
__________________________________________________________________

Other Contact information: ___________________________________________

Audiometric testing will be offered annually to all employees who have been baseline tested.

Employee Notification
(Sample Notification Letters are in the Forms found under “Noise” at http://www.mine-safety.mtu.edu.

Within 10 working days of receiving the results of an audiogram, or of a follow-up evaluation required under § 62.173 of Part 62, this mine will notify the miner in writing of the following:
1. The results and interpretation of the audiometric test, including any finding of a standard threshold shift or reportable hearing loss; and
2. The need and reasons for any further testing or evaluation, if applicable.

Note: When evaluation of the audiogram shows that a miner has incurred a reportable hearing loss as defined in Part 62, this mine will report such loss to MSHA as a noise-induced hearing loss in accordance with part 50 of 30 CFR. (Unless a physician or audiologist has determined that the loss is neither work-related nor aggravated by occupational noise exposure.)
62.180 – Training

Within 30 days of a miner's enrollment into the Hearing Conservation Program, this mine will provide the miner with training. This mine operation will give training every 12 months thereafter if the miner's noise exposure continues to equal or exceed the action level. Training will include:

1. The effects of noise on hearing.
2. The purpose and value of wearing hearing protectors.
3. The advantages and disadvantages of the hearing protectors to be offered.
4. The various types of hearing protectors offered by the mine operator and the care, fitting, and use of each type.
5. The general requirements of this standard.
6. The mine operator's and miner's respective tasks in controlling the miner's exposure to noise.
7. The purpose and value of audiometric testing and a summary of the procedures.

This mine will certify the date and type of training given each miner, and maintain a record of this training for as long as the miner is enrolled in the Hearing Conservation Program, and for at least 6 months thereafter.

(Sample Training Certificates are in Forms found under "Noise" at http://www.mine-safety.mtu.edu.

62.190 – Records

A person's access to this mine operations Part 62 records will be in accordance with 30 CFR Part 62.190.
Hearing Conservation Program Check-List

Any miner found to have a noise exposure on the 80 to 130dB scale of greater than or equal to 66% (50% with 2dBA error factor) will be included in a Hearing Conservation Program that meets the requirements established by 62.150.

Miner's Name: _____________________________________________ AL %Dose: __________
Mine ID: ______________________ Event Number: ________________ Date Sampled: ______

62.150 - Hearing Conservation Program Review
NOTE: After completion of this review or if you have any questions about compliance with any part of the "Hearing Conservation Program" requirements consult with the District Industrial Hygienist or Health Specialist.

62.110- Noise Exposure Assessment
YES / NO  62.110(a) Has the miner's noise exposure been evaluated by the mine operator? Note: If the operator has included the miner in a hearing conservation program without assessing exposure to the "Action Level" a citation may not be warranted.
YES / NO  62.110(d) Has the mine operator informed the miner in writing within the last twelve months of exposure determination?

62.160 - Hearing Protectors
YES / NO  62.160(a) Has the mine operator provided the miner with a selection of hearing protection at no cost.

62.170 through 62.175-Audiometric Testing
YES / NO  62.170 Has the mine operator offered to the miner an audiometric test at no cost?
YES / NO  62.170 Has audiometric testing been conducted every 12 months.
YES / NO  62.171 Is an audiometric test record maintained for the miner that documents: 1) name and job classification, 2) copy of all audiograms, 3) evidence that the audiogram is scientifically valid, 4) any exposure determination, and 5) results of follow-up exams.
YES / NO  62.175(a) Has the mine operator provided, within 10 working days, the miner with a written record of the results of the audiogram.
YES / NO  62.170(b) Has a reportable hearing loss been incurred by the miner (25dBA reduction) and has a 7000-1 been filed with MSHA?

Date of Baseline Audiometric Test: ____________________________
Date of Last Audiometric Test: ________________________________

62.180 - Training
YES / NO  62.180(a) Has the mine operator trained the miner on 1)effects of noise on hearing, 2)use, care, fitting of, advantages, disadvantages, and types of hearing protection devices 3)requirements of Part 62, 4)noise controls and 5)purpose and value of audiometric testing.
YES / NO  62.180(a) Has training been provided within 12 month of last HCP training.
YES / NO  62.180(b) Has the mine operator certified the date and type of training.

Date of Training: ____________________________
Hearing Conservation Program Check-List (use when exposure at/above 66% dose)

EMPLOYEE SAMPLED: ___________________ OCCUPATION: _________________

MINER IS ENROLLED IN HEARING CONSERVATION PROGRAM: YES NO (Circle One)
(If “NO” is circled, do not complete the remainder of this form)

DATE MINER ENROLLED IN HEARING CONSERVATION PROGRAM: ______________

Basis for enrolling miner in Hearing Conservation Program (check one)
___ Miner enrolled in Hearing Conservation Program because exposure at or above Action Level; OR
___ Miner enrolled in Hearing Conservation Program even though monitoring indicates noise exposure
   less than Action Level; OR
___ Miner enrolled in Hearing Conservation Program without monitoring

62.110 Noise Exposure Assessment (check if complied with)
___ System of monitoring evaluates noise exposure sufficiently to determine continuing compliance

NOISE EXPOSURE LEVEL DETERMINED BY MINE OPERATOR: ______________

___ Miner who is exposed at or above Action Level, Permissible Exposure Level, or Dual Hearing
   Protection Level is notified in writing within 15 days (not required more than once per year)

DATE OF MINER NOTIFICATION: ______________

62.160 Hearing Protectors (check if complied with)
___ Hearing protectors provided at no cost to miner
___ Hearing protectors in good condition, properly fitted, maintained
___ Mine operator insures miner wears hearing protectors when noise exposure equals or exceeds PEL

62.170 – 62.175 Audiometric Testing (check if complied with)
___ Baseline testing offered and provided within 6 months of enrolling in HCP (12 months for mobile lab)

MINER ACCEPTED OFFER OF AUDIOMETRIC TESTING: YES NO (Circle One)

IF MINER ACCEPTED OFFER, DATE OF BASELINE AUDIOGRAM: ______________

___ Annual audiometric testing offered every 12 months thereafter

DATES OF ANNUAL AUDIOGRAMS: _______________________________________

___ Within 10 days of receiving audiometric test results, mine operator notifies miner in writing of results
   and interpretation of test and, if necessary, need and reasons for further testing or evaluation

NOTE: If any audiogram irregularity is observed, send all related records to District IH for review

62.180 Training (check if complied with)
___ HCP training provided within 30 days of enrollment in HCP, and at intervals not less than 12 months

DATE OF MOST RECENT HEARING CONSERVATION PROGRAM TRAINING:

62.190 Records (check if complied with)
___ AR given access to all required records within 24 hrs of request
## Appendix 6 – Forms and Checklists

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<td>Sound Level Meter Noise Source Measurement Record</td>
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<td>Sound Level to Dose/Hr Conversion Table</td>
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<td>Noise Dose Table</td>
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<td>Example Notification Letter - - Exposure Above the PEL</td>
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<td>Hearing Conservation Program Training Record</td>
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<td>Record of Baseline Audiometric Testing</td>
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<td>Record of Annual Audiometric Testing</td>
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<td>Example Audiometric Testing Results Notification Letter</td>
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<td>HCP Checklist (MSHA uses when Exposure above 66% Dose)</td>
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<td>HCP Checklist (Alternate Form)</td>
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Check-List For Dosimeter Noise Sampling

Outline System Of Monitoring

- Notify Affected Workers So They Can Observe
- Noise Monitoring, If Desired
- For Initial Sampling, 1 To 5 Employees - Sample All
- For Initial Sampling, 6 Or More Employees - Sample Some Or All (Group Employees With Similar Exposures, Sample 1 Or More Representatives From Each Group)
- Follow-Up Sampling Whenever Exposure Changes (Sufficiently To Determine Continuing Compliance)
- Sampling Must Evaluate Each Miner’s Exposure
- Sampling Must Represent “Full Shift”

Supplies And Equipment

- Dosimeters (Should Already Be Set For “A” Scale, Slow Response)
- Wind Screen(S)
- Dosimeter Calibrator
- Fresh 9v Alkaline Batteries, Insert And Check “Battery Ok”
- Documentation Form(S)

Pre-Calibrate Dosimeter

- Calibrate, Record Pre-Calibration
- If Calibration Fails (More Than 1 Dba Difference Between Dosimeter And Calibrator), Do Not Use Dosimeter
- Clear Memory (Turn Off Toggle Switch)

Select Worker To Be Sampled

- Tell Worker What You Are Doing, And Why; Answer Any Questions They Have; Instruct Not To Tamper With Dosimeter, Tap On Microphone, Etc.
- Emphasize They Should Perform Normal Day’s Work
- Record Name, Location, Duties, Equipment Operated, Etc.

Begin Sampling

- Clip Dosimeter On Belt Or Place Into Pocket, Secure Cord
- Clip Microphone On Top Center Of Shoulder, Pointing Up
- Place Windscreen Over Microphone
- Turn On Dosimeter (Turn On Toggle Switch)

Periodically Check Dosimeter Throughout Sampling Period

- Once Per Hour, If Possible; Insure Dosimeter Operating
- Check Noise Doses At High And Low Thresholds
- Ask Worker If Normal Work Shift, Unusual Noise, Etc.
- Record Noise Doses

Routine Documentation

- Noise Doses During Periodic Dosimeter Checks
- Noise Doses At End Of Sampling Period
Sources Of Noise
Hearing Protectors
Environmental Conditions (Temperature, Precip, Etc.)
Evidence Of Normal Work Day (Number Of Loads Dumped,
Number Of Bags Filled, Tonnage Processed, Etc.)

_ Periodic Checks With SLM_  
Periodically Check Worker’s Noise Exposure With SLM  
Record SLM Data, Time, And Noise Source (If Identifiable)

_ End Sampling_  
Record Final Noise Dose  
Turn Off Dosimeter (Turn Off Toggle Switch)  
Tell Worker Final Noise Dose  
Discuss Sampling With Employee. Was This A “Normal Work Day” In Terms Of Noise Exposure?  
Sampling Should  

_ Post-Calibrate Dosimeter_  
Calibrate, Record Post-Calibration  
If Dosimeter Post-Calibration Fails, Sampling Is Invalid

Once You Have Begun Sampling, Don’t Turn Off Toggle Switch Until You Are Finished Sampling.

Turning Off Toggle Switch Instantly Erases All Accumulated Noise Dose In The Dosimeter’s Memory. This Memory Cannot Be Restored.
Form A6-1 -- Dosimeter Noise Exposure Documentation Form

Person Conducting Survey_____________________________ Dosimeter Manf & Model____________________ Dosimeter S/N__________

Dosimeter Pre-Calibration_____________________________ (If pre-calibration fails, calibrate or use another unit)

Dosimeter Post-Calibration_____________________________ (If post-calibration fails, survey results may be invalid)

Person Being Surveyed______________________________ Occupation/Work Activity____________________________

Mining Equipment Used________________________________ Manf & Model________________________________

Hearing Protection Used Y / N  Wind/Weather/Other Conditions________________________________________________________

INSTRUCTIONS:
1. Use new dosimeter batteries.
2. Hang dosimeter on belt, pocket, etc. and place microphone on shoulder, centered and pointing upward. If one shoulder is noisier than the other, place on noisier side. Make sure microphone is covered by wind shield.
3. Turn on dosimeter, and record sampling start time.
4. Observe worker periodically throughout sampling period and record time, work activity, equipment operated, source of noise, noise controls used, etc. Verify that person sampled is experiencing a “normal work day.”
5. Check dosimeter at regular intervals (4X per shift) and record noise dose. Spot check noise levels with SLM.
6. Remove dosimeter at end of sampling period. Record time and final noise dose, and turn off dosimeter.

TIME | Location, Work Activity, Equipment Operated, Equipment ID, Sources of Noise Noise Controls Used, General Observations and Comments | Noise Dose (%)
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## Form A6-2 -- Sound Level Meter (SLM) – Noise Source Measurement Record

Date _________  Person Conducting Survey_________________________________ SLM Manf & Model
SLM S/N_______________ SLM Pre-Calibration_______________________________________ (If pre-calibration fails, calibrate or replace unit)
SLM Post-Calibration______________________________________ (If post-calibration fails, survey results may be invalid)
Person Being Surveyed____________________________________ Occupation/WorkActivity_____________________________________________
Mining Equipment Used__________________________________________ Manf & Model_______________________________________________
Hearing Protection Used  Y /N
Wind/Weather/OtherConditions_______________________________________________________________________________________________

INSTRUCTIONS: The SLM microphone without the wind screen should be held with the microphone pointed upward at arm’s length and shoulder height in the approximate location where a worker would be standing. The microphone should be located between the noise source and the technician’s body.

### Sound Level Meter (SLM) Readings

<table>
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<th>Noise Source or Person</th>
<th>Time of Day</th>
<th>Duration of reading</th>
<th>Measurement Location</th>
<th>SLM Reading</th>
<th>Mining Activity Information</th>
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<tr>
<td>SLM Reading, dBA</td>
<td>Dose per hr of exposure</td>
<td>SLM Reading dBA</td>
<td>Dose per hr of exposure</td>
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<td>80</td>
<td>3.13</td>
<td>98.0</td>
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<td>99.0</td>
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<td>82</td>
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<td>100</td>
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<td>76</td>
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<td>86</td>
<td>7.18</td>
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<td>87</td>
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<td>87</td>
<td>8.25</td>
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<td>90</td>
<td>12.5</td>
<td>108</td>
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<td>109</td>
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<td>96</td>
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<td>114</td>
<td>348</td>
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<tr>
<td>97</td>
<td>33.0</td>
<td>115</td>
<td>400</td>
<td></td>
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</tbody>
</table>
When determining the Permissible Exposure Limit (PEL) Noise Dose, use only the portion of the Table including noise levels of 90 dBA and higher. When determining the Action Level (AL) Noise Dose, use the entire table. Note that using a Sound Level Meter and this table to estimate noise dose should be considered an approximation of actual noise dose. Add 2 dBA to SLM measurements to allow for calibration or sampling errors.

<table>
<thead>
<tr>
<th>Noise Level</th>
<th>.25</th>
<th>.50</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
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</thead>
<tbody>
<tr>
<td>80 dBA</td>
<td>1</td>
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<td>3</td>
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<td>34</td>
<td>36</td>
<td>40</td>
<td>44</td>
<td>47</td>
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<tr>
<td>81 dBA</td>
<td>1</td>
<td>2</td>
<td>4</td>
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<tr>
<td>82 dBA</td>
<td>1</td>
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<tr>
<td>83 dBA</td>
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<td>84 dBA</td>
<td>1</td>
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<td>85 dBA</td>
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<td>86 dBA</td>
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<td>87 dBA</td>
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<td>88 dBA</td>
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<td>89 dBA</td>
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<td>120</td>
<td>131</td>
<td>141</td>
<td>152</td>
<td>163</td>
</tr>
</tbody>
</table>

Only Sound Levels 90 dBA and higher are used for determining the PEL (All the values below.)

| Exposure Time in Hours | Only Sound Levels 90 dBA and higher are used for determining the PEL (All the values below.) |
**Form A6-3 -- Employee Noise Exposure Record**

*This is not an official MSHA form. Part 62 does not specify recordkeeping format. Mine operators may use any records format they wish.*

<table>
<thead>
<tr>
<th>Employee Name</th>
<th>Employee Number</th>
<th>Occupation Work Activity Equipment Used</th>
<th>Date Sampled (if employee is enrolled in HCP w/o sampling indicate by a dash in space)</th>
<th>Action Level Noise Dose (full shift, 80 dBA threshold)</th>
<th>Permissible Exposure Level Noise Dose (full shift, 90 dBA threshold)</th>
<th>Date Employee Notified Of Full Shift Noise Dose (required if AL noise dose at or above 50%)</th>
<th>Date Employee Enrolled In Hearing Conservation Program (required if AL noise dose at or above 50%)</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>
Form A6-4
EXAMPLE NOTIFICATION LETTER - - EXPOSURE AT or ABOVE AL

This is not an official MSHA form. Part 62 does not specify the format for notification letters.
Mine operators may use any format they wish for such letters.

Date

John Jones
Employee Number 24689753
Loader Operator

RE: Your Workplace Noise Exposure

On Thursday, May 10, 2001, you were sampled for noise exposure while you operated the #4 Cat loader feeding the plant hopper. Your full shift noise exposure did not exceed MSHA’s Permissible Exposure Level, however your noise dose of 82% did exceed MSHA’s Action Level for noise exposure. The Action Level for noise exposure is one-half of the Permissible Exposure Limit.

Because of this noise exposure, you have been enrolled in the company’s Hearing Conservation Program (HCP). By following the provisions of the HCP, your chances of sustaining a serious hearing loss as a result of on-the-job noise exposure will be greatly reduced. Within the next 30 days, you will be provided with specialized hearing conservation training, and you will shortly be offered both audiometric testing and your choice of either ear muffs or ear plugs.

If you have any questions, please feel free to contact me or your supervisor.

Sincerely,

John Smith
General Manager

NOTE: Miners exposed at or above the Action Level, Permissible Exposure Level, or Dual Hearing Protection Level must be notified in writing within 15 days of:
1. The exposure determination, and
2. The corrective action being taken.

The mine operator must maintain a copy of the miner notification, or a list on which the relevant information is recorded for the duration of the miner’s exposure at or above the Action Level plus 6 months.
Date

John Jones
Employee Number 24689753
Loader Operator

RE: Your Workplace Noise Exposure

On Thursday, May 10, 2001, you were sampled for noise exposure while you operated the #4 Cat loader feeding the plant hopper. Your full shift noise dose was 171%, which exceeds MSHA’s Permissible Exposure Level for noise exposure.

Because of this noise exposure, you have been enrolled in the company’s Hearing Conservation Program (HCP). By following the provisions of the HCP, your chances of sustaining a serious hearing loss as a result of on-the-job noise exposure will be greatly reduced. Within the next 30 days, you will be provided with specialized hearing conservation training, and you will shortly be offered both audiometric testing and your choice of either ear muffs or ear plugs. Until engineering and/or administrative controls are implemented to reduce your noise exposure below the Permissible Exposure Level, you will be required to wear hearing protection while you are operating the loader or exposed to any other noise sources in the mine or plant area.

If you have any questions, please feel free to contact me or your supervisor.

Sincerely,

John Smith
General Manager

NOTE: Miners exposed at or above the Action Level, Permissible Exposure Level, or Dual Hearing Protection Level must be notified in writing within 15 days of:

1. The exposure determination, and
2. The corrective action being taken.

The mine operator must maintain a copy of the miner notification, or a list on which the relevant information is recorded for the duration of the miner’s exposure at or above the Action Level plus 6 months.
Form A6-6 -- Hearing Conservation Program Employee Enrollment Record

This is not an official MSHA form. Part 62 does not specify recordkeeping format.
Mine operators may use any records format they wish.

<table>
<thead>
<tr>
<th>Employee Name</th>
<th>Employee Number</th>
<th>Date Enrolled In HCP</th>
<th>Reason For Enrolling In HCP (Check one)</th>
<th>Date Audiometric Testing First Offered</th>
<th>Date of Initial Hearing Conservation Training</th>
<th>Removal From HCP (Complete One)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Noise Exposure At Or Above Action Level</td>
<td>Enrolled W/O Exposure Monitoring</td>
<td></td>
<td>Date Employee Removed From HCP</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td>Date Of Employee Separation</td>
</tr>
</tbody>
</table>


Form A6-7 -- HEARING CONSERVATION PROGRAM TRAINING RECORD/CLASS ROSTER

This is not an official MSHA training form. This form is being provided to assist the mine operator in documenting “Hearing Conservation Program” training requirements. Part 62 does not specify what form to use for documenting training.

On ______________________(date) the listed personnel attended a hearing conservation training class. The subject material contained the following:

1. The effects of noise on hearing;
2. The purpose and value of wearing hearing protectors;
3. The advantages and disadvantages of the hearing protectors to be offered;
4. The various types of hearing protectors offered by the mine operator and the care, fitting, and use of each type;
5. The general requirements of this part;
6. The mine operator’s and mine’s respective tasks in maintaining noise controls; and
7. The purpose and value of audiometric testing and a summary of the procedures.

<table>
<thead>
<tr>
<th>Personnel</th>
<th>Job Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
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<tr>
<td>2.</td>
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<td>4.</td>
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<td>6.</td>
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<tr>
<td>9.</td>
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<tr>
<td>10.</td>
<td></td>
</tr>
</tbody>
</table>

As required by §62.180(b), I certify that the above training has been completed

(Signature of person responsible for training)
Form A6-8 -- HEARING CONSERVATION PROGRAM TRAINING RECORD

This is not an official MSHA training form. This form is being provided to assist the mine operator in documenting “Hearing Conservation Program” training requirements. Part 62 does not specify what form to use for documenting training.

Miner’s Full Name (print):  _____________________________________________________

Miner’s Job Title:  _____________________________________________________

<table>
<thead>
<tr>
<th>30 CFR Part 62.180 Training</th>
<th>Check ✔ if completed</th>
<th>Miner’s Initials (optional)</th>
</tr>
</thead>
<tbody>
<tr>
<td>§ 62.180(a)(1) The effects of noise on hearing;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>§ 62.180(a)(2) The purpose and value of wearing hearing protectors;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>§ 62.180(a)(3) The advantages and disadvantages of the hearing protectors offered;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>§ 62.180(a)(4) The various types of hearing protectors offered by the mine operator and the care, fitting and use of each type;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>§ 62.180(a)(5) The general requirements of this part;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>§ 62.180(a)(6) The operator’s and miner’s respective task in maintaining mine noise controls; and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>§ 62.180(a)(7) The purpose and value of audiometric testing and a summary of the procedures.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Optional Training
List all additional training provided on the companies “HCP” in the space below.

1)  
2)  
3)  
4)  

As required by §62.180(b), I certify that the above training has been completed.

(Signature of person responsible training)   (Date training provided)
Form A6-9 -- Record of Baseline Audiometric Testing

This is not an official MSHA form. Part 62 does not specify recordkeeping format. Mine operators may use any records format they wish.

<table>
<thead>
<tr>
<th>Employee Name</th>
<th>Employee Number</th>
<th>Date Enrolled In HCP</th>
<th>Baseline Audiometric Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td>Date Offered</td>
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</tbody>
</table>

* Note – If Company Policy Allows and Employee Declines Audiometric Testing, have employee initial this column after the “D”
**Form A6-10 -- Record of Annual Audiometric Testing**

*This is not an official MSHA form. Part 62 does not specify recordkeeping format. Mine operators may use any records format they wish.*

<table>
<thead>
<tr>
<th>Employee Number</th>
<th>Date Offered</th>
<th>Offer* Accepted (A) Declined (D)</th>
<th>Date Of Annual Audiometric Test</th>
<th>Date Offered</th>
<th>Offer* Accepted (A) Declined (D)</th>
<th>Date Of Annual Audiometric Test</th>
<th>Date Offered</th>
<th>Offer* Accepted (A) Declined (D)</th>
<th>Date Of Annual Audiometric Test</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

* If company policy allows and employee declines audiometric testing, have employee initial this column after the “D”*
Form A6-11 -- Example Audiometric Testing Results Notification Letter

TO (employees name): ____________________________
TODAYS DATE: ____________________________
EMPLOYEE NUMBER: ____________________________
EMPLOYEE JOB DESCRIPTION: ____________________________
SUBJECT: Notification of Audiometric Testing Results

Dear Employee:

This letter is notification of your recent audiometric testing results. The testing, done (Date)______ indicates the following age-adjusted change from your earlier baseline audiogram.

___Hearing loss equivalent to:
   ____dbA in your right ear and
   ____dBA in your left ear.

The audiologist considers this change to be work related or aggravated by occupational noise exposure:
   Yes____, No____

1. If the hearing loss for either ear is equal to 25 dBA or more, it is considered a Reportable Hearing Loss and the company must report it to MSHA.

2. If the hearing loss for either ear is equal to 10 dBA or more, MSHA considers it to be a Standard Threshold Shift requiring certain actions on the part of the company as discussed below, unless the testing physician or audiologist determines that the change is neither work-related nor aggravated by occupational noise exposure:

   Within 30 calendar days of receiving evidence or confirmation of a Standard Threshold Shift the company will:

   (a) Retrain you, including the instruction required by 30CFR part 62.180;

   (b) Provide you with the opportunity to select a hearing protector, or a different hearing protector if you have previously selected a hearing protector, from among those offered by the mine operator in accordance with 30CFR part 62.160;

   (c) Review the effectiveness of any engineering and administrative controls to identify and correct any deficiencies; and

   (d) Hearing protection is mandatory if, during the course of your regular job, you are exposed to noise above the Action level.

If you have any questions, please feel free to contact me or your supervisor.

John Smith
General Manager
EMPLOYEE SAMPLED: ___________________  OCCUPATION: __________

MINER IS ENROLLED IN HEARING CONSERVATION PROGRAM: YES  NO  (Circle One)
(If "NO" is circled, do not complete the remainder of this form)

DATE MINER ENROLLED IN HCP: __________
Basis for enrolling miner in HCP (check one)
__ Miner enrolled in HCP because exposure at or above Action Level; OR
__ Miner enrolled in HCP even though monitoring indicates noise exposure
less than Action Level; OR
__ Miner enrolled in HCP without monitoring

62.110 Noise Exposure Assessment (check if complied with)
__ System of monitoring evaluates noise exposure sufficiently to determine continuing compliance

NOISE EXPOSURE LEVEL DETERMINED BY MINE OPERATOR: __________
__ Miner who is exposed at or above Action Level, Permissible Exposure Level, or Dual Hearing
Protection Level is notified in writing within 15 days (not required more than once per year)

DATE OF MINER NOTIFICATION: __________

62.160 Hearing Protectors (check if complied with)
__ Hearing protectors provided at no cost to miner
__ Hearing protectors in good condition, properly fitted, maintained
__ Mine operator insures miner wears hearing protectors when noise exposure equals or exceeds PEL

62.170 – 62.175 Audiometric Testing (check if complied with)
__ Baseline testing offered and provided within 6 months of enrolling in HCP (12 months for mobile lab)

MINER ACCEPTED OFFER OF AUDIOMETRIC TESTING: YES  NO  (Circle One)

IF MINER ACCEPTED OFFER, DATE OF BASELINE AUDIOGRAM: __________

__ Annual audiometric testing offered every 12 months thereafter

DATES OF ANNUAL AUDIOGRAMS: ________________________________
__ Within 10 days of receiving audiometric test results, mine operator notifies miner in writing of results
and interpretation of test and, if necessary, need and reasons for further testing or evaluation

NOTE: If any audiogram irregularity is observed, send all related records to District IH for review

62.180 Training (check if complied with)
__ HCP training provided within 30 days of enrollment in HCP, and at intervals not less than 12 months

DATE OF MOST RECENT HCP TRAINING: __________

62.191 Records (check if complied with)
__ AR given access to all required records within 24 hrs of request
### Hearing Conservation Program Check-List

Any miner found to have a noise exposure on the 80 to 130dB scale of greater than or equal to 66% (50% with 2dBA error factor) will be included in a HCP that meets the requirements established by 62.150.

Miner's Name: _______________________________  AL %Dose: __________

Mine ID: ______________________  Event Number: _______________  Date Sampled: ______

### 62.150 - Hearing Conservation Program Review

**NOTE:** After completion of this review or if you have any questions about compliance with any part of the "HCP" requirements consult with the District Industrial Hygienist or Health Specialist.

### 62.110- Noise Exposure Assessment

YES / NO  62.110(a) Has the miner's noise exposure been evaluated by the mine operator? Note: If the operator has included the miner in a HCP without assessing exposure to the "Action Level" a citation may not be warranted.

YES / NO  62.110(d) Has the mine operator informed the miner in writing within the last twelve months of exposure determination?

### 62.160 - Hearing Protectors

YES / NO  62.160(a) Has the mine operator provided the miner with a selection of hearing protection at no cost.

### 62.170 through 62.175-Audiometric Testing

YES / NO  62.170 Has the mine operator offered to the miner an audiometric test at no cost?

YES / NO  62.170 Has audiometric testing been conducted every 12 months.

YES / NO  62.171 Is an audiometric test record maintained for the miner that documents: 1) name and job classification, 2) copy of all audiograms, 3) evidence that the audiogram is scientifically valid, 4) any exposure determination, and 5) results of follow-up exams.

YES / NO  62.175(a) Has the mine operator provided, within 10 working days, the miner with a written record of the results of the audiogram.

YES / NO  62.170(b) Has a reportable hearing loss been incurred by the miner (25dBA reduction) and has a 7000-1 been filed with MSHA?

- Date of Baseline Audiometric Test: ______________________________
- Date of Last Audiometric Test: ______________________________

### 62.180 - Training

YES / NO  62.180(a) Has the mine operator trained the miner on 1)effects of noise on hearing, 2)use, care, fitting of, advantages, disadvantages, and types of hearing protection devices 3)requirements of Part 62, 4)noise controls and 5)purpose and value of audiometric testing.

YES / NO  62.180(a) Has training been provided within 12 month of last HCP training.

YES / NO  62.180(b) Has the mine operator certified the date and type of training.

- Date of Training: ______________________________