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How to Draft an SOP?

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How to Draft an SOP

ERAU offers resources to support SOP development.

ERNIE

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Departments

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“E”

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Environmental Health & Safety (All Campuses)

↓

Standard Operating Procedures
- Generic SOPs
- SOP templates

↓

Safety Training
- EHS-100 Module 6

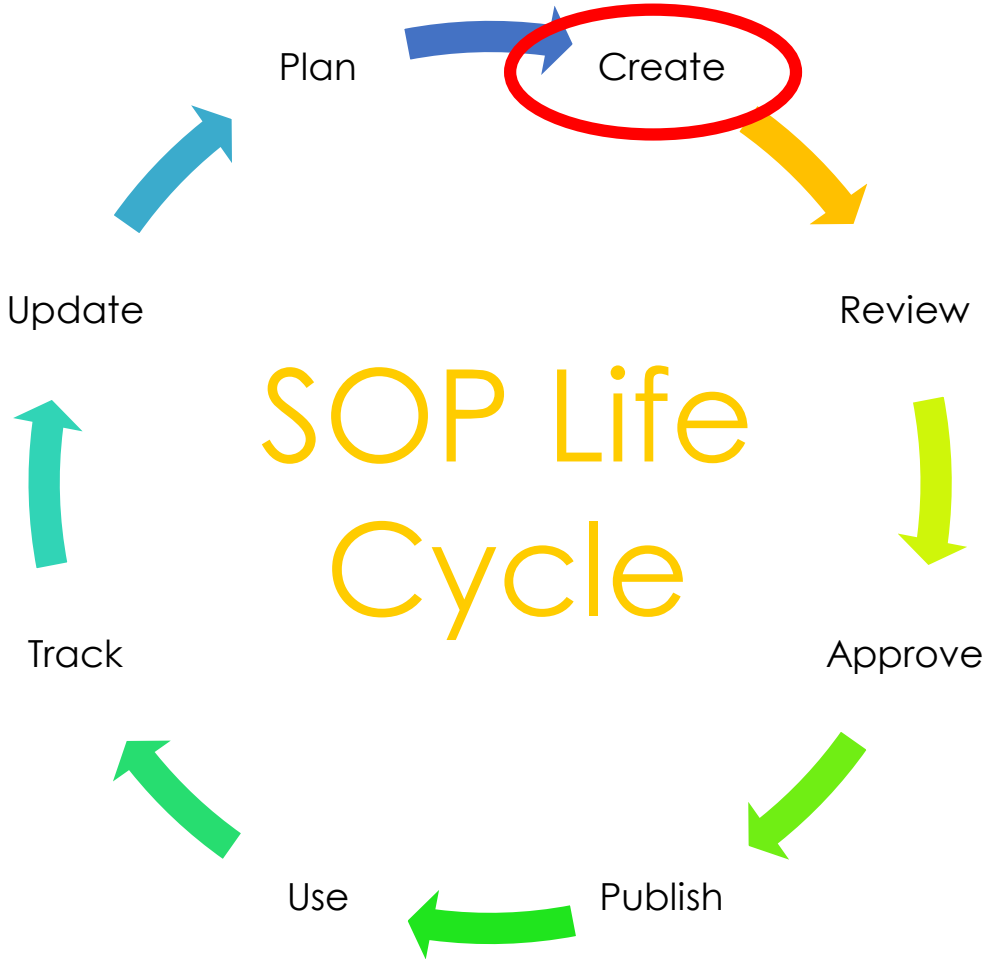
↓

Contact Us
- Consultation services

We can streamline efforts by learning from the past.

- Do not write an SOP for an individual process or action, it should be a part of the larger process.
- Disregard the first sentence if the material is so dangerous that it needs its own SOP created.
- If you are having trouble, stop and ask for assistance. The process can become frustrating.
- Be specific (what size container, slow/fast pour, what speed to mix at).
- Do not refer to other checklists if at all possible, multiple SOPs/checklists can cause errors/mistakes.
- Write the procedure in bullet checklist style.

In Part 1 of this workshop, you will create an SOP using available resources.



Take 2 minutes to draft Section 1 of your SOP.

1. General Information

1.1 Lab-Specific Information

Building/Room(s) covered by this SOP:	Click here to enter text.
College/Organization:	Click here to enter text.
Department:	Click here to enter a date.
Principal Investigator Name:	Click here to enter text.
SOP Effective Date (review annually at a minimum)	Click here to enter a date.

1.2 - This Standard Operating Procedure (SOP) is for a:

- ☐ Specific laboratory procedure or experiment (e.g. synthesis of carbon nanotubes)
- ☐ Generic laboratory procedure that covers several chemicals (e.g. chromatography)
- ☐ Generic use of specific chemical/class of chemicals with similar hazards (e.g. organic azides)

1.3 - Hazard Summary

☐ Chemical hazard(s)	☐ Hazardous waste generated
☐ Physical hazard(s)	
☐ Biological hazard(s)	☐ Biological waste generated
☐ Radiological hazard(s)	☐ Radiological waste generated

Procedures are task-oriented.

Passive Voice, Indicative mood:

1. A weapon will be useful.

Active Voice, imperative mood, present tense:

1. Find a weapon.

Procedures include clarifying information.

2. Using the weapon, destroy the zombie's brain.

2. Using the weapon, strike the zombie on its head until all motion stops.

   Danger: Zombie blood is contagious. Protect your eyes and mouth from exposure by using a face shield or other impenetrable barrier.

Procedures have simple steps.

3. When the zombie stops moving, quickly cover the windows with dark tarps or blankets and block the doorways with heavy furniture, then collect survival supplies from your immediate area, including water, food, blankets, clothing, and more weapons.

3. Cover the windows with dark tarps or blankets.
4. Block the doorways with heavy furniture.
5. Gather survival supplies from your immediate area:
    - Water
    - Food
    - Blankets
    - Clothing
    - Weapons

Applying best practices in SOP writing, spend 15 minutes drafting your procedures section

2. Process or Experiment Description:

Note: You will need to complete Section 3 before you can draft your procedures section. This section appears first for usability of the final document, placing the most relevant information first.

Click here to enter text. Describe the procedure in step-wise detail. Be thorough, yet concise. Consider using a process flow diagram for long procedures. Use imperative mood, active voice. Each step should be one action. It is ideal that the steps will contain a result (e.g. turn lever until you hear the click.) Consider adding a "prerequisites" section at the start that identifies procedures outlined in other documents (e.g. engineering control SOPs). Consider using a list of materials and equipment. If any of your chemicals appear on the PHS list, you **MUST** identify a designated work area.

Here is an outline with example tasks to get you started:

Materials & Equipment List:

-

Chemical List:

-

Prerequisites:

a. Notify lab supervisor that the experiment is being executed (good idea for procedures that use a *particularly hazardous substance*.
b. Verify engineering controls are in place and operating correctly.
c. Ensure appropriate PPE is available and in appropriate condition for use. Don PPE.
d. Etc.

Procedure:

1. Chill 50mL of nitric acid in a chemical refrigerator for 3 hours or until 38ºF or below is achieved (<3ºC).
2. Etc.

View it through the eyes of a potential user.

Level of experience?

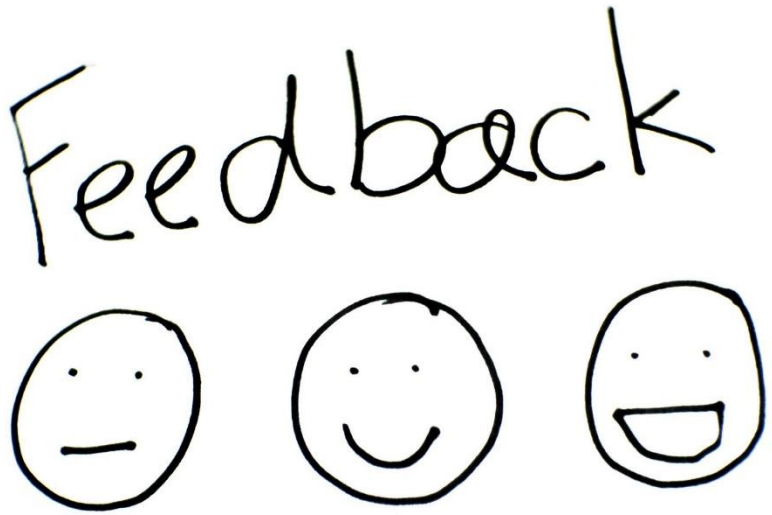
Frequency of use?

Common issues?

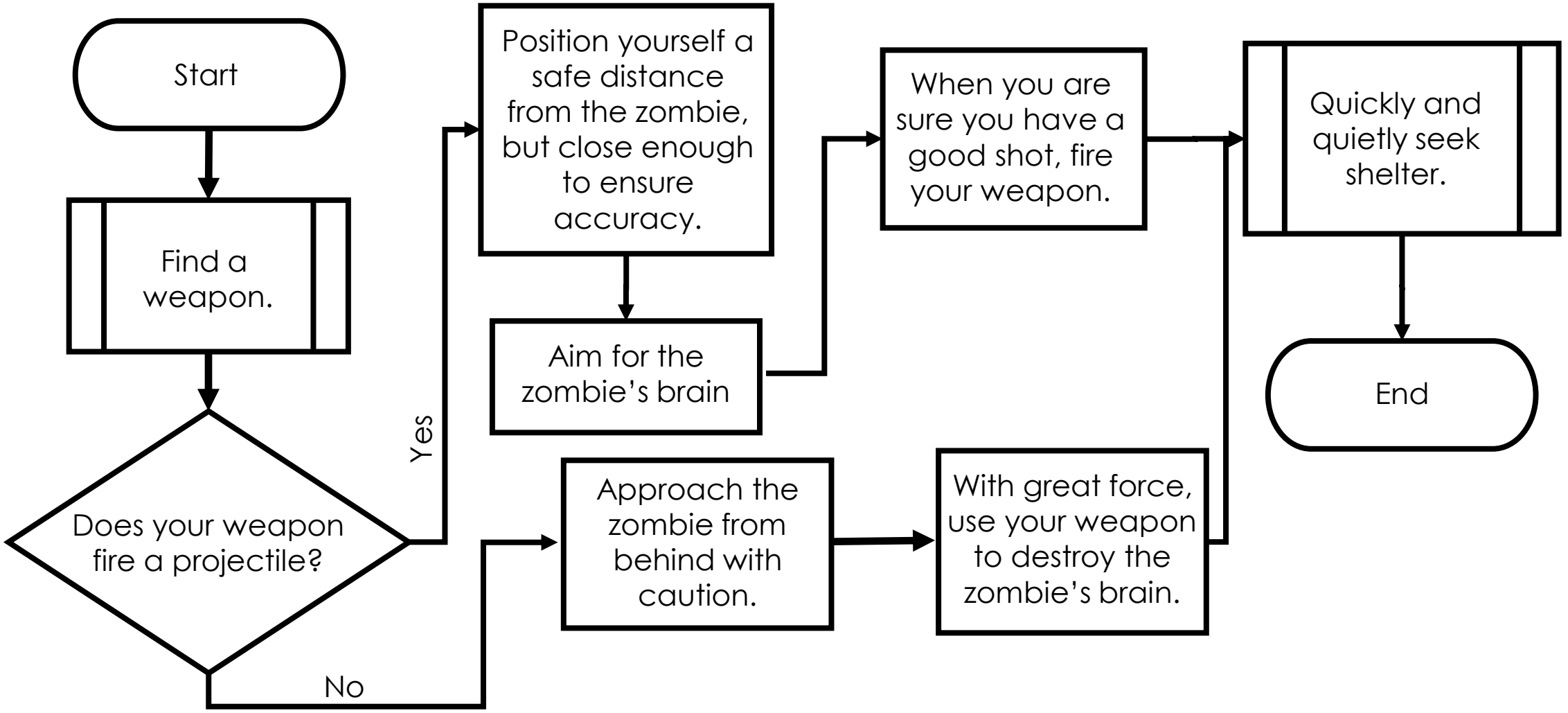
Preferences?

Potential distractions?

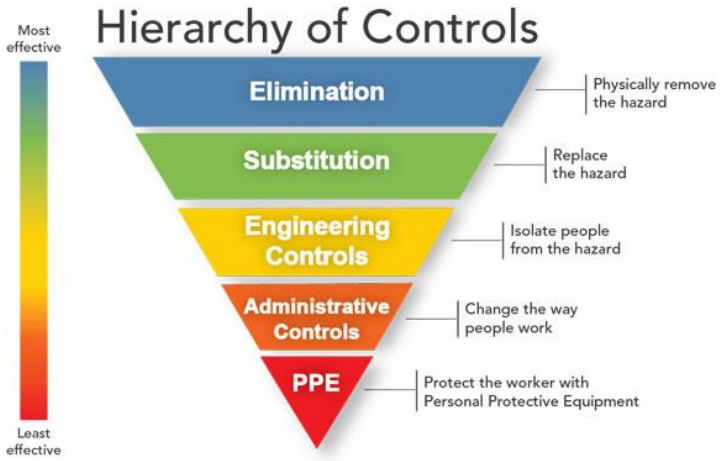
Spend 10 minutes providing peer review of procedures section …



A Process Flow Diagram helps visualize the process for complex procedures.



Section 3 covers all aspects of planning.



Where will you store the chemicals and equipment necessary for the procedure described?

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3. Planning

3.1 - Storage Requirements:

Select the type of storage cabinets required:

☐ Flammable ☐ Corrosive ☐ Toxic ☐ Oxidizer ☐ General

Click here to enter text. Review Section 7 of the SDS for each chemical involved. Describe special handling and storage requirements for hazardous chemicals, especially for highly reactive/unstable materials, highly flammable materials, and corrosives. Be sure to address secondary containers, chemical transfer equipment, etc.

How can you apply the Hierarchy of Controls?

3.2 - Engineering Controls:

☐ Process Control- Click here to enter text.

☐ Enclosure or Isolation- Click here to enter text.

☐ Redirection (e.g. ventilation)- Click here to enter text.

Note: Use of Engineering Controls should be evident in the detailed procedures in Section 2. If special steps are required for using the engineering control with this SOP, it needs to be addressed in your procedures. Otherwise, refer to the appropriate SOP for the engineering control in Section 2.

3.3 - Personal Protective Equipment:

Eyewear Choose an item.

Gloves ☐ Disposable Nitrile ☐ Thermal/Cryogenic ☐ Abrasion Resistant ☐ Butyl Rubber/Neoprene ☐ Other: Click here to enter text.

Protective Clothing ☐ Lab Coat ☐ Synthetic Lab Apron ☐ Tyvek Suit ☐ Shoe Covers ☐ Formed Boots ☐ Other: Click here to enter text.

Respirator ☐ Air-purifying ☐ Atmosphere-supplying ☐ Filters/Cartridges: Click here to enter text.

Note: Refer to Section 8 of the SDS.

How will you address incidents and accidents?

3.4 - Spill and Accident Procedures

Click here to enter text. Refer to the CHP for specific spill procedures, customizing as necessary for the unique hazards present for the procedures outlined in this SOP. This section should also address the location of specific safety equipment including eyewash/safety showers, first aid kit, and spill kit.

Write this section as step-by-step tasks, rather than concepts.

3.5 - Fire Safety

Click here to enter text. Describe the fire sensitivity of the chemicals involved in this SOP and the steps to reduce fire risks. Describe the location of fire safety equipment, including fire extinguisher and fire alarm manual pull station.

Write this section as tasks, rather than concepts.

How will wastes be handled?

3.6 - Waste Disposal

Click here to enter text. Describe the quantities of waste you anticipate generating and appropriate waste disposal procedures. Include any special handling or storage requirements for your waste. Include the location of your waste accumulation area and satellite collection area. Use ERAU's waste determination checklist if you are unsure if your waste should be handled as hazardous waste. Contact EH&S for questions and additional guidance.

Write this section as tasks, rather than concepts.

Training – an administrative control – is another key aspect of the SOP.

3.7 - Training Requirements

Who must be trained on this SOP: Click here to enter text.
Frequency of training for this SOP: Choose an item.
Documentation of Training Click here to describe how documentation will be logged and managed.

Actions that trigger mandatory re-training:

☐ Change in work conditions ☐ Off-cycle update to SOP
☐ Non-compliance with SOP ☐ Other: Click here to enter text.

Nature of training required for this SOP:

☐ EHS-100 (online) ☐ In-person/classroom ☐ Hands-on

Additional training required for safe execution of this SOP:

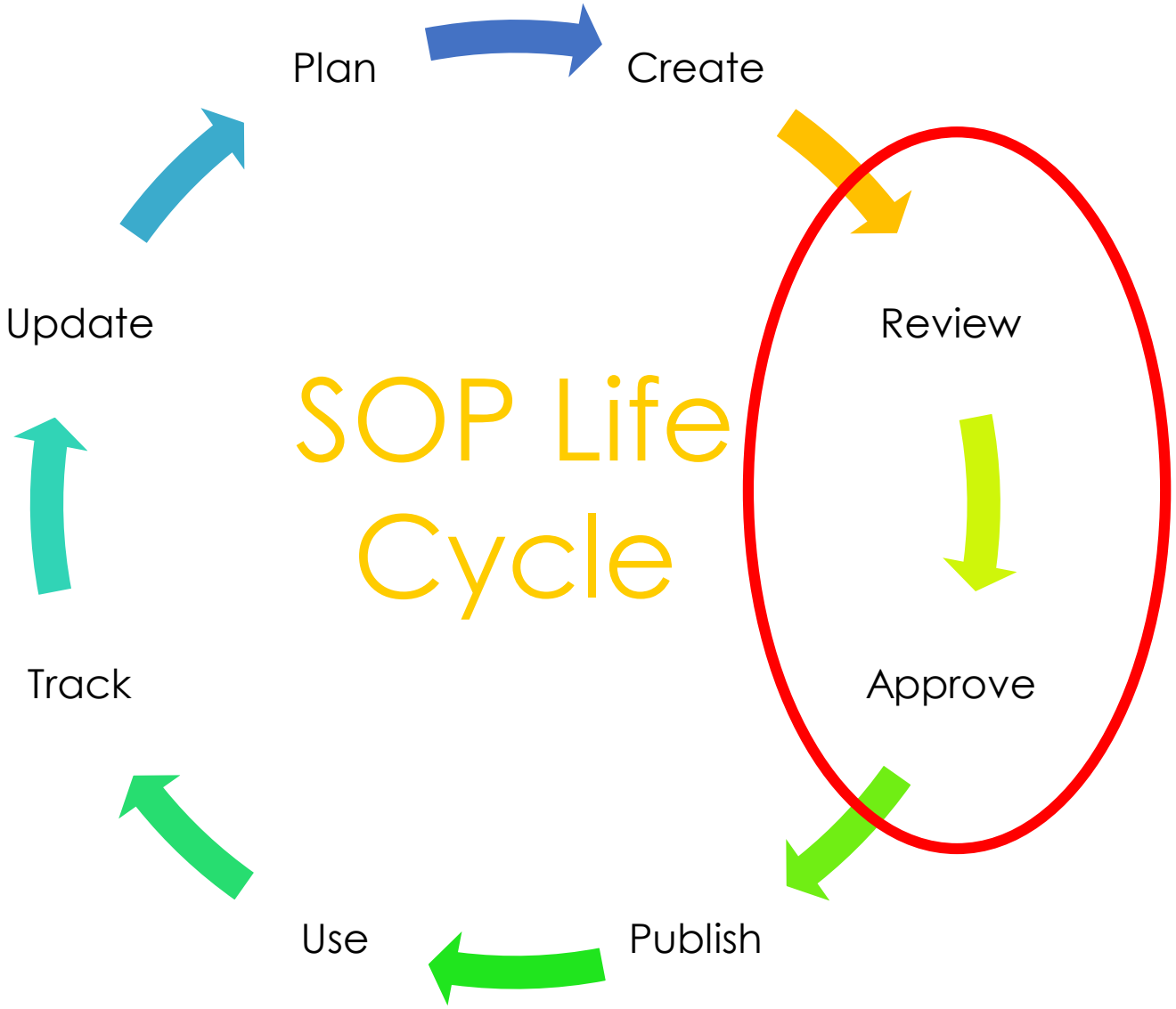
☐ Chemical Hygiene Plan	☐ Lab Safety Plan	☐ Biological Safety Plan
☐ Radiation Safety Plan	☐ Engineering Controls: Click here to enter text.	
☐ Acid Dilutions	☐ Chemical Container Labeling	☐ Chemical Inventory
☐ Compressed Gas Cylinders	☐ Cryogenic Liquids	☐ Eyewash & Safety Showers
☐ Flammable Liquids	☐ General Reagents	☐ Hazardous Waste
☐ Heating Devices	☐ Highly Reactive Chemicals	☐ Housekeeping
☐ Labware Washing	☐ Nitric Acid	☐ Non-hazardous Waste Disposal
☐ Phenolphthalein	☐ PPE	☐ Sharps Handling
☐ Sodium Hydroxide Solutions	☐ Other: Click here to enter text.	☐ Other: Click here to enter text.
☐ Other: Click here to enter text.	☐ Other: Click here to enter text.	☐ Other: Click here to enter text.

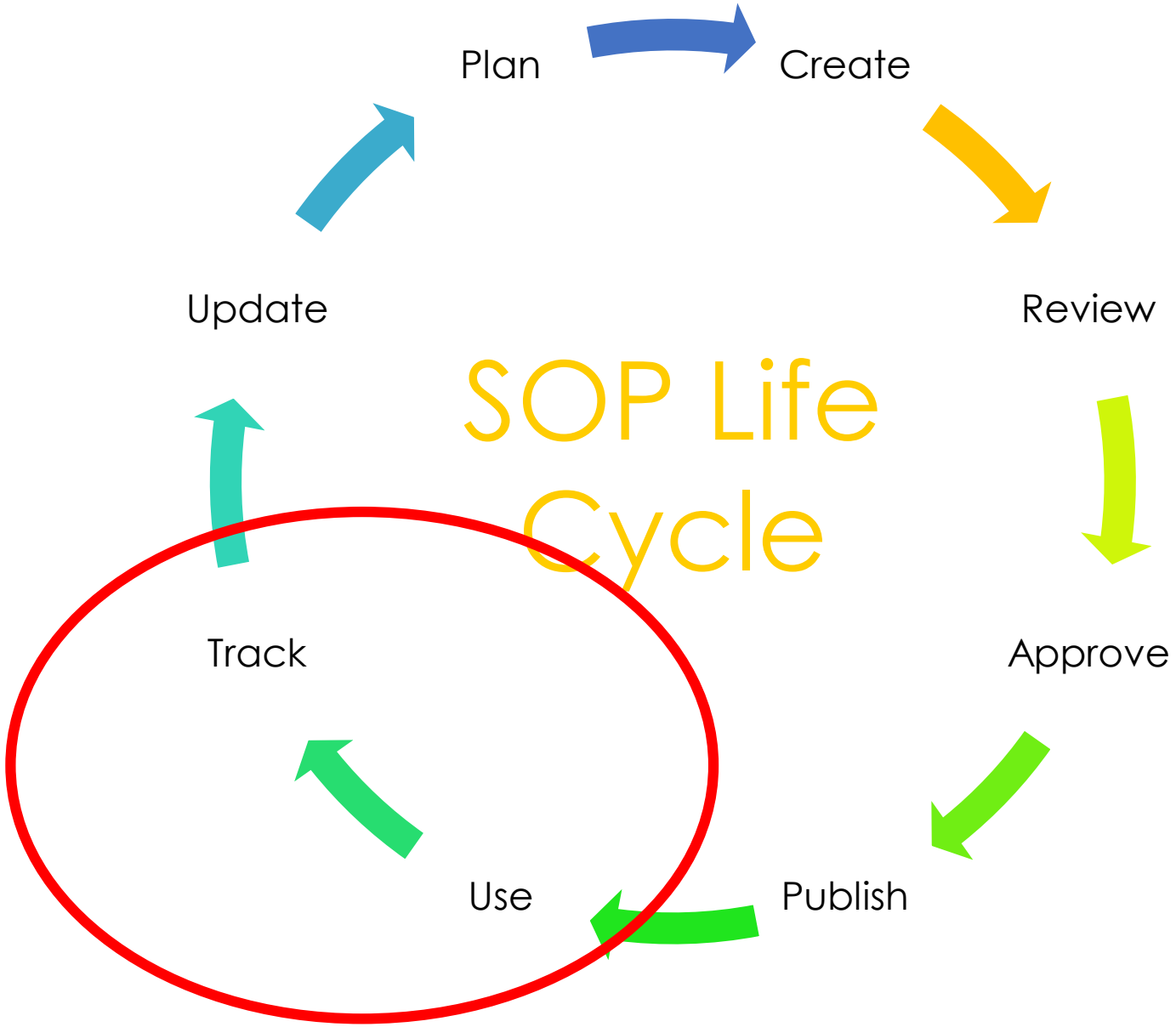
SOPs with chemical hazards have appendices to support the hazard assessment.

Appendix I. Detailed Hazards Description

Prepare this section as an attachment to the SOP. Use the following table to describe hazards. Refer to Safety Data Sheets (SDSs) and other resources like https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm. Copy/paste the table as many times as necessary based on the number of chemicals used in the procedure.

Click here to enter chemical name and CAS #	Choose an item.
Physical Hazards ☐ Explosives ☐ Pyrophoric Liquids ☐ Flammable Gases ☐ Pyrophoric Solids ☐ Flammable Aerosols ☐ Pyrophoric Gases ☐ Oxidizing Gases ☐ Self-Reactive ☐ Gases under Pressure ☐ Self-heating ☐ Flammable Liquids ☐ Corrosive to Metals ☐ Oxidizing Liquids ☐ Organic Peroxides ☐ Oxidizing Solids ☐ Combustible Dusts ☐ Chemicals that emit flammable gases upon water contact 	Health Hazards ☐ Acute Choose an item. Toxicity Click here to enter Category # ☐ Skin Corrosion/Irritation Click here to enter Category # ☐ Serious Eye Damage/Irritation Click here to enter Category # ☐ Respiratory or Skin Sensitization Click here to enter Category # ☐ Germ Cell Mutagenicity Click here to enter Category # ☐ Carcinogenicity Click here to enter Category # ☐ Reproductive Toxicity Click here to enter Category # ☐ Specific Choose an item. Target Organ Toxicity Click here to enter Category # ☐ Aspiration Hazard Click here to enter Category # ☐ Simple Asphyxiant Click here to enter Category # Routes of Exposure ☐ Eye Contact ☐ Inhalation ☐ Ingestion ☐ Skin Contact ☐ Skin Absorption Symptoms of Exposure Eye Contact: Click here to describe symptom(s) of exposure Skin Contact: Click here to describe symptom(s) of exposure Inhalation: Click here to describe symptom(s) of exposure Toxicity Limits: Click here to enter; Review Section 11 of SDS Exposure Monitoring: ☐ No ☐ Yes State method(s).


SOP Life Cycle
Plan
Create
Review
Approve
Publish
Use
Track
Update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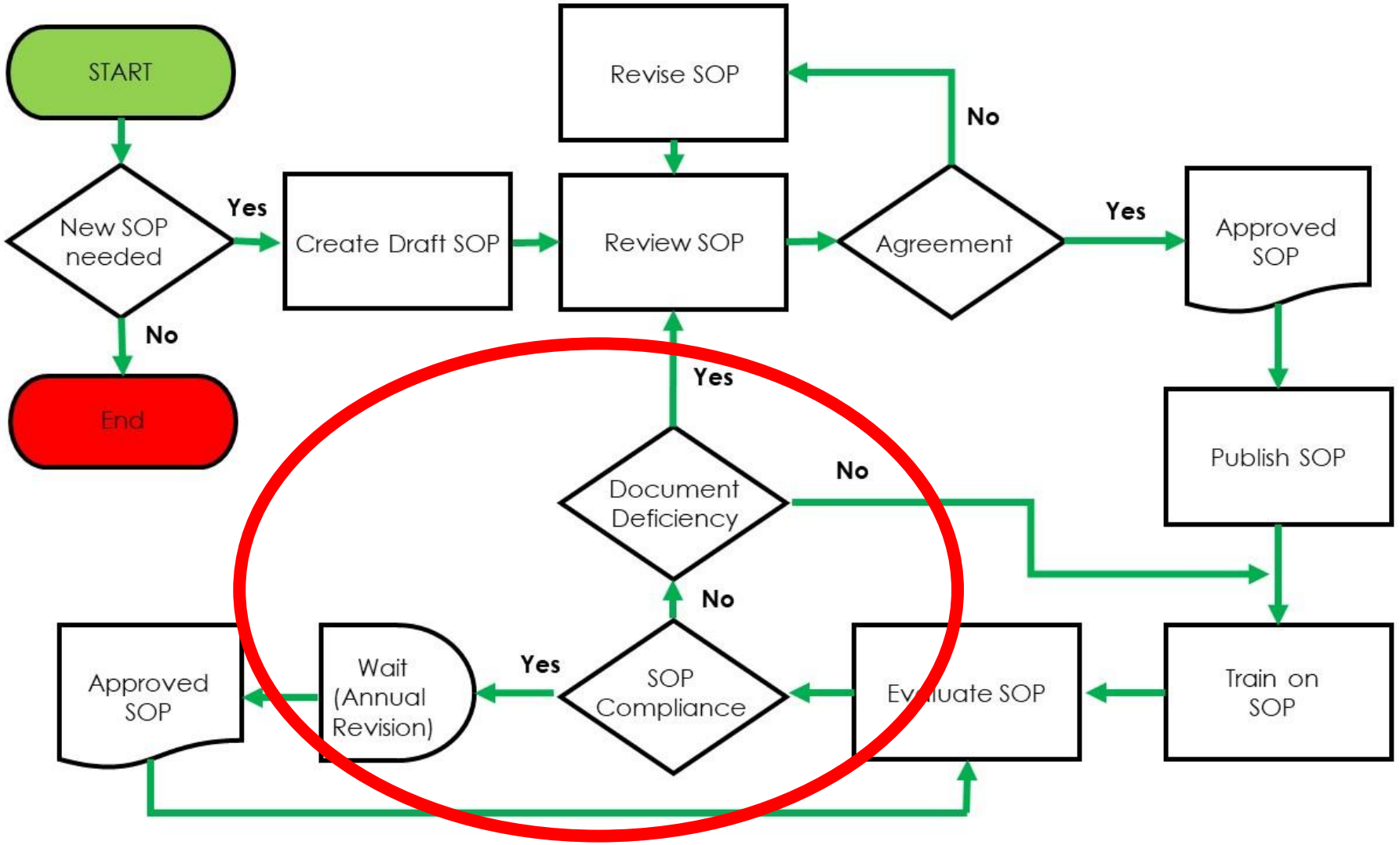
SOP Life Cycle

The SOP process diagram does a better job explaining SOP management at this stage.



Review of Workshop

✓	Plan and create SOPs using the Template.
✓	Craft procedures as discrete task-oriented steps.
✓	Review SOPs with users and experts prior to approving.
✓	Publish through EH&S.
✓	Train workers and evaluation compliance.
✓	Update SOPs annually.