ASPCRO
CAP DISCUSSION

COMPARISON OF AERATION PROCEDURES 1 & 2 AND CALIFORNIA AERATION PLAN (CAP)

Parameter	Aeration Procedures 1 & 2	CAP
No. trained persons present to initiate aeration	Two	One
SCBA Needed to Initiate Aeration	Yes	No
Min. time "Active" Aeration	1 h	12 h
Min. time "Passive" Aeration	5 or 7 h	None
Tarps Removed	Beginning of aeration	End of aeration
Extra Equipment (ducting, inlets, fans, tarps, etc.) required	No	Yes

CAP HISTORY

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SCOPE

- CAP MAY BE USED WITH TARPAULIN OR TAPE-AND-SEAL STRUCTURAL FUMIGATIONS.

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- CAP MAY BE USED FOR ALL STRUCTURAL FUMIGATIONS SUCH AS DWELLINGS, MULTI-UNIT BUILDINGS, COMMERCIAL AND INDUSTRIAL STRUCTURES, BOATS, VEHICLES, SHEDS, GARAGES/CARPORTS, GAZEBOS.
- WHILE THE USE OF SELF-CONTAINED BREATHING APPARATUS (SCBA) IS LEGALLY ACCEPTABLE, THE CAP PLAN MINIMIZES THE POTENTIAL RISK TO WORKERS BY PROVIDING THE OPTION TO REMOVE TARPS WITHOUT THE USE OF AN SCBA.

PLAN OVERVIEW

- Fumigant aeration is conducted remotely by pre-positioned inlet devices, ducting and aeration fans.
- CAP supersedes Aeration Procedure 1 and Aeration Procedure 2 on sulfuryl fluoride product labeling.
- If entry is required into the fumigated structure or space before the completion of aeration, then employees must use:
  - A self-contained breathing apparatus (SCBA), or
  - Continuous monitoring of fumigant levels.

PREPARATION FOR FUMIGATION: AERATION DEVICES

- Aeration equipment is comprised of aeration fans (connected to aeration ducting), aeration ducting, and inlets.
- For tarpaulin fumigations, aeration equipment is installed prior to fumigation so aeration can be initiated from outside the fumigated space.

PREPARATION FOR FUMIGATION: AERATION FANS

- Each aeration fan must be at least 18 inches in diameter.
- The minimum number of aeration fans required depends upon the volume of the fumigated structure and is specified in Table 1 (next slide).
- Aeration fans are turned on only to ventilate fumigant from the structure.

TABLE 1
DETERMINING THE NUMBER OF DUCTED AERATION FANS AND INLET DEVICES

FUMIGATED STRUCTURE SIZE (CUBIC FEET)	NUMBER OF DUCTED AERATION FANS	NUMBER OF INLET DEVICES	TOTAL INLET SIZE RANGE: (MINIMUM OF 240SQ. INCHES MAXIMUM OF 381SQ. INCHES FOR EACH INLET DEVICE)
60,000 or less	1	2-3	480sq. inches to 762sq. inches
60,001 to 120,000	2	3-4	720sq. inches to 1,143sq. inches
120,001 to 180,000	3	4-5	960sq. inches to 1,524sq. inches
180,001 to 240,000	4	5-6	1,200sq. inches to 1,905sq. inches
for each additional 60,000 over 240,000	1 additional ducted aeration fan unit AND	1-2 additional inlet device(s)*	adding a minimum of 240sq. inches up to a maximum of 381sq. inches per additional inlet device

* IT IS IMPORTANT TO MAINTAIN SOME NEGATIVE PRESSURE IN THE STRUCTURE DURING CAP, AS INDICATED BY TARPAULINS TIGHTENING AFTER AERATION FANS ARE ACTIVATED AND INLET DEVICES ARE OPENED. THE GREATER THE STRUCTURE VOLUME, THE GREATER THE STRESS ON THE TARPAULINS.

PREPARATION FOR FUMIGATION: AERATION FANS

- Place aeration fans within the fumigated space to draw fresh air through the structure.
- Use extension cords, remote relays, or other devices during aeration fan installation to enable activation of aeration fans from outside of the fumigated space at the initiation of aeration.

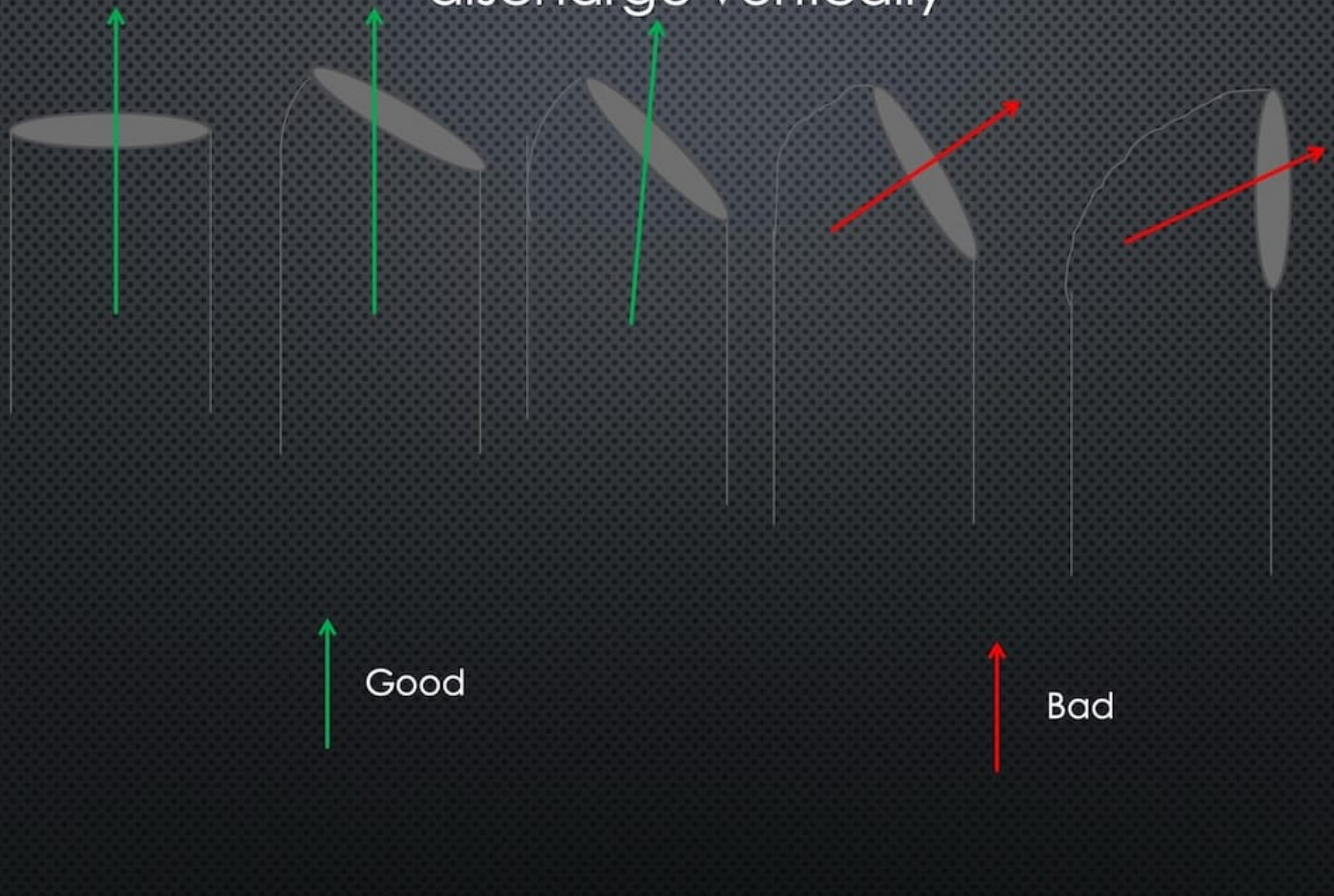
PREPARATION FOR FUMIGATION: AERATION DUCTING

- CONNECT EACH AERATION FAN SECURELY TO DURABLE REINFORCED DUCTING:
  - MINIMUM 18-INCH DIAMETER
  - DOES NOT EASILY COLLAPSE OR RESTRICT AIRFLOW
  - EXTEND AERATION DUCTING FROM INSIDE THE FUMIGATED SPACE, THROUGH TARPAULINS, TO THE FIRST STORY ROOFLINE OR AT LEAST 10 FEET ABOVE GROUND LEVEL FOR HIGHER ROOFLINES.

PREPARATION FOR FUMIGATION: AERATION DUCTING

- Position the aeration ducting so the release point is outside the tarpaulin and fumigant is discharged vertically.
- Place aeration ducting in an open area away from sensitive areas such as occupied structures.
- Whenever practical, space aeration ducts across the side of a structure to facilitate aeration.

Different Angle Opening of Ducts
"discharge vertically"



Good

Bad

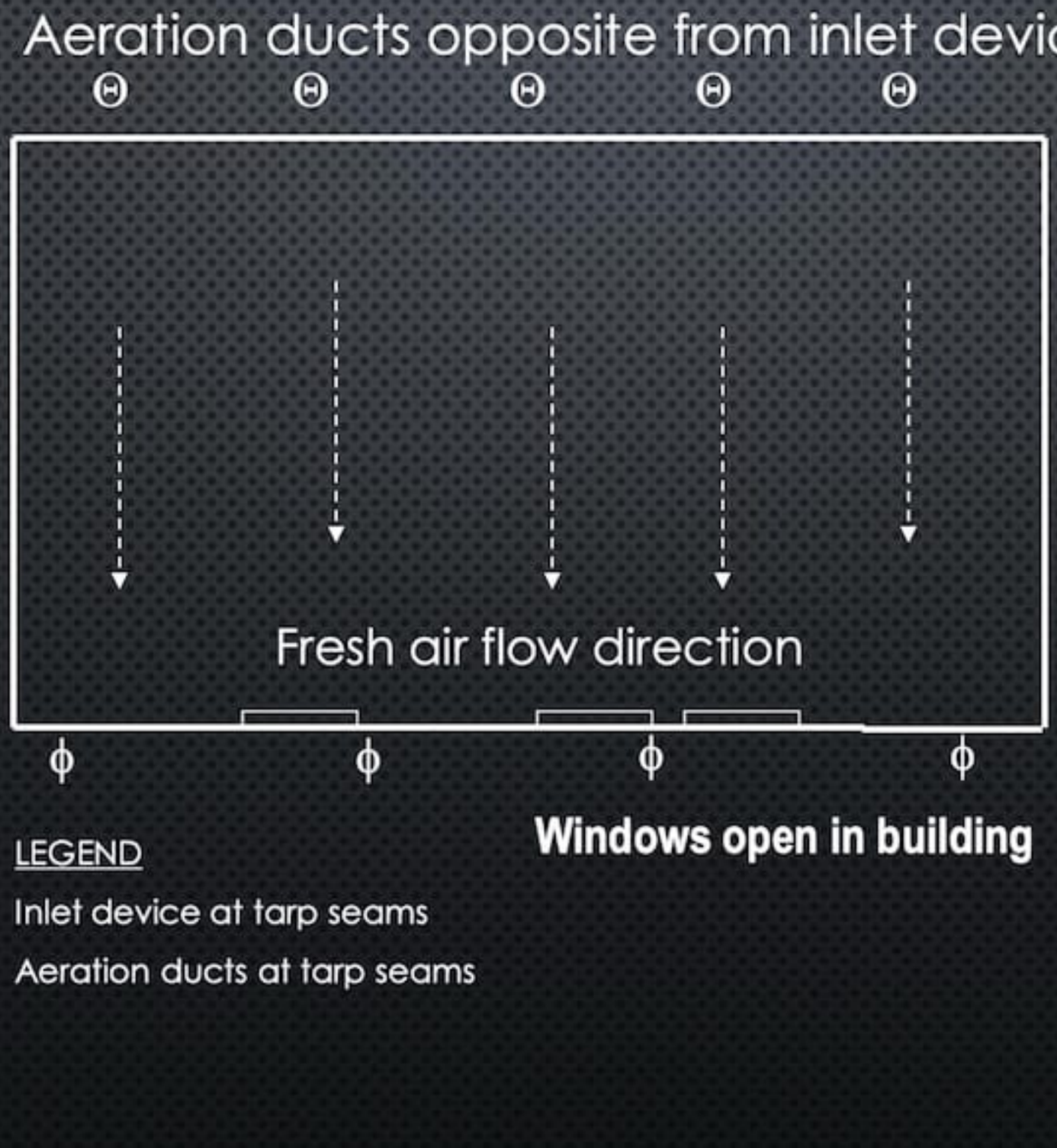
PREPARATION FOR FUMIGATION: AERATION DUCTING

- AERATION DUCTING SHALL BE DESIGNED AND SEALED IN A MANNER THAT ALLOWS IT TO BE OPENED REMOTELY FROM GROUND LEVEL WHEN AERATION IS INITIATED.
- IF THE DUCT COVER CANNOT BE OPENED REMOTELY DUE TO MALFUNCTION, AN SCBA MUST BE USED WHEN REMOVING THE DUCT COVER.

PREPARATION FOR FUMIGATION: INLET DEVICES

- THE OBJECTIVE OF INLET DEVICES IS TO ALLOW FRESH AIR TO BE DRAWN IN CREATING CROSS-VENTILATION.
- THE SIZE OF THE INLETS IS RELATED TO THE SIZE AND CAPACITY OF THE AERATION FAN AND AERATION DUCT.
- INLETS SHOULD BE SPACED OUT ACROSS THE SIDE OF THE STRUCTURE AND PLACED ON THE OPPOSITE SIDE OF WHERE THE AERATION DUCTING IS LOCATED.

240 MCF Commercial Building
Using CAP to Aerate Vikane® gas fumigant



SPACING AERATION DEVICES

Better Spacing

PREPARATION FOR FUMIGATION: INLET DEVICES

- INLET DEVICES MUST:
  - MAINTAIN THE INTEGRITY OF THE REQUIRED OPENING.
  - HAVE AN OPENING OF 240 TO 381 SQUARE INCHES.
  - HAVE AN OPENING COVERED IN MESH OR SOME SIMILAR MATERIAL.
  - BE LOCATED WHERE THE OPENING IS NOT BLOCKED.
  - HAVE THE ENTIRE INLET OPENING BE AT LEAST 4 FEET ABOVE EXTERIOR GRADE
  - BE SEALED IN A WAY THAT ALLOWS EXTERNAL OPENING DURING AERATION.
- THE NUMBER OF INLETS REQUIRED IS BASED ON VOLUME AND IS SPECIFIED IN TABLE 1 (FROM PREVIOUS SLIDE).

AERATION AND REENTRY

- Minimum length of aeration time is determined by initial concentration of SF and specified in Table 2 (next slide).
- If ambient air temperature is below 40°F at the fumigation site, a minimum of 24 hours aeration is required.
- All of the following steps must be completed in sequence and a licensed operator or field rep must be present for, and assure completion of, Steps 1 through 6.

TABLE 2
DETERMINING MINIMUM AERATION TIME

Determining Minimum Aeration Time Initial Concentration of Sulfuryl Fluoride Introduced (ounces per thousand cubic feet)	Minimum Aeration Time (hours)**
16 or less	12
17 to 32	14
33 to 48	16
49 to 64	18
65 to 96	20
97 to 112	22
> 112	24

- ** When the high ambient temperature for the aeration period is below 40°F at the fumigation site, a
- minimum of 24 hours of aeration is required.

AERATION AND REENTRY

- **STEP 1:**
  - TO INITIATE AERATION, REMOVE THE SEAL OR DUCT COVER FROM EACH PREVIOUSLY INSTALLED DUCT AND ACTIVATE THE AERATION FAN(S). IF THE DUCT COVER CANNOT BE OPENED DUE TO MALFUNCTION, AN SCBA MUST BE USED WHEN OPENING THE DUCT COVER.
- **STEP 2:**
  - AFTER ALL AERATION FANS ARE ACTIVATED, REMOVE THE INLET COVER FROM EACH PREVIOUSLY INSTALLED INLET DEVICE.
- **STEP 3:**
  - ANY TIME AFTER THE REQUIRED HOURS OF AERATION ARE COMPLETED, TURN OFF THE AERATION FAN(S).
- **STEP 4:**
  - REMOVE ALL TARPAULINS AND SEALS FROM THE STRUCTURE.

AERATION AND REENTRY

- **STEP 5:**
  - IF THE STRUCTURE HAS A CENTRAL AIR SYSTEM, TURN ON ONLY THE FAN.
  - AS AN ALTERNATIVE, A CIRCULATION FAN MAY BE PLACED IN FRONT OF A FURNACE INLET TO BLOW AIR INTO CENTRAL HEATING AND COOLING DUCTS.
  - REMOVE ALL CHLOROPICRIN PANS.

AERATION AND REENTRY

- **STEP 6:**
  - MEASURE THE CONCENTRATION OF SF IN BREATHING ZONES USING AN APPROVED CLEARANCE DEVICE.
  - IF THE CONCENTRATION OF SF IS GREATER THAN 1 PPM OR WARNING PROPERTIES OF CHLOROPICRIN ARE DETECTED, CONTINUE VENTILATION.
  - CONFIRM SF CONCENTRATIONS ARE 1 PPM OR LESS.

SUMMARY

BENEFITS

- SUPERIOR AERATION PROCESS THAT ADDRESSES WORKER AND BYSTANDER EXPOSURE CONCERNS
- VIRTUAL ELIMINATION OF CHLOROPICRIN CONCERNS
- ELIMINATES NEED FOR FUMIGATOR TO ENTER FUMIGATED SPACE TO INITIATE AERATION

DRAWBACKS

- COST FOR ADDITIONAL MATERIAL:
- CAP EQUIPMENT
- ADDITIONAL TARPAULINS, CLIPS, SAND SNAKES
- ADDITIONAL FANS
- ADDITIONAL CLEARANCE DEVICES
- INCREASE IN LABOR COSTS
- PROBLEMS WITH INEFFECTIVE DIY EQUIPMENT DESIGNS
- COMMERCIAL PROPERTY CONSTRAINTS

QUESTIONS