Current and Accurate Operating Procedures

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TU-A2

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Session Agenda

- Operating procedure guidance
- CalARP Program Level 2 and 3 operating procedure requirements
- IIAR 7 Standard for Developing Operating Procedures for Closed-Circuit Ammonia Refrigeration Systems

Poll Question 1

What would you like to learn most about in this session?

Poll Question 2

What functions do you perform on operating procedures under CalARP?

Operating Procedure Guidance

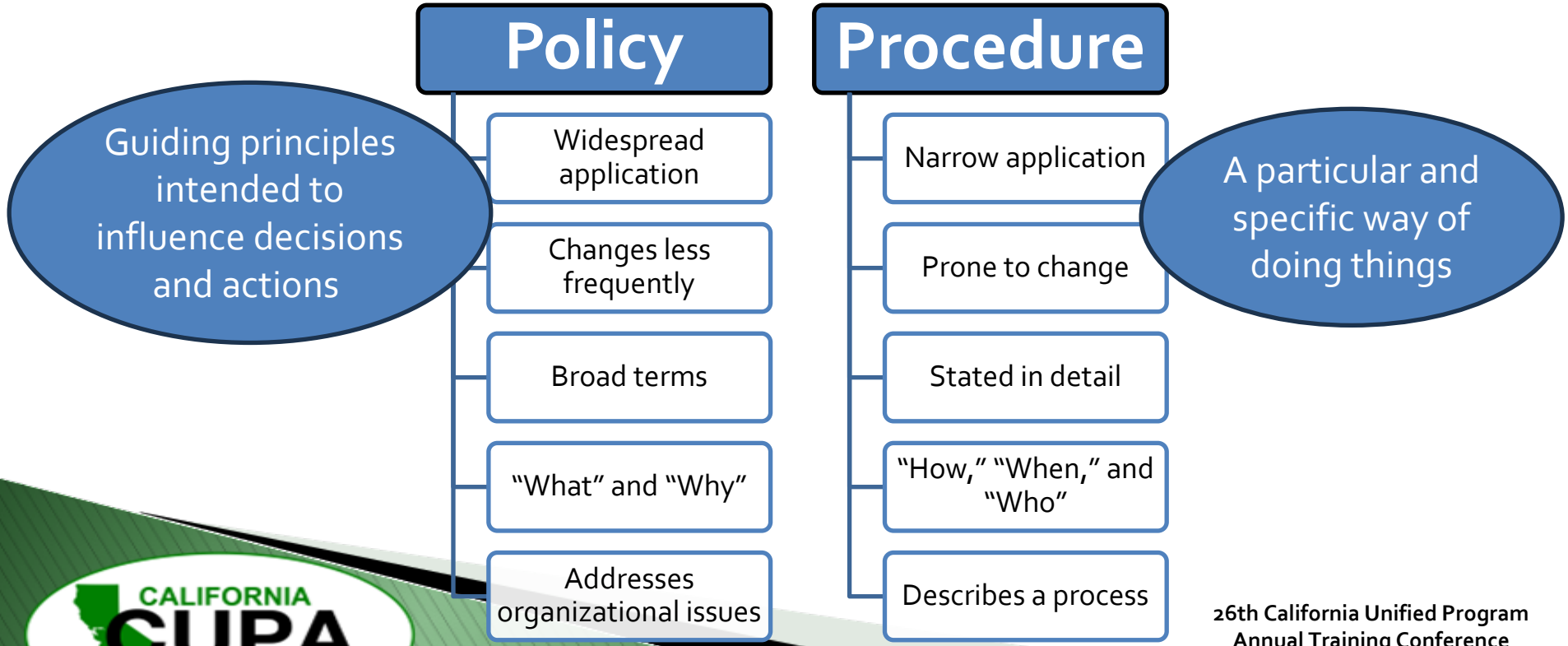
Operating procedure:

- Written step-by-step instructions and information for performing a task

Goals:

- Easy to understand
- Safe, effective and reliable
- Meet regulatory requirements

Operating Procedure Guidance



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Operating Procedure Guidance

Why are operating procedures important?

- Each operator uses the same procedures and methods
- Consistent execution of a particular task
- Procedures may be critical to prevent or mitigate a chemical release

Operating Procedure Guidance

Resources for Developing Operating Procedures:

- Operating manual and control narrative
- Vendor installation, operation, and maintenance manuals (IOMs)
- Safety Data Sheets (SDS)
- Piping and Instrumentation Diagrams (P&IDs)
- Process Hazard Analyses (PHAs)
- Relevant existing operating procedures

Operating Procedure Guidance

Best Practices

- Form a team for the update and verification of operating procedures
- Use a template
- Use terminology that is clearly defined or well-known
- Provide appropriate detail for step-by-step instructions

Operating Procedure Guidance

OSHA PSM Ammonia Refrigeration eTool

[Example Procedure Operation of Ammonia HPR]

Operation of Ammonia High Pressure Receiver HPR-1

Company Name	Section Number: TBD	Page 1
Process Safety Management	PSM/Standard Operating Procedures/Review/Revision/ HPR-1	
Prepared by: PSM Coordinator		Revision Date: 0/00
Revision Approved by: Plant Engineer		Issue Revision

Objective:	This procedure is designed to describe the Technical Operating Specifications (TOS), and to set down the Standard Operating Procedures for the safe

Operating Procedure Guidance

4. Emergency Shutdown and Isolation	4.1. Close HPL supply hand valve from condensers:	Valve number xxxx (hand valve)
	4.2. Close EQ line hand valve	Valve number xxxx (hand valve)
	4.3. Close Purge line hand valve	Valve number xxxx (hand valve)
	4.4. Close HPL return from transfer tanks 1 AND 2	Valve number xxxx (hand valve)
	4.5. Close liquid injection cooling supply line valve	Valve number xxxx
	4.6. Close liquid feed to plant hand valves	Valve number xxxx and Valve number xxxx
	4.7. Shut down liquid transfer pumps 1 and 2 at TT1 and TT2 in main compressor room	Transfer Tank 1, Transfer Tank 2, per relevant SOP for both
	4.8. Assess situation	If shutdown is for any period of time, refrigeration operations will shut down as liquid supply runs out.

Operating Procedure Guidance

IIAR PSM RMP Templates

OP-4
High Temperature Recirculator Operating Procedure

Revision Table

Rev. #	Description of Change	Date	Revised By
0	Initial issue	11/17/2011	

Objectives and Purpose

Operating Procedure Guidance

Department and Equipment Information

Department	Refrigeration
Operator/ Responsibility	Refrigeration Operator
Equipment	High Temperature Recirculator (HTR-1) High Temperature Recirculator Oil Pot (HTR-1OP)Ammonia Liquid Pumps PU-1 & PU-2
Location	The High Temperature Recirculator is located in the ammonia machinery room
Related documents	Anhydrous Ammonia Safety Data Sheet (SDS) Lockout/Tagout Procedures P&ID R-03

Operating Procedure Guidance

Ammonia Liquid Recirculator TOS: Operating Limits

Operating Limits	Deviations/Consequences	Steps to Correct/ Avoid Deviations
Recirculator pressure: 28 to 38 psig	Higher and lower suction pressures affect system temperatures, overload the motor and possible compressor damage.	Check the number of compressors operating and start/stop compressors as necessary. Check the capacity control system on the compressor. Check the system loads to determine if equipment has been started, stopped, or defrosted.

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Recirculator liquid level: 30 to 40% full	High levels could potentially damage a low stage compressor if a slug of liquid is sent to the compressor. Low levels could lead to loss of flow to the evaporator which could lead to higher room temperatures and pump damage.	Check the level control system to ensure it if functioning properly. Ensure that multiple freezers are not defrosting simultaneously

Operating Procedure Guidance

IIA

Ammonia Liquid Recirculator Standard Operating Procedure (OP)

Task	Step	Comment
Initial startup procedures	Perform a Pre-Startup Safety Review (if it is needed).	These procedures can be used to startup the high temperature recirculator following maintenance operations
	Verify power is energized to the local disconnect and circuit breaker.	
	Visually check the system for lockout/tagout devices and removed as necessary.	
	Close the drain valves if they are open (Valves HTR1-21, HTR1-10, HTR1-31, HTR1-42, HTR1-OP-3 and HTR1-OP-4).	
	Crack open the valve on the suction header from	If any leaks are

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		the high temperature recirculator following maintenance operations
	Verify power is energized to the local disconnect and circuit breaker.	
	Visually check the system for lockout/tagout devices and removed as necessary.	
	Close the drain valves if they are open (Valves HTR1-21, HTR1-10, HTR1-31, HTR1-42, HTR1-OP-3 and HTR1-OP-4).	
	Crack open the valve on the suction header from the recirculator to the compressor (Valve HTR1-28) and check for ammonia leaks.	If any leaks are detected, close the valve and fix the leaks before proceeding.
	After the leak check, fully open the valve in the suction header from the recirculator to the compressor (HTR1-28).	

Operating Procedure Guidance

OSHA vs IIAR Template

- IIAR template has more specific health and safety considerations, hazards, PPE requirements and inventory control.
- IIAR template covers deviations and steps to correct/avoid better
  - Recirculator pressure range, liquid level and pump operating range
- OSHA template is missing emergency stop function, if equipped.
- Both follow the Task, Step, Comment format and valve ID references
- OSHA template doesn't clearly define conditions when emergency shutdown is required.

Operating Procedure Guidance

Step by Step Detail

- One action per step
- Include descriptors as well as equipment or valve IDs
  - Close Liquid Supply isolation valves (HPL-501 and HPL-510)
  - Close Dry Suction to engine room isolation valves (LPG-521, LPG-524 and LPG-523)

Operating Procedure Guidance

Notes, Cautions, and Warning Statements

- Added to provide information to assist the operator in the next step
- Highlight information and importance
- Typically provided outside of the steps of the procedure

NOTE: PRIOR TO ISOLATING AND PUMPING OUT RECIRCULATOR (RP01) ENSURE THE FOLLOWING EQUIPMENT HAVE BEEN PLACED OUT OF SERVICE AND EVACUATED: RP2 AND LTU2

Operating Procedure Guidance

Notes, Cautions, and Warning Statements

- Notes provide information to assist the operator in the next step:
  - To perform the action safely
  - Prepare the user for the unexpected
  - Explain the reason for the step
  - Reference other materials
  - Help the user know when the action begins or ends
  - Give other pertinent information regarding the action step

Operating Procedure Guidance

Notes, Cautions, and Warning Statements

- Caution statements used to provide information of consequences of an incorrect action:
  - Adverse consequences to operation
  - Product quality issues
  - Equipment Damage
  - Harm to the environment

Operating Procedure Guidance

Notes, Cautions, and Warning Statements

- Warning statements used to provide information of consequences of an incorrect action:
  - Injury to personnel
  - Injury or harm to the surrounding community

Operating Procedure Activity

PB&J Exact Instruction Challenge

- Literal demonstration of the written steps
- No reading between the lines of the instructions to determine what was meant

Operating Procedure Activity

PB&J Exact Instruction Challenge

- Maximum group size of 4
- Provide steps for making a peanut butter and jelly sandwich
- I will attempt to make a PB&J sandwich
- Prizes for most accurate group
  - Provide name and phone number for prize

Operating Procedure Activity

Peanut Butter and Jelly Sandwich Production Overview

Initial development date:	2/27/2024
Revision No.	1

Revision Table

Rev. #	SOP Section Revised	Description of Change	Date	Revised By
0	PB&J Sandwich Steps	Initial issue of revised SOP	2/27/2024	
1				
2				

Department and Equipment Information

Location	Hyatt Regency, Burlingame, California
Process	Peanut Butter and Jelly Production
Department	Production
Operator Requirements	One trained operator and if available a buddy that has completed initial training.
Objective	This Standard Operating Procedures (SOP) provides steps for making a peanut butter and jelly sandwich.
Operational Description	The peanut butter and jelly production line prepares sandwiches for quick meals or on-the-go snacks.
Related Documents	Peanut butter, jelly and bread nutrition labels

Safety and Health Considerations

Hazards and Properties of	Peanut butter is thick and contains crunchy bits of crushed peanut. Danger: do not consume

Poll Question 3

What would cause you to review operating procedures?

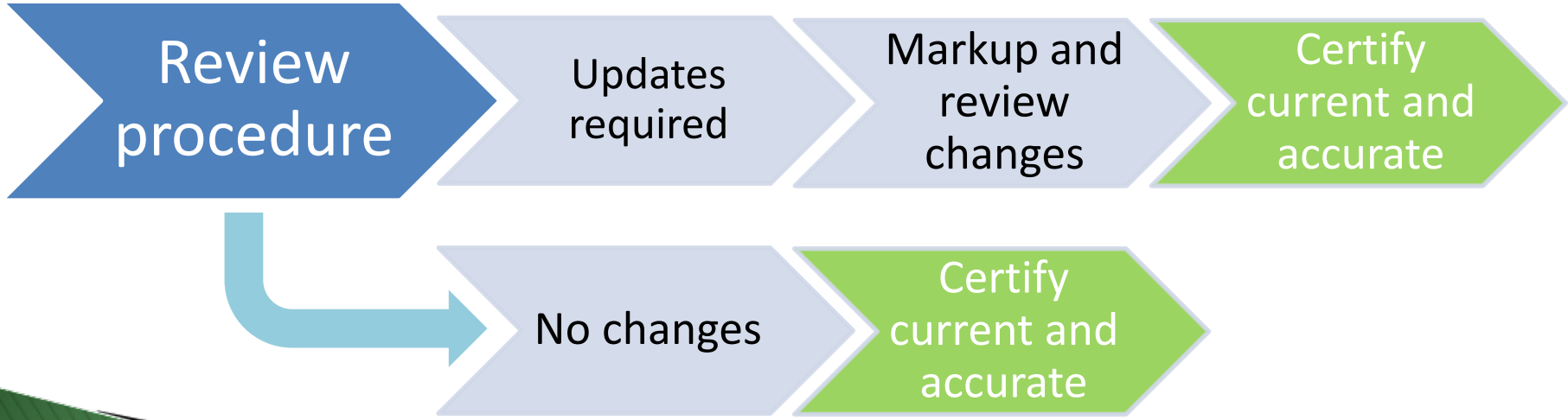
Operating Procedure Guidance

Triggers for reviewing operating procedures:

- Management of change
- Employee participation
- Incident investigation
- Process hazard analysis
- Compliance audit
- Contractor safety audit
- Training
- Annual review and certification

Operating Procedure Guidance

Reviewing operating procedures:



Operating Procedure Guidance

Review Summary and Certification Form

Facility Information	
Facility Name:	
Facility Location:	
Department/System/Equipment:	
List Operating Procedures Reviewed:	All procedures
Operating Procedure Review	Date(s): 2/27/2024
Attended By	Title
[X] All procedures found current and accurate	[ ] Some procedures to be updated
[ ] Additional procedures are needed	[ ] Some procedures no longer needed
Affected Operating Procedure(s):	

I have reviewed the updated / marked-up operating procedures and certify that to the best of my knowledge they are current and accurate.

Name:	Title:

CalARP Operating Procedures

Purpose of CalARP

- Prevent accidental releases of substances that can cause serious harm to the public and the environment
- Minimize the damage if releases do occur
- Satisfy community right-to-know laws

CalARP Program Level 3 Requirements

19 CCR § 2760.3 Operating Procedures

- Written operating procedures
- Provide clear instructions for safely conducting activities
- Consistent with the process safety information

CalARP Program Level 3 Requirements

Operating Phases:

- Initial startup
- Normal operations
- Temporary operations
- Emergency shutdown including conditions when shutdown is required, assignment of responsibility to qualified operators and executed in a timely manner
- Emergency operations
- Normal shutdown
- Startup following a turnaround or after an emergency shutdown

CalARP Program Level 3 Requirements

Operating Limits & Safety and Health

- Consequences of deviation (references to other documents are not acceptable)
- Steps to correct or avoid deviation
- Safety and health considerations (hazards, precautions, PPE, engineering and administrative controls)
- Quality control for raw materials and inventory levels
- Any special or unique hazards
- Safety systems and their functions

CalARP Program Level 3 Requirements

- Readily accessible to employees who work in or maintain a process
- Reviewed as necessary to reflect current practice and changes to chemicals, technology, or equipment
- Annually certified current and accurate

CalARP Program Level 3 Requirements

Initial Training

- Operators shall be trained in an overview of the process and in the operating procedures

In lieu of Initial Training:

- Certify in writing that the employee has the required knowledge, skills, and abilities to safely carry out the duties and responsibilities as specified in the operating procedures.

CalARP Program Level 3 Requirements

Refresher training

- At least provided every 3 years or when necessary
- Assure operator understands and adheres to the current operating procedures

Operating Procedures Comparison

Level 2 vs Level 3

- ~~Prepare~~ develop and implement written procedures
- ~~Associated with~~ involved in each covered process
- ~~Procedures/instructions developed by equipment manufactures or organizations knowledgeable about equipment as a basis for procedures~~

Operating Procedures Comparison

Level 2 vs Level 3

- Emergency shutdown ~~and operations~~ conditions under emergency shutdown is required and assignment of shutdown responsibility to qualified operators to ensure that emergency shutdown is executed in a safe and timely manner.
- Emergency operations
- Startup following a normal or after emergency shutdown or a major change that requires a hazard review
- Equipment inspections

Operating Procedures Comparison

Level 2 vs Level 3

- Safety and health considerations
- Readily accessible to employees
- ~~Updated, as necessary~~ reviewed as necessary to reflect current practice
- Certify annually procedures are current and accurate.
- Develop and implement safe work practices (lockout/tagout, confined space, line break, control entrance) for controlling hazards during operations for employees and contractors.

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Part 1: General

- Purpose and Scope
- Definitions
- References

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Part 2: Developing and Maintaining Operating Procedures

- PPE requirements for performing work






- When the buddy system is practiced (opening equipment and emergency operations)

Poll Question 4

Select the tasks where the buddy system **should** be used.

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Part 2: Developing and Maintaining Operating Procedures

Include a reference to the following or integrate into the procedure steps:

- Lockout/Tagout
- Confined space entry
- Opening equipment and piping

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Part 2: Developing and Maintaining Operating Procedures

- Version of each procedure shall be documented
- Revision number and/or revision date
- Review procedures when changes are made to the ammonia refrigeration system and update when necessary.

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Part 3: Equipment

- Procedures for system activities and each piece of equipment.
- List of equipment and phase specific requirements
  - May not be necessary to simple skid packages
- Information for equipment type on operating limits, consequences of deviation and steps to correct or avoid deviation

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Part 3: Equipment

- Compressors
- Refrigerant Pumps
- Condensers
- Evaporators
- Pressure vessels
- Purgers
- Oil removal devices
- Safety Systems
- Tasks

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Part 3: Equipment

Compressors Emergency Shutdown Considerations

- Person responsible
- Steps to stop the compressor
- Steps to close the compressor isolation valves, shutoff power and apply lockout/tagout devices
- Notification procedures
- Steps to log the conditions that caused the emergency shutdown

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Part 3: Equipment

- Evaporator Defrost
  - Manual or automatically controlled defrosted
- Oil Removal Devices
  - Oil pots
  - Add steps to replace caps and plugs
- Safety Systems
  - Ventilation, emergency shutoff switches, emergency pressure control systems (EPCS)

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Part 3: Equipment

Tasks

- Liquid management
  - Charging and transfers within the system
- Manually purging noncondensables
- Equipment opening

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Part 3: Equipment

Tasks – Equipment Opening Considerations

- PPE to wear and buddy system practices
- Pump out requirements for opening equipment and piping
- Physical inspection of equipment and piping prior to commencing work
- Location confirmed and communicated to those performing work
- Safe work practices for opening piping and equipment
- Steps for pump out
- Steps to open piping and equipment
- Steps to place the system back in normal operation

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Part 4: Informative

- Explanatory Material
- Operating Procedure Documentation
- Discussion - System Operating Procedures
- References

Operating Procedure Guidance Summary

- Use available resources for development
- Form a team
- Use a template
- One action per step
- Add in notes, cautions and warnings where appropriate

Operating Procedure Guidance Summary

- Take the time to review procedures thoroughly
- Spread out the reviews over the year
- Verify steps and references are accurate
- Operator assistance with field verification
- Revisit regulatory requirements and industry standards

Questions?

Thank you

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