



## MANAGEMENT OF CHANGE PROGRAM

### 1. PURPOSE AND APPLICABILITY

- 1.1. Management of Change (MOC) is designed to ensure that no unforeseen hazards are introduced and the risk of existing hazards to faculty, staff and visitors, or the environment is not unknowingly increased from the procurement of new equipment or through the renovation or construction of buildings or spaces on campus.
- 1.2. This program includes the review of proposed modifications to facilities or from the procurement of potentially hazardous items or equipment.
- 1.3. This program applies to all Notre Dame personnel involved in:
  - 1.3.1. The modification or renovation of physical assets such as buildings or laboratories or in the erection of new buildings on campus.
  - 1.3.2. The procurement of potentially hazardous items or equipment, not limited to new chemicals or equipment that may cause harm to people or the environment.

### 2. DEFINITIONS

- 2.1. **Pre-Startup Safety Review (PSSR)** – This is part of the process for projects creating a significant change or new equipment with substantial hazard potential. It is a pre use assessment and conducted prior to the release of the space or equipment for use. The safety and functionality of the space or equipment itself are checked to ensure that all safeguards are in place and functioning as intended so potential hazards can be mitigated or prevented. See Appendix B.
- 2.2. **Process Hazard Analysis (PHA)** – This is a systematic assessment of potential hazards associated with a change. A PHA provides information for making decisions for improving safety and reducing consequences of unwanted or unplanned events resulting from a change. A PHA is directed toward analyzing potential causes and consequences of fires, explosions, releases of toxic or flammable chemicals, spills of hazardous chemicals, and other consequences. It focuses on equipment, instrumentation, utilities, human actions, and external factors that might be hazardous to human health or the environment. See Appendix C.

### 3. RESPONSIBILITIES

- 3.1. Facility, Design and Operations (FDO) shall:
  - 3.1.1. Request the project owner complete the Process Safety Checklist for FDO Architectural and Renovation Projects (Appendix D) prior

- to commencing work. Consult with RMS if safety questions indicate a potential hazard is possible.
- 3.1.2. Partner with RMS to complete the PHA, if needed.
  - 3.1.3. Ensure all actions identified from the Process Safety Checklist for FDO Architectural and Renovation Projects (Appendix D) or the PHA are completed prior to project completion.
  - 3.1.4. Conduct a PSSR, Appendix B, with RMS and stakeholders prior to relinquishing the building or renovated area.
- 3.2. Procurement Services shall:
- 3.2.1. Include the Procurement Questions within the purchasing system. This is for the purchase of new equipment, radiological sources / lasers, biological agents, and hazardous chemicals (Appendix E).
  - 3.2.2. Notify RMS when screening questions warrant a notification.
  - 3.2.3. Request the shipper to create a note on the packaging informing Warehouse, Delivery and Transportation (WDT) to notify RMS when the equipment arrives. This is only for items or equipment requiring further analysis as indicated through the answers in the Procurement Questions (Appendix E) or consultation with RMS.
- 3.3. Risk Management and Safety (RMS) shall:
- 3.3.1. Provide training on procedural elements to University representatives as needed or upon request.
  - 3.3.2. Participate in or facilitate PHAs.
  - 3.3.3. Assist departments with developing mitigation efforts when new equipment or changes are requested.
  - 3.3.4. Review and maintain this program commensurate with best management practices.
  - 3.3.5. Conduct triennial program reviews.
- 3.4. University Personnel shall:
- 3.4.1. Use Procurement Services when ordering equipment and complete the Procurement Questions, Appendix E.
  - 3.4.2. Contact RMS if receiving purchased items having a note on the paperwork stating a review is required by RMS or similar.
  - 3.4.3. Consult with RMS if questions arise when hazards are noted with the new equipment or renovated spaces after the completion of the procurement screening questions, PHA or PSSR.
- 3.5. Warehouse, Delivery and Transportation (WDT) shall:

- 3.5.1. Inform RMS if receiving an item requiring additional safety analysis. Delivery should not occur until RMS conducts the PSSR or indicates a PSSR is not warranted.

#### 4. REQUIREMENTS FOR ORDERING EQUIPMENT (APPENDIX A)

- 4.1. Procurement Services shall be utilized when ordering equipment.
- 4.2. The Procurement Questions (Appendix E) shall be answered reviewing the equipment's hazard potential. The purpose of the questions is to notify RMS of any potentially hazardous equipment so further review can be conducted, if necessary.
- 4.3. RMS shall partner with the individual or group in need of the equipment to ensure all safety measures are incorporated prior to delivery of the item when appropriate. When these steps are complete RMS shall release the order for Procurement to process.
- 4.4. Once the equipment arrives, WDT shall notify RMS. RMS shall conduct a PSSR with the appropriate stakeholders, if necessary. All safety deficiencies identified during the PSSR, shall be addressed prior to the equipment entering service.

#### 5. REQUIREMENTS FOR RENOVATING SPACES OR CONSTRUCTION ACTIVITIES (APPENDIX A)

- 5.1. All renovation and construction projects shall be coordinated with FDO.
- 5.2. The Project Lead shall complete the Process Safety Checklist for FDO Architectural and Renovation Projects (Appendix D). For low risk projects, construction activities may commence. For higher risk projects, the Project Lead, RMS and stakeholders shall discuss the need for a process hazard analysis (PHA). If warranted, the PHA shall be completed prior to construction activities commencing (See Appendix C for an example PHA).
- 5.3. A Pre-Startup Safety Review (Appendix B) shall be conducted with FDO, RMS and the appropriate stakeholders, if deemed necessary. All deficiencies shall be addressed prior to the space being released for operations.

#### 6. PRE-START UP SAFETY REVIEW (PSSR)

- 6.1. A PSSR may be warranted:
  - 6.1.1. If the proposed new equipment has Procurement Questions indicating a potential hazard exists. This should be conducted after the equipment has arrived. This PSSR shall include a physical



review of the equipment.

6.1.2. After the renovation of spaces or construction of buildings. The PSSR shall include a physical walk through of the building.

6.2. Participation in the PSSR

6.2.1. PSSRs for new equipment shall include the equipment owner, RMS and others as deemed necessary.

6.2.2. PSSRs for renovation projects and new construction shall include FDO, RMS, the proposed occupant (if identified and appropriate), and others as deemed necessary by any group involved in the project.

7. **PROGRAM REVIEW AUDITS**

7.1. Program Audits – RMS shall conduct triennial reviews of this program and make changes as indicated during the review.

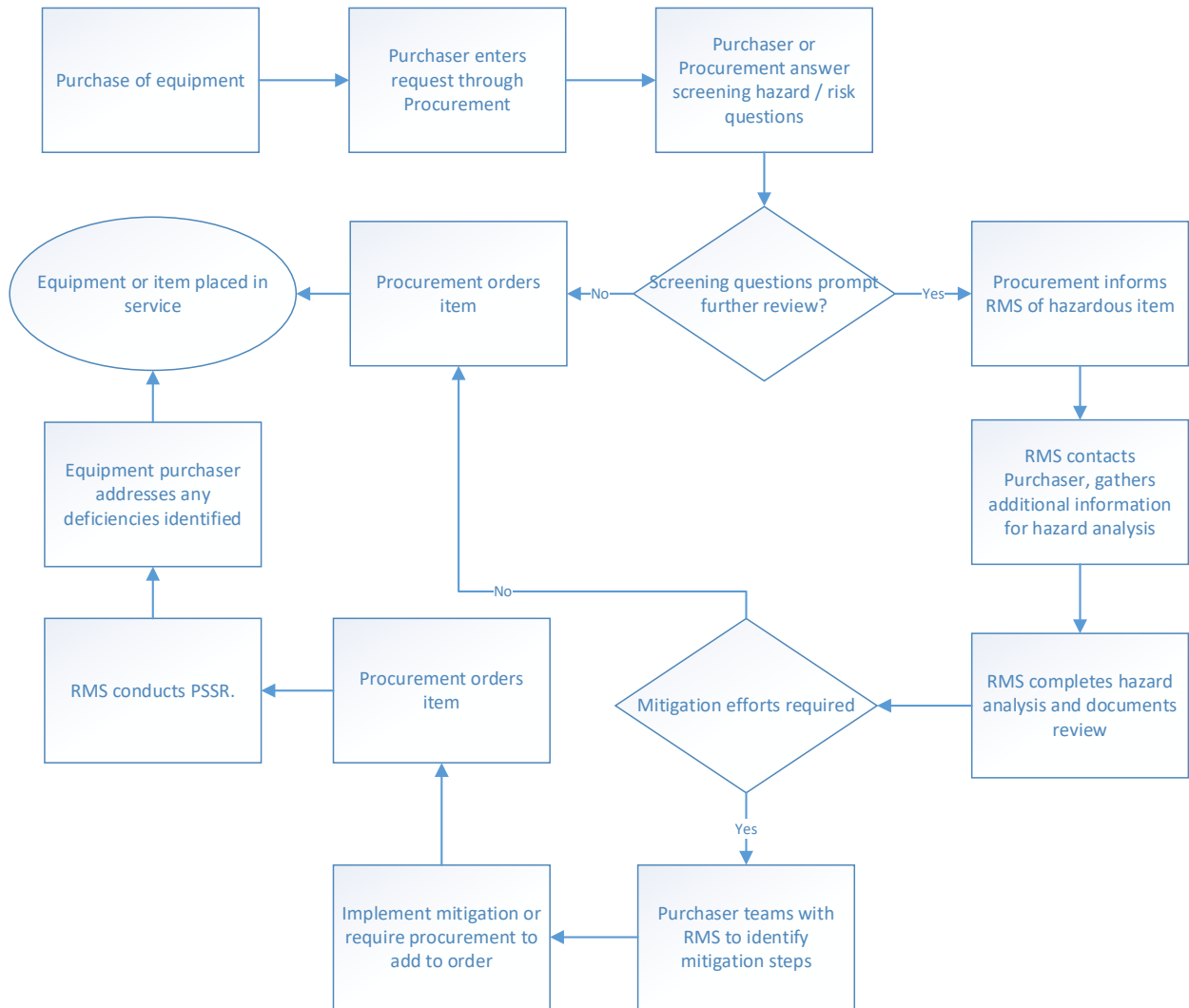
8. **RECORD RETENTION**

8.1 Maintain all records per the University of Notre Dame Records Retention and Disposition Schedule.

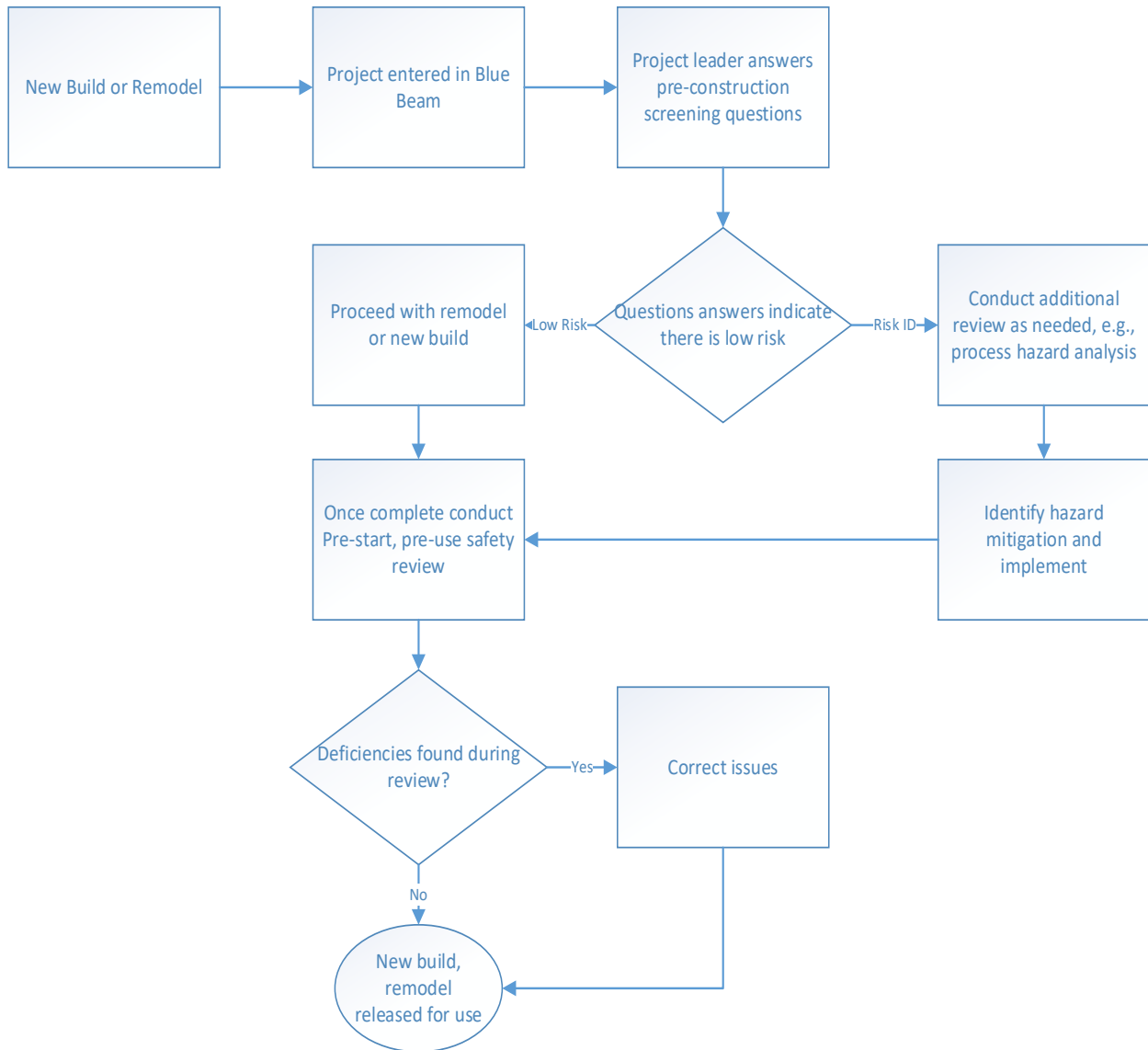
<b>Procedure Revision Table</b>	
<b>Revision Description</b>	<b>Date Revision Made</b>
MOC Procedure Developed	May 2020
Appendix B – Separated question 12 into question 12 and 13.	January 2021
Appendix B – Added question requiring training on new equipment and or procedures	February 2021

**Appendix A**  
**MOC Program Flow Charts**

**New Equipment Flow Chart**



### Renovation or Building Construction Flow Chart





**Appendix B  
Pre-Startup Safety Review (PSSR)**

Description of equipment or space: \_\_\_\_\_

Location (if applicable) \_\_\_\_\_

Date of PSSR: \_\_\_\_\_

Attendees:


Establish a team to conduct the PSSR. At least 1 other individual associated with the change should be involved. Answer each question below by checking Yes, No or N/A. Actions to correct the deficiency must be developed for all questions answered with a “No”. Document the actions and note which items must be completed prior to the release of the equipment or space to the end user.

#	Item	Yes	No	N/A
1.	Has the construction of the project been in accordance with the design specifications?			
2.	Are the Materials of Construction for all piping, valves, equipment and instruments suitable for the chemical service?			
3.	Has grounding protection been installed?			
4.	Have all new alarms and interlocks been <u>tested</u> as functional?			
5.	Have all Pre-Startup Best Management Practices been followed including, but not limited to: <ul style="list-style-type: none"> <li>• Checking motor rotation.</li> <li>• Drying of equipment and piping systems prior to introducing process chemicals.</li> <li>• Integrity and/or leak testing of equipment and piping.</li> </ul>			
6.	Was appropriate access to and around the equipment considered?			
7.	Was appropriate room for maintenance & operations work considered?			
8.	Are proper escape routes available?			
9.	Are vessels and pipelines labeled i.e., flow direction for piping, HazCom and equipment number for vessels?			
10.	Are Start/Stop buttons, disconnect switches, etc., labeled?			

#	Item	Yes	No	N/A
11.	Are emergency shut-off switches/valves properly marked and located so as to be accessible in foreseeable emergencies?			
12.	Are valves, circuit breakers labeled and capable of being locked out?			
13.	Are energy control procedures developed and available?			
14.	Is machine guarding appropriate and installed?			
15.	Appropriate provisions provided for material handling?			
16.	Adequate lighting/emergency lighting?			
17.	Safety Showers available, identified and operational? Is drainage installed?			
18.	Is the installation free of head-knockers and trip hazards?			
19.	Have any necessary safety signs been installed?			
20.	Were Human Factors considerations properly addressed (direction of operation of valves and switches, location/orientation of controls and switches, etc.)?			
21.	Have any identified Industrial Hygiene concerns (exposure to chemicals or noise) been communicated to RMS and addressed?			
22.	Has area been cleared of debris?			
23.	Have remotely operated valves been checked for proper operation (open/close)?			
24.	Are hoists, ladders (fixed), and lifting devices properly designed and installed?			
25.	Has safety equipment been installed as necessary, i.e., ventilation, emergency stop buttons, fire suppression, fire extinguishers, etc.?			
26.	Have personnel received training on new equipment and / or procedures?			
27.	Other			

### Actions to Address Deficiencies

Action Description	Responsible Person	Target Date	Does Action Need Completing Prior to Releasing? Yes or No



### Appendix C Example Process Hazard Analysis (PHA)

Date:													
System Name:													
System / Subsystem	What If		Hazards	Consequences	Risk Matrix (1 Low to 4 High)			Safeguards	Recommendations		Controls Risk Matrix (1 Low to 4 High)		
					S	L	Risk Rating				S	L	Risk Rating
<i>Example - Supply system</i>	<i>Example</i>	<i>Bypass regulator on booster pump is improperly set in pump house</i>	<i>Potential to dead head booster pump, potential high pressure in piping system</i>	<i>Possible fire, explosion, possible release of propellant, possible off site consequence</i>	4	1	C	<i>The booster pump piping system is equipped with an external bypass that continuously recirculates material back to the storage tank to prevent a "dead headed" condition</i>	1	<i>No recommendations-- existing safeguards considered adequate</i>	4	1	C
	1	Equipment failures											
	2	Human Error											
	3	External Events											
	4	Facility functions: Alarms, construction materials, control systems, documentation and training, instrumentation, piping, pumps, vessels, etc											

### Appendix C Example Process Hazard Analysis (PHA)

Severity Table	
Severity	Qualitative Employee Safety Consequence
1	No employee injuries
2	One Lost Time Injury or Illness
3	Multiple Lost Time Injuries or Illnesses
4	Multiple Lost Time Injuries or Illnesses w/one or more fatalities

Likelihood Table	
Likelihood	Qualitative Likelihood Criteria
1	Not expected to occur during the lifetime of the process. Examples – Simultaneous failures of two or more independent instrument or mechanical systems
2	Expected to occur only a few times during the life of the process. Examples – Rupture of product piping, trained employees w/procedures injured during LOTO operation
3	Expected to occur several times during the life of the process. Examples – hose rupture, pipe leaks, pump seal failure
4	Expected to occur yearly. Examples – instrument component failures, valve failure, human error, hose leaks

Example Risk Priority Matrix					
<b>Consequences (Severity) ↑</b>	4	C	B	A	A
	3	C	B	B	A
	2	D	C	B	B
	1	D	D	C	C
		1	2	3	4
<b>Likelihood →</b>					

Example Risk Priority Legend	
Risk Class	Explanation of Risk
<b>A</b>	Risk intolerable - needs to be mitigated within 2 weeks to at least a Class C, if that cannot be accomplished, process needs to be shutdown
<b>B</b>	Risk undesirable - needs to be mitigated within 6 months to at least a Class C
<b>C</b>	Risk tolerable with controls (engineering and administrative)
<b>D</b>	Risk acceptable – no further action required



**Appendix D  
Process Safety Checklist for  
FDO Architectural and Renovation Projects**

Review and consider the impact on the following. Check Yes, No, or Unsure for each issue.

<b>General Safety Section Complete for all Projects</b>				
<b>Question</b>	<b>Yes</b>	<b>No</b>	<b>Unsure</b>	<b>If Yes, provide brief explanation &amp; page # in drawings, if applicable</b>
Will this impact emergency preparedness procedures, including but not limited to emergency egress, occupant loading, etc.?				
Will this impact emergency equipment, fire alarms, sprinklers system, etc.?				
Are there any modified or new confined spaces?				
Are there fall protection requirements including but not limited to handrail installation or modification, roof fall protection, platforms >4', etc.?				
Are there fixed ladders?				
Are there any mezzanines or platforms?				
Do walking working surfaces require drainage, e.g., drain for safety shower?				
Do walking working surfaces require slip resistance e.g., kitchen areas?				
Will there be equipment requiring guarding?				
Is there a need to label electrical disconnects, breaker panels, etc.?				

<b>General Safety Section Complete for all Projects</b>				
<b>Question</b>	<b>Yes</b>	<b>No</b>	<b>Unsure</b>	<b>If Yes, provide brief explanation &amp; page # in drawings, if applicable</b>
Will there be electrical outlets installed within 6' of water source?				
Are there any electrically hazardous areas (Class I, II, or III)?				
Will safety showers or eyewash stations be installed?				
Will emergency lighting be installed?				
Will general or local exhaust ventilation to control a hazardous atmosphere (not HVAC) be installed?				
Are there or will there be any underground storage tanks (new or existing)?				
Will pressure vessels be installed or modified in any way?				
Will cranes or overhead hoists be installed?				
Will there be a loading dock?				
Will there be piping or vessels that require labeling?				
Will any high noise (>85 dBA) equipment be installed or modified?				
Will any equipment that emits atmospheric pollution be installed? Consider generators, boilers, etc.?				
Will there be emergency shutoffs or interlocks installed on equipment?				

<b>Environmental Section Complete for ALL Projects</b>				
<b>Question</b>	<b>Yes</b>	<b>No</b>	<b>Unsure</b>	<b>If Yes, provide brief explanation &amp; page # in drawings, if applicable</b>
Will asbestos testing or abatement occur?				
Will lead testing or abatement occur?				
Will mold testing or remediation occur?				
<b>Laboratory Section Complete for Projects Impacting Laboratories</b>				
<b>Question</b>	<b>Yes</b>	<b>No</b>	<b>Unsure</b>	<b>If Yes, provide brief explanation &amp; page # in drawings, if applicable</b>
Is there a need to modify or add ventilation such as hoods (chemical, biological, dust, vapors, etc.)?				
Will a biosafety laboratory be impacted?				
Are there any design considerations or enhancements for radiation sources or laser use?				
Will there be any special systems installed such as chemical gases delivery systems for experiments, environmental controls, mechanical equipment for experiments, etc.?				
Are there any design considerations for animal handling?				

## Appendix E

### Procurement Questions Purchase of New Industrial Equipment, Radiological Sources/Lasers, Biological Agents or Hazardous Chemicals

**Non-Catalog Form** ? X

**Enter Supplier**

or  
[Supplier Search](#)

Product Description	Catalog No.	Quantity	Unit Price	Unit of Measure
<input style="width: 95%;" type="text"/>	<input style="width: 95%;" type="text"/>	<input style="width: 95%;" type="text"/>	<input style="width: 95%;" type="text"/>	EA - Each <span style="float: right;">▼</span>

254 characters remaining [expand](#) | [clear](#)

[Product Details](#)

- [Controlled Substance \(Click HERE more information\)](#)
- [Industrial Equipment \(Click HERE for more information\)](#)
- [Radioactive/Lasers \(Click HERE for more information\)](#)
- [Hazardous Chemicals/Biological Agents \(Click HERE for more info.\)](#)
- [Procurement Review Item \(Click HERE to view list\)](#)
- [Human Embryonic Tissue or Derived Cell Line \(Click HERE for info.\)](#)

Save and Close
Save and Add Another Item
Close

If an item meets any of the criteria listed below, it needs to be reviewed by Risk Management & Safety, and the check box next to the corresponding Product flag label is to be clicked. If you are unsure, click the corresponding check box.

#### Equipment:

Question	Yes	No	N/A
Does the item being purchased require any of the following power sources to run?			
1. Electricity $\geq$ 220 Volts			
2. Propane			
3. Battery, e.g., cars, trucks, SUVs, RVs, marine vehicles, heavy-duty and commercial-use vehicles			
Is the item a machine with exposed moving parts?			
Is the item being procured a crane or a hoist?			
Is the item a powered industrial truck, such as, but not limited to, fork truck, aerial lift, dump truck, front end loader, etc.?			
Does the item generate noise $\geq$ 85 dB?			
Does the item generate off gases, fumes, vapors or another atmospheric hazard?			
Is a contractor required to install or set up the item?			

Question	Yes	No	N/A
Does the item increase the risk of human health exposure to chemicals or release of any materials to the environment?			
Does the equipment add a new process to the area?			
Will additional training be required for personnel due to the addition of this equipment, e.g., fall protection, respiratory protection, hearing protection, etc.?			
Does the installation of the item require any ground penetrations, such as tent stakes or excavation work?			

**Radiological Sources/Lasers:**

Question	Yes	No	N/A
Is the item radioactive or does it contain radioactive material?			
Is the item a laser?			

**Biological Agents or Hazardous Chemicals**

Question	Yes	No	N/A
Is the item particularly hazardous chemicals as defined by OSHA			
Is the item a Biological agent (bacteria, fungi, viruses, parasites, recombinant materials), cell lines, blood, select agents, prions?			
Is it a services for remediation / removal of hazardous chemicals and wastes, weapons, ammunition			