UNL Laboratory Ventilation & Controls

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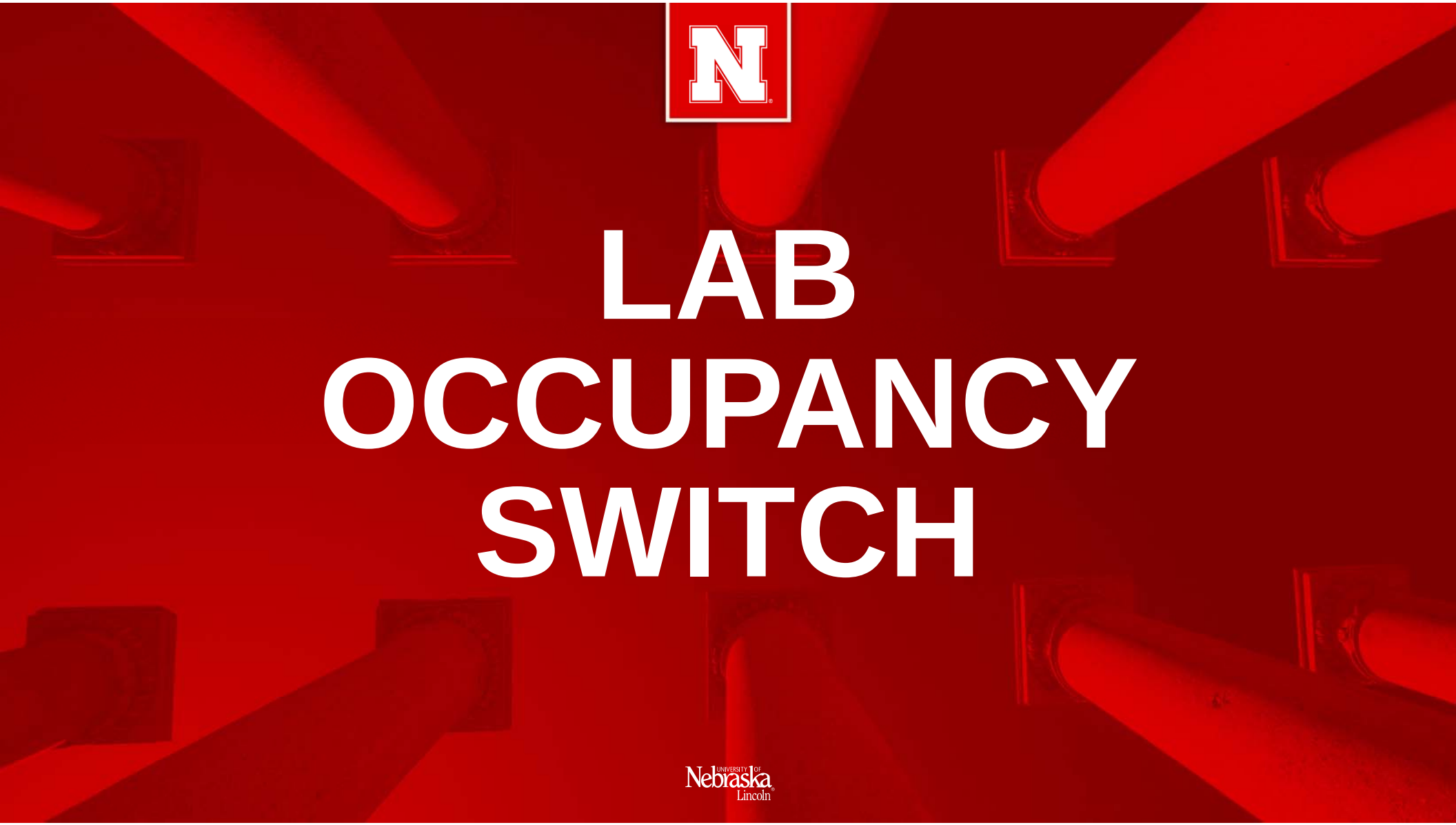
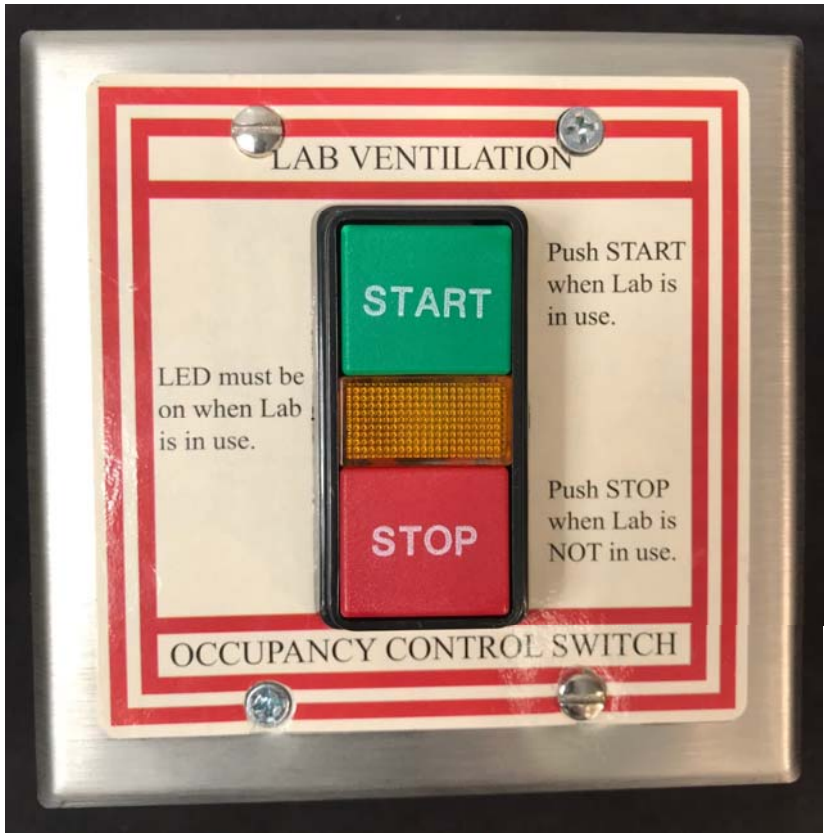
BUILDING SYSTEMS MAINTENANCE


LABORATORY
VENTILATION
University of Nebraska Lincoln

LABORATORY VENTILATION

- All labs are different…
- Ventilation is a balance of supply and exhaust air to the lab
  - Majority of labs based on a constant air flow offset control
  - Exhaust > Supply = Negative Offset/Pressure
  - Supply > Exhaust = Positive Offset/Pressure (Clean rooms)
- Lab ventilation rates are in terms of Air Changes per Hour (ACH)
  - Unoccupied labs typically operate at 4 ACH
  - Occupied labs operate at a 6-10 ACH minimum (typical)
  - Ventilation rates increase if cooling is needed


LAB
OCCUPANCY
SWITCH
University of Nebraska Lincoln



LAB OCCUPANCY SWITCH

- PUSH THE “START” BUTTON WHEN THE LAB IS IN USE. LED WILL ILLUMINATE.
- PUSH THE “STOP” BUTTON WHEN THE LAB IS NOT IN USE

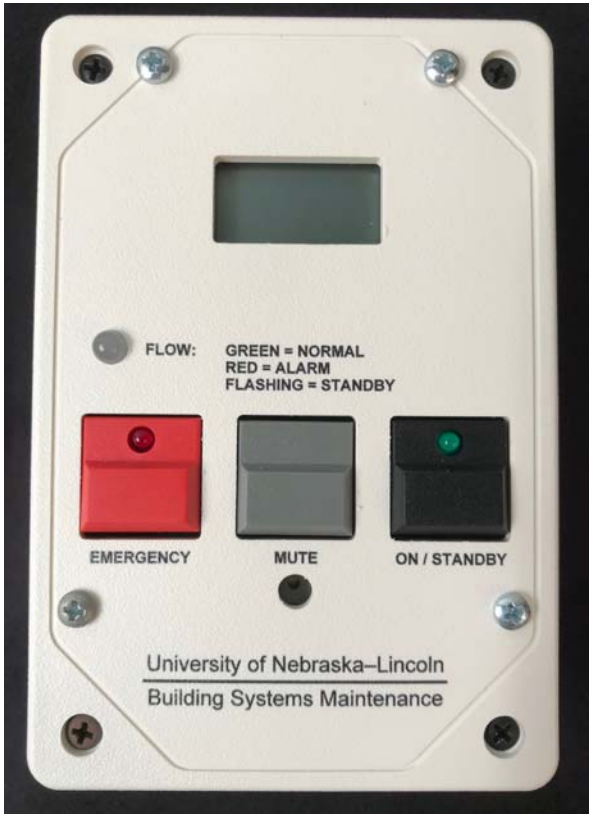
LAB IN USE:

- 6-10 AIR CHANGES PER HOUR MINIMUM (TYPICAL)
- +/- 1 DEGREE F CONTROL TOLERANCE

LAB NOT IN USE:

- 4 AIR CHANGES PER HOUR (TYPICAL)
- +/- 3 DEGREES F CONTROL TOLERANCE


FUME HOOD
CONTROLS
University of Nebraska Lincoln



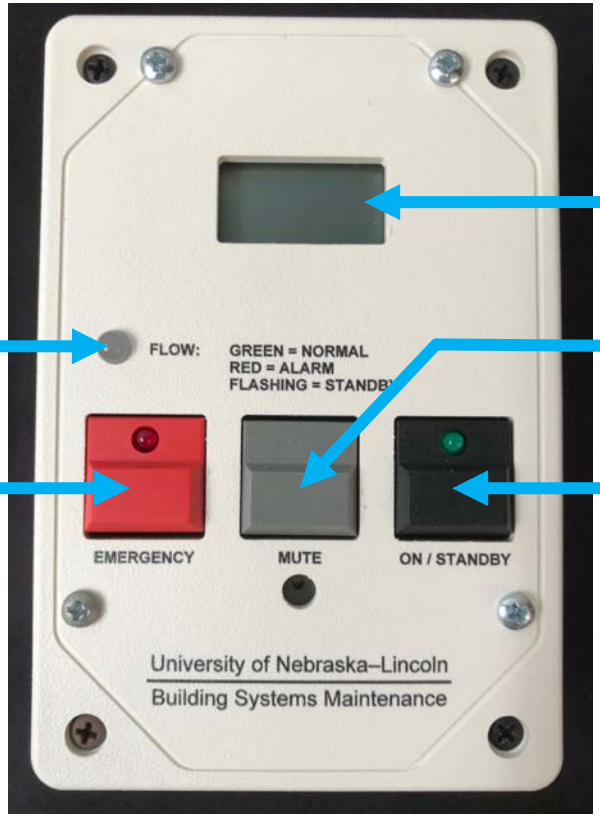
Fume Hood Controllers

- Currently have 463 in operation today
- Controls constant volume or variable volume hoods
- Can monitor sash position and air flow
- Controls exhaust air valves to maintain constant face velocity

Variable Volume = Air flow dependent on sash position

Constant Volume = Air flow constant independent of sash position

FUME HOOD CONTROLLER INTERFACE



FACE VELOCITY DISPLAY

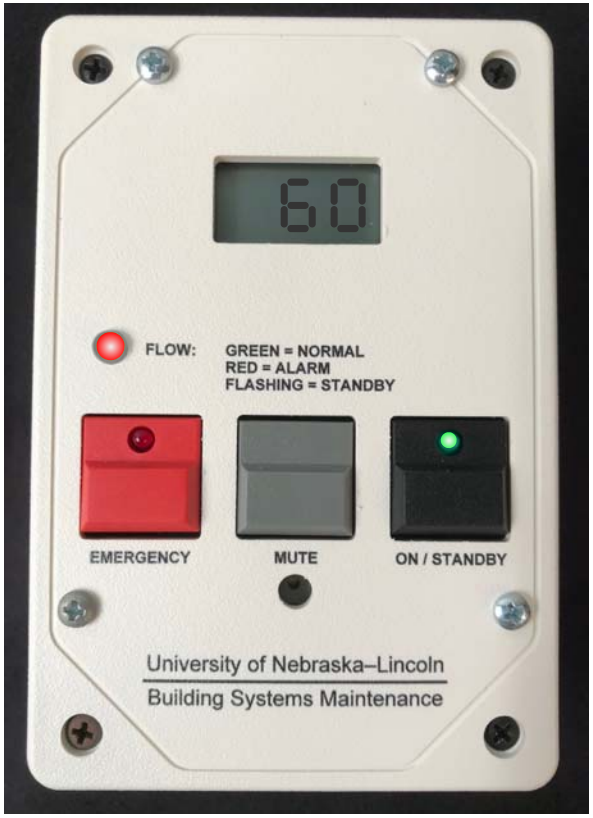
FLOW STATUS INDICATOR

ALARM MUTE BUTTON

EMERGENCY BUTTON

ON/STANDBY BUTTON

FUME HOOD CONTROLS



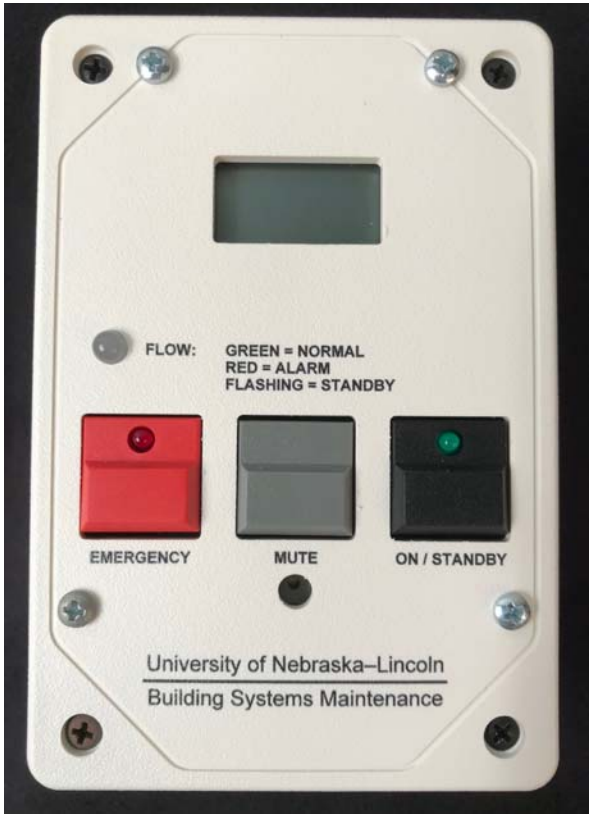
NORMAL OPERATION

TO TURN ON:

- PRESS THE ON/STANDBY BUTTON IN
- THE ON/STANDY LED WILL ILLUMINATE
- THE FACE VELOCITY WILL BE DISPLAYED
- THE FLOW STATUS INDICATOR WILL TURN GREEN (ASSUMING PROPER FLOW CAN BE ACHIEVED)

STANDBY MODE (HOOD NOT IN USE):

- PRESS THE ON/STANDBY BUTTON TO RELEASE
- THE ON/STANDBY LED WILL TURN OFF
- THE FACE VELOCITY DISPLAY WILL TURN OFF
- THE FLOW STATUS INDICATOR WILL FLASH RED/GREEN

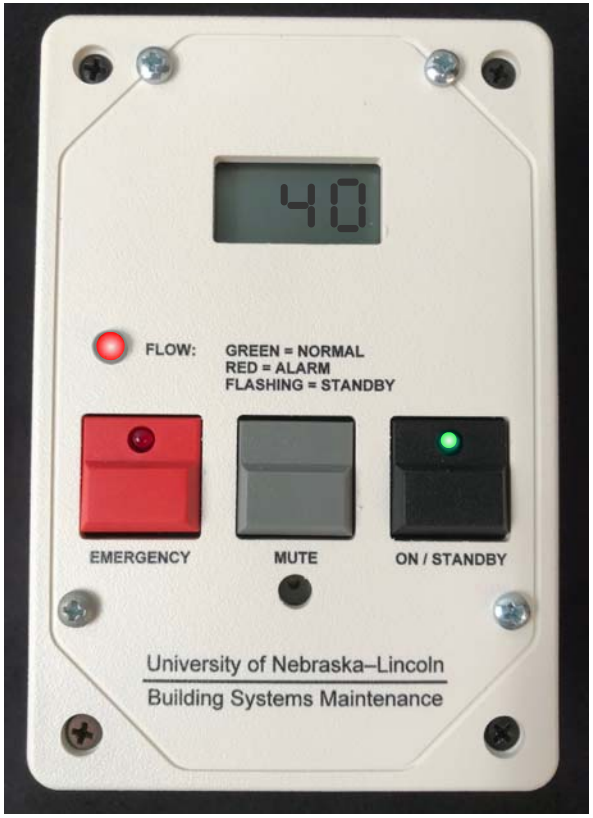


STANDBY MODE

WHAT DOES THIS MEAN?

- THE HOOD IS NOT IN USE
- NO CHEMICALS ARE PRESENT IN THE HOOD
- THE EXHAUSTED AIR GOES TO MINIMUM ALLOWABLE AIR FLOW

➢ EVERY LAB/HOOD IS DIFFERENT SO THE MINIMUM ALLOWABLE AIR FLOW CAN BE DIFFERENT FOR EACH HOOD

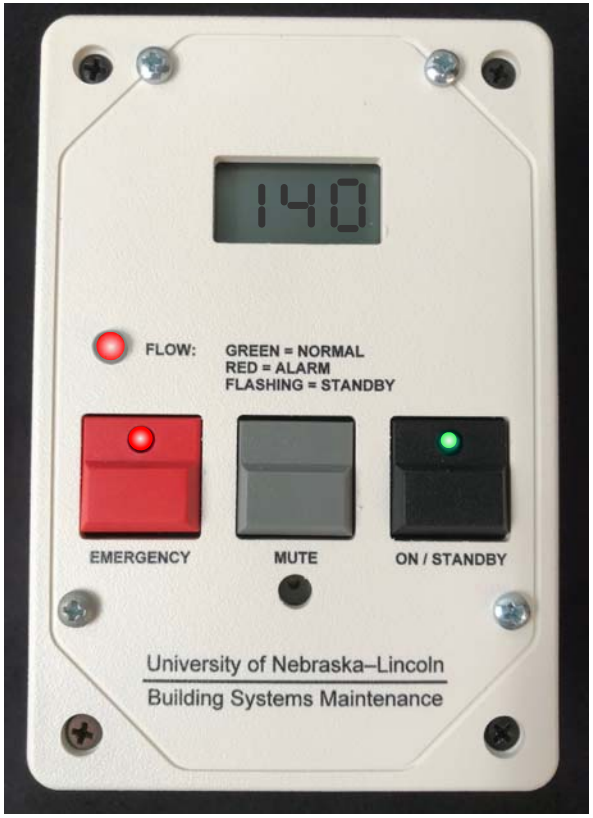


FUME HOOD ALARM

IF THERE IS NOT PROPER AIR FLOW, THE FUME HOOD CONTROLLER WILL TRIGGER AN AUDIBLE ALARM AND THE FLOW STATUS INDICATOR WILL TURN RED.

WHAT DO I DO WHEN THE ALARM GOES OFF?

- **PROPERLY STORE YOUR CHEMICALS AND SECURE ANY ACTIVE EXPERIMENTS WITHIN THE HOOD**
- **CLOSE THE SASH**
- **PRESS THE “MUTE” BUTTON TO SILENCE THE AUDIBLE ALARM**
- **CALL FACILITIES MAINTENANCE TO REQUEST SERVICE**



EMERGENCY MODE

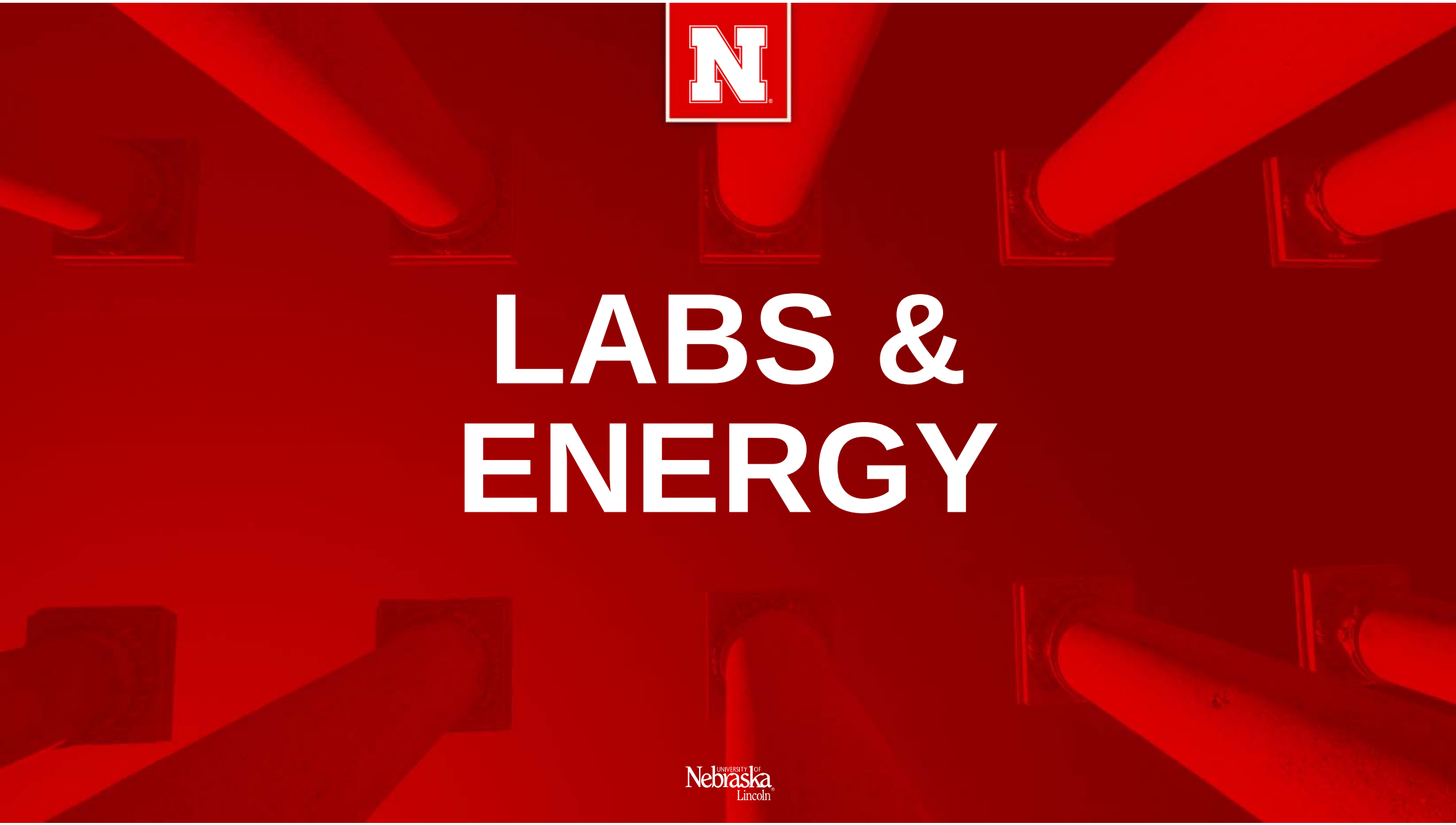
WHAT SHOULD I DO IF I SPILL A HAZARDOUS CHEMICAL IN THE HOOD?

- PRESS THE "EMERGENCY" BUTTON TO PUT THE FUME HOOD IN EMERGENCY MODE
- CLOSE THE SASH
- CALL ENVIRONMENTAL HEALTH & SAFETY

➢ EMERGENCY MODE SETS THE FUME HOOD TO MAXIMUM EXHAUST IGNORING ALL SETPOINTS OR SASH POSITION

OTHER FUME HOOD CONTROLS

- **A number of older hoods do not have modern electronic controls**
  - **Toggle switches turning independent fume hood exhaust fans on/off**
  - **Pressure gauges indicating exhaust air flow (0 = Do Not Use Fume Hood)**


LABS &
ENERGY
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LABORATORIES & ENERGY USE

- Lab controls for Safety + Energy Management
- Labs are the highest energy costs on campus
- Conditioned air costs $3 - $4 per CFM per year
- Average 6ft hood = $2000/year or more
- Closing sashes and utilizing the standby mode have a huge impact on energy costs
- Proper use of a laboratory occupancy switch can save 50% or more of lab energy costs