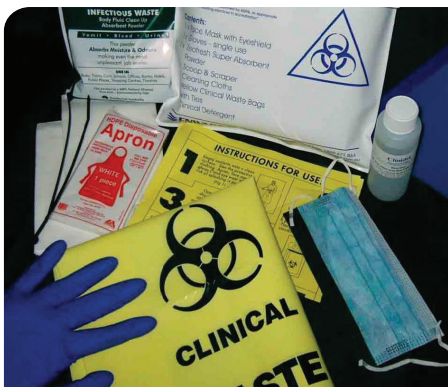
Safety Plans
What You Need to Know



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What You Need to Know

Center for Health, Environment & Justice

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Mentoring a Movement

Empowering People

Preventing Harm

About the Center for Health, Environment & Justice

CHEJ mentors the movement to build healthier communities by empowering people to prevent the harm caused by chemical and toxic threats. We accomplish our work by connecting local community groups to national initiatives and corporate campaigns. CHEJ works with communities to empower groups by providing the tools, strategic vision, and encouragement they need to advocate for human health and the prevention of harm.

Following her successful effort to prevent further harm for families living in contaminated Love Canal, Lois Gibbs founded CHEJ in 1981 to continue the journey. To date, CHEJ has assisted over 15,000 groups nationwide. Details on CHEJ's efforts to help families and communities prevent harm can be found on www.chej.org.

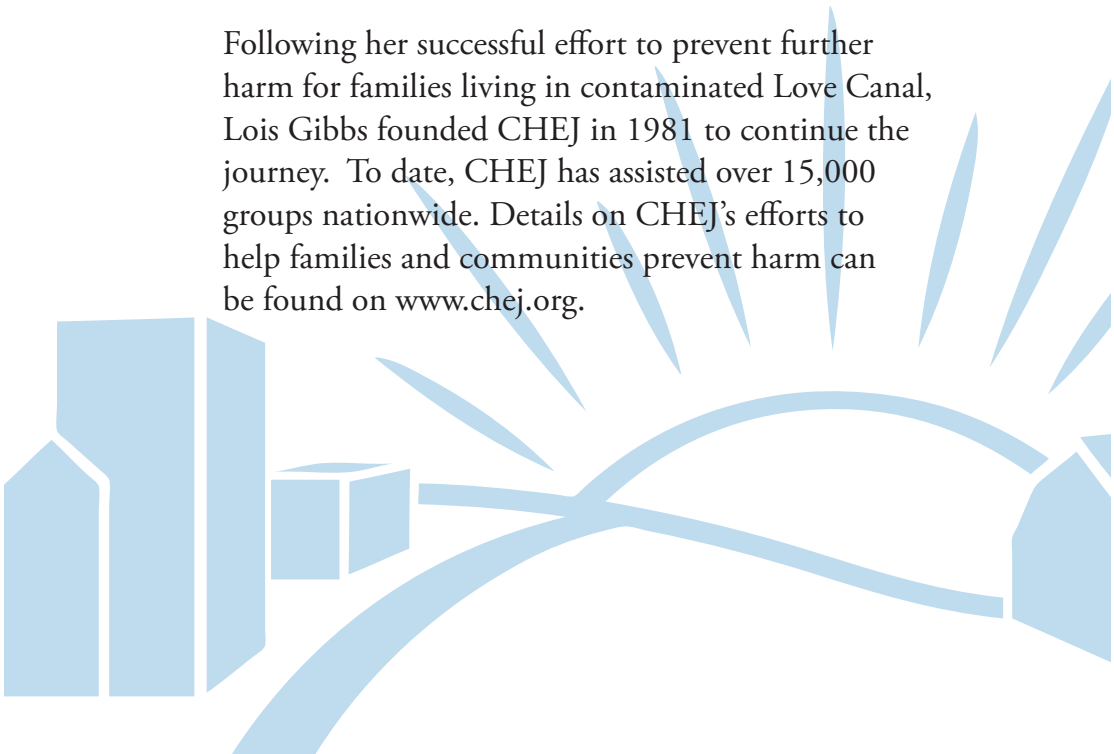

Table of Contents

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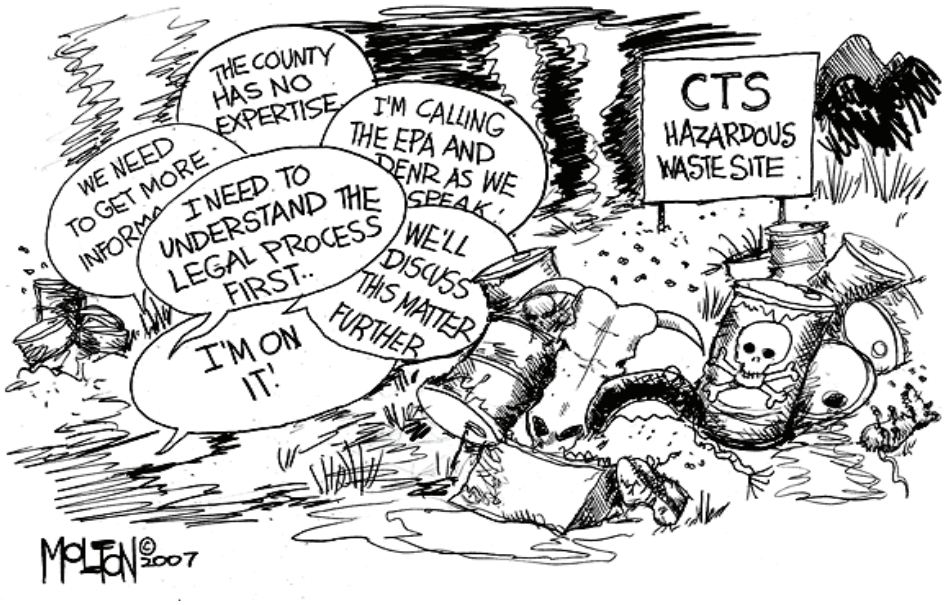
Chapter 1: Introduction



Communities are often faced with "plans" to clean up and monitor hazardous waste sites, spills and other forms of environmental contamination. Eventually, the Environmental Protection Agency (EPA), the state and the responsible parties come to agreement on how they are going to cleanup a contaminated site. You might not like their plan, but you want to make sure you have a say in how the plan is executed. This guidebook is meant to help you get the most out of this process.

The first step in this process is the release of an environmental assessment report. If the site is a federal Superfund site, then this report is called a Remedial Investigation/Feasibility Study (RI/FS). In the case of a Superfund site, there is often a short 30-day comment period. This may or may not be true for non

At CHEJ, we receive calls frequently from local panicked, community leaders who need help deciphering these reports. It's routine for government to give communities highly technical 400-500 page reports and only 30 days to comment. Residents struggle to read, understand and comment within the deadline. They become so rushed, frantic and confused by the report that they almost always focus only on how they will clean up the site and forget about the safety of the community and workers during the actual cleanup (often mentioned only in passing in the report). It's not the community's fault that this issue is rarely discussed. Instead, the blame falls on EPA, the state or the responsible parties who force unreasonable time constraints for community comment and who fail to address this critical issue as part of the cleanup plan.

The time to start thinking about safety plans is as soon as someone agrees to clean up a site. Yes, EPA will tell you that they can't prepare a safety plan until a cleanup plan is selected (after the RI/FS process is complete). And yes, EPA will tell you that they'll do a complete safety plan as part of the design phase of the selected cleanup. But, if you wait until EPA wants you to comment, it may be too late. The time to start thinking about the safety plan is when cleanup options are first being considered. Otherwise, you may end up with a cleanup plan that makes a lot of sense to EPA, but poses too great a risk to your community.

One of the first things you'll hear is "A Good On-Site Plan is a Good Off-Site Plan". If workers aren't exposed, then the community will be protected. This simply isn't true. Workers on-site wear protective clothing and have breathing devices available and, they get away from the site each night when they go home. The residents don't. Further, in case of an accident, you can reasonably expect that the workers will take care of themselves and their fellow workers first. You'll be on your own. Look at what happened at Bhopal, or at the Union Carbide plant in Institute, West Virginia. Delayed or non-existent warnings have had enormous impact on people living in the community surrounding an accidental release. It's impossible and somewhat unreasonable to ask the workers to ignore fellow workers who've been overcome to sound an alarm for the community and then go to the aid of their friends. To avoid these problems, the community needs its own safety plan.

Contaminated sites pose a lot of health and safety concerns, any one of which could result in serious injury or even death. These hazards include chemical exposures, fire and explosions, safety hazards, and exposures to infectious and radioactive wastes. The uncontrolled nature of a waste site makes these hazards all the more dangerous and difficult to manage. Add the uncertainties of what's in the dump and together you have an environment where hazards:

- may pose immediate danger to life or health;
- may not be immediately obvious or identifiable;
- may vary in different parts of the site;
- may change as the site activities proceed.

> You'll also be told that "it can't happen here." You should be insulted when they tell you this. What magic formula do you have at your site that no one else has? Accidents can happen anywhere.

Chapter 2:
Getting Started

"So what steps can you take to reduce the uncertainties and help develop a good safety plan?" Start by looking at what information is available on the chemicals in the site. First, get a list of the chemicals and look at these characteristics of the wastes: Are they explosive, flammable, corrosive, highly volatile or stable? How toxic are they? Are we talking PCBs or saturated fats?

Then ask: "How well do the chemicals travel through groundwater, surface water or soil?" Will they adhere to the soil and thus be carried on dust particles? Will the presence of other chemicals change their behavior? Dioxin, for example, which normally doesn't move in soil at all, will begin to travel if organic solvents like benzene or toluene are present in the soil.

Next, find out how "reactive" the waste is. Will it react to sunlight, water or oxygen? What will-happen if it does react? Dioxin, for example, will slowly degrade in sunlight, while methyl isocyanate (MIC, the chemical that killed hundreds in Bhopal, India) will create a toxic cloud when mixed with air (oxygen). Lastly, find out how the waste was disposed of. Are they in barrels, specialized containers, or were they just emptied into the ground?

The best source for identifying what contamination is present at the site is the Site Environmental Assessment Report. In the case of a Superfund site, this is the Remedial Investigation report. It may not tell you everything you want to know, but it is a great place to start. Once you have a list of the

contaminants at the site, then you want to find out about the physical and chemical properties of these contaminants. This information is not hard to find, especially with the advent of the internet. Workers or labor unions can generally get you one-page fact sheets outlining this information. CHEJ as well as other environmental organizations can also help.

Assessing the Hazards

Once you've determined the types of chemicals present and found out their characteristics, assessing the hazards is next. This is generally done by referring to standard reference sources for data and guidelines on "permissible" levels of exposure, flammability ranges, reactivity, etc.

While standards and guidelines have some general merit, they are not to be considered absolute measures of safety or risk, especially when considering community exposures. They are mostly defined for workers exposed for only 8 hrs/day, 5 days/week. They do not consider constant exposure, 24 hrs/day, 7 days/week; they don't consider exposure to more than one chemical at a time; and they generally don't address more than one type of risk (such as cancer, but not acute liver disease).

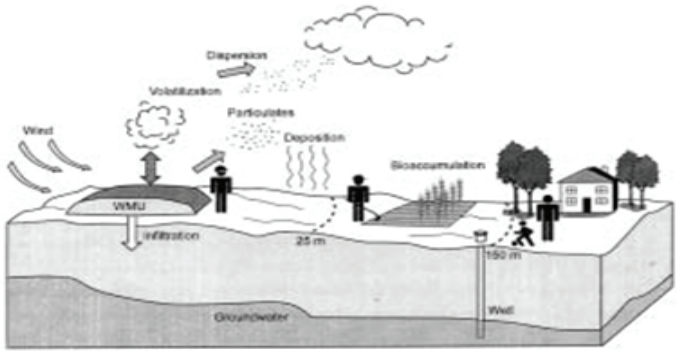
A more simplistic approach is to make sure that all releases of toxic chemicals are avoided, or, if unavoidable, are properly controlled to minimize exposures.

What Type of Problems Could You Run Into?

Lots of things can go wrong during cleanup: chemical releases, explosions when barrels with explosive chemicals are struck, vehicles tracking contamination off-site, dust blown by wind and waste washed off by rain to name but a few. How these and other activities impact the community depends on the ways chemicals can leave the site, or, their "pathways of exposure."

Exposure Pathways

People are exposed to chemicals through four basic routes of exposure – air (breathing), skin absorption (direct contact), consumption (ingesting drinking water or food contaminated by chemicals) or from the mother via the placenta (while a fetus) or from breast milk. The figure below offers a simple visual of these pathways.



The most important pathways are described below.

GENERAL AIR CONTAMINATION. Air contamination from dust, gases and fumes is inevitable if the cleanup plan includes removal or disturbing of contaminated surface soil. Although the levels should never be as high as the examples noted below, they can still be dangerous. A significant problem is continued, low-level air contamination from on-site activities. On-site levels should be at or below workplace standards. But, unless someone is monitoring the air continually, you never know what's coming off the site. Bear in mind though, that workplace standards are totally unacceptable levels and useless in evaluating risks for babies, children, older people, pregnant women and others with health sensitivities who are part of your community. In fact, workers (who are supposed to be safe at these levels) will tell you the levels are much too high, even for them. Air contamination levels on-site should be of the utmost interest to you since that's what you'll be breathing throughout the cleanup, especially if homes, playgrounds or streets are close to the cleanup. Although there's the argument that air will disperse or be diluted by the time it reaches these areas, that doesn't mean the air is healthy to breathe.

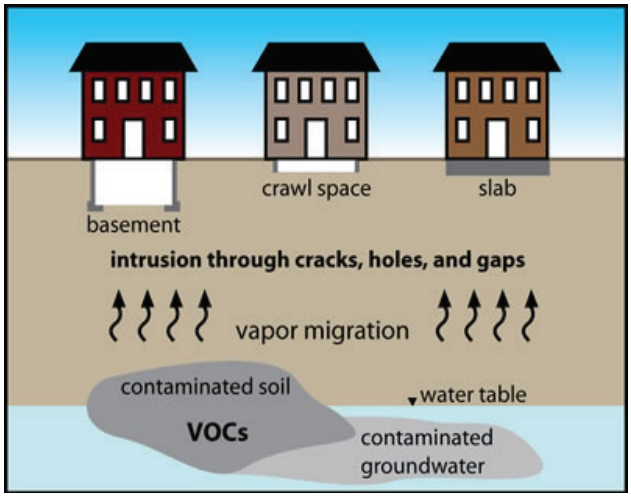
GROUNDWATER. If groundwater is the source of your drinking water, watch out. Besides obvious leakage from a contaminated site, cleanup activities themselves can also cause problems. For example, if tractors, earth movers, or other heavy equipment are being used on-site, their weight can force underground wastes out into groundwater and the surrounding environment. How? The best way to demonstrate this is to take a tube of toothpaste. Open the tube and poke several holes in the side. Then slowly apply pressure on the tube with your hand and watch what happens. It's just like the waste in the dumpsite.

CONTAMINATED SOIL. At all cleanup sites, measures need to be taken to ensure no contamination moves off site. Too often, trucks (many times, uncovered) are allowed to drive on and off a site without being washed down before leaving the site. As a result, significant amounts of contaminated soil are dragged into public streets on truck tires or can fall off the truck, especially if it's not covered. Anyone exposed to this highly contaminated soil, or to generated dust, is at risk.

The most likely route of exposure for contaminated dirt could occur if the cleanup plan calls for excavating and removing contaminated surface soil. For example, if the cleanup plan calls for removing the top 4 feet of contaminated soil. If this is done, any volatile chemicals trapped in the soil will be exposed to the air and they will be released. Similarly, dust will be generated when this is done and this dust will be contaminated. Excavation and removal of contaminated soil will pose the greatest risk to neighboring residents.

VAPOR INTRUSION.

In past 10 years or so, a new route of exposure at contaminated sites has been identified - Vapor Intrusion. This is a process by which volatile organic compounds (VOCs) such as trichloroethylene (TCE), tetrachloroethylene (PCE), and other chlorinated solvents present in groundwater or subsurface soil move from the original source location to nearby homes where they enter through cracks, gaps or pores in soil and building foundations (see figure). These are invisible chemicals that are odorless at the concentrations that pose long-term health risks.



Vapor intrusion has been found to be a major route of chemical exposure at hundreds of sites across the country including Denver, CO, Endicott, NY, and Pompton Lakes, NJ. And at many sites previously considered cleaned up, including the Mountain View Superfund site in CA, regulators have re-opened investigations to evaluate vapor intrusion as a route of exposure. At Hopewell Junction, NY, TCE from a local manufacturing plant contaminated the groundwater that provided drinking water to more than 150 homes. At first, the EPA's investigation focused only on drinking water, but about a year later, the agency begin indoor air testing and discovered vapors from the TCE plume had infiltrated at least 70 homes. EPA has since installed pipe systems under 46 homes to capture vapors coming out of the ground and vent them to the outside air).

Mitigation systems can be installed to prevent vapor intrusion, but these methods are limited and require long-term operation, maintenance, and monitoring. Mitigation should never be seen as a long–term solution to vapor intrusion. Remediation, that is treatment or removal of the sources of contamination, is necessary. In Providence, RI, for example, a new high school was built on a highly contaminated site formerly operated by the Gorham Silver Company. The city designed a state-of-the-art mitigation system that included installing membranes and depressurization systems in the building, but there was no long-term site management plan. Neighborhood activists demanded such a plan, and they are negotiating with state regulators to strengthen requirements for long-term monitoring.

DUST CONTAMINATION. As tractors, backhoes and other equipment go to work, dirt will be disturbed and dust will be generated. Since this dust comes right from polluted soil, it's usually very contaminated. Depending on weather and if the cleanup crew wets down the site, some dust will always travel to the community. Contaminated dust can get into your home, be taken into your body and contaminate surface water.

Many chemicals, including dioxin, can be carried by dust particles. In addition to health risks for children playing outdoors and everyone else who breathes the dust, food supplies can be contaminated. Watch out when eating fruits and vegetables, meat, poultry or milk grown in areas affected by airborne contamination.

EXPLOSION. Sparking explosive or flammable waste could result in a sudden release with no warning sending smoke, debris, contaminated soil or even a toxic cloud into your neighborhood. The extent of damage and danger could be devastating depending on the time of day and weather conditions.

Some possibilities include exposing people living nearby in their homes (even with windows closed), at work, or children playing outdoor; contaminating nearby homes, soil, gardens and surface water. The extent of impact will largely depend on wind, humidity and the intensity of the explosion.

FIRE. Whether it occurs independently or as the result of an explosion, fires can burn uncontrollably for hours or even days. Some sites, like one in Elizabeth City, NJ, burned for moths. Smoke from such fires usually contain toxic chemicals and are very dangerous, blackening the sky, contaminating air, soil, vegetation and waterways in its path. The extent of damage from a fire, like an explosion, is determined by the chemicals in the fire, weather conditions and the intensity of the fire. For example, if it's a very windy day, the smoke will disappear quickly, contaminating a wider area than on a still day. Or, if there's an inversion, the smoke will not move far and will mostly settle over the immediate surrounding area.

TOXIC CLOUD. This is another variation that can result from mixing incompatible chemicals. The hazard associated with this depends on how toxic or poisonous the cloud is plus immediate weather conditions, as discussed above. As in all these situations, those closest to the release are probably in the most danger.

RAINWATER RUNOFF. During moderate to heavy rainfall, rain can mix with chemicals to produce "leachate" Storm sewers will also transport the contamination. Even though these sewers are underground, odors and chemicals can and will evaporate through any surface openings. Further, sewers usually empty into waterways (creeks, rivers, etc.) with no pre-treatment. Thus, the full effect of this route of contamination will end up wherever your local waterway goes.

There's also the sediment (wet dirt) which generally lines the bottom of sewer pipes. This sediment can hold high amounts of certain chemical for years, until they're disturbed or dislodged releasing a "slug" of contamination at the discharge point of the sewer line. This chemical "surprise" could come back to haunt you for years after the cleanup is over. It's also possible, but rare, that the storm sewers could blow up if the right mixture of chemicals were present Finally, leachate run-off seeping into surrounding soil, can contaminate (or further contaminate) both surface and underground drinking water for humans, livestock, as well as irrigation water.

Chapter 3:

Before Construction Begins

Before construction begins, make sure you know what's in the soil where the construction will occur. A safety plan should include a systematic plan to test the ground before work begins.

This was an important part of Love Canal's safety plan. Before any trenches were dug to install a leachate collection system, tests were done along the trench line. This safety measure reduced the risk that the backhoe would hit a barrel or find a chemical "pool" which could be released into the air or worse, blow up. Here are several tests to do before work begins.

1. Conduct a Metal Survey - Determines where metal objects, such as barrels, are buried. However, this has certain limitations. It won't detect barrels or metal objects buried very deeply and won't detect plastic containers.

2. Conduct a Seismic Survey - Determines the make-up of the ground. It can tell you, for example, where the perimeter of the site is, if the site was originally excavated, as is the case with just about all old landfills. It gives you information on where solid, original ground is and where the ground has been filled. It can also tell you where any pits, pipes or underground "holes" may be. These could be filled with liquid chemicals and provide easy routes for contamination to get into your community.

3. Take Test Borings – Test borings are done routinely just about every time anybody does any digging. Utilities do it before laying pipelines; contractors do it before building a house. You should make sure it's done before cleanup begins. Test borings can tell if there are barrels missed by the metal survey, as well as identify other hazards, like highly flammable or toxic chemicals. Borings should be drilled close enough together to give a clear picture of what to expect in the areas to be excavated (typically borings could be every 20 or 40 feet at first, then every 100 feet once the soil conditions are understood). The soil from these borings, as

well as the air from each sample should be tested for chemical levels and toxicity. The metal survey, seismic tests and borings are a critical part of a safety plan. They help prevent surprises that could cause an accident.

When construction begins, here's what should be in place:

1. Most importantly, the community should have discussed, understood and agreed to the safety plan, and, if appropriate, an evacuation plan. A "rehearsal" of the emergency plan is a good idea. The emergency plan will be needed if toxic waste is going to be excavated and removed from the site.

2. The on-site and off-site coordinators should be identified.

3. A written safety plan, with all the features we described, should be printed and disseminated to workers, residents and appropriate officials.

4. A written, long-range schedule available to everyone as well as a weekly schedule or progress report.

5. Training should be completed.

6. The area should be fenced off and posted. There should be only one access point with proper security. The access point should have a clean, staging area, so that contaminants aren't tracked on and off-site. A washing area should also be near the access point to clean all vehicles and equipment leaving the site. The washing area should be designed to drain the water towards the site so no contaminated water runs onto a "clean" area. It's generally best to keep all vehicles and equipment used daily on-site rather than going back and forth each day. There should also be a facility for on-site workers to leave their street clothes when they change into work clothes and a shower to wash off contamination before they get back into their street clothes.

7. All air monitors--on or off-site---should be in the appropriate places and working.

8. All seismic, metal scanning and radioactive testing should be completed with a map showing the test results. In addition, detection equipment for metal and radioactivity should remain on-site and be actively used during construction. Results from these monitors should be written in the weekly progress report and available to everyone, including the community. Test borings should take place before any major excavation is done. Be sure to have bore holes monitored, as this provides important evidence of contamination if present.

9. Weather conditions should be checked and work schedules should be adjusted to reflect adverse weather conditions and forecasts.

10. Lime and charcoal should be on-site and piled close to any excavation. This could be used either for firefighting or to neutralize pockets of chemicals that were encountered. Any other firefighting material or equipment should be in place right from the start. Your needs will vary depending on what's in the site.

11. A berm (retaining wall) should be in place at the trench to avoid waste run-off from overflow or rainfall. In addition, a berm should be placed around the whole construction site to avoid any surface run off into the community.

12. Watch for dust problems. Wetting down the site with water can avoid a lot of on-site dust, but beware of wetting chemicals that react violently to water! Love Canal was a good example of dust contamination… hedges and 25-year old oak trees blocks away died from what residents believed was dioxin-contaminated dust disturbed during the cleanup.

13. All excavated material, open trenches and other "spoils" should be covered at the end of each day. When these areas are to be left for long periods of time, they should be covered even during the day. Volatile chemicals will evaporate into the air even at mild temperatures and certainly when it's hot.

14. At the end of each work week, a weekly report should be written and there should be a regularly scheduled meeting between the on-site and off-site coordinators and community representatives.

Chapter 4:

Key Elements to a Safety Plan

The components of a safety plan depend on the waste in the site, how they were originally disposed of and the type of cleanup action to take place. For example, if the clean up plan calls for excavation and removal, you'll need a much more detailed plan than if they just plan to place a clay cap on the site. Here's a "laundry list" of safety plan provisions that should be considered in any safety plan.

OFF-SITE SAFETY COORDINATOR: This person should coordinate all activities around the cleanup work. This person should have a two-way radio linked to workers on-site from his/her office off-site in case of an emergency. He/she should be able to answer questions for the community while work goes on (such as "what are they doing over there? It stinks!") and know about all activities taking place.

The Safety Coordinator would be responsible for holding a community meeting to help pull together both an on-site and off-site safety plan. People and institutions that should be involved at this stage include emergency response personnel, firefighters, police, hospital, ambulance, Red Cross, United Way, local officials, civil defense, county and state medical society, business owners, school administrators or others responsible for buildings housing a number of people during working hours (such as a nearby senior citizens home). Of course, the community leaders and other interested people who live or work in the area are a must for the meeting.

Since the discussion will revolve around what might or can happen, the meeting should also include those knowledgeable about the contamination at the site. This

meeting should be scheduled well in advance of the first phase of construction to allow time to develop the safety plan.

ON-SITE SAFETY OFFICER: This person watches over all on-site activities. This person should answer questions about present work schedules and give a weekly, written up-date of what was done and what is planned for the following week. This person is responsible for notifying the off-site coordinator and emergency response team of all dangers or problems. He/She "sounds the alarm" for both workers and community in the event of immediate danger.

The safety officer would also make sure workers follow the safety plan and requirements, such as washing contaminated vehicles before they leave the site, spraying to control dust and maintaining separate clean and dirty areas. A more complete list of responsibilities is shown in Appendix A.

LIMIT ACCESS TO THE SITE: This is necessary to keep unauthorized individuals, including small, curious children and animals, from just walking on the site. Children naturally want to watch trucks and tractors, and animals and pets don't know not to run through the area. Protect them from themselves.

Define "clean" and "dirty" areas and make sure the restricted area is clearly identified. The government agency, responsible party and contractors may agree to fence off the area they consider contaminated for cleanup purposes only. This is different than the way you might want the restricted area defined. It's one thing to pinpoint an area for cleanup and certainly necessary to restrict that area. However, it's not the same as saying the area immediately outside of where they put the fence is safe for children to play or livestock to wander. The bottom line is that you want them to fence off and restrict a large enough area for public safety and you want them to lean in the direction of public safety. is a brief overview

Beware: Don't let them simply install a weak fence, like a snow fence or chicken wire. Though this may be temporarily adequate for blowing trash and paper, it (a) won't last and (b) is next to useless at protecting humans and animals. Breeches will develop and children and livestock will get through.

AIR MONITORING: Air monitoring should be done from beginning to end of the cleanup. Air contamination is a serious health hazard that can be monitored by either of the two types of sampling devices - on-line or direct reading devices that give results usually within a matter of minutes and the more sophisticated (and precise) equipment that captures contaminants and requires analysis in a laboratory. It usually takes at least several days before results are available using these devices.

Direct Reading Instruments: One of the most common direct reading devices is the toxic vapor monitor (TMV), sometimes called a "sniffer." The TVM gives an immediate reading of total organic halogens in the air at any given moment. The most common type is the "H Nu" meter. The "sniffer" should be placed right over or next to the area where the digging is going on. This tells workers on-site what's coming off the soil

and into the air where they are working. Workers can then decide if they need to wear protective breathing equipment. Sniffers also provide the first warning of contamination that might lead to giving the community the alert about a dangerous situation. The sniffer should have an automatic alarm, triggered at a certain contamination level. The alarm should be loud enough that everyone near the site can hear it.

There are several limitations to sniffers. They only measure total volatile organics or chemicals that evaporate into the air and only if levels are above 1 part per million (ppm). Concentrations less than 1 ppm are not detected. TVMs do not tell you what specific chemicals are present. Instead they group volatile chemicals together, giving you a total for that group. Also, different detecting probes can be used to measure different chemicals. For example, the probe that measures benzene, toluene and phenol cannot detect methylene chloride, chloroform or dichloromethane.

Air monitors that can tell you specifically what chemicals are in the air should be placed in the surrounding community. This is needed to measure chemical levels that could cause immediate effects as well as long term public health risks. People have a right to know what they are being exposed to and at what level. These monitors, however, don't give an immediate read-out. Instead, you have to wait several days for the for lab results. Thus, you could be exposed to highly toxic chemicals, but not know it and therefore do nothing about it. Unfortunately what you get, mainly, is after-the-fact "proof" of why people got sick or why vegetation died, justifying a radical change in on-site practices to avoid future exposure.

Pay attention to where monitors are placed. It's common sense that they'd be placed where the wind blows, but we've seen enough accidental or deliberate misplacements that you should ASSUME NOTHING! Monitors should be placed strategically, downwind of the work site, to get an accurate reading.

TRAINING PROGRAM: Targeted for workers on-site and in the community, particularly emergency response personnel and firefighters. This program should include what to do in case of an emergency, who's in charge of what and what "rules" apply for people on- and off-site. Training programs teach everyone general safe work practices and clearly define job hazards. It also cuts down on "surprises" and creates a disciplined, serious attitude about what could be very dangerous procedures. Air monitoring devices, fences and evacuation plans are useless unless everyone understands what they're for, how to use them and how to recognize and deal with an emergency.

DECONTAMINATION PROCEDURES: Prevents contaminants that have gotten on equipment and workers from contaminating clean areas, mixing with incompatible chemicals and minimizes contaminant release into the community. The first step in decontamination is to minimize contact with waste and avoid potential contamination.

Specific decontamination procedures include:

- Designate specific "clean" staging areas where materials and supplies can be delivered without coming into contact with contaminated soil.
- Maintain equipment on-site for as long as needed (avoids cleaning equipment more than once).

- Restrict on-site vehicles to reduce spreading toxic contamination beyond the site.
- Clean all vehicles before they leave the site.
- Maintain strict site control measures, making and posting maps that show "clean" and "dirty" areas.
- Clearly defining actions to be taken to mitigate hazards and respond to accidents which may occur.

RADIATION MONITORING: It's important to check for radiation, even if there's no history of this type of waste being dumped. Since radioactive materials must be cleaned up and disposed of differently than chemical waste, and pose different hazards, residents and workers alike need to know if it's present.

At the Stringfellow Acid Pits in California, cleanup was well underway and waste was moved off-site before anyone bothered to test for radioactivity. When they finally did, they found very high levels. The waste had to be brought back to Stringfellow because the site where it had been dumped had no permit for radioactive waste. Needless to say, everyone was pretty angry and upset. All of this could have been avoided by measuring for radioactivity. Though you may not expect to find this at your site, discoveries of illegal radioactive waste dumping happen often.

TEMPORARY EVACUATION PLAN: For sensitive people such as children, the elderly or people with respiratory problems that could be aggravated by even small exposures. This would allow these people, and others where appropriate, to leave the impacted area during critical times of excavation or in the event of an accident. Procedures for how these people would leave would be clearly spelt out.

MONITORING WEATHER CONDITIONS: All kinds of bad weather like wind, hurricanes and tornados can make a site a whole lot more dangerous than it already is. Less dramatic weather problems, like air inversions, can make contamination sit on and around the site and not disperse. Instead of assuming that weather is being monitored, ask what specific weather conditions are being monitored and what specific actions are planned to adjust to both normal seasonal weather changes and unusual weather conditions.

OTHER KEY INGREDIENTS OF A GOOD SAFETY PLAN:

Appendix B includes a long list of questions you should consider when developing a safety plan for the cleanup of a contaminated site. Here are a few examples:

- Name key personnel and assignments of all safety responsibilities
- List and describe protective clothing to be worn by workers
- Establish a medical surveillance program to monitor the health of the workers and community residents, if necessary.

Chapter 5:
Summary and Conclusion

You need a good safety plan for your community as well as the workers on-site. Emphasize to those proposing cleanup options that a safety plan to protect the community is important and should be considered part of the remedial selection process. In fact, a cleanup plan should never be adopted without addressing safety questions. Fight for a safety plan before any construction begins. Compare the proposed safety plan with many of the measures raised here. Take nothing for granted, expect the unexpected. Make sure every reasonable fear and concern is addressed. How good your safety plan will be will depend on you. It's up to you to make sure that the safeguards raised here are included. Remember the old saying "an ounce of prevention is worth a pound of cure."

Appendix A

Responsibilities of the On-Site Safety Officer

The on-site safety officer advises the Project Team Leader on all aspects of health and safety on site. He/She has the authority to stop work if any operation threatens worker or public health and safety.

- Selects protective clothing and equipment
- Periodically inspects protective clothing and equipment
- Ensures that protective clothing and equipment are properly stored and maintained.
- Controls entry and exit at the Access Control Point(s).
- Coordinates safety and health program activities.
- Confirms each team member's suitability for work based on a physical exam and a physician's recommendation.
- Monitors the work parties for signs of stress, such as cold exposure, heat stress, and fatigue.
- Monitors on-site hazards and conditions.
- Participates in the preparation of and implements the Site Safety Plan.
- Conducts periodic inspections to determine if the Site Safety Plan is being followed.
- Enforces the "buddy" system.
- Knows emergency procedures, evacuation routes, and the telephone numbers of the ambulance, local hospital, poison control center, fire department, and police department.
- Notifies, when necessary, local public emergency officials.
- Coordinates emergency medical care.
- Communicate with key leaders in the community.

Appendix B

Questions to Raise When Developing an Emergency Response Plan as Part of a Safety Plan

This appendix includes a series of questions about emergency planning that provides a preliminary framework that can be further developed for use in preparing an enhanced emergency plan and response system. These questions address accident assessment, communications and control, warnings, protective actions, emergency relief, and emergency preparedness.

ACCIDENT ASSESSMENT

How long will it take to recognize the nature of the accident?

Does the emergency plan address detection systems for recognizing an accident?

How long will it take to identify the source of the exposure?

How will data on emissions be collected?

Do emergency planning procedures document what and how data will be collected for releases?

How will exposures be estimated?

What meteorological data will be collected?

What dispersion model will be used?

How long will it take to obtain first projections of exposure?

How will estimates be verified and concentrations monitored?

What provisions are made for collecting real-time data on plume dispersion on-site and off- site?

COMMUNICATIONS AND CONTROL

Who will be notified of the emergency?

Do the plans identify a list of on-site and off-site notifications? Do the plans identify back-up notifications?

What information will be transmitted?

What means of communication will be used?

Are the means of primary communications documented for on-site and off-site use?

What back-up communications equipment will be available?

Are the means of back-up communications documented for on-site and off-site use?

ON-SITE AND OFF-SITE EMERGENCY RELIEF

What medical resources will be needed and available?

Does the plan provide estimates of needed medical resources given the various accident scenarios for both on-site and off-site uses?

Have agreements to use public resources been made?

What medical facilities will be available?

Does the plan address the availability of off-site facilities and capacities?

How will the nonfatally injured be transported to facilities?

Does the plan address the adequacy of available vehicles for transporting victims?

How will decontamination be handled?

Does the plan address the resources needed for decontamination?

What evacuation centers will be established?

Does the plan address the availability of relocation centers for on- site personnel and residents?

What emergency supplies (e.g., food, water) will be available?

Does the plan address the availability of emergency supplies?

What will be done to monitor food and water supplies?

Does the plan address how environmental systems will be monitored for contamination?

How will search and rescue services be provided?

Does the plan address how search and rescue activities will be implemented?

Does the plan address the availability of personnel and resources for search and rescue?

What will be done to maintain law enforcement?

Does the plan address security and law enforcement after an emergency?

How will body recovery be handled?

Does the plan address how this task will be performed?

How will re-entry decisions be handled?

Does the plan address the procedures for re-entry to locations that have been contami nated?

EMERGENCY PREPAREDNESS

What emergency plans will have been prepared? Are emergency plans well organized and usable? Are on-site and off-site plans consistent?

How will emergency personnel be trained?

Have emergency personnel been trained?

How will response systems be tested and exercised?

How often have exercises been conducted and what has been exercised?

How will equipment be maintained?

Is emergency equipment adequate?

What education will be provided to the public?

Has information been given to the public to foster the best possible emergency response?

What emergency operations centers (EOCs) will be established?

Have primary and back-up EOCs been established both on-site and offsite?

Have provisions been made for relocation?

Who is in charge?

Does the plan clearly define the line of command?

How will on-site and off-site response be coordinated?

Does the plan define lines of communication and responsibilities between on-site and off-site organizations?

How will emergency planning zones be delineated?

Are emergency planning zones identified in the plan?

WARNINGS

Who will decide to warn?

Does the plan identify who will make the decision to issue a warning?

How will warnings be communicated?

Does the plan identify the way in which warnings will be disseminated?

Does the plan identify who is responsible for disseminating warnings?

Can the warning system reach all of those at risk?

What will be the contents of the warnings?

Have messages been prepared?

Do they meet the criteria of a good message?

How will rumors be controlled?

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