

EMERGENCY SANITATION

During an earthquake or other major disaster, essential services are often damaged or disrupted for a period of time including water, sewer, electricity, and garbage pick-up. Many people often get unnecessarily sick and die after these events because 1) they don't have clean water, 2) don't dispose of their waste properly, and/or 3) don't practice adequate personal hygiene. During times of emergency it is critical that sanitation be strictly observed.

Think about it. You may not be able to get water from your taps. You may not be able to send anything through the toilet and other sewer drains of your home. How will you bathe, do laundry, use the toilet, etc? How can you keep sewer from backing up into your home? This would change your life! These problems may be short-term, lasting only a few days; or long-term lasting months or indefinitely. You will need to know how to obtain clean water. It is important to realize that clean water will most likely be in short supply and will need to be used sparingly and very wisely.

Personal Hygiene

Hand Washing / Sanitizing

- Keeping hands clean by washing often with soap and/or with use of sanitizer is extremely important--especially before preparing food and eating, after going to the toilet or changing diapers, assisting an ill person, or handling possibly contaminated material.
- Wash hands for at least 20 seconds, making sure to clean under the finger nails. Air dry your hands as towels can harbor germs.
- Have a place prepared near the toilet and in the kitchen to wash or sanitize hands.
- Be sure to cover your mouth when coughing and sneezing. Use a tissue or cough and sneeze into your upper sleeve rather than your hands.
- Teach family members, especially children, proper hygiene habits. Make sure children wash hands often.

Body

- **Sponge Water Baths:** Use a small amount of water and sponge/washcloth to wash. Share water, if possible, (if there is no illness) cleanest to dirtiest. A squirt bottle filled with water could also be helpful for bathing with minimal water. Baby wipes can be used as well—a bath in a box!
- **Shower:** Portable solar and propane heated showers are available. Besides showering, they can help in heating water for other purposes. Portable privacy enclosures can also be helpful outdoors.

Hair

- For short-term use, No Rinse shampoo doesn't require water--just apply, massage, and towel dry.
- Wetting hair with a squirt bottle and sharing water are ways to wash hair with minimal water.
- Brush your hair often. Women used to brush their hair 100 times a day with a natural bristled brush to help cleanse and stimulate the scalp and to distribute the natural oils through the hair.
- Wear hats and bandanas.

Personal Hygiene supplies to have on hand:

Essential: Soap, hand sanitizer, shampoo, wash cloths, towels, toothbrush, toothpaste, floss, squirt bottle, bowl or small tub. Extra: Solar or propane shower, large tub, portable enclosure.

Garbage/Human Waste/Greywater Disposal

What will you do if your toilet stops flushing and no one is coming to take your garbage away? If an emergency like this happens you **MUST** find a way to safely dispose of the human waste (sewage), waste water (greywater) and garbage yourself or disease and sickness will flourish in your home and community.

The three most important things to do are:

1. Store all garbage and human waste in covered containers or bury at least 100 feet away from water wells or open water to avoid contaminating water sources.
2. Store all garbage and human waste in covered containers or bury at least 18 inches deep to keep flies, roaches and animals out.
3. Wash or clean your hands whenever you handle something dirty, **BEFORE** you touch something that might be touched by someone else.

Garbage

Garbage is trash that has food or anything else in it that would attract insects, rats or other critters. It should not be allowed to accumulate where these pests can get into it. In an emergency, the city will do everything it can to help dispose of garbage in a timely fashion, but there may be a delay in garbage pick-up services. We need to know what to do with it in the meantime.

Short-term garbage disposal: If garbage service is expected to resume or a garbage drop-off place is designated within a week or two, then dry garbage should be tightly sealed in bags or kept in tightly covered garbage cans.

Long-term garbage disposal: If garbage service is out for several weeks or longer and you are unable to store it, then whatever can't be reused, fed to animals, or composted should be buried or burned. We will be advised by authorities how best to dispose of it. Avoid keeping garbage inside your home or shelter.

Methods of Disposal

- **Bagging:** Crush containers to make them smaller. Garbage should be drained before being placed in storage containers. If liquids are strained away, garbage may be stored for a longer period of time without developing an unpleasant odor. Keep all garbage in a closed container. A tight-fitting lid is important to keep out flies and other insects and critters.
- **Burning:** To burn garbage, use a metal barrel with holes in the bottom and a grate or screen over the top to act as a spark arrester to prevent wildfires. Only dry paper-type garbage should be burned. Wet garbage should be buried. Only burn if permission is granted by authorities.
- **Burying:** If no space is available in covered containers, dig a hole deep enough to cover trash with at least 18-24 inches of dirt, which will prevent insect breeding and discourage animals from digging it up.
- **Composting:** You can compost just about anything that was once living. Meat scraps, dairy products and fatty foods take longer to break down so they are often not suggested for composting. Composted material turns back into soil so there is no waste!
- **Recycling:** Recycle or reuse any garbage that can be (empty plastic containers, etc.).

Garbage supplies to have on hand:

Heavy Trash bags; rubber gloves; shovel; covered trash cans; metal barrel with screen for burning; composting pile or device.

Human Waste

In an emergency, the city will do everything it can to help dispose of human waste and/or provide alternate toilet facilities as soon as possible, but there may be a period of time before this happens. We need to know what to do in the meantime.

Sewage back-up: If there is a possibility the sewer lines have been compromised in your area, you need to immediately begin these steps to protect your home from sewage back-up. Once you have done this, do not allow anything to go down any toilet or drain until you have been given the OK by proper authorities.

- **Homes with back-flow valves:** If you know your home has a back-flow valve installed in your sewer line, understand that the slightest amount of water put down your drains could open up the valve and allow sewage into your home. 1) Turn off the water to your home. 2) Flush toilets until there is no water in them. 3) Close sink and tub plugs. 4) Cover sinks and toilets with signage reminding family members not to let anything down the drains. 5) Set up alternate hand-washing and toilet facilities.
- **Homes without back-flow valves:** If you do not have a back-flow valve or do not know if you have one installed in your sewer lines, immediately start blocking all drains below street level to keep sewage from backing up into your home. 1) Turn off water. 2) Flush toilets until there is no water in them. 3) Plug all basement floor, shower/tub, and toilet drains with a rubber ball or plumbing test plug.

The plumbing test plug or rubber ball should be very tight fitting once in place. Balls should be made of solid squishable rubber. They can be cut with a knife to make the right size. You can place the ball in an old sock, covered in Vaseline/shortening or other grease (prevents backup smells) to make removal easier. If you do not have balls, the next best thing is to take grease smothered rags and stuff them into the drains. This won't make as good of a seal, but may be better than nothing.

If raw sewage has entered the home, EVACUATE!! It is no longer safe and will smell awful.

Emergency Toilets

Short-Term Solutions: Set up a temporary toilet facility. Once the toilet facility is set up, add one of the following to the toilet to aid in decomposing and odor control:

- Add sand, dirt, saw dust, or cat litter to cover the deposit each time the toilet is used (cheap!).
- Add toilet chemical according to package directions.
- Add 1 tbsp. lime (Home Depot in brick section) and 1 tbsp. Borax (or other disinfectant) each time the toilet is used.
- Add absorbent powder (janitorial supply stores). This deodorizes and gels liquid waste, so you can collect liquid and solid waste together without it getting sloshy. Add 1 tbsp. to start, and add more as needed.
- Use Wag Bag or Poo Powder, Restop 2, Double Doodie w/Bio-Gel or other products that are land-fill safe and allow you to throw the solid waste into the garbage (thepett.com, whennaturecalls.com, relianceproducts.com, or outdoor/camping stores).

Home Toilet Conversion: 1) Turn of the water valve to the toilet. 2) Wash the toilet bowl and flush toilet to empty reserve. 3) Dry the bowl and plug the hole as explained previously. 3) Line the bowl with a sturdy plastic bag and tape down with duct tape. 4) Put another heavy-duty trash bag inside the toilet and either tape down or lower seat to hold in place. 5) Keep toilet covered when not in use using a piece of cardboard place between the bowl and the seat. 6) Change the bag when 1/2 full.

Portable Toilets: These are helpful if you need to evacuate. There are many different types of portable toilets available (Luggable Loo, Hassock, Pett, etc.). They can be made at home with a used bucket, or purchased online or at any outdoor/camping or emergency preparedness store. Use them like the Home Toilet Conversion. Large families might want to have two.

Portable Chemical Toilet: These portable toilets are similar to an RV toilet, in that you flush the waste into a closed small holding tank rather than an open plastic bag. This helps control odors and is more sanitary to not have an open container of human waste. These work best with toilet chemical. Do not use absorbent gel powders with these toilets as it will make it harder to empty. Put used toilet paper into a different container so the holding tank doesn't fill up too fast. Later, bury or burn the used toilet paper. Once the holding tank is full, dispose of the waste properly as described below.

Human feces are toxic and need to be buried or disposed of in a proper human waste disposal site. Urine is generally sterile and is safe to pour outside. You can separate the two and pour the urine outside to decrease volume and sloshiness, but it is not necessary. To dispose of solid waste: 1) tightly close the bag. 2) Put in a pail or something sturdy to move it so it doesn't split open during transport. 3) Put the bag in a covered garbage can designated just for human waste, or buried at least 18" deep (to keep animals from smelling it and digging it up). If it is being buried temporarily, leave extra dirt piled so you remember where you buried it. To bury it permanently, poke holes in the bag after it is put in the hole, or empty the bag's contents and bury it and the bag into the hole, then cover with lime and fill in with dirt.

Long-Term Solutions:

- **Trench Latrine:** Dig a pit 4-6 feet deep and 1 foot wide. Place a bucket/box/ barrel or anything with a hole in it to sit on over the pit. You **MUST** cover the pit and toilet tightly so that flies cannot get in it while no one is using it. Clean seat regularly with water/bleach solution. When the pit fills to within 18 inches of the top, fill the hole with clean dirt and mound it over.
- **Composting Toilets:** A composting toilet system converts human waste into an organic compost and usable soil. It is an expensive set-up and would require a little research, but ultimately is the best long-term solution. More information can be found in the Humanure Handbook. It can be downloaded for free at <http://www.weblife.org/humanure>.

Suggested human waste disposal items to have on hand:

Hygiene: Short-term: Toilet Paper (6 rolls per person, per month), wet wipes. Long-term: Cloth wipes-- reusable TP (6-8" squares made of terry cloth, diaper flannel, or double thick flannel; rags. Put in borax/water after use, then wash); newspaper, phonebooks, or magazines. Peri Bottles - used to rinse off.
Additives for Home Toilet or Portable Toilet: Options are described above under Short-Term Solutions.
Other important items: Toilet; toilet brush, sanitizer, rubber gloves; shovel; heavy-duty trash bags, covered trash cans; hand-washing facilities; fly swatter; portable privacy enclosure, outhouse, or items for home-made enclosure (ropes, PVC pipe, sheets/shower curtains/tarps, etc.) .

Greywater

Greywater from washing hands, hair, body, dishes, laundry, will need to be poured out. Greywater can be contaminated with harmful bacteria and chemicals. Use these safe greywater disposal rules:

- Use biodegradable soaps and cleaners
- Pour out 100 ft from open bodies of water and water wells
- Do not drink greywater
- Don't come in physical contact with greywater (wash promptly if you accidentally do)
- Don't allow greywater to come in contact with edible portions of food crops

- Don't allow greywater to pool on the surface of the ground
- Don't allow greywater to run off your property.
- Can be used to water plants
- Discard organic material (compost) and/or filter wastewater with large amounts of grease through a grease trap. (See the Humanure Handbook for ideas of how to create effective and useful greywater drainage systems.)

Grease Trap: 1) Take an old barrel or bucket with no top and bore holes in the bottom. 2) Fill with gravel 6-8 inches. 3) Add sand or wood ashes for 12 inches. 4) Cover with burlap, straw, grass, or similar material to strain out grease and particles--this should be changed often. 5) Place over a soakage pit or elevated to allow throughput to run in desired direction. Again, this should be 100 feet from any possible water source.

Feminine Hygiene

Having disposable feminine hygiene products on hand is obviously a good idea. However, what would you do if during a long-term situation disposable products were not available and you ran out of your existing supply? There are several ideas and products to fill this need.

Cloth menstrual pads:

- Cloth diapers, socks, or other absorbent material folded and pinned on or held in place with underpants.
- There are many commercially made reusable cloth sanitary pads for sale on the internet (clothpads.org, tlc-pads.com, gladrags.com, lunapads.com, goddessmoons.com, etc.).
- There are also patterns and instructions to make your own. (clothpads.org, <http://www.tinybirdsorganics.com/organiccotton/clothpads.html>, <http://www.hillbillyhousewife.com/sanitarypads.htm>, <http://www.diapersewing.com/clothpads.htm>)

Cloth menstrual pad care: After they have been used, put in a small covered bucket with cold water (vinegar, borax, baking soda, or peroxide may be added) to soak. Empty soaking bucket daily. Launder pads, but do not use fabric softeners or dryer sheets as they reduce the absorbency.

Menstrual cups: There are several reusable menstrual cups available on the market (Diva cup, Moon cup, Keeper, etc.) that are made of silicone or latex rubber. They are worn internally like a tampon. (<http://www.labyrinth.net.au/~obsidian/clothpads/Cups.html>, keeper.com, divacup.com)

Menstrual cup care: After use, empty cup, rinse, and reinsert. After your period, rinse in soapy water or 1 to 9 part vinegar/water solution and store until next month.

Feminine hygiene items to have on hand:

Short term: toilet paper, disposable pads and tampons, baby wipes

Long term: reusable cloth wipes, cloth menstrual pads, menstrual cup, peri bottle, bucket for soaking, vinegar.

Diapers

Having disposable diapers on hand is also a good idea. However, again, if you ran out during a long-term situation, having some type of reusable diapers on hand may be helpful.

Cloth diapers: From flat to all-in-ones and pins to diaper wraps, cloth diapering has changed over the years. For a description of the types now available go to <http://www.chooseydiapers.com/guide.shtml>. Also try clothdiaper.com, diaperpin.com, pinstripesandpolkadots.com, diaperjungle.com, etc.).

Cloth diaper care: Shake solids into toilet and rinse if necessary. Store in dry pail. Launder using half of the recommended amount of mild laundry detergent, free of dyes, fragrances or any types of bleach. Add 1/2 cup baking soda or washing soda (optional). Rinse **twice** adding 1/2 cup to 1 cup white vinegar to the second rinse. Air dry in the sunshine. Do not use fabric softeners or dryer sheets. They reduce the absorbency.

Diapering items to have on hand: disposable diapers, cloth diapers, pins and rubber pants or modern equivalent, baby wipes, changing pad, diaper rash ointment, reusable cloth wipes, pail

Laundry

In emergencies that last longer than a few days, you may need to do laundry by hand. Here's how!

Pre Wash: Before washing clothes, sort according to color and dirtiness. Pre-treat problem spots. Let clothes soak in soapy water at least 1 hour or overnight, if possible. Wash whites first, using hot or warm water if possible, followed by coloreds, washing the dirtiest clothes last. Wring clothes between washing and rinsings to help get out soap and dirt.

Washing and rinsing: Here are a couple of methods for doing laundry by hand. Please note that two good rinsings are needed to get the soap and dirt out well.

- **Hand Washing:** You can wash laundry in a tub scrubbing, scrunching and swishing items around with your hands and against each other; using a floor scrubbing brush or washboard on clothes that are very dirty. Use another tub or two for rinsing, or let the dirty water out, fill up again with clean water, swish laundry all about, let water out again, fill tub up with clean water again, swish laundry about, then the clothes are clean and rinsed.
- **Hand-Held Agitator:** Use a 5-6 gallon bucket with a 2" hole cut in lid and a hand-held agitator i.e., a clean toilet plunger with rubber suction cup or a commercially made hand held agitator (The Breather (breathingwasher.com), Rapid Washer (Lehmans.com)). Just raise and lower the hand-held agitator. Use another bucket or two for rinsing or empty dirty water out and fill with clean water for rinsing.

Washboard or Soft Brush: Use these items for really dirty clothes (Lehmans.com). To use a washboard, rub the clothes back and forth like you were cleaning the washboard with the clothing.

Wringing and Drying

Wringing: Wring items out to remove excess dirt, soap and/or water after washing and rinsing twice using one of the following methods:

- Twist and squeeze clothes. Twisting around a stick may not be as hard on your hands.
- Use a mop bucket with a wringer to wash and wring out clothes. Washboards sit in there well.
- Run clothing through a clothes ringer (windtrax.com, Lehmans.com, Ebay, 2nd hand Store). This is more expensive, but is much easier and works better than the other methods.

Drying: You can hang dry your laundry outside year round using a clothesline and clothes pins or inside using drying racks.

More laundry helpful hints:

- Water doesn't have to be drinkable, only clean.
- Hand washing gets hard-to-clean clothes cleaner than any machine will.
- Linens and clothing used in caring for the sick should be bleached and/or boiled if possible.
- Set tubs or buckets on a bench to save bending over.
- Drying clothing in the sunlight will kill germs and parasites.
- Save rinse water for your next wash water.
- To save on the amount of laundering, wear clothes more often before washing.

Suggested laundry supplies to have on hand:

Tubs or buckets, hand-held agitator, heavy rubber gloves (to protect hands), clothes line, clothes pins, laundry soap, and washboard/brush.

Laundry Soap

When washing laundry by hand, any laundry soap will do, but knowing that you will be pouring it out onto the ground, using soap that is eco-friendly is ideal. Here are a few home-made laundry soap recipes that are very inexpensive, eco-friendly, and work great! Ingredients are easily found at most grocery stores.

Homemade Dry Laundry Detergent

(1 tsp in laundry bucket, 1 Tbsp in front loading washer, 2 Tbsp in top loading washer)

1 cup Bar Soap--grated into fine flakes (1/2 bar of Fels Naptha /Zote or 1 bar of Ivory)
1 cup 20 Mule Team Borax
1 cup Arm & Hammer Super Washing Soda

Homemade Liquid Laundry Soap (hard water version)

(1/2 - 3/4 cup per load/64 loads) \$0.02 per load

6 cup Hot Water
1/2 bar Fels Naptha Soap, finely grated (can use Zote or Ivory) see above
3/4 cup Arm & Hammer Washing Soda
3/4 cup 20 Mule Team Borax
2 gal. bucket w/ lid to mix in
4 cup Hot water
1 gal. + 6 cup cold water
1/2 -1 oz. essential oil (for fragrance) Optional

Mix grated soap in a sauce pan with 6 cup hot water and heat on low until dissolved. Stir in Washing Soda and Borax. Stir until thickened and remove from heat. Put 4 cups hot water to bucket, add soap mixture and mix well, add in essential oil (opt). Add cold water stir. Let sit for 24 hours and it will gel. Store covered or used liquid laundry soap bottles; keep labeled. This is a low sudsing soap.

(1 box of washing soda, 2 boxes of borax, 9 bars soap will make a year's supply of soap.)

Homemade Fabric Softener

Small Batch

2 cups water
1 cup baking soda
1 cup vinegar
2-3 Tbsp. hair conditioner

Large Batch

6 cups water
3 cups baking soda
3 cups vinegar
1/2 cup hair conditioner

Place baking soda in a large bowl and pour vinegar over it; while it is bubbling, pour cold water in and mix. Once mixture is thoroughly combined add hair conditioner. Store in a sealed container and shake well before using (the baking soda tends to settle on the bottom, so shake well before each use. Add 1/4 cup of mixture to rinse water. Use 1/2 to 2/3 cup if using in your electric washing machine.

Dishes & Food Preparation Surfaces

Washing Dishes: Wipe out dishes, pans, etc., before washing to keep your water cleaner. Wash dishes with dish soap and hot water whenever possible.

Rinsing: Ideally, in absence of running hot water, a double rinse would be best. First rinse is a hot rinse. Second rinse is a hot rinse with bleach (2 tablespoons of liquid bleach to a gallon of water) or Steramine. If the ideal can't be done, do the best you can do.

Drying: Allow dishes to air dry on a rack (germs can hide in towels). You can sanitize dishes in a solar cooker (leave in for 1 hour in full sun).

Cleaning Food Preparation Surfaces: Clean all surfaces with a disinfectant before and after food preparation. There are many disinfectants that could work for this purpose, but bleach (2 tablespoons liquid bleach to 1 gallon of water) or hydrogen peroxide and vinegar alternately applied work well and are inexpensive. Steramine is used for sanitizing in the restaurant industry. It is also an inexpensive option for sanitizing food preparation surfaces and as a second rinse for dishes.

Other Ideas

- Paper Products (cups/plates/utensils/napkins) are useful in short-term situations.
- Be careful storing, handling, and eating of food to avoid illnesses.
- Be sure to wash hands after handling uncooked meat.

Suggested supplies to have on hand:

2-3 small tubs, dish soap, dishcloths, paper towels, hand towels, scrubbing sponge or brush, dish draining rack, surface disinfectant.

Recommended cleaning/disinfecting products

Our cupboards are full of various cleaning products, but there are a few basic products that would be worth having on hand because of their cost effectiveness, useful properties, and versatility. With these few products, you could practically clean and disinfect everything in your home, including laundry.

Vinegar: Go to www.versatilevinegar.org for a long list of uses. Besides being used in salad dressings, marinades, and other food recipes, vinegar can be used for health, for household cleaning including floors, windows & walls, kitchen and bathroom (disinfectant properties), lawn and garden, laundry (eliminates soap residue when added to laundry rinse water, breaks down uric acid in laundry) and more.

Baking Soda: Go to <http://www.armhammer.com/basics/magic/> for a long list of uses. Baking soda is a deodorizer, stops mold, mildew, and is a natural whitener. It neutralizes stomach acid, cleans kitchen and bathroom surfaces, acts as a gentle scouring powder, smothers small fires, and is a great laundry booster.

Borax: Go to <http://www.dialcorp.com/documents/borax.pdf> for a long list of uses. It cleans, deodorizes, disinfects and softens water naturally (excellent laundry booster and effective as a household cleaner (do not use on food surfaces)). It also repels cockroaches, ants and other bugs.

Hydrogen Peroxide: Go to <http://www.using-hydrogen-peroxide.com/> for a long list of uses. It cleans and disinfects wounds, removes blood stains in fabric, is used as a disinfectant in kitchen and bathroom, cleans cutting boards, can be used as a laundry bleach, can be used as a mouthwash.

Rodent, Insect, & Fly Control

Before and after a disaster, controlling the spread of rodents, insects, & flies can help deter the spreading of many diseases.

Rodents

Rats and mice can carry infections and diseases that can be transmitted to humans. These diseases include: the plague, salmonellosis, leptospirosis, murine typhus, rickettsialpox, lymphocytic choriomeningitis, rat-bite fever, hantavirus hemorrhagic pulmonary syndrome, hemorrhagic fevers, Venezuelan equine encephalitis, Powassan encephalitis, rabies, Rocky Mountain spotted fever, and tularemia, as well as parasites such as trichinosis, eosinophilic meningitis, and taeniasis.

The transmission of these infections to humans occurs by indirect contact. Some are transmitted through contact with infected rodent urine or feces, others through fleas and lice, and still others through mosquito bites.

What to do:

- Store food in secure containers to protect from rodents
- Prevent breeding grounds by keeping area clean
- Store traps and poisons

Insects

Not only would any kind of insect infestation be an undesirable situation, many insects spread disease. Fleas, mosquitoes, ticks, and lice have been known to spread diseases such as: plague, encephalitis, West Nile virus, dengue fever, malaria, Rift Valley fever, Yellow Fever, babesiosis, Crimean-Congo hemorrhagic fever, ehrlichiosis, Lyme disease, Rocky Mountain spotted fever, Southern tick-associated rash illness, tick-borne relapsing fever, and tularemia.

What to do:

- Store food in secure containers and keep in a cool, dry place
- Prevent breeding grounds by keeping area clean
- Eliminate standing water, as it is a breeding ground for mosquitoes

Flies

Houseflies are carriers of easily communicable diseases. It takes only a matter of seconds for them to transfer these pathogens to food or touched surfaces. Diseases carried by houseflies can include: typhoid, cholera, dysentery, salmonella, anthrax, tuberculosis, conjunctivitis, poliomyelitis, and leprosy. They have also been known to transmit the eggs of parasitic worms.

What to do:

- Keep area free from garbage and waste products
- Keep temporary toilet facilities covered at all times
- Store insect repellent and bug killers
- Store fly swatters and/or traps and use them