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Morenci Safe Production Standard	Standard # 5.1	
	OHSAS 18001:2007	4.4.6
	Revision #	02
Industrial Hygiene Program	Revision Date	06/28/2013
	Effective Date	2/28/2012
	Document Owner	Industrial Hygiene
Review:		Approval:
<i>Management Representative: 02/2012</i>		<i>General Manager, Administration: 02/2012</i>

1.0 PURPOSE:

1.1 The Industrial Hygiene Safe Production Standard is intended to identify occupational health hazards present throughout the Freeport McMoRan Morenci Operations (FMMO), determine employee exposures to those hazards and developing plans to control exposures and minimize occupational illnesses.

2.0 SCOPE:

2.1 The procedures outlined in this standard apply to all Freeport-McMoRan Copper & Gold Morenci Operations employees, contractors and visitors.

3.0 TERMS, DEFINITIONS AND ABBREVIATIONS

3.1 Definitions

Risk Assessment is the determination or estimation (qualitative or quantitative) of the frequency, duration, health effects, and control of occupational hazards.

Permissible Exposure Level (PEL) is established by either OSHA or MSHA and is the concentration or level of an occupational hazard to which nearly all workers may be repeatedly exposed 8 hours a day, 40 hours a week, for 30 days without adverse effects.

Occupational Exposure Limit (OEL) unless otherwise noted, are values that are based on the United States OSHA or MSHA regulations, which ever is more protective for the worker. Other values come from NIOSH and ACGIH TLVs.

OSHA: Occupational Safety and Health Administration

MSHA: Mine Safety and Health Administration

ACGIH: American Conference of Industrial Hygienists

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Page 1 of 18

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NIOSH: National Institute of Occupational Safety and Health

4.0 RESPONSIBILITIES:

4.1 Health and Safety Manager

- Ensure compliance with the activities establish in the Industrial Hygiene Safe Production Standard.
- Ensure the implementation of occupational risk assessments and risk map for all areas of the Morenci Operation.
- Review and approve the standard in accordance with changes in site operation, company policies or national standards for occupational health & safety.

4.2 Industrial Hygiene

- Identify, evaluate and assist the division with the control of the occupational health hazards.
- Assist and provide technical advice to divisions and departments in the resolution of occupational exposures.
- Develop Industrial Hygiene safe production standards and applicable procedures in compliance with all federal and state regulations and corporate guidelines.
- Comply with the activities establish in this document and appendices (see appendix A).
- Develop annual risk assessments to evaluate effectiveness of controls and the annual sampling plan (see appendix B and C).
- Review annual sampling data to analyze effectiveness of controls and risk assessment.
- Follow up with action items from divisions to track controls and effectiveness for occupational exposures.

4.3 Division Manager

- In coordination with the Industrial Hygienist implement corrective measures according to the recommendations for the control of occupational health risks.
- Ensure compliance with the Occupational Health and Safety Management System in relation to Industrial Hygiene and Occupational Health.
- Notify the Health and Safety department the proposed changes in the process.

4.4 Employees

- Follow the requirements outlined in the Industrial Hygiene Safe Production Standard.
- Participate and comply with the annual sampling programs and evaluations.

5.0 STANDARDS OF PERFORMANCE

5.1 Industrial Hygiene is defined as the anticipation, recognition, evaluation, and control of occupational health hazards; these include physical, chemical, and biological hazards. See the principal activities of Industrial Hygiene in Appendix A. Programs and policies that are in place to accomplish this include:

5.2 Annual Sampling Program

The areas for annual sampling of occupational health hazards are based on the results of previous

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Page 2 of 18

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sampling results and risk assessment by similar exposure groups. The occupational health hazards have been identified by area in Appendix B. The annual sampling schedule has been established and is found in Appendix C. The results will be compared with the permissible exposure limit (PEL) and occupational exposure level (OEL) indicated in Appendix D. A sampling report will be communicated to all areas associated in the occupational hazard evaluation.

5.3 Occupational Health Procedure

Occupational health procedure is designed to identify individuals who are or could be affected by exposures in the workplace, to prevent further exposure, and to provide medical treatment if necessary. Pre-placement evaluations are also a part of this procedure that aid in job placement and physical capabilities.

5.4 Respiratory Protection Standard

The respiratory protection standard is implemented to decrease the risk of exposure to airborne contaminants. The program lists procedures for fit testing, respirator required areas, respirator requirements for use and care, medical clearance and responsibilities.

5.5 Hearing Conservation Standard

Hearing conservation standard is developed to minimize noise exposure and hearing loss of the company's employees and contractors.

5.6 Personal Protective Equipment Standard

Personal protective equipment in some areas of the property is required to prevent exposure to chemical, physical or biological hazards that engineering and administrative controls are unable to eliminate. The use of PPE is the responsibility of the supervisor and employee and should be properly selected, maintained and used appropriately.

5.7 Hazard Communication Program

The hazard communication program is a program designated to employee knowledge of chemical hazard exposure in the workplace. Each chemical is evaluated for hazards to both employee and environmental health. The program also educates employees on the 'right to know' what chemicals and hazards they work with through the collection of material safety data sheets.

5.8 Radiation Safety Standard

Under the direction of the site Radiation Safety Officer, this standard is designed to protect occupationally and non-occupationally exposed employees from high doses of radiation. Radiation is used in several processes throughout the site and specific measures are taken to limit the exposure of all employees.

5.9 Lead Management Program

This Program has been established to ensure that all lead-containing materials are evaluated and that safe use and handling information is provided to all individuals that may be potentially exposed to lead. This program is aligned with the Corporate Safety and Health Policy Statement and the Occupational

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Safety and Health Administration (OSHA) and Mine Safety Health Administration (MSHA) regulations as applicable.

5.10 Carcinogen Management Program

The purpose of this program is to minimize the use of substances which are known or suspected carcinogens and/or reproductive hazards. Where use cannot be eliminated altogether or reduced to acceptable levels, a hierarchy of controls will be implemented to protect individuals from harmful exposures.

5.11 Asbestos Management Plan

In conjunction with the Environmental Services Department, the control of asbestos on site is implemented through this program. Industrial Hygiene is responsible for medical surveillance and sampling of asbestos projects.

5.13 Training

A technical training program for occupational health hazards will be established with the assistance of the Training Department.

5.14 Compliance of the Program

A review will be done every six months to ensure the activities required to establish, implement, control and maintain the program are defined and completed. This report will be submitted to the management of health and safety.

6.0 REFERENCE DOCUMENTS

6.1 Freeport McMoRan Field Guide for Occupational Health and Industrial Hygiene

<http://fmweb/sites/HSPro/default.aspx>

6.2 Freeport McMoRan Morenci Operations Industrial Hygiene Programs:

- Respiratory Protection Program
- Hearing Conservation Program
- Occupational Health Procedure
- Personal Protective Equipment Program
- Hazard Communication Program
- Radiation Safety Program
- Lead Management Program
- Carcinogen Management Program
- Asbestos Management Plan

6.3 Occupational Safety and Health Administration (OSHA)

6.4 Mine Safety and Health Administration (MSHA)

6.5 American Conference of Industrial Hygienists (ACGIH)

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Page 4 of 18

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7.0 RECORDS

Name of the Document	Responsible for Control	Records Retention
Hazard Surveys	Industrial Hygiene	Permanent
Hazard Monitoring	Industrial Hygiene	Permanent
Employee Exposure Notification	Industrial Hygiene	Permanent
Monitoring Reports	Industrial Hygiene	Permanent
Program Audits	Industrial Hygiene	Audit + 10 Years
Employee Health Records (audiograms, fit tests, medical surveillance, medical clearance, physicals, etc.)	Occupational Health Provider	Permanent
Monitor Calibration Records	Industrial Hygiene/ Applicable Departments	Permanent
Training Records	Industrial Hygiene / Training Department	Permanent
Regulatory Agency Inspections	Industrial Hygiene / Safety Department	Permanent

8.0 APPENDICES

- 8.1 Appendix A Industrial Hygiene Activities
- 8.2 Appendix B Risk Map
- 8.3 Appendix C Sampling Plan
- 8.4 Appendix D Exposure Limits

9.0 REVIEW AND CHANGE

All changes, modifications and/or revisions must be documented on the table below:

Description of Changes to this Document

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Page 5 of 18

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1.0 Objectives: revised the objectives to comply with new Standards of Procedures format
2.0 Scope: specified directly the individuals under the Industrial Hygiene Program, i.e. FMI employees, contractors and visitors
3.1 Health and safety manager: changed the work update to approve, the role of the manager is to review and approve the program, the industrial hygiene department is responsible for updating the program
3.2 Industrial Hygiene: Added more details to the responsibilities of the Industrial Hygiene department, included references to appendices.
3.4 Employees: Added the second bullet to the responsibilities
5.0 Description: Updated the definition of Industrial Hygiene and reference to appendices
5.1 Annual Sampling Program: changed the wording of monitoring to sampling; added risk assessment to first sentence; and updated references to appendices
Added 5.9 Lead Management Program, 5.10 Carcinogen Management Program, and 5.11 Asbestos Management Plan
Deleted 5.6 Ergonomic, until further review (currently there is not an ergonomic program) and 5.9 Confined Space Inventory which is now controlled by the Safety Department
5.14 Compliance of the Program: Changed the wording for the review/report that will be done every six months
6.0 Added the Industrial Hygiene Programs as reference documents for this program
7.0 Updated and added more applicable records maintained by the Industrial Hygiene department
8.0 Updated Appendices to reflect 2012 sampling schedules and risk assessment
06/28/2013 – Updated records table – S. Elias Rev. 02


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Appendix A Annual Industrial Hygiene Activities

Element	Activities	Responsible	Indicator Rate
Industrial Hygiene Management	Prepare and review the annual Industrial Hygiene Standard	Industrial Hygiene / Health & Safety Manager	Approved Standard
	Communication of Industrial Hygiene standards	Industrial Hygiene & Safety Representative	Programmed Activites vs Done Activities
	Review and evaluate the compliance of the IH programs	Industrial Hygiene / Health & Safety Manager	Report Indicate Compliance
Risk Assessment	Update similar exposure groups	Industrial Hygiene	Risk Assessment Completion
	Evaluate effectiveness of controls and sampling plan	Industrial Hygiene	Risk Assessment Completion
Sampling Schedule of Occupational Health Hazards	Establish sampling plan based on risk assessment map	Industrial Hygiene	Programmed Activites vs Done Activities
	Implement sampling plan	Industrial Hygiene	Programmed Activites vs Done Activities
	Communication of results	Industrial Hygiene	Programmed Activites vs Done Activities
Evaluation of Chemical Products	Compliance with the approval process for all chemicals to come on site (product approval)	Industrial Hygiene / Environmental	Programmed Activites vs Done Activities
	MSDS Inspection	Industrial Hygiene / Environmental	Programmed Activites vs Done Activities
Confined Space	Keep updated confined space inventory by areas	Industrial Hygiene / Safety Representative	Programmed Activites vs Done Activities
	Review the labeling of all confined space	Safety Supervisor	Programmed Activites vs Done Activities
Training	Assist in the development of training for occupational health hazards	Industrial Hygiene / Technical Training	Programmed Activites vs Done Activities

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		<h2 style="text-align: center;">Appendix B Risk Map 2012</h2>							<div style="display: flex; justify-content: space-between;"> <div style="width: 20px; height: 15px; background-color: green; border: 1px solid black;"></div> Low Risk <div style="width: 20px; height: 15px; background-color: yellow; border: 1px solid black;"></div> Medium Risk <div style="width: 20px; height: 15px; background-color: red; border: 1px solid black;"></div> High Risk </div>		
Division	Department	Position	Noise	Respirable Dust	Silica	Welding Fume	Acid Mist	Diesel Particulate	Organic Vapor	Lead (Airborne)	
Mine Operations	Haulage/Loading	Truck Driver/Water Truck	High Risk	Low Risk	Medium Risk			Low Risk			
		Support Equipment Operator (track dozer)	High Risk	Low Risk	Medium Risk			Medium Risk			
		Support Equipment Operator (grader)	High Risk	Low Risk	Medium Risk						
		Support Equipment Operator (rubber tire dozer)	Low Risk	Low Risk	Medium Risk						
		Support Equipment Operator (track hoe)	Low Risk	Low Risk	Medium Risk						
		Shovel Operator	Low Risk	Low Risk	Medium Risk						
		Drill Operator	High Risk	Low Risk	High Risk						
		Blasting Employee	Low Risk	Low Risk	Medium Risk						
		Laborer	Low Risk	Low Risk	Medium Risk						
		Supervisor	Low Risk	Low Risk	Medium Risk						
		Operations Technician	Low Risk	Low Risk	Medium Risk						
		Admin Clerk	Low Risk	Low Risk	Low Risk						
		Engineer	Low Risk	Low Risk	Low Risk						
		Planner	Low Risk	Low Risk	Low Risk						
		Superintendent	Low Risk	Low Risk	Medium Risk						
Mine Maintenance	Drill Maintenance	Drill Diagnostic Mechanic	Low Risk	Low Risk	Medium Risk	Medium Risk					
		Supervisor	Low Risk	Low Risk	Medium Risk						
		Superintendent	Low Risk	Low Risk	Medium Risk	Medium Risk					
	Electrical Shop	Electrician	Low Risk	Low Risk	Medium Risk						
		Process Plant Automation Technicians	Low Risk	Low Risk	Medium Risk						
		Supervisor	Low Risk	Low Risk	Medium Risk						
		Superintendent	Low Risk	Low Risk	Medium Risk						
	Fabrication Shop	Boilermaker/Welder	High Risk	Low Risk	Medium Risk	High Risk					
		Supervisor	Low Risk	Low Risk	Medium Risk	Low Risk					
	Haulage Maintenance	Diesel Diagnostic Mechanic	Low Risk	Low Risk	Medium Risk	Medium Risk					
		Supervisor	Low Risk	Low Risk	Medium Risk						
		RAMP Technician	Low Risk	Low Risk	Medium Risk						
	Line Electricians	Electrician	Low Risk	Low Risk	Medium Risk						
		Support Equipment Operator	Low Risk	Low Risk	Medium Risk						
	Machine Shop	Machinist	High Risk	Low Risk	Medium Risk						
Shovel Maintenance	Shovel Diagnostic Mechanic	Low Risk	Low Risk	Medium Risk	Medium Risk						
	Supervisor	Low Risk	Low Risk	Medium Risk							
Tire Shop	Tire Repair Employee	High Risk	Low Risk	Medium Risk							
	Supervisor	Low Risk	Low Risk	Medium Risk							

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FREEMPORT-McMORAN COPPER & GOLD MORENCI OPERATIONS		Appendix B Risk Map 2012								Low Risk	
										Medium Risk	
										High Risk	
Division	Department	Position	Noise	Respirable Dust	Silica	Welding Fume	Acid Mist	Diesel Particulate	Organic Vapor	Lead (Airborne)	
Morenci Concentrator	Operations	Operator	High Risk	Medium Risk	High Risk						
		Mill Laborer	High Risk	High Risk	High Risk						
		Supervisor	High Risk	Medium Risk	Medium Risk						
		Operation Technician	Medium Risk	Medium Risk	Medium Risk						
	Maintenance	Diagnostic Mechanic	High Risk	Medium Risk	High Risk						
		Boilermaker/Welder	High Risk	Medium Risk	High Risk	Medium Risk					
		Electrician	Medium Risk	Low Risk	Medium Risk						
		Supervisor	Medium Risk	Medium Risk	Medium Risk						
	Tailings	Tailings Dam Operator	Medium Risk	Low Risk	Low Risk						
	Tech Services	Metallurgist	Medium Risk	Low Risk	Medium Risk						
		Analytical Assistant	Medium Risk	Low Risk	Medium Risk						
		Engineering Tech	Medium Risk	Low Risk	Medium Risk						
	Administration	Superintendent	Medium Risk	Low Risk	Medium Risk						
		Planner	Medium Risk	Low Risk	Medium Risk						
		Technical Coordinator	Medium Risk	Low Risk	Medium Risk						
		Admin Clerk	Low Risk	Low Risk	Low Risk						
	Crush/Convey	IPCC Operations	Operator	High Risk	Medium Risk	High Risk					
			Supervisor	Medium Risk	Low Risk	Medium Risk					
		IPCC Maintenance	Diagnostic Mechanic	High Risk	Medium Risk	High Risk					
Electrician			Medium Risk	Low Risk	Medium Risk						
Supervisor			Medium Risk	Low Risk	Medium Risk						
Metcalf Crusher Operations		Operator	High Risk	Medium Risk	High Risk						
		Supervisor	Medium Risk	Low Risk	Medium Risk						
Metcalf Crusher Maintenance		Diagnostic Mechanic	High Risk	Medium Risk	High Risk						
		Electrician	High Risk	Medium Risk	High Risk						
		Supervisor	Medium Risk	Medium Risk	Medium Risk						
Agglomeration Stacking Operations		Operator	High Risk	Medium Risk	High Risk						
		Supervisor	Medium Risk	Low Risk	Medium Risk						
Agglomeration Stacking Maintenance		Diagnostic Mechanic	High Risk	Medium Risk	High Risk						
		Boilermaker/Welder	High Risk	Low Risk	High Risk	Medium Risk					
		Supervisor	Medium Risk	Medium Risk	Medium Risk						
Administration		Superintendent	Low Risk	Low Risk	Low Risk						

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 FREEMORE COPPER & GOLD MORENCI OPERATIONS		Appendix B Risk Map 2012							 Low Risk	 Medium Risk	 High Risk
Division	Department	Position	Noise	Respirable Dust	Silica	Welding Fume	Acid Mist	Diesel Particulate	Organic Vapor	Lead (Airborne)	
Hydrometallurgy	SX Operations	SX Operator	Yellow					Green	Green		
		Supervisor	Green					Green	Green		
	EW Operations	EW Operator	Yellow					Red		Yellow	
		Supervisor	Yellow					Green		Green	
	SX/EW Maintenance	Diagnostic Mechanic	Red				Red	Yellow		Green	Green
		Electrician	Yellow					Green		Green	
		Supervisor	Yellow					Green		Green	
	Tech Services	Metallurgist	Green					Green		Green	
		Administration	Green					Green		Green	
	Leaching	Operations	Leaching Operator	Red	Yellow	Yellow					
Supervisor			Yellow	Yellow	Yellow						
Maintenance		Leaching Repair Employee	Yellow	Green	Green						
		Leaching Tech Services	Surveyor	Yellow	Yellow	Yellow					
			Engineering Tech	Yellow	Yellow	Yellow					
Maintenance Services	Mechanical Field Services	Boilermaker/Welder	Yellow	Green	Yellow	Yellow					
		Machinist	Yellow	Green	Green						
		Mechanic	Red	Green	Yellow						
		Supervisor	Yellow	Green	Green						
	Industrial Railroad	Locomotive Operator	Red	Green	Yellow						
		Locomotive Mechanic	Red	Green	Yellow						
	RW Electric	Electrician	Yellow	Green	Yellow						
		Reliability Centered Maintenance	Infrared Technician	Yellow	Yellow	Yellow					
			Tribology Technician	Green	Green	Green				Red	
	Vibration Technician		Red	Yellow	Red						
	Surface	Mobile Equipment Operator	Red	Green	Yellow						
		Support Equipment Operator	Red	Green	Yellow						
	RW Garage	Mechanic	Yellow	Green	Green						
		Supervisor	Yellow	Green	Green						
	Substation Maintenance	Electrician	Yellow	Green	Yellow						
	Utility	Laborer	Red	Yellow	Red						
		Supervisor	Yellow	Green	Yellow						
	Administration	Planner	Green	Green	Green						
Admin Clerk		Green	Green	Green							
Transportation Coordinator		Green	Green	Green							
		Engineer	Green	Green	Green						

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Division	Department	Position	Noise	Respirable Dust	Silica	Welding Fume	Acid Mist	Diesel Particulate	Organic Vapor	Lead (Airborne)		
Administration	Accounting	Accountant	Low Risk	Low Risk	Low Risk							
	Asset Recovery / Recycle Facility	Support Equipment Operator	Medium Risk	Low Risk	Low Risk							
	Employment / Benefits	HR Generalist/Assistant	Low Risk	Low Risk	Low Risk							
		Administration	Low Risk	Low Risk	Low Risk							
	Environmental	Environmental Engineer	Low Risk	Low Risk	Low Risk							
		Environmental Technician	Medium Risk	Low Risk	Medium Risk							
		Administration	Low Risk	Low Risk	Low Risk							
	Geology	Geologist	Medium Risk	Low Risk	Medium Risk							
		Administration	Low Risk	Low Risk	Low Risk							
	Global Supply	Warehouse Technician	Medium Risk	Low Risk	Medium Risk							
		Buyer/Inventory Controller	Low Risk	Low Risk	Low Risk							
		Administration	Low Risk	Low Risk	Low Risk							
	Health & Safety	Health & Safety Technician	Medium Risk	Low Risk	Medium Risk							
		Health & Safety Specialist	Medium Risk	Medium Risk	Medium Risk							
		Industrial Hygienist	Medium Risk	Low Risk	Medium Risk							
		Administration	Low Risk	Low Risk	Low Risk							
	Information Services	Infrastructure Technician	Low Risk	Low Risk	Low Risk							
		Administration	Low Risk	Low Risk	Low Risk							
	Plant Engineering	Engineer	Low Risk	Low Risk	Low Risk							
		Surveyor	Medium Risk	Low Risk	Medium Risk							
		Administration	Low Risk	Low Risk	Low Risk							
	Resource Management	Engineer	Low Risk	Low Risk	Low Risk							
		Geologist	Low Risk	Low Risk	Low Risk							
		Sampler Technician	Medium Risk	Low Risk	Medium Risk							
Surveyor		Medium Risk	Low Risk	Medium Risk								
Administration		Low Risk	Low Risk	Low Risk								
Security	Security Officer	Medium Risk	Low Risk	Medium Risk								
	Administration	Medium Risk	Low Risk	Medium Risk								

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FREEMORE COPPER & GOLD Morenci Operations		Appendix C Sampling Plan 2012												D	N	W	A	O						
Division	Department	Position	Number Exposed	Number of Samples	January	February	March	April	May	June	July	August	September	October	November	December	Dust	Noise	Welding Fume	Acid Mist	Organic Vapor			
Mine Operations	Haulage/Loading	Truck Driver/Water Truck	419	42					N 21					N 21										
		Support Equipment Operator (track dozer)	131	13					N 5					N 5						N 3				
		Support Equipment Operator (grader)		13					N 5						N 5						N 3			
		Support Equipment Operator (rubber tire)		13					N 5						N 5						N 3			
		Support Equipment Operator (track hoe)		13					N 2	D 2														
		Dill Operator		45	6							N 4									N 2			
		Shovel Operator	40	6							N 4	D 4								N 2	D 2			
		Laborer	17	6											N 6	D 6								
Mine Maintenance	Drill Maintenance	Drill Diagnostic Mechanic	24	6					N 6	D 6	W 2													
	Fabrication Shop	Boilermaker/Welder	38	6		N 4	W 4							N 6	D 6	W 6								
	Electrical Shop	Electrician	33	6				N 6	D 6															
		Process Plant Automation Technicians	13	6				N 6																
	Haulage Maintenance	Diesel Diagnostic Mechanic	158	16								N 8	D 8	W 3							N 8	D 8		
	Line Electricians	Electrician	12	6				N 6	D 6															
		Support Equipment Operator	2	3				N 2	D 2															
	Shovel Maintenance	Shovel Diagnostic Mechanic	32	6						N 6	D 6	N 4	W 4											
Tire Shop	Tire Repair Employee	24	6	N 4									N 2	D 6										
Morenci Concentrator	Operations	Operator	100	10	N 3	N 12	D 4																	
	Maintenance	Diagnostic Mechanic	95	10					N 5	D 5							N 5	D 5						
		Electrician	21	6				N 6	D 6															
		Boilermaker/Welder	2	2				N 2	D 2															
Tailings	Tailings Dam Operator	13	6								N 6	D 6												

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FREEMORE COPPER & GOLD Morenci Operations		Appendix C Sampling Plan 2012												D	N	W	A	O					
Division	Department	Position	Number Exposed	Number of Samples	January	February	March	April	May	June	July	August	September	October	November	December	Dust	Noise	Welding Fume	Acid Mist	Organic Vapor		
Crush/Convey	IPCC Operations	Operator	23	6									N	D									
	IPCC Maintenance	Diagnostic Mechanic	32	6	D									N	D								
		Electrician	10	6										N	D								
	Metcalf Crusher Operations	Operator	18	6																	N	D	
	Metcalf Crusher Maintenance	Diagnostic Mechanic	21	6																		N	D
		Electrician	3	3																		N	D
	Agglomeration Stacking Operations	Operator	18	6			N	D															
	Agglomeration Stacking Maintenance	Diagnostic Mechanic	14	6			N	D															
Electrician		9	6			N	D																
Boilermaker/Welder		2	2			N	W																
Hydrometallurgy	SX Operations	SX Operator	33	6		O																	
	EW Operations	EW Operator	41	6						N	A												
	SX/EW Maintenance	Diagnostic Mechanic	26	6									N	W									
Electrician		22	6																		N		
Leaching	Operations	Operator	64	6									N	D									
	Maintenance	Leaching Repair Employee	15	6									N	D									
Maintenance Services	Mechanical Field Services	Boilermaker/Welder	8	6									N	W									
		Machinist	7	6										N									
		Mechanic	9	6										N									
	HDPE Recycle Facility	Support Equipment Operator	4	4																	N	D	
	Industrial Railroad	Locomotive Operator	8	6																		N	
		Locomotive Mechanic	6	6																		N	
RW Electric	Electrician	7	6																		N		

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FREEMORE COPPER & GOLD Morenci Operations		Appendix C Sampling Plan 2012												D	Dust		
														N	Noise		
														W	Welding Fume		
														A	Acid Mist		
														O	Organic Vapor		
Division	Department	Position	Number Exposed	Number of Samples	January	February	March	April	May	June	July	August	September	October	November	December	
Maintenance Services	Reliability Centered Maintenance	NDT Technician	3	3						N 3							
		Vibration Technician	5	5						N 5							
		Infrared Technician	2	2						N 2							
		Tribology Technician	2	2						N 2							
	RW Garage	Mechanic	10	6										N 6			
	Substation Maintenance	Electrician	9	6												N 6	
	Surface	Mobile Equipment Operator	12	6		N 4							N 6				
		Support Equipment Operator	14	6									N 6				
	Utility	Laborer	27	6						N 6	D 6						
Administration	Environmental Services	Environmental Technician	7	6										N 2	D 2		
	Global Supply	Warehouse Technician	14	6										N 6	D 6		
	Resource Management	Sampler Technician	9	6		N 4	D 4					N 2	D 2				
	Security	Security Officer	27	6												N 6	

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Appendix D Occupational Exposure Limits

Agents	MSHA Permissible Exposure Limit	FMI Occupational Exposure Limit
Arsine	0.05 ppm	0.005 ppm
Arsenic	0.05 mg/m ³	0.01 mg/m ³
Asbestos	0.1 f/mL	0.1 f/mL
Beryllium	0.002 mg/m ³	0.00005 mg/m ³
Cadmium (fume)	0.1 mg/m ³	0.005 mg/m ³
Carbon Dioxide	5000 ppm	5000 ppm
Carbon Monoxide	50 ppm	25 ppm
Chromium (VI)	0.5 mg/m ³	0.005 mg/m ³
Chromium (metal and III)	0.5 mg/m ³	1 mg/m ³
Cobalt (metal, dust, fume)	0.1 mg/m ³	0.1 mg/m ³
Copper (dust/mist)	1 mg/m ³	1 mg/m ³
Copper (fume)	0.2 mg/m ³	0.1 mg/m ³

Agents	MSHA Permissible Exposure Limit	FMI Occupational Exposure Limit
Diesel Particulate Matter (DPM)	308 ug/m ³	160 ug/m ³ Total Carbon
Hydrogen Cyanide	10 ppm	4.7 ppm
Hydrogen Sulfide	10 ppm	1 ppm
Respirable Dust	5 mg/m ³	3 mg/m ³
Ionizing Radiation	5 rem/yr (NRC)	20 mSv average for 5 years
Iron	10 mg/m ³	10 mg/m ³
Lead (airborne)	0.15 mg/m ³	0.05 mg/m ³
Manganese (metal and inorganic compounds)	5 mg/m ³	1 mg/m ³
Mercury	0.05 mg/m ³	0.025 mg/m ³
Molybdenum (metal and insoluble forms)	10 mg/m ³	3 mg/m ³
Molybdenum (metal and soluble forms)	5 mg/m ³	0.5 mg/m ³
Nickel (metal and inorganic compounds; insoluble)	1 mg/m ³	0.2 mg/m ³

Agents	MSHA Permissible Exposure Limit	FMI Occupational Exposure Limit
Nickel (metal and inorganic compounds; soluble)	1 mg/m ³	0.1 mg/m ³
Noise	90 dB(A)	85 dB(A)
Oil Mist (TWA)	5 mg/m ³	5 mg/m ³
Oil Mist (STEL)	10 mg/m ³	10 mg/m ³
Respirable Dust w/ Silica	10/(% silica+2)	0.05 mg/m ³
Total Dust	15 mg/m ³	15 mg/m ³
Sulfuric Acid Mist	1 mg/m ³	1 mg/m ³
Zinc as oxide (fume)	5 mg/m ³	2 mg/m ³
Zinc as oxide (STEL)	10 mg/m ³	10 mg/m ³
Lead in Blood (Male)	50 ug/L	30 ug/L
Lead in Blood (Female)	50 ug/L	10 ug/L

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