

MineShield

GUARDIAN



Model 18 - Modular Portable Emergency Shelter

Installation and Operations Manual

Introduction

Thank you for your purchase of the "Guardian" Emergency Shelter. There is no finer shelter on the market today. This unit has been built with the greatest care and with the safety of its occupants in mind. The Model 18 Modular Shelter has an occupancy rating of 6 persons, with ample provisions to sustain life for no less than 96 hours. It is our sincerest hope that this is one item that will never have to be used for its intended purpose.

Please take the time to read through this manual and become familiar with the assembly and operation of the shelter before attempting set-up. Any problems with assembly or operations whatsoever, please do not hesitate to call us as we will be more than happy to help.

!!! *NOTE:*

Please use extreme caution when moving/assembling this unit. There are power supplies and sensitive electronics within. Do not drop or jar the unit. Use extreme caution when moving as each unit weighs about 6000 lbs. Good judgement rarely goes out of style.

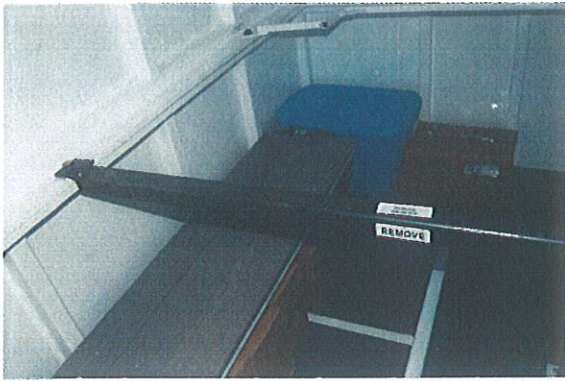
Unloading/ Moving the Unit

Utilize care and safety when unloading the unit from the truck. Recommended procedure is to use a forklift of adequate capacity to unload and move the chamber. Spread the forks to the widest position and stay in the center of the chamber. Place the chamber on a relatively flat surface. Tow lugs have been provided as well on the front and rear in lieu of carrying the chamber. This works best on a relatively smooth surface.

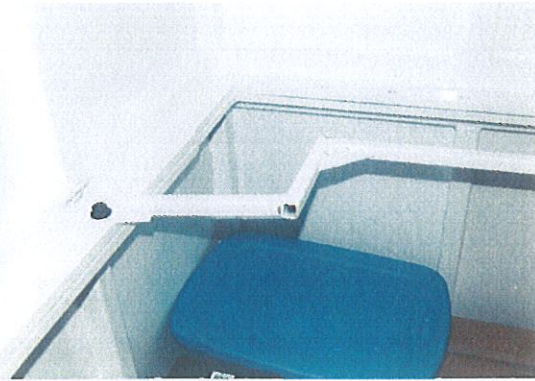
Seperating the Modules

Should it become necessary to separate the modules to allow for mine access, the following steps should be taken:

1. Make sure chamber is on a flat, level surface.
2. Open entrance door and locate shipping bar inside.
3. Remove 2 bolts from bar and remove bar from interior.
4. Locate tank retaining bar and remove 2 bolts holding it to inner flange (save).

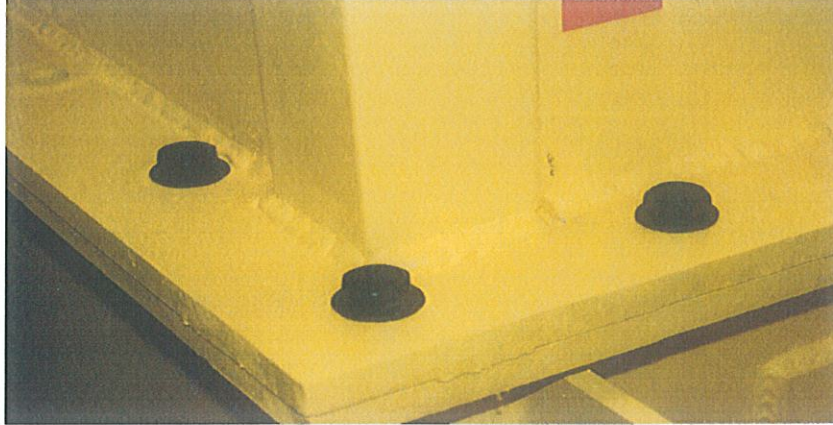


Shipping Bar



Tank Retainer Bar

5. Exit and close door, locate outer flange bolts, remove and save. (Approx.20)

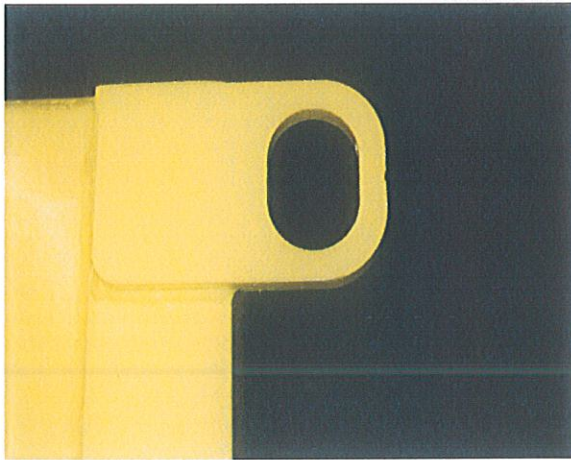


Outer Flange Bolts

!!! Note!!!

The following steps should be taken using extreme caution.

6. Locate lift rings at the top of the chamber, attach chains to the rings and with forklift or boom, lift top half of unit straight up from the lower half. Carefully move top half to the side and place on a level surface. Top half should be placed on wooden boards in order not to mar the inner surface of the flange. This could affect sealing capabilities. Electronics are in the top half so take care not to drop or jar the unit.

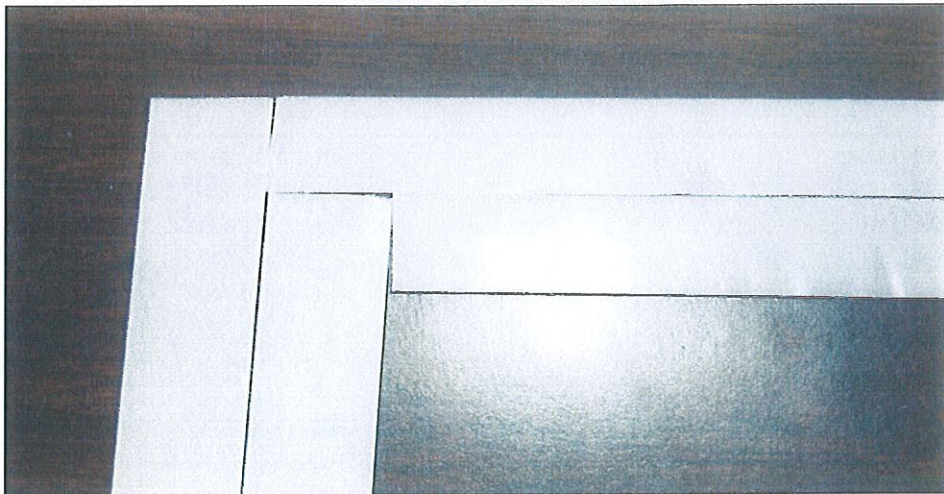


Lifting Ring

7. The two halves may be tilted as needed to gain access to the mine via elevator, etc. Take care however not to bend or mar the surface of the flanges in any way as this will affect sealing capabilities. Also, when tilting the lower half, make sure the battery boxes are at the bottom. Filters, tote, food and water etc. may have to be removed at this point depending on the tilt angle.

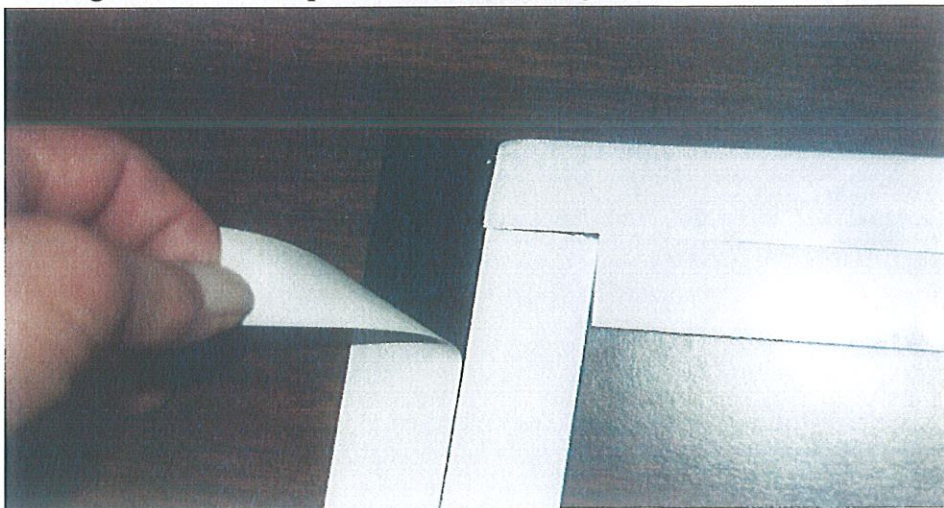
Reassembly

1. Locate the bottom half of the unit as close as possible to final location. This should be as level and solid as possible.
2. Insure that both halves of the mating flanges are clean and dry and have not been scratched or marred. Wiping with a soft cloth and alchohol is recommended.
3. Make 2 runs side by side of the foam self-stick sealant tape on the flange on the bottom half of the chamber, staying as close to the center of the flange as possible. Take care not to stretch the tape during installation and insure a good fit at the corners. Do not remove the white backing at this point.



Preferred corner mating of seal tape

4. Lift the top half of the unit using the lift rings on the corners of the top half and move close to the bottom half. Again insure the flange is clean and dry. Remove the white backing from the seal tape on the bottom flange.



Removing Backing

5. Lift top half over bottom half, keeping it as level as possible.
6. Slowly lower the top half onto the bottom half. A few $\frac{3}{4}$ " steel rods would be an asset at this point to use as guides onto the lower half. Ensure the bolt holes line up between top and bottom. It will not be possible to adjust the placement after contact is made without damage to the seal strips. Ideally, holding the top about $\frac{1}{2}$ ' over the bottom and starting the outer bolts works best.
7. Start nuts on the outer flange and repeat installation of inner bolts and nuts. Take note of tank rack bracket location and omit these two bolts at this point.
8. Tighten all nuts inside and out. The unit is now reassembled.

Tank Installation

The Model 18 is designed for use with type K compressed gas tanks (not included). 4 Breathable air and 3 Oxygen tanks are necessary for proper operation. Tanks should be filled to approx. 2650psi @ 70 deg.F.(This is a 10% overfill). Oxygen tanks must be fitted with a CGA540 outlet and Breathable Air tanks must have a CGA346 outlet.

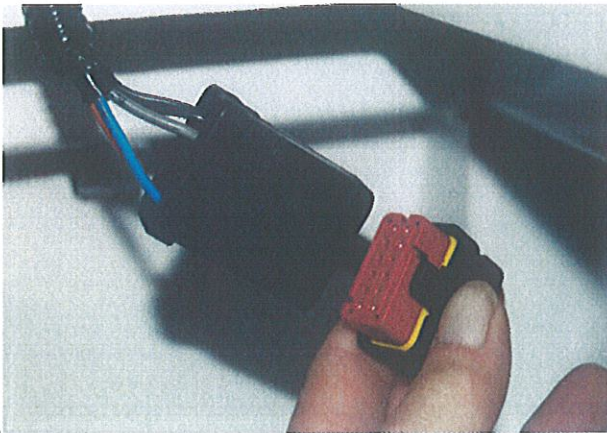
1. Facing the rear of the chamber, place 3 oxygen tanks to the right side of the tank platform against the back wall and 4 B/A tanks to the left.(3 against the back wall and one at the left side wall) working from the outside in. Tanks fit very tightly as designed. Orient the tank outlets to face toward the interior of the chamber.
2. Locate tank retaining bar and fasten with 2 bolts at each side
3. Remove tank valve caps.
4. Locate the pressure regulators for the breathable air and oxygen tanks. *These should be clearly marked and are not interchangeable.*
5. Install a regulator on one of each of the B/A and O2 tanks, taking care not to overtighten the CGA nut. Slowly open the valve on the oxygen tank and adjust the pressure to 10-15 psi.
6. Open the valve on the B/A tank and adjust this pressure to 45-50 psi.
7. Turn off both tanks at this point.



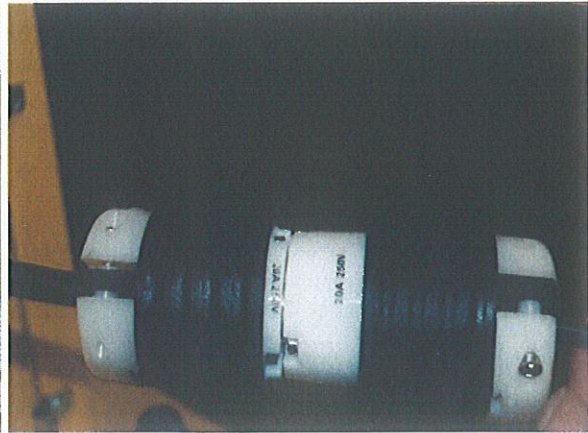
Tank installation

Final Assembly

1. Locate electrical plug halves at the front inside corner of the unit and connect. Slide the red lock into place.
2. Plug the 110 volt connection in using the twist lock connector provided



Interior connection



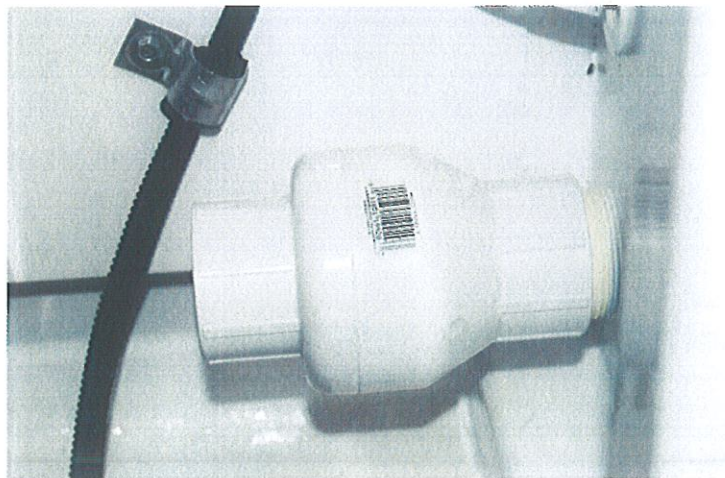
110V outer connection

3. Loosen or remove the 1 1/2" outer air relief cap. This cap may be left on hand tight during non-use, but must be removed during operation to allow relief valve to operate and prevent pressure buildup inside the chamber.



Outer air relief cap

4. Relocate essentials (food, water, filters, etc.) to their proper locations to conserve space.



Pressure relief valve (0.1psi)

5. Latch enter door.

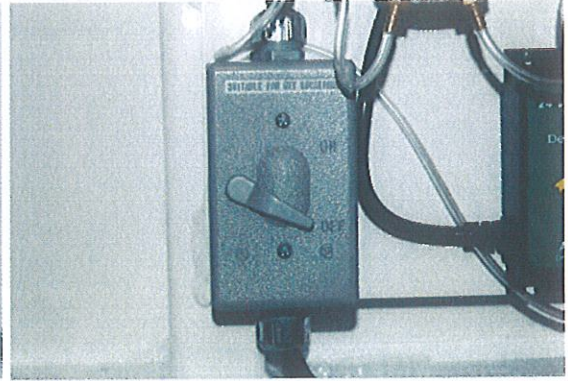
NOTE: Some customers have requested that only the one latch marked "open/close" be fastened in order to speed entry in an emergency. This is an acceptable practice.

Initial Test Procedure

1. Upon initial entry, locate the 24V light switch on the gray control box located on the front side wall and the 110V light switch located under the RKI monitor. Turn both of these to the “on” position. Both 24V and 110V lights should illuminate.

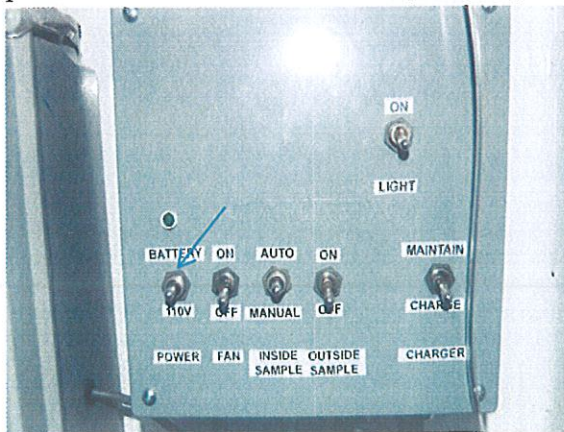


24V light switch



110V light switch

2. Locate the “power” switch on the gray control box and move it downward to the “110V” position. The RKI monitor will power up.



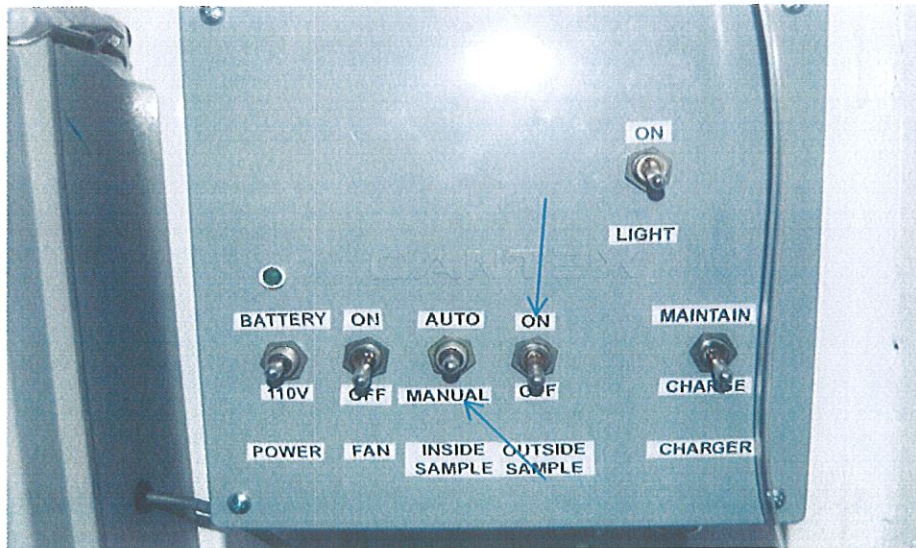
Power Switch



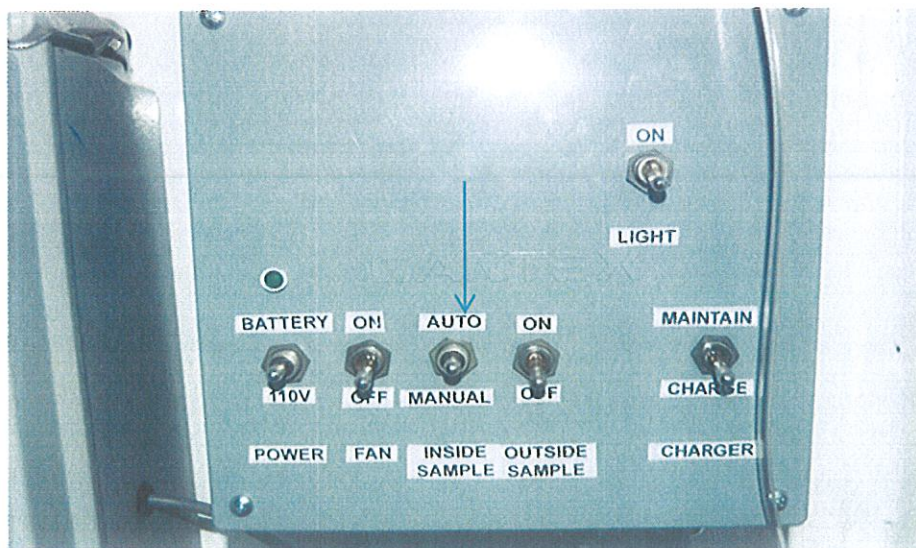
Fan Switch

3. Move the “fan” switch to its (on) position. The scrubber fan should now operate.

4. Move the inside sample switch to “manual” and you should hear the pump running. Return to center “off” position.
5. Move outside sample switch to “on” and you should hear the pump running. Return to the “off” position.
6. Move the inside sample switch to ‘auto’. Expect a delay of approximately 7-10 minutes and an “on” time of 30-45 seconds.



Inside/outside manual operation

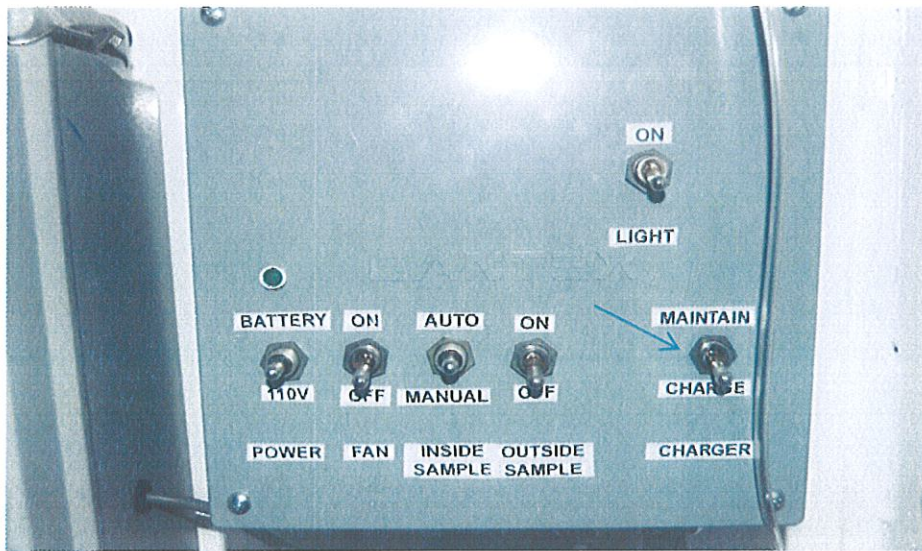


Auto operation

A quick start guide will be included with the chamber.

Charging System

The Guardian is equipped with an automatic battery charging system. As long as the unit is connected to 110V, the batteries will be maintained at 98-100% charge at all times. On setup, run the charge system on “CHARGE” for up to 24 hours, after which move the switch to “MAINTAIN”. This feature prevents the batteries from overcharging.



Charging System Switch

Air Quality Monitor

The Guardian is equipped with an RKI Beacon 410 gas monitor with built in alarm system. The system monitors the air inside and outside the chamber for levels of:

Carbon Dioxide (CO₂)

Carbon Monoxide (CO)

Methane (CH₄)

Oxygen (O₂)

Follow the guide located in the chamber for acceptable levels of gasses.



RKI Gas Monitor

Operational Procedure

The following steps are recommended on deployment of the shelter. A quick start guide is provided inside the shelter for start up procedures.

1. Remove 1 ½" cap from front of unit if not already removed.
2. Using wrench provided at right of door, open front door and enter.
3. Turn on both light switches. If there is still 110V power to the unit, the light will illuminate and this may be used.
4. Using the inner wrench, latch all dogs on the entrance door.
5. Turn the power switch to "on" (110V or 24V, whichever is applicable).

6. The RKI monitor takes 60 seconds warm up and activate. During this time, open 2 filters and place them onto the filter box. Ensure that the rubber seal on the filters are facing down against the filter box.
7. Turn "fan" switch to its "on" position.
8. Check the quality of the inside air at this point by manually sampling the inside air. Turn inside sample switch to "manual". Allow to run for at least 1 minute.
9. If the monitor gives an alarm and bad gas is detected inside the shelter, a purge is necessary:
 - a. Open tank valve to the regulated Breathable Air tank and allow to run for 3 to 5 minutes.
 - b. Take another air sample and repeat if necessary.
 - c. After inner air quality is safe, move the inside sampling switch to "auto".
10. The shelter is now in automatic mode.



Installing CO2 Filter

Oxygen/CO2 Monitoring

Normal gas tolerences are:

O2	18.5-23%
CO2	<1%, brief excursions to 2.5%
CO	<2.5%
CH4	<25ppm

1. Replace CO2 filters when levels are consistently at or above 1%
2. Add O2 when levels drop to 19.5 %
 - a. Turn inside sample to "manual"

- b. Slowly open valve on regulated O2 tank and allow oxygen to flow until sensors read 22.5%. Repeat as necessary.

DO NOT allow O2 levels to consistently be above 23% or less than 19%.

DO NOT allow CO2 levels to consistently exceed 2.5%

3. Before leaving the shelter, sample the outside air to insure exit is safe.

Routine Maintenance

Daily:

Ensure unit is connected to 110V AC power.

Inspect for damage to unit, wrench is in holder, door closed and latched

Monthly:

Check 1 ½" cap against seizure (if applicable).

Yearly:

Enter unit, check operations, check shelf life of perishables recalibrate RKI monitor. (This process is recommended and available by MineShield if necessary.) www.rkiinstruments.com for cal. instructions.

Following all the recommended procedures and maintenance will provide the safest Emergency Shelter available. Any questions, comments, problems, etc. simply call us at (859)792-1605.

Again, Thank you for choosing MineShield.

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