

Protocol for Inspection and Decontamination of Paper Records Potentially Contaminated by Rodents



US Department of the Interior
Office of Policy Management and Budget
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Protocol for Recognition, Evaluation and Control of Potential Hantavirus Contaminated Paper Records.

Background. A recent Agency Technical Assistance Review (ATAR) performed by the OSHA Area office on the US DOI Office of the Special Trustee for American Indians (OST) records storage facilities in Albuquerque, NM uncovered a potentially serious health hazard resulting from contamination of these records by rodents. Employees working with records contaminated with rodent feces and urine are at potential risk of exposure to Hantavirus. While OST took immediate actions to prevent the continuation of the health risk to their employees, questions relating to the decontamination of the facility and the large numbers of records in all three Albuquerque warehouses as well as up to 100 remote storage sites were addressed to DOI headquarters for resolution.

Hantavirus pulmonary syndrome (HPS) is a severe cardiopulmonary illness resulting in death in approximately 45% of cases. The principle etiologic agent of HPS is Sin Nombre virus (SNV). The virus is transmitted to humans from its primary rodent reservoir, deer mouse, by direct contact with infected rodents, rodent droppings, or nests or through inhalation of aerosolized virus particles from mouse urine or feces.

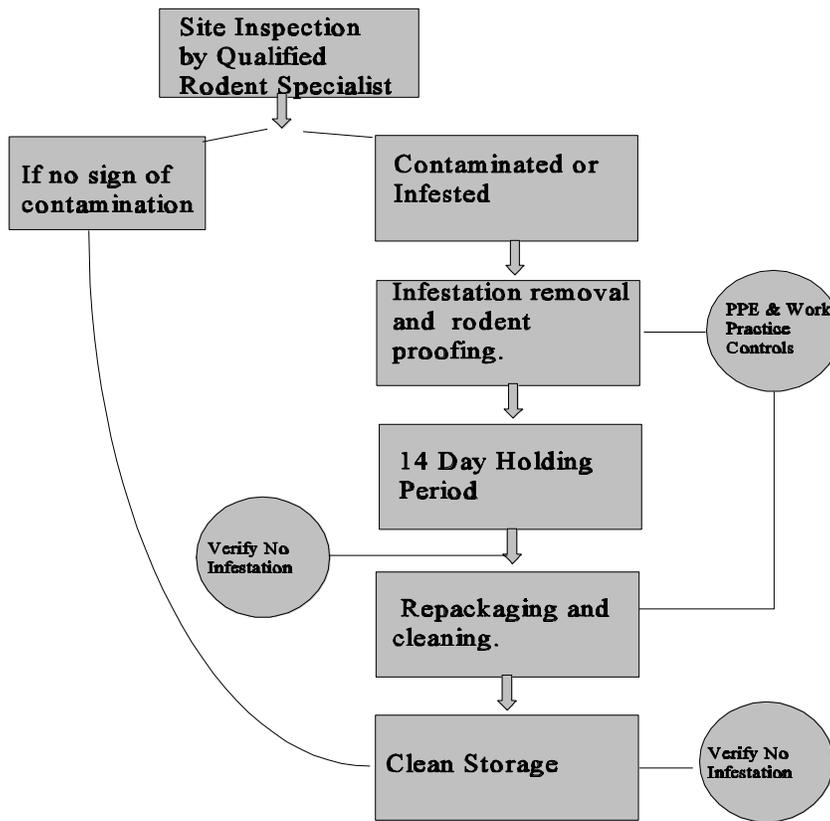
SNV was identified following the initial outbreak of HPS in the “four corners” area of the Southwest in 1993. Since that time additional cases have continued to occur in a geographically diverse area of the US. Much about the virus is unknown, but recent research suggests that hantaviruses are not stable in the environment once they are excreted in the feces and urine of the host animal. In addition, the virus is susceptible to a variety of disinfection agents. Research conducted on Hantaan virus (unpublished research by Huggins and Kefauver), which is a lipid encapsulated virus structurally similar to all other Hantaviruses, suggests that the virus maintains viability for no more than approximately 48-72 hours on indoor environmental surfaces. Due to the lack of direct data on a wide variety of potential environmental conditions, a longer holding period (14 days) and additional precautions are considered prudent in the design of a protocol to protect humans from a risk of infection. These additional precautions include the use of disinfectants where possible, the use of personal protective equipment (PPE), and local exhaust ventilation in facilities where decontamination is a routine operation.

Protocol Overview. This protocol addresses procedures for the decontamination of records storage facilities, procedures for retrieving records from remote locations, and methods to ensure facilities remain rodent free. Although SNV is predominantly carried by the deer mouse, the decontamination protocol will consider all rodent feces and urine a potential source of hantavirus. The protocol utilizes several key concepts in the process of safely accessing and decontaminating facilities and paper records. The first is the use of a solution of 5% Lysol, or if this is not available, a solution of 10% household bleach in water to disinfect areas and the outsides of boxes. The second is the use of a 14 day holding period after de-infestation before allowing unprotected access to records as a final assurance that the records are clean. After the holding

period the hantavirus is considered to be no longer viable. The third is the use of HEPA vacuuming to remove gross signs of contamination after the hantavirus is no longer viable. Other methods of disinfection may also be effective, such as heat treatment, and ultraviolet light exposure. However, the 14 day holding period and the cleaning procedures are considered to be most practical for this situation.

ALBUQUERQUE OR OTHER CENTRAL RECORDS STORAGE FACILITIES:

Figure 1. Storage Facility Decontamination



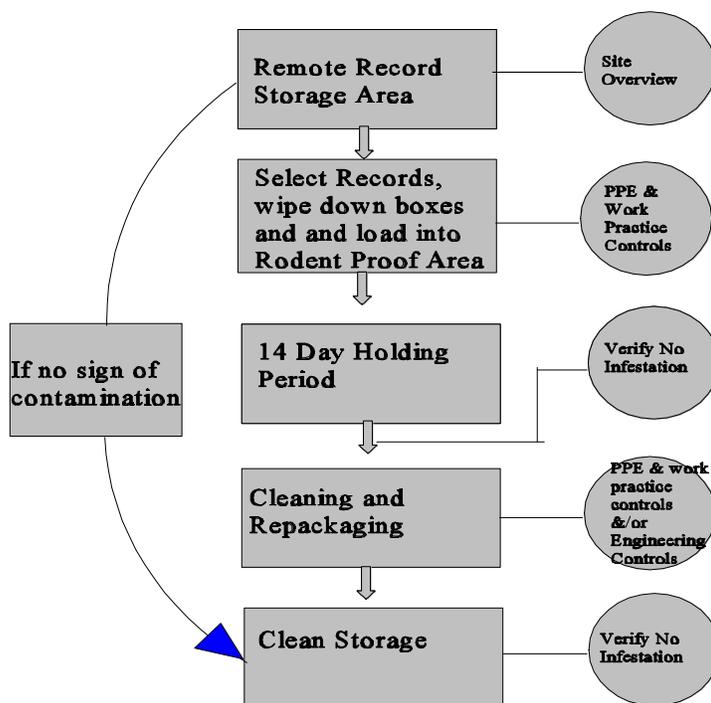
- Consult a qualified rodent expert (vertebrate pest control specialist) to determine the current extent of infestation, procedures to trap existing rodents, and methods to rodent-proof and monitor to insure continued rodent free status. Refer to CDC document “Hantavirus Infection -- Southwestern United States: Interim Recommendations for risk reduction”, and the Park Service document on “Mechanical Rodent Proofing Techniques” in Attachment 2.

- AFTER rodent infestation is eradicated, begin a 14 day holding time after which the facility is re-inspected and, if no new evidence of infestation is found, considered decontaminated.
- Inspect (triage) existing boxes in facility and clean rodent residue using PPE and HEPA vacuum or engineering controls (e.g ventilation hood) to remove gross contamination.
- Continue trapping and inspecting to verify facility is free of infestation.

REMOTE SITE RECORD RETRIEVAL:

(retrieving records from remote facilities **NOT** determined to be infestation free)

Figure 2. Remote Site Record Retrieval

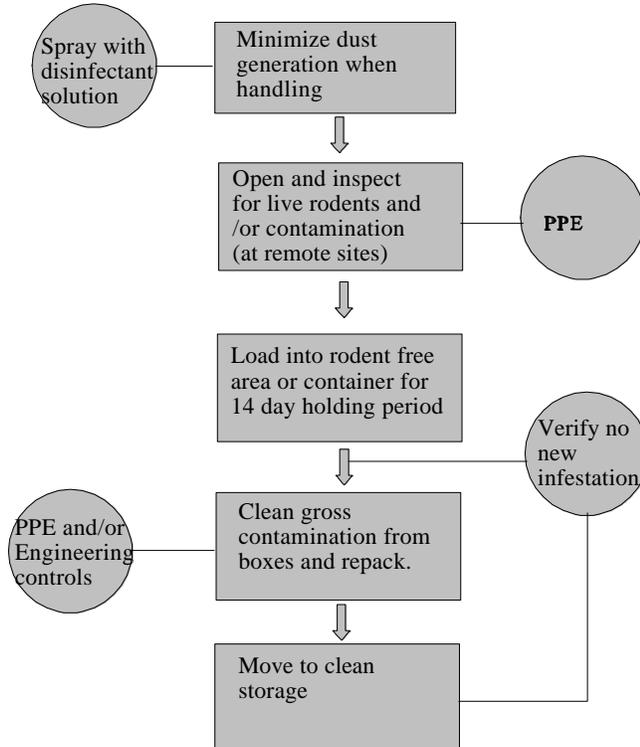


- Site overview. Conduct an overview of the facility by meeting with local management to discuss pest control records and to review pertinent background information on the condition of the boxes and storage facility. If no contamination is found then site can be considered uncontaminated.

- If it is not feasible to rodent proof the site and verify that the facility is free of infestation for a 14 day period, the records must be considered contaminated and handled according to the protocol for inspecting and decontaminating a box.
- Select boxes, wipe outside of box with disinfectant, open and ensure no current infestation, and load into rodent proof area to begin 14 day holding period. PPE must be worn during the handling of contaminated boxes. Holding area must be monitored to verify that holding area is free of infestation.
- After the 14 day holding period, inspect (triage) boxes and clean rodent residue using PPE and HEPA vacuuming or engineering controls (e.g. ventilation hood). (HEPA vacuuming is to remove gross contamination and not as a precaution for hantavirus) Move records to “clean” rodent proof storage area.
- Continue trapping and inspecting to verify the facility remains free of infestation.

INSPECTING AND/OR DECONTAMINATING A BOX:

Figure 3. Box Inspection and Decontamination



- Use PPE or local ventilation when decontaminating boxes.
- Spray the exterior of any suspect box of records with 5% Lysol, or a dilute 10% chlorine in water solution.
- Open and inspect the box for visible signs of current infestation, or of rodent droppings, visible discoloration by urine, or other indications of past contamination by rodents.
- If there are no signs of infestation or contamination; the box can be considered clean and stored in the “clean” area.
- If any signs of contamination are found on the box or in the initial examination of the contents, the box should be considered contaminated.
- Place in rodent-free holding area or container for a 14 day period. Trapping must be done to verify no new infestation.
- If no new evidence of infestation is discovered, move to “clean” area and continue trapping and inspecting to verify the facility remains free of infestation.

Triage. The first step in determining the appropriate action to take on a specific box of records, or in a storage facility is to perform an initial assessment on the extent of potential contamination. All facilities and records are to be considered contaminated until this initial assessment is completed. All triage activities should be done using the PPE outlined in this protocol. If a facility has no signs of rodent feces or urine, the records can be considered not to be a hantavirus hazard.

Facility Triage and Decontamination. Determining the extent of existing infestations, planning the eradication of any existing population of rodents and rodent proofing existing storage facilities should be done using the input of a trained and qualified vertebrate pest control specialist. Based on this examination, steps can be taken to remove active rodent infestations from the facility, clean up the existing contamination in the both the facility and the stored records, and rodent proof and monitor the facility to prevent and minimize future contamination. Figure 1 provides a flowchart for facility decontamination. In the removal of records from remote sites where an entire facility of records is to be removed and the facility decontaminated afterwards, or where it is not feasible to rodent proof the facility, alternate procedures may be used. In remote facilities, other sources of information, such as local management knowledge of the facility, review of pest control

records, and local health department information should be evaluated to determine the extent of contamination prior to entering the facility. If there is any doubt on the condition of records storage at remote sites, or if unexpected contamination is encountered, then full PPE and procedures should be used as described in this protocol. Access to storage areas considered to be contaminated should be restricted and security and housekeeping personnel should be notified of the hazards.

Records Triage and Decontamination. The exterior of any suspect box of records should be lightly sprayed with a 5% Lysol or a dilute 10 percent chlorine in water solution. Care should be taken not to damage the contents of the box or to raise dust. A very fine misting is the desired action. Once this is done, the outside of the box should be wiped with a cloth and appropriate disinfectant and then the box can be opened and inspected for visible signs of rodent droppings, visible discoloration by urine, or other indications of past contamination by rodents. If there are no signs of infestation or contamination; the box can be considered clean and stored in the “clean” area. If any signs of contamination are found on the box or in the initial examination of the contents, the box should be considered contaminated and placed in a holding area for 14 days. After the holding period, the gross contamination in the boxes can be cleaned.

If a remote facility does not have an active infestation and has not been infested for at least 14 days, as determined by inspection, then the entire content can be considered uncontaminated. Boxes should still be handled and cleaned as indicated above if signs of old contamination are present.

If old nests are found in the general area, if visible rodent feces are seen, if urine odor or visible discoloration of box or records inside (it may be difficult or impossible to differentiate incidental water damage from rodent urine) are detected, then the box should be considered to have been contaminated at some time. Regardless of the age of the contamination or the source (visible feces, visible discoloration, or urine odor), the box should be cleaned using the decontamination procedure outlined in this protocol.

Remote Sites. Designated records retrieval teams travel to a variety of active and inactive records storage sites to package and ship records to Albuquerque for cataloging, scanning and/or storage. These remote sites are the source of most of the contaminated records. It is essential that personnel performing these remote duties utilize the protective measures outlined in this protocol to triage, access, and decontaminate records prior to shipment. The team members must receive training on the basic principles of hantaviruses and HPS, such as the modes of transmission, symptomology and methods to protect themselves from exposure. They must also be trained on the proper use of PPE including respiratory protection as outlined in the OSHA regulations.

Personnel Protective Equipment - Basic Personal Protective Equipment required to access and work around known or suspected rodent contaminated areas consists of

coveralls (either disposable breathable Tyvec or cloth that can be laundered onsite or by a knowledgeable laundry service), foot coverings, rubber or latex gloves and half-face HEPA filter respirators worn with splash goggles. All personnel assigned to duties in contaminated facilities, or accessing potentially contaminated records should be provided this PPE. A written respiratory protection program is required which addresses respirator selection, employee training, fit testing, and medical screening for respirator use. The current DOI medical screening protocol and the OSHA standard for respirator users is in Attachment 3.

Engineering Controls. Because of the long term duration of operations at the major storage facilities in the Albuquerque and the need to receive records from remote facilities on a continuous basis, engineering controls are recommended to provide a safe ventilation controlled environment to triage and decontaminate incoming records shipments after they have been through the 14 day holding period. Installation and use of such a ventilation booth will minimize the potential contamination of the storage warehouse(s) and provide a safe area to access and clean incoming shipments, without the need for extensive and uncomfortable PPE. After the holding period the virus is assumed to be non-viable, however engineering controls gives an extra measure of protection against exposure to general particulate matter. Attachment 4 provides schematics on several acceptable ventilation designs.

Monitoring for Infestation. An integrated pest management program including ongoing monitoring for re-infestation should be implemented at all facilities considered to be free of infestation and to verify that the holding areas remain free of rodents. .

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Attachment 1.

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Initial Studies on the Environmental Stability of the Hantavirus Hantaan

Final

Running head: Stability of Hantaan Virus

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Abstract

The basic conditions that influence the survival of hantaviruses excreted into the environment have not been investigated under conditions relevant to possible transmission. The prototype hantavirus Hantaan was stable during a 30 min incubation in buffered saline within the range of pH 6.6 to 8.8, but inactivated at pHs above or below this range. Adding serum levels > 0.1% resulted in virus survival throughout the entire 5.8 to 9.0 pH range tested. No significant change was noted in viral stability during a 30-min incubation over a temperature range of 4° to 42°C. The stability of dried Hantaan virus was not influenced by the surface (glass or plastic) upon which it was dried, but the addition of fetal bovine serum increased the period in which viable virus could be recovered, from 0.5 day with no serum to 2 days with ≥ 0.3% serum.

The spectrum of clinical disease caused by the hantaviruses Puumala, Seoul, and Hantaan ranges from mild or inapparent infection to severe hemorrhagic fever with renal syndrome. Severe and rapidly progressive respiratory failure (hantavirus pulmonary syndrome) is caused by a distinctly different hantavirus initially referred to as Four Corners virus. Human disease is associated with contact with infected rodent hosts [1]. The primary natural rodent hosts for Puumala, Seoul, Hantaan and Four Corners viruses are bank voles, Clethrionomys glareolus [2]; domestic rats, Rattus norvegicus [3]; striped field mice, Apodemus agrarius [4]; and the mice Peromyscus maniculatus [5], respectively.

Chronic asymptomatic infection occurs in rodents, and persists even in the presence of neutralizing antibody. Experimentally infected rodents excrete virus for extended periods and horizontal intercage transmission of Hantaan virus has been demonstrated in *Apodemus* mice [6] and Puumala, in bank voles [7]. Experimental transmission of virus in true small-particle aerosols has been demonstrated in the domestic rat [8], and aerosolized Hantaan and Seoul viruses were suspected as the source of laboratory-acquired infections [9, 10]. Epidemiological studies have not, however, been able to clearly establish if infection requires close contact with infected rodents, or if contact with virus-containing excreta on environmental surfaces is sufficient [11]. Only limited studies of virus stability have been reported [12] and they do not adequately evaluate the conditions that viruses would encounter in rodent excreta. The composition of rodent urine is influenced by several factors, including age, disease state, and diet. Urine pH can vary from 5.5 - 9 and protein content from < 0.1- to >30% in rodents [13].

Materials and Methods

Cells. Vero E6 (Vero C1008, ATCC CRL 1586) were grown in 800 cm² roller bottles, with passage (1:3 split ratio) at 7-day intervals as previously described [14]. Cells were seeded (4.0×10^5 in 2 ml) in 6-well cell culture plates (9.6 cm² per well) and grown for 3-5 days at 37°C in 5% CO₂, until 80-90% confluent.

Virus assay. Virus was quantitated by plaque assay on confluent monolayers of Vero E6 cells by using a modification of published procedures [14]. Tenfold dilutions in Hank's balanced salts solution (HBSS) containing 10% fetal bovine serum (FBS) were inoculated (three wells per dilution) and incubated for 1 h at 37°C in 5% CO₂ with shaking at 15 min intervals to allow virus adsorption. The cells were then overlaid with 2.0 ml per well of solid overlay medium (Eagle's minimum essential medium [EMEM] with Earl salts [without phenyl red], 8 mM glutamine, 10 mM HEPES, 3.5% FBS, 50 µg/ml of gentamicin, 2.5 µg/ml Fungizone[®], 0.6% SeaKem ME agarose) at 42°C and incubated at 37°C in 5% CO₂ for 8 days. Plaques were stained with 2.0 ml of a solid neutral red overlay medium (overlay medium as above but lacking FBS, with a final 2% concentration of a neutral red solution [3.33 g neutral red sodium salt/L]) and incubated at 37°C in 5% CO₂. Plaques were visible 24-48 h after neutral red staining and were counted and recorded as plaque-forming units (PFU) per ml. Means and standard deviations for each point are the average of two independent plaque assays with three replicate wells each.

no significant change in viral stability under any of these conditions (analysis of variance $p = 0.2$, Macintosh Systat V5.2 for fully factorial (M)ANOVA).

Stability upon desiccation. Hantaan virus was initially diluted under conditions of low and isotonic ionic strength (distilled water, buffered saline or buffered saline +10% FBS) at physiological pH (7.4), dried on either glass or plastic surfaces, and incubated at room temperature. The recovered infectivity of dried Hantaan virus was not influenced by the surface upon which it was dried. In the absence of added serum, all four conditions gave identical stability profiles (figure 2, buffered saline on glass shown). Hantaan virus was significantly more stable in the presence of FBS, which increased the period during which viable virus could be recovered from 0.5 day with no serum to 2 days with serum (figure 2).

Discussion

Hantaan, the prototype hantavirus, was chosen, for relative ease of quantitation by plaque assay, to obtain information on the factors influencing viral stability. Large differences in physical properties have not been reported among closely related viruses. Physical properties of viruses, such as stability to temperature, pH and drying, are generally related to viral structure (lipid envelope, nucleic acid-protein interaction, viral encoded enzymes) rather than strain differences, which are related to minor changes in glycoprotein sequences. Because of the multitude of influences on urine, sputum, and feces composition, we began by investigating those general properties most likely to influence stability: temperature, ionic strength, pH, and incubation time. It was also necessary to investigate the stability of dried virus, because rodents typically excrete only a drop of urine at a time, which dries rapidly. While Hantaan virus showed a typical pH stability profile in the absence of serum (as a source of protein), viability was dramatically enhanced at high and low pH in the presence of $\geq 0.3\%$ of serum. Rodent urine normally contains $> 1\%$ protein, which suggests this finding may have significance in nature. Similarly, the presence of serum greatly increased the time during which viable virus could be recovered in dried samples, from 0.5 to 2 days. Taken together, the stability profile suggests that hantaviruses may remain viable on environmental surfaces for several days. Because so many factors influence the composition of sputum, urine and feces, as well as the environment of a possible exposure, we made no attempt to determine the conditions of optimum stability, and it is possible that under certain conditions, Hantaan may remain viable for much longer periods. These studies do suggest, however, that Hantaan virus, and most likely all hantaviruses, might persist on environmental surfaces for a sufficient period of time to enable infection from contact with fomites.

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This finding has important public health considerations. If dried virus capable of forming aerosols can be infectious for several days after excretion.

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Figure Legend

1. Stability of Hantaan virus in solution at 23°C. A, Effect of pH on virus stability in the presence (—●—) or absence (---◆---) of 10% FBS. B, Effect of serum on pH stability (pH 5.8 —■—, pH 7.4 —◆—, pH 9.0 ---▼---)
2. Effect of serum and substrate on the stability of dried Hantaan virus at 23°C (buffered saline - glass —■—, buffered saline + FBS - glass ---◆---, buffered saline + FBS - plastic ---▼---).

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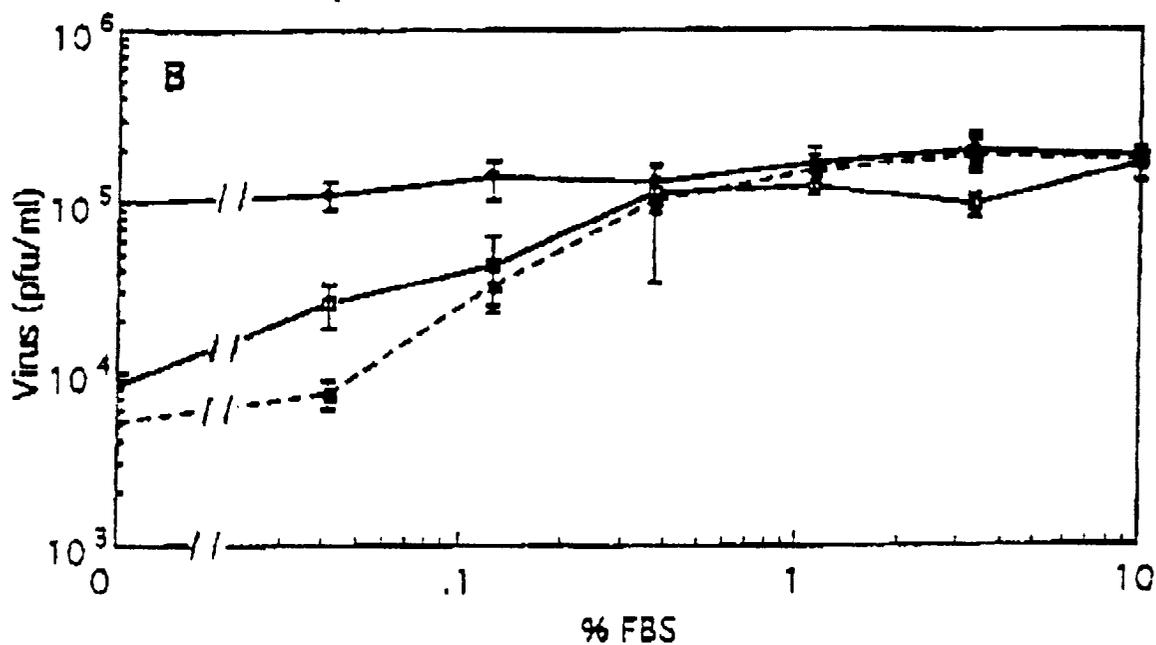
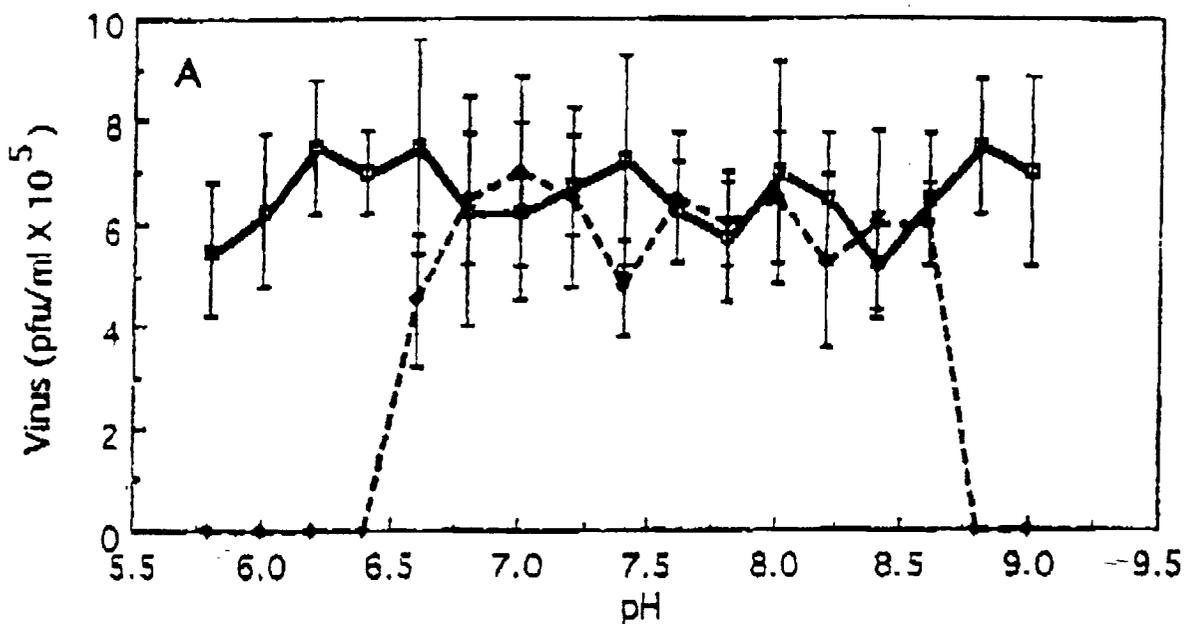


Fig 1

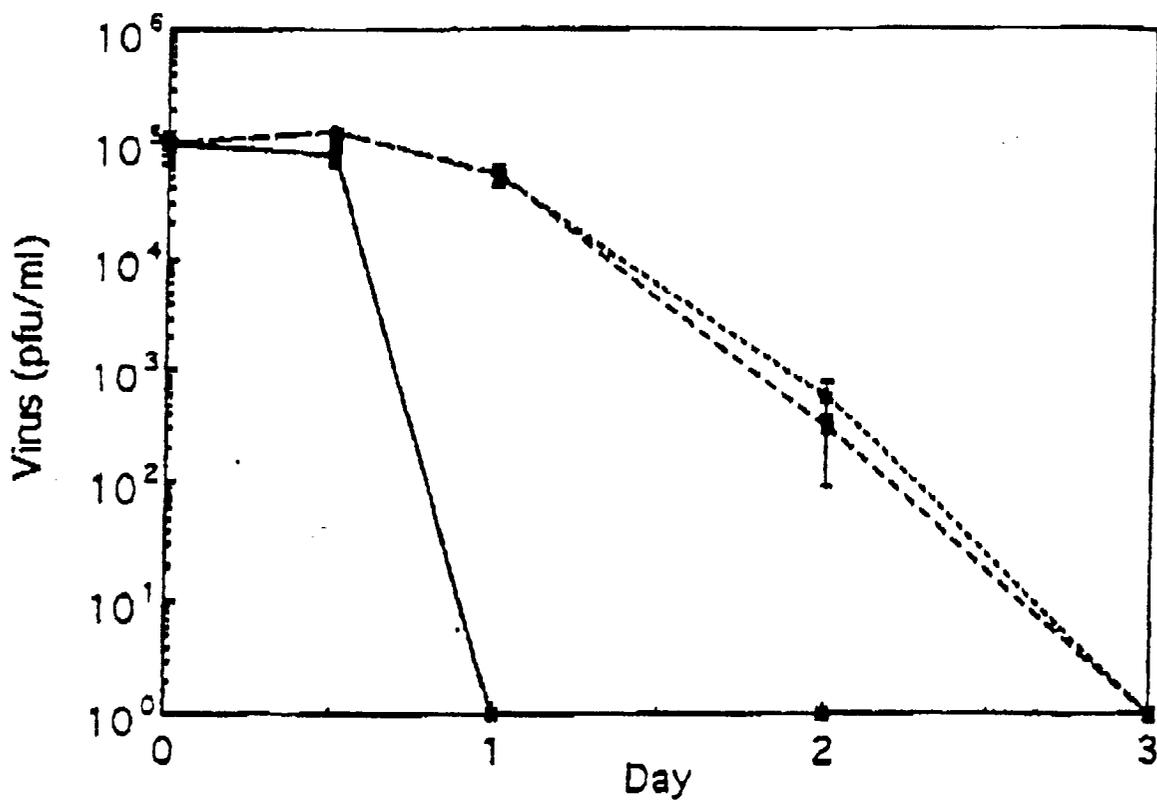


Fig 2

Answers To Frequently Asked Questions About Hantavirus



HOW COMMON IS THE HANTAVIRUS DISEASE?

Because hantavirus disease is still rare, there is no cause for panic. Learning how to avoid the disease is the best defense against hantavirus.

HOW IS HANTAVIRUS SPREAD?

A person can be infected by inhaling airborne particles of urine, droppings or saliva from infected rodents, particularly deer mice and cotton rats. The virus may also be spread by touching the nose, mouth or eyes after handling infected rodents, their nests or droppings. Persons have also become infected after being bitten by rodents.

HOW CAN A DEER MOUSE BE DISTINGUISHED FROM OTHER MICE?

The deer mouse (*Peromyscus maniculatis*) is 2 to 3 inches long from head to tail, ranges in color from grey to brown and has white fur on its belly and on the underside of the tail. Characteristically, it has large ears. It is found in different habitats all over the U.S., including human residences in rural and semirural areas, but generally not in urban centers.

HOW CAN AN INFECTED RODENT BE DISTINGUISHED FROM A RODENT FREE OF HANTAVIRUS?

There is no way to tell an infected rodent from a noninfected rodent just by looking. It is also very difficult to tell deer mice from other mice, especially if they are hiding. Therefore, all rodents should be treated as potentially infectious and handled with proper precautions. Keeping rodents out of the home is the best advice.



HOW CAN RODENTS BE KEPT OUT OF THE HOUSE?

Tell residents in your area to deny rodents food, water and shelter.

- Keep food in sealed containers or in the refrigerator.
- Clean up spilled food immediately. Use garbage containers with tight-fitting lids.
- Remove pet food from the floor after 30 minutes.
- Seal openings into the house that are greater than 1/4 inch with steel wool or cement. Surround the house with gravel to discourage burrowing.
- Spring-loaded snap traps and EPA-registered baits should be used continuously to kill rodents.

WHAT IS THE SAFEST WAY TO DISPOSE OF TRAPPED RODENTS AND CLEAN AFFECTED AREAS?

According to the CDC, disinfection is an essential part of the disposal and clean-up process. Always remember to:

- Use rubber gloves. Thoroughly wet the dead rodent, trap, droppings and nests with a general household disinfectant. Let area soak for 15 minutes.
- Then double-bag the disinfectant-soaked rodent and clean-up material (gloves, newspaper, paper towels, etc.) securely in plastic bags and seal. Bury deeply or burn where permitted. If burning or burying is not possible, contact your local health official or the CDC for proper disposal methods.



WHAT SHOULD BE DONE IN HOMES WHERE HANTAVIRUS HAS BEEN CONFIRMED —OR IN BUILDINGS WITH HEAVY RODENT INFESTATIONS?

Special precautions are called for in this situation. In general, the CDC advises the following:

- A baseline serum sample should be available for all persons conducting the clean-up. The serum sample should be drawn before the clean-up is begun, and stored at -20°C .
- Closed buildings should be ventilated first by opening doors and windows for at least thirty minutes, and an exhaust fan should be used for cross ventilation if possible. Workers should not stay in the building during the airing-out period.
- Those cleaning up should wear coveralls (disposable, if possible), rubber boots or disposable shoe covers, rubber or plastic gloves, protective goggles and respiratory protection such as a half-mask air-purifying (or negative pressure) respirator with a high-efficiency particulate air filter (HEPA). Precautions should be taken that facial hair does not interfere with the face seal.
- Personal protective gear should be decontaminated on removal at the end of the day. Launder coveralls on site or immerse in liquid disinfectant until they can be washed.
- Potentially infective materials including respirator filters should be burned or buried on site. If that's impossible, they should be double bagged, labeled as infectious and disposed of in accordance with local requirements for disposal of infectious waste.

WHAT ARE THE SYMPTOMS OF HANTAVIRUS INFECTION IN HUMANS?

Hantavirus symptoms include fever, headache, shortness of breath, severe muscle aches, coughing, vomiting and abdominal pain. These symptoms may last a few hours to several days. As the illness progresses, the lungs fill with fluid, making breathing difficult. Lung failure can follow rapidly.

If anyone in your area who has been exposed to rodents experiences these symptoms, make sure they receive medical attention immediately.

WHAT ABOUT A HANTAVIRUS CURE?

There is no specific cure for hantavirus infection other than early diagnosis and good medical care. Experts believe that it is best to prevent the disease and use rodent precautions, so that the disease is not contracted in the first place.

This information is provided as a public service by Reckitt & Colman Inc.,
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and LYSOL® Brand Disinfectant Spray.
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ADDITIONAL INFORMATION

To learn more about hantavirus, its causes, symptoms and future, the following is a bibliography of book and articles recommended by the CDC.

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Hantavirus: The Essential Facts



SEPARATING MYTH FROM FACT

Hantavirus is the name for one of a family of viruses that originated in Asia and Europe that leads to Hantavirus Pulmonary Syndrome (HPS) in the United States. It was relatively unknown in the U.S. until 1993, when the medical community in the four-corners region of the Southwest (Arizona, New Mexico, Utah and Colorado) reported sudden deaths due to severe infection of the lungs.

According to the U.S. Centers for Disease Control and Prevention (CDC) in Atlanta, hantavirus is contracted mainly by breathing in tiny droplets from fresh or dried droppings, urine and saliva left by infected rodents or through direct contact with these rodent excretions, or possibly through rodent bites. Infection may also be contracted by touching anything in an environment where rodents have been active, then touching the face, eyes, nose or mouth. Suspect rodents include the deer mouse and cotton rat—so far, the most common carriers—and perhaps other rodents, as well.

The virus is not transmitted from person to person, or from insects, pets or livestock.

WHO IS IN DANGER?

Though hantavirus does not seem to be limited to any age, race, ethnic group or geographic region, experts agree that those who live and work where rodents are common should exercise special care. This high-risk group includes those who occupy or clean rodent-inhabited barns, sheds or abandoned dwellings; hikers; campers; and farmers.

However, anyone is at potential risk, since virtually all homes or garages can harbor mice, particularly in rural areas and during the colder months, when rodents seek shelter indoors. Caution should be exercised during spring clean-up, as well.

To date, hantavirus victims have ranged in age from 12 to 69. They've all been previously healthy and active. Men and women have been affected almost equally (54% males/46% females).

SYMPTOMS AND TREATMENT OF HANTAVIRUS

The CDC advises anyone who visits a physician for the symptoms described below to notify the physician of any recent exposure to rodents.

Fever, headache, shortness of breath, severe muscle aches, coughing (which is often dry), vomiting and abdominal pain are all potential warning signs of hantavirus. They may last a few hours to several days, and lead directly to lung failure.

In distinguishing hantavirus infection from other infections, it is helpful to know that sore throats are very unusual. To date, there have not been accompanying symptoms of ear or sinus infections, and there have been no rashes.

What *does* characterize hantavirus infection is fever (ranging from 101° F to 104° F) which does not respond to medication, and intense muscle aches in the large muscle groups—thighs, hips, back and sometimes the shoulder. These aches differ from standard flu-like aching hands and joints in that hantavirus patients experience muscle aches so severe they cannot sit up or roll over in bed. Abdominal pain is often focal in the lower part of the abdomen, and is so severe it is sometimes mistaken for kidney infection or appendicitis.

Other identifying clues based on the complete blood count (CBC) are:

- presence of immature neutrophils and atypical lymphocytes
- significant bandemia
- Thrombocytopenic or falling platelet count

Though there is not yet a specific medicine or treatment that will cure the hantavirus, the best treatment to date has been early diagnosis and hospital care.

For now, keeping homes and the work environment free of rodents and their excretions is probably the best way to prevent hantavirus infection.

Specific Precautions and Preventive Measures:

CONTROLLING MICE INSIDE THE HOME

- **Making sure rodents can't come in.** Because mice can fit through spaces as small as the size of a dime, stuff steel wool or concrete in holes larger than one-quarter inch in diameter. Three inches of gravel around the base of the home—especially mobile homes—discourages burrowing. And metal roof flashing placed around the base of wooden, earthen or adobe dwellings will help keep rodents out of the house.
- **Trapping rodents effectively.** Recommend that people in your area always use spring-loaded (snap) rodent traps inside.



In addition to traps, they should use EPA-registered rodenticides, such as bait pellets, in areas close to walls, and in dark corners—behind the stove, washer, dryer and refrigerator.

Recommend the use of insecticide, flea or tick spray, prior to trapping if plague or tick-borne relapsing fever is a problem in your area.

Baits should be checked every few days to see if they need replacing. And of course, baits and traps should be kept out of the reach of children and pets.

- **Eliminating food sources.** All food, water and garbage should be kept in metal or thick plastic containers with tight-fitting lids. Tell residents to clean up spilled food, dirty dishes and cooking utensils immediately, and dispose of trash and clutter right away.

CONTROLLING MICE OUTSIDE

- **Nature needs a helping hand.** Cats, hawks, snakes and coyotes will help keep down the rodent population. But snap traps and baits should be used in barns, sheds and outbuildings, where animals and children cannot reach them.
- **Keeping rodents away from the house.** Those in your area should relocate woodpiles, vegetable gardens, trash cans and animal feed at least 100 feet away from their houses, and elevate hay, woodpiles and trash cans at least 12 inches off the ground. Animal food and water should never be left in feeding dishes overnight.
- **Eliminating rodent nesting sites.** Junk cars, old tires and trash piles should be removed. Grass, brush and shrubbery should be cut within 100 feet of the house.

SAFE RODENT DISPOSAL

The CDC specifically recommends the following steps for safe disposal and clean-up of dead rodents and/or rodent droppings. People in your area should:

- 1) **Wear** rubber gloves.
- 2) **Thoroughly wet** dead rodents, traps, droppings and contaminated areas with a general household disinfectant. NEVER sweep or vacuum mouse dropping prior to disinfecting, since this might put virus-laden dust into the air.
- 3) **Discard** disinfectant-soaked rodents into a plastic bag and seal it. Then place in a second plastic bag and seal that, too. If possible, burn or bury the bag. If burning or burying is not possible, contact your local health official or the CDC for proper disposal methods.
- 4) **Disinfect** floors, countertops and other surfaces with a general household disinfectant.
- 5) **Wash** gloved hands in disinfectant, then in soap and water. Thoroughly wash hands with soap and water after removing gloves.
- 6) **Disinfect** used traps, then set them again, or replace them.

To clean up heavily infested sites, see the pertinent section in the enclosed fact sheet, "Answers to Frequently Asked Questions about Hantavirus."

Reporting & Testing of a Suspected Case in Your Area

All reporting and testing for HPS suspect cases is done through your state Health Department. For information on submission of samples for hantavirus testing, physicians should contact the state Health Department and follow the guidelines they have provided.

Precautions for Workers in Affected Areas Who Are Exposed to Rodents:

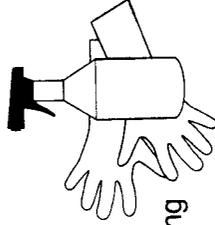
- 1) A baseline serum sample, preferably drawn at the time of employment, should be available for all persons whose occupations involve frequent rodent contact. Testing of routine baseline specimens is not recommended at the time of collection. The serum sample should be stored at -20°C .
- 2) Workers in potentially high-risk settings should be informed about the symptoms of the disease and be given detailed guidance on prevention measures.
- 3) Workers who develop a febrile or respiratory illness within 45 days of the last potential exposure should immediately seek medical attention and inform the attending physician of the potential occupational risk of hantavirus infection. The physician should contact local health authorities promptly if hantavirus-associated illness is suspected. A fresh blood sample should be obtained and forwarded along with the previously-stored baseline serum to the state Health Department to arrange for hantavirus antibody testing.

This information is provided as a public service by Reckitt & Colman Inc.,
makers of d-CON[®] rodenticides and insecticides
and LYSOL[®] Brand Disinfectant Spray.
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You should also relocate woodpiles, vegetable gardens, trash cans and animal feed at least 100 feet from the house. Hay bales, woodpiles and trash cans should sit at least 12 inches off the ground.

Use Safety Precautions:

Safe disposal of rodents and proper cleaning and disinfection of rodent-inhabited areas are keys to minimizing exposure to the hantavirus.



The CDC specifically recommends following these steps for safe disposal and clean-up of dead rodents and/or rodent droppings:

- Wear rubber gloves.
- Thoroughly spray dead rodents, traps, droppings, and contaminated areas with a general household disinfectant. Also, if you find mouse droppings inside, DO NOT sweep or vacuum them until you have wet the affected areas with disinfectant, since these activities might put virus-laden dust into the air.
- Discard disinfectant-soaked rodents into a plastic bag and seal it. Then place it into a second plastic bag and seal. If possible, burn or bury the bag or contact your local or state health department about other appropriate disposal methods.
- Disinfect floors, countertops and other surfaces with a general household disinfectant.
- Before removing the gloves, wash gloved hands in disinfectant, and then in soap and water. Thoroughly wash hands with soap and water after removing the gloves.
- Disinfect all used traps, and then set them again or replace them.
- Eliminate possible rodent nesting sites such as junk cars, old tires and trash piles. Do not leave animal food and water in feeding dishes overnight, and keep all food in rodent-proof containers. Cut grass, brush and dense shrubbery within 100 feet of the home.
- Remember to keep an eye out for signs of rodents and to use the precaution measures listed above even when away from home—such as when at work or when camping.

Treatment of hantavirus:

So far, there is no specific medicine or treatment available that will cure the hantavirus, but the best treatment has been early detection and hospital care. The CDC recommends specific rodent prevention precautions in order to minimize your chances of getting the disease.

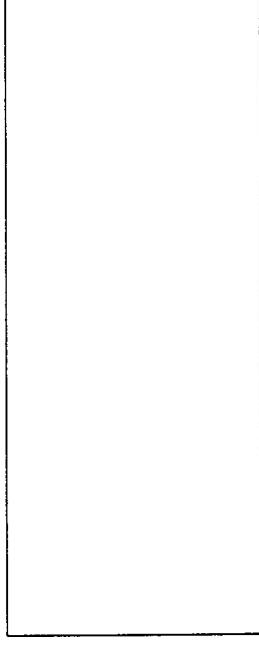
Hantavirus in the future:

Since Hantavirus Pulmonary Syndrome was first diagnosed in 1993, a great deal has been learned about the disease and how to prevent it—but a great deal more is left to learn.

Currently, scientists are researching the virus. They are hard at work on new diagnostic tests to identify the disease more quickly and more accurately. They are determined to pinpoint which different rodents are determined to spread the hantavirus. Doctors are researching the best treatment for the disease and improving supportive care.

In the future, we can look forward to rapid diagnostic tests and better medical care. Until then, remember that preventive care, including rodent-proofing your home and proper clean-up and disposal, is still the best way to help reduce the risk of contracting the hantavirus.

To request additional free brochures, call the d-CON hantavirus helpline at 1-800-395-3266 or for more information, contact your local county health department at:



This information is provided as a public service by L&F Products, Inc., makers of d-CON® rodenticides and insecticides and Lyso® Brand Disinfectant Spray.

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HANTAVIRUS



INFORMATION ABOUT THE DISEASE AND HOW TO HELP PREVENT IT

As part of its ongoing program of prevention partnerships, Centers for Disease Control and Prevention (CDC) has reviewed the content of this brochure for technical accuracy.

HANTAVIRUS

Though still relatively rare, hantavirus infection is a serious and life-threatening illness that is currently being diagnosed in many parts of the country. By taking the right precautions, you can minimize your risk of becoming infected with this rodent-borne virus.

A brief history of the hantavirus disease:

The hantavirus in the U.S. leads to Hantavirus Pulmonary Syndrome (HPS), an often fatal infection of the lungs. The hantavirus is actually a member of a family of viruses long known in Asia and Europe. It first became a recognized health concern when one strain caused Hemorrhagic Fever in soldiers who served in the Hantaan area of Korea in the 1950's.

The disease was first diagnosed in the U.S. in May of 1993, when a number of deaths attributed to HPS occurred in the four-corners region in the Southwest. Since then, the virus has also been identified in other states across the country.

The disease—Hantavirus Pulmonary Syndrome:

According to the U.S. Centers for Disease Control and Prevention (CDC) in Atlanta, the symptoms of the hantavirus are much like those of the flu—fever, headache, shortness of breath, severe muscle aches, coughing, vomiting, and abdominal pain. These symptoms may last a few hours to several days. Victims soon develop rapid respiratory failure and severe lung problems.

If you experience flu-like symptoms within one to six weeks of exposure to rodents or rodent secretions, see your doctor immediately, or call your local county health department.

How you get it:

It is believed that the disease is contracted mainly by breathing in tiny droplets from fresh or dried droppings, urine and saliva left by infected rodents or through direct contact with these rodent excretions, and possibly also through rodent bites. You may also get the hantavirus by touching anything (tools, furniture, clothing) where the virus has been deposited and then touching your nose, eyes or mouth.

Researchers believe that the deer mouse and the cotton rat are the most common carriers of the virus, although other rodents are also suspect. There is no

evidence that the virus is transmitted from person to person, or from insects, pets or livestock.

Who should be concerned?

The hantavirus does not appear to be limited to any age, race or ethnic group, nor does it appear to be limited to any geographic region. The illness has occurred in various ethnic groups, in young people as well as adults, and in both males and females.

Your highest risk of contracting the hantavirus comes from exposure to rodents or their droppings. Most cases have been acquired in rural settings, however everyone is at potential risk since many homes or garages harbor mice. Activities which pose a more significant risk include occupying or cleaning rodent-inhabited barns, sheds or abandoned dwellings; disturbing rodent-inhabited areas while hiking or camping; living in or visiting areas where there has been an increase in rodents; and working in enclosed spaces that have been infested with rodents.

Use precautions year-round. Experts urge extra precautions in the spring when clearing out areas undisturbed during the colder months, and during the fall/winter months when more mice seek shelter indoors.

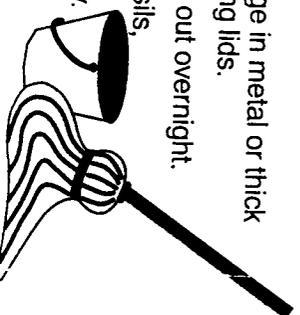
How can you prevent hantavirus disease?

You can't prevent hantavirus disease by taking medicine, but you can prevent it by avoiding contact with rodents and using prevention techniques. Rodent control in and around the home is currently the primary hantavirus prevention strategy. There are plenty of precautions you can take both inside and outside your home to avoid rodents—and thus avoid hantavirus infection.

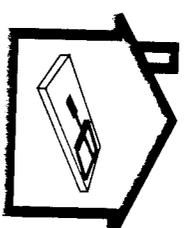
Follow these guidelines to keep your home safe from rodents:

Keep your home clean

- Keep all food, water and garbage in metal or thick plastic containers with tight-fitting lids.
- Never leave pet food and water out overnight.
- Wash dishes and cooking utensils, and clean spilled food from counters and floors immediately.
- Dispose of trash and clutter.



Control rodents inside your home



- You can prevent rodents from entering your home by stuffing steel wool or concrete in holes larger than one-quarter inch in diameter. Mice can fit through spaces the size of a dime! Placing three inches of gravel under the base of homes or under mobile homes also discourages rodent burrowing. And placing metal roof flashing around the base of wooden, earthen or adobe dwellings acts as a rodent barrier.
- Use spring-loaded (snap) rodent traps in the home continuously. Traps designed with a cover are particularly effective as they minimize contact with the dead rodent.

- As a supplement to traps, use EPA-approved rodenticides, such as bait pellets, on an ongoing basis inside the house. Ideal places for baits and traps are dark corners such as behind the stove, washer and dryer, and refrigerator and close to walls. Check baits every few days to see if they need replacing. Remember that in some parts of the country, rodent fleas may carry plague. In these areas, use insecticides prior to trapping or baiting to control fleas that may transmit disease when they leave the dead rodent.

Remember to keep baits and traps out of the reach of children and pets.

Control rodents outside your home



- Natural predators such as hawks, snakes and coyotes help control the rodent population naturally. But snap traps and baits should be used inside barns and sheds, remembering to keep all rodenticides safely out of the reach of animals and children.

Attachment 2.

CENTERS FOR DISEASE CONTROL AND PREVENTION

Hantavirus Illness in the United States

An outbreak of unexplained illness occurred in the Southwestern part of the United States in 1993. Laboratory findings from the Centers for Disease Control and Prevention indicate that the illness is caused by a hantavirus. The newly recognized hantavirus-associated disease, called Hantavirus Pulmonary Syndrome (HPS), begins with one or more symptoms including fever, severe muscle aches, headache, and cough which progress rapidly to severe lung disease, often requiring intensive care treatment.

Since the hantavirus was discovered in 1993, less than 100 cases of HPS have been identified in 20 states. These states encompass the western half of the United States and most recently a few eastern states as well. Over half the people who get HPS die from the illness. In 1994, about two dozen cases have been confirmed. It is predicted that less than 50 cases will occur this year. So far the earliest known case dates back to 1975. Almost all cases have had evidence of close contact with rodents (deer mice or cotton rats).

Rodents are the primary reservoir host of the recognized hantaviruses. Each hantavirus appears to have a preferred rodent host, but other small mammals can be infected as well. Data strongly suggests that the deer mouse is the primary carrier of the hantavirus seen in all parts of the United States except the Eastern Coast and the Southeast. In the Southeast, the cotton rat has been identified as a carrier for the virus causing HPS. Evidence of infection has also been found in pinon mice, brush mice and western chipmunks. The deer mouse is highly adaptable and is found in different habitats, including human residences in rural and semirural areas, but generally not in urban centers.

Hantaviruses do not cause obvious illness in their rodent hosts. Infected rodents shed virus in saliva, urine, and feces for many weeks, but the duration and period of maximum infectivity are unknown.

Human infection may occur when infective saliva or excreta are inhaled as aerosols produced directly from the animal. Transmission may also occur when fresh or dried materials contaminated by rodent excreta are disturbed, directly introduced into broken skin, introduced into the eyes, or, possibly, ingested in contaminated food or water. Persons have also become infected after being bitten by rodents.

Ticks, fleas, mosquitos and other biting insects are not known to have a role in the transmission of hantaviruses. Person-to-person transmission has not been associated with any of the previously identified hantaviruses or with the recent outbreak in the Southwest. Cats and dogs are not known to be a reservoir host of hantaviruses in the United States. However, these domestic animals may bring infected rodents into contact with humans.

Hantavirus pulmonary syndrome does not appear to be limited to a particular age, race, ethnic group, or gender. The chance of exposure to hantavirus is greatest when individuals work, play or live in closed spaces where there is an active rodent infestation. It is important to be aware of possible rodent exposure, for example, when working in crawl spaces, opening phone line stations or using air condition equipment after winter storage.

Travel to and within all areas where hantavirus infection has been reported is safe. The possibility of exposure to hantavirus for campers, hikers, and tourists is very small and reduced even more if steps are taken to reduce rodent contact.

Cleaning of areas with small numbers of rodents should include wearing latex or rubber gloves and wetting down affected areas with general household disinfectant solutions such as Lysol or bleach

and water or Amonia. Cleaning of areas with large numbers of rodents includes wearing latex or rubber gloves, goggles, HEPAfilter mask and wetting the area with disinfectant solutions or bleach and water.

Remember that the chances of getting HPS are very low. However, if you do get the disease, it can be very serious.

Recommendations for Prevention and Control

Summary

This report provides interim recommendations for prevention and control of hantavirus infections associated with rodents in the southwestern United States. It is based on principles of rodent and infection control and contains specific recommendations for reducing rodent shelter and food sources in and around the home, recommendations for eliminating rodents inside the home and preventing them from entering the home, precautions for preventing hantavirus infection while rodent-contaminated areas are being cleaned up, prevention measures for persons who have occupational exposure to wild rodents, and precautions for campers and hikers.

Introduction

The recently recognized hantavirus-associated disease among residents of the southwestern United States and the identification of rodent reservoirs for the virus in the affected areas warrant recommendations to minimize the risk of exposure to rodents for both residents and visitors. While information is being gathered about the causative virus and its epidemiology, provisional recommendations can be made on the basis of knowledge about related hantaviruses. These recommendations are based on current understanding of the epidemiologic features of hantavirus infections in the Southwest; they will be periodically evaluated and modified as more information becomes available.

Rodents are the primary reservoir hosts of recognized hantaviruses. Each hantavirus appears to have preferential rodent hosts, but other small mammals can be infected as well. Available data strongly suggest that the deer mouse (*Peromyscus maniculatus*) is the primary reservoir of the newly recognized hantavirus in the southwestern United States. Serologic evidence of infection has also been found in piñon mice (*P. truei*), brush mice (*P. boylii*), cotton rats (*Sigmodon hispidus*), and western chipmunks (*Tamias* spp.). *P. maniculatus* is highly adaptable and is found in different habitats, including human residences in rural and semirural areas, but generally not in urban centers.

Hantaviruses do not cause apparent illness in their reservoir hosts. Infected rodents shed virus in saliva, urine, and feces for many weeks, but the duration and period of maximum infectivity are unknown. The demonstrated presence of infectious virus in saliva of infected rodents and the marked sensitivity of these animals to hantaviruses following inoculation suggests that biting may be an important mode of transmission among rodents.

Human infection may occur when infective saliva or excreta are inhaled as aerosols produced directly from the animal. Persons visiting laboratories where infected rodents were housed have been infected after only a few minutes of exposure to animal holding areas. Transmission may also occur when dried or fresh materials contaminated by rodent excreta are disturbed, directly introduced into broken skin, introduced onto the conjunctivae, or, possibly, ingested in contaminated food or water. Persons have also become infected after being bitten by rodents.

Arthropod vectors are not known to have a role in the transmission of hantaviruses. Person-to-person transmission has not been associated with any of the previously identified hantaviruses or with the recent outbreak in the Southwest. Cats and dogs are not known to be reservoir hosts of hantaviruses in the United States. However, these domestic animals may bring infected rodents into contact with humans.

Known hantavirus infections of humans occur primarily in adults and are associated with domestic, occupational, or leisure activities that bring humans into contact with infected rodents, usually in a rural setting. Patterns of seasonal occurrence differ, depending on the virus, species of rodent host, and patterns of human behavior, cases have been epidemiologically associated with the following situations:

- planting or harvesting field crops;
- occupying previously vacant cabins or other dwellings;
- cleaning barns and other outbuildings;
- disturbing rodent-infested areas while hiking or camping;
- inhabiting dwellings with indoor rodent populations;
- residing in or visiting areas in which the rodent population has shown an increase in density.

Hantaviruses have lipid envelopes that are susceptible to most disinfectants (e.g., dilute hypochlorite solutions, detergents, ethyl alcohol [70%], or most general-purpose household disinfectants). How long these viruses survive after being shed in the environment is uncertain.

The reservoir hosts of the hantavirus in the southwestern United States also act as hosts for the bacterium *Yersinia pestis*, the etiologic agent of plague. Although fleas and other ectoparasites are not known to play a role in hantavirus epidemiology, rodent fleas transmit plague. Control of rodents without concurrent control of fleas may increase the risk of human plague as the rodent fleas seek an alternative food source.

Eradicating the reservoir hosts of hantaviruses is neither feasible nor desirable. The best currently available approach for disease control and prevention is risk reduction through environmental hygiene practices that deter rodents from colonizing the home and work environment.

General Household Precautions in Affected Areas

Although epidemiologic studies are being conducted to identify specific behaviors that may increase the risk for hantavirus infection in humans in the United States, rodent control in and around the home will continue to be the primary prevention strategy (Box 1). CDC has issued recommendations for rodent-proofing urban and suburban dwellings and reducing rodent populations through habitat modification and sanitation.

Box 1. General precautions for residents of affected areas Eliminate rodents and reduce the availability of food sources and nesting sites used by rodents inside the home.

- Follow the recommendations in the section on Eliminating Rodents Inside the Home.
- Keep food (including pet food) and water covered and stored in rodent-proof metal or thick plastic containers with tight-fitting lids.
- Store garbage inside homes in rodent-proof metal or thick plastic containers with tight-fitting lids.
- Wash dishes and cooking utensils immediately after use and remove all spilled food.
- Dispose of trash and clutter.
- Use spring-loaded rodent traps in the home continuously.
- As an adjunct to traps, use rodenticide with bait under a plywood or plastic shelter (covered bait station) on an ongoing basis inside the house.

Note: Environmental Protection Agency (EPA)-approved rodenticides are

commercially available. Instructions on product use should always be followed. Products that are used outdoors should be specifically approved for exterior use. Any use of a rodenticide should be preceded by use of an insecticide to reduce the risk of plague transmission. Insecticide sprays or powders can be used in place of aerosols if they are appropriately labeled for flea control.

Prevent rodents from entering the home. Specific measures should be adapted to local circumstances.

- Use steel wool or cement to seal, screen, or otherwise cover all openings into the home that have a diameter greater than or equal to 1/4 inch.
- Place metal roof flashing as a rodent barrier around the base of wooden, earthen, or adobe dwellings up to a height of 12 inches and buried in the soil to a depth of 6 inches.
- Place 3 inches of gravel under the base of homes or under mobile homes to discourage rodent burrowing. Reduce rodent shelter and food sources within 100 feet of the home.
- Use raised cement foundations in new construction of sheds, barns, outbuildings, or woodpiles.
- When possible, place woodpiles 100 feet or more from the house, and elevate wood at least 12 inches off the ground.
- Store grains and animal feed in rodent-proof containers.
- Near buildings, remove food sources that might attract rodents, or store food and water in rodent-proof containers.
- Store hay on pallets, and use traps or rodenticide continuously to keep hay free of rodents.
- Do not leave pet food in feeding dishes.
- Dispose of garbage and trash in rodent-proof containers that are elevated at least 12 inches off the ground.
- Haul away trash, abandoned vehicles, discarded tires, and other items that may serve as rodent nesting sites.
- Cut grass, brush, and dense shrubbery within 100 feet of the home.
- Place spring-loaded rodent traps at likely spots for rodent shelter within 100 feet around the home, and use continuously.
- Use an EPA-registered rodenticide approved for outside use in covered bait stations at places likely to shelter rodents within 100 feet of the home.

NOTE: Follow the recommendations specified in the section on Clean-Up of Rodent-Contaminated Areas if rodent nests are encountered while these measures are being carried out.

Eliminating Rodents Inside the Home and Reducing Rodent Access to the Home

Rodent infestation can be determined by direct observation of animals or inferred from the presence of feces in closets or cabinets or on floors or from evidence that rodents have been gnawing at food. If rodent infestation is detected inside the home or outbuildings, rodent abatement measures should be completed (Box 2). The directions in the section on Special Precautions should be followed if evidence of heavy rodent infestation (e.g., piles of feces or numerous dead animals) is present or if a structure is associated with a confirmed case of hantavirus disease.

Box 2. Eliminating rodent infestation: Guidance for residents of affected areas

- Before rodent elimination work is begun, ventilate closed buildings or areas inside buildings by opening doors and windows for at least 30 minutes. Use an exhaust fan or cross ventilation if possible. Leave the area until the airing-out period is finished. This airing may help remove any aerosolized virus inside the closed-in structure.
- Second, seal, screen, or otherwise cover all openings into the home that have a diameter of greater than or equal to 3/4 inch. Then set rodent traps inside the house, using peanut butter as bait. Use only spring-loaded traps that kill rodents.

- Next, treat the interior of the structure with an insecticide labeled for flea control; follow specific label instructions. Insecticide sprays or powders can be used in place of aerosols if they are appropriately labeled for flea control. Rodenticides may also be used while the interior is being treated, as outlined below.
- Remove captured rodents from the traps. Wear rubber or plastic gloves while handling rodents. Place the carcasses in a plastic bag containing a sufficient amount of a general-purpose household disinfectant to thoroughly wet the carcasses. Seal the bag and then dispose of it by burying in a 2- to 3-foot-deep hole or by burning. If burying or burning are not feasible, contact your local or state health department about other appropriate disposal methods. Rebait and reset all sprung traps.
- Before removing the gloves, wash gloved hands in a general household disinfectant and then in soap and water. A hypochlorite solution prepared by mixing 3 tablespoons of household bleach in 1 gallon of water may be used in place of a commercial disinfectant. When using the chlorine solution, avoid spilling the mixture on clothing or other items that may be damaged. Thoroughly wash hands with soap and water after removing the gloves.
- Leave several baited spring-loaded traps inside the house at all times as a further precaution against rodent reinfestation. Examine the traps regularly. Disinfect traps no longer in use by washing in a general household disinfectant or the hypochlorite solution. Disinfect and wash gloves as described above, and wash hands thoroughly with soap and water before beginning other activities.

NOTE: EPA-approved rodenticides are commercially available. Instructions on product use should always be followed. Products that are used outdoors should be specifically approved for exterior use. Any use of a rodenticide should be preceded by use of an insecticide to reduce the risk of plague transmission. Insecticide sprays or powders can be used in place of aerosols if they are appropriately labeled for flea control.

Clean-up of Rodent-Contaminated Areas

Areas with evidence of rodent activity (e.g., dead rodents, rodent excreta) should be thoroughly cleaned to reduce the likelihood of exposure to hantavirus-infected materials. Clean-up procedures must be performed in a manner that limits the potential for aerosolization of dirt or dust from all potentially contaminated surfaces and household goods (Box 3).

Box 3. Clean-up of rodent-contaminated areas: Guidance for residents of affected areas

- Persons involved in the clean-up should wear rubber or plastic gloves.
- Spray dead rodents, rodent nests, droppings, or foods or other items that have been tainted by rodents with a general-purpose household disinfectant. Soak the material thoroughly, and place in a plastic bag. When clean-up is complete (or when the bag is full), seal the bag, then place it into a second plastic bag and seal. Dispose of the bagged material by burying in a 2- to 3-foot-deep hole or by burning. If these alternatives are not feasible, contact the local or state health department concerning other appropriate disposal methods.
- After the above items have been removed, mop floors with a solution of water, detergent, and disinfectant. Spray dirt floors with a disinfectant solution. A second mopping or spraying of floors with a general-purpose household disinfectant is optional. Carpets can be effectively disinfected with household disinfectants or by commercial-grade steam cleaning or shampooing. To avoid

generating potentially infectious aerosols, do not vacuum or sweep dry surfaces before mopping.

- Disinfect countertops, cabinets, drawers, and other durable surfaces by washing them with a solution of detergent, water, and disinfectant, followed by an optional wiping-down with a general-purpose household disinfectant.
- Rugs and upholstered furniture should be steam cleaned or shampooed. If rodents have nested inside furniture and the nests are not accessible for decontamination, the furniture should be removed and burned.
- Launder potentially contaminated bedding and clothing with hot water and detergent. (Use rubber or plastic gloves when handling the dirty laundry; then wash and disinfect gloves as described in the section on Eliminating Rodents Inside the Home.) Machine-dry laundry on a high setting or hang it to air dry in the sun.

Special Precautions for Homes of Persons with Confirmed Hantavirus Infection or Buildings with Heavy Rodent Infestations

Special precautions are indicated in the affected areas for cleaning homes or buildings with heavy rodent infestations (Box 4). Persons conducting these activities should contact the responsible local, state, or federal public health agency for guidance. These precautions may also apply to vacant dwellings that have attracted numbers of rodents while unoccupied and to dwellings and other structures that have been occupied by persons with confirmed hantavirus infection. Workers who are either hired specifically to perform the clean-up or asked to do so as part of their work activities should receive a thorough orientation from the responsible health agency about hantavirus transmission and should be trained to perform the required activities safely.

Box 4. Special precautions for clean-up in homes of persons with hantavirus infection or buildings with heavy rodent infestation

- A baseline serum sample, preferably drawn at the time these activities are initiated, should be available for all persons conducting the clean-up of homes or buildings with heavy rodent infestation. The serum sample should be stored at -20 C.
- Persons involved in the clean-up should wear coveralls (disposable if possible), rubber boots or disposable shoe covers, rubber or plastic gloves, protective goggles, and an appropriate respiratory protection device, such as a half-mask air-purifying (or negative-pressure) respirator with a high-efficiency particulate air (HEPA) filter or a powered air-purifying respirator (PAPR) with HEPA filters. Respirators (including positive-pressure types) are not considered protective if facial hair interferes with the face seal, since proper fit cannot be assured. Respirator practices should follow a comprehensive user program and be supervised by a knowledgeable person.
- Personal protective gear should be decontaminated upon removal at the end of the day. If the coveralls are not disposable, they should be laundered on site. If no laundry facilities are available, the coveralls should be immersed in liquid disinfectant until they can be washed.
- All potentially infective waste material (including respirator filters) from clean-up operations that cannot be burned or deep buried on site should be double bagged in appropriate plastic bags. The bagged material should then be labeled as infectious (if it is to be transported) and disposed of in accordance with local requirements for infectious waste.
- Workers who develop symptoms suggestive of HPS within 45 days of the last potential exposure should immediately seek medical attention. The physician should contact local health authorities promptly if hantavirus-associated

illness is suspected. A blood sample should be obtained and forwarded with the baseline serum through the state health department to CDC for hantavirus antibody testing.

Precautions for Workers in Affected Areas Who are Regularly Exposed to Rodents

Persons who frequently handle or are exposed to rodents (e.g., mammalogists, pest-control workers) in the affected area are probably at higher risk for hantavirus infection than the general public because of their frequency of exposure. Therefore, enhanced precautions are warranted to protect them against hantavirus infection (Box 5).

Box 5. Precautions for workers in affected areas who are exposed to rodents

- A baseline serum sample, preferably drawn at the time of employment, should be available for all persons whose occupations involve frequent rodent contact. The serum sample should be stored at -20°C.
- Workers in potentially high-risk settings should be informed about the symptoms of the disease and be given detailed guidance on prevention measures.
- Workers who develop a febrile or respiratory illness within 45 days of the last potential exposure should immediately seek medical attention and inform the attending physician of the potential occupational risk of hantavirus infection. The physician should contact local health authorities promptly if hantavirus-associated illness is suspected. A blood sample should be obtained and forwarded with the baseline serum through the state health department to CDC for hantavirus antibody testing.
- Workers should wear a half-face air-purifying (or negative-pressure) respirator or PAPR equipped with HEPA filters when removing rodents from traps or handling rodents in the affected area. Respirators (including positive-pressure types) are not considered protective if facial hair interferes with the face seal, since proper fit cannot be assured. Respirator use practices should be in accord with a comprehensive user program and should be supervised by a knowledgeable person.
- Workers should wear rubber or plastic gloves when handling rodents or handling traps containing rodents. Gloves should be washed and disinfected before removing them, as described above.
- Traps contaminated by rodent urine or feces or in which a rodent was captured should be disinfected with a commercial disinfectant or bleach solution. Dispose of dead rodents as described in the section on Eliminating Rodents inside the Home.
- Persons removing organs or obtaining blood from rodents in affected areas should contact the Special Pathogens Branch, Division of Viral and Rickettsial Diseases, National Center for Infectious Diseases, Centers for Disease Control and Prevention, [telephone (404) 639-1115] for detailed safety precautions.

Precautions for Other Occupational Groups Who Have Potential Rodent Contact

Insufficient information is available at this time to allow general recommendations regarding risks or precautions for persons in the affected areas who work in occupations with unpredictable or incidental contact with rodents or their habitations. Examples of such occupations include telephone installers, maintenance workers, plumbers, electricians, and certain construction workers. Workers in these jobs may have to enter various buildings, crawl spaces, or other sites that may be rodent

infested. Recommendations for such circumstances must be made on a case-by-case basis after the specific working environment has been assessed and state or local health departments have been consulted.

Precautions for Campers and Hikers in the Affected Areas

There is no evidence to suggest that travel into the affected areas should be restricted. Most usual tourist activities pose little or no risk that travelers will be exposed to rodents or their excreta. However, persons engaged in outdoor activities such as camping or hiking should take precautions to reduce the likelihood of their exposure to potentially infectious materials (Box 6).

Box 6. Reducing risk of hantavirus infection: Guidance for hikers and campers

- Avoid coming into contact with rodents and rodent burrows or disturbing dens (such as pack rat nests).
- Do not use cabins or other enclosed shelters that are rodent infested until they have been appropriately cleaned and disinfected.
- Do not pitch tents or place sleeping bags in areas in proximity to rodent feces or burrows or near possible rodent shelters (e.g., garbage dumps or woodpiles).
- If possible, do not sleep on the bare ground. Use a cot with the sleeping surface at least 12 inches above the ground. Use tents with floors.
- Keep food in rodent-proof containers.
- Promptly bury (or--preferably--burn followed by burying, when in accordance with local requirements) all garbage and trash, or discard in covered trash containers.
- Use only bottled water or water that has been disinfected by filtration, boiling, chlorination, or iodination for drinking, cooking, washing dishes, and brushing teeth.

Conclusion

The control and prevention recommendations in this report represent general measures to minimize the likelihood of human exposure to hantavirus- infected rodents in areas of the southwestern United States affected by the outbreak of hantavirus-associated respiratory illness. Many of the recommendations may not be applicable or necessary in unaffected locales. The impact and utility of the recommendations will be assessed as they are implemented and will be continually reviewed by CDC and the involved state and local health agencies as additional epidemiologic and laboratory data related to the outbreak become available. These recommendations (which were developed in July, 1994) will be supplemented or modified in the future.

To receive additional recommendations for the prevention and control of hantavirus infections associated with rodents in the United States, you will need to call 404-332-4565 and follow the prompts. The following documents on Hantavirus are available: 310031, Hantavirus Illness in the United States; 310032, Hantavirus Illness Prevention Information; 310033, Guidelines for Removing Organs or Obtaining Blood from Rodents Potentially Infected with Hantavirus; 310034, Laboratory Management of Agents Associated with Hantavirus Pulmonary Syndrome: Interim Biosafety Guidelines; 310035, State Contacts for Hantavirus Information



**National Center for Infectious Diseases
Centers for Disease Control and Prevention**

Atlanta, GA

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MECHANICAL RODENT PROOFING TECHNIQUES



U.S. DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
PUBLIC HEALTH PROGRAM

MECHANICAL RODENT PROOFING TECHNIQUES

**NATIONAL PARK SERVICE
Public Health Program
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INTRODUCTION

Rodents have been a common problem in living and working environments, probably, ever since humans began living in permanent dwellings. Even today many people believe rodent infestations are “inevitable”. However, the recent appearance of Hantavirus (Sin Nombre Virus, Hantavirus Pulmonary Syndrome, HPS) in the Western states has re-awakened the public to the serious health problems posed by rodents and has prompted new inquiries into more effective ways to manage infestations. This manual is designed as a training reference for making rodent control in buildings an attainable goal.

METHODS USED IN RODENT CONTROL

Control of rodents in buildings is not complicated but it is not **easy** and always involves much more than simply setting out a few mouse traps or a package of rat poison. To be effective, rodent control must be done in a professional manner and regarded as “all-out war” on rodents. At the very minimum, successfully controlling rodents in structures requires the following:

- **a basic knowledge of rodent biology.** A fundamental understanding of the habits and reproductive abilities of rodents is helpful for knowing where to look for signs of animals and how to select the best control measures.
- **a thorough inspection of the exterior and interior of a building.** The main purpose of an inspection is to identify structural defects which allow rodents to enter buildings. Inspections also provide information on the kinds of rodents present, key shelter areas, locations where animals obtain food and water, and identify conditions around buildings favoring infestations. Those findings are used to set priorities for repairs needed to keep animals out of buildings and to recommend changes in conditions supporting rodent populations.
- **effective exclusion.** Rodent control in structures is based on one simple rule: **rodents must be prevented from entering a building or a room.** Excluding rodents by closing all possible holes where they can enter or leave a structure is always the most important measure against infestation.
- **good sanitation practices that eliminate food, water, and shelter for rodents.** Good sanitation removes resources needed by rodents and limits the numbers of animals that can live in an area. Good sanitation is very important for controlling rodent populations, but even the best of sanitation measures will not prevent infestations where exclusion is not adequate.
- **continually removing 85 to 95 percent of the rodents present capable of reproduction.** Rodents mature quickly and produce large numbers of young. The numbers of animals present will not change much or may continually increase unless most of the breeding adults are removed.
- **regularly checking for new rodent activity.** Regular re-inspection (monitoring) of sites is important to determine if previous control efforts were effective; to find any newly opened holes animals could use; to watch for changes in sanitation and harborage conditions; and to determine if the numbers of animals present are increasing, decreasing, or unchanging. The importance of continual watchfulness is clear when it is known how rapidly rodent populations can increase and how difficult it is to control established infestations.
- **cooperation between people.** Controlling rodents must always be a team effort between building occupants (affected persons), maintenance workers (for repairs), and area managers (decision makers). It is urgent for all involved persons to be totally committed to and have a clear understanding of the program needs.

None of the above activities are difficult to do but when any of them are overlooked or not sufficiently stressed, rodent control is often unsuccessful. Common failures in controlling rodent infestations in buildings are usually the result of one or more oversights:

- under-estimating the severity of a rodent infestation - either in regard to the numbers of animals present or the size of the infested area.
- failing to find or satisfactorily closing holes used by animals to enter rooms or buildings.
- using too few traps, trapping stations, or improperly placing traps.
- failing to remove trapped rodents which become food for surviving animals.
- placing too much reliance on poison bait as a means of control.

REASONS FOR CONTROLLING RODENTS

There are two **very** important reasons for controlling rodent populations in and around structures occupied by humans. Rodents can be responsible for spreading disease and rodents can damage buildings and building contents.

Health risks

By far, the most basic reason to control rodents is because of potential health risks from human contact with rodents or rodent debris. Rodents are known to be able to **carry** over 200 disease organisms, many of which can be transmitted to man. Many of these diseases are spread while rodents wander about in buildings at night searching for food and mates. During those activities, they continually drop feces, urine, and hairs which can come in contact with human foods, eating utensils, bedding, etc. or can be responsible in other ways for the spread of diseases.

Old World house mice and rats (rodents that were accidentally introduced into this country) can spread plague, typhus, rat bite fever, trichinosis, salmonella food poisoning and other infectious diseases. Native rats and mice (rodents naturally occurring in this country) can carry plague; tularemia, leptospirosis (in urine), endemic relapsing fever, Rocky Mountain spotted fever, and Q-fever. In 1992, deer mice were identified as the most important transmitter of **Sin Nombre virus (Hantavirus Pulmonary Syndrome; HPS)**. Humans can become ill with Sin Nombre Virus after coming in contact with rodents; rodent feces, urine, or body fluids; or after inhaling dust arising from rodent feces or nesting materials.

Rodent food caches, nests, and dead rodent carcasses (poisoned animals or animals dying from **natural** causes) cause secondary health issues when they attract parasites, flies, carpet beetles, and other pests - all of which can also become serious problems in buildings, damage building contents, and also spread diseases.

The night time activities of rodents inside buildings can result in sleep disturbances to human occupants and, in rare cases, have been associated with paranoid fears and even serious accidents.

Damage

Many kinds of physical damage are expected when rodents enter or infest buildings. The animals often build nests and store large amounts of food (acorns, nuts, seeds, etc.) behind walls or in attics and such storage can cause structural damage and attract other pests. Rodents often burrow into and re-arrange wall and attic insulation and, because of their habit for gnawing on objects, may damage upholstered furniture, museum collections, paper and leather goods, clothing, and electrical lines and equipment (including computers). Many structural fires each year in this country are thought to result from electrical wiring damaged by rodents.

Outside, rodent burrows near building foundations can increase the rate of structural deterioration by loosening soils, allowing for increased water penetration, and support excessive vegetation. And, the mere presence of rodent burrows attracts larger predatory animals that enlarge the burrows to cause additional structural damage. Rodent damage to buildings increases the potential for deterioration from weathering, moisture, and other sources. Rodents frequently enter and make nests in parked machinery and vehicles and damage electrical wiring and hoses. This can be quite serious should emergency-response vehicles be involved. Rodents often damage valuable gardens and ornamental plantings.

RODENT BIOLOGY AND HABITS

Rodents are one of the most numerous, successful, and adaptable of all living animal groups and differ from other kinds of animals by their front teeth which are specialized for gnawing. There are over 3,000 different kinds of rodents in the world that range in size from small (fraction of an ounce) to large (more than 100 pounds) animals. Rodents of one kind or another occur in every kind of environment from **deserts to tundra**.

Rodents have a keen sense of smell and the animals produce many natural odors (pheromones) which attract others of their kind. Once rodents have entered a hole, room, or building, their odors remain on the hole and may attract other rodents.

Rodents present in this country may be either native (New World) or exotic (Old World) animals. It is very important to be able to accurately identify rodents causing problems because these animals resemble one another but have quite different habits and living requirements.

Native (naturally occurring) rodents include: mice (white-footed, pygmy, pocket, grasshopper, harvest, and jumping mice); rats (wood, cotton, kangaroo, and rice rats); voles; porcupines; pocket gophers; lemming; nutria; squirrels (ground, tree, and flying); chipmunks; marmots; prairie dogs; muskrats; and beaver.

Exotic rodents (animals accidentally introduced into this country from other countries) are house mice and rats (Norway and black rats). Exotic rodents are easily identified by their scaled, nearly hairless tails (giving them the name, "naked-tail" rodents").

Mice and rats are the most common structural pests in buildings. A basic description of their biology follows.

MICE

Mice, because of their size and adaptability, are the most common indoor rodent pests in buildings. In the Eastern part of this country, exotic house mice are the animals more often found inside buildings but native mice (especially, white-footed mice) are the most common indoor rodent pests in the West.



In general, rodents produce large numbers of young. This is necessary for the survival of rodent populations since they have a high mortality rate. House mice, for example, are able to reproduce all year indoors. During one year and under ideal conditions, a single pair of house mice is thought to be able to produce over 3,000 offspring. This is theoretically possible because young house mice can produce young when only about 30 days old and a female can become pregnant with a second litter even while the first litter is still nursing. Native deer mice, more adapted to life in the out-of-doors, do not reproduce year-round and produce fewer young. Yet, under ideal conditions, a pair of deer mice theoretically are capable of producing a population of about 800 mice during their **4-month-long** breeding season. Under natural outdoor conditions, however, competition between mice for space and food and natural predation (from owls, foxes, etc.) removes 80 to 90 percent of all young mice soon after birth. It is not surprising that when ample food, water, and shelter are available and predation absent (conditions found indoors), mouse populations can explode. Indeed, mice will occupy as many spaces in a building as possible until a limitation in the resources available to them restricts the numbers of animals that can survive.

Mice are exceptionally agile animals and can jump 12 or more inches straight up from one flat surface to another. They can even jump against a flat vertical surface such as a wall and spring-board to even higher levels. They can jump down to the floor without being injured from an elevation of 8 or more feet. They can climb any slightly rough, vertical surface such as wood, plaster, brick, metal pipes, wire mesh, cables, etc. And, they have good balance and can easily run along horizontal electrical wires, ropes, and cables from one part of the building to another.

Mice are actually somewhat smaller than they appear and can squeeze their head through a hole only about **1/4-inch** in diameter, about the same size as a wooden pencil. After getting its head through a hole, a mouse has no trouble getting the rest of its body through.

Although mice tend to prefer cereal grains, they will eat almost all foods consumed by humans and domestic pets. A mouse's daily food requirements are small, only about 1/10-ounce (**1/2** teaspoon) of food and **1/5-ounce** of water per day for survival and much of that water can come from food they eat. Mice are sometimes difficult to poison because they will only nibble on small bits of food from many locations. Unless the animals can be somehow encouraged to heavily feed on poison bait, they may not get a lethal dose. And, only eating small amounts of bait may only cause mild discomfort and make the bait repulsive to them. Some animals have definite food preferences and will not eat bait at all.

Mice are most active after sunset but are sometimes seen during the day when, in severe infestations, there is extreme competition for space between mice.

Activity habits are different between native and exotic mice. Native white-footed mice occupy a home range area of about **1/3** to 4 acres and may travel 200 or more feet from the nest to a food source. They do not hibernate but are less active during winter. Exotic house mice have much smaller ranges, seldom travel more than 20 feet from their nest site to a food source, and are active all winter.

Mice are strongly attracted to the warmth, shelter, food, and water offered by occupied human structures. Outdoors, native mice are most numerous during late summer and competition between animals for nest sites becomes high with the onset of cold weather. This is when animals begin to enter buildings, however many mice that move into buildings during the fall will continue to feed outside on natural foods until winter. With the return of warmer spring weather, adult mice begin producing young. Shortly thereafter, rodent problems in buildings seem to suddenly come to an end when most animals return to outdoor habitats where they remain during summer.

RATS

The principal indoor rat-sized pest in the Eastern part of the country are Old World rats. The most common, rat-sized structural pests in the West, are native wood rats, squirrels, and chipmunks. Both native and exotic rats quickly adapt to nearly all living environments provided them by humans (granaries, fields, sewers, attics, basements, etc.). Old World rats, similar to exotic mice, often live most of their lives inside buildings. In the West, chipmunks, wood rats, some ground squirrels, and tree squirrels may nest inside buildings, attics, crawlspaces, chimneys, etc. (especially during winter), but usually feed outside and seldom enter occupied portions of a building.



Old World female rats become reproductively mature when about 3 months old and can produce an average of 20 surviving young per year. Native rat-size rodents are less productive than mice but females can usually raise 3 to 4 surviving young each year.

Rats eat the same general foods as do mice but, being larger animals, require about 1-ounce (2 tablespoons) of food and **1/2** to 1-ounce of water per day for survival. Like mice, a water supply is not as critical as food because most water comes from their food.

Old World rats are **very** agile and can leap 3-feet straight up or 4-feet horizontally. They can also climb the outside of a **3-inch** diameter pipe, walk on wires between buildings, swim **1/2-mile** of open water, tread water for days, swim up-current in sewer lines and through toilet traps, and survive a fall of more than 50-feet. Native rats (tree squirrels, wood rats, chipmunks, and some ground squirrels) are also very agile.

Rats have powerful teeth and are able to gnaw holes through concrete block, aluminum siding, adobe brick, wall board, plaster, wood, and various other durable materials. Usually, there must be an exposed edge to gnaw; smooth surfaces limit their ability to initiate holes.

Although rats are much larger animals than mice, they can squeeze through holes only **1/2-inch** in diameter.

Old World rats usually **range** within about 100 to **150-feet** of their nest. They may sometimes nest indoors and forage outside for food - or - live outside and forage indoors. Native rats have relatively large forage areas and can move long distances from an indoor nest site to a food source.

INSPECTION

The underlying causes of most rodent infestations in buildings are structural defects (deficiencies such as holes, cracks, and gaps) which allow animals to enter. These defects can be discovered by routinely inspecting buildings. Observations made over long periods of time (**monitoring**) provides additional information on: the relative effectiveness of control efforts, changes in the numbers of animals present or renewed rodent activity, locations of greatest rodent activity, changes in the amount of food or shelter available for rodents, changes in the rates of structural deterioration, and other helpful information.

These two terms, “**inspections**” and “**monitoring**”, commonly used by pest control workers, are sometimes confusing because they describe what seem to be similar activities. The difference is:

INSPECTION

A comprehensive initial evaluation where the “inspector” looks for presence of rodents and rodent signs, conditions favoring them, and potential sources of rodent access into buildings.

MONITORING

A continuing activity that identifies and evaluates conditions over time including re-infestation and new sources of rodent access which have occurred since the last evaluation. Monitoring will be discussed in the section following the discussion of rodent control methods.

BACKGROUND INFORMATION FOR MAKING RODENT INSPECTIONS

Rodent infestations were studied in 1994 in a number of buildings in 3 National Park Service areas. Both interiors and exteriors of buildings were inspected for rodent activity, conditions favoring such rodent activity, and for structural defects allowing rodents to enter. The studies showed it is common to be able to initially trap animals outside of a building and then later recapture the same animals inside the building. Animals first captured on the outside were often later re-trapped on the inside. This study showed the ability of animals to move between building exteriors and interiors.

After identified sources of rodent access into buildings were repaired, overall rodent infestations decreased by more than 90 percent compared to similar structures not repaired. In most of the repaired structures no rodent activity was detected. This study clearly shows that identification of defects followed by relatively simple mechanical repairs can SIGNIFICANTLY reduce or eliminate rodent problems in most buildings.

To adequately rodent-proof structures takes knowledge of rodent behavior, great care in identifying and eliminating sources of rodent access and periodic **followup** to ensure all sources of rodent access were eliminated and no new sources were created through repair or replacement of utility lines, plumbing fixtures etc.

Information derived from inspections is very helpful to follow-up control programs. Information an inspector should gain and describe in a written inspection report include:

- the kind, extent, and severity of the rodent infestation,
- locations where rodents may be entering the building,
- any possible supporting reasons for the infestation,
- the presence and location of major rodent activity and harborage areas, and
- recommendations for the safest and most appropriate rodent control strategies.

SAFETY NOTE. Because of the recent reognition of Hantavirus (Sin Nombre Virus; HPS), anyone performing rodent inspections or monitoring duties and who might come in contact with dead or live rodents or rodent debris should follow all of the U. S. Center for Disease Control (CDC) guidelines

for personal safety and wear unlined rubber or plastic gloves and goggles'. Workers should wash their hands in disinfectant soap and water before removing gloves. In areas where Hantavirus has been **confirmed** present, persons cleaning up rodent debris or removing rodents from traps should follow those same CDC guidelines for personal safety (gloves and goggles) but also wear coveralls, rubber boots or disposable shoe covers, and appropriate respiratory protection (a half-face mask with a high efficiency particulate air **<HEPA>** filter).

INSPECTION EQUIPMENT

A clipboard, pencil or pen, and inspection forms are necessary for recording inspection findings. A bright flashlight should be used during inspections even in daylight hours. The light helps concentrate one's focus and better illuminates rodent sign, structural deficiencies, and likely harborage. Other useful pieces of equipment may include: a hand and extendable inspection mirror; tape measure; Polaroid, 35 mm, and/or video camera; Phillips and slot screwdrivers; step ladder; compass; colored sticky labels (to mark areas needing repair); and a hard hat and knee pads if sub-floor or attic areas will be entered. Sometimes, an electronic moisture meter, stud finder and/voltage detector; pocket-sized tape recorder, jeweler's eye loop, and long forceps are also helpful.

BUILDING EXTERIORS

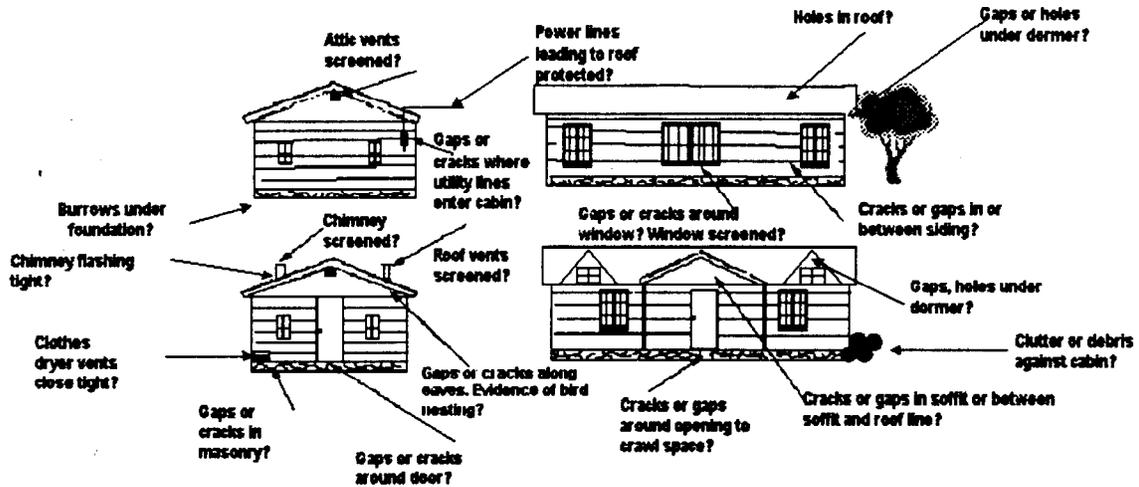
Exterior inspections of buildings should be made at least twice a year (once during spring to evaluate winter damage and a second time during the fall before rodents try to move into buildings). The two inspections should document any new structural defects or building repairs/accidents which may have opened new points of entry for rodents.

The first step in making an inspection of a building is to prepare a rough drawing of the building exterior. Show all major features where pests might find entry (Figure 1). These may be access points for electrical and plumbing service lines, doors and windows, crawlspace and basement openings, window wells, porches and decks, dormer corners, chimneys, etc. Also note on the drawing an arrow to indicate the direction North, the point on the building where you begin the inspection, and a curved arrow to show the direction you moved around the building during the inspection.

From a point of beginning, slowly and systematically examine the entire building exterior from the ground to the roof while looking for defects that could allow for rodent entry. When defects are found, note their locations on the drawing and describe them as possible rodent entry points. The aim of an exterior inspection is to obtain as much information as possible on any ways rodents might enter and on any existing conditions in or near the building which might support or attract rodent activity. Normally, deficiencies seen on building exteriors will give clues as to what will be found inside.

This all sounds easy but many inexperienced inspectors miss or under-evaluate the importance of defects rodents are able to use to enter a building or fail to recognize conditions supporting rodents. Understandably, it would be difficult to try to list here all of the many elements which **could** be found in the wide variety of existing building styles. Model inspection forms, for both interior and exterior inspections, are found in Appendix A. They will help in developing forms specific to needs. The following descriptions offer general guidance in some of the major deficiencies to look for. Sections of the manual that follow will discuss recommendations for repairs and specific repair materials.

Figure 1

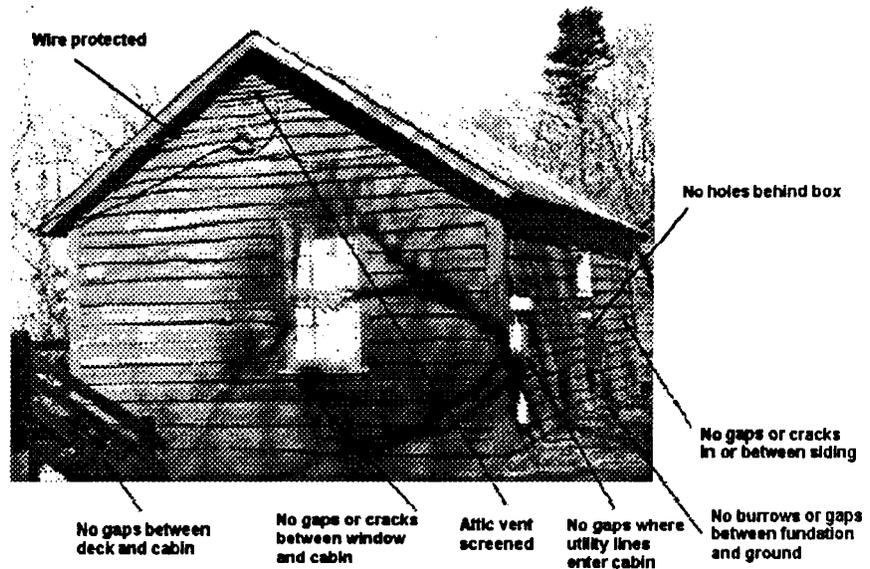


General Building Exterior Carefully check the siding, eaves, soffits, cornices, gables, porches, chimney or furnace clean-out ports, loading platforms, and all other external areas for cracks or holes which are **1/4-inch** or more in size (Figures 2-4). Carefully check around porches and decks adjoining the building, dormer corners, and chimneys, for any holes, cracks, or gaps which could allow rodent entry. The corner joints and cracks in log buildings require careful inspection. Check to see that exhaust flaps on clothes dryer vents close easily and are not blocked open by lint. When doubts occur **as** to whether or not to list borderline-sized holes, mark them anyway. A repair crew will follow most inspections and it will take them very little time to fill a few extra holes to assure the building is adequately sealed. Record the locations and severity of all defects found on the structural drawing.

Report any piles or stacks of lumber, firewood, rocks, trash, debris, vegetation, or tree stumps found within 50 feet of the building (Figures 3 & 4). Make note of **any** shrubs with thick bottom leaves and stems that could provide shelter to rodents. Take note of tall vegetation growing next to the building; the wider the vegetation-free area around buildings, the better. Watch for "vegetation ladders" (shrubs or trees touching or overhanging a building) rodents could climb to get onto the building.

Watch for standing water near buildings, leaking pipes or hydrants, and inadequate water run-off (grade) from buildings.

Figure 2



Foundations

Foundations are particularly vulnerable to rodent attack (Figures 4 and 5). Look for cracks and holes in or under foundations, improperly fitting crawl space or basement doors, openings around window wells, etc. Watch for signs of rodent activity next to buildings as shown by fresh burrowing activity, burrows that lead under foundations, rodent runways along walls, plants damaged by rodents, rodent tracks and droppings, rodent feeding stations, gnawing damage on structures, harborage for rodents (debris or tall vegetation), etc.

Doors and Windows

Doorways are one of the most common places rodents enter buildings. The animals are drawn to outside doors, especially those with lights that attract night-flying insects and bats. Check doors and screen doors for self-closing springs, doorsweeps, and screening made from metal and not loose or damaged. Carefully check around exterior door frames, thresholds, and windows for cracks and gaps (Figures 6 and 7). Examine closed doors from the inside of the building during daylight hours to evaluate the size of any holes admitting light.

Service Lines and Breaker Boxes

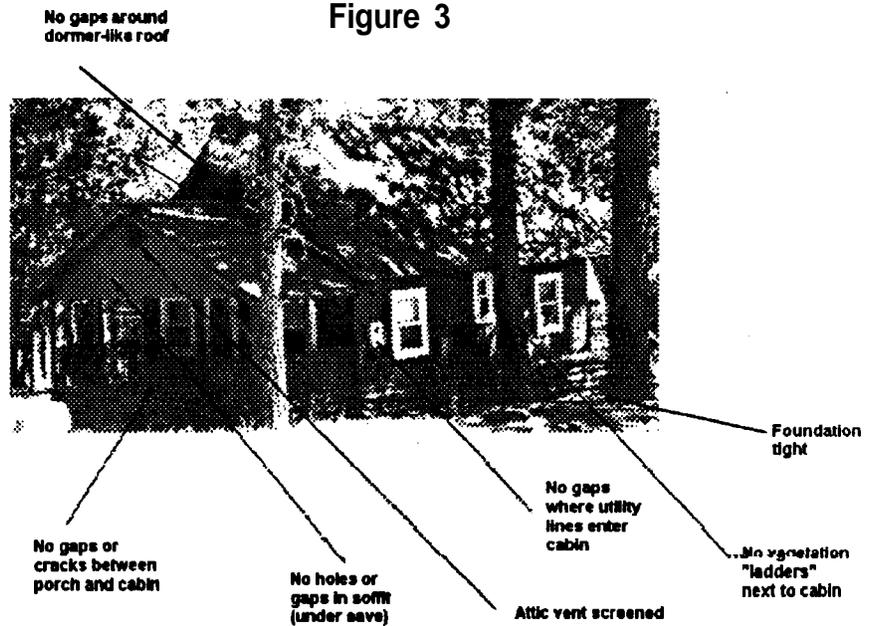
Gaps and holes around electrical, plumbing, and gas line entering the building are ideal entrance points for rodents (Figure 8). Check to see that there are no holes or gaps larger than 1/4-inch around where electrical lines and pipes pass through walls. Check to see if electrical breaker box doors fit tightly.

Roofs, Chimneys and Vents

Use a ladder to examine soffits, gables, and to inspect the roof (Figure 9). Check to see chimney and vent flashings are tight and fireplace chimneys are capped when not in use or covered with a commercial rodent-proof chimney cover. Verify that all vent pipes are screened with **1/4-inch** mesh hardware cloth or appropriate exclusion devices. Look for gaps around

heating and air conditioning units and vents. Be sure the open ends of corrugated metal and Spanish tile roofing are sealed. Check the general condition of the roof for defects and possible water leaks or depressed areas that might hold water. Take note of cables or electrical lines leading to the roof and of any overhanging vegetation.

Figure 3



Attics and Crawl Spaces

It is difficult to find suspected rodent entry points from the exterior of an attic or crawl space (Figures 1 and 2). The best method for inspecting these areas is to enter them during daylight hours. Then, turn off all interior lights; possible entry points will be visible at locations where light enters from the outside. If holes in the roof are seen, insert a plastic straw or other thin item through the hole and return to the top of the roof and mark the locations.

Garbage

Odor from garbage disposal areas attract rodents to buildings (Figure 10). Examine garbage containers and surrounding areas for obvious rodent activity and poor sanitation (garbage on the ground, improperly washed concrete pads), garbage cans located too close to buildings, and loose-fitting garbage can or dumpster lids. Rodents must be kept from feeding on garbage. Poor sanitation practices that support rodents should be noted in the inspection report and brought to the attention of building residents or managers.

HOUSE TRAILER EXTERIORS

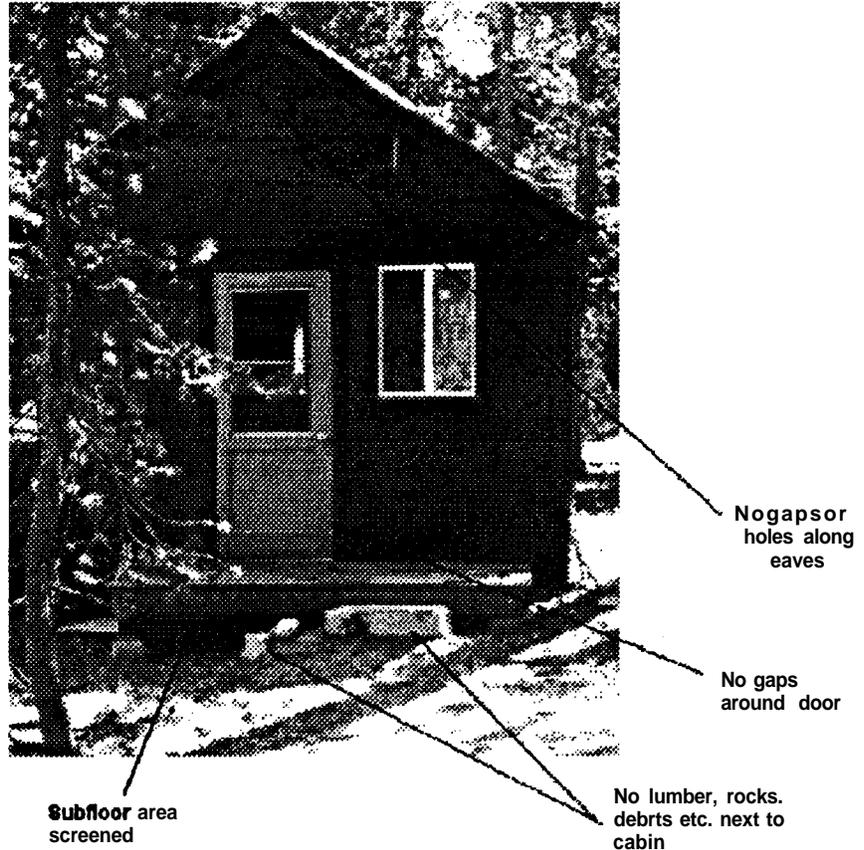
The inspection of house trailers (whether used for offices or residences) are not greatly different from other buildings (Figures 10 and 11). However, trailers are more difficult to rodent-proof because of materials and methods used in construction and subsequent repairs (commonly seen in the crawlspace) which have damaged the integrity of the floors. Since it can be quite difficult to seal the bottom of a trailer, the exterior inspection must center on ways to keep animals from entering the structure from the outside. In addition to items noted above, be particularly watchful for the following.

- The foundational skirting of the trailer must not have any sags, gaps, holes, or cracks which could admit rodents into the crawlspace beneath the trailer. If the trailer does not have a concrete (or other) rodent-proof foundation, the bottom of the skirting all around the trailer must be protected with a curtain-wire barrier, (see Exclusion section) to keep animals from digging under it.

- Holes are commonly found around the trailer tongue when it has not been removed. Inspect the tongue area carefully for holes rodents could use to get into the crawlspace or walls.

- Electrical, water, gas, and (sometimes) sewer lines enter a trailer through or under the skirting. Check carefully around all service lines for gaps and holes.

Figure 4



- Hot water heater closets on most trailers open to the outside, have pipes and wires that penetrate into the crawlspace, and are locations where rodents frequently enter trailers. Carefully examine hot water heater cabinet doors for **warpage** or damage and thoroughly examine cabinet interiors for holes or gaps that could allow animals to enter the trailer. It is not uncommon to find considerable wood rot in hot water heater cabinets. When bath tubs and plumbing repairs are made, workman sometimes fail to seal holes they make.

- Check all exterior doors for tight fit and check all windows for intact glass and screens. Exterior trailer doors are made of metal and **often** become bent during use and do not properly close. Temporary trailer residents sometimes remove window glass or make holes in screens for electrical extensions.

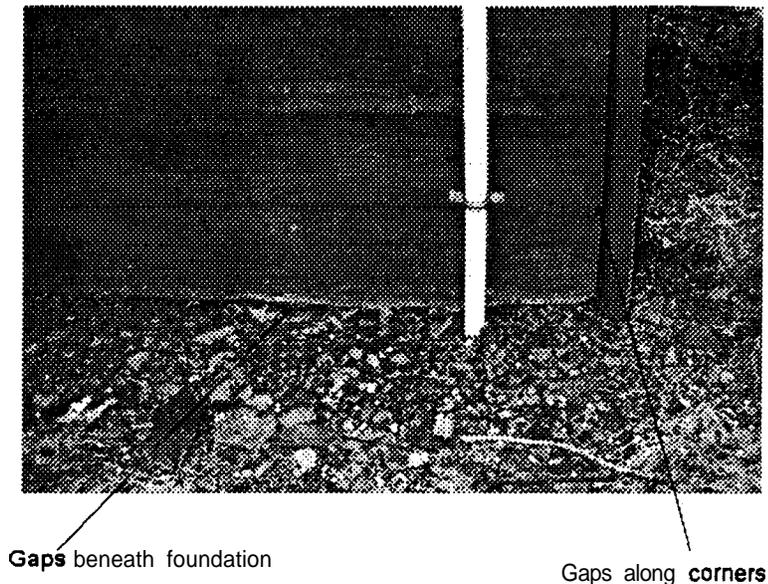
- Carefully check all roof-mounted air conditioners and other appliances to see flashings are tight and units are adequately screened with **1/4-inch** mesh hardware cloth. Check to see that roof ventilation vents are screened and close tightly and are not partly open because of an

electrical extension line or water line leading to the outside.

Figure 5

BUILDING INTERIORS

Similar to exteriors, building interiors should also be inspected at least twice a year. In addition, it is desirable to continually monitor building interiors to detect the presence of rodents or any changed conditions that could attract rodents or allow them entry. Changes in structures and the habits of occupants can come about quickly and, once introduced, rodent infestations are **very** difficult to control.



An interior building inspection is normally performed after inspecting the building exterior. Interior inspections require the same careful, methodical examinations to be able to detect: places where rodents can enter; food, water, and harborage available to animals; signs of rodents; and sanitation practices (or habits) which might support rodents or allow them entry.

With a rough drawing of the building's interior floor plan-in hand (Figure 12), begin at an identifiable point on the inside (usually, the front door) and systematically progress along each wall and through **all** rooms: living rooms and bedrooms, kitchens and lunch rooms, bath rooms, boiler and furnace rooms, storerooms, offices, locker rooms, garages, attics, etc. Look for any possible points where rodents could enter and for conditions that might support their presence. Record defects found on the inspection report and/or building floor plan.

Finding Rodent Entry Holes

Thorough interior inspections is essential since rodents can enter rooms through any small hole, crack, or gap - just **1/4-inch** or slightly larger which connects room interiors with the outside or with wall, floor, and ceiling voids or crawlspace and attic areas. The most common entry places are under doors and through the "larger-than-required" holes in walls and floors (chases) provided for passage of electrical, water, gas, and sewer lines and vents and conduits. Carefully check all, thresholds and pipe and electrical chases. Holes and gaps around stone or brick fireplaces are also common entry places for rodents. Other, more difficult-to-find entryways may be hidden in dark comers of rooms and closets; behind or under built-in cupboards and around hot water heaters, radiators, furnaces, dish and clothing washers, and stoves. Use a flashlight to examine all comers and closets; remove and inspect behind and under the lower drawers of cupboards; and inspect around appliances.

If evidence of an active rodent infestation is found in a room, it is very important to concentrate efforts on finding where the animals entered. Beyond the initial inspection, this may require follow-up inspections after placing out rodent traps, bait stations, or non-toxic tracking stations (wheat flour, talc, or corn starch sprinkled on the floor or on small boards around the room) to show those areas most used by rodents. Closing interior doors between rooms at night will limit rodent activity and to find points of entry.

Figure 6



Finding Food and Water Available to Rodents

Watch for any sources of food or water available to rodents. These may be found in desks, kitchens and snack rooms, around pop and candy machines and coffee stations, indoor storage of empty aluminum cans destined for recycling, dead insects or rodents on sticky or snap traps, bars of soap in restrooms, garbage left overnight in buildings, broken packages or spilled foods in storage cabinets, open drains or leaking pipes, etc.

Check under threshold for gaps or cracks

Check around door frame for gaps or cracks

Always be on the lookout for rodent feeding stations when making inspections. These are **semi-hidden** sites where rodents feel it is safe to eat food they have collected from other locations. Usually, feeding stations are located in protected room corners; under or behind the bottom drawers of kitchen cupboards; under stoves, refrigerators, or sinks; and under or behind furniture. The stations **are** recognized by finding a greater than normal amount of rodent feces and urine deposits in some spot or finding remnants of a variety of foods (candy wrappers, nut shells, etc.) in a given location. The food remnants found in feeding stations can offer helpful clues for the need to inspect other locations for rodent activity. Determine if there are any sources of moisture available to rodents and other pests. Ask building occupants if they have known water leaks; be on the lookout for moist areas, swollen wood, and cracked paint. If

necessary, use a moisture meter to check walls and floors for suspicious excessive moisture which may be coming from leaking plumbing, improper grade or drainage, clogged drain traps, condensation on cold pipes or windows, humidifiers and dehumidifiers, fish tanks, potted plants, etc. The presence of continual moisture supports mold, fungus, slime, lint, and insects (fungus-feeding beetles, flies, mites, and centipedes) and spiders and scorpions - all of which can be a source of food and water to rodents. Correcting sources of moisture in a building is not only important for pest control but also for the continued life of the building.

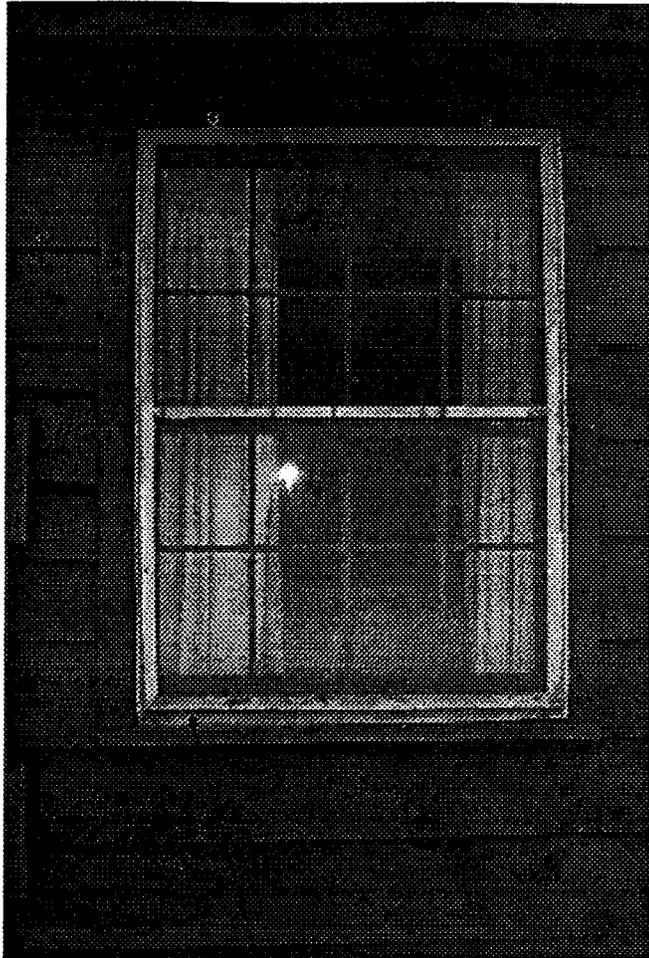
Note on the inspection report any poor sanitation practices which promote rodent infestations and bring these to the attention of building residents or managers.

Finding Rodent Harbor-age

Use a flashlight to look for areas offering shelter to rodents. Such areas will be found inside cabinets, in and among boxes and other items stored on floors, under dressers and chests of drawers, behind and inside machinery (kitchen appliances, water coolers, etc.), around hot water heaters and furnaces, and in employee lockers. Sometimes overlooked sources of rodent harborage and activity are found under the lower drawers in kitchen cupboards or stoves, in refrigerator drip pans and coils, inside upholstered furniture or furniture having hollow legs, in attic and store room clutter, inside wall voids, and inside of electrical motor and computer cases.

Check to see that boxes and other items sometimes stored on floors are placed on shelves or pallets that are elevated off the floor 6 or more inches. Moving items up off the floor and away from rodent activity eliminates hiding places, allows floors to be cleaned and inspected, and

Figure 7



Check around window frame for gaps or cracks

Figure 8

provides locations for placement of rodent traps.

Finding Evidence of Rodents

A good suspicion of the presence of mice in closed rooms can be had when detecting the unusual and easily recognized, musky odor left by mice. Building occupants are usually more than happy to discuss with you where they have seen mice in the building or where mice have gotten into their foods. Be watchful for such signs of rodents as feces, partially eaten nuts, candy wrappers, shredded paper, etc.



HOUSE TRAILERS INTERIORS

Methods and used in constructing and setting up house trailers can leave many small holes available to rodents that allow them to get into the maze of inter-connecting open spaces (voids) behind walls and ceilings and beneath floors. Once inside voids, the animals usually find a way to enter living spaces. Interior inspections of house trailers are very important and must check all of the items previously noted for other structures and also particularly note the following (Figure 12).

Check for gaps or holes around electrical, plumbing and gas lines entering the cabin.

- Carefully check all points **where gas, water, electrical, and drain** lines and vents penetrate floors, ceilings, or walls. Open gaps around pipes **are** often found under the kitchen sink are usually open. Check for loose pipe escutcheons which do not properly seal the chase around incoming water lines. If the hot water heater is located inside the trailer, carefully check the interior of the cabinet for openings. Look inside the kitchen cupboard above the stove for gaps around where the stove vent penetrates the top of the trailer ceiling. If the kitchen vent leads out through the side of the trailer, be sure that the louvers properly close or that the open end is screened.

- Thoroughly examine the interior of built-in furnace cabinets for gaps or holes. Look for rodent **feces** or other evidence of their presence inside floor-mounted heating registers. Rodents sometimes gnaw through plastic heating ducts in the crawlspace and can then move up into rooms through heating registers. Sometimes, heating conduits under the trailer are open and not even attached to the furnace. Look for openings on ceilings and walls around **air** conditioning installations. Look for gaps around where the furnace vent penetrates the upper-most portion of the trailer ceiling; this may require removal of a ceiling and/or wall panel.

- Check for gaps around clothes washing machine pipes **and** bibs. Inspect the exhaust flaps on clothing dryer to be sure the louvers are not restricted by lint build-up. If the clothing dryer is vented to the crawlspace, inspect the vent line for possible holes. If a clothing washer and/or clothing dryer are not present, verify that pipes and vents are tightly sealed.

Figure 9



Check roof for defects such as holds or cracks and depressions that allow water to puddle.

Check vent pipes to ensure they are covered with 1/4 inch mesh screen or other appropriate • xclusion device.

Check chimney to ensure flashing is tight and it covered with • commercial frodent-proof device or capped when not in use.

- On many trailers, the main electrical circuit breaker box is mounted on a wall in a bedroom. Check to see the box is properly installed and does not have open spaces around or inside of it.

- If evidence of rodents is found inside the trailer, carefully inspect the interiors of upholstered furniture for possible nesting sites.

PREVENTION AND CONTROL OF RODENT INFESTATIONS

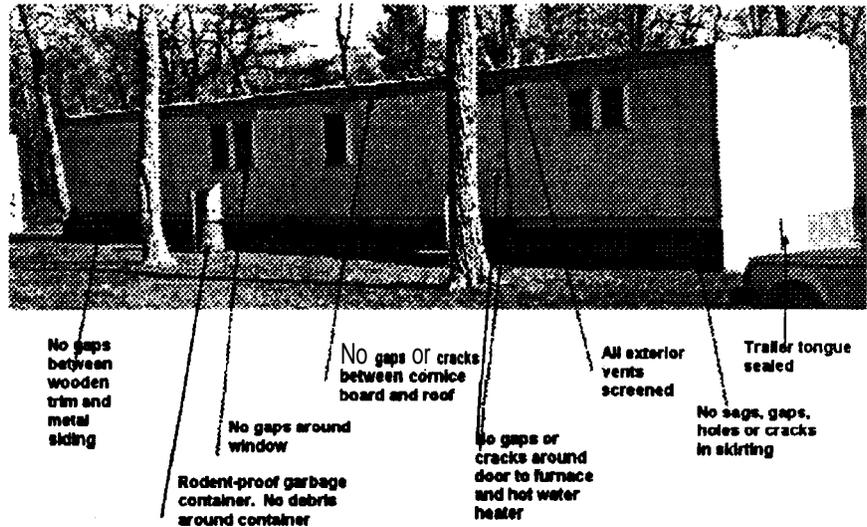
The second step in preventing and controlling rodent infestations is to exclude rodents by correcting defects in the building. Some types of building construction (or when there are mandates to maintain a given historical appearance) may not allow building exteriors to be altered to prevent rodent entry. If so, rodents will enter the inner structure of a building and move around in open spaces behind walls and floors (voids) but the animals can usually be kept out of interior (living or working) spaces by carefully sealing all possible points of entry. The needs for exclusion in rodent control are evident.

Excluding Rodents

Exclusion (**or, rodent-proofing**) is the most important, most effective, and most permanent method to prevent and control rodent infestations. And, it is rather simple: eliminate (or minimize) all holes, cracks, and gaps of **1/4-inch** size or larger where rodents can enter or leave buildings, rooms, or equipment or where the animals can reach food, water, or shelter. It is usually easy to be able to find a good number of those entry points in buildings, especially in buildings with active rodent infestations. Common points of entry are those beneath exterior doorways; around water, electrical, gas, vent, and sewer line chases; through unscreened pipes, exhausts, chimneys, and vents; through broken screens and through gaps in window and door facings; under/through building foundations and trailer skirting. The importance of closing such passageways was shown in the 1994 study of rodent infestations in 3 national **park** areas. That study reduced rodent infestations

Figure 10

in structures by more than 90 percent with , good exclusion methods. The work, done by maintenance crews with no specialized training in rodent control and at an average cost of about \$600 per structure, only used standard construction methods and materials. Descriptions of various rodent-proofing materials are noted at the end of this chapter.



It must always be remembered, however, that exclusion is never Permanent. Continual and on-going inspection, exclusion, sanitation, and monitoring are required to keep buildings tight enough to prevent or control re-infestations and to deprive rodents of food and harborage.

BUILDING EXTERIORS

Sidings and window and door frames

Most small holes and cracks in building siding can be filled with painter's caulking (Figure 13) of an appropriate color or painted after the caulking dries. Larger holes may require a filler (such as wire mesh or foam) before applying caulking. Expanding foam (Figure 14), sometimes used for **difficult** to seal cracks, is very messy and expensive **material** to work with and its use requires **follow-up** after it dries. The foam breaks down under sunlight and **presents** an unfinished appearance unless it is sealed with paint or caulking.

Holes with large open spaces behind them (voids) which prevent the use of fillers, such as holes made through sidings by squirrels or woodpeckers, are usually covered with thin, galvanized sheet metal and then painted. When attaching sheet metal, be sure all edges **are** securely attached.

Utility Lines

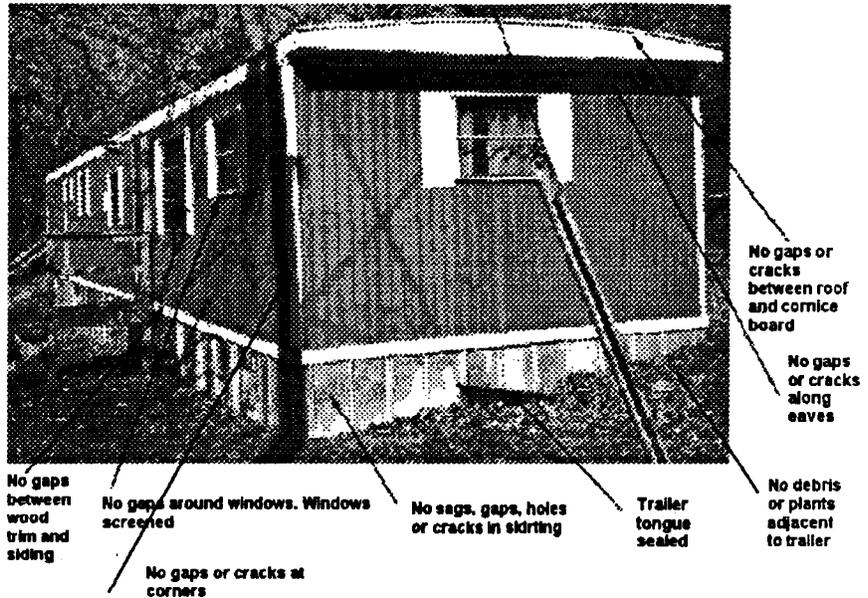
Most of the many small gaps and holes around electrical lines, plumbing and drain pipes, conduits, gas lines, air conditioners and ducts, and TV lines which enter the building can be sealed with caulking compounds, hardware cloth, or sheet metal (Figure 15).

Sheet metal is sometimes used to fabricate conical or flat, rodent-proof guards around wires to prevent animals from climbing onto roofs.

Vents and chimneys

Where permitted and safe, screen open ends of plumbing, exhaust, heating and air conditioning vents and other pipes with **1/4-inch** hardware cloth (Figure 9). Terminal ends for clothing dryer vents are available that exhaust the air vertically rather than horizontally and seem more effective in excluding rodents than the usual flapper-type vent ends.

Figure 11



Install commercial, rodent-proof chimney guards over fireplace chimneys if hardware cloth could cause a fire hazard (Figure 9).

Doors and windows

Most small holes around door and window facings can be filled with painter's caulking of an appropriate color or painted after the caulking dries (Figure 16). Install metal kick plates (Figure 16), tight-fitting door sweeps, or metal thresholds (Figures 16 and 17) on all exterior doors that allow no more than **1/4-inch** clearance between the door and floor. Windows must properly close and have intact screening, preferably made from metal (Figure 18). Seal all cracks or gaps around window and door frames with caulking or repair the facings.

Foundations and trailer skirting

Repair cracks in stone and cement foundations with concrete or mortar (Figure 19).

If rodent burrows are found that extend under foundations or trailer skirting, animals must be removed (by trapping or other means) before exclusion devices can be installed. Following removal of the animals, protect the entire perimeter of foundations or skirting with a buried "L-shaped" hardware cloth "curtain-wire barrier" (Figure 20). This is an "L-shaped" piece of **1/4-inch** hardware cloth, about **14-inches** wide. The taller, vertical edge of the wire is tightly attached to the building siding about 5 to **6-inches** above ground-level and the other end of the wire is buried below ground-level 2 or more inches. The bottom edge of the wire extending below-ground is bent out horizontally (about 5 to 6 inches) away from the building. The horizontal edge of the below-ground wire should be made tight by staking it to the ground every foot or so of length and then covering it with 2 or more inches of soil and rocks. Most animals attempting to burrow under a wall begin digging downwards where the wall meets the ground. The buried, horizontal portion of the curtain-wire barrier extending out away from the wall makes that impossible.

Old World rats are more aggressive in their attempts to burrow under foundations and may require installation of a concrete “curtain wall”. This is an “L-shaped”, 4-inch thick wall of concrete which abuts the foundation. It extends above-ground for 6 to 8-inches and below ground for a minimum of 2-feet. The lower and horizontal portion of the curtain wall extends out away from the building for at least a foot. Although this type of construction can be used for nearly any type of foundation, it is expensive to retrofit to structures because a 2-foot ditch has to be dug around the building and concrete forms constructed.

Attics and crawl space vents

Install tight doors or commercially-available, screened, self-closing vents over attic and crawlspace openings or screen them with 1/4-inch mesh hardware cloth (Figure 2).

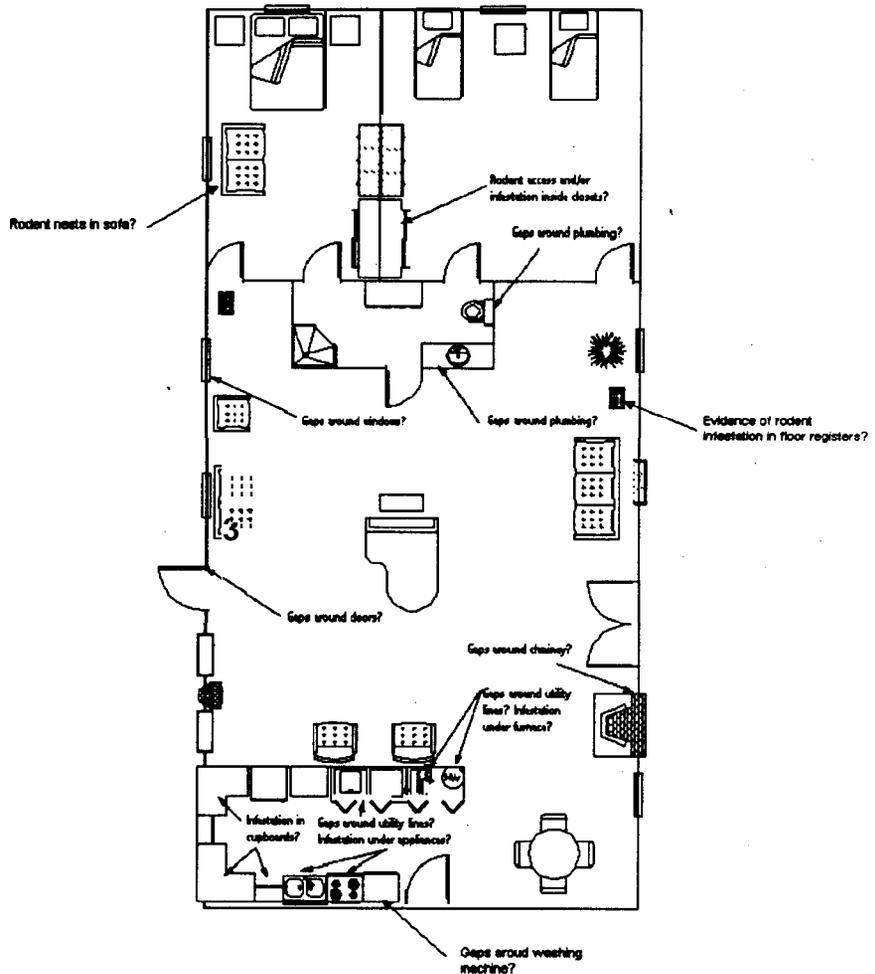
Trailer tongues

Usually, 1/4-inch-mesh hardware cloth wire is the best material to use for closing irregular openings around trailer tongues (Figures 10 and 11). Its use may require considerable ingenuity, however, to find secure ways to attach the wire to both the tongue and trailer siding. Extreme cases may require the use of quick-setting, construction cements or epoxy compounds.

Vegetation

To keep rodents from being able to use vegetation as a way onto roofs, trim all trees and shrubs away from buildings and remove limbs which overhang or come close to roofs.

Figure 12

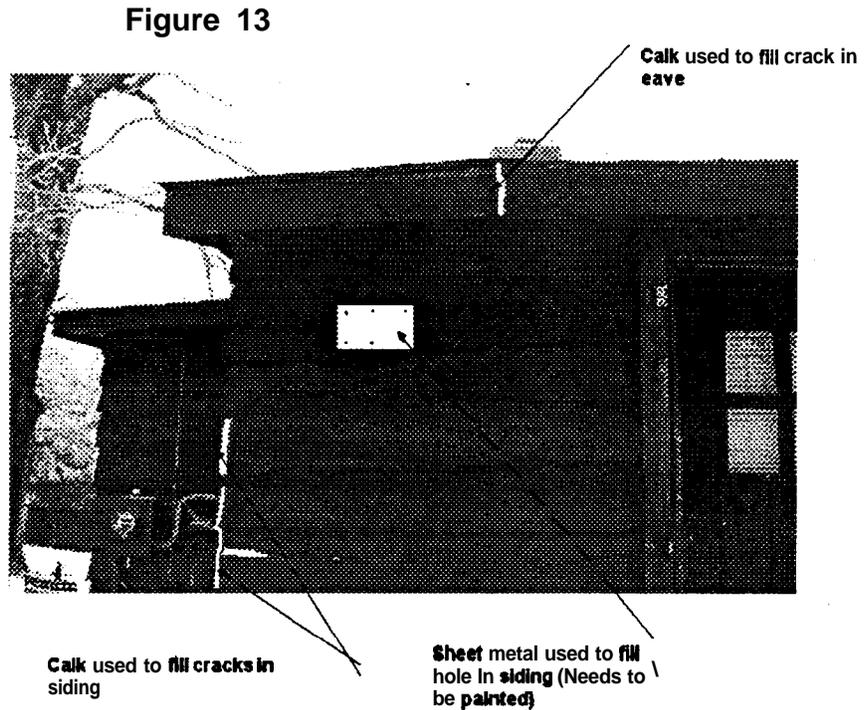


Garbage and trash areas

Repair trash can and dumpster lids so they fit tightly and screen any large drain holes in the bottoms of those receptacles with **1/4-inch** mesh hardware cloth (Figure 10).

Automobiles and machinery

It is impossible to try to keep rodents out of machinery like automobiles, loaders, construction equipment, fire engines, etc. when parked outside. Machinery can only be kept free from rodent damage by parking it in enclosed, rodent-proof garages. The same general guidelines as previously described for other buildings apply to the exclusion of rodents from garages and outbuildings. Specially designed door seals and gaskets are commercially available.



BUILDING INTERIORS

All holes, gaps, and cracks in walls, floors, ceilings, cupboard interiors and around bath tubs or chimneys must be sealed to keep rodents from entering rooms.

Similarly, all open chases and gaps must be sealed around conduits, electrical wires, circuit breaker boxes, water pipes, gas lines, drains, exhaust vents and ducts, air conditioners, or other elements penetrating walls, floors, and ceilings. Different from the exterior, the use of hardware cloth wire or sheet metal to cover cracks and holes inside buildings does not produce a desired finished appearance and caulking, plastering, and/or painting usually has to follow repairs.

Screen floor drains in custodial closets, laundry rooms, and lunch rooms with stainless steel grates having openings less than **1/4-inch** in diameter.

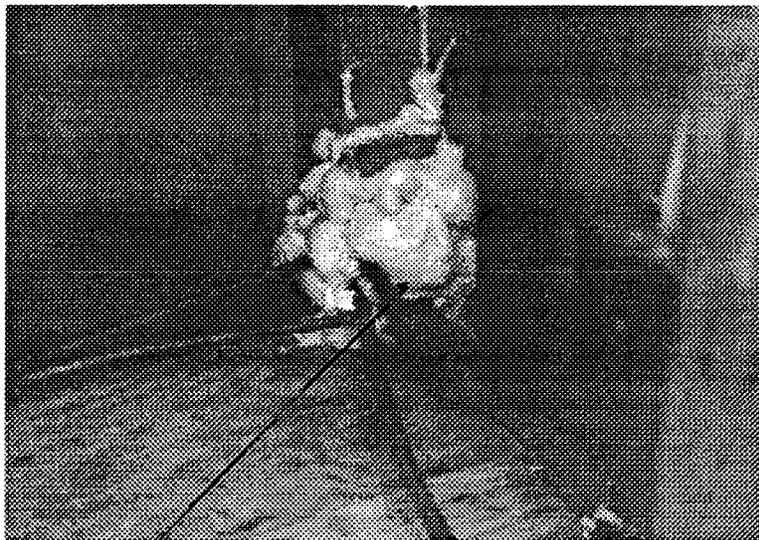
Fit exterior doors with self-closing devices (springs) and reduce the threshold gap to **1/4-inch** or less. Interior doors may also be fitted with close-fitting door sweeps to make it possible to contain or isolate indoor rodent problems to specific rooms or areas.

Install **1/4-inch** hardware cloth over heating registers and cold air return vents if these pathways are used by rodents.

RODENT-PROOFING MATERIALS'

The object of rodent exclusion is to physically prevent or discourage rodent penetration. However, the sharp teeth of rodents are adapted for gnawing and allow the animals to penetrate many commonly used construction materials. Materials selected for rodent proofing must be those that are as resistant as possible to penetration by rodents, used in manners that discourage rodents from penetrating them, and are as easy as possible to work with. Regardless of the materials used, no holes should be left open on the inside or outside of buildings that are more than **1/4-inch** in diameter.

Figure 14



SOLID METAL MATERIALS

Sheet Metal

Galvanized sheet metal, 24 gauge or heavier, is recommended for most general uses to exclude rodents.

"Tyne" Sheet Metal

Some pest control technicians prefer to use a **40-pound** weight, tin-coated steel, called "**Tyrne**" sheet metal. This is soft, bendable (annealed), and can be had with a rosin coating which allows it to readily take paint. Tyrne is extremely animal resistant and comes on a **14-inch** wide by **50-foot** long roll (Follansbee Steel).

Kick Plate

Where necessary, door bottoms can be protected from gnawing rodents by installing a **12-inch**

Expanding foam caulk used to eliminate rodent access where utility lines pass through wall. Needs to be trimmed and painted

¹ Also see Sources for Pest Control Supplies and Equipment in **Appendix B** for the addresses of manufacturers

wide kick plate at the bottom of the door made from 24 or 26 gauge metal (galvanized steel or brass).

Figure 15

Rodent Guards

Flat or Tunnel-Shaped Rodent Guards for single vertical utility lines leading into buildings can be made from sheet metal. Multiple vertical utility lines require more elaborate guards. Protect horizontal lines leading into buildings with **18-inch-radius** metal **disk-guards** set far enough away from buildings to keep animals from jumping from the line to the roof.

Aluminum Coil Stock

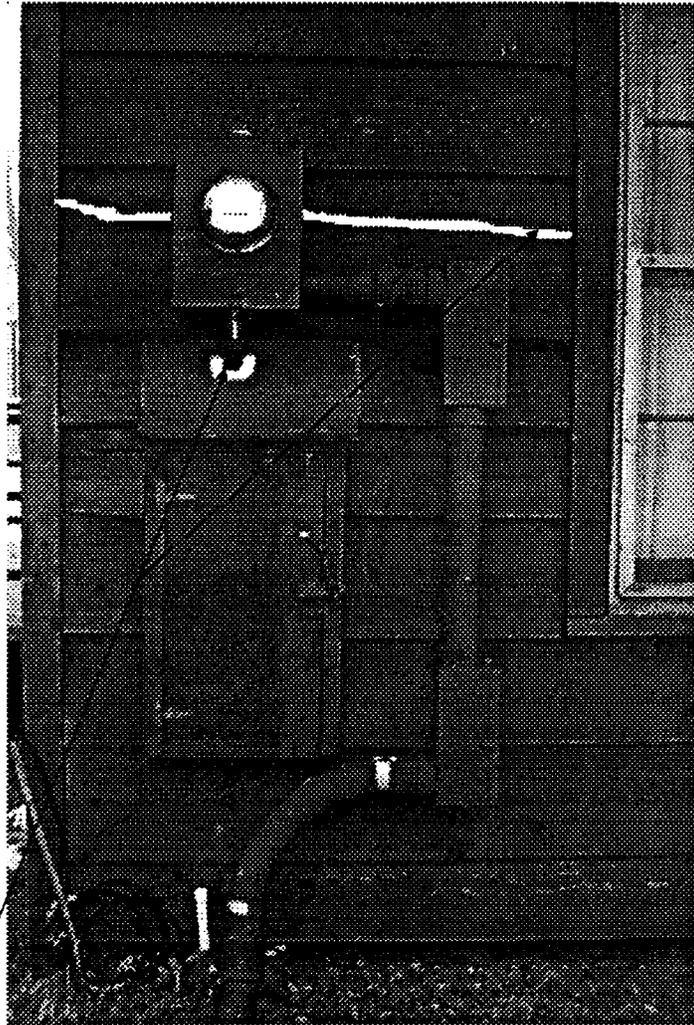
Soft, easily shaped, and excludes birds (except woodpeckers) and bats but mice, rats, and squirrels can easily gnaw through aluminum. If at all possible, use galvanized sheet metal rather than aluminum.

SCREENING MATERIALS

Expanded Metal

Galvanized (non-rusting) expanded metal, 28 gauge or heavier, resembles heavy-duty hardware cloth and, although it is bulky and somewhat difficult to work with, is very resistant to most animals.

Perforated Metal Galvanized (non-rusting) perforated metal, 24 gauge or heavier, is also very resistant to most animals and is also somewhat difficult to work with.



Calk used to eliminate hole around utility line and crack in siding

Hardware Cloth

Hardware cloth is the best and one of the easiest materials to use for screening foundation vents, open pipes and other holes. It effectively excludes mice and most native rats. Light gauge hardware cloth, however, is not entirely resistant to more aggressive animals such as Old World rats.

Use 16-gauge, welded-at-each-joint, 1/2-inch by 1/2-inch mesh, galvanized-after-welding wire screen to exclude larger animals or aggressive rats. This is extremely strong material and will last 10 to 20-years due to its heavy zinc coating.

Use 19 or heavier gauge, galvanized, 1/4-inch (or smaller) mesh hardware cloth to keep smaller animals (mice) out. Covering hardware cloth with metal window screening also keeps insects out.

Stainless Steel Hardware Cloth

Cover floor drains with heavy gauge, 1/4-inch mesh, stainless steel hardware cloth and be careful to not leave any openings around the sides larger than 1/4-inch.

Metal Window Screening

Metal window screening is not an adequate protective material for rodent proofing and should only be used on windows to keep insects out. Plastic window screening does not provide any rodent-proofing qualities at all.

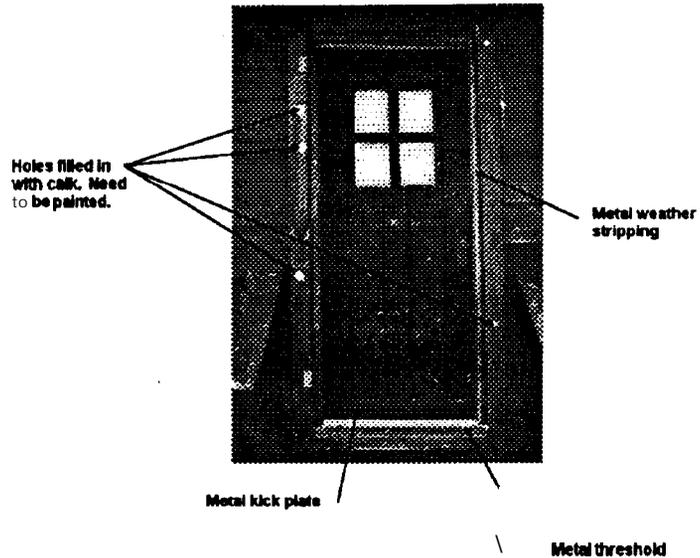
Weather stripping

Many different kinds of weather stripping are commercially available for sealing small spaces between movable parts like doors and windows. However, special kinds of weather stripping can also be had for even unusual applications. Refer to manufacturer catalogs for specific designs needed.

Compression Seals

Compression seals are commonly made from felt, foam, or sponge materials and are not very

Figure 16

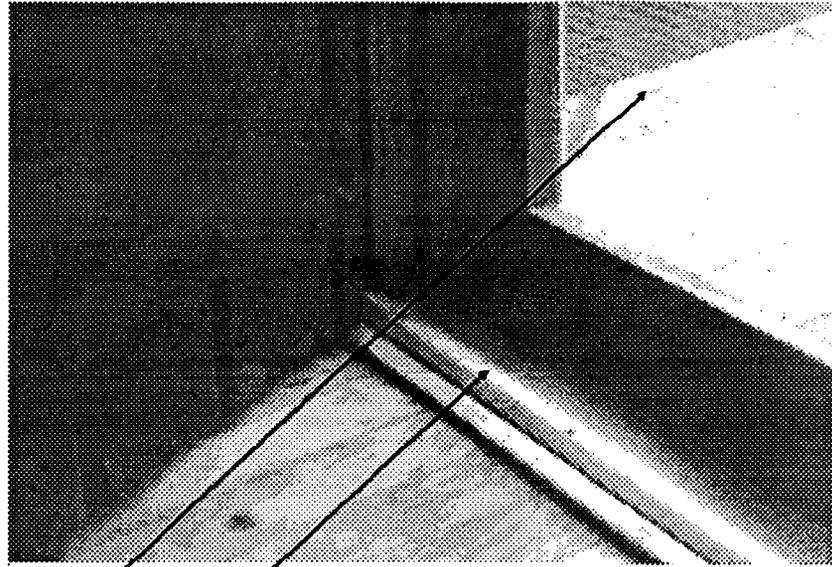


resistant to gnawing rodents. Compression seals are best used for non-uniform **gaps**, are inexpensive, and easy to install; however, they are less durable than other kinds of weather stripping.

“Bump”-Type Seals

Include vinyl tubular gaskets (with or without reinforcing molding) and may be backed with vinyl, felt, wool pile, or foam strips. These are unobtrusive and also suitable for non-uniform gaps. Heavy duty types of seals function better but even these are not resistant to gnawing rodents.

Figure 17



Use a metal threshold to eliminate rodent access beneath door
Use metal screen to prevent rodents from entering

Metal Tension Strips

Come in a variety of designs in brass, bronze, and aluminum wafer-like strips. These are not difficult to install but are not suitable for non-uniform gaps. They are permanent, tight, unobtrusive, and only offer moderate resistance against rodents.

Interlocking Seals

These are made in two pieces and form a double seal on door jambs, door bottoms, and windows. These are relatively expensive and may require installation by a carpenter. They are **not** suitable for non-uniform gaps but are permanent, highly effective, unobtrusive, and offer moderate resistance against rodents.

Door Sweeps

Although frequent repair is required, good door sweeps are one of the most important means for keeping rodents out of structures. To keep rodents from gnawing on door sweeps, install metal kick plates on the outside of doors allowing less than **1/4-inch** clearance to the floor. Gustatory repellents (bad-tasting substances) are sometimes applied to rubber and vinyl door sweeps and seals to keep rodents from gnawing on them.

Door bottom or Threshold Seals

These are compressible rubber or vinyl seals that fit on door bottoms or thresholds. They are relatively expensive and somewhat difficult to properly install but are suitable for uneven gaps.

Common Door Sweeps

These include felt, vinyl, and stiff bristle sweeps which are inserted in a metal holder and are used to weather-seal door bottoms. These are suitable for slightly uneven gaps, moderately priced, and easy to install but are quite visible. Sweeps with elongated mounting holes for screws allow readjustments as the sweep wears. Automatic door sweeps **are** also available; these drop to seal against the floor when the door closes but may require professional installation.

Garage Door Strips

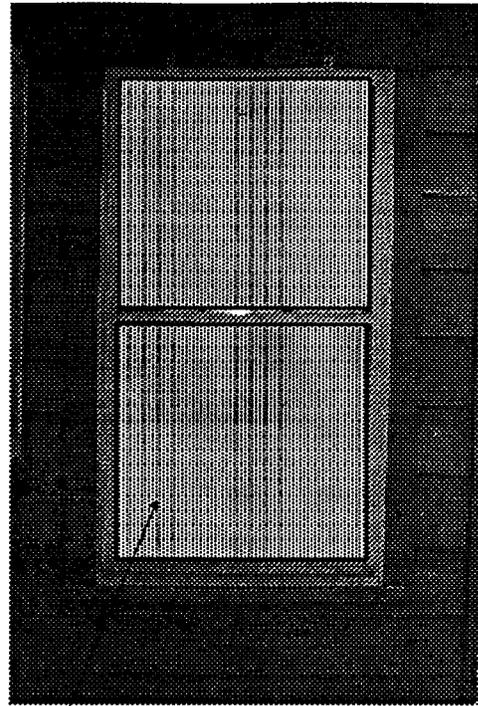
Weather striping used on overhead garage doors are usually either flap-type door sweeps or round, rubber gaskets that compress under weight of the door. Garage door sweeps are suitable for somewhat uneven gaps, durable, moderately priced, and easy to install unless they somehow interfere with the door-locking mechanism. Damage to garage door sweeps and compression gaskets from rodents trying to gain entrance is usually confined to gasket corners which can sometimes be protected with metal flashings.

FILLER MATERIALS

Lath Screen or Lath Metal

This is a galvanized, light-gauge metal mesh and is installed over wooden walls before plaster is applied. This material is extremely malleable and can be wadded up and pushed into holes; it is very rodent proof. Lath screen is galvanized and does not rust/bleed through caulking. This is an excellent filler material and can be easily compressed to completely fill even very odd-shaped holes. After forcing lath screen into holes, slightly expand its sharp edges with a screwdriver to better fill the cracks and force the metal into the edges of the hole. Be careful of sharp edges when handling this material.

Figure 18

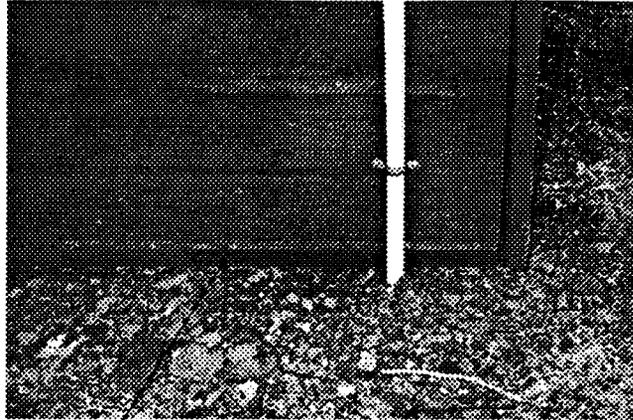


Use metal screen to prevent rodent access through windows/doors

Figure 19

Steel Wool

If steel wool must be used, only use 00-size material. Steel wool is a good and easy-to-use filler for small holes but it rusts and cannot be used where moisture is present. Rodents often work their way between the steel wool and edges of the hole; **always** caulk over steel wool to seal it and to make it easier to determine if rodents have penetrated the seal.



Use concrete to seal holes under foundation

Copper Screen

Copper is a soft metal and may be penetrated by rodents. Aluminum and plastic screening do not exclude rodents at all.

Copper Mesh

“Stuff-It” is a compressible copper mesh that is commercially available and is reported by the manufacturer to be rodent-proof. However, it is still best to caulk over holes filled with copper mesh.

CAULKING Use the best available caulking and in colors which match the structure.

Oil resin Based Caulking

This caulking is preferred by some because it is long-lasting (1 to 4 years) and has superior smoothing qualities, even in cold weather. Although easy to apply and inexpensive, oil-resin caulking may discolor, shrink, or poorly adhere to porous (brick) surfaces. It cures slowly and requires paint thinner for cleanup. Oil-based caulking is adequate for filling small holes and cracks which are not subject to stress (between wooden frames and siding).

Latex Caulking

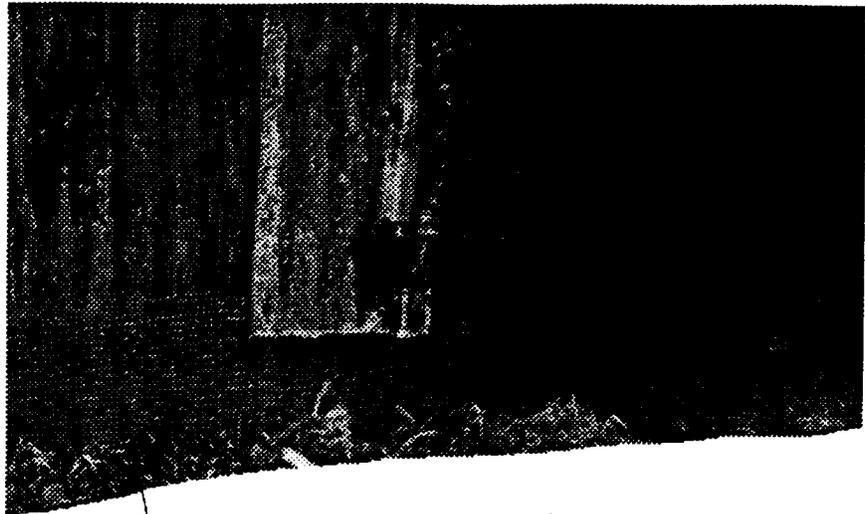
Can be either acrylic or vinyl caulking. Acrylic latexes are good for non-moving joints, last longer, and have better weathering characteristics but are more expensive than vinyl latexes. Both of these products are easy to apply, quick curing, do not stain or bleed, clean up with water, durable (3 to 10 years), have good adhesion, and do not shrink greatly. However, latex caulking may freeze

before it hardens when used during cold weather.

Figure 20

Butyl Caulking

Although this material is slow curing, it is very good for sealing gaps between metal and masonry and for joints up to **3/4-inch** wide and **3/8-inch** deep. Butyl caulking is slightly more durable than latex but is harder to apply. Butyl, however, has good resistance to shrinking, excellent adhesion, and is good for use below **ground-level**. It is flammable when wet and requires paint thinner for clean up.



L-shaped hardware cloth used to eliminate rodent access beneath trailer skirt. One edge bent out from trailer and buried below SON.

Elastomeric Sealants

These materials include silicones, **polyurethanes, polysulfides** etc. They are best used for joints subject to movement (between masonry and wood, metal, or fiberglass siding). Silicones can be used in cracks even larger than 1-inch wide and **1/2-inch** deep and are quite durable (up to 20 years). Elastomeric sealants cure rapidly, are waterproof, remain flexible in a wide range of temperatures, show excellent resistance to shrinking, **and** adhere well to most materials. However, only certain formulations can be painted, they are more expensive than other caulking, and require solvents for clean up.

Asphalt Sealant

This is a tough, outdoor caulking that mice have been seen to gnaw on but not penetrate. This material requires mineral spirits for clean up and thinning. It **stays** flexible between expanding and contracting surfaces; resists oil, grease, salt, and heavy traffic; and sets up tack-free in about **30-**minutes. Color selection is limited.

Roof Cement (in caulking tubes)

This material is softer and thinner than canned roofing cement and easier to apply. The best types contains fiber.

Roof Cement (in cans)

This material is waterproof and pasty. It sticks to nearly everything it touches as long as the items are dry and not dusty. It is available in 1 and **5-gallon** sized cans. This is good material for cementing around chimney flashings and caps because it expands and contracts with changing temperatures. Roof cement lasts twice as long as mortar when applied to clean and dry surfaces and it is relatively inexpensive, compared to other types of adhesives.

Epoxy and Fiber Glass Resins

They can be used as caulking and hole-filling material. These materials are available from auto and boat repair supply sources; many formulations harden quickly and are very durable, **weather-resistant**, and rodent-proof.

MORTAR/CEMENT

Cement and Mortar

Although these materials are excellent barriers to wildlife, they are not practical in most situations because they harden so slowly and require considerable time to mix and clean up.

Cement/Concrete

These materials are good for larger jobs (steps, sidewalks, tuck pointed foundations, chimneys, and barriers around slabs and sidewalks). The best mixes for cement are **1** part cement to 3 parts sand or richer. For concrete, use 1 part cement to 2 to 4 parts sand or richer.

Cement Mortar

This is a mixture of several materials and is designed to be an elastic spacer for ceramics (bricks). Cement mortar it is not as hard as cement, weathers faster, is not a substitute for cement, and not generally recommended for rodent exclusion. If mortar must be used, use a **1:3** mixture or richer.

Cement Patching Powder

This material has similar physical characteristics to cement . Is available in small-sized containers and is easier to mix. Most brands harden in less than 4 hours and provide good to moderate rodent exclusion.

WOOD

Even wooden patches on holes can effectively repel most smaller rodents if there are no gnawing edges (butts, joints, holes, or other surface breaks) where rodents can begin gnawing. Use the smoothest and best grades of wood available.

SANITATION AND HABITAT MODIFICATION

Rodents can be extremely difficult to eliminate from buildings, even when excellent sanitation is practiced. They enter buildings through small, hidden holes, live in extremely confined spaces, and only require very limited amounts of food. To make matters worse, rodents may only nest and reproduce inside structures while satisfying their food needs outside buildings. And, other rodents may actually live outside and only enter buildings to feed. Although it is clear that excluding rodents is the most important key in preventing infestations, good interior sanitation is always important in controlling rodents. Good sanitation practices have tremendous impacts in limiting the size or increase of rodent populations by limiting resources available to them. Major guidelines in good sanitation practices include the following.

INSIDE

Food and -Water

Reduce and eliminate ALL possible food and water available to rodents. Store all foodstuffs (dry pet food, grass seed, groceries, etc.) in glass, metal, or durable plastic rodent-proof containers. Keep indoor and outdoors garbage cans tightly covered, remove garbage from buildings every night, and empty outdoor garbage containers at least twice a week. Promptly remove left-over food not eaten by pets. Check for and remove foods stored in desk, cupboard, or filing case drawers. Continually clean up all crumbs in kitchens and snack rooms and never leave left-over food or dirty dishes out. Do not take food into rooms other than the kitchen or snack room. Do not store empty aluminum cans for recycling inside buildings. Keep stove-tops clean and frequently clean under and behind stoves and behind lower stove drawers. Frequently clean under bottom drawers in built-in kitchen cabinets. Frequently clean lint from refrigerator cooling coils, drip pans, and from under refrigerators. Promptly repair all water leaks.

Harborage

Mice will nest in anything that doesn't move. Continually rearrange furniture, boxes, clothing, etc. to discourage nest development. Store everything up off the floor. Raise hollow-base furniture off the floor on legs or blocks. Remove all stacks of paper or plastic sacks, cardboard boxes, and other items rodents could use for shelter.

Importation of Rodents

Be sure rodents are not imported into buildings from the outside. Animals are sometimes brought in with grocery sacks, boxes, patio furniture, firewood, and **other** items. Do not bring any

more firewood inside than will be immediately burned.

Preventing Rodent Damage in Unoccupied Buildings

Rodent damage occurring over-winter to furniture and contents in unoccupied cabins/houses can be reduced by removing or limiting food and available harborage and nesting sites. Remove bed linens and hang mattresses on taut lines between ceiling beams. Remove padded cushions from furniture and store cushions on edge, separated from one another, and up off the floor. Store all boxes and other materials on raised pallets or shelves. Remove drawers from cupboards or chests, empty them, and re-insert them upside-down. Place all stored food in rodent-proof containers or cabinets.

OUTSIDE

Remove as much grass, weeds, and debris as possible from around buildings. These provide food sources and harborage sites for rodents. If possible, maintain an **18-inch** wide, vegetation-free zone around buildings. Continually clean up all outside and inside clutter/litter. Trim the bottoms of hedges and other ground-hugging plants up from the ground to eliminate rodent harborage. Trim plants that touch or overhand buildings back 3 to 4-feet. Promptly repair all water leaks.

Store firewood, lumber, rubbish, equipment, construction materials, and other items on pallets raised at least **18-inches** off the ground and located at least 30 feet from buildings, walls, and fences.

It is better to place exterior lighting on poles out and away from structures and shine the light back onto buildings from a distance. This prevents the attraction of night-flying insects which can serve as a food source for rodents.

POST-TREATMENT MONITORING AND EVALUATIONS

Continually monitoring for rodents is the last important step in managing rodent infestations. Before beginning a monitoring program, use diagrams of exterior and interior floor plans to identify locations where traps or non-toxic tracking stations will be placed. Assign specific persons to do monitoring and establish a fixed schedule for those activities.

Keep records on the appearance of rodent sign around the outside of structures and any developing structural deficiencies which **could** allow animals to enter a building. Increasing numbers of rodents around a building (resulting from changes in weather or seasonal changes in the amount of food or shelter available to rodents) and newly developed structural deterioration clearly indicate the potentials for rodents to move into structures.

To monitor for possible rodent activity inside buildings, place traps and non-toxic tracking stations in all areas of likely rodent harborage. It was recently found that tracking patches may be a more effective tool to monitor for the presence of mice in structures than either bait stations or traps. Regularly check traps and tracking stations and individually record them on a floor plan drawing along with the numbers and types of rodents captured (or tracking stations showing rodent

activity); Make records of any snapped traps that failed to catch rodents and of traps not snapped that had the bait removed.

Watch for and **record** the presence and locations of any rodent sign (feces, food damage, feeding stations, gnawing damage, rodent holes, etc.) and ask building occupants if they have seen rodents or evidence of rodent activity.

Over time, the written monitoring record will provide very helpful information on the actual presence of rodents, on relative increases and decreases in the number of animals present, and clearly point out those areas in the building where rodent activity is heaviest.

Monitoring records will also show the effectiveness of treatments. This information can be used to show the needs for developing more effective management strategies or control methods.

SUMMARY

Controlling rodents in buildings is very important from the standpoints of both human health and possible structural damage. Rodent control can be an attainable goal but it always demands more than randomly setting out a few traps. Uppermost, rodents **must be prevented from entering the building (or room)**. This demands cooperative efforts between all involved persons (maintenance persons, building occupants, and managers) in frequently inspecting buildings and promptly closing small, seemingly unimportant, holes. And, it also requires good sanitation practices and implementing effective trapping and monitoring programs. None of these measures are complicated nor excessively difficult; however, rodent control is usually unsuccessful when these critical steps are not fully undertaken.

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APPENDIX A

INSPECTION AND MONITORING FORM

DATE: _____ INSPECTED BY: _____

BUILDING INTERIORS

This list is a helpful reminder of things to look for during inspection and monitoring; however, do not fail to watch for other things supporting pests.

DEFECTS NOTED

1. WINDOWS: Tightly sealed, glass complete, screens in good repair? Opened regularly? Frames intact?

2. DOORS: In good repair, effectively seal off rooms/areas? Seals and sweeps tight (no light showing through)? Close properly?

3. FACILITY AREAS:

PIPES: Routinely inspected? In good repair? Leaks? Pipe traces open or sealed?

MECHANICAL ROOM: Free from debris or water? Cracks or crevices in walls? Openings directly to outside? Vent and exhaust chases sealed? Suspended ceilings? Pests in dust collectors or central vacuum systems? Door sweeps too high?

ELECTRICAL ROOMS: Conduits and lines open or sealed? Holes, cracks, or crevices in walls? Openings directly to outside? Suspended ceilings? Pests inside seldom-used equipment? Door sweeps too high?

CUSTODIAL CLOSETS: Cleanliness? Personal item storage? Food stored/eaten here? Walls, floors, sink areas with cracks, crevices, holes? Excessive or long term storage of paper or supplies? Suspended ceilings? Mops off floor?

BOILER/STEAM ROOMS: Standing water? Holes in walls, floors, or ceilings? Pest evidence? What? Suspended ceilings? Door sweeps too high? Grates on drain?

4. WATER SOURCES: Standing water? All cracks, crevices, holes sealed? Pipe traces sealed?

5. MUSEUM COLLECTION STORAGE: How often inspected? Cracks, crevices, holes in walls, floors, ceiling? Temperature and humidity monitored/controlled? Control on materials moving into and out of storage? Inspect seldom used storage areas, cut-buildings, old nooks. Is there continual pest monitoring? How? Who? Doors/windows seal tightly? Storage on floor? Air conditioner sealed? Procedures for pest identification, isolation, preservation, record keeping? Suspended ceilings?

6. GIFT AND ACQUISITION AREA: Procedures for de-infesting new acquisitions/gifts? Regular inspection for pest infested materials? Isolation from primary collections storage? Route that materials take in entering area? Specific unpacking area away from primary collections area? Suspended ceilings? Storage conditions?

7. INTER-LIBRARY LOANS: Procedures for examining incoming materials? Are pests or damage identified? Isolation of suspected books? Food, beverage, etc. present? Suspended ceilings?

8. CONSERVATION LABORATORIES MD PRESERVATION OFFICES: Separated human collection storage and other areas? Treatment area present? Insect identification collection? Is collection kept pest free and in pest-free drawers/containers? Suspended ceilings?

APPENDIX B

SOURCES OF RODENT CONTROL SUPPLIES AND EQUIPMENT

The following list of rodent control equipment and chemical suppliers is not meant to completely cover the entire field and is offered as an assistance in finding specific products. Space

limitations do not permit including every possible vendor. Undoubtedly, the list omits those products or companies not coming to our attention. Products or companies listed here are not endorsed or recommended by the United States Government or G&L Consultants. No discrimination is intended against products or companies not listed. Additional listings and classified by subject can be found in: Scott E. Hygnstrom, Robert M. Timm, and Gary E. Larson, 1994; Prevention and Control of Wildlife Damage, Coop. Exten. Div., Inst. Agric. and Nat. Res., University of Nebraska, Lincoln NE.

ALPHABETIZED LISTING

Advantage Products, P.O. Box 307, 2343 Commerce Blvd., Mound MN 56364; 6CD1257-3464. Rodent bait stations.

Agricultural Warehouse, Box 237, Ennis TX 75210; 214/875-0090. Deodorizers.

Allen Special Products, Box 605, Montgomeryville PA 16936; 800/848-6805. Manufacturer of "Stuff-It", a copper, non-rusting, material to exclude pests.

Animal Damage Control (magazine), ADC, P.O. Box 224, Greenville PA 16125, 412/588-3492; References and information.

Animal Management Inc., 720 Eppley Rd., Mechanicsburg PA 17055-9786; 717/790-9346, 800/745-8173. Deodorizers.

AO Safety; distributor: Public Health Equipment & Supply, P.O. Box 10458, San Antonio TX 76210, 800/284-0106, 800/444-4774. Respirators, personal protective safety equipment.

Atlantic Paste and Glue Co., 4-53rd St., Brooklyn NY 11232; 718/492-3646. Catchmaster rodent sticky traps.

Ben Meadows Co., PO Box 80549, Atlanta, Georgia 30366; 800/547-8813. Weed flammers.

Bramton Co., Dallas TX 214/438-0397. Outright Skunk Odor Eliminator (enzyme from Bacillus subtilis that breaks down sulfide bonds in skunk scent)

Brody Enterprises, 9 Arlington Place, Fair Lawn, New Jersey 07410; 1-800/GLU-TRAP; rodent snap/live traps, glue boards, other products.

Burlington Scientific Corp., 222 Sherwood Ave., Farmingdale NY 11735; 516/694-9000. Ro-Pel (benzyl-diethyl methyl ammonium saccharide) general gustatory repellent to prevent gnawing by rodents.

Cabot Safety Corp., Safety Div. of American Optical; 1/800/444-4774. HEPA filters and respirators.

Chim-a-lator, 8824 Wentworth Ave. S., Minneapolis MN 55420; 61 2/884-7274. Chimney covers.

Clean & Fresh, 6619 13th Ave, Brooklyn NY 11219; 800/373-7487. Odor neutralizers, degreasers, and cleaning supplies.

Consep, Inc., 213 SW Columbia St., Bend OR 97702; 800/367-8727. Yellow jacket end wasp traps, fly traps, clothing moth traps, teflon (flon) barrier paint, covered rodent traps, etc..

Critter Control Inc., 640 Starkweather, Plymouth MI 48170, 313/453-6300. Rodent and animal traps and control supplies.

DAP Inc., USG Corporation, PO Box 277, Dayton OH 45401. Asphalt caulking.

Direct Safety Co., P.O. Box 50050, Phoenix AZ 85076-0050 (7815 South 46th St., Phoenix AZ 85044); 800/528-7405. Respirators (UVEX), other safety equipment.

Elco Mfg. Co., 111 3rd St., Pittsburgh, PA 15215; 412/782-1850. Moisture meters, blacklights, decontaminants, bait stations/trays, disinfectants, glueboards, tracking powder stations, automatic traps, other products.

Epoleon Cap., 3658 Carson St., Suite 212, Torrance CA 90503; 213/316-4242. Deodorizers.

Follansbee Steel, PO Box 610, Follansbee WV 26037; 304/527-1260. Tyre metal.

Forestry Suppliers, Inc. 205 West Rankin Street, PO Box 6397, Jackson, MS 39204-0397; 800/647-5368. Weed flammers; live/multiple capture/snap traps; monitoring equipment, other products.

Fox Valley Marking Systems, Inc., 172 S. Northwest Hwy, Cary, IL 60013; 800/323-4770. Metal traps.

Fritsche, Dodge & Olcott Inc, 76 Ninth Ave., New York, NY 10011. Neutroleum alpha, odor eliminator.

G.G. Bean, Brunswick ME; 207/729-3708. Skunk Kleen, water based deodorizer.

Glendale Protective Technologies Inc., Woodbury NY. Respirators, filters, HEPA filters.

Guardian Trap Co, PO Box 1935, San Leandro CA 94577, 415/357-0900. Gopher traps.

Havahart Traps, Wood&ream Corp. Front and Locust Streets, Lii, PA 17543, 717/626-2125. Lii traps.

HY-C Co., 2107 North 14th St., St. Louis MO 63106; 314/241-1214. Chimney covers.

IDENTIFICATION SOURCES: call/write to inquire about services or other sources of identification.

Arizona Dept of Health Services, Disease Control, 3008 N. 3rd Ave., Room 201, Phoenix AZ 85012. Pests of public health concern.

A & L Mid West Laboratories, Inc., 13611 B Street, Omaha, NE 68144; 402/334-7770; Complete chemical/analytical lab services.

Combined Scientific Supplies, P.O. Box 1446, Fort Davis, Texas 79734; 91 5/426-3851

Consulting Diagnostic Service, 992 Santa Barbara Rd., Berkeley, CA 94707; 415/642-4950 (days), 415/524-9476 (evenings).

Duke University Medical Center, Mii Center, Div. Infectious Diseases and International Health, Duke Univ., Durham NC 27710; 919/684-3717. Histoplasmosis in guano/feces.

Fumigant Service and Supply, 10540 Jessup Blvd., PO Box 40641, Indianapolis IN 46260-1451; 317/846-5444.

New Mexico State University, Las Cruces, New Mexico, Department Entomology, Cooperative Extension Service; New Mexico Pest Survey and Detection Program.

Raltech Scientific Services, Inc., P.O. Box 7545, Madison, WI 53707; 608/241-4471.

University of Arizona, Cooperative Extension, 2400 S. Milton, Flagstaff AZ 860001, 602/774-1868

Improvements, 4944 Commerce Parkway, Cleveland OH 44128; 800/642-2112. HEPA vacuum bags, door sweeps, weather stripping, caulking tips, epoxy kits. vertical-rising dryer vent cover, under appliance vacuum tip and brush.

Industrial Safety Co., 1390 Nwbrecht Rd., Lima OH 45801; 800/537-9721. Respirators and replacement cartridges, safety supplies.

Intruder Traps, P.O. Box 136, Rice Lake WI 54868; 800/553-5129. Easy-set plastic rat and mouse traps.

Isothermics, PO Box 18703, Anaheim CA 92817; 714/778-1396. Heat treatments for termite and pest infestations.

J. Noms Corp, 25 W. Merrick Rd, Freeport NY 11520. Dazie Disk skunk odor remover.

J.T. Eaton and Company, 1393 East Highland Rd., Twinsburg OH 44087; 800/321-3421. Traps, rodenticides, bait boxes.

K Fence Systems, Rt. 1 Box 195, Zumbro Falls MN 55991; 507/753-2943.

Kness Manufacturing, Hwy. 5 South, P.O. Box 70, Albia IO 52531-0070; 800/247-5062. Snap/multiple-capture rodent traps; supplies.

Lab Safety Supply, P.O. Box 1368, Janesvilk, WI 54547-1368; 800/356-0783. HEPA fitters, respirators, vacuum cleaners, disposable coveralls.

Live Trap Manufacturing Co., P.O. Box 411, Pioche NV 89043; 702/962-5402. No Spray Skunk Lii Trap, with enclosed area where skunk can hide.

Lowry Products and Services Inc., Box 531966, Grand Prairie TX 75053; 214/647-8727. Deodorizers.

M & M Fur Co., Box 15, Bridgewater SD 57319-0015; 605/729-2535. Animal lures and urine, traps, trapping supplies.

Mackianburg-Duncan co., 800/654-8454. Major manufacturer of weather stripping devices with designs shown in their catalog.

McClintock Metal Fabricators, Haul-All Equipment Systems, Woodland California 95695; 800/350-3588. Hid-A-Bag, a tightly closing garbage can for vertebrate pests.

Meyer Brand Trapline Products, Box 153, Garrison, Iowa 52229; lli traps.

Miracle Marketing Manufacturing Corp., P.O. Box 520125, Salt Lake City UT 84152; 800/634-6102. Lii Hummer HEPA fitter vacuum.

Moldex-Metric Inc., Safety Products Div., 4571 Leahy St., Culver City CA 90232; 800/421-0668. Disposable fume, dust, mist HEPA respirators, fit testing kits.

Morrison Manufacturing Co., PO Box 52, Highway #175, Morrison IA 50657, 800/648-CAGE, 319/345-6406. Safe-N-Sound Lii Traps live traps.

Mustang Mfg. Co., Box 920947, Houston, TX 77292; 713/682-0811. Live traps

Myro, Inc., Milwaukee WI 53233. Caulk finishing tool and plastic caulking tube tips; available in hardware departments of stores like K-Mart.

Neutron Industries, Formula NI-712 Super Concentrated Organic Odor 800/426-8481.

Nilfisk of America, 300 Technology Drive, Malvern PA 19355, 213/647-4620. HEPA titter vacuum cleaners.

On Target Animal Attractants, P.O. Box 5345, Glendale Hts. IL 60139, 708/858 4895. Lures and scents.

Pestgon Products. Snooper 2000 PCO Pest Detector a rake-like device producing heat, vibration, and color; attracts fleas to a disposable stiiiky trap.

Phillips Petroleum Co., Bartlesville OK 74004. R-55 (tert-butyl selfenytdimethyidithiocarbamate) pocket gopher/burrowing animal repellent; for application to soil and cables; phytotoxtc.

Professional Equipment, 130 Date St., West Babylon NY 11704; 800/334-9291. Full lli of test equipment, moisture meters.

Pocatello Supply Depot, USDA-APHIS Animal Damage Control; U.S. Fish and Wildlife Service, 238 E. Dillon St., Pocatello ID 83201; 208/236-6920. Gopher control supplies, deodorants (and netroleum alpha).

P-W Manufacturing, 610 High Stree, Henryetta OK 74437; 918/652-4981. Death-Klutch DK-1 and DK-2 Gopher Getter gopher traps.

Racal Health and Safety, 7305 Exeutive Way, Frederick MD 21701-8368; 301/695-8200, 800/682-9500. Delta 3 HEPA Fitter.

R.C.F. Developments Inc., 2509 Browncroft Blvd, Rochester NY 14625. Skunk-Off odor eliminator.

R.C. Steele Veterinarian Supplies, 1989 Transit Way, Box 910, Brockport NY 14420-0910. Happy Jack Flea Trap sticky trap with and attached heat source.

Sealeze Corp., 8000 White Pine Rd., Richmond VA 23237; 800/446-7325. Pest Stop, brush-type weatherseals for commercial and residential doors and window

Science Products Co. Inc.. Chii IL 60646. Science Rabbit and Deer Repellent (thiram) for deer, meadow mice, rabbits.

Sherman, H.B.; 3731 Peddie Drive, P.O. Box 20267, Tallahassee FL 32303, 904/575-8727. Standard Sherman folding live traps.

Survival Air Systems (SAS) Co., 340169th St., Long Beach CA 90805; 800/262-0200. Respirators, personal protective equipment.

Sudbury Laboratory Inc., Box 34820, Phoenix AZ 85067; 602/285-1660. Chaperone Deer and abbit Repellent (thiram) rabbit, deer, meadow mice repellent.

Target Specialty Products, Box 1117, Cerritos CA 90702-1117; 213/865-9541, 800/352-3870. Deodorants.

Tomahawk Lii Trap Co., PO Box 323, Tomahawk, WI 54487; 715/453-3550; live traps.

Tramex, 1893 Coyote Cir., Golden CO 80403, 303/582-3538. Non-destructive moisture meter.

UVEX Safety, LLC, 10 Thurber Blvd., Smithfield RI 02917; 401/232-1200, 800/343-3411. HEPA-Tech 3010 Fitter.

Van Waters and Rogers, 2600 Campus Dr., Box 5932, San Mateo CA 94403, nation-wide number 800/888-4897; Phoenix office: Kt2Q72-3272,

Tucson office: 602/747-8717. Chemicals, pest control equipment.

Wildlife Control Technology Inc., 2501 N. Sunnyside Ave. #103, Fresno CA 93727; 209/294-0262, 800/235-0262. Fencing materials, "Bat Kit" and instructions.

Wildlife Management Supplies, Critter Control Inc., 640 Starkweather Rd., Plymouth MI 48170; 800/451-6544. Chimney covers, skunk deodorants.

Woodstream Cup., Litz PA 17543, 717/626-2125. Vior Gopher Getter and Victor Gopher Trap; Havahart live traps, sticky traps.

ZA Macabee Gopher Trap Co, 110 Loma Alta Ave., Los Gato CA 95030, 408/354-4158;

Attachment 3.

42 CFR Part 84

Respiratory Protective Devices

SUMMARY: This final rule was made available to the public at the Government Printing Office in Washington, DC, on June 2, 1995. It is scheduled for publication in the Federal Register on June 8, 1995, in Part II of that issue. This rule addresses NIOSH and the Department of Labor/Mine Safety and Health Administration (MSHA) certification requirements for respiratory protective devices. Specifically, the rule replaces MSHA regulations at 30 CFR part 11 with new public health regulations at 42 CFR part 84, while also upgrading testing requirements for particulate filters. Concurrently with publication by NIOSH of this new rule, MSHA published a final rule to remove existing regulations at 30 CFR part 11, which are made obsolete by this final rule. NIOSH will now have exclusive authority for testing and certification of respirators with the exception of certain mine emergency devices, which will continue to be jointly certified by NIOSH and MSHA.

The certification of air-purifying respirators under the final rule will enable respirator users to select from a broader range of certified respirators. All of these new respirators will meet the performance criteria recommended by CDC for respiratory devices used in health-care settings for protection against *Mycobacterium tuberculosis* (Mtb), the infectious agent that causes tuberculosis (TB). The CDC published "Guidelines for Preventing the Transmission of *Mycobacterium tuberculosis* in Health-Care Facilities, 1994", in the Federal Register (59 FR 54242) and MMWR (Volume 43, No. RR-13) on October 28, 1994. All nine classes of air-purifying, particulate respirators to be certified under the provisions of the new particulate filter tests exceed the performance recommendations contained in the CDC Guidelines. Several of these new classes of air-purifying, particulate respirators are expected to be less expensive than respirators with HEPA filters.

This action is the first of a series of modules that will incrementally upgrade current respirator approval standards. This modular approach will allow improvements to be implemented on a safety and health priority basis as well as facilitate adaptation to new requirements by the manufacturers and users of respirators. It will also expedite the incorporation of technological advancements and will allow for expeditious response to emerging hazards.

Except for the particulate-filter standards, most of the existing regulations are incorporated into the new 42 CFR part 84 without change. The revised testing standards for particulate filters will significantly improve the effectiveness of air-purifying filters in removing toxic particulates from the ambient air. These changes are consistent with two decades of advances in respiratory protection technology.

Under the new particulate filter tests, NIOSH will certify three classes of filters, N-, R-, and P-series, with three levels of filter efficiency, 95%, 99%, and 99.97%, in each class. All filter tests will employ the most penetrating aerosol size, 0.3 μ m aerodynamic mass median diameter. The N-series will be tested against a mildly degrading aerosol of sodium chloride (NaCl). The R- and P-series filters will be tested against a highly degrading aerosol of dioctylphthalate (DOP):

Filter	Minimum	Test	Maximum Test
Designation	Efficiency	Agent	Challenge Loading

N100	99.97%	NaCl	200 mg filter loadi
N99	99%	NaCl	200 mg filter loadi
N95	95%	NaCl	200 mg filter loadi
R100	99.97%	DOP	200 mg filter loadi
R99	99%	DOP	200 mg filter loadi
R95	95%	DOP	200 mg filter loadi
P100	99.97%	DOP	Maximum filter degr
P99	99%	DOP	Maximum filter degr
P95	95%	DOP	Maximum filter degr

Tested to a specified maximum loading level (200 mg), the N- and R-series will be certified with the recognition that in some settings time-use limitations will apply. A single shift time limitation, for example, may be appropriate. In addition to possible time-use restrictions, the N-series filters should be restricted to use in those workplaces free of oil or other severely degrading aerosols. The R-series filters would not have similar aerosol-use restrictions. The P-series filters will be tested with DOP until no further decrease in filter efficiency is observed. The P-series filters have neither aerosol-use nor time-use limitations. As for any filter, service time will be limited by considerations of hygiene and increased breathing resistance due to filter loading.

The final rule differs from the proposal (59 FR 26850) in eight ways. These changes are summarized as follows:

PROPOSAL
FINAL RULE

2 categories of particulate filters (Solid;
Solid and Liquid)

3 categories of particulate filters
(N-, R-, and P-series)

Filter efficiency tests applied to all
air-purifying particulate filters.

Filter efficiency tests apply only
to air-purifying particulate filter
for non-powered respirators. Filter
for powered air-purifying respiratc
will be addressed in another module

Inhalation resistance maximum at 30 mm;
exhalation resistance maximum at 20 mm.

Inhalation resistance maximum at 35
exhalation resistance maximum at 25

Isoamyl acetate tightness test for

Isoamyl acetate tightness test was

particulate respirators was included.

eliminated from the certification procedures.

Certification of filters was based on statistical evaluation of results from 30 filters tested.

Pass/Fail test based on results from filters tested. All must pass.

Pending Part 11 applications would be processed for six months, and no new Part 11 applications accepted after the effective date of Part 84.

All pending Part 11 applications will be processed. All new applications received after the effective date of Part 84 will be considered applications for approval under Part 84.

Approval holders allowed to manufacture and sell Part 11 filters as approved devices for 2 years from the effective date of Part 84.

Approval holders allowed to manufacture and sell Part 11 filters as approved devices for 3 years from the effective date of Part 84.

No provisions were included for the continued issuance of extensions of existing 30 CFR Part 11 approvals.

A new subpart KK has been added for issuance of extensions of existing CFR Part 11 approvals to address respirator non-conformances when there is a demonstrated safety or health hazard during the 3-year transition period for the approval of PAPRs until addressed in a later module.

EFFECTIVE DATE: This final rule is effective on July 10, 1995

FOR FURTHER INFORMATION CONTACT: Richard W. Metzler, Chief, Certification and Quality Assurance Branch, Division of Safety Research, NIOSH, 1095 Willowdale Road, Morgantown, West Virginia 26505-2888. The telephone number is (304) 285-5907. Copies of this final rule can be downloaded from the NIOSH World Wide Web page (<http://www.cdc.gov/niosh/homepage.html>) or may be obtained by calling the NIOSH toll-free information number (1-800-35-NIOSH, option 5, 9:00 am - 4:00 pm, ET). Arrangements have also been made for this final rule to be listed on the electronic bulletin boards of the Government Printing

Office and of the Department of Labor; the telephone numbers are (202) 512-1387 and (202) 219-4784, respectively.

The [HHS Press Release](#) announcing the publication of the final rule is also available.

A complete copy of 42 CFR Part 84 can be downloaded in [Wordperfect 6.1 \(IBM-PC\) format](#) or [ASCII](#).

A [current list](#) of approved respirators under 42 CFR Part 84 is available.

The [HHS Press Release](#) announcing NIOSH certified respirators is also available.

Go back to the [NIOSH Home Page](#)  or to the [CDC Home Page](#) 

This page was last updated on March 4, 1997.

OSHAOccupational Safety & Health Administration
U.S. Department of Labor

OSHA Regulations (Standards - 29 CFR) Respiratory Protection. - 1910.134

[OSHA Regulations \(Standards - 29 CFR\) - Table of Contents](#)

- **Standard Number:** 1910.134
- **Standard Title:** Respiratory Protection.
- **SubPart Number:** I
- **SubPart Title:** Personal Protective Equipment

Interpretation(s)

This section applies to General Industry (part 1910), Shipyards (part 1915), Marine Terminals (part 1917), Longshoring (part 1918), and Construction (part 1926).

..1910.134(a)

(a)

Permissible practice.

(a)(1)

In the control of those occupational diseases caused by breathing air contaminated with harmful dusts, fogs, fumes, mists, gases, smokes, sprays, or vapors, the primary objective shall be to prevent atmospheric contamination. This shall be accomplished as far as feasible by accepted engineering control measures (for example, enclosure or confinement of the operation, general and local ventilation, and substitution of less toxic materials). When effective engineering controls are not feasible, or while they are being instituted, appropriate respirators shall be used pursuant to this section.

(a)(2)

Respirators shall be provided by the employer when such equipment is necessary to protect the health of the employee. The employer shall provide the respirators which are applicable and suitable for the purpose intended. The employer shall be responsible for the establishment and maintenance of a respiratory protection program which shall include the requirements outlined in paragraph (c) of this section.

..1910.134(b)

(b)

Definitions. The following definitions are important terms used in the respiratory protection standard in this section.

Air-purifying respirator means a respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through the air-purifying element.

Assigned protection factor (APF) [Reserved]

Atmosphere-supplying respirator means a respirator that supplies the respirator user with breathing air from a source independent of the ambient atmosphere, and includes supplied-air respirators (SARs) and self-contained breathing apparatus (SCBA) units.

Canister or cartridge means a container with a filter, sorbent, or catalyst, or combination of these items, which removes specific contaminants from the air passed through the container.

Demand respirator means an atmosphere-supplying respirator that admits breathing air to the facepiece only when a negative pressure is created inside the facepiece by inhalation.

Emergency situation means any occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment that may or does result in an uncontrolled significant release of an airborne contaminant.

Employee exposure means exposure to a concentration of an airborne contaminant that would occur if the employee were not using respiratory protection.

End-of-service-life indicator (ESLI) means a system that warns the respirator user of the approach of the end of adequate respiratory protection, for example, that the sorbent is approaching saturation or is no longer effective.

Escape-only respirator means a respirator intended to be used only for emergency exit.

Filter or air purifying element means a component used in respirators to remove solid or liquid aerosols from the inspired air.

Filtering facepiece (dust mask) means a negative pressure particulate respirator with a filter as an integral part of the facepiece or with the entire facepiece composed of the filtering medium.

Fit factor means a quantitative estimate of the fit of a particular respirator to a specific individual, and typically estimates the ratio of the concentration of a substance in ambient air to its concentration inside the respirator when worn.

Fit test means the use of a protocol to qualitatively or quantitatively evaluate the fit of a respirator on an individual. (See also Qualitative fit test QLFT and Quantitative fit test QNFT.)

Helmet means a rigid respiratory inlet covering that also provides head protection against impact and penetration.

High efficiency particulate air (HEPA) filter means a filter that is at least 99.97%

efficient in removing monodisperse particles of 0.3 micrometers in diameter. The equivalent NIOSH 42 CFR 84 particulate filters are the N100, R100, and P100 filters.

Hood means a respiratory inlet covering that completely covers the head and neck and may also cover portions of the shoulders and torso.

Immediately dangerous to life or health (IDLH) means an atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere.

Interior structural firefighting means the physical activity of fire suppression, rescue or both, inside of buildings or enclosed structures which are involved in a fire situation beyond the incipient stage. (See 29 CFR 1910.155)

Loose-fitting facepiece means a respiratory inlet covering that is designed to form a partial seal with the face.

Maximum use concentration (MUC) [Reserved].

Negative pressure respirator (tight fitting) means a respirator in which the air pressure inside the facepiece is negative during inhalation with respect to the ambient air pressure outside the respirator.

Oxygen deficient atmosphere means an atmosphere with an oxygen content below 19.5% by volume.

Physician or other licensed health care professional (PLHCP) means an individual whose legally permitted scope of practice (i.e., license, registration, or certification) allows him or her to independently provide, or be delegated the responsibility to provide, some or all of the health care services required by paragraph (e) of this section.

Positive pressure respirator means a respirator in which the pressure inside the respiratory inlet covering exceeds the ambient air pressure outside the respirator.

Powered air-purifying respirator (PAPR) means an air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering.

Pressure demand respirator means a positive pressure atmosphere-supplying respirator that admits breathing air to the facepiece when the positive pressure is reduced inside the facepiece by inhalation.

Qualitative fit test (QLFT) means a pass/fail fit test to assess the adequacy of respirator fit that relies on the individual's response to the test agent.

Quantitative fit test (QNFT) means an assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator.

Respiratory inlet covering means that portion of a respirator that forms the protective barrier between the user's respiratory tract and an air-purifying device or breathing air source, or both. It may be a facepiece, helmet, hood, suit, or a mouthpiece respirator with nose clamp.

Self-contained breathing apparatus (SCBA) means an atmosphere-supplying respirator for which the breathing air source is designed to be carried by the user.

Service life means the period of time that a respirator, filter or sorbent, or other respiratory equipment provides adequate protection to the wearer.

Supplied air respirator (SAR) or airline respirator means an atmosphere

Supplied-air respirator (SAR) or airline respirator means an atmosphere-supplying respirator for which the source of breathing air is not designed to be carried by the user.

This section means this respiratory protection standard.

Tight-fitting facepiece means a respiratory inlet covering that forms a complete seal with the face.

User seal check means an action conducted by the respirator user to determine if the respirator is properly seated to the face.

(c)

Respiratory protection program. This paragraph requires the employer to develop and implement a written respiratory protection program with required worksite-specific procedures and elements for required respirator use. The program must be administered by a suitably trained program administrator. In addition, certain program elements may be required for voluntary use to prevent potential hazards associated with the use of the respirator. The Small Entity Compliance Guide contains criteria for the selection of a program administrator and a sample program that meets the requirements of this paragraph. Copies of the Small Entity Compliance Guide will be available on or about April 8, 1998 from the Occupational Safety and Health Administration's Office of Publications, Room N 3101, 200 Constitution Avenue, NW, Washington, DC, 20210 (202-219-4667).

(c)(1)

In any workplace where respirators are necessary to protect the health of the employee or whenever respirators are required by the employer, the employer shall establish and implement a written respiratory protection program with worksite-specific procedures. The program shall be updated as necessary to reflect those changes in workplace conditions that affect respirator use. The employer shall include in the program the following provisions of this section, as applicable:

(c)(1)(i)

Procedures for selecting respirators for use in the workplace;

(c)(1)(ii)

Medical evaluations of employees required to use respirators;

(c)(1)(iii)

Fit testing procedures for tight-fitting respirators;

(c)(1)(iv)

Procedures for proper use of respirators in routine and reasonably foreseeable emergency situations;

(c)(1)(v)

Procedures and schedules for cleaning, disinfecting, storing, inspecting, repairing, discarding, and otherwise maintaining respirators;

(c)(1)(vi)

Procedures to ensure adequate air quality, quantity, and flow of breathing air for atmosphere-supplying respirators;

(c)(1)(vii)

Training of employees in the respiratory hazards to which they are potentially exposed during routine and emergency situations;

..1910.134(c)(1)(viii)**(c)(1)(viii)**

Training of employees in the proper use of respirators, including putting on and removing them, any limitations on their use, and their maintenance; and

(c)(1)(ix)

Procedures for regularly evaluating the effectiveness of the program.

(c)(2)

Where respirator use is not required:

(c)(2)(i)

An employer may provide respirators at the request of employees or permit employees to use their own respirators, if the employer determines that such respirator use will not in itself create a hazard. If the employer determines that any voluntary respirator use is permissible, the employer shall provide the respirator users with the information contained in Appendix D to this section ("Information for Employees Using Respirators When Not Required Under the Standard"); and

(c)(2)(ii)

In addition, the employer must establish and implement those elements of a written respiratory protection program necessary to ensure that any employee using a respirator voluntarily is medically able to use that respirator, and that the respirator is cleaned, stored, and maintained so that its use does not present a health hazard to the user. Exception: Employers are not required to include in a written respiratory protection program those employees whose only use of respirators involves the voluntary use of filtering facepieces (dust masks).

(c)(3)

The employer shall designate a program administrator who is qualified by appropriate training or experience that is commensurate with the complexity of the program to administer or oversee the respiratory protection program and conduct the required evaluations of program effectiveness.

(c)(4)

The employer shall provide respirators, training, and medical evaluations at no cost to the employee.

(d)

Selection of respirators. This paragraph requires the employer to evaluate respiratory hazard(s) in the workplace, identify relevant workplace and user factors, and base respirator selection on these factors. The paragraph also specifies appropriately protective respirators for use in IDLH atmospheres, and limits the selection and use of air-purifying respirators.

(d)(1)

General requirements.

(d)(1)(i)

(i) The employer shall select and provide an appropriate respirator based on the respiratory hazard(s) to which the worker is exposed and workplace and user factors that affect respirator performance and reliability.

(d)(1)(ii)

The employer shall select a NIOSH-certified respirator. The respirator shall be used in compliance with the conditions of its certification.

(d)(1)(iii)

The employer shall identify and evaluate the respiratory hazard(s) in the workplace; this evaluation shall include a reasonable estimate of employee exposures to respiratory hazard(s) and an identification of the contaminant's chemical state and physical form. Where the employer cannot identify or reasonably estimate the employee exposure, the employer shall consider the atmosphere to be IDLH.

..1910.134(d)(1)(iv)**(d)(1)(iv)**

The employer shall select respirators from a sufficient number of respirator models and sizes so that the respirator is acceptable to, and correctly fits, the user.

(d)(2)***Respirators for IDLH atmospheres.*****(d)(2)(i)**

The employer shall provide the following respirators for employee use in IDLH atmospheres:

(d)(2)(i)(A)

A full facepiece pressure demand SCBA certified by NIOSH for a minimum service life of thirty minutes, or

(d)(2)(i)(B)

A combination full facepiece pressure demand supplied-air respirator (SAR) with auxiliary self-contained air supply.

(d)(2)(ii)

Respirators provided only for escape from IDLH atmospheres shall be NIOSH-certified for escape from the atmosphere in which they will be used.

(d)(2)(iii)

All oxygen-deficient atmospheres shall be considered IDLH. Exception: If the employer

All oxygen deficient atmospheres shall be considered IDLH. Exception: If the employer demonstrates that, under all foreseeable conditions, the oxygen concentration can be maintained within the ranges specified in Table II of this section (i.e., for the altitudes set out in the table), then any atmosphere-supplying respirator may be used.

(d)(3)

Respirators for atmospheres that are not IDLH.

(d)(3)(i)

The employer shall provide a respirator that is adequate to protect the health of the employee and ensure compliance with all other OSHA statutory and regulatory requirements, under routine and reasonably foreseeable emergency situations.

(d)(3)(i)(A)

Assigned Protection Factors (APFs) [Reserved]

(d)(3)(i)(B)

Maximum Use Concentration (MUC) [Reserved]

(d)(3)(ii)

The respirator selected shall be appropriate for the chemical state and physical form of the contaminant.

(d)(3)(iii)

For protection against gases and vapors, the employer shall provide:

(d)(3)(iii)(A)

An atmosphere-supplying respirator, or

(d)(3)(iii)(B)

An air-purifying respirator, provided that:

(d)(3)(iii)(B)(1)

(1) The respirator is equipped with an end-of-service-life indicator (ESLI) certified by NIOSH for the contaminant; or

(d) (3) (iii) (B) (2)

If there is no ESLI appropriate for conditions in the employer's workplace, the employer implements a change schedule for canisters and cartridges that is based on objective information or data that will ensure that canisters and cartridges are changed before the end of their service life. The employer shall describe in the respirator program the information and data relied upon and the basis for the canister and cartridge change schedule and the basis for reliance on the data.

(d) (3) (iv)

For protection against particulates, the employer shall provide:

(d) (3) (iv) (A)

An atmosphere-supplying respirator; or

(d) (3) (iv) (B)

An air-purifying respirator equipped with a filter certified by NIOSH under 30 CFR part 11 as a high efficiency particulate air (HEPA) filter, or an air-purifying respirator equipped with a filter certified for particulates by NIOSH under 42 CFR part 84; or

(d) (3) (iv) (C)

For contaminants consisting primarily of particles with mass median aerodynamic diameters (MMAD) of at least 2 micrometers, an air-purifying respirator equipped with any filter certified for particulates by NIOSH.

TABLE I. -- Assigned Protection Factors [Reserved]

Altitude (ft.)	Oxygen deficient Atmospheres (% O ₂) for which the employer may rely on atmosphere-supplying respirators
Less than 3,001	16.0-19.5
3,001-4,000	16.4-19.5
4,001-5,000	17.1-19.5
5,001-8,000	17.8-19.5

6,001-7,000	18.5-19.5
7,001-8,000 ¹	19.3-19.5

¹ Above 8,000 feet the exception does not apply. Oxygen-enriched breathing air must be supplied above 14,000 feet.

..1910.134(e)**(e)**

Medical evaluation. Using a respirator may place a physiological burden on employees that varies with the type of respirator worn, the job and workplace conditions in which the respirator is used, and the medical status of the employee. Accordingly, this paragraph specifies the minimum requirements for medical evaluation that employers must implement to determine the employee's ability to use a respirator.

(e)(1)

General. The employer shall provide a medical evaluation to determine the employee's ability to use a respirator, before the employee is fit tested or required to use the respirator in the workplace. The employer may discontinue an employee's medical evaluations when the employee is no longer required to use a respirator.

(e)(2)

Medical evaluation procedures.

(e)(2)(i)

The employer shall identify a physician or other licensed health care professional (PLHCP) to perform medical evaluations using a medical questionnaire or an initial medical examination that obtains the same information as the medical questionnaire.

(e)(2)(ii)

The medical evaluation shall obtain the information requested by the questionnaire in Sections 1 and 2, Part A of Appendix C of this section.

(e)(3)

Follow-up medical examination.

(e)(3)(i)

The employer shall ensure that a follow-up medical examination is provided for an employee who gives a positive response to any question among questions 1 through 8 in Section 2, Part A of Appendix C or whose initial medical examination demonstrates the need for a follow-up medical examination.

(e)(3)(ii)

The follow-up medical examination shall include any medical tests, consultations, or diagnostic procedures that the PLHCP deems necessary to make a final determination.

(e)(4)

Administration of the medical questionnaire and examinations.

(e)(4)(i)

The medical questionnaire and examinations shall be administered confidentially during the employee's normal working hours or at a time and place convenient to the employee. The medical questionnaire shall be administered in a manner that ensures that the employee understands its content.

(e)(4)(ii)

The employer shall provide the employee with an opportunity to discuss the questionnaire and examination results with the PLHCP.

(e)(5)

Supplemental information for the PLHCP.

(e)(5)(i)

The following information must be provided to the PLHCP before the PLHCP makes a recommendation concerning an employee's ability to use a respirator:

(e)(5)(i)(A)

(A) The type and weight of the respirator to be used by the employee;

(e)(5)(i)(B)

The duration and frequency of respirator use (including use for rescue and escape);

(e)(5)(i)(C)

The expected physical work effort;

(e)(5)(i)(D)

Additional protective clothing and equipment to be worn; and

(e)(5)(i)(E)

Temperature and humidity extremes that may be encountered.

(e)(5)(ii)

Any supplemental information provided previously to the PLHCP regarding an employee need not be provided for a subsequent medical evaluation if the information and the PLHCP remain the same.

(e)(5)(iii)

The employer shall provide the PLHCP with a copy of the written respiratory protection program and a copy of this section.

Note to Paragraph (e)(5)(iii): When the employer replaces a PLHCP, the employer must ensure that the new PLHCP obtains this information, either by providing the documents directly to the PLHCP or having the documents transferred from the former PLHCP to the new PLHCP. However, OSHA does not expect employers to have employees medically reevaluated solely because a new PLHCP has been selected.

(e)(6)

Medical determination. In determining the employee's ability to use a respirator, the employer shall:

(e)(6)(i)

Obtain a written recommendation regarding the employee's ability to use the respirator from the PLHCP. The recommendation shall provide only the following information:

(e)(6)(i)(A)

Any limitations on respirator use related to the medical condition of the employee, or

relating to the workplace conditions in which the respirator will be used, including whether or not the employee is medically able to use the respirator;

(e)(6)(i)(B)

The need, if any, for follow-up medical evaluations; and

(e)(6)(i)(C)

A statement that the PLHCP has provided the employee with a copy of the PLHCP's written recommendation.

(e)(6)(ii)

If the respirator is a negative pressure respirator and the PLHCP finds a medical condition that may place the employee's health at increased risk if the respirator is used, the employer shall provide a PAPR if the PLHCP's medical evaluation finds that the employee can use such a respirator; if a subsequent medical evaluation finds that the employee is medically able to use a negative pressure respirator, then the employer is no longer required to provide a PAPR.

(e)(7)

Additional medical evaluations. At a minimum, the employer shall provide additional medical evaluations that comply with the requirements of this section if:

(e)(7)(i)

An employee reports medical signs or symptoms that are related to ability to use a respirator;

(e)(7)(ii)

A PLHCP, supervisor, or the respirator program administrator informs the employer that an employee needs to be reevaluated;

(e)(7)(iii)

Information from the respiratory protection program, including observations made during fit testing and program evaluation, indicates a need for employee reevaluation; or

(e)(7)(iv)

A change occurs in workplace conditions (e.g., physical work effort, protective clothing, temperature) that may result in a substantial increase in the physiological burden placed on an employee.

(f)

Fit testing. This paragraph requires that, before an employee may be required to use any respirator with a negative or positive pressure tight-fitting facepiece, the employee must be fit tested with the same make, model, style, and size of respirator that will be used. This paragraph specifies the kinds of fit tests allowed, the procedures for conducting them, and how the results of the fit tests must be used.

(f)(1)

The employer shall ensure that employees using a tight-fitting facepiece respirator pass an appropriate qualitative fit test (QLFT) or quantitative fit test (QNFT) as stated in this paragraph.

(f)(2)

The employer shall ensure that an employee using a tight-fitting facepiece respirator is fit tested prior to initial use of the respirator, whenever a different respirator facepiece (size, style, model or make) is used, and at least annually thereafter.

(f)(3)

The employer shall conduct an additional fit test whenever the employee reports, or the employer, PLHCP, supervisor, or program administrator makes visual observations of, changes in the employee's physical condition that could affect respirator fit. Such conditions include, but are not limited to, facial scarring, dental changes, cosmetic surgery, or an obvious change in body weight.

(f)(4)

If after passing a QLFT or QNFT, the employee subsequently notifies the employer, program administrator, supervisor, or PLHCP that the fit of the respirator is unacceptable, the employee shall be given a reasonable opportunity to select a different respirator facepiece and to be retested.

..1910.134(f)(5)

(f)(5)

The fit test shall be administered using an OSHA-accepted QLFT or QNFT protocol. The OSHA-accepted QLFT and QNFT protocols and procedures are contained in Appendix A of this section.

(f) (6)

QLFT may only be used to fit test negative pressure air-purifying respirators that must achieve a fit factor of 100 or less.

(f) (7)

If the fit factor, as determined through an OSHA-accepted QNFT protocol, is equal to or greater than 100 for tight-fitting half facepieces, or equal to or greater than 500 for tight-fitting full facepieces, the QNFT has been passed with that respirator.

(f) (8)

Fit testing of tight-fitting atmosphere-supplying respirators and tight-fitting powered air-purifying respirators shall be accomplished by performing quantitative or qualitative fit testing in the negative pressure mode, regardless of the mode of operation (negative or positive pressure) that is used for respiratory protection.

(f) (1) (8) (i)

Qualitative fit testing of these respirators shall be accomplished by temporarily converting the respirator user's actual facepiece into a negative pressure respirator with appropriate filters, or by using an identical negative pressure air-purifying respirator facepiece with the same sealing surfaces as a surrogate for the atmosphere-supplying or powered air-purifying respirator facepiece.

(f) (1) (8) (ii)

Quantitative fit testing of these respirators shall be accomplished by modifying the facepiece to allow sampling inside the facepiece in the breathing zone of the user, midway between the nose and mouth. This requirement shall be accomplished by installing a permanent sampling probe onto a surrogate facepiece, or by using a sampling adapter designed to temporarily provide a means of sampling air from inside the facepiece.

(f) (1) (8) (iii)

Any modifications to the respirator facepiece for fit testing shall be completely removed, and the facepiece restored to NIOSH-approved configuration, before that facepiece can be used in the workplace.

(g)

Use of respirators. This paragraph requires employers to establish and implement procedures for the proper use of respirators. These requirements include prohibitions

procedures for the proper use of respirators. These requirements include prohibiting conditions that may result in facepiece seal leakage, preventing employees from removing respirators in hazardous environments, taking actions to ensure continued effective respirator operation throughout the work shift, and establishing procedures for the use of respirators in IDLH atmospheres or in interior structural firefighting situations.

(g)(1)

Facepiece seal protection.

(g)(1)(i)

The employer shall not permit respirators with tight-fitting facepieces to be worn by employees who have:

(g)(1)(i)(A)

Facial hair that comes between the sealing surface of the facepiece and the face or that interferes with valve function; or

(g)(1)(i)(B)

Any condition that interferes with the face-to-facepiece seal or valve function.

(g)(1)(ii)

If an employee wears corrective glasses or goggles or other personal protective equipment, the employer shall ensure that such equipment is worn in a manner that does not interfere with the seal of the facepiece to the face of the user.

(g)(1)(iii)

For all tight-fitting respirators, the employer shall ensure that employees perform a user seal check each time they put on the respirator using the procedures in Appendix B-1 or procedures recommended by the respirator manufacturer that the employer demonstrates are as effective as those in Appendix B-1 of this section.

(g)(2)

Continuing respirator effectiveness.

(g)(2)(i)

Appropriate surveillance shall be maintained of work area conditions and degree of employee exposure or stress. When there is a change in work area conditions or degree of employee exposure or stress that may affect respirator effectiveness, the employer shall reevaluate the continued effectiveness of the respirator.

(g) (2) (ii)

The employer shall ensure that employees leave the respirator use area:

..1910.134(g)(2)(ii)(A)

(g) (2) (ii) (A)

To wash their faces and respirator facepieces as necessary to prevent eye or skin irritation associated with respirator use; or

(g) (2) (ii) (B)

If they detect vapor or gas breakthrough, changes in breathing resistance, or leakage of the facepiece; or

(g) (2) (ii) (C)

To replace the respirator or the filter, cartridge, or canister elements.

(g) (2) (iii)

If the employee detects vapor or gas breakthrough, changes in breathing resistance, or leakage of the facepiece, the employer must replace or repair the respirator before allowing the employee to return to the work area.

(g) (3)

Procedures for IDLH atmospheres. For all IDLH atmospheres, the employer shall ensure that:

(g) (3) (i)

One employee or, when needed, more than one employee is located outside the IDLH atmosphere;

(g) (3) (ii)

(g)(3)(ii)

Visual, voice, or signal line communication is maintained between the employee(s) in the IDLH atmosphere and the employee(s) located outside the IDLH atmosphere;

(g)(3)(iii)

The employee(s) located outside the IDLH atmosphere are trained and equipped to provide effective emergency rescue;

(g)(3)(iv)

The employer or designee is notified before the employee(s) located outside the IDLH atmosphere enter the IDLH atmosphere to provide emergency rescue;

(g)(3)(v)

The employer or designee authorized to do so by the employer, once notified, provides necessary assistance appropriate to the situation;

(g)(3)(vi)

Employee(s) located outside the IDLH atmospheres are equipped with:

(g)(3)(vi)(A)

Pressure demand or other positive pressure SCBAs, or a pressure demand or other positive pressure supplied-air respirator with auxiliary SCBA; and either

(g)(3)(vi)(B)

Appropriate retrieval equipment for removing the employee(s) who enter(s) these hazardous atmospheres where retrieval equipment would contribute to the rescue of the employee(s) and would not increase the overall risk resulting from entry; or

(g)(3)(vi)(C)

Equivalent means for rescue where retrieval equipment is not required under paragraph (g)(3)(vi)(B).

(g)(4)

Procedures for interior structural firefighting. In addition to the requirements set forth under paragraph (g)(3), in interior structural fires, the employer shall ensure

that:

(g)(4)(i)

At least two employees enter the IDLH atmosphere and remain in visual or voice contact with one another at all times;

(g)(4)(ii)

At least two employees are located outside the IDLH atmosphere; and

(g)(4)(iii)

All employees engaged in interior structural firefighting use SCBAs.

Note 1 to paragraph (g): One of the two individuals located outside the IDLH atmosphere may be assigned to an additional role, such as incident commander in charge of the emergency or safety officer, so long as this individual is able to perform assistance or rescue activities without jeopardizing the safety or health of any firefighter working at the incident.

Note 2 to paragraph (g): Nothing in this section is meant to preclude firefighters from performing emergency rescue activities before an entire team has assembled.

(h)

(h) ***Maintenance and care of respirators.*** This paragraph requires the employer to provide for the cleaning and disinfecting, storage, inspection, and repair of respirators used by employees.

(h)(1)

Cleaning and disinfecting. The employer shall provide each respirator user with a respirator that is clean, sanitary, and in good working order. The employer shall ensure that respirators are cleaned and disinfected using the procedures in Appendix B-2 of this section, or procedures recommended by the respirator manufacturer, provided that such procedures are of equivalent effectiveness. The respirators shall be cleaned and disinfected at the following intervals:

(h)(1)(i)

Respirators issued for the exclusive use of an employee shall be cleaned and disinfected as often as necessary to be maintained in a sanitary condition;

(h)(1)(ii)

Respirators issued to more than one employee shall be cleaned and disinfected before being worn by different individuals;

(h)(1)(iii)

Respirators maintained for emergency use shall be cleaned and disinfected after each use; and

(h)(1)(iv)

Respirators used in fit testing and training shall be cleaned and disinfected after each use.

(h)(2)

Storage. The employer shall ensure that respirators are stored as follows:

(h)(2)(i)

All respirators shall be stored to protect them from damage, contamination, dust, sunlight, extreme temperatures, excessive moisture, and damaging chemicals, and they shall be packed or stored to prevent deformation of the facepiece and exhalation valve.

(h)(2)(ii)

In addition to the requirements of paragraph (h)(2)(i) of this section, emergency respirators shall be:

(h)(2)(ii)(A)

Kept accessible to the work area;

(h)(2)(ii)(B)

Stored in compartments or in covers that are clearly marked as containing emergency respirators; and

(h)(2)(ii)(C)

Stored in accordance with any applicable manufacturer instructions.

..1910.134(h)(3)

(h)(3)

Inspection.

(h)(3)(i)

The employer shall ensure that respirators are inspected as follows:

(h)(3)(i)(A)

All respirators used in routine situations shall be inspected before each use and during cleaning;

(h)(3)(i)(B)

All respirators maintained for use in emergency situations shall be inspected at least monthly and in accordance with the manufacturer's recommendations, and shall be checked for proper function before and after each use; and

(h)(3)(i)(C)

Emergency escape-only respirators shall be inspected before being carried into the workplace for use.

(h)(3)(ii)

The employer shall ensure that respirator inspections include the following:

(h)(3)(ii)(A)

A check of respirator function, tightness of connections, and the condition of the various parts including, but not limited to, the facepiece, head straps, valves, connecting tube, and cartridges, canisters or filters; and

(h)(3)(ii)(B)

A check of elastomeric parts for pliability and signs of deterioration.

(h)(3)(iii)

In addition to the requirements of paragraphs (h)(3)(i) and (ii) of this section, self-contained breathing apparatus shall be inspected monthly. Air and oxygen cylinders shall be maintained in a fully charged state and shall be recharged when the pressure falls to 90% of the manufacturer's recommended pressure level. The employer shall determine that the regulator and warning devices function properly.

(h)(3)(iv)

For respirators maintained for emergency use, the employer shall:

(h)(3)(iv)(A)

Certify the respirator by documenting the date the inspection was performed, the name (or signature) of the person who made the inspection, the findings, required remedial action, and a serial number or other means of identifying the inspected respirator; and

(B) Provide this information on a tag or label that is attached to the storage compartment for the respirator, is kept with the respirator, or is included in inspection reports stored as paper or electronic files. This information shall be maintained until replaced following a subsequent certification.

(h)(4)

Repairs. The employer shall ensure that respirators that fail an inspection or are otherwise found to be defective are removed from service, and are discarded or repaired or adjusted in accordance with the following procedures:

(h)(4)(i)

Repairs or adjustments to respirators are to be made only by persons appropriately trained to perform such operations and shall use only the respirator manufacturer's NIOSH-approved parts designed for the respirator;

(h)(4)(ii)

Repairs shall be made according to the manufacturer's recommendations and specifications for the type and extent of repairs to be performed; and

(h)(4)(iii)

Reducing and admission valves, regulators, and alarms shall be adjusted or repaired only by the manufacturer or a technician trained by the manufacturer.

(i)

Breathing air quality and use. This paragraph requires the employer to provide employees using atmosphere-supplying respirators (supplied-air and SCBA) with breathing gases of high purity.

(i)(1)

The employer shall ensure that compressed air, compressed oxygen, liquid air, and liquid oxygen used for respiration accords with the following specifications:

(i)(1)(i)

Compressed and liquid oxygen shall meet the United States Pharmacopoeia requirements for medical or breathing oxygen; and

..1910.134(i)(1)(ii)**(i)(1)(ii)**

Compressed breathing air shall meet at least the requirements for Grade D breathing air described in ANSI/Compressed Gas Association Commodity Specification for Air, G-7.1-1989, to include:

(i)(1)(ii)(A)

Oxygen content (v/v) of 19.5-23.5%;

(i)(1)(ii)(B)

Hydrocarbon (condensed) content of 5 milligrams per cubic meter of air or less;

(i)(1)(ii)(C)

Carbon monoxide (CO) content of 10 ppm or less;

(i)(1)(ii)(D)

Carbon dioxide content of 1,000 ppm or less; and

(i)(1)(ii)(E)

Lack of noticeable odor.

(i)(2)

The employer shall ensure that compressed oxygen is not used in atmosphere-supplying respirators that have previously used compressed air.

(i)(3)

The employer shall ensure that oxygen concentrations greater than 23.5% are used only in equipment designed for oxygen service or distribution.

(i)(4)

The employer shall ensure that cylinders used to supply breathing air to respirators meet the following requirements:

(i)(4)(i)

Cylinders are tested and maintained as prescribed in the Shipping Container Specification Regulations of the Department of Transportation (49 CFR part 173 and part 178);

(i)(4)(ii)

Cylinders of purchased breathing air have a certificate of analysis from the supplier that the breathing air meets the requirements for Grade D breathing air; and

(i)(4)(iii)

The moisture content in the cylinder does not exceed a dew point of -50 deg.F (-45.6 deg.C) at 1 atmosphere pressure.

(i)(5)

The employer shall ensure that compressors used to supply breathing air to respirators are constructed and situated so as to:

(i)(5)(i)

Prevent entry of contaminated air into the air-supply system;

(i)(5)(ii)

Minimize moisture content so that the dew point at 1 atmosphere pressure is 10 degrees F (5.56 deg.C) below the ambient temperature;

(i)(5)(iii)

Have suitable in-line air-purifying sorbent beds and filters to further ensure breathing air quality. Sorbent beds and filters shall be maintained and replaced or refurbished periodically following the manufacturer's instructions.

(i)(5)(iv)

Have a tag containing the most recent change date and the signature of the person authorized by the employer to perform the change. The tag shall be maintained at the compressor.

(i)(6)

For compressors that are not oil-lubricated, the employer shall ensure that carbon monoxide levels in the breathing air do not exceed 10 ppm.

(i)(7)

For oil-lubricated compressors, the employer shall use a high-temperature or carbon monoxide alarm, or both, to monitor carbon monoxide levels. If only high-temperature alarms are used, the air supply shall be monitored at intervals sufficient to prevent carbon monoxide in the breathing air from exceeding 10 ppm.

(i)(8)

The employer shall ensure that breathing air couplings are incompatible with outlets for nonrespirable worksite air or other gas systems. No asphyxiating substance shall be introduced into breathing air lines.

(i)(9)

The employer shall use breathing gas containers marked in accordance with the NIOSH respirator certification standard, 42 CFR part 84.

(j)

Identification of filters, cartridges, and canisters. The employer shall ensure that all filters, cartridges and canisters used in the workplace are labeled and color coded

with the NIOSH approval label and that the label is not removed and remains legible.

(k)

Training and information. This paragraph requires the employer to provide effective training to employees who are required to use respirators. The training must be comprehensive, understandable, and recur annually, and more often if necessary. This paragraph also requires the employer to provide the basic information on respirators in Appendix D of this section to employees who wear respirators when not required by this section or by the employer to do so.

(k)(1)

The employer shall ensure that each employee can demonstrate knowledge of at least the following:

..1910.134(k)(1)(i)

(k)(1)(i)

Why the respirator is necessary and how improper fit, usage, or maintenance can compromise the protective effect of the respirator;

(k)(1)(ii)

What the limitations and capabilities of the respirator are;

(k)(1)(iii)

How to use the respirator effectively in emergency situations, including situations in which the respirator malfunctions;

(k)(1)(iv)

How to inspect, put on and remove, use, and check the seals of the respirator;

(k)(1)(v)

What the procedures are for maintenance and storage of the respirator;

(k)(1)(vi)

How to recognize medical signs and symptoms that may limit or prevent the effective

how to recognize medical signs and symptoms that may limit or prevent the effective use of respirators; and

(k)(1)(vii)

The general requirements of this section.

(k)(2)

The training shall be conducted in a manner that is understandable to the employee.

(k)(3)

The employer shall provide the training prior to requiring the employee to use a respirator in the workplace.

(k)(4)

An employer who is able to demonstrate that a new employee has received training within the last 12 months that addresses the elements specified in paragraph (k)(1)(i) through (vii) is not required to repeat such training provided that, as required by paragraph (k)(1), the employee can demonstrate knowledge of those element(s). Previous training not repeated initially by the employer must be provided no later than 12 months from the date of the previous training.

(k)(5)

Retraining shall be administered annually, and when the following situations occur:

(k)(5)(i)

Changes in the workplace or the type of respirator render previous training obsolete;

(k)(5)(ii)

Inadequacies in the employee's knowledge or use of the respirator indicate that the employee has not retained the requisite understanding or skill; or

(k)(5)(iii)

Any other situation arises in which retraining appears necessary to ensure safe respirator use.

(k)(6)

The basic advisory information on respirators, as presented in Appendix D of this section, shall be provided by the employer in any written or oral format, to employees who wear respirators when such use is not required by this section or by the employer.

(l)

Program evaluation. This section requires the employer to conduct evaluations of the workplace to ensure that the written respiratory protection program is being properly implemented, and to consult employees to ensure that they are using the respirators properly.

(l)(1)

The employer shall conduct evaluations of the workplace as necessary to ensure that the provisions of the current written program are being effectively implemented and that it continues to be effective.

(l)(2)

The employer shall regularly consult employees required to use respirators to assess the employees' views on program effectiveness and to identify any problems. Any problems that are identified during this assessment shall be corrected. Factors to be assessed include, but are not limited to:

..1910.134((l)(2)(i)**(l)(2)(i)**

Respirator fit (including the ability to use the respirator without interfering with effective workplace performance);

(l)(2)(ii)

Appropriate respirator selection for the hazards to which the employee is exposed;

(l)(2)(iii)

Proper respirator use under the workplace conditions the employee encounters; and

(l)(2)(iv)

Proper respirator maintenance.

(m)

Recordkeeping. This section requires the employer to establish and retain written information regarding medical evaluations, fit testing, and the respirator program. This information will facilitate employee involvement in the respirator program, assist the employer in auditing the adequacy of the program, and provide a record for compliance determinations by OSHA.

..1910.134(m)(1)

(m)(1)

Medical evaluation. Records of medical evaluations required by this section must be retained and made available in accordance with 29 CFR 1910.1020.

(m)(2)

Fit testing.

(m)(2)(i)

The employer shall establish a record of the qualitative and quantitative fit tests administered to an employee including:

(m)(2)(i)(A)

The name or identification of the employee tested;

(m)(2)(i)(B)

Type of fit test performed;

(m)(2)(i)(C)

Specific make, model, style, and size of respirator tested;

(m)(2)(i)(D)

Date of test; and

(m)(2)(i)(E)

The pass/fail results for QLFTs or the fit factor and strip chart recording or other recording of the test results for QNFTs.

(m)(2)(ii)

Fit test records shall be retained for respirator users until the next fit test is administered.

(m)(3)

A written copy of the current respirator program shall be retained by the employer.

(m)(4)

Written materials required to be retained under this paragraph shall be made available upon request to affected employees and to the Assistant Secretary or designee for examination and copying.

(n)***Dates.*****(n)(1)**

Effective date. This section is effective April 8, 1998. The obligations imposed by this section commence on the effective date unless otherwise noted in this paragraph. Compliance with obligations that do not commence on the effective date shall occur no later than the applicable start-up date.

(n)(2)

Compliance dates. All obligations of this section commence on the effective date except as follows:

..1910.134(n)(2)(i)**(n)(2)(i)**

The determination that respirator use is required (paragraph (a)) shall be completed no later than September 8, 1998.

(n)(2)(ii)

Compliance with provisions of this section for all other provisions shall be completed no later than October 5, 1998.

(n)(3)

The provisions of 29 CFR 1910.134 and 29 CFR 1926.103, contained in the 29 CFR parts 1900 to 1910.99 and the 29 CFR part 1926 editions, revised as of July 1, 1997, are in effect and enforceable until October 5, 1998, or during any administrative or judicial stay of the provisions of this section.

(n)(4)

Existing Respiratory Protection Programs. If, in the 12 month period preceding April 8, 1998, the employer has conducted annual respirator training, fit testing, respirator program evaluation, or medical evaluations, the employer may use the results of those activities to comply with the corresponding provisions of this section, providing that these activities were conducted in a manner that meets the requirements of this section.

..1910.134(o)**(o)**

Appendices.

(o)(1)

Compliance with Appendix A, Appendix B-1, Appendix B-2, and Appendix C of this section is mandatory.

(o)(2)

Appendix D of this section is non-mandatory and is not intended to create any additional obligations not otherwise imposed or to detract from any existing obligations.

[63 FR 1152, Jan. 8, 1998; 63 FR 20098, April 23, 1998]



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OCCUPATIONAL MEDICINE PROGRAM HANDBOOK

Medical Clearance for Respirator Use

Attachment - E 1

What follows is a comprehensive guide to the medical examination and review of information related to the use of respirators. It may be used for general reference on the subject, or the materials may be used to implement a full program acceptable to DOI.

Medical Clearance for Respirator Use - Clinical Protocol

1.0 Scope

This protocol covers all medical evaluations of Department of the Interior (DOI) employees for activities involving the use of a respirator, regardless of the provider of clinical services.

2.0 Frequency of Evaluation

2.1 Medical evaluations must be performed **prior to beginning respirator use or training.**

2.2 **If a new employee, or new respirator user, has not had an adequate medical evaluation within the previous twelve months,** such an evaluation must be performed before a medical disposition regarding the use of a respiratory protective device can be formulated.

If an adequate medical evaluation has been performed **between six and twelve months previously,** the examiner may, upon review of: a) the medical record; b) a formal interval medical history; and, if indicated, c) telephone contact with the employee, issue a medical disposition regarding respirator use without a current physical/laboratory examination.

If an adequate medical evaluation has been performed **within previous six months,** the examiner may, upon review of: a) the medical record, and, if indicated, b) telephone contact with the employee, issue a medical disposition regarding respirator use without a more current medical history/physical/laboratory examination.

2.3 Subsequent medical evaluations to support recommendations regarding the use of a respirator shall occur **periodically** per NIOSH recommendations, as follows:

	Employee Age (yrs)		
	<35	35-45	>45
Most work conditions requiring a respirator	Every 5 yrs	Every 2 years	1 - 2 years
Strenuous work conditions with an SCBA	Every 3 years	Every 2 years	Annually

2.4 Medical evaluations shall be performed **more frequently:**

- **if required by OSHA standards for specific hazards;** or
- for workers with **medical conditions** that do not preclude the use of a

respirator, but for whom safe use of such a device is relatively more problematic; in such cases, the frequency of medical evaluations should be set according to prudent medical judgment.

NOTE: If an employee is enrolled in another medical surveillance or clearance program, the medical evaluation for respirator use can occur concomitantly with this other evaluation.

- 2.5 Re-evaluations** shall be conducted **more frequently** than stated
- if significant changes in health status occur, such as returning to work following prolonged absence due to serious illness or injury; or
 - if another condition exists which would warrant a more frequent review of the client's medical status.

Such re-examinations should be performed prior to respirator use.

3.0 Evaluation Steps

- 3.1** A **signed and dated request** by an authorized **DOI** representative, noting the following items, is to be provided to the examining facility/provider:
- the name and social security number (or other identifying number) of the employee to be evaluated
 - the job title of the employee to be evaluated
 - the type of respirator to be worn*
 - the duration and frequency of respirator use
 - the job activity in which the respirator is to be worn, including the reason(s) for its use

Please refer to Appendix A for a description of the various types of respirators, their uses, and the physiological effects of their use. *Examiners should read and be familiar with this material.

Also: Please see **Appendix E 1 (b)** of this document for an example of a respirator clearance request form.

- 3.2** A copy of the **OSHA Respirator Medical Evaluation Questionnaire** (see Appendix E 1 (c)) is to be completed by the employee and presented to the examining facility/provider at the time of the evaluation. All employees who are to use a respirator are required to complete this form, which is considered a minimum clearance requirement by OSHA. DOI recommends that all employees who are to use a respirator also complete a medical/occupational history questionnaire, such as that contained in the DOI Standard Medical History and Examination Form (see Tab 12, Attachment D - 3, of this Handbook) and have a physical examination according to the schedule and content summarized in this protocol.

3.3 A **medical/occupational history questionnaire** containing at least the following items is to be completed by the employee and signed and dated, then made available to the examining physician at or before the medical exam:

- history of any cardiovascular or pulmonary conditions
- history of diabetes, or impairment of visual or auditory function
- history of musculoskeletal, rheumatological, or neurological symptoms or diseases that limit functional capacity
- history of a skin condition that might interfere with wearing a respirator
- history of any facial surgery or disfiguring illness or injury
- presence of dentures
- requirement for corrective lenses and the type worn (contacts or glasses)
- a list of current medications and allergies
- history of claustrophobia
- history of past and present job duties, including potential and actual hazardous exposures and personal experience with respiratory protective devices

3.4 A **physical and laboratory evaluation** shall be performed, including at least the following items (see Attachment B of this protocol):

- 3.4.1 vital signs** (blood pressure, pulse, height, and weight; also, temperature, if clinically indicated)
- 3.4.2 visual acuity** (utilizing an automated vision screener, such as Titmus™ or Optec™ machines, if available) (**baseline exam only**) (a clinical evaluation by the examiner may be conducted thereafter, unless automated testing is clinically indicated)
- 3.4.3 hearing** (audiogram)(**baseline exam only**) (a clinical evaluation by the examiner may be conducted thereafter, unless automated testing is clinically indicated)
- 3.4.4 examination of the head** (tympanic membranes, eyes, scalp, nose, oral cavity), **neck, lungs and heart**
- 3.4.5 musculoskeletal and neurological** evaluation relevant to respirator use
- 3.4.6 spirometry** (FEV1 and FVC, actual and % predicted)(**baseline exam only** unless exposures to asbestos or formaldehyde are known or suspected to have occurred, in which case spirometry is to be done as a part of the annual or periodic exam)
- 3.4.7 resting 12 lead electrocardiogram** if client is > 40 years of age (**baseline exam only** unless symptoms or medical history indicate that the electrocardiogram may offer pertinent clinical information)
- 3.4.8 additional testing** as warranted by the medical history and/or physical exam findings; examples of such testing are a serum chemistry profile, chest radiograph, spirometry (periodic exam), resting ECG (periodic exam), or an exercise tolerance test (e.g., a treadmill ECG).

(NOTE: performance of an exercise tolerance test first should be approved by the DOI occupational medicine consultant.)

3.4.9 a **respirator use test**, if clinically indicated; (clinically indicated = the examiner has reservations regarding the examinee using a respirator due to physical and/or psychological conditions)

Definition of a Respirator Use Test: a procedure in which the examinee dons the respirator that is to be used at the worksite, and wears it in a safe environment for 15 - 30 minutes. During this interval, exertional efforts approximating actual work tasks are simulated and observed by the examiner.

Procedure: Once the examinee dons the respirator, a health care professional should carefully **monitor** the examinee for **signs of distress**; monitoring should include serial measurements (every 5 - 10 minutes) and recordings of **pulse, blood pressure, respiratory rate**, and, as appropriate, auscultation of the lungs and heart, and observation for signs of claustrophobia. A **progress note** describing the results of the Use Test should be placed in the medical record.

3.4.10 the **printed name** and **signature** of the **examiner**, the **date** of the evaluation, and the **location** of the facility in which the evaluation occurred shall appear on the examination form.

3.5 a **written disposition** based on available information (signed and dated by the examiner) shall be provided to the **DOI** regarding the appropriateness, from a medical perspective, of respirator use by the examinee (see Section 7.0 of this document).

4.0 Clinical Considerations

4.1 General Job Duties

The proper approach to medical evaluation of a respirator user includes initial **verification** that, from a physical/cognitive/emotional perspective, **the examinee is/would be physically qualified to perform assigned duties without the respirator in place**. Therefore, as a general rule, and with the exception of using respiratory protection during heavy exertion (particularly with an SCBA), an employee who physically can perform assigned duties without donning a respirator likely will be able to work from a functional perspective with a respirator in place.

If such a conclusion has not been properly reached, then the scope of the evaluation to evaluate the examinee for the potential for safe/unsafe use of a respirator should be appropriately expanded.

4.2 Medical Conditions - Stable

A **variety of medical disorders if sufficiently severe** may limit or contraindicate safe and effective use of a respiratory protective device. However, **if the various medical conditions/diagnoses have not limited the respirator candidate in the**

past in jobs at least as taxing as the proposed/existing position, then such conditions usually will not preclude respirator use for the proposed duties.

Consistent with this concept is the corollary that during periodic examinations of respirator users, disorders which have remained **stable** and heretofore have not interfered with safe and effective respirator use will likely not do so in the near term future.

4.3 Medical Conditions - New, Evolving or Intermittent

Medical conditions can change, and new diagnosis which are not documented in the medical record and which can impact respirator use may appear. Thus, the examining physician must be familiar with and consider those medical conditions which are relevant to respirator use (and other job functions).

Another important issue is the approach to **disorders which become symptomatic or which are exacerbated on an intermittent basis** (e.g., asthma, diabetes, seizure disorders, etc.). Obviously, the clinical evaluation of such individuals heavily depends on a **detailed medical and work history** (i.e., frequency and severity of symptoms), as at the time of medical evaluation the clinical manifestations may underestimate (or overestimate!) the functional limitations and risk imposed on the examinee if a respirator is used.

A closely-related consideration is the **nature of the worksite** at which respiratory protection is needed. If a worker becomes sufficiently ill while using a respirator such that exiting the hazardous area is indicated, the ability of the worker to leave quickly enough such that respiratory protection is not compromised during exit and such that the safety of fellow workers is not jeopardized by the respirator user's absence should be taken into consideration by the examiner.

4.4 Target Organ Damage

Under most circumstances, a **respirator is a form of worker protection resorted to when airborne hazards cannot be sufficiently controlled by engineering, work practice, and/or administrative controls.** Thus, it is often appropriate in such environments to monitor respirator users for evidence of target organ damage or indicator organ response both as a "backup" to industrial hygiene techniques as well as an indication of the effectiveness of respiratory protection. Thus, the hospital worker who wears a HEPA respirator for protection against exposure to tuberculosis will also undergo periodic PPD testing, or the lead exposed worker will undergo blood lead monitoring, or the asbestos worker will receive periodic chest x-rays and pulmonary function tests. Therefore, the examiner who evaluates the respirator user should utilize such information and, if it is not being collected, recommend appropriate surveillance testing.

4.5 Use Test

Occasionally, even after a complete and appropriate medical evaluation **a question may remain as to whether or not a particular examinee is able to utilize a form of respiratory protection safely and effectively** In such circumstances, it is appropriate for the evaluation to include a **Use Test**. A Use Test not only represents an individualized assessment of the appropriateness of use of a particular respirator when a concern has arisen, but it also provides the opportunity to observe the examinee for claustrophobia not otherwise uncovered.

NOTE: A Use Test **does not** substitute for a required, formal Fit Test as defined in various OSHA regulations.

5.0 Responsibilities

- 5.1 It is the responsibility of **DOI** to provide the examiner with the information requested in Section 4.1.
- 5.2 It is the responsibility of the **examinee** to provide the historical data requested in an occupational and medical questionnaire.
- 5.3 It is the responsibility of the **examiner** to review the historical medical and occupational data and conduct the clinical evaluation according to generally accepted community medical standards.
- 5.4 Unless **DOI** requests an occupational medical consultant to make a medical disposition, it is the responsibility of the **examiner** at the service provision site to render a written medical disposition regarding the use of a respirator if an adequate basis for doing so has been developed during the examination. (See Section 6.1 below.)
- 5.5 It is the responsibility of **DOI** or its occupational medicine consultant to review this protocol annually and make changes if warranted.

6.0 Communication with DOI, the Employer

- 6.1 If the examiner determines that **additional information is needed** from **DOI** prior to issuing a medical disposition, then this request, in writing, should be forwarded to the **DOI Safety Office**. In such cases, the health record should be flagged for review in a few weeks by the requesting examiner, such that if the requested information is not received, a written report can be issued noting that a recommendation can not be made due to lack of sufficient information.
- 6.2 Following completion of the written medical disposition by either the examiner or the occupational medicine consultant, **the original of the written disposition should be forward to DOI.**
- 6.3 **Guidelines Regarding Content of the Disposition**
 - 6.3.1 The disposition **will not** contain specific examination findings (including laboratory results) or specific medical diagnoses.
 - 6.3.2 The disposition should contain information in the form of a **recommendation.**

- 6.3.3 Information forwarded to **DOI** should answer the following question: **Is it the recommendation of the examiner that the employee can safely wear the indicated respirator while performing the indicated activities?**
- 6.3.4 The response to the question, i.e., the **recommendation**, will be either
- to place **no limitation** on respirator use **-OR-**
 - to **limit respirator use** according to specifically stated circumstances; if respirator use is **limited**, the specific limitation is to be addressed in the recommendation **-OR-**
 - to **preclude any respirator use** at the worksite **-OR-**
 - to state that no disposition can be issued due to lack of information (noncompliant employee, inability to obtain information from employee or **DOI**, etc.; see Sections 6.1 and 7.3).
- 6.3.5 If suggested by the results of the medical examination, an **accommodation** is warranted (allowing the examinee to function more safely and/or effectively while using respiratory protection) such a recommendation is to be included in the summary.

Example: “The employee is not medically cleared to wear a negative pressure respirator; a PAPR is recommended.”

7.0 Communication with the Employee

- 7.1** If the **employee requests copies** of all or part of the physical evaluation (copies to be given directly to the examinee), this request is to be honored; a consent form generally **is not required** for this transaction (the policies of the individual examining facility may vary).
- 7.2** Communication with the employee is required to explain fully any abnormal findings of an examination.
- 7.3** If **additional medical information is needed from the employee** for adequate evaluation of a medical condition, a letter requesting the needed information can be issued to the examinee for completion by the employee’s private physician.

In such cases, the health record should be flagged for review in a few weeks by the requesting examiner, such that if the requested information is not received, a written report can be issued noting that a recommendation can not be made due to lack of sufficient information.

Appendix E 1 (a) **Types of Respirators**

The following information should be provided to the servicing examination site to assist the health care providers as they conduct the respirator medical clearance examinations. Engineering descriptions of the various types of respiratory protective devices are inadequate by themselves for guiding examining providers who conduct respirator medical clearance examinations. Factors related to the physiologic effects and consequences of the various devices for the wearer are more important considerations than are the internal mechanical characteristics of the device in use or to be used. All respirators used at Federal worksites should be NIOSH/MSHA approved.

A1 Air-Purifying, Negative Pressure (non-powered) Respirator

This category includes several types of devices. All have a **face piece (either full or partial)** which provides a tight seal against the face. Inhalation of toxic substances is prevented either by direct filtration through the face piece material, through filters/cartridges attached to the face piece, or by a remote assembly typically worn on the belt and involving a chemical reaction. An **air-purifying** respirator, as the name implies, can only be used in an environment with an adequate supply of oxygen, since the respirator only filters/ purifies and, to some extent, prevents physical contact with ambient gas. The **negative pressure** designation relates to the method of air delivery and removal, i.e., the wearer creates a negative pressure inside the face piece in order to inhale. This type of device may be completely disposable or may contain replaceable parts.

The hazard eliminating mechanism is specific for the physical state of the hazard, i.e., some devices protect only against particulates while others protect only against gases or vapors. (Some devices protect against both.)

A negative pressure respirator is not appropriate for certain hazards and for concentrations of hazards exceeding its protective capacity. If the means of respiratory protection is via particulate filtration, the resistance to breath will increase as the filter becomes saturated. **Since the major limiting factor to using this type of device is breathing resistance**, particularly for workers with obstructive airway conditions (predominately on inhalation if there is an exhalation valve), this factor should be considered during medical clearance examinations, especially if a “use test” is conducted with a “clean” respirator. The cloth **high efficiency particulate air (HEPA)** filter mask, commonly used for protection against exposure to tuberculosis, is an example of this type of respiratory protective device.

A2 Air-Purifying, Positive Pressure (powered) Respirator (PAPR)

This variant of the air-purifying type of respirator utilizes a **blower** worn on a belt at the waist to move ambient air through the filtering mechanism. Consequently, **respirable air is presented to the wearer under slightly positive pressure**. Because the blower operates continuously, i.e., air is constantly flowing into and out of the face piece, **resistance both to inhalation and exhalation is negligible** as is the physiologic dead space. This feature may be helpful to workers with mild to moderate disease who are

otherwise able to meet their job requirements.

Some PAPRs rely on **high air flow rates to prevent toxic substances** from entering the mask rather than forming a seal against the face. Variants of these devices utilize a hood or helmet which fits over the entire head with respirable air supplied to the entire space beneath the hood/helmet. This **alternative is particularly useful for workers with beards or other facial features** which interfere with forming a tight seal with a face piece. A PAPR is not appropriate for IDLH (**immediately dangerous to life and health**) environments or other situations requiring a high level of respiratory protection.

A3 Self-Contained Breathing Apparatus (SCBA)

An SCBA is a device for which the **wearer carries his/her source of respirable air in a compressed gas cylinder typically positioned in a back harness**. The gas flow path conforms to either an open or closed circuit, i.e. expired air is either exhausted through a valve to the ambient environment or returned to a bag of pooled gas at ambient pressure, respectively. Carbon dioxide is scrubbed in the closed circuit and inhalations are drawn directly from the bag.

An SCBA is worn with a **mask (usually a full face piece)** which is supposed to provide a tight seal against the face. If the wearer uses lenses, specially configured lenses which can fit entirely within the face piece must be worn, i.e., temples (sidebars) cannot penetrate the seal between the mask and the face.

SCBAs provide air to the wearer under **positive pressure**. They usually operate in demand or pressure demand mode. In the **demand mode**, respirable air is available when inspiratory effort lowers the pressure in the face piece below ambient pressure. In the **pressure demand mode**, positive pressure is in the face piece throughout the respiratory cycle, i.e., gas is supplied when inspiratory effort lowers mask pressure, but not all the way to ambient pressure. Consequently, in a pressure demand device, exhalation is accomplished against greater resistance than in a demand device. (This drawback is counterbalanced by the greater protection offered by a pressure demand device, since continuously positive mask pressure suppresses inward leaking during the entire respiratory cycle.)

The **considerable weight of an SCBA (up to 35 pounds) may limit functional (exertional) capacity during performance of heavy work, especially for workers with certain cardiovascular conditions**. Exertional capacity while wearing an SCBA may also be limited by the inability of the device to support very high ventilatory rates, either through limited maximal air supply rates or, in the case of the pressure demand device, working against increased exhalation resistance. It is also noteworthy that attempts to breathe at ventilation rates greater than the device's maximal flow rates may lead to inward air/gas leakage from the ambient environment (mask pressure can be forcefully driven below ambient pressure by extreme ventilatory efforts).

SCBAs can operate in a continuous mode (air is flowing regardless of inspiratory effort).

In this type of device, resistance during exhalation is less than with demand mode devices, since the exhalation valve essentially is held open. SCBAs with pressure demand regulators are used in oxygen deficient atmospheres (< 19.5% O₂) or other environments which are immediately dangerous to life or health (IDLH), i.e., they require a high level of respiratory protection (e.g., firefighting).

A4 Supplied Air Respirator

Some respirators are designed to provide the wearer with non-ambient, **respirable air from a remote source**. The air/gas reaches the user's breathing apparatus through a flexible pressurized hose, which usually is tethered at the waist. Air is delivered to the wearer's face piece either through a demand or pressure demand type regulator, similar to an SCBA, or through a flow system, similar to a PAPR.

Appendix E 1 (b)

Sample of Request for Respirator Clearance form

Request for Respirator Clearance -- Department of the Interior

Employee Name: _____ **SS#:** _____
Job Title: _____ **Work Phone Extension:** _____

Instructions to Safety Officer or Supervisor: Please check all respirators and other applicable items which apply to the employee's job functions, sign and print your name and the date of the request. **Forward** this form to the servicing examination facility such that a medical evaluation of the employee can be scheduled.

Request for NIOSH/MSHA-approved respirator:

- single use, filter mask (four attachment points)
- full-faced cartridge-type respirator, negative pressure
- full-faced powered cartridge-type respirator (PAPR)
- hood/helmet powered cartridge-type respirator (PAPR) (not positive pressure)
- half-faced cartridge-type, negative pressure
- half-faced powered cartridge-type respirator (PAPR)
- self-contained breathing apparatus (SCBA)
- half faced/full faced/hood/helmet positive pressure airline respirator

Frequency of Use:

- daily
- monthly
- emergency use only
- other: _____
- weekly
- yearly

Duration of Use:

- < 30 min per work day
- 30 - 60 min per work day
- 1 - 4 hours per work day
- 4 - 8 hours per work day
- greater than 8 hours per work day

Other Personal Protective Equipment (PPE) to be Used:

- barrier clothing (Tyvek, etc., coveralls, chemical splash suit)
- safety glasses/splash goggles
- fully encapsulated suit
- other: _____

Job Functions While Wearing the Respirator:

- regular job duties** require use of respirator; please refer to position description for these activities
- light** physical activity (sitting or standing to control machines, performing hand or arm work)
- moderate** physical activity (walking about with moderate lifting/carrying/pushing)
- heavy** physical activities (lifting/carrying greater than 25 lbs, sustained effort requiring whole body movements)
- HAZMAT Team Activities: Level: A B C D (as per 29 CFR 1910.120)
- confined space activities or work in awkward small spaces
- solitary/isolated duty
- unusual environmental conditions (excessive heat, cold, humidity, etc.)

Signature of Requesting Safety Officer or Supervisor Date

Printed Name of Requesting Safety Officer or Supervisor (phone # with area code)
Original of this document to remain with original of employee's health record. 4/96

Appendix E 1 (c)

Mandatory OSHA Respirator Medical Evaluation Questionnaire
(from Appendix C, 29 CFR 1910.134)

U.S. DEPARTMENT OF THE INTERIOR

OSHA Respirator Medical Evaluation Questionnaire (Mandatory) Appendix C to 29 CFR 1910.134:

To the employer: Answers to questions in Section 1, and to question 9 in Section 2 of Part A, do not require a medical examination.

To the employee:

Can you read (select one): Yes No

Your employer must allow you to answer this questionnaire during normal working hours, or at a time and place that is convenient to you. To maintain your confidentiality, your employer or supervisor must not look at or review your answers, and your employer must tell you how to deliver or send this questionnaire to the health care professional who will review it.

Part A. Section 1. (Mandatory) The following information must be provided by every employee who has been selected to use any type of respirator (please print).

1. Today's date _____
2. Your name: _____
3. Your age (to nearest year): _____
4. Sex (circle one): Male/Female
5. Your height: _____ ft. _____ in.
6. Your weight: _____ lbs.
7. Your job title: _____
8. A phone number where you can be reached by the health care professional who reviews this questionnaire (include the Area Code):

9. The best time to phone you at this number: _____
10. Has your employer told you how to contact the health care professional who will review this questionnaire (select one): Yes No
11. Check the type of respirator you will use (you can check more than one category):
 - a. _____ N, R, or P disposable respirator (filter-mask, non-cartridge type only).
 - b. _____ Other type (for example, half- or full-facepiece type, powered-air purifying, supplied-air, self-contained breathing apparatus).
12. Have you worn a respirator (select one): Yes No
If "yes," what type(s): _____

Part A. Section 2. (Mandatory) Questions 1 through 9 below must be answered by every employee who has been selected to use any type of respirator (please select "yes" or "no").

1. Do you currently smoke tobacco, or have you smoked tobacco in the last month: Yes No

2. Have you ever had any of the following conditions?

- a. Seizures (fits): Yes No
- b. Diabetes (sugar disease): Yes No
- c. Allergic reactions that interfere with your breathing: Yes No
- d. Claustrophobia (fear of closed-in places): Yes No
- e. Trouble smelling odors: Yes No

3. Have you ever had any of the following pulmonary or lung problems?

- a. Asbestosis: Yes No
- b. Asthma: Yes No
- c. Chronic bronchitis: Yes No
- d. Emphysema: Yes No
- e. Pneumonia: Yes No
- f. Tuberculosis: Yes No
- g. Silicosis: Yes No
- h. Pneumothorax (collapsed lung): Yes No
- i. Lung cancer: Yes No
- j. Broken ribs: Yes No
- k. Any chest injuries or surgeries: Yes No
- l. Any other lung problem that you've been told about: Yes No

4. Do you currently have any of the following symptoms of pulmonary or lung illness?

- a. Shortness of breath: Yes No
- b. Shortness of breath when walking fast on level ground or walking up a slight hill or incline: Yes No
- c. Shortness of breath when walking with other people at an ordinary pace on level ground: Yes No
- d. Have to stop for breath when walking at your own pace on level ground: Yes No
- e. Shortness of breath when washing or dressing yourself: Yes No
- f. Shortness of breath that interferes with your job: Yes No
- g. Coughing that produces phlegm (thick sputum): Yes No
- h. Coughing that wakes you early in the morning: Yes No
- i. Coughing that occurs mostly when you are lying down: Yes No
- j. Coughing up blood in the last month: Yes No
- k. Wheezing: Yes No
- l. Wheezing that interferes with your job: Yes No
- m. Chest pain when you breathe deeply: Yes No
- n. Any other symptoms that you think may be related to lung problems: Yes No

5. Have you ever had any of the following cardiovascular or heart problems?

- a. Heart attack: Yes No
- b. Stroke: Yes No
- c. Angina: Yes No
- d. Heart failure: Yes No
- e. Swelling in your legs or feet (not caused by walking): Yes No
- f. Heart arrhythmia (heart beating irregularly): Yes No
- g. High blood pressure: Yes No
- h. Any other heart problem that you've been told about: Yes No

6. Have you ever had any of the following cardiovascular or heart symptoms?

- a. Frequent pain or tightness in your chest: Yes No
- b. Pain or tightness in your chest during physical activity: Yes No
- c. Pain or tightness in your chest that interferes with your job: Yes No
- d. In the past two years, have you noticed your heart skipping or missing a beat: Yes No
- e. Heartburn or indigestion that is not related to eating: Yes No
- f. Any other symptoms that you think may be related to heart or circulation problems: Yes No

7. Do you currently take medication for any of the following problems?

- a. Breathing or lung problems:
- b. Heart trouble: Yes No
- c. Blood pressure: Yes No
- d. Seizures (fits): Yes No

8. If you've used a respirator, have you ever had any of the following problems? (If you've never used a respirator, check the following space and go to question 9:)

- a. Eye irritation: Yes No
- b. Skin allergies or rashes: Yes No
- c. Anxiety: Yes No
- d. General weakness or fatigue: Yes No
- e. Any other problem that interferes with your use of a respirator: Yes No

9. Would you like to talk to the health care professional who will review this questionnaire about your answers to this questionnaire: Yes No

Questions 10 to 15 below must be answered by every employee who has been selected to use either a full-facepiece respirator or a self-contained breathing apparatus (SCBA). For employees who have been selected to use other types of respirators, answering these questions is voluntary.

10. Have you ever lost vision in either eye (temporarily or permanently): Yes No

11. Do you currently have any of the following vision problems?

- a. Wear contact lenses: Yes No
- b. Wear glasses: Yes No
- c. Color blind: Yes No
- e. Any other eye or vision problem: Yes No

12. Have you ever had an injury to your ears, including a broken ear drum: Yes No

13. Do you currently have any of the following hearing problems?

- a. Difficulty hearing: Yes No
- b. Wear a hearing aid: Yes No
- c. Any other hearing or ear problem: Yes No

14. Have you ever had a back injury: Yes No

15. Do you currently have any of the following musculoskeletal problems?

- a. Weakness in any of your arms, hands, legs, or feet: Yes No
- b. Back pain: Yes No
- c. Difficulty fully moving your arms and legs: Yes No
- d. Pain or stiffness when you lean forward or backward at the waist: Yes No
- e. Difficulty fully moving your head up or down: Yes No

- f. Difficulty fully moving your head side to side: Yes No
- g. Difficulty bending at your knees: Yes No
- h. Difficulty squatting to the ground: Yes No
- i. Climbing a flight of stairs or a ladder carrying more than 25 lbs: Yes No
- j. Any other muscle or skeletal problem that interferes with using a respirator: Yes No

Part B Any of the following questions, and other questions not listed, may be added to the questionnaire at the discretion of the health care professional who will review the questionnaire.

1. In your present job, are you working at high altitudes (over 5,000 feet) or in a place that has lower than normal amounts of oxygen: Yes No

If "yes," do you have feelings of dizziness, shortness of breath, pounding in your chest, or other symptoms when you're working under these conditions: Yes No

2. At work or at home, have you ever been exposed to hazardous solvents, hazardous airborne chemicals (e.g., gases, fumes, or dust), or have you come into skin contact with hazardous chemicals: Yes No

If "yes," name the chemicals if you know them: _____

3. Have you ever worked with any of the materials, or under any of the conditions, listed below:

- a. Asbestos: Yes No
- b. Silica (e.g., in sandblasting): Yes No
- c. Tungsten/cobalt (e.g., grinding or welding this material): Yes No
- d. Beryllium: Yes No
- e. Aluminum: Yes No
- f. Coal (for example, mining): Yes No
- g. Iron: Yes No
- h. Tin: Yes No
- i. Dusty environments: Yes No
- j. Any other hazardous exposures: Yes No

If "yes," describe these exposures: _____

4. List any second jobs or side businesses you have: _____

5. List your previous occupations: _____

6. List your current and previous hobbies: _____

7. Have you been in the military services? Yes No

If "yes," were you exposed to biological or chemical agents (either in training or combat): Yes No

8. Have you ever worked on a HAZMAT team? Yes No

9. Other than medications for breathing and lung problems, heart trouble, blood pressure, and seizures mentioned earlier in this questionnaire, are you taking any other medications for any reason (including over-the-counter medications): Yes No

If "yes," name the medications if you know them: _____

10. Will you be using any of the following items with your respirator(s)?

a. HEPA Filters: Yes No

b. Canisters (for example, gas masks): Yes No

c. Cartridges: Yes No

11. How often are you expected to use the respirator(s) (select "yes" or "no" for all answers that apply to you)?:

a. Escape only (no rescue): Yes No

b. Emergency rescue only: Yes No

c. Less than 5 hours per week: Yes No

d. Less than 2 hours per day: Yes No

e. 2 to 4 hours per day: Yes No

f. Over 4 hours per day: Yes No

12. During the period you are using the respirator(s), is your work effort:

a. Light (less than 200 kcal per hour): Yes No

If "yes," how long does this period last during the average shift: _____ hrs. _____ mins.

Examples of a light work effort are sitting while writing, typing, drafting, or performing light assembly work; or standing while operating a drill press (1-3 lbs.) or controlling machines.

b. Moderate (200 to 350 kcal per hour): Yes No

If "yes," how long does this period last during the average shift: _____ hrs. _____ mins.

Examples of moderate work effort are sitting while nailing or filing; driving a truck or bus in urban traffic; standing while drilling, nailing, performing assembly work, or transferring a moderate load (about 35 lbs.) at trunk level; walking on a level surface about 2 mph or down a 5-degree grade about 3 mph; or pushing a wheelbarrow with a heavy load (about 100 lbs.) on a level surface.

c. Heavy (above 350 kcal per hour): Yes No

If "yes," how long does this period last during the average shift: _____ hrs. _____ mins.

Examples of heavy work are lifting a heavy load (about 50 lbs.) from the floor to your waist or shoulder; working on a loading dock; shoveling; standing while bricklaying or chipping castings; walking up an 8-degree grade about 2 mph; climbing stairs with a heavy load (about 50 lbs.).

13. Will you be wearing protective clothing and/or equipment (other than the respirator) when you're using your respirator: Yes No

If "yes," describe this protective clothing and/or equipment: _____

14. Will you be working under hot conditions (temperature exceeding 77 deg. F): Yes No

15. Will you be working under humid conditions: Yes No

16. Describe the work you'll be doing while you're using your respirator(s):

17. Describe any special or hazardous conditions you might encounter when you're using your respirator(s) (for example, confined spaces, life-threatening gases):

18. Provide the following information, if you know it, for each toxic substance that you'll be exposed to when you're using your respirator(s):

Name of the first toxic substance: _____

Estimated maximum exposure level per shift: _____

Duration of exposure per shift: _____

Name of the second toxic substance: _____

Estimated maximum exposure level per shift: _____

Duration of exposure per shift: _____

Name of the third toxic substance: _____

Estimated maximum exposure level per shift: _____

Duration of exposure per shift: _____

The name of any other toxic substances that you'll be exposed to while using your respirator:

19. Describe any special responsibilities you'll have while using your respirator(s) that may affect the safety and well-being of others (for example, rescue, security):

DEPARTMENT OF THE INTERIOR

STANDARD MEDICAL HISTORY AND EXAMINATION FORM

***** CAUTION *****

**WHEN COMPLETED, THIS DOCUMENT CONTAINS
CONFIDENTIAL
MEDICAL INFORMATION**

DOI Occupational Health Services Program Manager: Please: 1) complete the box in the lower left corner of page 2; 2) check the box (if indicated) in the top right corner of page 8 to indicate the additional services to be provided; 3) complete the addresses below to indicate your address, that of the Medical Review Officer who is to review the examination results, and the location for the examination; 4) indicate where the forms are to be sent after the examination; and 5) deliver the form to the person who is to receive the examination.

Person to Receive the Examination: Please complete ONLY THE SHADED PORTIONS of ALL of the following pages of this form, and send the entire packet directly to the EXAMINING PHYSICIAN/CLINIC at the address noted below.

Examining Physician: Please complete all of the appropriate portions of the form on pages 2, 3, and 4. Please note that for pages 6 through 10, only those position- and clearance-specific tests and services specified on pages 2-4 are to be carried out and recorded on the form. When complete, please return this form and any associated forms and reports to:

- the Occupational Health Services Program Manager
- the Medical Review Officer

DOI OCC. HEALTH SVCS. PROG. MGR.

MEDICAL REVIEW OFFICER

EXAMINING PHYSICIAN/CLINIC

DOI Occupational Health Services Program -- Medical History and Examination Form

The individual to be examined is to complete the shaded medical history portions of this form prior to his/her appointment.

The examining physician/clinic is to attach to this form any hard copies of screening, diagnostic, and/or laboratory tests, and send them as a package to the addressee checked on page 1 of this form.

Name, address, and phone number (including fax) of physician/ health center performing examination:		New Applicants ONLY: Your Current Occupation: Your Current Employer: Time in Current Position (in years/months):
Name of Agency:		
Examinee's Name:	Position/Job Title:	SS#
Address:	Home Phone:	Work Phone:
Date of Scheduled Exam:	Date of Birth:	Gender: Male <input type="checkbox"/> Female <input type="checkbox"/>

DOI OHS PROGRAM MANAGER

EXAMINING PHYSICIAN (Please Note - Core Exam must Always Be Completed)

<p style="text-align: center;">SPECIFY POSITION AND/OR CLEARANCES REQUESTED</p> <p>Please check all that apply:</p> <p><input type="checkbox"/> Preplacement/Baseline/Exit <input type="checkbox"/> Periodic</p> <p>Position:</p> <p><input type="checkbox"/> Law Enforcement Officers</p> <p><input type="checkbox"/> U.S. Fish and Wildlife Service Special Agent</p> <p><input type="checkbox"/> Inspectors (OSM Surf. Mining Rec.)</p> <p><input type="checkbox"/> Other (specify)</p> <p>Functional Clearance(s):</p> <p><input type="checkbox"/> Respirator User</p> <p><input type="checkbox"/> Divers</p> <p><input type="checkbox"/> Wild Land Fire Fighters</p> <p><input type="checkbox"/> Commercial Drivers License</p> <p><input type="checkbox"/> Pilot/Aviator</p> <p><input type="checkbox"/> Hazardous Waste Workers</p> <p><input type="checkbox"/> Firearms Instructor</p> <p><input type="checkbox"/> Other (specify)</p>	<p style="text-align: center;">PREPLACEMENT/BASELINE/EXIT CORE EXAM OCCUPATIONAL HEALTH EVALUATION</p> <p><u>Required Services:</u> (Check those services completed)</p> <p><input type="checkbox"/> Authorization for Disclosure Form</p> <p><input type="checkbox"/> General Medical History</p> <p><input type="checkbox"/> General Physical Examination</p> <p><input type="checkbox"/> Chemistry Panel, Complete Blood count, and Urinalysis</p> <p><input type="checkbox"/> Audiometry (including noise exposure history)</p> <p><input type="checkbox"/> Electrocardiogram</p> <p><input type="checkbox"/> Spirometry</p> <p><input type="checkbox"/> Vision Screening (Corr. and Uncorr. Near/Far; Color; Peripheral; Depth)</p> <p><input type="checkbox"/> Plus other Position or Functional Clearance-required services (see the following page)</p>	<p style="text-align: center;">PERIODIC CORE EXAM OCCUPATIONAL HEALTH EVALUATION</p> <p><u>Required Services:</u> (Check those services completed)</p> <p><input type="checkbox"/> Authorization for Disclosure Form</p> <p><input type="checkbox"/> General Medical History</p> <p><input type="checkbox"/> General Physical Examination</p> <p><input type="checkbox"/> Chemistry Panel, Complete Blood Count, and Urinalysis</p> <p><input type="checkbox"/> Plus other Position or Functional Clearance-required services (see the following page)</p> <p>Note: For Respirator User exams (see page 3), the General Physical Examination may be a brief, limited exam or a more extensive exam, depending on the judgement of the examiner. Also, the laboratory tests (e.g., chemistry panel, blood count, and urinalysis) are intended to be at the discretion of the examiner, rather than required services.</p>
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SPECIFIC EXAMINATION COMPONENTS

(Examination services are based on the Job Title/Position Description and any functional clearances that may be necessary)

Law Enforcement Officers

Pre-Placement/Baseline/Exit Core Exam, plus:

- Tuberculosis skin test (PPD)
- Blood lead

Periodic Core Exam, plus:

- Vision (Corr. and Uncorr. Near/Far; Color; Peripheral; Depth)
- Audiometry (including noise exposure history)
- ECG
- Maximal, diagnostic, symptom-limited stress EKG using the Bruce Protocol (every 5 yrs. after age 40 and per MRO)
- Chest X-Ray - PA or PA/Lat (Requires MRO Clearance)
- Blood lead (firearms instructors only)

U.S. Fish and Wildlife Service Special Agent

Pre-Placement/Baseline/Exit Core Exam, plus:

- Tuberculosis skin test (PPD)
- Blood lead
- Cholinesterase (RBC/Plasma)

Periodic Core Exam, plus:

- Vision (Corr. and Uncorr. Near/Far; Color; Peripheral; Depth)
- Audiometry (including noise exposure history)
- ECG
- Maximal, diagnostic, symptom-limited stress EKG using the Bruce Protocol (every 5 yrs. after age 40 and per MRO)
- Chest X-Ray - PA or PA/Lat (Requires MRO Clearance)
- Blood lead (firearms instructors only)
- Cholinesterase (RBC/Plasma)

Law Enforcement Firearm Instructor

- Audiometry (including noise exposure history) (YEARLY)
- Blood lead, with ZPP (YEARLY)

Wild Land Fire Fighters

Pre-Placement/Baseline/Exit Core Exam, plus:

- Chest X-ray (PA/Lat)
- Stress EKG (Requires MRO Clearance)
- Cholinesterase (RBC/Plasma)

Periodic Core Exam, plus:

- Audiometry
- Vision (Corr. and Uncorr. Near/Far; Color; Peripheral; Depth)
- Spirometry
- Cholinesterase (RBC/Plasma)

Respirator User

Pre-Placement/Baseline/Exit Core Exam, plus:
(Limited Exam)

Periodic Core Exam (see Note on page 2), plus:

- Electrocardiogram (if over 40 years old)
- Respirator Clearance
- Other Tests, prn

Divers

Pre-Placement/Baseline/Exit Core Exam, plus:

- Chest X-Ray (PA/Lat)
- Stress EKG (Requires MRO Clearance)
- Blood Type and Rh
- Sickle Cell Prep

Periodic Core Exam, plus:

- Audiogram (every 5 years)
- Vision (Corr. and Uncorr. Near/Far; Color; Peripheral; Depth)
- Chest X-Ray (PA/Lat) (every 2 years after age 40)
- Electrocardiogram (every year after age 35)

Client Name: _____ Date: _____

SPECIFIC EXAMINATION COMPONENTS (continued)

(Examination services are based on the Job Title/Position Description and any functional clearances that may be necessary)

Hazardous Waste Workers

Pre-Placement/Baseline/Exit Core Exam, plus:

- Chest X-ray (PA/Lat)
- Stress EKG (Requires MRO Clearance)
- Cholinesterase (RBC/Plasma)
- 24 hour Urine Heavy Metal Screen

Periodic Core Exam, plus:

- Vision (Corr. and Uncorr. Near/Far; Color; Peripheral; Depth)
- Chest X-ray (PA/Lat) (prn)
- Spirometry
- Cholinesterase (RBC/Plasma)
- 24 hour Urine Heavy Metal Screen

Inspectors/OSM Surface Mining Rec. Spec.

Pre-Placement/Baseline/Exit Core Exam, plus:

- Stress EKG (per MRO only, and if 40 or over)
- Chest X-Ray - PA/Lat (if indicated)

Periodic Core Exam, plus:

- Vision (Corr. and Uncorr. Near/Far; Color; Peripheral; Depth)
- Audiometry
- ECG
- Stress EKG (per MRO only and every 5 years if 40 or over)
- Chest X-Ray - PA/Lat (if indicated)
- Spirometry (if indicated)

Pilot/Aviator

Pre-Placement/Baseline/Exit Core Exam, plus:

- (to be developed)
-

Periodic Core Exam, plus:

- (to be developed)
-

Commercial Drivers License

Periodic Core Exam, plus:

- Audiometry
- Vision (Corr. and Uncorr. Near/Far; Color; Peripheral; Depth)
- Other, prn

Other (specify)

Pre-Placement/Baseline/Exit Core Exam, plus:

-

Periodic Core Exam, plus:

-

Client Name: _____ Date: _____

PAST MEDICAL HISTORY

(Please complete this page if this is your first time using this form, or if you are unsure if you have completed it before.)

Check each item "Yes" or "No". Every item checked "Yes" must be explained in the blank space at the right.

- A. Have you ever been treated for a mental condition? (If Yes, specify when, where, and give details.) Yes No
- B. Have you had or have you been advised to have any operation? (If Yes, specify when, where, why, name of doctor, and complete address of hospital.) Yes No
- C. Have you ever been a patient in any type of hospital after infancy? (If Yes, specify when, where, why, name of doctor, and complete address of hospital.) Yes No
- D. Have you ever had any serious illness of injury other than those already noted? (If yes, specify when, where, and give details.) Yes No
- E. Have you consulted or been treated by clinics, physicians, healers, or other practitioners within the past year for other than minor illness? (If Yes, give complete address of doctor, hospital, clinic, and details of problem.) Yes No
- F. Have you ever been rejected for military service because of physical, mental, or other reasons? (If Yes, give date and reason for rejection.) Yes No
- G. Have you ever been discharged from military service because of physical, mental, or other reasons? (If Yes, give date, reason, and type of discharge, whether honorable or other than honorable.) Yes No
- H. Have you ever received, is there pending, or have you applied for pension or compensation for existing disability? (If Yes, specify what kind, granted by whom, what amount, when, and why.) Yes No

Client Name: _____ Date: _____

MEDICAL HISTORY	DIAGNOSTIC AND PHYSICAL FINDINGS																		
<p>Have you ever experienced any of the following:</p> <p style="text-align: center;">VASCULAR</p> <p>Enlarged superficial veins, phlebitis, or blood clots Yes No <input type="checkbox"/> <input type="checkbox"/></p> <p>Anemia Yes No <input type="checkbox"/> <input type="checkbox"/></p> <p>Hardening of the arteries Yes No <input type="checkbox"/> <input type="checkbox"/></p> <p>High Blood Pressure Yes No <input type="checkbox"/> <input type="checkbox"/></p> <p>Stoke or Transient Ischemic Attack (TIA) Yes No <input type="checkbox"/> <input type="checkbox"/></p> <p>Aneurysms (Dilated arteries) Yes No <input type="checkbox"/> <input type="checkbox"/></p> <p>Poor circulation to hands and feet Yes No <input type="checkbox"/> <input type="checkbox"/></p> <p>White fingers with cold/vibration Yes No <input type="checkbox"/> <input type="checkbox"/></p>	<p style="text-align: center;">Cardio/Pulmonary</p> <p>Normal Abnormal</p> <p><input type="checkbox"/> <input type="checkbox"/> EKG - Attach with interpretation</p> <p><input type="checkbox"/> <input type="checkbox"/> Stress EKG - Bruce Protocol, attach with interpretation</p> <p><input type="checkbox"/> <input type="checkbox"/> Lungs/Chest</p> <p><input type="checkbox"/> <input type="checkbox"/> Heart (thrill, murmur)</p> <p><input type="checkbox"/> <input type="checkbox"/> Vascular (varicosities, stasis, insufficiency)</p> <p>Pulmonary Function Testing: (Attach Copy)</p> <p>Calibration Date _____ (same day as test)</p> <p>Machine Brand _____</p>				<p style="text-align: center;">CHEST X-RAY</p> <p>Last PA Chest X-ray: Date _____</p> <p>Result: <input type="checkbox"/> Normal <input type="checkbox"/> Abnormal</p> <p>Comments: _____</p> <p>_____</p> <p>TB Mantoux (PPD) Date: _____</p> <p>mm Induration: _____</p> <p style="text-align: center;">VITAL SIGNS</p> <p>Height _____ (inches) Weight _____ (pounds)</p> <p>Blood Pressure _____ / _____ mm/hg Pulse _____ /MIN (Conduct measurement while sitting; if elevated, repeat in 15 min.)</p> <p>Respirations _____ /MIN Temp(if indicated) _____</p>														
<p style="text-align: center;">RESPIRATORY</p> <p>Asthma(including exercise induced asthma) Yes No <input type="checkbox"/> <input type="checkbox"/></p> <p>Bronchitis Yes No <input type="checkbox"/> <input type="checkbox"/></p> <p>Emphysema Yes No <input type="checkbox"/> <input type="checkbox"/></p> <p>Acute or chronic lung infections Yes No <input type="checkbox"/> <input type="checkbox"/></p> <p>Wind pipe or lung surgery Yes No <input type="checkbox"/> <input type="checkbox"/></p> <p>Collapsed lung Yes No <input type="checkbox"/> <input type="checkbox"/></p> <p>Scoliosis (curved spine) with breathing limitations Yes No <input type="checkbox"/> <input type="checkbox"/></p> <p>History of Tuberculosis Yes No <input type="checkbox"/> <input type="checkbox"/></p> <p> Previous positive TB skin test? Date: Yes No <input type="checkbox"/> <input type="checkbox"/></p>	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td style="width:25%;">Actual FVC</td> <td style="width:25%;">Actual FEV1</td> <td style="width:25%;">Actual FEV1/FVC</td> <td style="width:25%;">Actual FEF 25-75</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> <tr> <td>%Predicted FVC</td> <td>%Predicted FEV1</td> <td>%Predicted FEV1/FVC</td> <td>%Predicted FEF 25-75</td> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table> <p>Comments: Findings</p>	Actual FVC	Actual FEV1	Actual FEV1/FVC	Actual FEF 25-75					%Predicted FVC	%Predicted FEV1	%Predicted FEV1/FVC	%Predicted FEF 25-75					<p style="text-align: center;">IMMUNIZATIONS</p> <p>Last Tetanus (Td) Shot (Date): _____</p> <p> Given today? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Has client received Hepatitis B Vaccine? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Declined <input type="checkbox"/> Not Applicable</p> <p>Hep B series complete? <input type="checkbox"/> Yes <input type="checkbox"/> No When? _____</p> <p>Date Immunization #1: _____ #2: _____ #3: _____</p>	
Actual FVC	Actual FEV1	Actual FEV1/FVC	Actual FEF 25-75																
%Predicted FVC	%Predicted FEV1	%Predicted FEV1/FVC	%Predicted FEF 25-75																
<p style="text-align: center;">HEART</p> <p>Heart pain (Angina) Yes No <input type="checkbox"/> <input type="checkbox"/></p> <p>Heart rhythm disturbance or palpitations (irregular beat) Yes No <input type="checkbox"/> <input type="checkbox"/></p> <p>History of Heart Attack Yes No <input type="checkbox"/> <input type="checkbox"/></p> <p>Organic heart disease (including prosthetic heart valves, mitral stenosis, heart block, heart murmur, mitral valve prolapse, pacemakers, Wolf Parkinson White (WPW) Syndrome, etc.) Yes No <input type="checkbox"/> <input type="checkbox"/></p> <p>Heart surgery Yes No <input type="checkbox"/> <input type="checkbox"/></p> <p>Sudden loss of consciousness Yes No <input type="checkbox"/> <input type="checkbox"/></p> <p>Other (specify) Yes No <input type="checkbox"/> <input type="checkbox"/></p>	<p>Cardiac Risk Profile (record here, or attach report)</p> <p>Chol _____ HDL _____ LDL _____ Trig _____ Gluc _____</p> <p>Attach copy of complete blood count (CBC) report, including differential</p>		<p style="text-align: center;">CORONARY RISK FACTORS</p> <p style="text-align: right;">Yes No</p> <p>Blood Pressure \geq 145/90 <input type="checkbox"/> <input type="checkbox"/></p> <p>Fasting Glucose \geq 120 mg/dl <input type="checkbox"/> <input type="checkbox"/></p> <p>Total Cholesterol \geq 200 mg/dl <input type="checkbox"/> <input type="checkbox"/></p> <p>Family history of CVD in members \leq 55 <input type="checkbox"/> <input type="checkbox"/></p> <p>Obesity <input type="checkbox"/> <input type="checkbox"/></p> <p>No regular exercise program <input type="checkbox"/> <input type="checkbox"/></p> <p>Currently smoking or \geq pack/yr history <input type="checkbox"/> <input type="checkbox"/></p>																
<p>Describe Your Physical Activity or Exercise Program(check one)</p> <p>Intensity: Low _____ Moderate _____ High _____ Duration, in Minutes per Session _____</p> <p>Activity _____ Frequency _____ Days per week</p>																			

Client Name: _____ Date: _____

MEDICAL HISTORY

DIAGNOSTIC AND PHYSICAL FINDINGS

WELLNESS/HEALTH PROFILE

Smoking History

This information is needed since smoking increases your risk for lung cancer and several other types of cancer, chronic bronchitis, emphysema, asbestos related lung diseases, coronary heart disease, high blood pressure, and stroke. Please check your smoking status and complete that section:

Current Smoker
Number of cigarettes per day _____
Number of cigars per day _____
Number of pipe bowls per day _____
Total years you have smoked _____

Former Smoker
Number of cigarettes per day _____
Number of cigars per day _____
Number of pipe bowls per day _____
Total years you smoked _____

Alcohol/Drug Use

What is your average alcohol consumption (number) in a week?

_____ drinks

(1 drink = 12 Oz. beer, 1 glass wine or 1.5 oz liquor)

How often do you drink alcohol?

Weekdays Weekends Both

RESPIRATOR CLEARANCE QUESTIONS

What type of respirator do/will you use:

Cartridge Air Supply SCBA

How often do you use a respirator?

Daily Weekly Monthly < two times a year

Effort while using respirator?

Light Moderate Heavy

Hazards present during use?

High altitude Temp extremes Confined spaces

Have you ever had, or do you now have any of the following? Please check all that apply and use the space below to comment on positive responses.

Yes No
 Persistent Cough
 Heart Trouble
 Shortness of breath
 History of fainting or seizures
 Fear of tight or enclosed spaces
 Sensation of smothering
 Heat exhaustion or heat stroke
 Contact lenses or eyeglasses
 Other conditions that might interfere with respirator use or result in limited work activity

Discuss "Yes" responses with the examining physician.

Examination Comments/Findings for any/all topics on this page:

ENDOCRINE

	Yes	No
Diabetes (insulin requiring; units per day _____)	<input type="checkbox"/>	<input type="checkbox"/>
Diabetes (non-insulin requiring)	<input type="checkbox"/>	<input type="checkbox"/>
Childhood Onset Diabetes	<input type="checkbox"/>	<input type="checkbox"/>
Thyroid Disease	<input type="checkbox"/>	<input type="checkbox"/>
Obesity	<input type="checkbox"/>	<input type="checkbox"/>
Unexplained weight loss or gain	<input type="checkbox"/>	<input type="checkbox"/>

OBSTETRIC

	Yes	No
Are you currently pregnant?	<input type="checkbox"/>	<input type="checkbox"/>

Attach copy of blood chemistry panel report

MENTAL HEALTH

	Yes	No
History of psychosis	<input type="checkbox"/>	<input type="checkbox"/>
Psychiatric/psychological consultation	<input type="checkbox"/>	<input type="checkbox"/>
Poor adaptation to stress	<input type="checkbox"/>	<input type="checkbox"/>
Panic attacks, hyperventilation, or anxiety or phobia disorder	<input type="checkbox"/>	<input type="checkbox"/>
Uncontrollable rage	<input type="checkbox"/>	<input type="checkbox"/>
Claustrophobia	<input type="checkbox"/>	<input type="checkbox"/>
Diagnosed depression, personality disorder, or neuroses	<input type="checkbox"/>	<input type="checkbox"/>

DERMATOLOGY/ALLERGY

	Yes	No
Sun sensitivity	<input type="checkbox"/>	<input type="checkbox"/>
Allergic dermatitis to rubber	<input type="checkbox"/>	<input type="checkbox"/>
History of chronic dermatitis	<input type="checkbox"/>	<input type="checkbox"/>
Active skin disease	<input type="checkbox"/>	<input type="checkbox"/>
Moles that change in size or color	<input type="checkbox"/>	<input type="checkbox"/>
Allergies, including hay fever (if so, to what?)	<input type="checkbox"/>	<input type="checkbox"/>

MEDICATIONS

List all medications (prescription and over-the-counter) you are currently taking.

MEDICAL HISTORY	DIAGNOSTIC AND PHYSICAL FINDINGS																																																					
<p style="text-align: center;">MUSCULOSKELETAL</p> <table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 80%;"></th> <th style="width: 10%; text-align: center;">Yes</th> <th style="width: 10%; text-align: center;">No</th> </tr> </thead> <tbody> <tr><td>Moderate to severe joint pain, arthritis, tendonitis</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>Amputations</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>Loss of use of arm, leg, fingers, or toes</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>Aseptic bone necrosis</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>Loss of sensation</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>Loss of strength</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>Loss of coordination</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> <tr><td>Chronic back pain (back pain associated with neurological deficit or leg pain)</td><td style="text-align: center;"><input type="checkbox"/></td><td style="text-align: center;"><input type="checkbox"/></td></tr> </tbody> </table> <p>Are you RIGHT <input type="checkbox"/> or LEFT <input type="checkbox"/> handed (check one)?</p>		Yes	No	Moderate to severe joint pain, arthritis, tendonitis	<input type="checkbox"/>	<input type="checkbox"/>	Amputations	<input type="checkbox"/>	<input type="checkbox"/>	Loss of use of arm, leg, fingers, or toes	<input type="checkbox"/>	<input type="checkbox"/>	Aseptic bone necrosis	<input type="checkbox"/>	<input type="checkbox"/>	Loss of sensation	<input type="checkbox"/>	<input type="checkbox"/>	Loss of strength	<input type="checkbox"/>	<input type="checkbox"/>	Loss of coordination	<input type="checkbox"/>	<input type="checkbox"/>	Chronic back pain (back pain associated with neurological deficit or leg pain)	<input type="checkbox"/>	<input type="checkbox"/>	<table style="width: 100%; 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Moderate to severe joint pain, arthritis, tendonitis	<input type="checkbox"/>	<input type="checkbox"/>																																																				
Amputations	<input type="checkbox"/>	<input type="checkbox"/>																																																				
Loss of use of arm, leg, fingers, or toes	<input type="checkbox"/>	<input type="checkbox"/>																																																				
Aseptic bone necrosis	<input type="checkbox"/>	<input type="checkbox"/>																																																				
Loss of sensation	<input type="checkbox"/>	<input type="checkbox"/>																																																				
Loss of strength	<input type="checkbox"/>	<input type="checkbox"/>																																																				
Loss of coordination	<input type="checkbox"/>	<input type="checkbox"/>																																																				
Chronic back pain (back pain associated with neurological deficit or leg pain)	<input type="checkbox"/>	<input type="checkbox"/>																																																				
	Normal	Abnormal																																																				
<input type="checkbox"/> <input type="checkbox"/> Upper extremities (strength)																																																						
<input type="checkbox"/> <input type="checkbox"/> Upper extremities (range of motion)																																																						
<input type="checkbox"/> <input type="checkbox"/> Lower extremities (strength)																																																						
<input type="checkbox"/> <input type="checkbox"/> Lower extremities (range of motion)																																																						
<input type="checkbox"/> <input type="checkbox"/> Feet																																																						
<input type="checkbox"/> <input type="checkbox"/> Hands																																																						
<input type="checkbox"/> <input type="checkbox"/> Spine, other musculoskeletal																																																						
<input type="checkbox"/> <input type="checkbox"/> Flexibility of neck, back, spine, hips																																																						
	Yes	No																																																				
<input type="checkbox"/> <input type="checkbox"/> Vigorous aerobic exercise program 3 hr/wk																																																						
<input type="checkbox"/> <input type="checkbox"/> Push ups																																																						
<input type="checkbox"/> <input type="checkbox"/> Pull ups																																																						
<input type="checkbox"/> <input type="checkbox"/> Sit ups																																																						
<input type="checkbox"/> <input type="checkbox"/> One and one half mile (1 1/2) timed run																																																						
<input type="checkbox"/> <input type="checkbox"/> 3-mile timed walk																																																						
<input type="checkbox"/> <input type="checkbox"/> Time bicycle test																																																						
<input type="checkbox"/> <input type="checkbox"/> Squat/rise w/o holding on; hold squat 45 sec.																																																						
<input type="checkbox"/> <input type="checkbox"/> Kneel on one knee, arms extended for 7 sec.																																																						
<input type="checkbox"/> <input type="checkbox"/> Assume a 1 then 2 knee kneeling position w/i 2 seconds, rise w/o assistance, repeat																																																						
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Client Name: _____ Date: _____

MEDICAL HISTORY

VISION

	Yes	No
Frequent headaches	<input type="checkbox"/>	<input type="checkbox"/>
Blurred vision	<input type="checkbox"/>	<input type="checkbox"/>
Difficulty reading	<input type="checkbox"/>	<input type="checkbox"/>
Eye disease, glaucoma	<input type="checkbox"/>	<input type="checkbox"/>
Eyeglasses	<input type="checkbox"/>	<input type="checkbox"/>
Contact lenses	<input type="checkbox"/>	<input type="checkbox"/>
Cataracts	<input type="checkbox"/>	<input type="checkbox"/>
Color blindness	<input type="checkbox"/>	<input type="checkbox"/>
Have you had any type of eye surgery (e.g., radial keratotomy, PRK [laser], cataract, etc.) If "YES", please provide specific type and date of surgery:		
	<input type="checkbox"/>	<input type="checkbox"/>

DIAGNOSTIC AND PHYSICAL FINDINGS

Head and Neck

Normal	Abnormal
<input type="checkbox"/>	<input type="checkbox"/> Head, Face, Neck (thyroid), Scalp
<input type="checkbox"/>	<input type="checkbox"/> Nose/Sinuses/Eustachian tube
<input type="checkbox"/>	<input type="checkbox"/> Mouth/Throat
<input type="checkbox"/>	<input type="checkbox"/> Pupils equal/reactive
<input type="checkbox"/>	<input type="checkbox"/> Ocular Motility
<input type="checkbox"/>	<input type="checkbox"/> Ophthalmoscopic Findings
<input type="checkbox"/>	<input type="checkbox"/> Speech
Comments/Findings	

Vision

Color Vision
 Normal Abnormal Number Correct: _____ of _____ tested
 Can see Red/Green/Yellow? Yes No

Type of test
 Ishihara plate Function test (Yarn, colors in room)
 Other (specify _____)

Visual Acuity
Uncorrected vision (Snellen Units)
 Both Near 20/____ Right Near 20/____ Left Near 20/____
 Both Far 20/____ Right Far 20/____ Left Far 20/____

Corrected vision (Snellen Units)
 Both Near 20/____ Right Near 20/____ Left Near 20/____
 Both Far 20/____ Right Far 20/____ Left Far 20/____

Peripheral Vision
 Right Nasal _____ degrees Temporal _____ degrees
 Left Nasal _____ degrees Temporal _____ degrees

Depth Perception (Type of test: _____)
 Normal Abnormal Number Correct: _____ of _____ tested
 Interpretation: _____ Seconds of Arc

HEARING

	Yes	No
Loud, constant noise or music in the last 14 hours	<input type="checkbox"/>	<input type="checkbox"/>
Loud, impact noise in past 14 hours	<input type="checkbox"/>	<input type="checkbox"/>
Ringing in the ears	<input type="checkbox"/>	<input type="checkbox"/>
Difficulty hearing	<input type="checkbox"/>	<input type="checkbox"/>
Ear infections or cold in the last 2 weeks	<input type="checkbox"/>	<input type="checkbox"/>
Dizziness or balance problems	<input type="checkbox"/>	<input type="checkbox"/>
Eardrum perforation	<input type="checkbox"/>	<input type="checkbox"/>
Do you use a hearing aide?	<input type="checkbox"/>	<input type="checkbox"/>
Are you in a Hearing Conservation Program	<input type="checkbox"/>	<input type="checkbox"/>
Do you use protective hearing equipment	<input type="checkbox"/>	<input type="checkbox"/>
If yes, type(s): <input type="checkbox"/> foam <input type="checkbox"/> pre-mold/plugs <input type="checkbox"/> ear muffs		

Ears

Right	Normal	Abnormal
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Canal/External ear
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Tympanic Membrane
Left	Normal	Abnormal
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Canal/External ear
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/> Tympanic Membrane
Comments/Findings:		

Hearing

Audiogram: With hearing aid? Yes No **Type:** Baseline Annual Termination (Attach current and baseline audiogram)
 (Note: The use of hearing aids is not acceptable for some clearance examinations, such as for law enforcement.)
 Calibration Method: Oscar Biological Date _____

Frequency	500Hz	1000Hz	2000Hz	3000Hz	4000Hz	6000Hz	8000Hz
Right ear							
Left ear							

Review/compare with baseline: No Change Mild Change Significant Threshold Shift (10 dB ave. or more in 2000, 3000, and 4000
 Normal Abnormal **Explain:**

DEPARTMENT OF THE INTERIOR
OCCUPATIONAL HEALTH SERVICES PROGRAM

Medical Review Officer's Qualification Statement

Name of Examined Individual: _____

Physician/Clinic Address: _____

SS#: _____

Date of Birth: _____

Physician/Clinic Phone: _____

POSITION OR FUNCTIONAL CLEARANCE(S) REQUESTED
[please check those positions and/or functional clearances that apply]

<u>Position</u>	<u>Incumbent</u>	<u>Applicant</u>	<u>Functional Clearances</u>	
Law Enforcement Park Ranger	<input type="checkbox"/>	<input type="checkbox"/>	Respirator Use	<input type="checkbox"/>
National Park Service Criminal Investigator	<input type="checkbox"/>	<input type="checkbox"/>	Diver	<input type="checkbox"/>
National Park Service Correctional Officer	<input type="checkbox"/>	<input type="checkbox"/>	Commercial Driver's License	<input type="checkbox"/>
U.S. Fish and Wildlife Service Special Agent	<input type="checkbox"/>	<input type="checkbox"/>	Pilot	<input type="checkbox"/>
Surface Mining Reclamation Specialist	<input type="checkbox"/>	<input type="checkbox"/>	Hazardous Waste Work	<input type="checkbox"/>
Other (specify) _____	<input type="checkbox"/>	<input type="checkbox"/>		

This review is based on:

Report of Medical Examination, Dated: _____

Supplemental Medical Information, Dated: _____

Findings:

No Significant Findings - Individual meets the Department's medical standards and functional requirements of the position.

A Final Determination Cannot be Made Based on Available Medical Information - The following results were inconclusive and require further information or additional testing. Final recommendations cannot be made until this has been completed. The requested information should be provided within 30 days of the review date to the Medical Review Officer at the address noted at the bottom of this page.

Significant Medical Findings - The individual does not meet the Department's medical standards and functional requirements for the safe and efficient performance of the duties of the position.

Date of Medical Initial Review: _____

Reviewing Physician: _____

Date of Medical Final Review: _____

Signature: _____

Reviewer's Address: _____

5 CFR 339.104

Sec. 339.104 Definitions.

For purposes of this part--

Medical documentation or documentation of a medical condition means a statement from a licensed physician or other appropriate practitioner which provides information the agency considers necessary to enable it to make an employment decision. To be acceptable, the diagnosis or clinical impression must be justified according to established diagnostic criteria and the conclusions and recommendations must not be inconsistent with generally accepted professional standards. The determination that the diagnosis meets these criteria is made by or in coordination with a physician or, if appropriate, a practitioner of the same discipline as the one who issued the statement. An acceptable diagnosis must include the following information, or parts identified by the agency as necessary and relevant:

(a) The history of the medical conditions, including references to findings from previous examinations, treatment, and responses to treatment;

(b) Clinical findings from the most recent medical evaluation, including any of the following which have been obtained: Findings of physical examination; results of laboratory tests; X-rays; EKG's and other special evaluations or diagnostic procedures; and, in the case of psychiatric evaluation or psychological assessment, the findings of a mental status examination and the results of psychological tests, if appropriate;

(c) Diagnosis, including the current clinical status;

(d) Prognosis, including plans for future treatment and an estimate of the expected date of full recovery;

(e) An explanation of the impact of the medical condition on overall health and activities, including the basis for any conclusion

that restrictions or accommodations are or are not warranted, and where they are warranted, an explanation of their therapeutic or risk avoiding value;

(f) An explanation of the medical basis for any conclusion which indicates the likelihood that the individual is or is not expected to suffer sudden or subtle incapacitation by carrying out, with or without accommodation, the tasks or duties of a specific position;

(g) Narrative explanation of the medical basis for any conclusion that the medical condition has or has not become static or well stabilized and the likelihood that the individual may experience sudden or subtle incapacitation as a result of the medical condition. In this context, "static or well-stabilized medical condition" means a medical condition which is not likely to change as a consequence of the natural progression of the condition, specifically as a result of the normal aging process, or in response to the work environment or the work itself. "Subtle incapacitation" means gradual, initially imperceptible impairment of physical or mental function whether reversible or not which is likely to result in performance or conduct deficiencies. "Sudden incapacitation" means abrupt onset of loss of control of physical or mental function.

Physician means a licensed Doctor of Medicine or Doctor of Osteopathy, or a physician who is serving on active duty in the uniformed services and is designated by the uniformed service to conduct examinations under this part.

Practitioner means a person providing health services who is not a medical doctor, but who is certified by a national organization and licensed by a State to provide the service in question.

OCCUPATIONAL MEDICINE PROGRAM HANDBOOK

Privacy Act Notification Form

Attachment - D 3 (a)

What follows this page is the DOI Privacy Act Notification Form. It may be used by an employee who is to receive clinical services from which confidential medical information may be gathered. This form needs to be signed only once by an individual employee, and is to be maintained in his/her occupational medical file at the health service delivery site.

U. S. DEPARTMENT OF THE INTERIOR
PRIVACY ACT NOTIFICATION FORM

The following information is provided in order to comply with the requirements of the Privacy Act of 1974, and is consistent with the provisions of 5 CFR 293, 5 USC 2951(2) and 3301, Executive Orders 12107 and 12564, and the Departmental Manual 370 DM 293.

The health services you receive related to your employment with the Department of the Interior result in the gathering and recording of information that is personal and may be highly confidential. Depending on the provider of services (i.e., Departmental, other federal agency, or private health services agency), original documents or copies will be placed in an Employee Medical Folder (EMF), which is a distinct part of your official personnel folder. The EMF is maintained within the Employee Medical File System (EMFS) of the employing Department, Bureau, or individual office. The categories of records contained in your EMF are: 1) occupational medical records; 2) employee exposure records; and 3) records resulting from the testing for use of illegal drugs.

The records may be maintained in a manual or electronic system. Regardless of location, the information these folders contain is yours, and is considered privileged. Protecting the physical security of your record, as well as the information it contains, is the responsibility ultimately of the Department's Director of Personnel, with delegations of responsibility to the heads of the employing bureau or office, and the personnel officer of the employing bureau or office. The provider of clinical services also is held responsible for the security of all confidential information for which they have records.

Unless it is with your written consent, the information in your EMF is only for official purposes as specified by law. Those purposes include the following:

- a. To ensure that records required to be retained on a long-term basis to meet the mandates of law, Executive order, or regulations (e.g., the Department of Labor's Occupational Safety and Health Administration (OSHA) and OWCP regulations), are so maintained.
- b. To provide data necessary for proper medical evaluations and diagnoses, to ensure that proper treatment is administered, and to maintain continuity of medical care.
- c. To provide an accurate medical history of the total health care and medical treatment received by the individual as well as job and/or hazard exposure documentation and health monitoring in relation to health status and claims of the individual.
- d. To enable the planning for further care of the patient.
- e. To provide a record of communications among members of the health care team who contribute to the patient's care.
- f. To provide a legal document describing the health care administered and any exposure incident.
- g. To provide a method for evaluating quality of health care rendered and job-health-protection including engineering protection provided, protective equipment worn, workplace monitoring, and medical exam monitoring required by OSHA or by good practice.
- h. To ensure that all relevant, necessary, accurate, and timely data are available to support any medically-related employment decisions affecting the subject of the records (e.g., in connection with fitness-for-duty and disability retirement decisions).
- i. To document claims filed with and the decisions reached by the OWCP and the individual's possible reemployment rights under statutes governing that program.
- j. To document employee's reporting of on-the-job injuries or unhealthy or unsafe working conditions, including the reporting of such conditions to the OSHA and actions taken by that agency or by the employing agency.
- k. To ensure proper and accurate operation of the agency's employee drug testing program under Executive Order 12564.

The "Routine Uses" of your EMF are summarized on the back of this page.

Your receipt of health services as part of your employment, and your submission of confidential information to your EMF, are **voluntary**. If you do not wish to participate in these services, or provide the requested information, you are not required to do so. However, your continued employment or assignment to specific duties may depend on the availability of complete and current occupational health records. Lacking such information, the Department may be required to take personnel action related to your employment.

ACKNOWLEDGMENT OF REVIEW OF PRIVACY ACT INFORMATION

I have reviewed the Department of the Interior Privacy Act Notification Form and understand the use of my confidential medical information within the Department's Employee Medical File System.

(Signature)

(Date)

ROUTINE USES ALLOWED FOR EMPLOYEE MEDICAL FILE SYSTEM RECORDS

- a. To disclose information to the Department of Labor, Department of Veterans Affairs, Social Security Administration, Federal Retirement Thrift Investment Board, or a national, State, or local social security type agency, when necessary to adjudicate a claim (filed by or on behalf of the individual) under a retirement, insurance, or health benefit program.
- b. To disclose information to a Federal, State, or local agency to the extent necessary to comply with laws governing reporting of communicable disease.
- c. To disclose information to another Federal agency, to a court, or a party in litigation before a court or in an administrative proceeding being conducted by a Federal agency when the Government is a party to the judicial or administrative proceeding.
- d. To disclose information to the Department of Justice, or in a proceeding before a court, adjudicative body, other administrative body before which the agency is authorized to appear, when:
 1. The agency, or any component thereof; or
 2. Any employee of the agency in his or her official capacity; or
 3. Any employee of the agency in his or her individual capacity where the Department of Justice or the agency has agreed to represent the employee; or
 4. The United States, where the agency determines that litigation is likely to affect the agency or any of its components, is a party to litigation or has an interest in such litigation, and the use of such records by the Department of Justice or the agency is deemed by the agency to be relevant and necessary to the litigation, provided, however, that in each case it has been determined that the disclosure is compatible with the purpose for which the records were collected.
- e. To disclose in response to a request for discovery or for appearance of a witness, information that is relevant to the subject matter involved in a pending judicial or administrative proceeding.
- f. To disclose pertinent information to the appropriate Federal, State, or local agency responsible for investigating, prosecuting, enforcing, or implementing a statute, rule, regulation, or order when the disclosing agency becomes aware of an indication of a violation or potential violation of civil or criminal law or regulation.
- g. To disclose information to the Office of Management and Budget at any stage in the legislative coordination and clearance process in connection with private relief legislation as set forth in OMB Circular No. A-19.
- h. To disclose information to a congressional office from the record of an individual in response to an inquiry from the congressional office made at the request of that individual.
- i. To disclose information to the Merit System Protection Board or the Office of the Special Counsel, the Federal Labor Relations Authority and its General Counsel, the Equal Employment Opportunity Commission, arbitrators, and hearing examiners to the extent necessary to carry out their authorized duties.
- j. To disclose information to survey team members from the Joint Commission on Accreditation of Hospitals (JCAH) when requested in connection with an accreditation review, but only to the extent that the information is relevant and necessary to meet the JCAH standards.
- k. To disclose information to the National Archives and Records Administration in records management inspections and its role as Archivist.
- l. To disclose information to health insurance carriers contracting with the Office to provide a health benefits plan under the Federal Employees Health Benefits Program information necessary to verify eligibility for payment of a claim for health benefits.
- m. By the agency maintaining or responsible for generating the records to locate individuals for health research or survey response and in the production of summary descriptive statistics and analytical studies (e.g., epidemiological studies) in support of the function for which the records are collected and maintained. While published statistics and studies do not contain individual identifiers, in some instances the selection of elements of data included in the study might be structured in such a way as to make the data individually identifiable by inference.
- n. To disclose information to the Office of Federal Employees Group Life Insurance or Federal Retirement Thrift Investment Board that is relevant and necessary to adjudicate claims.
- o. To disclose information, when an individual to whom a record pertains is mentally incompetent or under other legal disability, to any person who is responsible for the care of the individual, to the extent necessary.
- p. To disclose to the agency-appointed representative of an employee, all notices, determinations, decisions, or other written communications issued to the employee, in connection with an examination ordered by the agency under--
 - (1) Medical evaluation (formerly Fitness for Duty) examinations procedures; or
 - (2) Agency-filed disability retirement procedures.
- q. To disclose to a requesting agency, organization, or individual the home address and other information concerning those individuals who it is reasonably believed might have contracted an illness or been exposed to or suffered from a health hazard while employed in the Federal workforce.
- r. To disclose information to a Federal agency, in response to its request or at the initiation of the agency maintaining the records, in connection with the retention of an employee, the issuance of a security clearance, the conducting of a suitability or security investigation of an individual, the classifying of jobs, the letting of a contract, or the issuance of a license, grant, or other benefit by the requesting agency; or the lawful, statutory, administrative, or investigative purpose of the agency, to the extent that the information is relevant and necessary to the requesting agency's decision on the matter.
- s. To disclose to any Federal, State, or local government agency, in response to its request or at the initiation of the agency maintaining the records, information relevant and necessary to the lawful, statutory, administrative, or investigatory purpose of that agency as it relates to the conduct of job related epidemiological research or the insurance of compliance with Federal, State, or local government laws on health and safety in the work environment.
- t. To disclose to officials of labor organizations recognized under 5 U.S.C. chapter 71, analyses using exposure or medical records and employee exposure records, in accordance with the records access rules of the Department of Labor's OSHA, and subject to the limitations at 29 CFR 1910.20(e)(2)(iii)(B).
- u. To disclose the results of a drug test of a Federal employee pursuant to an order of a court of competent jurisdiction where required by the United States Government to defend against any challenge against any adverse personnel action.
- v. To disclose information to contractors, grantees, or volunteers performing or working on a contract, service, grant, cooperative agreement or job for the Federal Government. Policies and practices of storing, retrieving, safeguarding, and retaining and disposing of records in the system

OCCUPATIONAL MEDICINE PROGRAM HANDBOOK

Authorization for Disclosure of Information Form Attachment - D 3 (b)

What follows this page is the DOI Authorization for Disclosure of Information Form. It may be used by an employee who is authorizing the release of information from a health care or occupational health services provider to any other recipient of such information, including management personnel in the employee's bureau, another DOI office, or any other person/program to whom the employee wishes to allow access to his/her confidential medical records.

U. S. DEPARTMENT OF THE INTERIOR

AUTHORIZATION FOR DISCLOSURE OF INFORMATION FORM

The following information is provided in order to comply with the requirements of the Privacy Act of 1974, and is consistent with the provisions of 5 CFR 293, 5 USC 2951(2) and 3301, Executive Orders 12107 and 12564, and the Departmental Manual 370 DM 293. The release of information about a patient who is treated or referred for treatment of alcohol or drug abuse, or the medical results of such abuse, is governed by the Confidentiality of Alcohol and Drug Abuse Patient Record Regulations, 42 CFR, Part 2. Any person who knowingly and willfully requests or obtains any record concerning an individual from a Federal agency under false pretenses shall be guilty of a misdemeanor and fined not more than \$5,000 (5 USC 552a(I)(3) and in the case of alcohol and drug abuse patient records a falsified authorization of disclosure is prohibited under 42 CFR 2.31(d) and is punishable by a fine of not more than \$500 for a first offense or a fine of not more than \$5,000 for a subsequent offense in accordance with 42 CFR 2.14.

TO:

(Name of Health Services Provider -- Custodian of the Records to be Released)

(Address)

You are hereby authorized to furnish information from the record of:

(Name of Subject Individual)

An employee (or prior employee) of:

(Bureau/Office/Agency)

The records are to be released to the following recipient:

(Name of Individual or Entity to Receive the Information)

(Address)

The inclusive dates for the information that is to be released, and the **specific information to be released**, are:

From _____ To _____

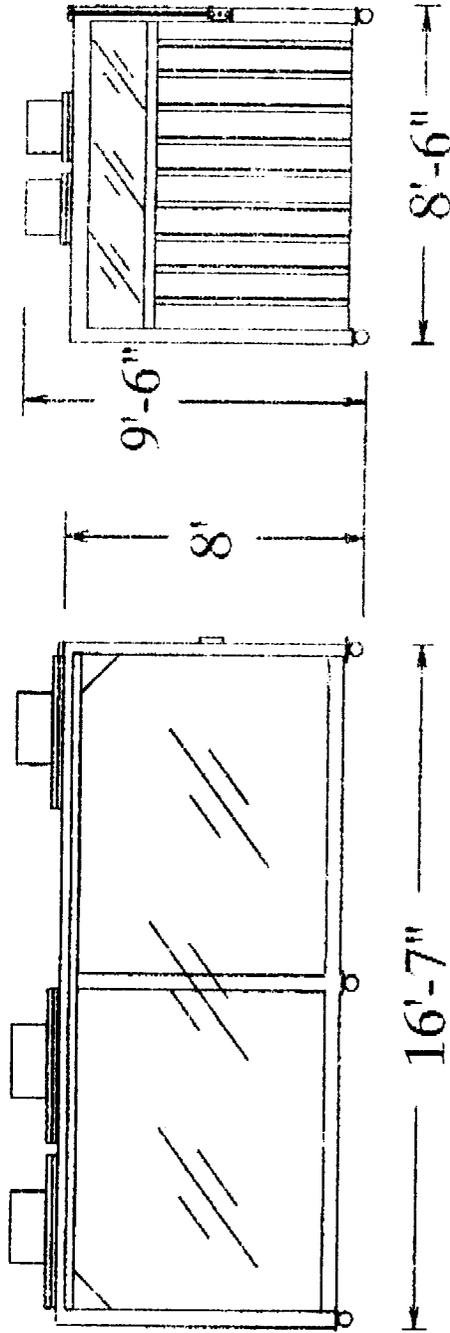
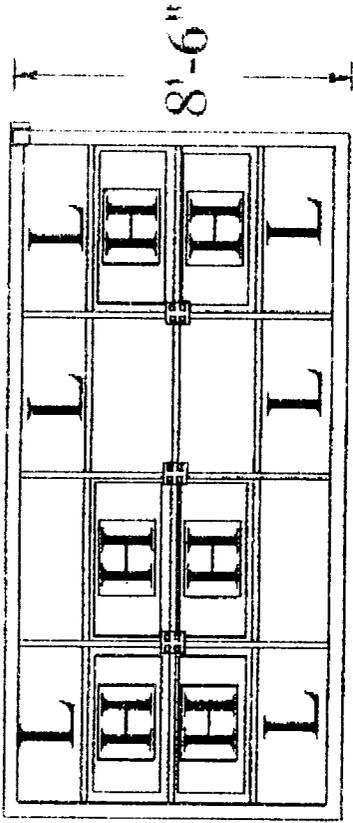
The release is for the following specific purpose:

- | | |
|--|---|
| <input type="checkbox"/> COMPENSATION CLAIM(S) | <input type="checkbox"/> INSURANCE CLAIM(S) |
| <input type="checkbox"/> PRIVATE PHYSICIAN | <input type="checkbox"/> ATTORNEY |
| <input type="checkbox"/> SELF | <input type="checkbox"/> OTHER |

If this authorization has not otherwise been revoked or has not expired in accordance with the terms of the duration statement provided above or has not been given for a longer period as set forth in the duration statement, it will terminate one year from the date of the signature.

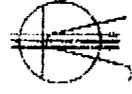
Signature:	Date:
Signature of Parent or Guardian, if Subject is a Minor:	If the signer is other than the subject individual, indicate the relationship or authority for this request:

Attachment 4.



MODEL# PCFMSX16-10K NOTES

- 1) MOTORIZED CEILING HEPA MODULES: 6 EA CFM248
- 2) FRAME: 2" X 2" TUBE STEEL FRAME WELDMENT WITH 1" X 2" CEILING CROSS MEMBERS. MOUNTED ON 6 EA SWIVEL LOCK CASTERS WITH POLY TIRES. SPRAY ON WHITE POLYURETHANE PAINT FINISH.
- 3) LIGHTS: 6 EA 2' X 4' CLEAN ROOM LIGHT FIXTURES WITH ENERGY SAVING T 8 WATT SAVER LIGHTING SYSTEM.
- 4) CLEAR ANTISTATIC PVC ENCLOSURE: 2 EA 20 MIL PANELS 16'-5" W X 7'H, 2 EACH 40 MIL STRIP DOORS 8'-4" W X 8'H. PVC MOUNTED ON A SPECIALLY DESIGNED CLEAR ANODIZED ALUMINUM TRACK MOUNTING SYSTEM.
- 5) ELECTRICAL: 3 EA QUAD OUTLETS ON TOP OF CEILING. OPERATING AMPERAGE OF 36 AMPS AT 115 VAC. PUSH BUTTON CONTROL BOX LOCATED ON LEG. SPEED CONTROLLERS LOCATED INSIDE EACH BLOWER HOUSING.



AIR APPLITEC, INC.

HOLLISTER, CA GEN CONT LIC# 54810
 TEL: 408-638-0256, FAX: 408-638-0258

REVISIONS		CUSTOMER: DEPARTMENT OF INTERIOR	
NO.	DATE	BY	DATE
		PCFMSX16-10K	
		SCALE	WT
		CATEGORY	DESIGN
			ISSUED

