

TABLE OF CONTENTS

Course Overview.....	3
Facilitator Preparation	5
Using the PPT Presentation.....	10
Introduction.....	13
Activity 1: Icebreaker	16
Module 1: Introduction to Hot Work.....	23
Activity 2: Completing a Hot Work Permit.....	28
Module 1 Quiz.....	33
Module 2: Critical Controls.....	35
Module 2 Quiz.....	40
Module 3: Roles and Responsibilities.....	43
Module 3 Quiz.....	49
Module 4: Equipment	51
Activity 3: Dressed for Hot Work.....	58
Module 4 Quiz.....	59
Module 5: Health Hazards	61
Activity 4: Hazardous Substances in the Work Area.....	66
Module 5 Quiz.....	67
Module 6: High Hazard Areas.....	69
Activity 5: Identifying Hazards	75
Module 6 Quiz.....	76
Conclusion	79
Facilitator Course Evaluation.....	83

COURSE OVERVIEW

The following sections give basic information about this course.

COURSE DESCRIPTION

Through this course, employees learn the guidelines for Hot Work activities executed in settings not normally identified as fire safe areas. Each module outlines the various hazards, controls, and procedures to conduct Hot Work safely and efficiently. The course discusses when and where the policy allows Hot Work as well as the process to ensure the completion of work safely.

COURSE OBJECTIVES

Upon completion of this course, students will be able to:

- Module 1: Introduction to Hot Work
 - Define Hot Work and fire safe areas and the associated safety concerns
 - Identify and differentiate between flammable and combustible materials
- Module 2: Critical Controls
 - Identify the use of applicable controls
- Module 3: Roles and Responsibilities
 - Describe the roles and responsibilities of persons involved in Hot Work
- Module 4: Equipment
 - Summarize the various equipment and hazards for different types of Hot Work
- Module 5: Health Hazards
 - Describe the health hazards associated with Hot Work
- Module 6: High Hazard Areas
 - Evaluate scenarios and categorize the associated hazards

COURSE PRE-REQUISITES

Before taking this course, students should have completed the Fundamentals of Safety course and the initial Hot Work course, as this is a refresher course.

COURSE LENGTH

This course takes approximately 2.5 hours to complete.

CLASS SIZE

This course is designed for a maximum of 20 students. Class size may be more or less depending on each site's needs and the students' skills and experience levels.

TARGET AUDIENCE

This training is intended to train anyone involved with Hot Work.

FACILITATOR QUALIFICATIONS

Facilitators should be well versed in the Freeport-McMoRan Hot Work Policy (FCX-HS06) and the risks and controls used to safely conduct Hot Work.

REGULATIONS/POLICIES/PROCEDURES

This course teaches to the Freeport-McMoRan Hot Work Policy (FCX-HS06), which provides guidelines and monitors compliance for all Hot Work activities performed in locations not normally identified as fire safe areas. Common Hot Work processes include welding, soldering, cutting, grinding, and brazing.

FACILITATOR PREPARATION

The following information helps the facilitator prepare course facilitation.

ABOUT THIS GUIDE

The Facilitator Guide (FG) gives the facilitator a general outline for the flow of the course. It assists the facilitator in presenting content, conducting classroom activities, and managing time to meet the learning objectives. Use the FG in conjunction with the Student Guide (SG) and the PowerPoint (PPT). The guide belongs to the facilitator to make notes and write in as much as needed.

SAFETY

Safety must remain a fundamental component of this course. Students must adhere to safety information in the SG and from the facilitator, and maintain focus on safety procedures throughout the training. Students may not operate equipment without facilitator authorization.

ACTIVITIES

Students participate in many hands-on activities that give students time to practice the knowledge learned throughout the course. They also provide the facilitator with opportunities to give immediate feedback on what each student does/does not do well. Facilitators must review each activity's directions in the FG before guiding students through the learning activities.

GENERAL MATERIALS

Courses consistently need the following materials. Gather the necessary items and verify all equipment functions before starting class.

- Attendance sign-in sheets
- Name cards – 1 per student
- Pens or pencils
- Push pins or tape such as painter's tape
- Sticky notes
- Easel
- Flipchart
- Markers of various colors
- Student Guide (SG) – 1 per student
- Projector and sound system for course PPT and videos
- Laptop with access to the internet
- Assessments
- Course Evaluations (Found in the back of SG and FG)
- Appropriate Personal Protective Equipment (PPE)






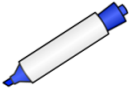




ACTIVITY MATERIALS

Gather the following materials specific to the activities in each module.

Module	Materials
Introduction	<ul style="list-style-type: none"> • Activity 1: Icebreaker <ul style="list-style-type: none"> ○ Gather the appropriate materials depending on the icebreaker chosen
Module 1: Introduction to Hot Work	<ul style="list-style-type: none"> • Activity 2: Completing a Hot Work Permit <ul style="list-style-type: none"> ○ Student Guide ○ Pens/Pencils
Module 2: Critical Controls	<ul style="list-style-type: none"> • None
Module 3: Roles and Responsibilities	<ul style="list-style-type: none"> • None
Module 4: Equipment	<ul style="list-style-type: none"> • Activity 3: Dressed for Hot Work <ul style="list-style-type: none"> ○ Student Guide ○ Pens/Pencils ○ PPT slides
Module 5: Health Hazards	<ul style="list-style-type: none"> • Activity 4: Hazardous Substances in the Work Area <ul style="list-style-type: none"> ○ Student Guide ○ Pens/Pencils
Module 6: High Hazard Areas	<ul style="list-style-type: none"> • Activity 5: Identifying Hazards <ul style="list-style-type: none"> ○ Student Guide ○ Pens/Pencils
Conclusion	<ul style="list-style-type: none"> • Knowledge Assessment

FACILITATOR GUIDE CUES

Facilitators quickly identify slides that have unusual but important features by recognizing the cues used throughout the FG. Reference the table below to understand the purpose of each symbol. On each slide that has a cue, the corresponding talking points are **bolded**.

Description	Symbol	Purpose
Audio Link		The speaker icon indicates when a PPT slide links to an audio file.
Video Link		The director's clapboard indicates when a PPT slide links to a video file.
Animated Slide		The star indicates when an animation appears on a PPT slide and requires more than one click to view all slide content.
Note		The notepad indicates the PPT slide or FG include a note relating to the slide but not necessarily found in the SG.
Incidents		The first aid symbol indicates when the PPT slide or FG addresses a PFE, testimonial, or other safety-related incidents.
Flipchart		The marker indicates when a facilitator writes down responses given by students on a flipchart or whiteboard.
Discussion		The question mark indicates when students need to participate in a discussion either as a class or in small groups.
Example		The hand indicates when the facilitator holds up an item or passes an example around the class.
Facilitation Tip		The podium indicates a facilitation technique used by the facilitator to enhance the presentation. The tip is included beneath a red heading at the end of the slide's talking points.
Site Specific		The yellow arrow indicates a place where the facilitator needs to prepare and add site-specific information before class starts.

LAWS OF LEARNING

Implementing the Six Laws of Learning can produce a more effective learning experience for both students and facilitators. Refer to the Instructor Fundamentals SG for more information.

Readiness: Students learn when they are ready, and learn little when they are not ready. Motivate students to prepare for learning and participate by setting a purpose, clearly stating objectives, and giving logical reasons for learning at the start of training.

Exercise: Content repeated is remembered. Every time a concept is practiced, learning is reinforced. Exercise includes recall, review, restatement, drills, and physical application.

Effect: People learn better in a favorable situation. Strengthen learning with pleasant motivational feelings. Constant negative motivation stifles the learning process.

Intensity: Students learn more from the real-life applications than from substitutes. Increase intensity, the power of the learning, through performance activities such as demonstrations, skits, audio/video clips, and models.

Primacy: What a student learns first stays. Teach the correct information the first time. Re-teaching may not work immediately and requires more time and practice with the student.

Recency: The most recent learning idea is the easiest to recall. Practice this law with restating, summaries, and conclusions.

FACILITATION REMINDERS

Incorporating feedback and eye contact, while eliminating semantic barriers can produce a more effective learning experience for both students and facilitators.

Feedback: Feedback in the classroom is evaluative or corrective information about a student's performance given by a facilitator to a student. Feedback guides students toward attaining the course objectives.

Eye contact: Eye contact means looking directly into the eyes of the students and at each student equally, not just at a few. It is communication that lets students know the facilitator is interested, allows for nonverbal feedback from students as the facilitator reads their expression, and enhances facilitator credibility as students can view facilitators with more eye contact as being more confident and competent.

Semantic Barriers: One word can confuse what the facilitator says and what the audience interprets. Avoid the overuse of jargon, symbolism, abbreviations, acronyms, and slang. Using clear and concrete words eliminates misunderstandings and helps students receive the message without misinterpretations.

QUESTIONING TECHNIQUES

Questions help the facilitator gauge the amount of understanding or student learning taking place.

TYPES OF QUESTIONS

Three types of questions can be used based on the type of response desired.

Rhetorical: No answer from a student is required, but it can be used throughout a lesson to gain attention.

Direct: Questions directed to one specific individual.

Overhead: Questions directed to an entire audience or class and can be answered by anyone.

When a facilitator seeks verbal responses, use response questions that engage and stimulate deeper thinking by the students rather than giving answers to the students.

Reverse: A question asked by student, then redirected back to the same student. Be sure there is a reasonable chance the student can answer it, and give assistance if needed.

Relay: A question asked by student, then redirected to another student. As with a reverse question, be sure there is a reasonable chance the student can answer it.

TYPES OF QUESTIONS TO AVOID

Types of questions to avoid are:

Dead end: Simple yes or no answers do nothing to promote thinking or discussions. If used, follow up with, “Why / How / When / Where?” to encourage students to explain their answers.

Foggy: Questions that are unclear or vague in nature and, therefore, hard to answer. Think about the answer desired before asking a question.

Multiple questions: Several questions at the same time. This technique is confusing for students. Allow them to focus on one question at a time. If you have several questions, wait for an answer to one before asking another one.

USING THE PPT PRESENTATION

When preparing to facilitate the course, there are several ways to integrate the PPT with the FG.

1. The facilitator can project the PPT and carry the paper copy of the FG as he/she walks around the room.
2. The facilitator can begin the PPT in presentation mode on his/her computer. This displays only the current slide to the class on the projection screen, but shows the facilitator a different view on his/her computer. The facilitator's screen shows a notes screen that has the same information for the slide that is included in the FG. This view also shows the next slide and lets the facilitator see the marker tools to write on the slides and emphasize talking points.
3. The facilitator can also choose to do both, which is the **preferred** method. Moving around the room helps the facilitator engage more participants and keeps the students' brains stimulated, thus promoting learning.



Facilitation Tip : The facilitator is the presentation. The PPT is an aid. Know the required talking points in the PPT notes or FG and engage the class by maintaining eye contact as much as possible and not directly reading from the slides or pages.

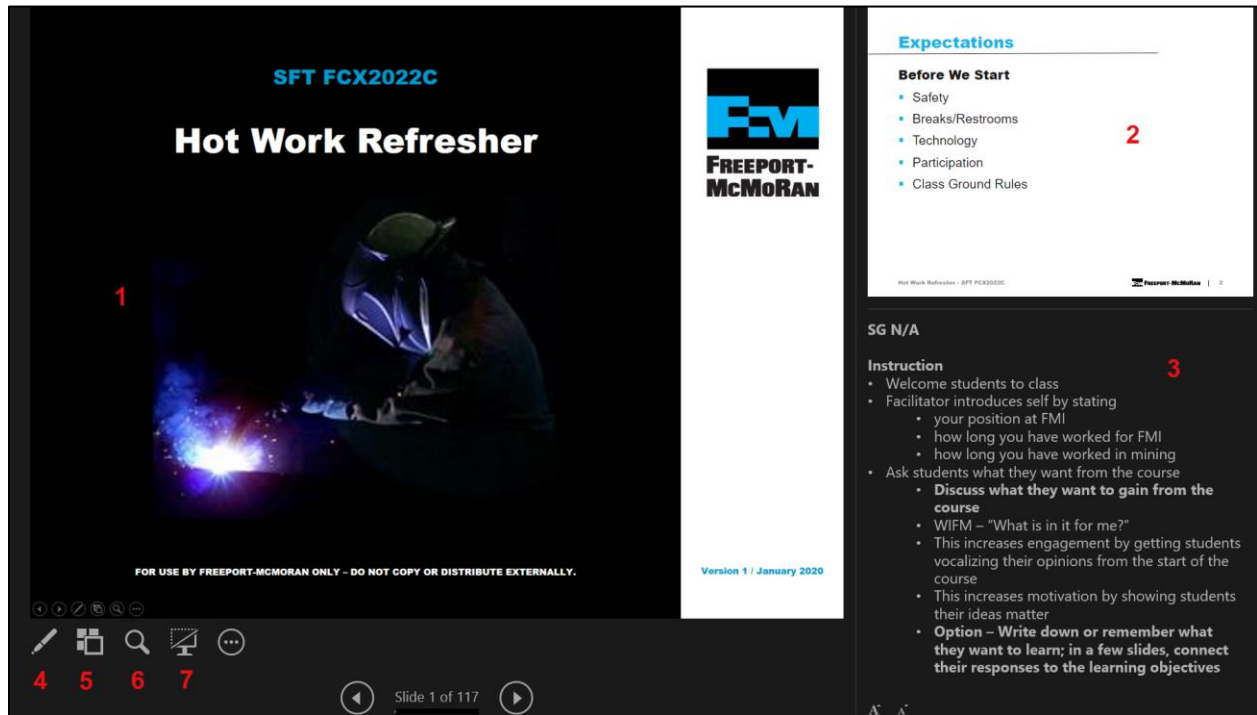
SETTING THE PRESENTATION MODE

To initiate the presentation mode, do the following.

Step	Action
1	Open the PPT presentation.
2	Find the colored bar at the bottom of the screen. The look and color vary depending on the PPT version used.
3	Select the icon circled in the image below and often found in the bottom right-hand corner of the PPT screen.

PRESENTATION MODE FEATURES

When in presentation mode, the students only see the slide displayed, but the facilitator sees the layout below. Some of the commonly used features available from this view are numbered and explained below.



1. **Current slide** – This is the slide students see on the projection screen.
2. **Next slide** – Shows a visual preview of the next slide.
3. **Notes** – Shows the same talking points available in the FG. The notes shown correspond to the current slide projected to the students.
4. **Pens** – This icon gives the user access to a laser pointer, pen, highlighter, ink color, and arrow options. The tool shows on the facilitator’s screen and the students’ projection screen. Facilitators use the tools to emphasize specific points on the PPT and customize the presentation to suit the needs of the site and students better.
5. **All slides** – This shows small slide images together on the facilitator’s screen.
6. **Zoom** – This icon lets the facilitator zoom in on specific aspects of the PPT.
7. **Black screen** – If the facilitator wants to explain content further but feels the PPT slide shown on the screen distracts from the learning, black out the screen to help focus the students.

INTRODUCTION

The introduction sets the tone for the course by introducing the facilitator, setting class expectations, welcoming the students, presenting the course learning objectives, setting safety as a priority, and providing guidelines on Hot Work activities and its associated controls, equipment, responsibilities, and hazards.

ACTIVITIES

Activity 1: Icebreaker

For further details, refer to *Activity Materials* under *Facilitator Preparation* on page 6.

TOTAL TEACHING TIME

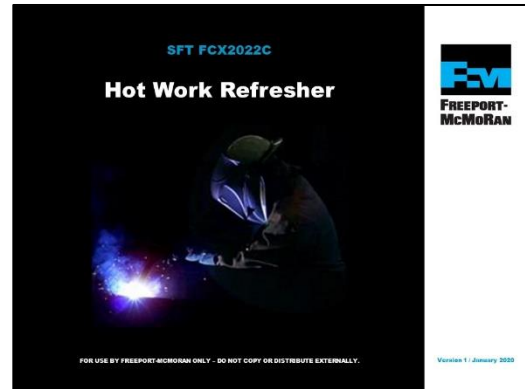
The introduction takes approximately 15 minutes to complete.

PPT slide 1, SG N/A



Instruction

- Welcome students to class
- Facilitator introduces self by stating
 - your position at FMI
 - how long you have worked for FMI
 - how long you have worked in mining
- Ask students what they want from the course
 - **Discuss what they want to gain from the course**
 - WIFM – “What is in it for me?”
 - This increases engagement by getting students vocalizing their opinions from the start of the course
 - This increases motivation by showing students their ideas matter
 - **Option – Write down or remember what they want to learn; in a few slides, connect their responses to the learning objectives**



Facilitation Tip

- Create a pleasant and welcoming atmosphere at the start of the class to increase learning (Law of Effect)
- Learn more in the Facilitator Preparation Section at the start of the FG

PPT slide 2, SG N/A



Instruction

- Discuss administrative/classroom guidelines
- Safety: Identify the appropriate evacuation procedures, gathering areas, and emergency exits and fire extinguisher locations, etc.
- Breaks and Restrooms
 - Establish and announce a break schedule to the class; ten minute breaks are included throughout the FG and occur approximately every 50 minutes so students can relax, refocus, and re-engage
 - Identify the location of restrooms and smoking areas
- Technology policy: Review your expectations on cell phone and laptop use during the training
- Participation
 - This course requires significant participation
 - Students should be prepared for discussions and small group activities
- Class ground rules – Verbalize your expectations; suggestions include the following:
 - Participate
 - Be on time
 - Stay on task
 - Listen when others talk
 - Respect the opinions and attitudes of others
- Student Course Evaluations
 - Direct students to the Student Course Evaluation at the end of the SG
 - Tell students to work on this throughout the course
 - Helps students write ideas down as they have them
 - Helps gather more substantial feedback as they are not rushed to complete the entire evaluation at the conclusion of the course when they are anxious to leave

Expectations

Before We Start

- Safety
- Breaks/Restrooms
- Technology
- Participation
- Class Ground Rules

Hot Work Refresher – SFT FCX2022C  2

Facilitation Tip

Letting students help create class rules

- Empowers them
- Creates buy-in
- Builds trust with the facilitator
- Helps maintain control as students hold each other accountable

ACTIVITY 1: ICEBREAKER

PPT slide 3



Time

Approximately 10 minutes

Materials

Choose an icebreaker and gather appropriate materials

Purpose

- Successful icebreakers promote a safe learning environment, which can reduce stress and increase retention. They also encourage students to contribute their ideas and experiences thus increasing motivation and engagement in the class
- Below is an assortment of icebreakers the facilitator can incorporate **at the beginning of the course as well as after breaks**

Icebreaker

Directions

Participate in an activity getting to know each other

Hot Work Refresher - SFT FCX2022C

Activity 1

Icebreaker	Instructions
<p>The Four Cs (10-15 minutes) <i>No prep needed</i></p>	<p>Ask each person to name a cartoon character, a color, a car, and a cuisine that best describes his or her personality and explain why</p>
<p>Nicknames (10-15 minutes) <i>No prep needed</i></p>	<ol style="list-style-type: none"> 1. Give students two minutes to think about a nickname they had during their lifetime and how they got it 2. Students introduce themselves to the class by sharing their nickname and explaining how they got it
<p>Color Introductions (10-15 minutes) <i>Need colored items and chart paper filled in ahead of time</i></p>	<ol style="list-style-type: none"> 1. Have colored items (i.e., marbles, dot stickers, Life Savers, gum drops, Skittles, M&Ms, etc.) available 2. Give each person 1-5 items (if it is food wear gloves and tell them not to eat it yet) 3. Tell them what each candy type/color represents (write on chart paper ahead of time and adjust as necessary/wanted) <ul style="list-style-type: none"> • Red – Favorite hobbies • Green – Favorite place on earth • Blue – Favorite memory • Yellow – Dream job • Orange – Wildcard (anything about yourself) 4. Each student introduces himself or herself, stating their name and sharing the fact corresponding to the color

Icebreaker	Instructions
<p>Fun Facts (10-15 minutes)</p> <p><i>Need notecards/paper</i></p>	<ol style="list-style-type: none"> 1. Divide class into groups of 3-5 students, designate 1 leader for the group, and give each student a notecard 2. Students write one fun, lesser known fact about themselves on a notecard without sharing it with anyone 3. Leader collects all notecards and reads them one at a time 4. Groups guess which fact belongs to whom 5. If time allows, each leader shares one fact with the class
<p>Blobs and Lines (10-15 minutes)</p> <p><i>No prep needed</i></p>	<ol style="list-style-type: none"> 1. Ask students to stand up from their chair 2. Give them a prompt, such as, “Gather with people who enjoy the same food as you” 3. Students move around the room and interact with others to complete the prompt 4. Prompts may require students to group themselves or line up 5. Call on students for answers to the prompts. <p>Possible prompts for groups</p> <ul style="list-style-type: none"> • Favorite sport • Type of pets • Best part of the holidays (if that time of year) <p>Possible prompts for lines</p> <ul style="list-style-type: none"> • Time you woke up this morning • Distance you drove to work • Alphabetical order by first name

Continued on next page

Icebreaker	Instructions
<p>Who Has (10-15 minutes)</p> <p><i>Need two sets of the same questions written on separate slips of paper</i></p>	<ol style="list-style-type: none">1. Write several questions on separate slips of paper beginning each with “Who has”; example questions:<ul style="list-style-type: none">• “Who has the farthest commute to work?”• “Who has the most family members?”• “Who has been on the most unusual vacation?”2. Write the same questions separately on other slips of paper3. Give one question to each student and locate the other student with the matching question4. Students introduce selves to partner and discuss answers5. As a class, students introduce partner and share partner’s answer along with any additional information they learned; examples provided below<ul style="list-style-type: none">• “Sarah has the longest commute to work; she drives 35 miles both ways to her job.”• “Jake’s commute was only 5 miles but he does ride a motorcycle every day.”

PPT slides 4-6, SG page iii




Instruction

- State objective(s) for each module
- Learning objectives are also located at the beginning of each module
- Option
 - If you wrote down or remember the student’s ideas of what they want to learn in the course, connect each response they gave to an objective (even if it is a vague connection)
 - This increases motivation by showing students their ideas matter

Facilitation Tip

- Reviewing objectives before teaching prepares students for learning (Law of Readiness)
- Learn more in the Facilitator Preparation Section at the start of the FG

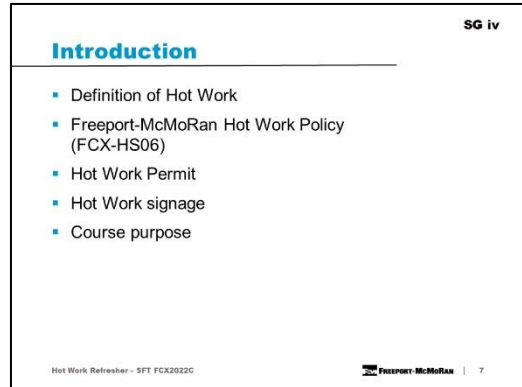
<p>Learning Objectives</p> <p>Module 1: Introduction to Hot Work</p> <ul style="list-style-type: none">▪ Define Hot Work and Fire Safe Areas and the associated safety concerns▪ Identify and differentiate between flammable and combustible materials <p>Module 2: Critical Controls</p> <ul style="list-style-type: none">▪ Identify the use of applicable controls	SG iii
<p>Learning Objectives</p> <p>Module 3: Roles and Responsibilities</p> <ul style="list-style-type: none">▪ Describe the roles and responsibilities of persons involved in Hot Work <p>Module 4: Equipment</p> <ul style="list-style-type: none">▪ Summarize the various equipment and hazards for different types of Hot Work	SG iii
<p>Learning Objectives</p> <p>Module 5: Health Hazards</p> <ul style="list-style-type: none">▪ Describe the health hazards associated with Hot Work <p>Module 6: High Hazard Areas</p> <ul style="list-style-type: none">▪ Evaluate scenarios and categorize the associated hazards	SG iii

Hot Work Refresher – SFT FCX2022C  6



Instruction

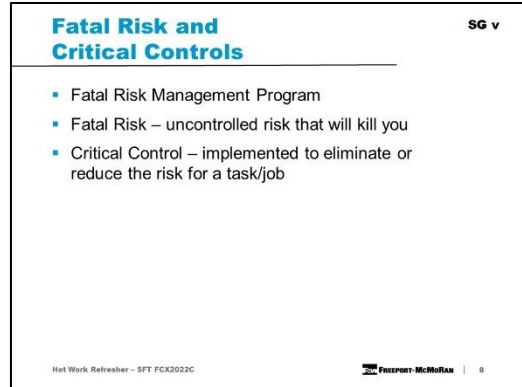
- Hot Work definition
 - Working with ignition sources near flammable materials
 - Any temporary maintenance, construction, or activity that uses gas or electrically powered equipment, which produces flames, sparks, or heat that is sufficient to start a fire or ignite flammable/combustible materials
- Freeport-McMoRan Hot Work Policy (FCX-HS06) – located on DOHS SharePoint
 - **Ask students: why is it important to know about the policy and where it is located?** (Possible answers: to know about any changes, current guidelines)
 - Provides guidelines and monitors compliance for all Hot Work activities performed in locations not normally identified as fire safe areas
 - Common Hot Work processes include welding, soldering, cutting, grinding, and brazing
- Hot Work Permit
 - Required for Hot Work operations unless working in a designated fire safe area (e.g., welding shop), which is documented by management
 - Valid for one work shift and one task
- Hot Work signage
 - Located in operational areas
 - Indicate fire hazards that may not be clear to personnel (e.g., machinery containing rubber liners, conveyor galleries, oil containment/storage, etc.)
- Course purpose
 - Provides guidelines for Hot Work activities executed in settings not normally identified as fire safe areas
 - Outlines the various hazards, controls, and procedures to conduct Hot Work safely and efficiently
 - Discusses when and where the policy allows Hot Work as well as the process to ensure the completion of work safely



PPT slide 8, SG page v

Instruction

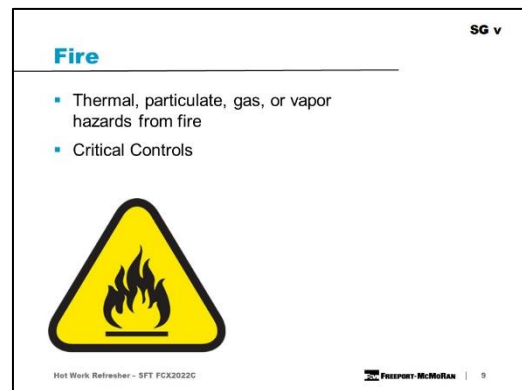
- Fatal Risk Management
- Continuation of Fatality Prevention Program
 - Focus placed on identifying Fatal Risks and Critical Controls to safeguard employees
 - Standardizes communication by implementing icons, definitions, and Critical Controls for twenty-three Fatal Risks
- Fatal Risks are based on safety issues that have resulted in catastrophic events such as severe injury or death
- While all risks have a degree of danger, Fatal Risks are risks that, when left uncontrolled, will kill you
- After identifying a Fatal Risk, Critical Control(s) are implemented to prevent death or mitigate consequences
 - Absence/failure of a Critical Control significantly increases the risk of severe injury or death despite the existence of other controls.
 - Help keep you from being killed
- Fatal Risks and Critical Controls relevant to this course are discussed next



PPT slide 9, SG page v

Instruction

- The Fire Fatal Risk is defined as exposure to thermal, particulate, gas, or vapor hazards from a fire
- **Discuss the Critical Controls**
 - Alarm Systems
 - Evacuation Plan
 - Fire Suppression Systems
 - Hot Work Permit Execution
 - Rescue Systems
 - Segregation and Storage




PPT slide 10, SG page vi

Instruction

- The Exposure to Hazardous Substances Chronic Fatal Risk is defined as workplace exposure to carcinogens and other substances that can cause lethal disease over time (e.g. silica, arsenic, lead, welding fumes, asbestos, acid mist, etc.)
- **Discuss the Critical Controls**
 - Access Control
 - Engineered Controls
 - Handling Requirements
 - PPE

Exposure to Hazardous Substances – Chronic SG vi

- Carcinogens and other substances
- Can cause lethal disease over time
- Critical Controls



Hot Work Refresher – SFT FCX2022C Freeport-McMoRan | 10

MODULE 1: INTRODUCTION TO HOT WORK

This module contains information about fire safe areas and describes how to complete the Hot Work Permit. The module also discusses the differences between flammables and combustibles.

LEARNING OBJECTIVES

Upon completion of this module, students will be able to

- Define Hot Work and Fire Safe Areas and the associated safety concerns
- Identify and differentiate between flammable and combustible materials

ACTIVITIES

Activity 2: Completing a Hot Work Permit

For further details, refer to *Activity Materials* under *Facilitator Preparation* on page 6.

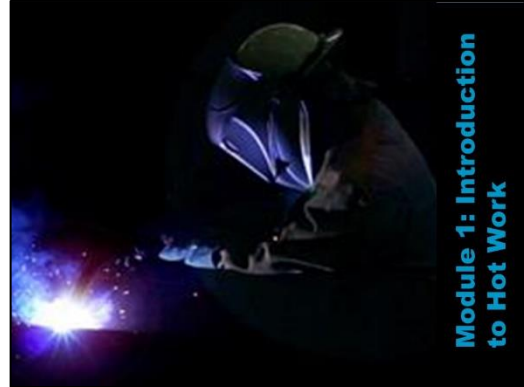
TOTAL TEACHING TIME

The module takes approximately 25 minutes to complete.

PPT slide 11, SG pages 3 and 5

Instruction

- Review learning objectives for the module
- Upon completion of this module, students will be able to:
 - Define Hot Work and Fire Safe Areas and the associated safety concerns
 - Identify and differentiate between flammable and combustible materials
- Module discusses the following:
 - Introduces what constitutes Hot Work
 - Discusses the difference between areas safe for Hot Work and the requirements to make an area safe
 - Describes flammables and combustibles and how ignition sources play a role with those materials is critical to the safety of employees
 - Focuses on how to identify combustible areas

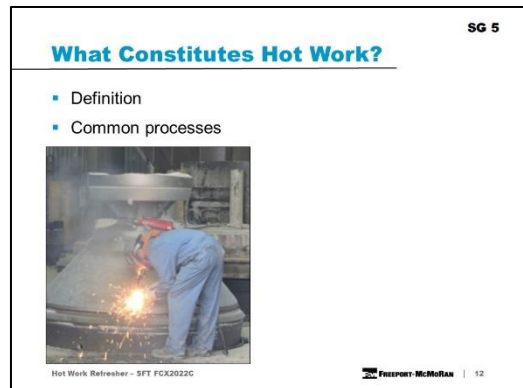


PPT slide 12, SG page 5



Instruction

- **Ask students: how would you define Hot Work?** (answers may vary)
- Policy definition: any process that can be a source of ignition when flammable or combustible materials are present or can be a fire hazard regardless of the presence of flammable/combustible materials in the workplace
- **Ask students: what are some common Hot Work Processes?** (answer: welding, soldering, cutting, grinding, and brazing)
- Equipment used in the process can produce flames, sparks, or heat that is sufficient to start a fire or ignite flammable/combustible materials



Facilitation Tip

- Questions are key to learning and can be used to clarify and stimulate thinking
- Use different questioning techniques to enhance the overall student experience
- See examples in the Facilitator Preparation Section at the start of the FG

PPT slide 13, SG page 5

Instruction

- Fire safe designated area: an area specifically designed for Hot Work (e.g., welding shops), which are free of any exposed combustibles
- Sometimes known as fire safe areas, Hot Work free zones, or fire safe zones
- Sites must identify each area along with the tasks that employees can perform
- Sites must maintain a record of the area and the processes

SG 5

Fire Safe Areas

- Specifically designed for Hot Work
- Free of any exposed combustibles
- Area identified by sites along with acceptable tasks
- Record maintained by sites



Hot Work Refresher - SFT FCX2022C

Freeport-McMoRan | 13

PPT slide 14, SG page 6

Instruction

- Hot Work Permit
 - Required for areas not designated as fire safe
 - Helps to guide workers through the process
 - Filed by supervisor for a minimum of one year
- Must complete when Hot Work operations will be on or near operational processes, or within one of the following:
 - 35 feet (11 meters) of distance for flammable/combustible materials
 - 50 feet (15 meters) of distance for flammable gases or vapors
 - 100 feet (30 meters) of distance for powder magazines
- Must also complete when performing work within 35 feet (11 meters) of the following:
 - Fuel storage areas or distribution lines
 - Battery storage or charging areas
 - Cooling towers
 - Reagent storage
 - Oxygen storage areas
 - Sewer and septic systems
 - Conveyor belting
 - Tire storage areas
 - Mobile fuel and lubrication trucks
 - Storage/materials handling areas where combustible or flammable materials are present
 - Other areas designated as permit required through established signs/labeling

SG 6

Hot Work Permit

When is a Permit Required?

- Hot Work operation on or near operational processes
- 35 feet (11 meters) of distance for flammable/combustible materials
- 50 feet (15 meters) of distance for flammable gases or vapors
- 100 feet (30 meters) of distance for powder magazines

Hot Work Refresher - SFT FCX2022C

Freeport-McMoRan | 14

PPT slide 15, SG page 7

Instruction


- Initiate the process before beginning work
- Keep the permit at the job site until 60 minutes after the job is complete and risk of fire has subsided
- Good for only one work shift and one task
- Signed by anyone involved with the Hot Work or assisting with the Hot Work; signing acknowledges the hazards, Fatal Risks, critical controls, and the roles and responsibilities before the start of the task.
- Becomes invalid under one of the following conditions:
 - Delay of 90 minutes or more of work
 - Change in the environment
 - Lack of Fire Watch(es)
 - Work stopped by anyone due to control failure or hazard recognition
- Obtain permit by following the site-specific procedure
- Complete all sections of the permit and do not leave any blanks

SG 7

Hot Work Permit

About the Permit

- Initiate process before beginning work
- Keep at job site until 60 minutes after
- Good for one work shift and one task
- Signed by anyone involved with work
- Become invalid in specific conditions

Hot Work Refresher - SFT FOX20220  | 15



Instruction

- Go over each section of the permit
- **Click for General Information section**
 - Identifies the Authorized Individual who will be performing the task/activity
 - Identifies the following:
 - Date
 - Start and end time
 - Location
 - Department
 - Task/Activity
 - Individual(s) performing work
 - Fire Watch
 - Emergency contact
- **Click for Hot Work on Containers and Fuel Tanks section**
 - Any Hot Work that must be performed on containers holding flammable or combustible liquids/gases must be purged, cleaned, and filled with inert liquid or gases and tested for % LEL/LFL
 - Initial when reading is taken and tested to verify LEL/LFL less than 10%
- **Click for Hot Work in All Areas section**
 - Read each item 1-9 and answer by checking either the “Yes” or “No” box
 - Complete a variance if any answer is checked No
 - Refer to Policy Administrative Requirements FCX-HS01 located under DOHS Policies for additional information on Variances
- **Click for Atmospheric Testing section**
 - Conduct when there is a reasonable possibility for flammable gases, vapors, or excessive oxygen
 - LEL must be below 10%
 - Oxygen Measurement must be below 23%
 - Stop all work if oxygen is above 23% or LEL are greater than 10%
 - Place NA for not applicable if not applicable to the task
- **Click for Complete this Section at End of Job section**
 - Document the date and time once work is complete
 - Ensure the final inspection is signed by the assigned Fire Watch 60 minutes from the time the work is completed
 - Record the end time

Hot Work Permit - Example

SG 9

COMPLETE THIS SECTION AT END OF JOB
 Work Completed Date & Time 08/19/19 10:50 AM
 I verify the area has been monitored for the absence of fire for 30 minutes after hot work ceased, and that a thorough inspection of the entire work area has been completed.
 Final inspection by: Roger Garcia
 Time: 11:20 AM

Hot Work Refresher - SFT FCX2022C

Freeport-McMoRan | 16

ACTIVITY 2: COMPLETING A HOT WORK PERMIT

PPT slides 17-18, SG pages 10-11



Time

Approximately 10 minutes

Materials

- Student Guide
- Pens/Pencils

Purpose

This activity gives students the opportunity to complete a Hot Work Permit

Instruction

1. Read the following scenario: *The administration department requested that the maintenance group repair a flagpole damaged by wind and cracked at its base. You must remain in the field to complete the task.*
2. Give students 5 minutes to complete the permit
 - a. Students may work individually, in pairs, or in small groups
 - b. Assist as needed
3. Go over the permit as a whole group using the suggested answers provided on the next page and on slide 18

Facilitation Tip


- Module activities increase learning through repetition (Law of Exercise)
- Learn more in the Facilitator Preparation Section at the start of the FG

SG 10

Completing a Hot Work Permit

Directions

1. Read the scenario
2. Complete the Hot Work Permit based on the scenario's information
3. Discuss as a whole group

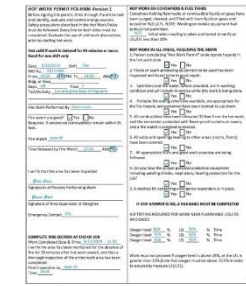


Hot Work Refresher - SFT FCX2022C

Activity 2

SG 11

Completing a Hot Work Permit



Hot Work Refresher - SFT FCX2022C

Freeport-McMoran | 10

Suggested Answer Key

HOT WORK PERMIT FCX-HS06 Version 1

Before signing this permit, think through the entire task and identify, evaluate and control energy sources. Safety precautions described in the Hot Work Policy must be followed. Every line on both sides must be completed. Evaluate the use of cold work alternatives prior to starting hot work.

**Not valid if work is delayed for 90 minutes or more.
Good for one shift only**

Date 8/13/2019 Shift Day
 WO No. 08111983
 From 10:00 AM/PM To 14:00 AM/PM
 Bldg. or Area _____
 Dept. HR Floor 1
 Task/Activity Cut and grind base of flag pole

Hot Work Performed By Geno Louis

Fire watch assigned? Yes No
 Required, if uncovered combustibles remain within 35 feet.

Fire Watch Jean All

Time Released by Fire Watch 14:30 AM/PM

I verify that the area has been inspected
Geno Louis

Signatures of Persons Performing Work
Grace Glad

Signature of Area Supervisor or Designee

Emergency Contact 911

COMPLETE THIS SECTION AT END OF JOB

Work Completed Date & Time: 8/13/2019 14:30
 I verify the area has been monitored for the absence of fire for 30 minutes after hot work ceased, and that a thorough inspection of the entire work area has been completed.
 Final Inspection by: Jean All
 Time: 14:45

HOT WORK ON CONTAINERS & FUEL TANKS

Containers holding flammable or combustible liquids or gases have been purged, cleaned, and filled with inert liquid or gases and tested for %LEL/LFL. NOTE: Welding on mobile equipment fuel tanks is not permitted.

N/A Initial when reading is taken and tested to verify an LEL/LFL less than 10%

HOT WORK IN ALL AREAS, INCLUDING THE ABOVE

- Person completing "Hot Work Permit" understands hazards in the hot work zone.
 Yes No
- Flame or spark-producing equipment to be used has been inspected and found to be in good repair.
 Yes No
- Sprinklers and fire water, where provided, are in working condition and will remain in service while this work is being done.
 Yes No
- Portable fire extinguishers are available, are appropriate for the fire hazard, and personnel have been trained to use them.
 Yes No
- All combustibles have been relocated 35 feet from the hot work, and the remainder protected with flame-proof curtains or covers, and a fire watch is assigned as needed.
 Yes No
- All voids and openings leading to other areas (rooms, floors) have been covered.
 Yes No
- All appropriate SOPs and good work practices are being followed.
 Yes No
- Do you have the proper personal protective equipment including welding shields, respirators, hearing protection for the job?
 Yes No
- A method for contacting emergency responders is in place.
 Yes No

IF ANY ANSWER IS NO, A VARIANCE MUST BE COMPLETED

AIR TESTING REQUIRED FOR WORK NEAR FLAMMABLE LIQUIDS AND GASES

Oxygen level N/A % LEL N/A % Time
 Oxygen level N/A % LEL N/A % Time
 Oxygen level N/A % LEL N/A % Time

Work must not proceed if oxygen level is above 23%, or the LEL is greater than 10% (note that oxygen must be above 19.5% in order to accurately measure LEL/LFL).

PPT slide 19, SG page 12

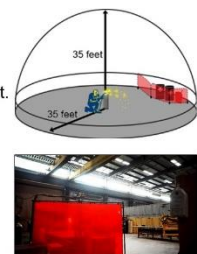
Instruction

- Check to see that the Hot Work area is free of any exposed combustibles before beginning work
- Relocate all combustible material and debris at least 35 feet (11 meters) from the work area
- Secure combustibles with flame-resistant blankets or shield combustibles with heat-resistant curtains if relocation is impossible
- Protect combustible objects from falling sparks, hot materials, and igneous byproduct generated from Hot Work

Area Safe for Hot Work

SG 12

- Check area free of exposed combustibles
- Relocate combustible material and debris 35 ft. (11m) from work area
- Secure combustibles with blankets or shield with curtains
- Protect combustible objects



Hot Work Refresher - SFT FCX2022C

Freeport-McMoRan | 19

PPT slide 20, SG page 13



Instruction

- Flammable and combustible liquids: present at all sites
- **Ask students: what are some examples of flammable or combustible liquids?** (Possible answers: fuels and many common products like solvents, thinners, cleaners, adhesives, and paints)
- Be aware of the hazards
- Know how to work safely with them
- Reference the Safety Data Sheet (SDS) and other reference materials that contain information on the properties of a specific material or liquid

Flammables and Combustibles

SG 13

- Present at all sites
- Be aware of hazards
- Know how to work safely with them
- Reference Safety Data Sheet (SDS) and other reference materials

Hot Work Refresher - SFT FCX2022C

Freeport-McMoRan | 20

PPT slide 21, SG page 13




Instruction

Go over the table

- Flammable
 - Definition: Material that can easily catch fire under normal circumstances and with the help of minimal ignition source; simple spark is sufficient
 - Examples: Fuel, solvents, thinners, cleaners, adhesives, paint
 - Flash Point: Below 100 degrees Fahrenheit / 38 degrees Celsius (<100°F / 38°C)
- Combustible
 - Definition: Any material that will burn but requires more vigorous conditions; simple spark is not enough
 - Examples: Combustible liquids, metal, wood, paper, rubber, certain dust concentrates, plastics
 - Flash Point: Between 100 and 200 degrees Fahrenheit / 38 and 93 degrees Celsius (100°F/38°C - 200°F/93°C)
- **Ask students: which is more dangerous?** (Answer: flammable because only a simple spark is sufficient)

SG 13

	Flammable	Combustible
Definition	Easily catch on fire, minimal ignition source	Can burn, requires more vigorous conditions
Flash Point	Below 100°F / 38°C	Between 100°F and 200°F / 38°C and 93°C

Hot Work Refresher - SFT FCX2022C  | 21

PPT slide 22, SG page 14

Instruction


- Areas with known, but not readily visible, combustibles must have appropriate signage that requires the use of a Hot Work Permit
- Examples of the areas include the following:
 - Electrical installations
 - Conveyor galleries
 - Machinery that contains rubber or plastic products
- Vital to identify and utilize controls on items that are plastic, rubber-lined, combustible, or flammable
- Ensure there is a Fire Watch or multiple Fire Watches when introducing ignition sources into a combustible area


SG 14

Flammables and Combustibles

Combustible Areas

- Require appropriate signage and use of Hot Work Permit
- Vital to identify and use controls on items
- Ensure Fire Watch(es) when introducing ignition sources



Hot Work Refresher - SFT FCX2022C  | 22

PPT slide 23, SG page 14




Instruction

- Create conditions that expose employees to a hazardous atmosphere
- Conduct atmospheric testing (by trained personnel) as part of the permit process where there is a reasonable possibility that flammable gases, vapors, or excessive oxygen may exist
- Conduct periodic atmospheric checks throughout the Hot Work task (by trained personnel) to ensure flammable gases are within range or eliminated during Hot Work
- **Ask students: what is the minimum distance required by the Freeport-McMoRan Hot Work Policy (FCX-HS06) between the Hot Work and the flammable gases or vapors?** (Answer: 50 feet (15 meters) or more away)

Flammables and Combustibles SG 14

Flammable Gas

- Create conditions expose to hazardous atmosphere
- Conduct atmospheric testing as part of permit process
- Conduct periodic atmospheric checks throughout Hot Work task



Hot Work Refresher - SFT FCX2022C Freeport-McMoRan | 23


PPT slide 24, SG page 15

Instruction

- Conduct periodic checks of the work area as work progresses
- Observe for fire, dust accumulation, adequate ventilation, atmospheric testing, or other hazardous condition
- Stop the job if anyone observes a hazard and correct the problem before continuing work

Hazardous Conditions SG 15

- Conduct periodic checks of work area
- Observe for hazardous conditions
- Stop the job if needed and correct problem



Hot Work Refresher - SFT FCX2022C Freeport-McMoRan | 24

MODULE 1 QUIZ

PPT slides 25-30, SG page 16



Instruction

- Students write answers to the quiz questions in the SG
- Review the answers as a class
- **Click to view circled answer**

Quiz Answers

Question	Answer
1	C, source of ignition, SG Page 5
2	B, combustibles, SG Page 5
3	A, True, SG Page 6

Facilitation Tip

- Module quiz questions increase learning through repetition (Law of Exercise)
- Learn more in the Facilitator Preparation Section at the start of the FG

Module 1 Quiz
SG 16

Directions

1. Complete the quiz in the Student Guide
2. Discuss the answers as a class

Quiz

Hot Work Refresher - SFT FCX2022C

Module 1 Quiz
SG 16

1. According to the Freeport-McMoRan Hot Work Policy (FCX-HS06), Hot Work is any process that can be a _____ when flammable or combustible materials are present or can be a fire hazard regardless of the presence of flammable/combustible materials in the workplace.
 - a. source of fire
 - b. source of heat
 - c. source of ignition
 - d. source of explosion

Module 1 Quiz
SG 16

2. A fire safe designated area is an area specifically designed for Hot Work (e.g., welding shops), which are free of any exposed _____.
 - a. ignition sources
 - b. combustibles
 - c. heat sources
 - d. flammables

Module 1 Quiz
SG 16

3. Areas not designated as fire safe require a Hot Work Permit.
 - a. True
 - b. False

Hot Work Refresher - SFT FCX2022C
Freeport-McMoRan | 28

Continued on next page

PPT slides 25-30, SG page 16



Instruction

- Students write answers to the quiz questions in the SG
- Review the answers as a class
- **Click to view circled answer**

Quiz Answers

Question	Answer
4	B, False, SG Page 13
5	A, 35 feet (11 meters), SG Page 6

SG 16

Module 1 Quiz

4. All combustible materials are flammable.

a. True

b. False

SG 16

Module 1 Quiz

5. Complete a Hot Work Permit when working within _____ of combustible materials.

a. 35 feet (11 meters)

b. 50 feet (15 meters)

c. 90 feet (27 meters)

d. 100 feet (30 meters)

Hot Work Refresher – SFT FCX2022C Freeport-McMoRan | 30

PPT slide 31, SG N/A



Instruction

Discuss the questions on the slide

Facilitation Tip

- Debriefs help summarize, review, refresh, retain, and clarify previously covered content, which increases learning (Law of Recency)
- Learn more in the Facilitator Preparation Section at the start of the FG
- Add debriefs before or after breaks, and at the beginning or end of a day to gauge student understanding and prepare them to learn more

Debrief

- What are some key concepts learned in this module?
- What do you need to understand better?
- What information surprised you?

Hot Work Refresher – SFT FCX2022C Freeport-McMoRan | 31

MODULE 2: CRITICAL CONTROLS

This module contains information about various controls and methods used during Hot Work activities to help eliminate the risk of fire. The module also discusses methods used to protect employees in the event of a control failure.

LEARNING OBJECTIVES

Upon completion of this module, students will be able to identify the use of applicable controls.

ACTIVITIES

None

TOTAL TEACHING TIME

The module takes approximately 10 minutes to complete.

PPT slide 32, SG pages 19 and 21

Instruction

- Review learning objectives for the module
- Upon completion of this module, students will be able to identify the use of applicable controls
- Module discusses the following:
 - Discusses several critical controls and methods to eliminate the risk of fire
 - Describes PPE, fire suppression, and emergency procedures that protect employees in the event of a control failure



PPT slide 33, SG page 21

Instruction

- Identify all Fatal Risks
- Inspect all critical controls already in place to evaluate if they are in proper working order
- Stop the work if conditions change

Hazard Control

SG 21

- Identify all Fatal Risks
- Inspect all critical controls already in place
- Stop the work if conditions change



Hot Work Refresher - SFT FCX2022C

Freeport-McMoRan | 33




Instruction

- For Hot Work procedures, evaluate the work area by identifying combustible/flammable material and Fatal Risks
 - Takes place before, during, and after performing Hot Work
 - **Ask students: what kind of questions do you ask when conducting a workplace exam for Hot Work?** (possible answers listed below)
 - What could happen if conditions such as weather and lighting change?
 - Have you and your coworkers been trained to perform the given tasks? Do not perform a task unless trained to complete it safely
 - Are there hazards that could originate from outside of your work area? Examples include dust or gas, like vehicle exhaust, which migrates into the work area from somewhere else
 - Are your activities creating hazards for you and others in the area? Examples include working with open holes, welding above people who are walking, or using chemicals that could splash or need specific gloves or equipment to handle
- Complete a Hot Work Permit when employees cannot relocate work
- Protect flammable materials either with fire-resistant or insulating material and assign a Fire Watch

SG 22

Area Inspection

- Identify combustible/flammable materials and Fatal Risks
- Complete Hot Work permit if cannot relocate work
- Protect flammable materials
- Assign Fire Watch



Hot Work Refresher - SFT FCX2022C Freeport-McMoRan | 34


Instruction

- Identify any safety concerns such as clear walkways, housekeeping issues, and safe access to all escape and emergency exits during the workplace exam
- Discuss an escape plan with all the individuals involved before conducting work
- Evaluate the scope of the work and develop a rescue plan that includes a way for safe/fast rescue (e.g., man-lift, scissor lifts)
- Know the area's emergency procedures and do not put yourself in harm's way
- Follow the site's emergency procedures if an emergency occurs
 - Radio procedures
 - Emergency numbers and procedure

SG 22

Emergency Procedures

- Identify safety concerns
- Discuss escape plan
- Evaluate scope of work and develop rescue plan
- Know area's emergency procedures
- Follow site's emergency procedures

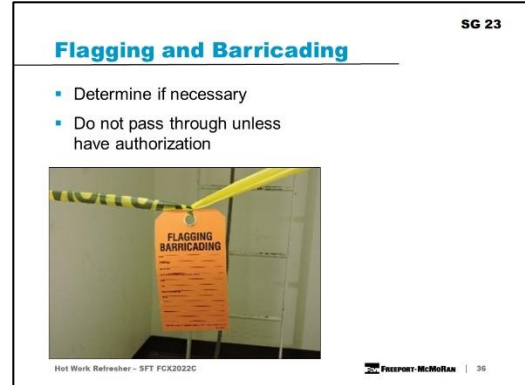


Hot Work Refresher - SFT FCX2022C Freeport-McMoRan | 35

PPT slide 36, SG page 23

Instruction

- Determine if necessary to use flagging and barricading before starting Hot Work
- Do not pass through a guarded or flagged area or go around a welding curtain unless the employee has the authorization to be in the area or the employee adheres to the Flagging and Barricading Policy



PPT slide 37, SG page 23



Instruction

- **Ask students: what are fire extinguishers for?** (answer: to assist in escape or to extinguish a small fire in its early stages)
- Remind students that if there is even the slightest doubt about personal safety:
 - Do not fight the fire
 - Exit the area immediately and notify emergency personnel
- Isolate nearby alarm systems
- Ensure the following when working on or near fire suppression or alarm equipment
 - Do not deactivate the entire alarm or sprinkler system when working near smoke detectors, alarm sensors, or sprinkler systems
 - Isolate the detectors, sensors, or sprinkler heads in the affected area to prevent false alarms or sprinkler system activation
 - Ensure the device(s) is (are) returned to normal service conditions after the completion of work
 - Make appropriate notifications to site operations



PPT slide 38, SG page 24

Instruction

- Ventilation goal: keep fresh air moving through the space and make the air safe to breathe and work in
- Always be sure there is an adequate supply of blowers and flexible ducts for the types of operations performed

Ventilation Requirements SG 24

- Keep fresh air moving through the space
- Make air safe to breathe and work in
- Consider two main types



Hot Work Refresher - SFT FCX2022C Freeport-McMoRan | 38


PPT slide 39, SG pages 24-25

Instruction


- Local Exhaust ventilation system: removes hazardous fumes and dust generated from operations such as welding, cutting, burning, and continuous brazing at or near the generation point
- Forced air ventilation system: Primary source of air circulation or in conjunction with a local exhaust system called a Push-Pull system whenever possible; Forced air (dilution) systems more effective than local exhaust systems

Ventilation Requirements SG 24-25

Local Exhaust
Removes hazardous fumes and dust



Forced Air
Primary source of air circulation



Hot Work Refresher - SFT FCX2022C Freeport-McMoRan | 39

MODULE 2 QUIZ

PPT slides 40-45, SG page 26



Instruction

- Students write answers to the quiz questions in the SG
- Review the answers as a class

Click to view circled answer

Quiz Answers

Question	Answer
1	B, To keep fresh air moving through the space, making the air safe to breathe and work in, SG Page 24
2	C, Before conducting any work, SG Page 22
3	A, True, SG Page 23

Module 2 Quiz
SG 26

Directions

1. Complete the quiz in the Student Guide
2. Discuss the answers as a class

Quiz

Hot Work Refresher - SFT FCX2022C

Module 2 Quiz
SG 26

1. What is the goal of ventilation?
 - a. To keep bad air moving through the space, making the air safe to breathe and work in.
 - b. To keep fresh air moving through the space, making the air safe to breathe and work in.
 - c. To keep fresh air moving through the space, making the air dangerous to breathe and work in.
 - d. To keep bad air moving through the space, making the air dangerous to breathe and work in.

Module 2 Quiz
SG 26

2. When do you create an emergency plan during Hot Work?
 - a. Before the permit expires
 - b. Once an emergency occurs
 - c. Before conducting any work
 - d. After the monthly safety meeting

Module 2 Quiz
SG 26

3. After flagging and barricading an area, personnel not involved in the Hot Work operation cannot pass through the area.
 - a. True
 - b. False

Hot Work Refresher - SFT FCX2022C
Freeport-McMoRan | 43

Continued on next page

PPT slides 40-45, SG page 26



Instruction

- Students write answers to the quiz questions in the SG
- Review the answers as a class
- **Click to view circled answer**

Quiz Answers

Question	Answer
4	B, False, SG Page 23
5	A, B, and C, Before, during, and after performing Hot Work, SG Page 22

SG 26

Module 2 Quiz

4. Use fire extinguishers to put out large fires.

a. True

b. False

SG 26

Module 2 Quiz

5. When should employees evaluate the work area by identifying combustible material, flammable material, and Fatal Risks? Circle all that apply.

a. After performing Hot Work

b. Before performing Hot Work

c. During performing Hot Work

Hot Work Refresher – SFT FCX2022C Freeport-McMoRan | 45

PPT slide 46, SG N/A



Instruction

Discuss the questions on the slide

Debrief

- What are some key concepts learned in this module?
- What do you need to understand better?
- What information surprised you?

Hot Work Refresher – SFT FCX2022C Freeport-McMoRan | 46

Break

- Take a 5 to 10 minute break after this module
- Clearly communicate what time you expect students to return

MODULE 3: ROLES AND RESPONSIBILITIES

This module contains information about the roles involved in Hot Work, including qualified personnel, authorized personnel, and the Fire Watch.

LEARNING OBJECTIVES

Upon completion of this module, students will be able to describe the roles and responsibilities of persons involved in Hot Work.

ACTIVITIES

None

TOTAL TEACHING TIME

The module takes approximately 10 minutes to complete.

PPT slide 47, SG pages 29 and 31

Instruction

- Review learning objectives for the module
- Upon completion of this module, students will be able to describe the roles and responsibilities of persons involved in Hot Work
- Module discusses the following
 - Roles of qualified and authorized employees who may conduct Hot Work
 - Role of the Fire Watch as well as discusses the required training for the role

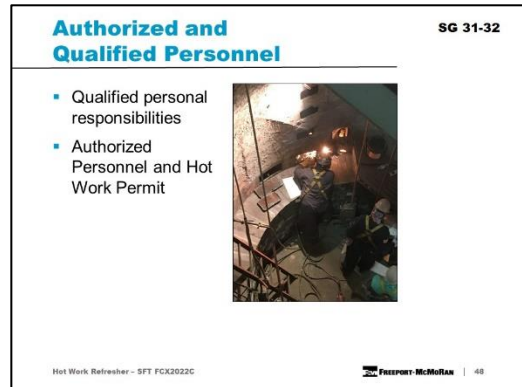


PPT slide 48, SG pages 31-32



Instruction

- Only authorized and qualified personnel allowed to perform Hot Work activities
- Qualified Person: one who, by possession of a recognized degree, certificate, or professional standing, or who by knowledge, training, and experience, has successfully demonstrated his/her ability to solve or resolve problems relating to the subject matter, the work, or the project
- **Ask students: what are some Hot Work responsibilities of Qualified Personnel?** (possible answers listed below)
 - Complete the Hot Work Permit Procedure if necessary
 - Remove all flammable or combustible materials within 35 feet (11 meters) of the Hot Work area; further distances are necessary due to the type of combustible or situation (e.g., for powder magazines the Hot Work must be 100 feet (30 meters) away)
 - Shield any combustibles in the Hot Work area that workers cannot remove with non-combustible blankets or other non-combustible materials.
 - Use a non-combustible spray or water on combustible floors, walls, or ceiling areas around Hot Work operations if possible

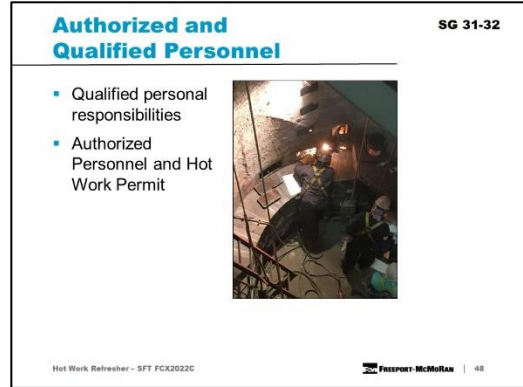


Continued on next page



Instruction

- **Ask students: what are some Hot Work responsibilities of Qualified Personnel?**
(possible answers listed below)
 - Seal any cracks and openings through which hot sparks enter or pass through; use a fire-resistant shield to block openings
 - Place non-combustible or flame-resistant curtains or screens to protect personnel in adjacent work areas from heat, flames, UV, radiant energy, and weld splatter
 - Inspect all cutting and welding equipment to ensure that they are in proper operating condition and good working order
 - Ensure completion of proper task training in the safe operation of the equipment and the Hot Work process they are about to perform
- The procedures for the Hot Work Permit include the following steps:
 1. Authorized Person inspects the area before authorizing a Hot Work permit.
 2. Employee/Hot Work operator completes the Hot Work Permit at the job area and posts the permit until completion of the job or duration of the permit (not to exceed the work shift)
 3. All personnel involved in the Hot Work sign the permit.
 4. Employee/Hot Work operator returns the Hot Work Permit to the supervisor after completing or at the end of the work shift
 5. Department who initiated the permit stores and maintains the permit

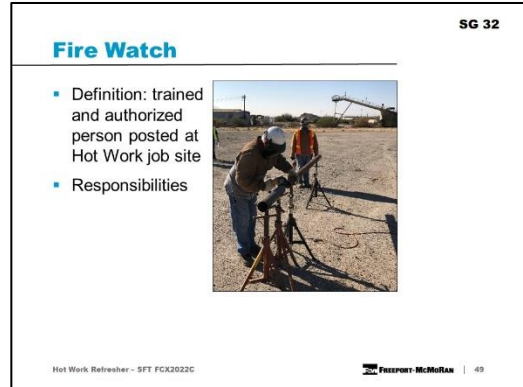


PPT slide 49, SG page 32



Instruction

- Fire Watch: trained and authorized person posted at the Hot Work job site who remains there for the duration of the job and beyond as required by the Hot Work Permit
- **Ask students: what are the Fire Watch's responsibilities?** (possible answers listed below)
 - Assists with fire control, communication, and inspection of the affected area
 - Monitors the Hot Work areas to make sure that conditions do not change when workers cannot effectively remove, protect, or shield combustible materials
 - Helps prevent and extinguish fires at the incipient (beginning) stage
 - Observes for fire, dust accumulation, adequate ventilation, atmospheric testing, or other hazardous conditions that endanger the safety of the workers
 - Performs no other functions or tasks during their assignment as a Fire Watch
 - Is able to activate the alarm if unable to extinguish a fire in the areas exposed to the Hot Work
- Authorizing individual responsible for identifying and implementing all precautions and assigning the proper individuals must inspect Hot Work area before permitting any Hot Work
- Each person assigned as a Fire Watch sign and date the Hot Work Permit

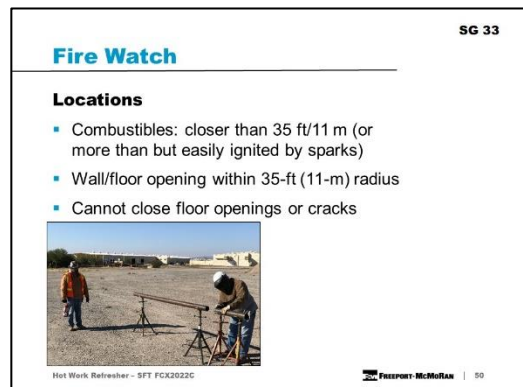


PPT slide 50, SG page 33

Instruction

Fire Watch required whenever performing Hot Work in locations where the following conditions exist:

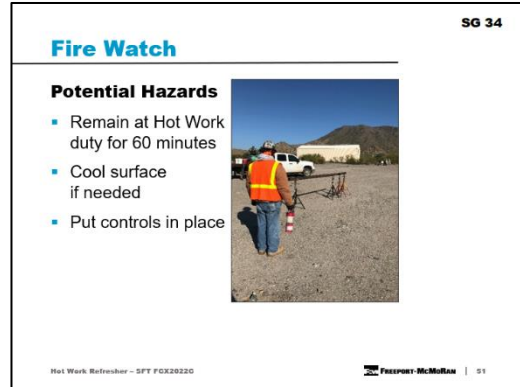
- Combustible material is closer than 35 feet (11 meters) to the point of operation
- Combustibles are more than 35 feet (11 meters) away but easily ignited by sparks
- Wall or floor openings within a 35-foot (11-meter) radius expose combustible material in adjacent areas including concealed spaces in walls or floors
- Workers cannot close floor openings or cracks in the flooring; take precautions to eliminate exposure of readily combustible materials
 - Look for exposure of materials located on floor below to sparks which can drop through the floor
 - Observe the same precautions about cracks or holes in walls, open doorways, and open or broken windows



PPT slide 51, SG page 34

Instruction

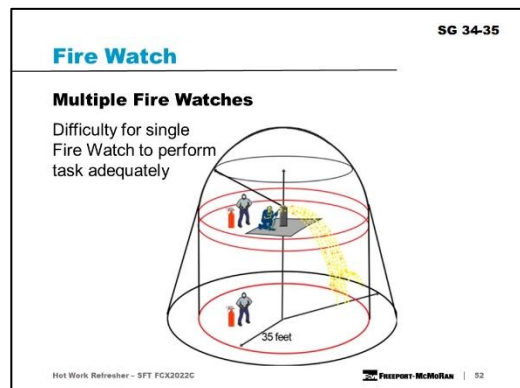
- Remain at the Hot Work duty for 60 minutes after the completion of the Hot Work task to detect and extinguish possible smoldering fires
- Cool the surface by appropriate means or extend the watch until the risk has abated if after 60 minutes, the material is still noticeably hot
- Put controls in place when any of the following potential hazards exist:
 - Cannot remove, protect, or shield combustible materials
 - Possible exposure to welding or toxic fumes
 - Transference of heat from one space to another or to spaces below
 - Potential of fire in adjacent spaces
 - Any coverings used to protect equipment are not fire retardant



PPT slide 52, SG pages 34-35

Instruction

- Example/image explanation
 - Additional safeguards apply when applying the 35-foot (11-meter) rule involving elevated work
 - Workers close the doors, seal the floor openings, post the permit, and prevent general access
 - Supervision determines the need for additional Fire Watches
 - Position the operator to limit spatter during work if possible and relocate combustible storage or cover with approved barriers
 - Protect equipment below and position Fire Watchers to protect potential hazard areas
 - Always provide a means for communication



Continued on next page

PPT slide 52, SG pages 34-35



Instruction

- **Ask students: when would a task need additional or multiple Fire Watches?**
(possible answers listed below)
 - Fire Watch cannot be present at all times during the performance of Hot Work
 - Fire Watch does not have a clear view of and immediate access to all areas included in the fire watch
 - Fire Watch is unable to communicate with all the workers involved in the Hot Work
 - Fire Watch is unable to extinguish all incipient stage fires in the Hot Work area
 - Fire Watch is unable to alert all employees of any fire beyond the incipient stage
 - Fire Watch is unable to activate the alarm if unable to extinguish a fire in the areas exposed to the Hot Work

Fire Watch SG 34-35

Multiple Fire Watches

Difficulty for single Fire Watch to perform task adequately

Hot Work Refresher – SFT FCX2022C Freeport-McMoRan | 52

PPT slide 53, SG page 35

Instruction

- Physically capable of performing the necessary duties
- Complete training in the use of any required fire-extinguishing equipment
- Complete training in fire prevention and extinguisher use during initial training and refreshed annually

Fire Watch SG 35

Training

- Use of any required fire-extinguishing equipment
- Fire prevention and extinguisher use
- Initial training and refreshed annually

Hot Work Refresher – SFT FCX2022C Freeport-McMoRan | 53

MODULE 3 QUIZ

PPT slides 54-59, SG page 36



Instruction

- Students write answers to the quiz questions in the SG
- Review the answers as a class
- **Click to view circled answer**

Quiz Answers

Question	Answer
1	A, B, C, D, SG Page 31
2	B, False, SG Page 32
3	A, True, SG Page 32

Module 3 Quiz
SG 36

Directions

1. Complete the quiz in the Student Guide
2. Discuss the answers as a class

Quiz

Hot Work Refresher – SFT FCX2022C

Module 3 Quiz
SG 36

1. Which of the following responsibilities aligns with the individual performing the Hot Work? Circle all that apply
 - Ⓐ Complete the Hot Work Permit Procedure if necessary.
 - Ⓑ Inspect all cutting and welding equipment to ensure they are in proper operating condition and good working order.
 - Ⓒ Remove all flammable or combustible materials within a 35-foot radius of the Hot Work area.
 - Ⓓ Ensure completion of proper task training in the safe operation of the equipment and the Hot Work process about to perform.

Module 3 Quiz
SG 36

2. Only the Authorized Person and supervision must sign the Hot Work Permit.
 - a. True
 - Ⓑ False

Module 3 Quiz
SG 36

3. A Fire Watch is a trained and authorized person posted at the Hot Work job site who remains there for the duration of the job and beyond as required by the Hot Work Permit.
 - Ⓐ True
 - b. False

Hot Work Refresher – SFT FCX2022C
Freeport-McMoRan | 57

Continued on next page

PPT slides 54-59, SG page 36



Instruction

- Students write answers to the quiz questions in the SG
- Review the answers as a class
- **Click to view circled answer**

Quiz Answers

Question	Answer
4	C, 60, SG Page 34
5	A, B, C, D, SG Page 35

Module 3 Quiz SG 36

4. The Fire Watch must remain at the Hot Work duty for _____ minutes after the completion of the Hot Work task to detect and extinguish possible smoldering fires.

- a. 5
- b. 15
- c. 60
- d. 45

Module 3 Quiz SG 36

5. Which of the following situations require multiple Fire Watches? Circle all that apply.

- a. A single Fire Watch cannot be present at all times during the performance of Hot Work.
- b. A single Fire Watch does not have a clear view of and immediate access to all areas included in the fire watch.
- c. A single Fire Watch is unable to communicate with all workers involved in the Hot Work.
- d. A single Fire Watch is unable to extinguish all incipient stage fires in the Hot Work area and unable to activate the alarm.

Hot Work Refresher - SFT FCX2022C Freeport-McMoRan | 59

PPT slide 60, SG N/A



Instruction

Discuss the questions on the slide

Debrief

- What are some key concepts learned in this module?
- What do you need to understand better?
- What information surprised you?

Hot Work Refresher - SFT FCX2022C Freeport-McMoRan | 59

MODULE 4: EQUIPMENT

This module contains information about various equipment used to conduct Hot Work safely.

LEARNING OBJECTIVES

Upon completion of this module, students will be able to summarize the various equipment and hazards for different types of Hot Work.

ACTIVITIES

Activity 3: Dressed for Hot Work

For further details, refer to *Activity Materials* under *Facilitator Preparation* on page 6.

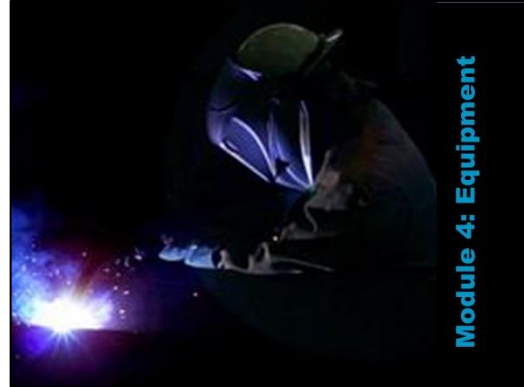
TOTAL TEACHING TIME

The module takes approximately 15 minutes to complete.

PPT slide 61, SG pages 39 and 41

Instruction

- Review learning objectives for the module
- Upon completion of this module, students will be able to summarize the various equipment and hazards for different types of Hot Work
- Module discusses the following: proper use and selection of equipment to conduct work safely
 - Achieve safe mitigation of Hot Work hazards by utilizing the correct equipment and ensuring the equipment is safe to use
 - Ensure safe working conditions through inspection and care
 - Eliminate the need for Hot Work if possible
 - Utilize engineering controls or alternate tools to eliminate the risk of fire and often encourage alternate means to Hot Work
 - Stop the job and consult with the supervisor or health and safety department before continuing work if there are questions or concerns about the materials or hazards, including which PPE to wear



PPT slide 62, SG page 41

Instruction

- Welding curtains, pads, and fire blankets are all controls used to mitigate property damage and injuries
 - Do not eliminate the hazard
 - Use as engineering or substitution controls
 - Know the hazards and applications of the curtains, pads, and blankets
- Welding curtains/screens
 - Material: made from a heat-resistant fabric
 - Applications:
 - Use in vertical applications with light to moderate exposures
 - Prevent sparks from escaping a confined area during Hot Work operation
 - Examples: chipping, grinding, heat-treating, and light horizontal welding
- Welding pads
 - Material: heat-resistant fabric
 - Application
 - Used for horizontal applications with severe exposures
 - Placed directly under Hot Work operation
 - Examples: molten substances or heavy horizontal welding



Continued on next page

PPT slide 21, SG page 41

Instruction

- Welding fire blankets
 - Material
 - Made from a heat-resistant fabric designed for workers to place them near a Hot Work operation
 - Heat and fire-resistant, but not fireproof
 - Application: use in horizontal applications with light to moderate exposures
 - Examples: chipping, grinding, heat-treating, and light horizontal welding



PPT slide 63, SG page 42



Instruction

- Produce risk if workers do not complete a proper inspection or do not use the equipment properly
- **Ask students: what are some examples of risks from using welding equipment?** (Possible answers: shock, fume exposure, fire, and explosions)
- Mitigate equipment risks
 - Use controls such as guards and ground fault equipment
 - Inspect and use equipment and control properly



PPT slide 64, SG page 42



Instruction

- **Ask students: when do we inspect equipment?** (Answer: at the start, during, and after each task)
- Inspect equipment for proper functionality and to maintain safe working conditions
- Never use defective or damaged equipment as it can lead to injury or even death
- Follow site-specific procedures for inspection of equipment
- Follow the site's tag out procedure when removing damaged or defective equipment from the job

Equipment Inspections SG 42

- Inspect for proper functionality
- Never use defective/damaged equipment
- Follow site-specific procedures
 - Equipment inspection
 - Equipment tag out

Hot Work Refresher - SFT FCX2022C Freeport-McMoRan | 64

PPT slide 65, SG page 42

Instruction

- Protect exposed personnel from heat, sparks, slag, noise, and ultraviolet radiation hazards through the use of fire-resistive screens or shields, or other protective measures
- Use standardized and specialized PPE for both the operator and the Fire Watch
- Never spray any type of bug repellent or aerosol prior to conducting Hot Work, as this may make the material flammable or combustible
- Correct use of the appropriate PPE
 - Allows freedom of movement
 - Provides adequate protection from Hot Work hazards
 - Prevents burns, the most common welding injury, and exposure to arc welding rays
- Use leather and flame-resistant treated clothing
 - Synthetic material, such as polyester or rayon (e.g., reflective vests): melts when exposed to extreme heat
 - Welding leather: use when performing welding out of position, such as vertical or overhead welding

Personal Protective Equipment (PPE) SG 42

- Use standardized and specialized
- Never spray bug repellent or aerosol
- Allow freedom of movement
- Provide adequate protection
- Prevent burns
- Use leather and flame-resistant treated clothing

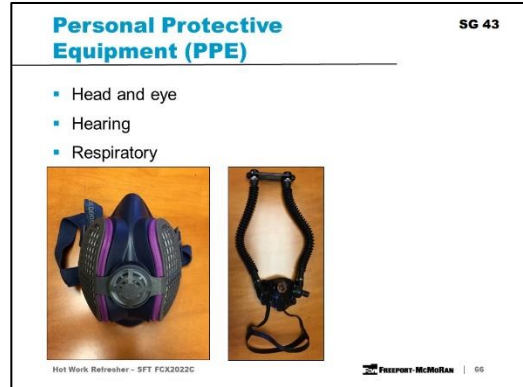


Hot Work Refresher - SFT FCX2022C Freeport-McMoRan | 65



Instruction

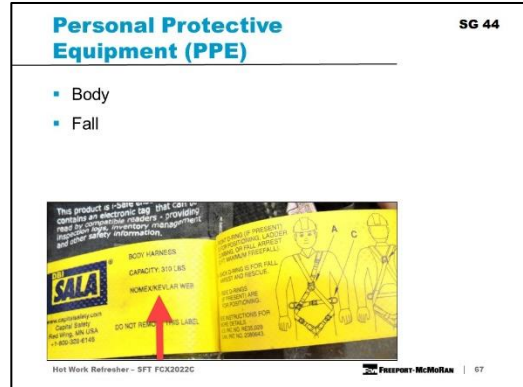
- Head and eye protection
 - Utilize helmets, shields, and goggles during Hot Work based on the hazard of the Hot Work task
 - Protect face and eyes when welding, brazing, soldering, and cutting
 - Wear safety glasses with side shields or goggles to keep debris from hitting eyes; make sure to choose the right shade lens for the Hot Work process
 - Wear hard hats to protect from sparks, heat, and electric shock
 - Use filtered lens to protect eyes from burns caused by infrared or intense radiant light
 - Remember to select the proper Filter Lens Shade: #5 for Gas Welding or #10 for Arc Welding
- **(Click for next set of images)**
- Hearing protection
 - Choose the appropriate protection for the type of job and the conditions of the area
 - Ensure that it fits properly and allows for unrestricted functioning of any other required PPE
 - Make sure to wear it properly
 - Wear when working near high noise levels
- **(Click for next set of images)**
- Respiratory protection
 - Ensure compatible with other PPE
 - Must have the authorization to use a respirator
 - Must complete a fit test before using a respirator
 - Utilize the correct respirator with the proper cartridge for the job
 - Low profile pads or slim cartridges
 - Cartridges with R (Oil-Resistant) or P (Oil-Proof) as needed





Instruction

- Body protection
 - Use fire-resistant (FR)
 - Include the following items:
 - Nomex/Kevlar, coveralls, uniforms, and shirts
 - Full or half top leathers
 - Welding gloves
 - Never wear polyester/rayon type material when performing Hot Work (e.g., polyester reflective vest, fleece)
 - Avoid rolling up the sleeves or pant cuff
 - Keep the pants over the top of work boots – do not tuck them in
 - Wear leather boots with 6-to-8-inch ankle coverage (best foot protection) and metatarsal guards over the shoelaces can protect feet from falling objects and sparks
 - Use heavy, flame-resistant, or leather gloves to protect from burns, cuts, and scratches; keep them dry to protect from electric shock
- **(Click for next image)**
- Fall protection
 - Use flame-resistant fall protection
 - Check the tag to make sure it has Nomex/Kevlar material
 - Ensure that competent and/or qualified individual properly select fall protection equipment and maintain a list of this inventory for periodic review, to ensure availability and effectiveness (i.e., flame-resistant harnesses for welders)

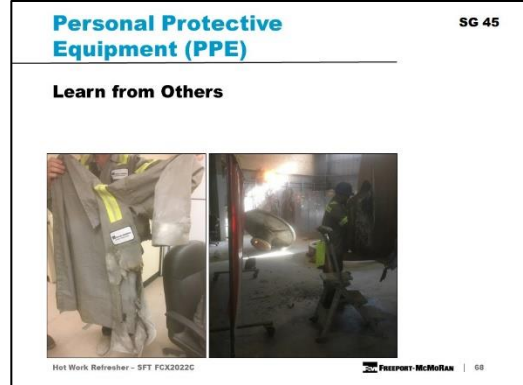


PPT slide 68, SG page 45



Instruction

- **Read or have a student read the “Learn from Others” in the SG**
- *On February 2, 2018, an individual was seriously burned while cutting lifting lugs off the liners of an Auto Mill feed cart using an air arc. The victim was positioned at the discharge end of the feed chute, and he was wearing leather gloves and arm/chest protection over the standard uniform shirt (100% cotton). The uniform shirt caught fire when slag/sparks from the air arc hit the lower left side of the shirt. After trying unsuccessfully to take the shirt off, another coworker put the fire out using a fire extinguisher.*
- Emphasize that the PPE available and worn was inadequate to protect the entire surface area of the employee’s torso.
- **Ask students for any personal connections to the incident**
- **Ask students: what PPE could have prevented this incident?** (Possible answer: full-length leather coat; tell students that this was not available at the time)



Facilitation Tip

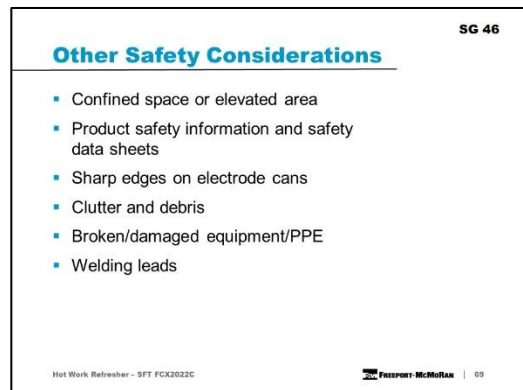
- Both good and bad personal stories from the facilitator and other students helps connect everyone to the content taught, and helps transfer knowledge into long-term memory
- Real-life applications promote learning (Law of Intensity)
- Learn more in the Facilitator Preparation Section at the start of the FG

PPT slide 69, SG page 46

Instruction

Several other safety conditions to be aware of within the Hot Work environment

- Take extra precautions if working in confined space or an elevated area, as these tasks are also Fatal Risks; utilize the appropriate critical control to mitigate these risks
- Pay close attention to safety information on the products used and the safety data sheets provided by the manufacturer
- Keep hands away from sharp edges if opening cans of the electrode
- Remove all clutter and debris from the Hot Work area to prevent tripping or falling
- Never use broken or damaged equipment or PPE
- Never drive over or park on welding leads with vehicles or equipment



ACTIVITY 3: DRESSED FOR HOT WORK

PPT slides 70-76, SG pages 47-49



Time

Approximately 5 minutes

Materials

- Student Guide
- Pens/Pencils
- PPT slides

Dressed for Hot WorkSG 47

Directions

1. For each image, state whether or not the employee is properly dressed for Hot Work
2. If the employee is not properly dressed, state the reason why

Activity 3

Hot Work Refresher – SFT FCX2022C

Purpose

This activity gives students the opportunity to identify appropriate PPE for Hot Work

Instruction

1. Go over the directions on the slide
2. Give students a few minutes complete the activity
3. **Go over the answers using the slides** – these provide suggested answers, but students may spot other PPE deficiencies

Answer Key

Image	Answer
1	Yes Note: remind students to wear hearing protection, as it gets loud while welding or torching
2	No; missing gloves and face shield
3	No; improper shoes
4	Yes Note: remind students to wear hearing protection, as it gets loud while welding or torching
5	Yes
6	No; improper clothes

MODULE 4 QUIZ

PPT slides 77-82, SG page 50



Instruction

- Students write answers to the quiz questions in the SG
- Review the answers as a class
- **Click to view circled answer**

Quiz Answers

Question	Answer
1	C and D, SG Page 41
2	B, False, SG Page 42
3	B and D, SG Page 42

Module 4 Quiz
SG 50

Directions

1. Complete the quiz in the Student Guide
2. Discuss the answers as a class

Quiz

Hot Work Refresher - SFT FCX2022C

Module 4 Quiz
SG 50

1. What is the purpose of welding curtains, pads, and fire blankets? Circle all that apply.
 - a. Used to eliminate the hazard.
 - b. Used to substitute for the use of PPE and Hot Work procedures.
 - c. Used to mitigate property damage and injuries.
 - d. Used as engineering or substitution controls.

Module 4 Quiz
SG 50

2. Workers only need to inspect equipment at the start of each task.
 - a. True
 - b. False

Module 4 Quiz
SG 50

3. Which type of PPE material(s) do you use for any Hot Work application? Circle all that apply.
 - a. Rayon
 - b. Leather
 - c. Polyester
 - d. Flame-resistant

Hot Work Refresher - SFT FCX2022C
Freeport-McMoRan | 80

Continued on next page

PPT slides 77-82, SG page 50



Instruction

- Students write answers to the quiz questions in the SG
- Review the answers as a class
- **Click to view circled answer**

Quiz Answers

Question	Answer
4	B, False, SG Page 44
5	D, Curtains/screens, SG Page 41

Module 4 Quiz SG 50

4. Tucking in the pants into the work boots helps protect feet from falling objects and sparks.

- a. True
- b. False

Module 4 Quiz SG 50

5. Which of the following equipment prevents sparks from escaping a confined area during Hot Work operations?

- a. Pads
- b. Blankets
- c. Guards/barriers
- d. Curtains/screens

Hot Work Refresher – SFT FCX2022C Freeport-McMoRan | 82

PPT slide 83, SG N/A



Instruction

Discuss the questions on the slide

Debrief

- What are some key concepts learned in this module?
- What do you need to understand better?
- What information surprised you?

Hot Work Refresher – SFT FCX2022C Freeport-McMoRan | 83

MODULE 5: HEALTH HAZARDS

This module contains information about health hazards associated with Hot Work. The module then discusses how to mitigate those hazards.

LEARNING OBJECTIVES

Upon completion of this module, students will be able to describe the health hazards associated with Hot Work.

ACTIVITIES

Activity 4: Hazardous Substances in the Work Area

For further details, refer to *Activity Materials* under *Facilitator Preparation* on page 6.

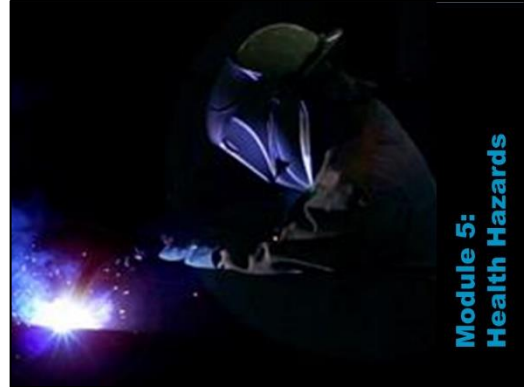
TOTAL TEACHING TIME

The module takes approximately 20 minutes to complete.

PPT slide 84, SG pages 53 and 55

Instruction

- Review learning objectives for the module
- Upon completion of this module, students will be able to describe the health hazards associated with Hot Work
- Module discusses the following:
 - Common health hazards associated with Hot Work
 - Mitigation of health hazards



PPT slide 85, SG page 55

Instruction

- Solids, liquids, gases, mists, and fumes – present during Hot Work activities
- Exposure to hazardous substances
 - Affects the body in many different ways
 - Damage from skin contact, inhalation, and ingestion
- Exposure from not properly utilizing controls
- Acute effects or chronic effects of the symptoms and exposures experienced if exposure to hazardous substance occurs

SG 55

Substances and Health Hazards

- Solids, liquids, gases, mists, and fumes
- Effect on body and damage
- Acute or chronic effect

	Acute Effects	Chronic Effects
Time to notice	Often immediate	Slower and harder to notice
Duration of exposure	Short	Weeks, months, or years

Hot Work Refresher – SFT FCX2022C Freeport-McMoRan | 55

PPT slide 86, SG pages 55-56

Instruction

- Can release high levels of sulfur dioxide when components contact concentrates
- Contain higher concentrations of lead and other heavy metals that create a hazard when workers heat or burn the concentrates
- Can reach hazardous levels of copper fumes when welding on items that have copper concentrate on them
- Can generate molybdenum trioxide, which is more hazardous than other forms of molybdenum, when components in contact with molybdenum concentrate
- Immediately report any potential overexposure to hazardous substances or any signs or symptoms experienced consistent with site hazards to the supervisor, as these conditions may require treatment


SG 55-56

Substances and Health Hazards

Concentrates

- Sulfur dioxide
- Lead and other heavy metals
- Copper fume
- Molybdenum trioxide

Immediately report any potential overexposure to hazardous substances

Hot Work Refresher - SFT FCX2022C  85

PPT slide 87, SG pages 56-59



Instruction


- Use the charts in the SG to review site-specific common hazardous substances
- Discuss any acute and/or chronic effects of the substances most common at your site

SG 56-59

Substances and Health Hazards

Common Hazardous Substances

- Hexavalent Chromium (CR-VI)
- Arsenic
- Manganese
- Sulfur Dioxide
- Copper
- Lead
- Zinc & Cadmium
- Cobalt
- Mercury

Hot Work Refresher - SFT FCX2022C  87

PPT slide 88, SG page 60

Instruction

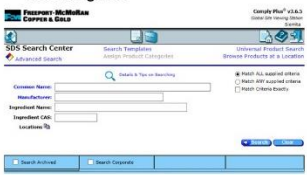
- Read the Safety Data Sheet (SDS) for the materials used in the work
- Use the SDS as a guide for making decisions on how to stay protected when working with hazardous substances and materials

SG 60

Mitigating Health Hazards

Safety Data Sheets (SDS)

- Read for materials used in work
- Use as guide



Hot Work Refresher - SFT FCX2022C  88

PPT slide 89, SG page 60

Instruction

- Follow site-specific procedures for cleaning or prepping surfaces before conducting Hot Work; hosing residue off with water can remove surface contamination and concentrate on the surface
- Test and continuously monitor the atmosphere of a pipe before and during Hot Work
- Utilize critical controls, such as ventilation and personal monitors, to reduce Fatal Risks
 - Several events where Hot Work on long pipes ignited flammable gas inside the pipe
 - Acid is another substance that can react with various steel alloys to generate hydrogen gas in pipes

SG 60

Mitigating Health Hazards

Surface Prep

- Follow site-specific procedures
- Test and continuously monitor pipe atmosphere
- Utilize critical controls

Hot Work Refresher - SFT FCX2022C Freeport-McMoRan | 60

PPT slide 90, SG page 61

Instruction

- May be asked by site's Industrial Hygienist to wear a sampling pump when performing Hot Work
- Ensure that as an employee you are not exceeding exposure limits for welding fumes

SG 61

Mitigating Health Hazards

Sampling

- May be asked to wear sampling pump
- Ensure not to exceed exposure limits for welding fumes

Hot Work Refresher - SFT FCX2022C Freeport-McMoRan | 61


PPT slide 91, SG page 61

Instruction

- Always minimize environmental risks by using approved environmental controls
- Act promptly and appropriately when faced with environmental concerns
- Dispose of spent rods in approved containers and recycle materials appropriately
- Contact the supervisor or site environmental department with any environmental questions or concerns

Environmental Awareness SG 61

- Use approved environmental controls
- Act promptly and appropriately
- Dispose of spent rods
- Contact supervisor or site environmental department

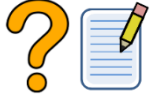


Hot Work Refresher - SFT FCX2022C

Freeport-McMoRan | 91

ACTIVITY 4: HAZARDOUS SUBSTANCES IN THE WORK AREA

PPT slide 92, SG page 62



Time

Approximately 10 minutes

Materials

- Student Guide
- Pens/Pencils

Purpose

This activity gives students the opportunity to describe the health hazards associated with Hot Work

Instruction

1. Go over the directions on the slide
2. Have students work in small groups
3. Give students about 5 minutes to discuss three hazardous substances in their work area
4. **Have each group share the hazardous substances and how they would mitigate the hazard**

Note: If the site works with 1-2 specific hazardous substances, facilitator can assign those specific substances to groups instead of having groups choose 3 substances

Hazardous Substances in the Work Area	SG 62
<p>Directions</p> <ol style="list-style-type: none">1. Discuss three hazardous substances that you may encounter in your work area2. Discuss methods for mitigating these hazards3. Be prepared to share with the class <p><small>Hot Work Refresher - SFT FCX2022C</small></p>	<p>Activity 4</p>

MODULE 5 QUIZ

PPT slides 93-98, SG page 63



Instruction

- Students write answers to the quiz questions in the SG
- Review the answers as a class
- **Click to view circled answer**

Quiz Answers

Question	Answer
1	B, Acute, SG Page 55
2	A, Chronic, SG Page 55
3	C, Safety Data Sheets, SG Page 60

Module 5 Quiz
SG 63

Directions

1. Complete the quiz in the Student Guide
2. Discuss the answers as a class

Quiz

Hot Work Refresher – SFT FCX2022C

Module 5 Quiz
SG 63

1. _____ effects are often immediate and result from exposures over a short duration.
 - a. Chronic
 - b. Acute
 - c. Small
 - d. Large

Module 5 Quiz
SG 63

2. _____ effects are slower and harder to notice, arising from weeks, months, or years of exposure to hazardous substances.
 - a. Chronic
 - b. Acute
 - c. Small
 - d. Large

Module 5 Quiz
SG 63

3. Which resource guides personnel on how to stay protected when working with hazardous substances and materials?
 - a. Fatal Risk Management (FRM)
 - b. Workplace Examination Form
 - c. Safety Data Sheets (SDS)
 - d. Hot Work Permit

Hot Work Refresher – SFT FCX2022C Freeport-McMoRan | 96

Continued on next page

PPT slides 93-98, SG page 63



Instruction

- Students write answers to the quiz questions in the SG
- Review the answers as a class
- **Click to view circled answer**

Quiz Answers

Question	Answer
4	B, False, SG Page 60
5	A, True, SG Page 61

SG 63

Module 5 Quiz

4. Only test and continuously monitor the atmosphere of a pipe before Hot Work.

a. True

b. False

SG 63

Module 5 Quiz

5. Always minimize environmental risk by using approved environmental controls.

a. True

b. False

Hot Work Refresher - SFT FCX2022C Freeport-McMoRan | 99

PPT slide 99, SG N/A



Instruction

Discuss the questions on the slide

Debrief

- What are some key concepts learned in this module?
- What do you need to understand better?
- What information surprised you?

Hot Work Refresher - SFT FCX2022C Freeport-McMoRan | 99

Break

- Take a 5 to 10 minute break after this module
- Clearly communicate what time you expect students to return

MODULE 6: HIGH HAZARD AREAS

This module contains information about high hazard areas associated with Hot Work.

LEARNING OBJECTIVES

Upon completion of this module, students will be able to evaluate scenarios and categorize the associated hazards.

ACTIVITIES

Activity 5: Identifying Hazards

For further details, refer to *Activity Materials* under *Facilitator Preparation* on page 6.

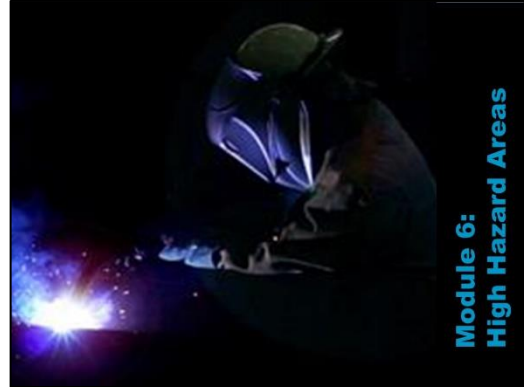
TOTAL TEACHING TIME

The module takes approximately 15 minutes to complete.

PPT slide 100, SG pages 67 and 69

Instruction

- Review learning objectives for the module
- Upon completion of this module, students will be able to evaluate scenarios and categorize the associated hazards
- Module discusses the following:
 - Outlines the high hazards encountered during Hot Work
 - Stop the job and consult the supervisor or health and safety department if unsure about something when working in high hazard areas

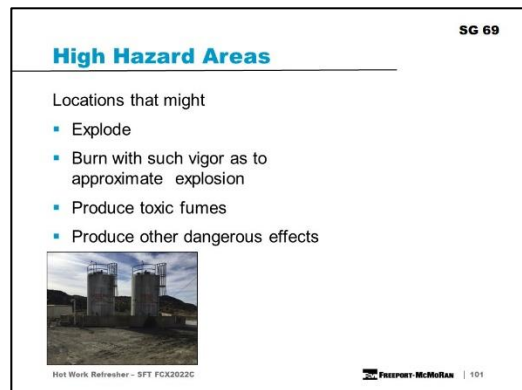


PPT slide 101, SG page 69



Instruction

- High hazard areas: locations that might explode, burn with such vigor as to approximate explosion, produce toxic fumes, or produce other dangerous effects
- Be aware of the most common Hot Work hazards and know how to avoid them; helps ensure a safe and productive work environment for everyone
 - Consider policies such as the Control of Hazardous Energy and Confined Space Entry in conjunction with the Hot Work Permit
 - Follow the statutory requirements for high hazard areas such as fuel storage areas or explosive magazines
 - Consult with the supervisor and site health and safety department if unsure about the designation of an area
- **Ask students: what are some examples of high hazard areas?** (possible answers listed below and on the next page)
 - Within 100 feet (30 meters) of powder magazines or explosive or blasting storage area
 - Dust collectors, ductwork, and other areas where rubber linings or combustible dust exists
 - Public commercial buildings, warehouses, assay labs



Continued on next page

PPT slide 101, SG page 69




Instruction

- **Ask students: what are some examples of high hazard areas?** (possible answers continued from previous page)
 - SX/EW plants and related work areas
 - Take specific precautions when performing cutting, welding, or other spark-producing work around SX/EW plants
 - Consult pertinent Standard Operating Procedures (SOPs) before working in these areas
 - Above or adjacent to cable trays or electrical cables
 - Inside vessels or confined spaces
 - Heavy equipment including haul trucks, shovels, drills, graders, and dozers (regardless of the location) where sparks or hot metal contact combustible materials

High Hazard Areas SG 69

Locations that might

- Explode
- Burn with such vigor as to approximate explosion
- Produce toxic fumes
- Produce other dangerous effects



Hot Work Refresher - SFT FCX2022C Freeport-McMoRan | 101


PPT slide 102, SG page 70

Instruction

- Pressurized system
 - Do not perform Hot Work on any vessel that is under pressure
 - Relieve all pressurized systems of all pressure and purge before completing repairs
 - Complete the Hot Work task, including cutting, welding, or applying heat to vessels or pipes, in compliance with the Hot Work Policy

High Hazard Areas SG 70

- Pressurized system
- Confined space
- Working at heights



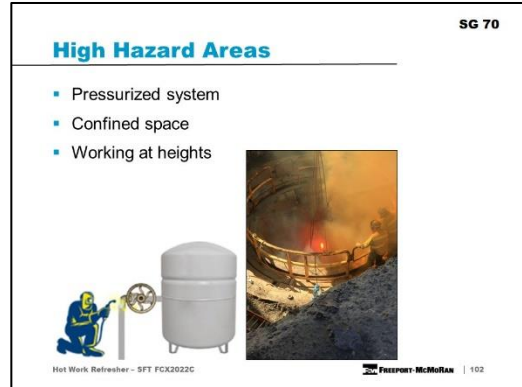
Hot Work Refresher - SFT FCX2022C Freeport-McMoRan | 102

Continued on next page



Instruction

- Confined space
 - Eliminate the possibility of gas escaping through leaks or improperly closed valves: close torch valves and positively shut off the gas supply to the torch and remove it from the confined space location when not in use
 - Help reduce or eliminate risk by using critical controls such as atmospheric testing, pre-inspection risk assessment, and respiratory protections
 - Lower Explosive Limit (LEL) or Lower Flammable Limit (LFL) above 10%
 - Oxygen Concentration (O₂) measurement must be outside the recommended range of 19.5% and 23%
 - Airborne combustible dust at a concentration that meets or exceeds its LFL – workers approximate this concentration as a condition in which the combustible dust obscures vision at a distance of 5 feet (1.5 meters) or less
- Working at heights
 - Try finding a location that is already safe for Hot Work and not at an elevated location before working at a height
 - Cannot relocate, then consider measures that protect everyone at risk
 - Permanent or temporary guardrails, lifts, and scaffolds
 - Fall protection and standard PPE
 - **Ask students: what are some examples of ways to eliminate ignition hazards while working at a height?** (possible answers listed below)
 - Relocate from the Hot Work area, appropriately protect with fire retardant welding blankets, or isolate with welding screens
 - Suspend welding blankets under Hot Work tasks – place noncombustible screens around Hot Work below to trap sparks
 - Utilize fire-resistant fall protection, including lanyards, wire rope self-tracking lanyard and personal fall limiter, and harnesses
 - Relocate the work to a safe area when welding or cutting at a height is necessary
 - Prohibited by Working at Heights Policy to weld or cut from a ladder without a variance
 - Use an alternate approved means, such as an aerial platform





Instruction

- Around conveyors
 - Take special precautions to control the risk of a fire when performing Hot Work within 35 feet (11 meters) of a conveyor belt or screen installations, or where these systems contact sparks, hot slag, or flame
 - Isolate the conveyor belts and screens from the Hot Work through the installation of solid metal barriers
 - Cover using fire-resistant materials
 - **Ask students: what are some considerations to keep in mind when performing Hot Work around conveyors?** (possible answers below)
 - Remove rubber lining from the immediate heat-affected zone
 - Limit fires from spreading and minimize risk to employees and equipment
 - Use alternate means to complete the Hot Work task
- In or on tanks
 - Cut/weld tanks/vessels that contain flammable, combustible, or other hazardous substance vapors, liquids, or solid residues
 - Follow the strict procedures for the repair or work that has the potential to create a fire, explosion, or another hazard
- Flammable vapors
 - Explosion can occur with the following conditions:
 - Mixing vapors of a flammable or combustible liquid with air in certain proportions
 - Ignition source like a spark or a flame is present
 - Hot Work must be 50 feet (15 meters) or more away from flammable/combustible gases
 - Controls incorporated into site Standard Operating Procedures:
 - Purge, clean, and fill with inert liquid or gases all containers holding flammable/combustible liquids or gases
 - Test these containers to ensure that the LEL /LFL is below 10%



PPT slide 104, SG page 72

Instruction

- Dust collector
 - Dust collector: device or combination of devices for separating dust from the air handled by an exhaust ventilation system
 - Create high concentrations of dust, resulting in combustible conditions if introducing a spark or flame
 - Include rubber-lined parts and pose a significant fire risk
- Working near explosives
 - 100 feet (30 meters) minimum distance between Hot Work and powder magazines or explosive or blasting storage areas

High Hazard Areas

SG 72

- Dust collectors
- Working near explosives



Hot Work Refresher - SFT FCX2022C  | 104

PPT slide 105, SG page 73

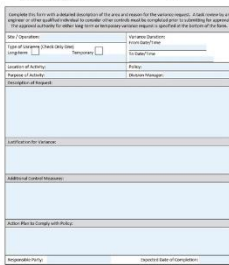
Instruction


- Cannot meet full compliance with the policy – file a variance with Health and Safety, per the Freeport-McMoRan Policy Administration Requirements
- Keep the approved and completed variance form on file with a Standard Operating Procedure or other work procedure established for future action
- Reviewed by an engineer or another qualified individual
 - Review the work
 - Justify the exemption
 - Give alternate safety controls to minimize or eliminate the risks

Variance Request

SG 73

- Cannot meet full compliance with policy
- Keep form on file with SOP
- Reviewed by engineer or qualified individual



Hot Work Refresher - SFT FCX2022C  | 105

ACTIVITY 5: IDENTIFYING HAZARDS

PPT slide 106, SG pages 74-76



Time

Approximately 10 minutes

Materials

- Student Guide
- Pens/Pencils

Purpose

This activity gives students the opportunity to evaluate scenarios and categorize the associated hazards

Instruction

1. Go over the directions on the slide
2. Have students work in small groups
3. Give students about 5 minutes to discuss the 4 scenarios
4. **Discuss the Fatal Risks and Critical Controls as group – suggested answers are provided below**

Answer Key

Scenario	Fatal Risks	Critical Controls
1	Fire, Working at Heights	Hot Work Permit, Fire Watch, fall protection, flagging and barricading
2	Fire, Confined Space, Uncontrolled Release of Energy	Hot Work Permit, Hazardous Energy Control (LOTOTO)
3	Fire	Hot Work Permit
4	Fire	Fire Watch, Hot Work Permit

Identifying Hazards

Directions

1. Read the scenarios
2. Identify the Fatal Risks involved
3. Identify the Critical Controls to mitigate the Fatal Risks
4. Be prepared to discuss with the class

SG 74-76

Activity 5

Hot Work Refresher – SFT FCX2022C

MODULE 6 QUIZ

PPT slides 107-112, SG page 77



Instruction

- Students write answers to the quiz questions in the SG
- Review the answers as a class
- **Click to view circled answer**

Quiz Answers

Question	Answer
1	B, C, D, and E, SG Page 69
2	A, C, and D, SG Page 70
3	B, False, SG Page 70

Module 6 Quiz
SG 77

Directions

1. Complete the quiz in the Student Guide
2. Discuss the answers as a class

Quiz

Hot Work Refresher – SFT FCX2022C

Module 6 Quiz
SG 77

1. Which of the following areas are high hazard areas? Circle all that apply.
 - a. In a designated area
 - b. Near dust collectors
 - c. Inside vessels or confined spaces
 - d. SX/EW plants and related work areas
 - e. Within 100 feet (30 meters) of powder magazines or explosive or blasting storage area

Module 6 Quiz
SG 77

2. When conducting work in a confined space, which of the following critical controls help reduce or eliminate risk? Circle all that apply.
 - a. Pre-inspection risk assessment
 - b. Fire suppression system
 - c. Respiratory protection
 - d. Atmospheric testing

Module 6 Quiz
SG 77

3. The Hot Work Policy allows Hot Work on a vessel under pressure.
 - a. True
 - b. False

Hot Work Refresher – SFT FCX2022C Freeport-McMoRan | 110

Continued on next page

PPT slides 107-112, SG page 77



Instruction

- Students write answers to the quiz questions in the SG
- Review the answers as a class
- **Click to view circled answer**

Quiz Answers

Question	Answer
4	B, 50 feet (15 meters), SG Page 71
5	B, False, SG Page 70

Module 6 Quiz SG 77

4. What is the distance from flammable vapors needed to conduct Hot Work?

- a. 35 feet (11 meters)
- b. 50 feet (15 meters)
- c. 100 feet (30 meters)
- d. 150 feet (45 meters)

Module 6 Quiz SG 77

5. The Hot Work Policy allows welding from a ladder as long as the worker wears proper PPE.

- a. True
- b. False

Hot Work Refresher – SFT FCX2022C Freeport-McMoRan | 112

PPT slide 113, SG N/A



Instruction

Discuss the questions on the slide

Debrief

- What are some key concepts learned in this module?
- What do you need to understand better?
- What information surprised you?

Hot Work Refresher – SFT FCX2022C Freeport-McMoRan | 113

CONCLUSION

The conclusion contains information about methods to stay safe during Hot Work activities.

ACTIVITIES

- Knowledge Assessment
- Student End of Course Questionnaire (in SG)

For further details, refer to *Activity Materials* under *Facilitator Preparation* on page 6.

TOTAL TEACHING TIME

The conclusion takes approximately 25 minutes to complete.

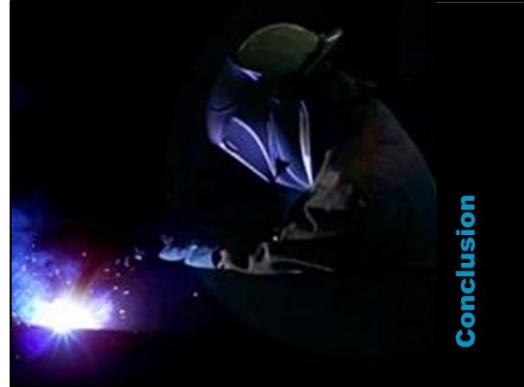
PPT slide 114, SG N/A



Instruction

The conclusion covers

- Review
- Assessments
- Student Course Evaluation
- Facilitator Course Evaluation



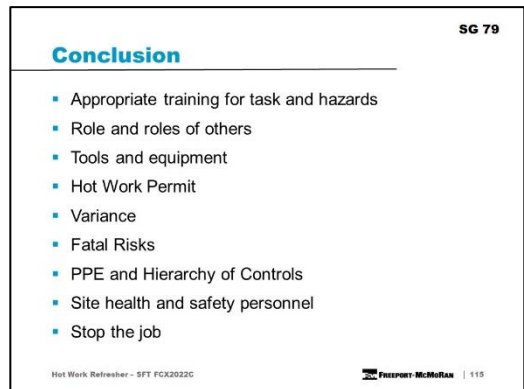
Facilitation Tip

- Debriefs help summarize, review, refresh, retain, and clarify previously covered content, which increases learning (Law of Recency)
- Learn more in the Facilitator Preparation Section at the start of the FG
- Add debriefs before or after breaks, and at the beginning or end of a day to gauge student understanding and prepare them to learn more

PPT slide 115, SG page 79

Instruction

- Complete appropriate training for the task and the hazards involved in any Hot Work
- Understand their role and the roles of others to ensure safe working conditions
- Maintain and inspect all Hot Work tools and equipment and ensure their safe use
- Always follow the Hot Work Permit process to ensure identification of safety measures and Fire Watches
- Apply for a variance if there is a situation where the Hot Work Policy is not practical
- Identify and control the Fatal Risks involved in the task performed; major Fatal Risk in Hot Work applications: fire
- Always use appropriate PPE and the best control from the Hierarchy of Controls
 - Strive for hazard elimination as the first line of defense
 - Move the Hot Work or find an alternate method to Hot Work when possible
- Always consult the site health and safety personnel before beginning Hot Work operations in high hazard areas or areas with uncertainty
- Always stop the job if unsure about a task, process, or control



PPT slide 116, SG N/A




Instruction

- As objectives for each module are reviewed, **discuss the students' lingering questions, comments, or concerns**
- Module 1: Introduction to Hot Work
 - Define Hot Work and Fire Safe Areas and the associated safety concerns
 - Identify and differentiate between flammable and combustible materials
- Module 2: Critical Controls
 - Identify the use of applicable controls
- Module 3: Roles and Responsibilities
 - Describe the roles and responsibilities of persons involved in Hot Work
- Module 4: Equipment
 - Summarize the various equipment and hazards for different types of Hot Work
- Module 5: Health Hazards
 - Describe the health hazards associated with Hot Work
- Module 6: High Hazard Areas
 - Evaluate scenarios and categorize the associated hazards

Debrief

- What are some of the key concepts in each module?
 - Module 1: Introduction to Hot Work
 - Module 2: Critical Controls
 - Module 3: Roles and Responsibilities
 - Module 4: Equipment
 - Module 5: Health Hazards
 - Module 6: High Hazard Areas
- Are there any additional questions, comments, or concerns?

Hot Work Refresher – SFT FCX2022C  | 116

Facilitation Tip

- At the end of the day, keep debriefs short and relevant
- Students are prone to be more focused on leaving than what the facilitator says

PPT slide 117, SG N/A

Instruction

- Students complete the knowledge assessment
- Use the Answer Key to score each assessment

Knowledge Assessment

Directions

1. Complete the assessment
2. Return the completed assessment to the facilitator
3. Facilitator scores the assessment

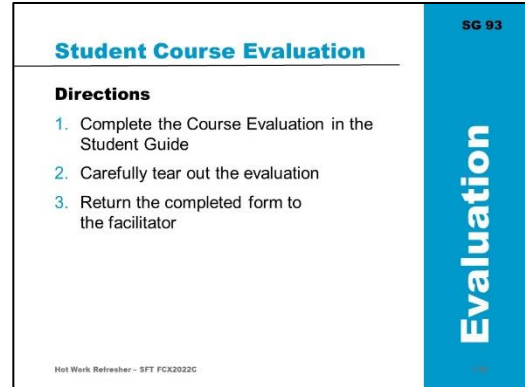
Hot Work Refresher – SFT FCX2022C

Assessment

PPT slide 118, SG page 93

Instruction

- Students complete the Student Course Evaluation (in SG)
- Collect and return evaluations (including the Facilitator Course Evaluation in the back of the FG) to the Mine Training Institute according to the directions on the form



The image shows a slide titled "Student Course Evaluation" with a blue header and a vertical blue bar on the right side containing the word "Evaluation" written vertically. The slide contains the following text:

Student Course Evaluation SG 93

Directions

1. Complete the Course Evaluation in the Student Guide
2. Carefully tear out the evaluation
3. Return the completed form to the facilitator

Hot Work Refresher - SFT FCX2022C

FACILITATOR COURSE EVALUATION

Course Name

Hot Work Refresher (Facilitator Led)

Facilitator Name

1. What worked well in the course? Please explain.

2. Were the topics effectively sequenced? If not, please provide suggestions for change.

3. Was the content up-to-date with current processes, equipment, etc.? If not, please provide specific examples.

4. Was the content at the appropriate level of difficulty? If not, please provide examples.

5. What in the course needs improvement? Please provide specific examples.

6. Were the course materials (PPT, FG, etc.) of high quality? If not, please provide examples.

7. Were there any inaccuracies or missing content? If so, please provide examples.

8. Do any of the issues you've identified need to be addressed immediately? If so, please list which ones.

Thank you for taking the time to complete the survey.

Please mail to: Mine Training Institute, Attention: Suzanne Anderson, 18550 S. La Canada Drive, Sahuarita, AZ 85629
Or scan and email to: sanderso2@fmi.com

