How to Conduct Research at CAES
Completing the Work Planning and Safety Envelope
Introduction
Introduction

Work Planning and Safety Envelope
# Introduction

CAES staff is here to help.

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<tr>
<th>Role</th>
<th>Name</th>
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<tr>
<td>Director</td>
<td>Philip Ruppert</td>
<td><a href="mailto:Philip.Reppert@inl.gov">Philip.Reppert@inl.gov</a></td>
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Introduction

Work planning addresses several elements.

1. Training Requirements
2. Purpose/Scope/Applicability
3. Risks and Controls
4. Area Hazards and Off-Normal Conditions
5. Export Control
6. Facility Conditions
7. Emergency Procedures
8. Post-performance Activities
9. Supporting Documentation
10. Drawings and Diagrams
11. Appendices
   A. Chemical Inventory
   B. Waste generation and disposal
Introduction

- Use the CAES-048, CAES Work Plan form.
- Additional templates may include
  - CAES-002, Researcher Controlled Activity
- Detailed instructions can be found in CAES-046, Project Planning, Work Control, and Research Execution at CAES (steps 4, 5, and 6).
- Supplemental instructions are included in the CAES User Guide for Researchers document.
Introduction

Fill out and submit form

- May include preliminary steps such as:
  - SOP or RCA forms
  - Supporting documentation
  - Home institution approvals

Focused Review

- Usually takes at least two weeks to complete after the work plan is submitted

Readiness Review

- May take time due to scheduling participants
Introduction
Form by Sections
Title & Signature Page

Principal Investigator, Laboratory Lead, and CAES Safety Officer Approvals

<table>
<thead>
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<th>Principal Investigator</th>
<th>Print</th>
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RESEARCH STAFF:

MAJOR EQUIPMENT USED IN ACTIVITY:
### Project Title:

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### ACTIVITY LOCATION BY LAB ROOM NUMBER

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**RESEARCH STAFF:**

**MAJOR EQUIPMENT USED IN ACTIVITY:**
Activity PI, LL, and AD

ACTIVITY PRINCIPAL INVESTIGATOR, LAB LEAD, and SPONSORING ASSOCIATE DIRECTOR
PI(s):
LL:
AD:

CAS Safety Officer: [Signature] Date: [Signature]
Print Sign

RESEARCH STAFF:

MAJOR EQUIPMENT USED IN ACTIVITY:
Activity Location

ACTIVITY LOCATION BY LAB ROOM NUMBER

Research Lab
Manager: ___________________________ Date: ____________
Print: ____________ Sign: ____________

CAES Safety Officer: ___________________________ Date: ____________
Print: ____________ Sign: ____________

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Equipment List

MAJOR EQUIPMENT USED IN ACTIVITY:

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Numbered Components

1. **TRAINING REQUIREMENTS**: (All CAES general and Lab Specific trainings are required. This is to list additional training requirements.)
2. **PURPOSE/SCOPE/APPLICABILITY**: (include activity abstract and objectives)
   2.1 Research Activity Description (include activity approach)
   2.2 List any bounding conditions.
3. **RISK AND CONTROLS**: Add lines to the table below as needed to adequately describe hazards and controls for the tasks you will be doing.
   
   **Task**: Identify any tasks that have associated hazards or require controls to prevent equipment damage. Hazard(s): Identify any hazards associated with the task that may cause personal injury or equipment damage. Examples of hazards include burn, fall, chemical contact, chemical inhalation, cuts, abrasions, etc.
   
   **Engineering Controls**: Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this protection. Examples include safety interlocks, sound dampening materials to reduce noise levels, ventilation systems (fume hoods), self-capping syringe needles, etc.
   
   **Administrative Controls**: Methods of controlling or reducing duration, frequency, and severity of employee exposure to hazardous chemicals or situations. Examples include job rotation, work assignments, time periods away from the hazard, or training to specific work practices designed to control exposures. These control measures have many limitations because the hazard itself is not actually removed or reduced.
   
   **PPE**: Devices worn by the worker to protect against hazards in the laboratory environment. Examples include respirators, gloves, safety shoes, and hearing protectors.

<table>
<thead>
<tr>
<th>Task</th>
<th>Potential Hazards</th>
<th>Controls (Engineering and Administrative)</th>
<th>PPE</th>
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Hazards: Identify any hazards associated with the task that may cause personal injury or equipment damage. Examples of hazards include burns, falls, chemical contact, chemical inhalation, cuts, abrasions, etc.

Engineering Controls: Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.

Engineering Controls are methods of eliminating, reducing, or controlling employee exposure to a chemical or physical agent by modifying the source or reducing the quantity of contaminants released into the work environment. Examples include safety interlocks, sound damping materials to reduce noise levels, ventilation systems, fume hoods, self-capping
2. Purpose/Scope/Applicability

2.1 Research Activity Description (include activity approach)

2.2 List any bounding conditions.

What

How
3. **Risk and Controls**

Add lines to the table below as needed to adequately describe hazards and controls for the tasks you will be doing.

**High levels of protection.**

- Engineering Controls are methods of eliminating, reducing, or controlling employee exposures to a chemical or physical agent by modifying the source or reducing the quantity of contaminants released into the work environment. Examples include (partial): Interlocks, sound damping materials to reduce noise levels, ventilation systems (fume hoods), self-capping cylinders, etc.
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### 4. AREA HAZARDS AND OFF-NORMAL CONDITIONS

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9. SUPPORTING DOCUMENTATION

9.1 Additional Documents Supporting this Project Plan

9.2 References

10. DRAWINGS AND DIAGRAMS

11. APPENDICES

Appendix A: Chemical Inventory
Appendix B: Waste Generation
5. Export Compliance

Responsibility for Export Compliance lies with each CAES member institution.

8. POST-PERFORMANCE ACTIVITIES

List activities that will need to take place to close out work, e.g., post-experimental clean-up, equipment dismantling and removal, actions taken to render the laboratory safe for the next research activity, removal of chemicals, etc. The intent is to not leave legacy items in the laboratory after the end of the project. Written justification from the Research Lab Manager is required for storage of any items.

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Appendix A, Chemical Inventory
Appendix B, Waste Generation
6. Facility Conditions

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6. FACILITY CONDITIONS

List any facility conditions that must be met before beginning work, e.g., facility exhaust is operational, building pressure is negative, fume hoods are operational and functioning properly, facility argon supply is adequate.

7. EMERGENCY PROCEDURES

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Appendix B, Waste Generation
7. Emergency Procedures

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7. Emergency Procedures

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Appendix B, Waste Generation
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6.2 References

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10. DRAWINGS AND DIAGRAMS

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11. APPENDICES

Appendix A: Chemical Inventory
Appendix B: Waste Management
11. Appendices

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11. APPENDICES

Appendix A, Chemical Inventory
Appendix B, Waste Generation
Appendix A: Chemical Inventory

APPENDIX A
CHEMICAL INVENTORY
(Chemical hazards are captured in the body of the Work Plan – this section only provides a list of chemicals used in execution of the plan.)

<table>
<thead>
<tr>
<th>Name and CAS Number</th>
<th>NFPA Health...</th>
<th>Chemical State</th>
<th>Concentration</th>
<th>Amount used per day</th>
<th>Frequency of Use</th>
<th>Max. Storage Volume</th>
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Appendix B: Waste Generation

## APPENDIX B
### WASTE GENERATION

<table>
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<tr>
<th>Type of Waste</th>
<th>Anticipated Volume</th>
<th>Container Type</th>
<th>Disposal Responsibility</th>
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List any special needs/requirements for storage and handling and disposal of wastes.

If a spill occurs, how will it be cleaned up?
Conclusion

Work Planning and Safety Envelope
## Conclusion

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