

**CHAPTER 21**  
**DOCUMENTATION AND RECORDKEEPING**

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## **Chapter 21**

### **DOCUMENTATION AND RECORDKEEPING**

#### **I. Introduction**

Documenting observations and findings during an inspection is an essential part of an inspector's job. When health sampling is conducted, the inspector must document:

- Information about the occupation or area being sampled;
- Activity of the person being sampled;
- Information about sampling equipment being used;
- Personal protective equipment being worn or not being worn;
- Conditions at the time of sampling;
- Screening information and corroborative data collected during sampling;
- Potential sources of overexposure(s);
- Controls that are in place or that can be installed or implemented, and
- Information to determine S&S, gravity and negligence (this is especially critical for samples that need to be submitted for laboratory results).

Additionally, an inspector must complete the appropriate forms to provide information to the MSHA Laboratory and databases for samples collected.

#### **II. Definitions**

**Area Sample Data Summary (ASDS)** - MSHA Form 4000-42 - form used to report area sample results to the Management Standard Information Systems (MSIS).

**Inspection/Investigation Data Summary (I&I)** - MSHA Form 4000-40 - form used to document the inspection when it is initiated. This form provides the unique event number.

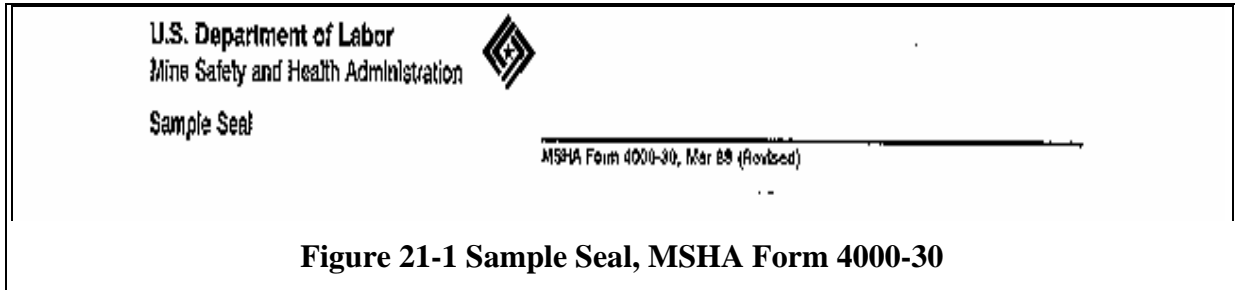
**Management Standardized Information Systems (MSIS)** – MSHA's Web-based database that allows for the integration of information systems into a common platform. The migrations of the system are in segments that allow for changes from the old to the new database. For example, health sample counts collected prior to 2005 were derived through the I&I entries.

**Personal Exposure Data Summary (PEDS)** - MSHA Form 4000-43 - form used to report personal sample results to the MSIS.

**Request For Laboratory Analysis (RLA)** - MSHA Form 4000-29 - form submitted with sampling media to provide information to the MSHA Laboratory for analytical purposes and to receive back an Analytical Report and applicable PEDS or ASDS.

**III. Sample Seal - MSHA Form 4000-30**

The sample seal is an integral part of the Metal/Nonmetal 'Chain of Possession' procedure. This procedure ensures that a sample has not been tampered with after it has been collected. The sample seal is placed on the sampling media (filter cassette, charcoal tube, etc.) after sampling. The inspector must sign or initial and date the seal prior to shipping it to the MSHA Laboratory.



**IV. Diesel Particulate Matter Sampling Field Notes (MSHA Form 4000-128)****A. General Instructions**

Diesel particulate matter sampling field notes must be completed when diesel particulate matter samples are taken. All diesel particulate matter sampling field notes, sketches, photographs, and additional notes applicable to a single inspection shall be kept together and maintained as part of the official mine file at the district office. A Diesel Particulate Matter Sampling Field Notes form must be completed for each sample taken. Up to three samples may be recorded on the same form. See Figures 21-2 and 21-3 for a sample MSHA Form 4000-128.

**B. Completing Diesel Particulate Matter Sampling Field Notes**

**Complete the following items on the Diesel Particulate Matter Sampling Field Notes form:**

1. **Mine name** - Record the name of the mine.
2. **Company name** - Record the name of the company.
3. **Mine ID** - Record the appropriate seven-digit identification number.
4. **Name of person conducting sampling** - Record the name of the person conducting the sampling.
5. **AR Number** - Record the Authorized Representative number of the person conducting the sampling.
6. **Date** - Record the date of sampling.
7. **Event #** - Record the event number from the Inspection/Investigation Data Summary form for this inspection or investigation.
8. **Commodity** - Record the commodity produced by the mine in the areas being sampled.
9. **Hours/Shift** - Record the number of hours of work during the shift sampled.
10. **Production Shifts/Day** - Record the number of production shifts a day.
11. **Maintenance Shifts/Day** - Record the number of maintenance shifts a day.
12. **Type of fuel in use at the mine** - Record the type of fuel being used in the

underground equipment.

13. **Fuel sulfur content (%)** - Record the percentage of sulfur in the diesel fuel being used in the equipment underground at the mine.
14. **Type of fuel additives used at the mine** - If fuel additives are used, record the type. If not, mark "none."
15. **Is there a person authorized to maintain diesel equipment?** - Mark yes (Y) or no (N). If the answer is "no," explain in item #41, Other Notes/Observations.
16. **Is there a planned maintenance program in place?** - Mark yes (Y) or no (N). If the answer is "no," explain in item #41, Other Notes/Observations.
17. **Has diesel equipment inventory been reviewed?** - Mark yes (Y) or no (N). If the answer is "no," explain in item #41, Other Notes/Observations.
18. **Has mine ventilation plan / map been reviewed?** - Mark yes (Y) or no (N). If the answer is "no," explain in item #41, Other Notes/Observations.

**\*Note:** Complete the following items 19 through 41 for each miner sampled. If more than one sample is taken on the individual miner being sampled, fill out items 19 through 41 for each sample taken.

19. **Sample Cassette No.** - Record the pre-printed sample cassette number.
20. **Name of miner sampled** - Record the name of the miner sampled, including first and last name.
21. **Number of miners affected** - Record the number of other miners working in the same work area as the miner sampled. This would include other miners who perform the same task on other shifts.
22. **Occupation sampled** - Record the job title or occupational classification of the miner being sampled.
23. **If a respirator is worn: brand, model, type of filters** - Record the name of the manufacturer of the respirator issued to the miner during sampling. If no respirator is worn during the sampling, note that none was worn. Record the model, name, filter/cartridge used, and NIOSH approval number of the respirator.
24. **If a respirator is worn: is there an acceptable respiratory protection program?** - Record whether a respirator program is in effect in



accordance with the respiratory requirements contained in ANSI Z88.2-1969 and if a medical evaluation and fit testing were done. Record any deficiencies in program in item #41, Other Notes/Observations.

25. **Equipment operated; Type or description; Identification #** - Record a description of the type of equipment the miner being sampled is operating, and the manufacturer and company identification number of that equipment.
26. **Location in mine** - Record a description of the location(s) where the miner is assigned to work during the sampling. If more than one location, enter the approximate amount of time (in hours) the miner spends in each.
27. **Is person sampled inside an environmental cab or booth with filtered breathing air?** - Mark yes (Y) or no (N). If the cab is not an *environmental* cab (positive pressure, air filtration system, etc.), then mark no (N).
28. **Temperature (°F) and humidity (%)** - Record the pertinent environmental conditions.
29. **Ventilation rate (CFM) in location sampled (measure if possible)** - Record the ventilation rate in the work area of the miner being sampled. If not measured or taken from mine map, mark “unknown” and explain in item #41, Other Notes/Observations.
30. **Sample pump make/model** - Record the manufacturer's name and model number of the pump used.
31. **Sample pump number** - Record the serial number and/or MSHA property number of the pump.
32. **Pre-calibration (average Lpm)** - Record the flow rate of the sampling pump during calibration before the survey.
33. **Post-calibration (average Lpm)** - Record the flow rate of the sampling pump during calibration after the survey.
34. **Sample pump time on** - Record the exact time sampling started. Document using 24-hour clock or indicating AM or PM for 12-hour clock.
35. **Sample pump time off** - Record the exact time sampling stopped. Document using 24-hour clock or indicating AM or PM for 12-hour clock.

**(Reverse of Form 4000-128)****36. For each piece of diesel equipment used at the workplace sampled, list:**

**A. type or description** - Record a description of the type of equipment operating.

**B. Identification #** - Record the manufacturer and company identification number of that equipment. If it can be safely obtained, you may also record the engine serial number here.

**C. equipment condition** - Describe the age and how well maintained the equipment is.

**D. Does the engine emit black smoke during acceleration?** Mark "yes," "no," or "did not check."

**E. type of DPM control devices** - Record whether any DPM filters or other on-board DPM control devices, catalytic converters, or fuel additives or catalysts have been implemented for this piece of equipment.

**37. Piece #** \_\_\_\_

**38. Piece #** \_\_\_\_

**39. Piece #** \_\_\_\_

**40. Piece #** \_\_\_\_

**(Use more sample blocks if needed)** - Number sequentially.

**41. Other Notes/Observations- Sampling equipment checks, environmental conditions, activities, DPM controls, ventilation control structures (stoppings, doors, brattices, etc.)** Record any additional information or observations related to the inspection or the sampling. Record each time that notes and observations were made, using 24-hour clock or indicating AM or PM for 12-hour clock. Record the following, using additional pages if necessary:

- Conditions of the sampling equipment and any adjustments made;
- Conditions observed in the work area;
- The location and activity of miner sampled; comments by the miner, verbatim if appropriate, regarding what the miner did since

the last check and the miner's knowledge of any hazardous or unusual situations or incidents;


- Miner's use of personal protective equipment (PPE) and any deficiencies of the personal protection program;
- The probable source(s) of the miner's exposure to DPM and the miner's proximity to each source listed;
- Engineering or administrative controls in use or tried by the operator to control the sampled miner's exposure and your evaluation of the condition and effectiveness of these controls; and
- Controls suggested by the inspector to the operator to reduce the sampled miner's exposure.

### **C. Recordkeeping**

Submit the Diesel Particulate Matter Sampling Field Notes form with the addendum to the inspection report after laboratory results have been received and appropriate action has been taken.

**Diesel Particulate Matter Sampling Field Notes**  
Metal and Nonmetal Mine Safety and Health

**U.S. Department of Labor**  
**Mine Safety and Health Administration**



1. Mine name \_\_\_\_\_ 2. Company name \_\_\_\_\_ 3. Mine ID \_\_\_\_\_

4. Name of person conducting sampling \_\_\_\_\_ 5. AR # \_\_\_\_\_ 6. Date \_\_\_\_\_ 7. Event # \_\_\_\_\_

8. Commodity \_\_\_\_\_ 9. Hours/Shift \_\_\_\_\_ 10. Production Shifts/Day \_\_\_\_\_ 11. Maintenance Shifts/Day \_\_\_\_\_

12. Type of fuel in use at the mine \_\_\_\_\_ 13. Fuel sulfur content(%) \_\_\_\_\_ 14. Type of fuel additives used at the mine \_\_\_\_\_

15. Is there a person authorized to maintain diesel equipment? Y N 16. Is there a planned maintenance program in place? Y N

17. Has diesel equipment inventory been reviewed? Y N 18. Has mine ventilation plan / map been reviewed? Y N

19. Sample Cassette No.				
20. Name of miner sampled				
21. Number of miners affected				
22. Occupation sampled				
23. If a respirator is worn: brand, model, type of filters				
24. If a respirator is worn: is there an acceptable respiratory protection program?	Y N	Y N	Y N	
25. Equipment operated Type or description Identification #				
26. Location in mine				
27. Is person sampled inside an environmental cab or booth with filtered breathing air?	Y N	Y N	Y N	
28. Temperature (°F) and humidity(%)				
29. Ventilation rate (CFM) in location sampled (measure if possible)				
30. Sample pump make/model				
31. Sample pump number				
32. Pre-calibration (average Lpm)				
33. Post-calibration (average Lpm)				
34. Sample pump time on				
35. Sample pump time off				

MSHA Form 4000-128, July 2005

**Figure 21-2. MSHA Form 4000-128 (Front)**

<b>Sample Cassette No.</b>  Name of miner sampled	36. For each piece of diesel equipment used at the workplace sampled, list:		37. Piece # _____	38. Piece # _____	39. Piece # _____	40. Piece # _____ (Use more sample blocks if needed)	41. Other Notes/Observations - Sampling equipment checks, environmental conditions, activities, DPM controls, ventilation control structures (stoppings, doors, brattices, etc.)
	A. type or description						
	B. Identification #						
	C. equipment condition						
	D. Does the engine emit black smoke during acceleration?						
E. type of DPM control devices							
<b>Sample Cassette No.</b>  Name of miner sampled	A. type or description						
	B. Identification #						
	C. equipment condition						
	D. Does the engine emit black smoke during acceleration?						
	E. type of DPM control devices						
<b>Sample Cassette No.</b>  Name of miner sampled	A. type or description						
	B. Identification #						
	C. equipment condition						
	D. Does the engine emit black smoke during acceleration?						
	E. type of DPM control devices						

Reverse, MSHA Form 4000-128, July 2005

Figure 21-3. MSHA Form 4000-128 (Reverse)

**V. Health Field Notes (MSHA Form 4000-31)****A. General Instructions**

Health field notes must be completed when personal exposure samples are taken. All health field notes, sketches, photographs, and additional notes applicable to a single inspection shall be kept together and maintained as part of the official mine file at the District Office. A Health Field Notes form must be completed for each personal sample taken. See Figures 21-4 and 21-5 for a sample MSHA Form 4000-31.

**B. Completing Health Field Notes**

**For each miner sampled, complete the following items on the Health Field Notes form:**

1. **Inspector** - Record the name of the person conducting the sampling.
2. **AR Number** - Record the Authorized Representative number of the person conducting the sampling.
3. **Date** - Record the date of sampling.
4. **Mine ID** - Record the appropriate seven-digit identification number.
5. **Mine** - Record the name of the mine.
6. **Company** - Record the name of the company.
7. **Employee Sampled** - Record the name of the miner sampled, including first and last name.
8. **Hours/Shift** - Record the number of hours the miner worked during the shift sampled.
9. **Days/Week** - Record the number of days per week that the miner normally works at the mine.
10. **Number Persons Affected** - Record the number of other miners working in the same work area as the miner sampled. This would include other miners who perform the same task on other shifts.
11. **Job Title** - Record the job title or occupational classification of the miner being sampled.

12. **Assigned Work Area** - Record a description of the location(s) where the miner is assigned to work during the sampling. If more than one location, enter the approximate amount of time (in hours) the miner spends in each.
13. **Assigned Duties** - Record a description of the miner's assigned work activities during sampling for each work area described, and enter the approximate amount of time (in hours) the miner spends performing each activity.

**When Sampling for Noise, fill out items 14 through 16. Otherwise, leave blank.**

14. **Hearing Protector Mfg.** - Record the name of the manufacturer of the hearing protector worn by the miner during sampling. If none is worn, note that none was worn.
15. **Model** - Record the model name and number of the hearing protector.
16. **NRR** - Yes or No. Indicate whether the hearing protection has an NRR value. The NRR value itself is not used for enforcement purposes.

**When Sampling for Contaminants:**

17. **Respirator Mfg.** - Record the name of the manufacturer of the respirator issued to the miner during sampling. If no respirator is worn during the sampling, note that none was worn.
18. **Model** - Record the model, name, filter/cartridge used, and NIOSH approval number of the respirator.
19. **Respirator Program** - Record whether a respirator program is in effect in accordance with the respiratory requirements contained in ANSI Z88.2-1969 and if fit testing was done. Record any deficiencies in the program.

**When Sampling for Noise:**

20. **Noise Dosimeter Mfg.** - Record the manufacturer's name and model number for the noise dosimeter used to sample the miner.
21. **ID Number** - Record the serial number and/or MSHA property number of the noise dosimeter.
22. **Cell Number** - This section should be left blank.
23. **Time On** - Record the exact time the dosimeter was turned on, using a 24-hour (military time) clock.

24. **Time Off** - Record the exact time the dosimeter was removed from the miner. This would be the time the dosimeter was paused for final dose reading. Document using the 24-hour clock format.
25. **% Readout** - Record the percent dose exposures for the Action Level (AL) and the Permissible Exposure Level (PEL) obtained from the noise dosimeter.
26. **Dosimeter Calibrator Mfg.** - Record the manufacturer's name and model number for the acoustical calibrator used for pre- and post-calibration check of dosimeter.
27. **ID Number** - Record the serial number and/or MSHA property number of the noise acoustical calibrator.
28. **Readout or Indicator Mfg.** - Leave this item blank.
29. **ID Number** - Leave item blank.
30. **SLM Mfg.** - Record the manufacturer's name and model number for the sound level meter used.
31. **ID Number** - Record the serial number and/or MSHA property number of the sound level meter.
32. **SLM Calibrator Mfg.** - Record the name of the manufacturer of the sound level meter calibrator used to calibrate the sound level meter.
33. **ID Number** - Record the serial number and/or MSHA property number of the sound level meter calibrator.

**When Sampling for Contaminants With a Pump:**

34. **Pump Mfg.** - Record the manufacturer's name and model number for the pump used.
35. **ID Number** - Record the serial number and/or MSHA property number of the pump.

**\*Note:** Complete the following items 36 through 40 for each sample taken. If more than one sample is taken on the individual miner being sampled, fill out items 36 through 40 for each sample taken.

36. **Sample Number** - Record the field number assigned to the sample by the AR or the number that is preprinted on the dust cassette by Technical



Support. Each sample requires a permanent distinct number which must be clearly identifiable and that is unique for that event. The same number cannot be repeated even if it is associated with a different type of sample.

37. **Pre-Seal Number** - Indicate that the pre-seal was intact by writing “yes.” If there is no pre-seal, such as sorbent tubes, write N/A (not applicable).
38. **Time On** - Record the exact time sampling started, using 24-hour clock.
39. **Time Off** - Record the exact time sampling stopped. Document using 24-hour clock.
40. **Post-Seal Number** - Write “yes” to indicate that a seal was placed on any sample submitted for analysis.
41. **Flow Rate** - Record the pump flow rate used during sampling.
42. **Sample Type** - Record the type of sample(s) collected (total dust, respirable dust, oil mist, welding fumes, elemental dust, charcoal tube, etc).
43. **Analysis Desired** - Record the type of analysis desired for the sample(s) collected (e.g., quartz, cristobalite, elemental scan, vanadium, lead, toluene, etc). Be as specific as possible.
44. **Blank Sample Number** - Record the assigned sample number for the blank or control.
45. **Blank Sample Seal Number** - Record the condition of the blank. Indicate “yes” if initially intact. A Sample Seal (MSHA Form 4000-30) must be attached to the blank after opening and resealing. Do not use this space for control filter cassettes.
46. **Bulk Sample Number** - Record the assigned bulk sample number. If a bulk sample is not provided, write “NA.”
47. **Location Bulk Sample Taken** - Record the specific location where the bulk sample was collected and also note its content.
48. **Environmental Conditions** - Record any pertinent environmental conditions, such as temperature, relative humidity, elevation, wind, rain, snow, etc.
49. **Remarks** - Record any additional information or observations related to the inspection or the sampling.

**(Reverse of Form 4000-31)**


- 50. Time** - Record each time that notes and observations were made, using 24-hour clock.
- 51. Notes/Observations** - Record the following, using additional pages if necessary:
- Conditions of the sampling equipment and any adjustments made;
  - Conditions observed in the work area;
  - The location and activity of miner sampled;
  - Manufacturer and company identification number of the equipment operating;
  - Comments by the miner, verbatim if appropriate, regarding what the miner did since the last check and the miner's knowledge of any hazardous or unusual situations or incidents; and
  - Miner's use and any deficiencies of the personal protection program.
- 52. SLM Readings** - Record any SLM readings taken, including location and time.
- 53. Sources of Employee Exposure** - Record the probable source(s) of the miner's exposure to each hazard for which a sample is taken. Record the miner's proximity to each source listed.
- 54. Controls in Use or Tried by Operator** - Record any engineering or administrative controls in use or tried by the operator to control the sampled miner's exposure and your evaluation of the condition and effectiveness of these controls.
- 55. Controls Suggested by Inspector** - Record controls suggested by the inspector to the operator to control the sampled miner's exposure.

**C. Recordkeeping**

When sample results have been determined in the field by the inspector, such as noise dose, detector tube readings, or the results from direct reading instruments and record in the health field notes. Pre- and post-calibration should also be recorded in the health field notes. Submit the health field notes with the inspection report to the district office unless samples are collected that require laboratory analysis. In that case, submit the Health field notes with the addendum to the inspection report after laboratory results have been received and appropriate action has been taken.

Figure 21-4 Health Field Notes, MSHA Form 4000-31, Front

Health Field Notes

U.S. Department of Labor  
Mine Safety and Health  
Administration 

Inspector 1 AR Number 2

Date 3 Mine ID 4

Mine 5

Company 6

Employee Sampled 7

Hours/Shift 8 Days/Week 9 Number Persons Affected 10

Job Title 11

Assigned Work Area 12

Assigned Duties 13

Hearing Protector Mfg. 14 Model 15 NRR 16

Respirator Mfg. 17 Model 18

Respirator Program 19

Noise Dosimeter Mfg. 20 ID Number 21

Cell Number 22 Time On 23 Time Off 24 % Readout 25

Dosimeter Calibrator Mfg. 26 ID Number 27

Readout or Indicator Mfg. 28 ID Number 29

SLM Mfg. 30 ID Number 31

SLM Calibrator Mfg. 32 ID Number 33

Pump Mfg. 34 ID Number 35

Sample Number	Pre-Seal Number	Time On	Time Off	Post-Seal Number
<u>36</u>	<u>37</u>	<u>38</u>	<u>39</u>	<u>40</u>

Flow Rate 41 Sample Type 42

Analysis Desired 43

Blank Sample Number 44 Blank Sample Seal Number 45

Bulk Sample Number 46 Location Bulk Sample Taken 47

Environmental Conditions 48

Remarks: 49

MSHA Form 4000-31, Jan 86 (Revised)



**VI. Radon Daughter Sampling Data Form (MSHA Form 4000-21)****A. General Instructions**

This form is completed when sampling is conducted at underground mines for ionizing radiation (radon or thoron daughters).

**B. Completing the Radon Daughter Sampling Data Form**

One form must be completed for each radon sample collected. The following information should be documented on this form:

1. **Mine Name** - Record name of the mine where samples were collected.
2. **Mine I. D.** - Record the identification number of the mine where samples were collected.
3. **Company Name** - Record name of mining company.
4. **Date** - Record the date sampling was conducted.
5. **AR Number** - Record AR number of person conducting sampling.
6. **Name** - Record name of person conducting sampling.
7. **Counter Number** - Record identification number of instrument used.
8. **Pump Number** - Record the number of the pump used to conduct sampling.
9. **Filter Number** - Record the unique number of the filter used to collect sample.
10. **LPM** - Record pump flow rate in Liters per minute (normally 2.0 Lpm).
11. **Sampling Time** - Record sampling time.
12. **Volume** - calculated volume:  $Lpm \times 5 \text{ mins.}$  (normally  $2.0 \text{ Lpm} \times 5 \text{ mins.} = 10.0 \text{ L}$ ).
13. **Time of Count** - Record the time of sample count using 24-hour clock.
14. **Sample End Time** - Record the time that sampling was stopped (with pump and filter) using 24-hour clock.

15. **Elapsed Time** (min) - Record the amount of time from when the sample was started to when it was stopped.
16. **CPM** - Counts per minute. Record the number of counts per minute. Note: The letters "CPM" may not appear in this space due to a printing error on some of the forms in circulation, but the value must still be entered to calculate the Working Level.
17. **Efficiency Factor** - Record unique efficiency factor from instrument used.
18. **Volume** - Record same volume as calculated in item 12.
19. **Time Factor** - Record time factor from chart (see chapter 10).
20. **Working Level** - Record calculated value for exposure of miners in area of sample.
21. **Sample Location** - Record the specific location of where the sample was collected.
22. **Remarks** - Observe and document relevant working environmental conditions and activities which may affect the sampling.

**C. Recordkeeping**

Include the completed forms with the inspection report and forward to the district office.

Radon Daughter Sampling Data		U. S. Department of Labor Mine Safety and Health Administration	
Mine Name		Mine ID	
1		2	
Company Name			
3			
Date	AR Number	Name	
4	5	6	
Counter No	Pump No	Filter No	
7	8	9	
LPM	Sampling Time (min)	Volume	
10	x 11	= 12	
Time of Count	Sample End Time	Elapsed Time (min)	
13	- 14	= 15	
CPM	Efficiency Factor	Working Level	
16	x 17	20	
Volume	Time Factor		
18	x 19		
Sample Location			
21			
Remarks			
22			

MSHA Form 4000-21, Nov 85 (Revised) Part 2 MSHA

Figure 21-6 Radon Daughter Sampling Data, MSHA Form 4000-21

## VII. Request for Laboratory Analysis (MSHA Form 4000-29)

### A. General Instructions

This form must be used when submitting industrial hygiene samples to the MSHA Laboratory for analysis. The Request for Laboratory Analysis (RLA) form replaces the old Air Sample Record (ASR) form. The RLA is used to request specific analyses. It provides information to the laboratory and assists the laboratory in determining which contaminants may be present. The RLA form will permit the MSHA Laboratory to calculate results and generate a complete report, including an “Analytical Report” and the applicable PEDS or ASDS, which is mailed directly back to the AR. For the process to be effective and a report to be generated, however, you must complete the entire form in advance and submit the original with the samples to the MSHA laboratory. Maintain a copy for your records.

### B. Completing the Request for Laboratory Analysis (RLA) Form

This form provides space for five samples and one blank or control. When submitting more than six samples total, complete another form, noting the number of Request for Laboratory Analysis forms used per job, i.e., page 1 of X. Keep a copy for your records. Enter the control filter information in the left-most sample data column of the RLA form.

Use a separate Request for Laboratory Analysis form for each set of personal or area samples, or when requesting different types of analyses, or when conducting consecutive samples on different persons. Record consecutive samples collected for one person onto one RLA form. Record the sampling information for each group of samples on one RLA form as much as possible. A group of respirable dust filter cassettes and a group of welding fume cassettes can be mailed into the lab together, but should be listed on two separate Request for Laboratory Analysis forms.

For MSHA’s laboratory to correctly analyze and send back a complete results package consisting of an “Analytical Report” and PEDS or ASDS, the inspector must complete all of the following items and submit the RLA with the samples:

1. **Event Number** - Enter the Event Number assigned to the inspection.
2. **Mine ID Number** - Enter identification number of mine or mill where samples were collected.
3. **Mine/Mill Name** - Enter legal name of the mine or mill where samples were collected.



4. **Company Name** - Enter full legal name of company owning the mine or mill.
5. **Contractor Name/Number** - Enter the contractor's name and ID number, if applicable.
6. **Commodity** - Enter mine or mill product.
7. **Collector** - Enter full name of MSHA representative collecting sample.
8. **AR Number** - Enter the AR number of the person who is responsible for the sample collection.
9. **Field Office Name** - Enter name of field office to which collector is assigned.

#### SAMPLING DATA

10. **Area/Personal (A/P)** - Enter A if the sample is an area sample, or P if a personal sample. Leave blank for Control/Blank.
11. **Date Collected** - Enter date of each sample collected: MM/DD/YY.
12. **Time Collected** - Enter the beginning and ending time of the sample, using 24-hour clock (military time) notation.
13. **Pre-seal Intact (Y/NA)** - Write "Y" if pre-seal was intact. The seal can be the plastic bag, package, or container in which the media is received. Charcoal tubes, passive monitors, vacuum bottles, vacutainers, and sorbent tubes will not have pre-seals. When submitting samples taken with these media, write N/A. **Note:** "VOID" the cassette if the seal is damaged or missing and use another cassette. Notify your district office of the voided cassette. Do not record information for voided cassettes on this form.
14. **Field Sample/Cassette No.** - Enter identifying sample number assigned by the Lab, or as in welding samples, by the AR. Normally this will be pre-stamped ID number on the pre-weighed filter cassette.
15. **Sample Type** - The new Sample Type letter identification system provides categories of media type associated with the specific analysis requested. The laboratory's automation system requires this information to correctly direct sample processing and analysis within the different sub-specialties of the lab. Enter appropriate letter(s) to describe type of sample collected:

- B** - Bulk (asbestos, silica, Hg, Pb, etc.)
- CB** - Control, Blank (required)
- CT** - Charcoal Tube (organics, solvents, other specific)
- F** - Fiber (asbestos)
- G** - Gas (vacuum samplers: CO, CH<sub>4</sub>, O<sub>2</sub>, CO<sub>2</sub>, NO<sub>2</sub>, etc.)
- HG** - Mercury Vapor (badge)
- M** - Mist (Oil, H<sub>2</sub>SO<sub>4</sub>, caustic, etc.)
- MD** - Metal Dust (single: lead, silver, copper, etc., or 14-element profile)
- MF** - Metal Fume (single: cadmium, silver, etc., or 14-element profile, Cr metal only - sample CrOx on PVC)
- OV** - Organic Vapor (badge: single, 16-solvent profile, unknowns screen, or other specific)
- R** - Respirable Dust (quartz, cristobalite, trydimite, silica)
- ST** - Silica Gel Tube (methanol, sulfuric, etc.)
- T** - Total Dust (nuisance; other)
- W** - Welding fume (14-element profile. Cr metal only - sample CrOx on PVC)
- WS** - Wipe Sample (mercury, lead, silver, PCB, etc.)
- MISC** - Other (not otherwise classified, Note: specify compound desired)

▪See reverse of RLA for more examples

- 16. Analysis Requested** - Enter analysis desired. Be as specific as possible. The analysis request must match with the Sample Type category in block 15. See above for examples of elements/compounds analyzed by Sample Type.
- 17. Flow Rate (LPM)** - Enter the flow rate of pump in Liters per minute (Lpm). Enter N/A if not applicable.
- 18. Material Listed (Y/N)** - Applies to Respirable and Total dust sampling. Is the material **that was sampled** listed as a “Nuisance Particulate”\* in Appendix E of the *TLVs<sup>®</sup> Threshold Limit Values for Chemical Substances in Workroom Air Adopted by ACGIH for 1973?* Answer Y (Yes), or N (No). Answer “Y” ONLY if the sampled material is a “Substance” in the TLV book on the Appendix E list:
  - a. Alundum (alumina, bauxite) Al<sub>2</sub>O<sub>3</sub>
  - b. Calcium Carbonate (CaCO<sub>3</sub>), including:
    - i. Limestone
    - ii. Calcite
    - iii. Dolomite (calcium magnesium carbonate)
  - c. Cellulose
  - d. Portland Cement
  - e. Corundum (Silicon carbide, Al<sub>2</sub>O<sub>3</sub>)

- f. Emery (may also be known as: Silicon carbide,  $\text{Al}_2\text{O}_3$ , fine grained Corundum)
- g. Glass, fibrous - when less than 5-7 $\mu\text{m}$  diameter, or dust
- h. Glycerin Mist
- i. Graphite (synthetic)
- j. Gypsum (Calcium Sulfate -  $\text{CaSO}_4$ )
- k. Vegetable oil mists (except castor, cashew nut, or similar irritant oils)
- l. Kaolin (Aluminum silicate)
- m. Limestone (see Calcium Carbonate -  $\text{CaCO}_3$ )
- n. Magnesite (Magnesium, Magnesium carbonate)
- o. Marble
- p. Pentaerythritol
- q. Plaster of Paris (Calcium Sulfate -  $\text{CaSO}_4$ )
- r. Rouge
- s. Silicon Carbide (Carborundum, see Emery, Corundum)
- t. Starch
- u. Sucrose
- v. Tin Oxide
- w. Titanium Oxide

**\*By definition, a “Nuisance” particulate/dust does not contain greater than 1% quartz or any other toxic ingredients.**

**Note:** “Stone” is used as a generic term and may or may not refer to materials on this list. Therefore, you must specifically identify the source material you are sampling. For example, mark an “N” when sampling stone or sand & gravel dusts not on this list.

- 19. **Job Code** - Enter the appropriate Job Code from the MSIS list.
- 20. **Job Description** - In addition to item 19, Job Code, briefly describe the work performed.
- 21. **Last Name** - Enter the last name of the person sampled.
- 22. **First Name** - Enter the first name of the person sampled.
- 23. **Location Code** - Enter the appropriate Location Code for the process or operation from the MSIS list.
- 24. **Location Description** - Identify the location of the process or operation where sampling occurred.
- 25. **Respiratory Protection (Y/N)** - Was respiratory personal protection worn? Enter Yes (Y) or No (N).

- 26. Volume of Air (CFM)** - Fill out only for methane analysis to determine the amount of methane liberated in 24 hours. Enter the CFM of air calculated from a traverse. Otherwise, enter N/A or leave blank.

**Special Instructions - Comments and Notes** - Include any remarks that may impact the sample analysis and reporting, *e.g.*, short term sampling, consecutive sampling, screening only.

**C. Recordkeeping**

The inspector forwards the completed original to the MSHA Laboratory with the collected samples, and retains a photocopy for him/herself. When analysis of the sample(s) is completed, the MSHA Laboratory returns the results, an “Analytical Report”, and an applicable PEDS or ASDS via e-mail directly to the collector, field office supervisor, and health specialist.

The inspector uses results contained on the Analytical Report to determine compliance and the appropriate action. For concentrations indicating overexposures exceeding the Enforcement TLV (Enf TLV), *i.e.*, a value greater than 1.0 in the C/TLV\*EF column, a corresponding Action Code and Citation Number are required to be handwritten on the lab-generated PEDS. A copy of the RLA, the Analytical Report, and completed PEDS/ASDS package is sent to the District Office for review, MSIS data entry, and filing with the inspection report.

**Request for Laboratory Analysis**

**U.S. Department of Labor**  
**Mine Safety and Health Administration**

1. Event Number		2. Mine ID Number	
3. Mine/Mill Name		4. Company Name	
5. Contractor Name/Number		6. Commodity	
7. Collector		8. AR Number	
9. Field Office Name			
<b>Sampling Data</b>			
10. Area/Personal (A/P)			
11. Date Collected			
12. Time Collected			
13. Pre-seal Intact (Y/NA)			
14. Field Sample/Cassette no.			
15. Sample Type*			
16. Analysis Requested (must match line 15., see reverse)			
17. Flow Rate (LPM)			
18. Material Listed (Y/N)**			
19. Job Code			
20. Job Description			
21. Last Name			
22. First Name			
23. Location Code			
24. Location Description			
25. Respiratory Protection (Y/N)			
26. Volume of air (CFM) †			

† For Methane liberated in 24 hrs

*Sample Type List (common examples)		**Appendix E, 1973 ACGIH TLV Material List		
B - Bulk (silica, asbestos)	OV - Organic Vapor (badge)	Emery	Alundum (Al <sub>2</sub> O <sub>3</sub> )	Corundum
CB - Control or Blank	R - Respirable Dust (quartz)	Silicon Carbide	Rouge	Kaolin
F - Fiber (asbestos)	T - Total Dust (nuisance, other)	Calcium Carbonate	Limestone	Marble
HG - Mercury Vapor	W - Welding Fume (16 element)	Portland Cement	Gypsum	Plaster of Paris
M - Mist (acid, caustic, oil)	WS - Wipe (Pb, Hg, Ag)	Fiberglass	Glass dust	Graphite (synthetic)
MD - Metal Dust (singles, or 16)	ST - Silica Gel Tube (methanol)	Magnesite (Mg)	Tin Oxide	Pentaerythritol
MF - Metal Fume (singles, or 16)	CT - Charcoal Tube (solvents)	Titanium Dioxide	Starch	Glycerin mist
G - Gas (vacuum samplers)	MISC - Other (specify)	Cellulose	Sucrose	Vegetable oil

SPECIAL INSTRUCTIONS - Comments, and Notes (i.e., short term, consecutive, etc.)

Interim MSHA Form 4000-29, Mar 01 (Revised)

Figure 21-7 Request for Laboratory Analysis, MSHA Form 4000-29

Interim MSHA Form 4000-29, Request for Laboratory Analysis								
Sample	Line No. 15 Sample Type	Line No. 16 Analysis Requested	Sample	Line No. 15 Sample Type	Line No. 16 Analysis Requested	Sample	Line No. 15 Sample Type	Line No. 16 Analysis Requested
Bulk	B	Asbestos Metals (6 elements) Barium Cadmium Chromium Lead Nickel Zinc Mercury Silver Cristobalite Quartz Tridymite Other (specify)	Mist	M	Caustic Sulfuric acid Oil Mist	Respirable Dust	R	Dust, Respirable (cyclone) Quartz, crystalline (Usually requested) Cristobalite Tridymite Diesel (carbon) Silica, Crystalline (request ONLY if also need cristobalite and tridymite)
Control/Blank	CB	Control Media Blank Field Blank	Metal Dust	MD	Elemental (16 elements) Aluminum Arsenic Beryllium Cadmium Chromium Cobalt Copper Iron Lead Manganese Molybdenum Nickel Titanium Vanadium Zinc	Silica Gel Tube	ST	Sulfuric acid Nitric Acid Methanol Hydrofluoric Acid Other (specify)
Charcoal Tube	CT	Organic 16 Solvent Screen 1,1,1-Trichloroethane Benzene 1,2, Dichloroethane Ethyl Benzene Hexane Octane Toluene Trichloroethylene Xylene o, m, p Acetone Chloroform Methyl Ethyl Ketone Tetrachloroethylene Alcohol (specify) BTEX Screen (benzene, toluene, ethylbenzene, xylene) Other (specify)	Metal Fume	MF	Elemental (16 elements) Aluminum Arsenic Beryllium Cadmium Cobalt Chromium (metal only-not the oxide form) Copper Iron Lead Magnesium Manganese Molybdenum Nickel Titanium Vanadium Zinc Silver Mercury, particulate Other (specify)	Total Dust	T	Dust, Total Particulate Listed 73 TLV Nuisance: Limestone, Emery, Cement, Silicon Carbide, Gypsum, Fiberglass, Alumina, Cellulose, Marble, Rouge, Tin Oxide, Titanium Dioxide, Starch, Magnesite, Tin Oxide, Kaolin, Plaster of Paris, Graphite, Pentaerythritol, Calcium Carbonate, Glycerin, vegetable oil, Corundum, Sucrose.
Fiber	F	Asbestos fiber Other (specify)				Welding Fume	W	Elemental (16 elements) Aluminum Arsenic Beryllium Cadmium Chromium (metal only-not the oxide form) Cobalt Copper Iron Lead Magnesium Manganese Molybdenum Nickel Titanium Vanadium Zinc Other (specify)
Gas	G	Mine Gas Screen (10 Gases) Acetylene Argon Ethane Carbon Dioxide Carbon Monoxide Ethylene Hydrogen Methane Nitrogen Oxygen Gas Screen (4 Gases- Carbon Dioxide, Carbon Monoxide, Oxygen, Methane) Other (specify)	Organic Vapor (badge)	OV	Organic 16 Solvent Screen 1,1,1-Trichloroethane Benzene 1,2, Dichloroethane Ethyl Benzene Hexane Octane Toluene Trichloroethylene Xylene o, m, p Acetone 2-Butanone Tetrachloroethylene Other (specify)	Wipe	WS	Beryllium Cadmium Chromium Cobalt Copper Iron Lead Manganese Molybdenum Nickel Vanadium Zinc Mercury Silver Other (specify)
Mercury Vapor	HG	Mercury Vapor						
MISC	MISC	Sodium Hydroxide Cyanide Other (specify)						

Welding and metal dust is now a 14 metal profile, not 16 elements. Aluminum and vanadium may be requested separately

Figure 21-8 Request for Laboratory Analysis, MSHA Form 4000-29, Reverse

## VIII. Personal Exposure Data Summary (MSHA Form 4000-43)

### A. General Information

The Personal Exposure Data Summary (PEDS) form is used to report personal sample results to MSHA's computer center information database. This form is completed whenever personal sampling has been conducted to evaluate an individual's exposure, to screen for potential sampling, or to report corroborative data collected during sampling. A separate form must be completed for each day's sampling at the same operation. When samples are submitted to the MSHA Laboratory with a Request for Laboratory Analysis form, a completed PEDS will be returned except for action code and citation number when a citable overexposure is reported on the analytical report. All PEDS are submitted to the district office for input into the MSHA MSIS database.

**Note:** Sound level meter readings used for screening or collecting corroborative data are not reported on this form. Record them in the Health Field Notes.

### B. Completing the Personal Exposure Data Summary

The Personal Exposure Data Summary form will be completed by hand for personal samples where results are determined at the time of the sampling (e.g., noise, diffusion tubes, and direct reading instruments). MSHA laboratory-generated PEDS require additional handwritten information, *i.e.* action code and citation number, when a citable overexposure result is reported. In addition to the inspection and mine/contractor information, the form can accommodate information for seven samples and should be completed as follows:

1. **Add, Change, Delete** – Check the appropriate box if information previously put into the MSIS was incomplete or incorrect and complete or correct data needs to be entered or re-entered.
2. **Office Code** - Enter the four-digit field office code. Refer to Appendix 21-A.
3. **Mine ID** - Enter the 7-digit mine identification number of the mine or mill where samples were collected,.
4. **Event Number** - Enter the event number as assigned on the corresponding Inspection and Investigation Data Summary form.

5. **Contractor ID** - Enter the 7-digit alpha/numeric identification number of the contractor, if applicable.
6. **AR Number** - Enter the AR Number of the person conducting the sampling.
7. **Date** - Enter the date that the sampling was conducted.

### Sampling Information

8. **Sequence Number** - This field establishes the link of the citation to the sample. The data for this field is obtained from the inspector's notes. When entering Sequence Number, enter any combination of numbers and letters. The date, AR number and sequence number make up the unique key on the MSIS. **The Sequence Number can not be repeated on any date for any given AR.** For instance, for a specific AR number, the same sequence ID of ABC can be used for different samples taken on 1/1/2006 and 1/2/2006, but cannot be used to identify different samples taken on 1/1/2006.
9. **Location Code** - Enter the code for the location where the sample was collected. Refer to Appendix 21-B.
10. **Job Code** - Enter the job code of the miner being sampled. Refer to Appendix 21-C.
11. **Contaminant Code** - Enter the code for the contaminant sampled. Refer to Appendix 21-D or Chapter 3 of this Handbook.
12. **Concentration** - Enter the contaminant concentration measured in the appropriate units as taken from the sampler. Refer to Appendix 21-D or Chapter 3 of this Handbook.
13. **Exposure Limit** - Enter the exposure limit in the appropriate units. Refer to Chapter 3.
14. **Short-Term** - Enter "Y" if sampling for a short-term exposure for comparison with STELs, ceiling limits, or excursion limits. Leave blank if sample was full-shift.
15. **Protection** - Enter "Y" if respiratory or hearing protection was worn, "N" if not.



16. **Action** - Indicate action taken as a result of the sampling. Refer to Appendix 21-E. This field must be completed any time the concentration exceeds the exposure limit or when a compliant sample is used to terminate an existing citation.
17. **Employee Name** – Enter the name of the miner who was personally sampled.
18. **Occupation** – Enter the title of the miner who was personally sampled.
19. **Contaminant** - Enter the name of the contaminant for which the miner was personally sampled. Refer to Appendix 21-D or Chapter 3 of this Handbook.
20. **Citation No.** – This field is also used to link a citation to the related sample. Record the citation number(s) if a citation is written for over-exposure to a given contaminant.

**C. Recordkeeping**

Submit all Personal Exposure Data Summaries (PEDS), along with inspection reports, to the district office. If the inspector must wait for sample results, submit the laboratory-generated PEDS to the district office later as an addendum to the inspection report.



**IX. Area Sample Data Summary (MSHA Form 4000-42)****A. General Information**

This form is completed whenever area sampling has been conducted to evaluate mine conditions, to screen for potential sampling, or to report corroborative data collected during sampling. A separate form must be completed for each day's sampling at the same operation. Each sample taken for that event must have a unique identifier. This form is used to report samples which are not used to determine personal exposure to a contaminant or physical agent. When samples are submitted to the MSHA laboratory with a Request for Laboratory Analysis form, a completed Area Sample Data Summary (ASDS) will be returned except for Action Code and Citation Number when a citable overexposure is reported on the Analytical Report. All ASDS are submitted to the district office for input into the MSHA MSIS database.

**B. Completing the Area Sample Data Summary**

The Area Sample Data Summary form will be completed by hand where results are determined at the time of the area sampled (*e.g.*, noise, detector tubes, direct reading gas instruments). MSHA laboratory-generated ASDS require additional hand-written information, *i.e.* action code and citation number, when a citable overexposure result is reported. In addition to the inspection and mine/contractor information, the form can accommodate information for 12 samples and should be completed as follows:

1. **Add, Change, Delete** – Check the appropriate box if information previously put into the MSIS was incomplete or incorrect and complete or correct data needs to be entered or re-entered.
2. **Office Code** - Enter the four-digit field office code. Refer to Appendix 21-A.
3. **Mine ID** - Enter the 7-digit mine identification number of the mine or mill where samples were collected.
4. **Event Number** - Enter the Event Number as assigned on the corresponding Inspection and Investigation Data Summary.
5. **AR Number** - Enter the AR Number of the person conducting the sampling.
6. **Mine ID** - Enter the 7-digit identification number of the contractor, if applicable.
7. **Date** - Enter the date that the sampling was conducted.

8. **Sequence Number** - This field links a citation to the related sample. The data for this field is obtained from the inspector's notes. When entering Sequence Number, enter any combination of numbers and letters. The date, AR number and sequence number make up the unique key on the MSIS. **The Sequence Number can not be repeated on any date for any given AR.** For instance, for a specific AR number, the same sequence ID of ABC can be used for different samples taken on 1/1/2006 and 1/2/2006, but cannot be used to identify different samples taken on 1/1/2006.
9. **Location Code** - Enter the location code where the sample was taken. See Appendix 21-B.
10. **Area** - Write the name of or identify the area where the sample was taken.
11. **Time On** - Enter the time the sample was started.
12. **Contaminant Code** - Enter the code for the contaminant sampled. Refer to Appendix 21-D or Chapter 3 of this Handbook.
13. **Concentration** - Enter the concentration measured in the appropriate units. Refer to Appendix 21-D or Chapter 3 of this Handbook.
14. **Action** - Enter the action code that represents the action take. Refer to Appendix 21-E.
15. **Citation No.** – This field is also used to link a citation to the related sample. Record the citation number(s) if a citation is written for over-exposure to a given contaminant.

### C. Recordkeeping

When sample results have been determined real time in the field by the inspector such as: noise, detector tubes, or with direct reading instruments, the inspection report is submitted to the district office including the completed Area Sample Data Summary (ASDS). If the inspector must wait for receipt of sample results submitted to the MSHA laboratory for analysis, submit the completed laboratory-generated ASDS to the district office later as an addendum to the inspection report.



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**CHAPTER 21**

**APPENDICES**

**MSIS CODES AND CONTACT INFORMATION**





**APPENDIX 21-A  
OFFICE CODES**



## Appendix 21-A

### OFFICE CODES

#### 1. Alphabetical

##### Code   Office

2881	Albany, NY Field Office (NE)	7641	Kent, WA Field Office (W)
7651	Albany, OR Field Office (W)	3861	Knoxville, TN Field Office (SE)
5641	Albuquerque, NM Field Office (RM)	4631	Lansing, MI Field Office (NC)
7621	Anchorage, AK Field Office (W)	3821	Lexington, KY Field Office (SE)
3611	Bartow, FL Field Office (SE)	5871	Little Rock, AR Field Office (SC)
2641	Beckley, WV Field Duty Station - Charlottesville, VA Field Office (NE)	4851	Newark, OH Field Office (NC)
3661	Birmingham, AL Field Office (SE)	3631	Macon, GA Field Office (SE)
7611	Boise, ID Field Office (W)	2861	Manchester, NH Field Office (NE)
7841	Boulder City, NV Field Office (W)	4641	Marquette, MI Field Office (NC)
5631	Carlsbad, NM Field Office (SC)	6861	Mesa, AZ Field Office (RM)
2641	Charlottesville, VA Field Office (NE)	5861	Norman, OK Field Office (SC)
3851	Columbia, SC Field Office (SE)	4821	Peru, IL Field Office (NC)
5671	Dallas, TX Field Office (SC)	6621	Rapid City, SD Field Office (RM)
5651	Denham Springs, LA Field Office (SC)	7831	Redlands, CA Field Office (W)
6642	Denver, CO Field Office (RM)	5851	Rolla (N), MO Field Office (SC)
4661	Duluth, MN Field Duty Station - Hibbing, MN Field Office (NC)	5852	Rolla (S), MO Field Office (SC)
7851	Elko, NV Field Office (W)	6851	Salt Lake City, UT Field Office (RM)
4671	Fort Dodge, IA Field Office (NC)	5611	San Antonio, TX Field Office (SC)
3811	Franklin, TN Field Office (SE)	3651	San Juan, PR Field Office (SE)
2851	Geneva, NY Field Office (NE)	3871	Sanford, NC Field Office (SE)
6831	Green River, WY Field Office (RM)	6651	Topeka, KS Field Office (RM)
6821	Helena, MT Field Office (RM)	4861	Vincennes, IN Field Office (NC)
4661	Hibbing, MN Field Office (NC)	2682	Warrendale, PA Field Office (NE)
		2621	Wyomissing, PA Field Office (NE)
		7821	Vacaville, CA Field Office (W)

##### **Abbreviations:**

NE - Northeast District  
SE - Southeast District  
W - Western District

SC - South Central District  
NC - North Central District  
RM - Rocky Mountain District

## 2. Numerical

### Code Office

#### **2000 NORTHEAST DISTRICT**

2621 Wyomissing, PA Field Office  
 2641 Charlottesville, VA Field Office  
       Beckley, WV Field Duty Station  
 2681 Warrendale, PA Field Office  
 2851 Geneva, NY Field Office  
 2861 Manchester, NH Field Office  
 2881 Albany, NY Field Office

#### **3000 SOUTHEAST DISTRICT**

3611 Bartow, FL Field Office  
 3631 Macon, GA Field Office  
 3651 San Juan, PR Field Office  
 3661 Birmingham, AL Field Office  
 3811 Franklin, TN Field Office  
 3821 Lexington, KY Field Office  
 3851 Columbia, SC Field Office  
 3861 Knoxville, TN Field Office  
 3871 Sanford, NC Field Office

#### **4000 NORTH CENTRAL DISTRICT**

4631 Lansing, MI Field Office  
 4641 Marquette, MI Field Office  
 4661 Hibbing, MN Field Office  
       Duluth, MN Field Duty Station  
 4671 Fort Dodge, IA Field Office  
 4821 Peru, IL Field Office  
 4851 Newark, OH Field Office  
 4861 Vincennes, IN Field Office

#### **5000 SOUTH CENTRAL DISTRICT**

5611 San Antonio, TX Field Office  
 5631 Carlsbad, NM Field Office  
 5641 Albuquerque, NM Field Office  
 5651 Denham Springs, LA Field Office  
 5671 Dallas, TX Field Office  
 5851 Rolla (N), MO Field Office  
 5852 Rolla (S), MO Field Office  
 5861 Norman, OK Field Office  
 5871 Little Rock, AR Field Office

#### **6000 ROCKY MOUNTAIN DISTRICT**

6621 Rapid City, SD Field Office  
 6642 Denver, CO Field Office  
 6651 Topeka, KS Field Office  
 6821 Helena, MT Field Office  
 6831 Green River, WY Field Office  
 6851 Salt Lake City, UT Field Office  
 6861 Mesa, AZ Field Office

#### **7000 WESTERN DISTRICT**

7611 Boise, ID Field Office  
 7621 Coeur d'Alene, ID Field Office  
 7641 Kent, WA Field Office  
 7651 Albany, OR Field Office  
 7821 Vacaville, CA Field Office  
 7831 Redlands, CA Field Office  
 7841 Boulder City, NV Field Office  
 7851 Elko, NV Field Office  
 7861 Anchorage, AK Field Office

#### **Abbreviations:**

NE - Northeast District  
 SE - Southeast District  
 W - Western District

SC - South Central District  
 NC - North Central District  
 RM - Rocky Mountain District

**APPENDIX 21-B  
LOCATION CODES**



## Appendix 21-B

### LOCATION CODES

#### 1. Alphabetical

<b>Code</b>	<b>Location</b>	<b>Area(s)</b>
31	Surface	Active Mining (production)
01	Underground	Active Mining (production)
83	Mill or Plant	Bagging or Packaging
85	Mill or Plant	Construction
51	Surface	Construction
21	Underground	Construction
61	Mill or Plant	Crushing
37	On Water	Dredges or Barges
67	Mill or Plant	Dry Screening
69	Mill or Plant	Drying and Roasting
33	Surface	Exploration and Development
03	Underground	Exploration and Development
79	Mill or Plant	Flotation and Reagent Areas
77	Mill or Plant	General (i.e., employee works in a number of areas)
49	Surface	General (i.e., employee works in a number of areas)
19	Underground	General (i.e., employee works in a number of areas)
63	Mill or Plant	Grinding
09	Underground	Hoistrooms
99	Anywhere	Laboratories
71	Mill or Plant	Load-in/out, Stockpiles, Other Ore Transfer Points
43	Surface	Load-in/out, Stockpiles, Other Ore Transfer Points
13	Underground	Load-in/out, Stockpiles, Other Ore Transfer Points
75	Mill or Plant	Offices, Lunchrooms, Storerooms
47	Surface	Offices, Lunchrooms, Storerooms
17	Underground	Offices, Lunchrooms, Storerooms
41	Surface	Ore Processing (primary crushing)
11	Underground	Ore Processing (crushing, grinding, washing, screening, bagging, etc.)
81	Mill or Plant	Pelletizing
35	Surface	Roads (haulage, access, other travelways)
39	Surface	Tailings Ponds or Dams
05	Underground	Travelways and Haulageways
07	Underground	Shafts and Stations
73	Mill or Plant	Shops
45	Surface	Shops
15	Underground	Shops
65	Mill or Plant	Washing and Screening

## 2. Numerical

<b>Code</b>	<b>Location</b>	<b>Area(s)</b>
01	Underground	Active Mining (production)
03	Underground	Exploration and Development
05	Underground	Travelways and Haulageways
07	Underground	Shafts and Stations
09	Underground	Hoistrooms
11	Underground	Ore Processing (crushing, grinding, washing, screening, bagging, etc.)
13	Underground	Load-in/out, Stockpiles, Other Ore Transfer Points
15	Underground	Shops
17	Underground	Offices, Lunchrooms, Storerooms
19	Underground	General (i.e., employee works in a number of areas)
21	Underground	Construction
31	Surface	Active Mining (production)
33	Surface	Exploration and Development
35	Surface	Roads (haulage, access, other travelways)
37	On Water	Dredges or Barges
39	Surface	Tailings Ponds or Dams
41	Surface	Ore Processing (primary crushing)
43	Surface	Load-in/out, Stockpiles, Other Ore Transfer Points
45	Surface	Shops
47	Surface	Offices, Lunchrooms, Storerooms
49	Surface	General (i.e., employee works in a number of areas)
51	Surface	Construction
61	Mill or Plant	Crushing
63	Mill or Plant	Grinding
65	Mill or Plant	Washing and Screening
67	Mill or Plant	Dry Screening
69	Mill or Plant	Drying and Roasting
71	Mill or Plant	Load-in/out, Stockpiles, Other Ore Transfer Points
73	Mill or Plant	Shops
75	Mill or Plant	Offices, Lunchrooms, Storerooms
77	Mill or Plant	General (i.e., employee works in a number of areas)
79	Mill or Plant	Flotation and Reagent Areas
81	Mill or Plant	Pelletizing
83	Mill or Plant	Bagging or Packaging
85	Mill or Plant	Construction
99	Anywhere	Laboratories



**APPENDIX 21-C**  
**JOB CODES**



## Appendix 21-C

### JOB CODES

#### 1. Alphabetical

<u>Code</u>	<u>Job</u>		
649	Administration personnel	399	Dimension stone cutter/sawyer/ splitter/trimmer/finisher
420	Aerial tram operator		
778	Backhoe operator	678	Dragline operator
879	Bagger/bagging operations worker	372	Dredge operator
372	Barge attendant	058	Drift miner
261	Battery station operator	833	Drill helper
154	Belt cleaner/belt picker	488	Dry-screening plant worker
612	Belt vulcanizer	379	Dryer operator
669	Bin puller	622	Dump operator
342	Bit grinder/bit sharpener	602	Electrician
807	Blaster - Development and Production	603	Electrician helper
372	Boat operator	456	Engineer (ventilation/electric/mining)
825	Bobcat operator	679	Flotation mill operator
513	Building repair & maintenance	389	Forklift operator
368	Bulldozer operator	782	Front-end loader operator
616	Bullgang	043	Gathering arm loader operator
920	Cager/cage attendant	618	Greaser
344	Car shake-out operator	726	Grizzly man/grizzly tender
394	Carpenter	710	Ground control
716	Cement man	706	Gunite man
607	Chipping hammer operator	279	Hammer mill operator/worker
833	Chuck tender	039	Hand loader (load only)
434	Churn drill operator	739	Hand trammer (load & dump)
045	Chute blaster	045	Hangup man
331	Clamshell operator	921	Hoist operator
613	Cleanup man	479	Hydrating plant operator/worker
679	Concentrator operator/worker	352	Iron worker
716	Concrete worker	607	Jackhammer operator
035	Continuous miner helper	534	Jackleg/stoper drill operator
036	Continuous miner operator	041	Jacksetter
601	Conveyor belt crew	413	Janitor
079	Crusher operator/worker	134	Jet piercing channeler operator
037	Cutting machine helper	234	Jet piercing drill operator
038	Cutting machine operator	934	Jumbo percussion drill operator
379	Kiln operator/worker	614	Lab technician

514	Laboratory technician	614	Sampler, dust
616	Laborer	765	Sand filler (dry)
385	Lampman	766	Sand filler (wet)
673	Leaching operations worker	393	Scale man
728	Load-Haul-Dump - complete cycle	747	Scaler (hand)
660	Machinist	847	Scaler (mechanical)
649	Management personnel	388	Scalper-screen operator
608	Mason	048	Scoop tram operator
604	Mechanic	763	Shaft repairer
352	Metal worker	807	Shooter/shotfirer
179	Mill operator (rod/ball/pebble)	706	Shotcrete man
804	Millwright	367	Shovel operator
579	Mixing operations worker	750	Shuttle car operator (diesel)
378	Mobile crane operator	950	Shuttle car operator (elec.)
969	Motorman	588	Sizing operations worker
029	Mucking machine operator	392	Skip dumper
609	Mipper	930	Skip tender
618	Oiler	579	Slurry operations worker
878	Overhead crane operator	030	Slusher
979	Packaging operations worker	930	Station attendant
894	Painter	057	Stope miner
079	Pan-feeder operator	674	Supply handler
779	Pelletizing operator/worker	609	Supply man
804	Pipefitter	623	Surveyor/survey crew
804	Plumber	962	Swamper
807	Powder man/powder gang	516	Tamping machine operator
579	Pumping operations worker	456	Technical services
759	Raise borer operator	710	Timberman
059	Raise miner	392	Tipple operator/toplander
850	Ram car operator	216	Track man/track gang
514	Refiner/laboratory technician	668	Tractor operator
375	Road grader operator	623	Transit man
046	Rock bolter	962	Trip rider
399	Rock sawyer	376	Truck driver
046	Roof bolter	669	Truck loader
048	Roof bolter, mounted	053	Utility man
387	Rotary bucket excavator operator	708	Ventilation crew
622	Rotary dump operator	334	Wagon drill operator
634	Rotary electric drill operator	674	Warehouse man
734	Rotary pneumatic drill operator	588	Washing operations worker
416	Salvage worker	393	Weighman
619	Welder		
397	Yard engine operator/engineer		

## 2. Numerical

<u>Code</u>	<u>Job</u>		
028	Scoop tram operator	375	Road grader operator
029	Mucking machine operator	376	Truck driver
030	Slusher operator	378	Mobile crane operator
032	Brattice man (ventilation man)	379	Dryer operator/kiln operator
034	Diamond drill operator (surface/UG)	385	Lampman
035	Continuous miner helper	387	Rotary bucket excavator operator
036	Continuous miner operator	388	Scalper-screen operator
037	Cutting machine helper	389	Forklift operator
038	Cutting machine operator	392	Toplander/skip dumper/tipple operator
039	Hand loader (load only)		
041	Jacksetter	393	Weighman/scale man
043	Gathering arm loader operator	394	Carpenter/plumber/painter
045	Chute blaster	397	Yard engine operator/fireman
046	Rock bolter/roof bolter	399	Dimension stone cutter/sawyer/splitter/trimmer/finisher
048	Roof bolter, mounted		
053	Utility man/laborer		
057	Stope miner	413	Janitor
058	Drift miner	416	Salvage worker
059	Raise miner	420	Aerial tram operator
079	Crusher operator/pan-feeder operator	434	Churn drill operator
134	Jet piercing channeler operator	456	Engineer (ventilation/electric/mining)
154	Belt cleaner/beltpicker/conveyor crew		
179	Mill operator (rod/ball/pebble)	479	Hydrating plant operator
216	Track man/track gang	488	Dry screening-plant operator
234	Jet piercing drill operator	513	Building repair & maintenance
261	Battery station operator	514	Laboratory technician/Refiner
279	Hammer mill operator	516	Tamping machine operator
331	Clamshell operator	534	Jackleg operator/stoper drill operator
334	Wagon drill operator	579	Slurry operator/mixing operator/pumping operator/pumper
342	Bit grinder/bit sharpener/machinist		
344	Car shake-out operator/car dumper	588	Sizing/washing operations worker
352	Iron worker/metal worker	601	Conveyor belt crew
367	Shovel operator	602	Electrician/wireman
368	Bulldozer operator	603	Electrician helper
372	Barge attendant/boat operator/dredge operator		

604	Mechanic	728	Load-Haul-Dump - complete cycle
607	Jackhammer operator/chipping hammer operator	734	Rotary pneumatic drill operator
608	Mason/bricklayer	739	Hand trammer (load & dump)
609	Supply man/nipper	747	Scaler (hand)
612	Belt vulcanizer	750	Shuttle car operator (diesel)
613	Cleanup man	759	Raise borer operator
614	Sampler/lab technician	763	Shaft miner/shaft repairer
616	Laborer/utility man	765	Sand filler (dry)
618	Greaser/oiler	766	Sand filler (wet)
619	Welder	778	Backhoe operator
622	Dump operator	779	Pelletizing operations worker
623	Surveyor/transit man	782	Front-end loader operator
634	Rotary electric/hydraulic drill operator	804	Plumber/pipefitter/millwright
649	Administration/supervisory personnel	807	Powder man/shotfirer/shooter/blaster
660	Machinist	825	Bobcat operator
663	Shaft miner/shaft repairer	833	Drill helper/chuck tender
668	Tractor operator	847	Scaler (mechanical)
669	Bin puller/truck loader	850	Ramcar operator
673	Leaching operations worker	878	Overhead crane operator
674	Warehouseman/supply handler	879	Bagger/bagging operations worker
678	Dragline operator	894	Painter
679	Flotation/concentrator operator	921	Hoist operator/hoistman-engineer
682	Pan scraper operator	930	Skip tender/cager/station attendant
706	Shotcrete man/gunite man	934	Jumbo percussion drill operator
708	Ventilation crew	950	Shuttle (elec.) car operator
710	Ground control/timberman	962	Trip rider/swamper
716	Cement man/concrete worker	969	Motorman
726	Grizzly man/grizzly tender	979	Packaging operations worker

# **APPENDIX 21-D CONTAMINANT CODES**





## Appendix 21-D

### CONTAMINANT CODES

#### 1. Alphabetical

<b>Code</b>	<b>Unit</b>	<b>Contaminant</b>
443	ppm	Acetaldehyde
243	ppm	Acetone
995	ppm	Acetic acid
801	WL	Alpha radiation
151	mg/m <sup>3</sup>	Aluminum oxide dust
703	mg/m <sup>3</sup>	Aluminum oxide fume, as Al <sub>2</sub> O <sub>3</sub>
401	ppm	Ammonia
611	µg/m <sup>3</sup>	Antimony dusts, as Sb
705	µg/m <sup>3</sup>	Antimony fume, as Sb
707	µg/m <sup>3</sup>	Arsenic fume, as As
313	ppb	Arsine
501	fibers/mL	Asbestos, fibers >5 µm in length
537	mg/m <sup>3</sup>	Asphalt (petroleum) fumes
641	µg/m <sup>3</sup>	Barium, soluble compounds
603	ppm	Benzene
541	µg/m <sup>3</sup>	Beryllium dusts
709	µg/m <sup>3</sup>	Beryllium fume
161	mg/m <sup>3</sup>	Boron oxide
483	ppb	Bromine
251	ppm	2-Butanone (MEK)
245	ppm	n-Butyl alcohol
623	µg/m <sup>3</sup>	Cadmium, metal dusts and soluble salts, as Cd
711	µg/m <sup>3</sup>	Cadmium oxide fume, as Cd
451	mg/m <sup>3</sup>	Calcium oxide
533	mg/m <sup>3</sup>	Carbon black
105	%	Carbon dioxide, CO <sub>2</sub>
631	ppm	Carbon disulfide
111	ppm	Carbon monoxide, CO
601	ppm	Carbon tetrachloride
485	ppm	Chlorine
605	µg/m <sup>3</sup>	Chlorodiphenyl (42% chlorine)
607	µg/m <sup>3</sup>	Chlorodiphenyl (54% chlorine)
995	ppm	Chloroform
543	µg/m <sup>3</sup>	Chromic acid and chromate dusts, as CrO <sub>3</sub>

713	$\mu\text{g}/\text{m}^3$	Chromic acid and chromate fume, as $\text{CrO}_3$
545	$\mu\text{g}/\text{m}^3$	Chromium, soluble chromic and chromous salts, as Cr
547	$\text{mg}/\text{m}^3$	Chromium, metal and insoluble salts
531	$\text{mg}/\text{m}^3$	Coal dust, respirable fraction, <5% quartz
649	$\mu\text{g}/\text{m}^3$	Cobalt dusts
715	$\mu\text{g}/\text{m}^3$	Cobalt fume
171	$\text{mg}/\text{m}^3$	Copper, dusts and mists
717	$\mu\text{g}/\text{m}^3$	Copper fume
447	ppm	Cresol
525	$\text{mg}/\text{m}^3$	Cristobalite, respirable fraction
419	$\text{mg}/\text{m}^3$	Cyanides, as CN
995	ppm	Cyclohexanone
995	ppm	1,2-Dichloroethane
555	$\mu\text{g}/\text{m}^3$	Elemental Carbon, EC
995	ppm	Ethyl alcohol
995	ppm	Ethyl Benzene
261	ppm	Ethylene glycol
505	fibers/mL	Fibers, >5 $\mu\text{m}$ in length (non-asbestos, non-talc, not Identified)
173	$\text{mg}/\text{m}^3$	Ferrovandium dust
441	ppm	Formaldehyde
417	$\text{mg}/\text{m}^3$	Fluoride dusts, as F
719	$\text{mg}/\text{m}^3$	Fluoride fume, as F
487	ppm	Fluorine
803	mR/hr	Gamma radiation
517	mppcf*	Graphite (natural)
659	ppm	Hexane (n-hexane)
249	ppm	Hexone (MIBK)
411	ppm	Hydrogen bromide
413	ppm	Hydrogen chloride
309	ppm	Hydrogen cyanide
415	ppm	Hydrogen fluoride
305	ppm	Hydrogen sulfide
175	$\text{mg}/\text{m}^3$	Iron, soluble salts, as Fe
721	$\text{mg}/\text{m}^3$	Iron oxide fume
723	$\mu\text{g}/\text{m}^3$	Lead fume
635	$\text{mg}/\text{m}^3$	Lead, inorganic dusts
101	%	Oxygen, $\text{O}_2$
255	ppm	n-Propyl alcohol
647	$\text{mg}/\text{m}^3$	Manganese dusts, as Mn
727	$\text{mg}/\text{m}^3$	Manganese fume, as Mn
725	$\text{mg}/\text{m}^3$	Magnesium oxide fume
307	ppb	Mercaptans (alkylthiols)

625	$\mu\text{g}/\text{m}^3$	Mercury, all dusts, fumes and vapors (except alkyl) from sources other than welding, cutting, brazing, hard surfacing, or soldering, as Hg
729	$\mu\text{g}/\text{m}^3$	Mercury fume and vapor from welding, cutting, brazing, hard surfacing, or soldering, as Hg
995	ppm	Mesitylene (Mesityl oxide)
103	%	Methane, $\text{CH}_4$
231	ppm	Methanol
205	ppm	Methyl chloroform
233	ppm	Methyl isobutyl carbinol
201	ppm	Methylene chloride
513	mppcf	Mica
995	Varies	Miscellaneous contaminants
999	Varies	Mixed contaminants
731	$\text{mg}/\text{m}^3$	Molybdenum fume
163	$\text{mg}/\text{m}^3$	Molybdenum, insoluble dusts
645	$\text{mg}/\text{m}^3$	Molybdenum, soluble compounds
253	ppm	Naphtha
733	$\text{mg}/\text{m}^3$	Nickel fume, as Ni
621	$\text{mg}/\text{m}^3$	Nickel, metal and insoluble dusts, as Ni
491	ppm	Nitric acid
301	ppm	Nitric oxide
493	ppm	Nitrogen dioxide
811	%	Noise, dosimeter (permissible exposure levels)
813	dB(A)	Noise, sound level meter (115 maximum permissible sound level)
880	%	Noise, dosimeter (action level)
121	$\text{mg}/\text{m}^3$	Nuisance dust, listed, respirable fraction, less than (<)1% silica
995	ppm	Octane
535	$\text{mg}/\text{m}^3$	Oil mist, total particulate
481	ppb	Ozone
218	ppm	Perchloroethylene
515	mppcf*	Perlite
445	ppm	Phenol
495	ppb	Phosgene
315	ppb	Phosphine
435	$\text{mg}/\text{m}^3$	Phosphorus pentasulfide
651	$\mu\text{g}/\text{m}^3$	Platinum, soluble salts, as Pt
453	$\text{mg}/\text{m}^3$	Potassium hydroxide

257	ppm	n-Propyl acetate
523	mg/m <sup>3</sup>	Quartz ≥1% respirable fraction
521	mg/m <sup>3</sup>	Respirable dust (not analyzed)
627	μg/m <sup>3</sup>	Selenium compounds, as Se
519	mppcf	Silica (amorphous)
653	μg/m <sup>3</sup>	Silver, metal and soluble compounds
735	μg/m <sup>3</sup>	Silver fume
455	mg/m <sup>3</sup>	Sodium hydroxide
311	ppb	Stibine
241	ppm	Stoddard solvent
259	ppm	Styrene
421	ppm	Sulfur dioxide
423	mg/m <sup>3</sup>	Sulfuric acid mist
503	fibers/mL	Talc, fibers >5 μm in length
511	mppcf*	Talc, nonfibrous, <1% quartz
321	μg/m <sup>3</sup>	Tellurium
655	μg/m <sup>3</sup>	Thallium, soluble compounds, as Tl
325	mg/m <sup>3</sup>	Tin, inorganic dusts (except SnH <sub>4</sub> SnO <sub>2</sub> ), as Sn
and		
157	mg/m <sup>3</sup>	Tin oxide dust
737	mg/m <sup>3</sup>	Tin oxide fume
153	mg/m <sup>3</sup>	Titanium dioxide dust
739	mg/m <sup>3</sup>	Titanium dioxide fume, as TiO <sub>2</sub>
551	μg/m <sup>3</sup>	Total Carbon, TC
553	μg/m <sup>3</sup>	Total Carbon, calculated from Elemental Carbon
123	mg/m <sup>3</sup>	Total dust, nuisance, listed particulate
133	mg/m <sup>3</sup>	Total dust, unlisted particulate
211	ppm	Trichloroethylene
207	ppm	1,1,2-Trichloroethane
221	ppm	Toluene
527	mg/m <sup>3</sup>	Tridymite, respirable fraction
741	mg/m <sup>3</sup>	Tungsten fume, as W
155	mg/m <sup>3</sup>	Tungsten, insoluble dusts, as W
323	mg/m <sup>3</sup>	Tungsten, soluble compounds, as W
131	mg/m <sup>3</sup>	Unlisted dust, respirable fraction, <1% silica
657	μg/m <sup>3</sup>	Uranium and compounds (natural), as U
471	μg/m <sup>3</sup>	Vanadium (V <sub>2</sub> O <sub>5</sub> ) Dusts, as V
743	μg/m <sup>3</sup>	Vanadium fume, (V <sub>2</sub> O <sub>5</sub> ), as V
223	ppm	Xylene
995	ppm	m-Xylene
995	ppm	o-Xylene

995	ppm	p-Xylene
745	mg/m <sup>3</sup>	Zinc oxide fume
643	mg/m <sup>3</sup>	Zirconium compounds, as Zr

## 2. Numerical/ Health Effect Listing

<u>Code</u>	<u>Unit</u>	<u>Contaminant</u>
<b>Low Risk Health Effects</b>		
101	%	Oxygen, O <sub>2</sub>
103	%	Methane, CH <sub>4</sub>
105	%	Carbon dioxide, CO <sub>2</sub>
111	ppm	Carbon monoxide, CO
121	mg/m <sup>3</sup>	Nuisance dust, listed, respirable fraction, <1% silica
123	mg/m <sup>3</sup>	Total dust, nuisance, listed particulate
131	mg/m <sup>3</sup>	Unlisted dust, respirable fraction, <1% silica
133	mg/m <sup>3</sup>	Total dust, unlisted particulate
151	mg/m <sup>3</sup>	Aluminum oxide dust
153	mg/m <sup>3</sup>	Titanium dioxide dust
155	mg/m <sup>3</sup>	Tungsten, insoluble dusts, as W
157	mg/m <sup>3</sup>	Tin oxide dust
161	mg/m <sup>3</sup>	Boron oxide
163	mg/m <sup>3</sup>	Molybdenum, insoluble dusts
171	mg/m <sup>3</sup>	Copper, dusts and mists
173	mg/m <sup>3</sup>	Ferrovandium dust
175	mg/m <sup>3</sup>	Iron, soluble salts, as Fe
<b>Narcosis</b>		
201	ppm	Methylene chloride
205	ppm	Methyl chloroform
207	ppm	1,1,2-Trichloroethane
211	ppm	Trichloroethylene
218	ppm	Perchloroethylene
221	ppm	Toluene
223	ppm	Xylene
995	ppm	m-Xylene
995	ppm	o-Xylene
995	ppm	p-Xylene
231	ppm	Methanol
233	ppm	Methyl isobutyl carbinol
241	ppm	Stoddard solvent
243	ppm	Acetone

245	ppm	n-Butyl alcohol
247	ppm	Ethyl alcohol
249	ppm	Hexone (MIBK)
251	ppm	2-Butanone (MEK)
253	ppm	Naphtha
255	ppm	n-Propyl alcohol
257	ppm	n-Propyl acetate
259	ppm	Styrene
261	ppm	Ethylene glycol
995	ppm	1,2-Dichloroethane
995	ppm	Cyclohexanone
995	ppm	Ethyl Benzene
995	ppm	Mesitylene (Mesityl oxide)
995	ppm	Octane

**Acute Toxicity**

301	ppm	Nitric oxide
305	ppm	Hydrogen sulfide
307	ppb	Mercaptans (alkylthiols)
309	ppm	Hydrogen cyanide
311	ppb	Stibine
313	ppb	Arsine
315	ppb	Phosphine
321	$\mu\text{g}/\text{m}^3$	Tellurium
323	$\text{mg}/\text{m}^3$	Tungsten, soluble compounds, as W
325	$\text{mg}/\text{m}^3$	Tin, inorganic dusts (except $\text{SnH}_4$ and $\text{SnO}_2$ ), as Sn

**Acute Toxicity/Marked Irritation**

401	ppm	Ammonia
411	ppm	Hydrogen bromide
413	ppm	Hydrogen chloride
415	ppm	Hydrogen fluoride
417	$\text{mg}/\text{m}^3$	Fluoride dusts, as F
419	$\text{mg}/\text{m}^3$	Cyanides, as CN
421	ppm	Sulfur dioxide
433	ppm	Acetic acid
423	$\text{mg}/\text{m}^3$	Sulfuric acid mist
435	$\text{mg}/\text{m}^3$	Phosphorus pentasulfide
441	ppm	Formaldehyde
443	ppm	Acetaldehyde
445	ppm	Phenol
447	ppm	Cresol
451	$\text{mg}/\text{m}^3$	Calcium oxide
453	$\text{mg}/\text{m}^3$	Potassium hydroxide

455	mg/m <sup>3</sup>	Sodium hydroxide
471	µg/m <sup>3</sup>	Vanadium (V <sub>2</sub> O <sub>5</sub> ) Dusts, as V
481	ppb	Ozone
483	ppb	Bromine
485	ppm	Chlorine
487	ppm	Fluorine
491	ppm	Nitric acid
493	ppm	Nitrogen dioxide
495	ppb	Phosgene
<b>Pulmonary Disease</b>		
501	fibers/mL	Asbestos, fibers >5 µm in length
503	fibers/mL	Talc, fibers >5 µm in length
505	fibers/mL	Fibers, >5 µm in length (non-asbestos, non-talc, not identified)
511	mppcf*	Talc, nonfibrous, <1% quartz
513	mppcf	Mica
515	mppcf*	Perlite
517	mppcf*	Graphite (natural)
519	mppcf	Silica (amorphous)
521	mg/m <sup>3</sup>	Respirable dust (quartz not analyzed)
523	mg/m <sup>3</sup>	Quartz ≥1%, respirable fraction
525	mg/m <sup>3</sup>	Cristobalite, respirable fraction
527	mg/m <sup>3</sup>	Tridymite, respirable fraction
531	mg/m <sup>3</sup>	Coal dust, respirable fraction, <5% quartz
533	mg/m <sup>3</sup>	Carbon black
535	mg/m <sup>3</sup>	Oil mist, total particulate
537	mg/m <sup>3</sup>	Asphalt (petroleum) fumes
541	µg/m <sup>3</sup>	Beryllium dusts
543	µg/m <sup>3</sup>	Chromic acid and chromate dusts, as CrO <sub>3</sub>
545	µg/m <sup>3</sup>	Chromium, soluble chromic and chromous salts, as Cr
547	mg/m <sup>3</sup>	Chromium, metal and insoluble salts
551	µg/m <sup>3</sup>	Total Carbon, TC
553	µg/m <sup>3</sup>	Total Carbon, calculated from Elemental Carbon
555	µg/m <sup>3</sup>	Elemental Carbon, EC
557	µg/m <sup>3</sup>	TC@350
559	µg/m <sup>3</sup>	EC@350

**Chronic Toxicity**

601	ppm	Carbon tetrachloride
603	ppm	Benzene
605	$\mu\text{g}/\text{m}^3$	Chlorodiphenyl (42% chlorine)
607	$\mu\text{g}/\text{m}^3$	Chlorodiphenyl (54% chlorine)
611	$\mu\text{g}/\text{m}^3$	Antimony dusts, as Sb
613	$\mu\text{g}/\text{m}^3$	Arsenic dusts, As
621	$\text{mg}/\text{m}^3$	Nickel, metal and insoluble dusts, as Ni
623	$\mu\text{g}/\text{m}^3$	Cadmium, metal dusts and soluble salts, as Cd
625	$\mu\text{g}/\text{m}^3$	Mercury, all dusts, fumes and vapors (except alkyl) from sources other than welding, cutting, brazing, hard surfacing, or soldering, as Hg
627	$\mu\text{g}/\text{m}^3$	Selenium compounds, as Se
631	ppm	Carbon disulfide
635	$\text{mg}/\text{m}^3$	Lead, inorganic dusts
641	$\mu\text{g}/\text{m}^3$	Barium, soluble compounds
643	$\text{mg}/\text{m}^3$	Zirconium compounds, as Zr
645	$\text{mg}/\text{m}^3$	Molybdenum, soluble compounds
647	$\text{mg}/\text{m}^3$	Manganese dusts, as Mn
649	$\mu\text{g}/\text{m}^3$	Cobalt dusts
651	$\mu\text{g}/\text{m}^3$	Platinum, soluble salts, as Pt
653	$\mu\text{g}/\text{m}^3$	Silver, metal and soluble compounds
655	$\mu\text{g}/\text{m}^3$	Thallium, soluble compounds, as Tl
657	$\mu\text{g}/\text{m}^3$	Uranium and compounds (natural), as U
659	ppm	Hexane (n-hexane)
995	ppm	Chloroform

**Metal Fumes**

703	$\text{mg}/\text{m}^3$	Aluminum oxide fume, as $\text{Al}_2\text{O}_3$
705	$\mu\text{g}/\text{m}^3$	Antimony fume, as Sb
707	$\mu\text{g}/\text{m}^3$	Arsenic fume, As
709	$\mu\text{g}/\text{m}^3$	Beryllium fume
711	$\mu\text{g}/\text{m}^3$	Cadmium oxide fume, as Cd
601	ppm	Carbon tetrachloride
713	$\mu\text{g}/\text{m}^3$	Chromic acid and chromate fume, as $\text{CrO}_3$
715	$\mu\text{g}/\text{m}^3$	Cobalt fume
717	$\mu\text{g}/\text{m}^3$	Copper fume
719	$\text{mg}/\text{m}^3$	Fluoride fume, as F
721	$\text{mg}/\text{m}^3$	Iron oxide fume



723	$\mu\text{g}/\text{m}^3$	Lead fume
725	$\text{mg}/\text{m}^3$	Magnesium oxide fume
727	$\text{mg}/\text{m}^3$	Manganese fume, as Mn
729	$\mu\text{g}/\text{m}^3$	Mercury fume and vapor from welding, cutting, brazing, hard surfacing, or soldering, as Hg
731	$\text{mg}/\text{m}^3$	Molybdenum fume
733	$\text{mg}/\text{m}^3$	Nickel fume, as Ni
735	$\mu\text{g}/\text{m}^3$	Silver fume
737	$\text{mg}/\text{m}^3$	Tin oxide fume
739	$\text{mg}/\text{m}^3$	Titanium dioxide fume, as $\text{TiO}_2$
741	$\text{mg}/\text{m}^3$	Tungsten fume, as W
743	$\mu\text{g}/\text{m}^3$	Vanadium fume, ( $\text{V}_2\text{O}_5$ ), as V
745	$\text{mg}/\text{m}^3$	Zinc oxide fume

### Physical Agents

801	WL	Alpha radiation
803	mR/hr	Gamma radiation
811	%	Noise, dosimeter (90 dBA permissible exposure level)
813	dBA	Noise, sound level meter (115 dBA maximum sound level)
880	%	Noise, dosimeter (action level)

### Miscellaneous

995	Varies	Misc. contaminants
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### Mixed

999	Varies	Mixed contaminants
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**APPENDIX 21-E**  
**ACTION CODES FOR ASDS AND PEDS**

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## Appendix 21-E

### ACTION CODES FOR ASDS AND PEDS

<u>Code</u>	<u>Explanation</u>
C	Citation (or order) issued.
E	Overexposure occurred, but does not meet or exceed permissible limit and applicable error factor.
H	PEDS only - the Action Level for noise exposure was exceeded, but not the PEL, and an adequate Hearing Conservation Plan was in effect.
N	ASDS only - no citation (or order) issued, even though contaminant level exceeded applicable standard (reasons must be in health field notes, MSHA form 4000-31).
P	PEDS only - citable overexposure occurred, but all feasible engineering and administrative controls have been implemented and a fully adequate HCP program is in place. <b>Note:</b> This code cannot be used without approval from the District and must be clearly documented in the notes.
T	Citation (or order) terminated.
X	Citation extended, or existing citation not yet due for abatement.
L	Lab only – Denotes overexposure conditions exist and enforcement action required
D	Citable overexposure of 551/553 (Carbon, Total) or 555 (Elemental Carbon) occurred, but all feasible engineering controls have been implemented and a fully adequate PPE program is in place.

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**APPENDIX 21-F**  
**ADDRESSES AND CONTACT INFORMATION FOR**  
**MSHA LABORATORIES AND OFFICES**

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## Appendix 21-F

### ADDRESSES AND CONTACT INFORMATION FOR MSHA LABORATORIES AND OFFICES

1. For questions concerning noise, organic and solvents analysis, heat stress, vapors, mists, and gases, call or write:

Chief, Physical and Toxic Agents Division  
Pittsburgh Safety and Health Technology Center  
P.O. Box 18233  
Cochrans Mill Road  
Pittsburgh, PA 15236  
Phone: (412) 386-6980  
FAX: (412) 386-6154

Note: Add to the address, ATTN: Bldg. 38, Room 137 - for the Acoustical Calibration Laboratory which calibrates personal noise dosimeters and acoustical calibrators.

Add to the address, ATTN: Bldg. 38 - for Toxic Materials Laboratory, which analyzes sorbent media for mists and vapors or vacuum samples for mine gases.

2. For questions concerning ionizing radiation, call or write:

Chief, Physical and Toxic Agents Division  
R.R. 1, Box 251  
Industrial Park Road  
Triadelphia, WV 26059  
Phone: (412) 386-6980 or (304) 547-2308  
FAX: (412) 386-6154 or (304) 547-2071

3. For questions concerning dusts, fibers, and fumes, call or write:

Chief, Dust Division  
Pittsburgh Safety and Health Technology Center  
P.O. Box 18233  
Cochrans Mill Road  
Pittsburgh, PA 15236  
Phone: (412) 386-6858  
FAX: (412) 386-6928

Note: This division will also analyze and report the results of sampling analyses for dusts (respirable and total), metal fumes and dusts, mineral fibers, bulk samples, etc., and provide technical assistance for conducting midget impinger sampling.

4. For questions concerning ventilation call, or write:

Chief, Ventilation Division  
Pittsburgh Safety and Health Technology Center  
P.O. Box 18233  
Cochrans Mill Road  
Pittsburgh, PA 15236  
Phone: (412) 386-6936  
FAX: (412) 386-6851

5. For ordering all health-related sampling supplies, or for questions concerning the availability of specific sampling items contact your District Office.

Please note items must be ordered by the field office supervisor.